LTRC Annual Research Program

Fiscal Year July 1, 2016 - June 30, 2017

FHWA Part II SPR Research Program
FAP Number SPR-0010(34)
&
FHWA Funded Research Program
&
FHWA LTAP Funded Program
&
FHWA STP Funded Program
&
Federal
&
Self-Generated Funded Research Program
&
Other DOTD Funded Projects

Conducted by:
Louisiana Department of Transportation and Development
Louisiana Transportation Research Center

In cooperation with
United States Department of Transportation Federal Highway Administration
June 2016

LOUISIANA TRANSPORTATION RESEARCH CENTER
LTRC

Research, Technology Transfer, Education & Training

DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

May 13, 2016

Mr. Charles W. Bolinger
Division Administrator
Federal Highway Administration
5304 Flanders Drive, Suite A
Baton Rouge, Louisiana 70808

Attention: Ms. Mary Stringfellow

RE: FY 2016-2017 Louisiana Transportation Research Center Work Program

Dear Mr. Bolinger:

Enclosed please find the FY 2016-2017 Louisiana Transportation Research Center (LTRC) Annual Work Program for your review and approval. You will note that the program is divided into multiple sections reflecting all funding sources.

As delegated by the Secretary, Louisiana Department of Transportation and Development (LADOTD), I, Samuel B. Cooper, Jr., Director, Louisiana Transportation Research Center, of the State of Louisiana, 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.

If I can provide additional information, please advise.

Sincerely,

Samuel B. Cooper, Jr., P.E., Ph.D.
Director

Enclosure
c: Ms. Janice Williams
Mr. Tyson Rupnow
Mr. Brandon Buchner

U.S. Department of Transportation
Federal Highway Administration

Louisiana Division Office

5304 Flanders Drive, Suite A
Baton Rouge, LA 70808
225.757.7600
225.757.7601 (fax)

June 29, 2016

In Reply Refer To:
HDA-LA

Shawn D. Wilson, Ph.D.
Secretary
Louisiana Department of Transportation
and Development
Baton Rouge, LA

Subject: FY 2016-2017 State Planning & Research (SPR) Work Program Part II

Attention: Eric Kalivoda
Deputy Secretary, LDOTD

Dear Mr. Wilson:

This letter is in response to Mr. Sam Cooper's letter, regarding the review and approval of the FY 2016-2017 SPR Work Program Part II. We have reviewed the subject work program and find it to be satisfactory. Please furnish this office with three copies of the final printed work program.

A separate request from your federal-aid section will be required to process the fiscal documents necessary to obligate the SPR funds.

Should you have any questions regarding this matter, please feel free to contact Mr. Brandon Buckner, FHWA at (225) 757-7622.

Sincerely yours,

Date: 2016.06.30
08:11:46 -05'00'

Charles W. Bolinger
Division Administrator

cc: Tyson Rupnow, LDOTD

Abbreviations and Acronyms

Funding

SPR	State Planning and Research
NCHRP	National Cooperative Highway Research Program
TRB	Transportation Research Board
IBRD	Innovative Bridge Research Deployment
LTAP	Local Technical Assistance Program
STP	State Transportation Program
NSF	National Science Foundation
TT-Fed	Transportation Trust – Federal
TT-State	Transportation Trust – State

Project Types

ADM	Administrative
RS	Research Support
GT	Geotechnical
P	Pavements
B	Bituminous
SA	Safety
SS	Special Studies
C	Concrete
ST	Structures
TT	Technology Transfer
LTAP	Local Technical Assistance Program
PF	Pooled Fund (Louisiana Lead)

Project Status

A	Active
P	Proposed
RFP	Request for Proposal

Table of Contents

FHWA SPR Work Program

Part II

FAP Number SPR-0010(34)

FHWA Funding

SPR Research Budget Recap	Total
Administrative Budget	$747,949
Research Support Studies Budget	$1,772,000
Active Studies Budget	$4,127.131
Proposed Studies Budget	$3,494,641
Pooled Fund Lead State Studies Budget	$211,513
Total SPR Budget	**$10,353,234**

SPR External Collaboration Budget Recap	Total
TRB Correlations	$134,316
NCHRP	$759,500
Total SPR External Collaboration Budget	**$893,816**

LTAP Budget Recap	Total
LTAP	$570,644
LTAP Program Total	**$570,644**

STP: Technology Transfer Program Budget Recap	Total
Technology Transfer Program and Operations	$1,258,875
Workforce Development Program	$5,787,145
Student Support Programs	$210,000
Total STP Budget	**$7,256,020**

STP: Technology Transfer Program to be funded from apportioned funds (NHPP, STP, HSIP, and/or CMAQ)

Federal Funding

Federal Budget Recap	Total
Active Studies Budget	$0
Proposed Studies Budget	$1,500,000
Total Federal Budget	**$1,500,000**

Self-Generated Funding

Self-Generated Budget Recap	Total
Active Studies Budget	$61,520
Proposed Studies Budget	$0
Total Self-Generated Budget	**$61,520**

Other DOTD Sections Funding

Other DOTD Sections Budget Recap	Total
Active Studies Budget	$797,509
Proposed Studies Budget	$438,440
Total Other DOTD Sections Budget	**$1,235,949**

LTRC ANNUAL RESEARCH PROGRAM

Administrative

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Administrative													
SPR: TT-Fed/TT-Reg	P	ADM	DOTLT1000125	17-1PM	$747,949	$748,000	LTRC	Tyson Rupnow	Program Management	7/1/2016	6/30/2017		C-2
					$747,949	**$748,000**	**ADMINISTRATIVE BUDGET TOTALS**						
Project Type: Research Support													
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000128	17-1TTRI	$425,000	$425,000	LTRC	Tyson Rupnow	Technology Transfer and Research Implementation	7/1/2016	6/30/2017		C-3
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000131	17-1TRS	$400,000	$400,000	LTRC	Tyson Rupnow	Technical Research Surveillance	7/1/2016	6/30/2017		C-5
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000127	17-1TA	$370,000	$370,000	LTRC	Tyson Rupnow	Technical Assistance	7/1/2016	6/30/2017		C-6
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000132	17-1SSR	$100,000	$100,000	DOTD	Tyson Rupnow	DOTD Staff Support for Research	7/1/2016	6/30/2017		C-8
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000130	17-1NPE	$72,000	$72,000	LTRC	Tyson Rupnow	New Products Evaluation	7/1/2016	6/30/2017		C-9
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000126	17-1LFT	$30,000	$30,000	LTRC	Tyson Rupnow	Research Laboratory and Field Test Support	7/1/2016	6/30/2017		C-10
SPR: TT-Fed/TT-Reg	P	RS	DOTLT1000129	17-1EQM	$375,000	$375,000	LTRC	Tyson Rupnow	Equipment Management	7/1/2016	6/30/2017		C-11
					$1,772,000	**$1,772,000**	**RESEARCH SUPPORT BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Geotechnical													
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000112	16-6GT	$193,000	$476,813	LTRC	Murad Abu-Farsakh	Incorporating the Site Variability and Laboratory/In-situ Testing Variability of Soil Properties in Geotechnical Engineering Design	7/1/2016		12/31/2018	C-13
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000094	16-5GT	$30,000	$49,999	LTU	Sanjay Tewari	Corrosion Map for Metal Pipes in Coastal Louisiana	1/25/2016	4/25/2017		C-14
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000049	15-2GT	$16,800	$48,493	LSU	Mostafa Elseifi	Lime Utilization in the Laboratory, Field, and Design of Pavement Layers	2/16/2015	2/15/2016	7/31/2016	C-15
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000048	15-1GT	$50,000	$200,000	Dataforensics, LLC	Scott Deaton	pLog Enterprise - Enterprise GIS-Based Geotechnical Data Management System Enhancements	7/31/2015	8/1/2017		C-16
SPR: TT-Fed/TT-Reg	A	GT	30001220	13-7GT	$9,217	$90,000	LTRC	Murad Abu-Farsakh	Support Study to ITRS proposal on "An Integrated Computational and Experimental Study of Pile Setup in Soft Clays"	2/18/2013	2/17/2016	6/30/2017	C-17
SPR: TT-Fed/TT-Reg	A	GT	30000981	13-5GT	$54,895	$302,200	LTRC	Murad Abu-Farsakh	Monitoring of In-Service Geosynthetic Reinforced Soil (GRS) Bridge Abutments in Louisiana	10/1/2014	9/30/2016		C-18
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000103	13-3GT	$82,160	$260,368	LTRC	Murad Abu-Farsakh	Finite Element Analysis of the Lateral Load Test on Battered Pile Group at I-10 Twin Span Bridge	3/1/2016		5/31/2018	C-20
SPR: TT-Fed/TT-Reg	A	GT	30000135	11-3GT	$37,398	$656,370	LTRC	Murad Abu-Farsakh	Accelerated Load Testing of Geosynthetic Base Reinforced Pavement Test Sections	12/1/2010	5/31/2012	6/30/2016	C-22
SPR: TT-Fed/TT-Reg	A	GT	30000661	11-1GT	$41,523	$354,679	LTRC	Murad Abu-Farsakh	In Situ Evaluation of Design Parameters and Procedures for Cementitiously Treated Weak	3/18/2013	9/17/2015	12/31/2016	C-23
SPR: TT-Fed/TT-Reg	A	GT	30000111	10-1GERL	$224,051	$13,991,168	LTRC	Murad Abu-Farsakh	LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)	7/1/2010	6/30/2015	6/30/2018	C-25
					$739,044	**$16,430,090**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Pavements													
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000107	16-6P	$94,500	$170,588	LTRC	Zhong Wu	Quality Management of Cracking Distress Survey in Flexible Pavements Using LTRC Digital Highway Data Vehicle	4/1/2016	3/31/2018		C-26
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000009	14-2P	$82,000	$170,213	LSU	Mostafa Elseifi	Assessment of Structural Capacity Indicators from Rolling Wheel Deflectometer Data Collection in Louisiana	7/1/2014	12/31/2015	6/30/2017	C-27
SPR: TT-Fed/TT-Reg	A	P	30000682	12-7P	$8,200	$476,270	LTRC	Zhong Wu	Roller Compacted Concrete Over Soil Cement Under Accelerated Loading	5/1/2012	4/30/2014	7/31/2016	C-28
SPR: TT-Fed/TT-Reg	A	P	30000729	12-3P	$58,500	$275,773	LTRC	Zhong Wu	Minimizing Shrinkage Cracking in Cement-Stabilized Bases Through Micro-Cracking	11/1/2012	4/30/2016	10/31/2017	C-29
SPR: TT-Fed/TT-Reg	A	P	30000425	12-2P	$90,414	$529,685	LTRC	Kevin Gaspard	Assessment of Environmental, Seasonal and Regional Variations in Pavement Base and Subgrade Properties	9/1/2011	8/31/2013	6/30/2018	C-30
SPR: TT-Fed/TT-Reg	A	P	30000607	12-1P	$81,279	$341,459	LTRC	Kevin Gaspard	Assessment of Pavement Distresses caused by Trees on Rural Highway	2/1/2012	7/1/2014	6/30/2018	C-31

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
SPR: TT-Fed/TT-Reg	A	P	30000610	12-11P	$24,297	$287,799	LTRC	Mark Martinez	Field Validation of Equivalent Modulus for Stabilized Subgrade Layer	5/1/2012	4/30/2014	5/1/2017	C-32
SPR: TT-Fed/TT-Reg	A	P	30000141	10-1ALF	$662,000	$16,682,103	LTRC	Zhong Wu	Management and Operation of the Pavement Research Facility	7/1/2009	6/30/2015	6/30/2018	C-33
					$1,101,190	**$18,933,890**	**PAVEMENTS BUDGET TOTALS**						
Project Type: Bituminous													
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000095	16-4B	$55,500	$85,797	LTRC	Samuel Cooper, III	Evaluation of Non-SBS Modified Binders using the Multiple Stress Creep Recovery Test	9/30/2015	9/30/2016	11/30/2016	C-34
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000059	15-2B	$93,400	$160,866	LSU	William Daly	Support Study for Evaluation of Crumb Rubber Modification of Louisiana Mixtures	4/15/2015	7/14/2017		C-35
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000054	15-1B	$61,500	$186,408	LTRC	Samuel Cooper, III	Evaluation of Crumb Rubber Modification of Louisiana Mixtures	4/15/2015	4/14/2017		C-36
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000008	14-1B	$65,000	$352,662	LTRC	Louay Mohammad	Effects of Temperature Segregation on the Quality of Asphalt Mixtures	8/5/2014	8/4/2016		C-37
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000007	12-1B	$50,000	$219,476	LTRC	Louay Mohammad	Evaluation Of Asphalt Mixtures Containing Recycled Asphalt Shingles	4/8/2014	4/7/2016	4/7/2017	C-39
SPR: TT-Fed/TT-Reg	A	B	30000112	10-1EMCRF	$143,000	$14,801,811	LTRC	Louay Mohammad	Pavement Materials Research Using Special Equipment at the Engineering Materials Characterization Research Facility	7/1/2009	6/30/2015	6/30/2018	C-41
					$468,400	**$15,807,020**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Structures													
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000043	15-3ST	$90,000	$150,000	West Virginia University	Hota-WVU GangaRao	Rehabilitation of Deteriorated Timber Piles using Fiber Reinforced Polymer (FRP) Composites	8/3/2015	8/2/2017		C-42
SPR: TT-Fed/TT-Reg	A	ST	30001123	13-2ST	$60,000	$172,209	LSU	Steve Cai	Live Load Monitoring of the I-10 Twin Span Bridge	8/4/2014	8/3/2016		C-43
					$150,000	**$322,209**	**STRUCTURES BUDGET TOTALS**						
Project Type: Special Studies													
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000046	15-2SS	$76,600	$152,922	LTRC	Kirk Zeringue	Cost and Time Benefits for using Subsurface Utility Engineering in Louisiana	1/28/2016	6/30/2016	1/28/2018	C-44
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000104	14-3SS	$116,307	$233,614	LTRC	Chester Wilmot	Development of a Mode Choice Model to Estimate Evacuation Transit Demand	3/1/2016		2/28/2018	C-45
SPR: TT-Fed/TT-Reg	A	SS	30000140	10-6SS	$178,285	$704,983	LSU	Julius Codjoe	Establishing an Intelligent Transportation Systems (ITS) Lab at LTRC (Phase II)	8/20/2010	11/19/2011	6/30/2018	C-46
SPR: TT-Fed/TT-Reg	A	SS	30000125	10-1PLAN	$528,401	$6,977,821	LTRC	Chester Wilmot	LTRC Proposal for the Support of Research and Development in Transportation Planning	7/1/2010	6/30/2015	6/30/2018	C-48
					$899,593	**$8,069,340**	**SPECIAL STUDIES BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Concrete													
SPR: TT-Fed/TT-Reg	A	C	30001663	14-4C	$125,000	$269,183	LTRC	Tyson Rupnow	Evaluation of Bonded Concrete Overlays over Asphalt under Accelerated Loading	4/8/2014	4/7/2016	12/31/2017	C-49
					$125,000	**$269,183**	**CONCRETE BUDGET TOTALS**						
Project Type: Other													
SPR: TT-Fed/TT-Reg	A	Other	30000169	11-1AD	$270,000	$2,780,222	LTRC	Vijaya Gopu	Administration of LTRC External Funding Programs	1/1/2008	6/30/2009	6/30/2018	C-50
					$270,000	**$2,780,222**	**CONCRETE BUDGET TOTALS**						
Project Type: Safety													
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000110	16-3SA	$95,114	$155,114	LTRC	Julius Codjoe	Evaluating Cell Phone Data for AADT Estimation	5/1/2016	12/31/2016	7/31/2017	C-51
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000087	15-3SA	$80,000	$129,876	ULL	Xiaoduan Sun	Investigating Safety Impacts of Centerline Rumble Strip, Lane Conversion, Roundabout and J-turn Features on Louisiana Highways	5/1/2015	4/7/2016	4/30/2017	C-52
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000088	15-2SA	$42,000	$149,865	LSU	Sherif Ishak	Development of a Simulation Test Bed for Connected Vehicles using the LSU Driving Simulator	6/1/2015	5/30/2017		C-53
SPR: TT-Fed/TT-Reg	A	SA	DOTL1000053	15-1SA	$53,000	$124,321	LSU	Sherif Ishak	Exploring Naturalistic Driving Data for Distracted Driving Measures	2/16/2015	8/15/2016	2/15/2017	C-54
SPR: TT-Fed/TT-Reg	A	SA	30001501	12-1SA	$103,790	$250,000	LTRC	Dortha Cummins	Louisiana Center for Transportation Safety	7/1/2014	12/31/2017		C-55
					$373,904	**$809,176**	**SAFETY BUDGET TOTALS**						
					$4,127,131	**$63,421,130**	**SPR: TT-FED/TT-REG ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Geotechnical													
SPR: TT-Fed/TT-Reg	P	GT	DOTLT1000097	16-1GT	$85,000	$85,000			LADOTD Geotechnical Design Manual	7/1/2016			C-57
SPR: TT-Fed/TT-Reg	P	GT			$90,000	$180,000			Data Collection and Analysis of Driven Pile Behavior within Pre-bored Soil	8/1/2016	6/30/2018		C-59
SPR: TT-Fed/TT-Reg	P	GT			$48,146	$250,000	LTRC	Murad Abu-Farsakh	Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling	9/1/2016			C-60
SPR: TT-Fed/TT-Reg	P	GT			$110,600	$250,000	LTRC	Murad Abu-Farsakh	Development of Software Solutions for Pile Design in Louisiana	7/1/2016			C-62
SPR: TT-Fed/TT-Reg	P	GT			$31,545	$100,000	LTRC		Quality Control/Assurance on Base Course and Embankment with the Dynamic Cone Penetrometer	7/1/2016			C-64
SPR: TT-Fed/TT-Reg	P	GT			$34,500	$40,000	LTRC	Murad Abu-Farsakh	Develop a Synthesis on the Application Of PCPT Technology for Geotechnical Engineering Design	9/1/2016	8/31/2017		C-65
SPR: TT-Fed/TT-Reg	P	GT			$69,494	$150,000	LTRC	Murad Abu-Farsakh	Implementation of Pile Set-up Analytical Models in Design	7/1/2016	6/30/2017		C-66
					$469,285	**$1,055,000**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Pavements													
SPR: TT-Fed/TT-Reg	P	P	DOTLT1000089	16-5P	$100,000	$200,000		Mohammad Khattak	Cost Effectiveness of Mitigating Reflective Cracking when Asphalt Surface Treatment Interlayers are Utilized on Soil Cement Base Courses	7/1/2016	6/30/2018		C-67
SPR: TT-Fed/TT-Reg	P	P			$82,528	$82,528	LTRC	Mark Martinez	Implementation of a Localized Roughness Specification for use on Louisiana Bridges				C-68
SPR: TT-Fed/TT-Reg	P	P			$36,954	$36,954	LTRC		Development and Implementation of a Shadow Specification that utilizes the Localized Roughness Index (LRI) to Locate Bumps on Louisiana Highways				C-69
SPR: TT-Fed/TT-Reg	P	P			$90,000	$180,000			Improving the Use of Crack Sealing to Asphalt Pavement in Louisiana	8/1/2016	7/31/2018		C-70
SPR: TT-Fed/TT-Reg	P	P		16-2P	$67,600	$125,000	LTRC	Zhong Wu	Transportation Infrastructure Asset Damage Cost Recovery Correlated with Shale Gas/Oil Recovery Operations in Louisiana				C-71
					$377,082	**$624,482**	**PAVEMENTS BUDGET TOTALS**						
Project Type: Bituminous													
SPR: TT-Fed/TT-Reg	P	B			$116,500	$233,000	LTRC	Louay Mohammad	Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures	7/1/2016	6/30/2018		C-72
SPR: TT-Fed/TT-Reg	P	B			$71,000	$143,000	LTRC	David Mata	Development of a 4.75mm Asphalt Mixture Design	7/5/2016	7/5/2018		C-73
SPR: TT-Fed/TT-Reg	P	B			$110,000	$220,000	LTRC	Louay Mohammad	Develop a Fracture Mechanic Based Test for the Evaluation of Moisture Sensitivity in Asphalt Mixtures				C-74

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
SPR: TT-Fed/TT-Reg	P	B			$131,000	$234,000	LTRC	Louay Mohammad	Develop a Cost Effective Perpetual Pavement Design	7/1/2016	6/30/2018		C-75
SPR: TT-Fed/TT-Reg	P	B			$95,000	$190,000	LTRC	Louay Mohammad	Evaluation of Non-destructive Test Methods for Asphalt Pavement Density Measurements	7/5/2016	7/5/2018		C-76
SPR: TT-Fed/TT-Reg	P	B			$100,000	$200,000			Field Implementation of Handheld FTIR Spectrometer for Polymer Content Determination and for Quality Control of RAP Mixtures	7/5/2016	7/5/2018		C-77
					$623,500	**$1,220,000**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Structures													
SPR: TT-Fed/TT-Reg	P	ST	DOTLT1000099	16-1ST	$21,000	$169,172			Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems	10/1/2015			C-78
SPR: TT-Fed/TT-Reg	P	ST			$252,886	$264,484	LSU	Ayman Okeil	Live Load Rating of Cast-In-Place Concrete Box Culverts in Louisiana	5/2/2016	7/31/2017		C-79
					$273,886	**$433,656**	**STRUCTURES BUDGET TOTALS**						
Project Type: Special Studies													
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$75,000	LTRC	Julius Codjoe	Evaluating the Effectiveness of Regulatory and Warning Signs on Driver Behavior near Highway/Rail crossings	7/1/2016	6/30/2017		C-80
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$75,000			Dredging Louisiana's Ports	9/1/2015			C-81
SPR: TT-Fed/TT-Reg	P	SS			$90,000	$125,000			Louisiana Trip Generation Manual	8/1/2016	1/31/2018		C-82
SPR: TT-Fed/TT-Reg	P	SS			$90,000	$125,000			Louisiana Highway Construction Work Zone Mobility Impact Assessment Tool	9/1/2015			C-83
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$125,000			Evaluation and Guidance of Planning-Level Cost Estimation	9/1/2016	2/28/2018		C-84
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$200,000	LSU	Chester Wilmot	Highway Evacuation Modeling Package	9/1/2016	8/31/2018		C-86
					$480,000	**$725,000**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Concrete													
SPR: TT-Fed/TT-Reg	P	C		16-1C	$112,656	$165,312	LTRC	Amar Raghavendra	Radio-frequency Identification (RFID) Tagging for Material Tracking and Future Asset Management	5/1/2016	4/30/2018		C-87
SPR: TT-Fed/TT-Reg	P	C			$33,000	$250,000	LTRC	Amar Raghavendra	Evaluation of CFRCP: Phase II Accelerated Loading	7/1/2016	6/30/2018		C-88
SPR: TT-Fed/TT-Reg	P	C			$47,000	$100,000	LTRC	Amar Raghavendra	Development of Prediction Models and Design Guides for RCC Pavements	7/1/2016	6/30/2018		C-89
SPR: TT-Fed/TT-Reg	P	C			$30,000	$30,000	LTRC	Zachary Collier	Feasibility and Advantages of Acceptance of Concrete Beyond 28 Days	7/1/2016	6/30/2017		C-90
SPR: TT-Fed/TT-Reg	P	C			$40,894	$40,894	LTRC	Zachary Collier	Reliable Early Opening Strength for Concrete Pavements and Patch Work	7/1/2016	6/30/2017		C-91
SPR: TT-Fed/TT-Reg	P	C			$500,000	$600,000	LTRC	Amar Raghavendra	Effect of Clay Content on Alkali-Carbonate Reactive (ACR) Dolomitic Limestone	7/1/2016	6/29/2018		C-92
					$763,550	**$1,186,206**	**CONCRETE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Other													
SPR: TT-Fed/TT-Reg	P	Other			$50,000	$150,000	LTRC	Louay Mohammad	Establishment of the Center for Sustainable Pavement Materials and Technologies	7/1/2016	6/30/2018		C-93
					$50,000	**$150,000**	**OTHER BUDGET TOTALS**						
Project Type: Safety													
SPR: TT-Fed/TT-Reg	P	SA		16-5SA	$151,232	$280,900	LSU	Sherif Ishak	A State-of-the-Art Virtual Environment for Highway Work Zone Construction Safety Research, and Training	4/1/2016	9/30/2018		C-95
SPR: TT-Fed/TT-Reg	P	SA		16-4SA	$100,000	$150,000			Pedestrians and Bicyclists Count	1/18/2016			C-96
SPR: TT-Fed/TT-Reg	P	SA		16-1SA	$56,148	$112,300	LSU	Helmut Schneider	Highway Construction Work Zone Safety Performance and Improvement in Louisiana	9/1/2015	4/30/2018		C-97
					$307,380	**$543,200**	**SAFETY BUDGET TOTALS**						
Project Type: TIRE													
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000139	17-5TIRE	$29,968	$29,968	ULL		Failure Prevention for Sensitized Structural Alloys used in Coastal Transportation	7/1/2016	6/30/2017		C-98
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000138	17-4TIRE	$30,000	$30,000	LSU		A Data-driven Framework for Damage Diagnosis and Prognosis of Coastal Bridges	7/1/2016	6/30/2017		C-99
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000137	17-3TIRE	$29,990	$29,990	ULL		Design and Investigation of a Fuel-Flexible Injection System for Low-Emission Vehicles	7/1/2016	6/30/2017		C-100
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000136	17-2TIRE	$30,000	$30,000	LSU	Supratik Mukhopadhyay	Drones for Automatic Pothole Detection and Road Construction Monitoring	7/1/2016	6/30/2017		C-101
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000135	17-1TIRE	$30,000	$30,000	LSU		Advanced Modeling of Piezocone Penetration Test Using Cavity Expansion Theory and Interpretation Simulator Development	7/1/2016	6/30/2017		C-102
					$149,958	**$149,958**	**TIRE BUDGET TOTALS**						
					$3,494,641	**$6,087,502**	**SPR: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: Pooled Fund: TT-Fed

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	PageNo.
Project Type: Pooled Fund													
SPR: Pooled Fund: TT-Fed	A	PF	DOTLT1000090	16-1PF	$78,400	$150,000	West Virginia University	Yoojung Yoon	Development of a Guidebook for Determining the Value of Research Results	1/4/2016	3/30/2017	1/3/2018	C-104
SPR: Pooled Fund: TT-Fed	A	PF	DOTLT1000057	15-1PF	$23,113	$91,953	Oklahoma State	Joshua Li	Prep-ME Software Implementation and Enhancement	8/1/2015	12/31/2016	10/31/2016	C-105
SPR: Pooled Fund: TT-Fed	A	PF	DOTLT1000002	14-5PF	$100,000	$306,812	LTRC	Louay Mohammad	Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents and/or RAS	11/1/2014	10/31/2017		C-107
SPR: Pooled Fund: TT-Fed	A	PF	30000281	09-1PF	$10,000	$300,000	LTRC	Tyson Rupnow	Southeast Transportation Consortium	9/1/2009	8/30/2012	8/30/2018	C-109
					$211,513	**$848,765**	**SPR: POOLED FUND: TT-FED ACTIVE BUDGET TOTALS**						
					$211,513	**$848,765**	**POOLED FUND BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

LTAP: TT-Fed/TT-Reg

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: LTAP													
LTAP: TT-Fed/TT-Reg	P	LTAP	DOTDLT10 00114	17-LTAP	$570,644	$570,644	LTRC	Marie Walsh	Local Technical Assistance Program (LTAP)	1/1/2016	12/31/2017		D-2
					$570,644	**$570,644**	**LTAP BUDGET TOTALS**						
					$570,644	**$570,644**	**LTAP: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

STP: TT-Fed

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Technology Transfer and Training													
STP: TT-Fed	A	TT	DOTLT100 0026	15-1WDSC	$93,790	$250,000	LTRC	Dortha Cummins	Workforce Development Support For Safety Center		12/31/2017		E-2
STP: TT-Fed	A	TT	30000241	10-4AD	$10,000	$110,000	LTRC	Tyson Rupnow	Technology Transfer & Research Implementation Support for Louisiana Universities	1/1/2010	12/31/2013	6/30/2016	E-3
STP: TT-Fed	A	TT	30000320	08-1TSQ	$353,833	$353,904	LTRC	Sam Cooper, Jr.	Technology Transfer Program and Operations (LSU)	7/1/2015	6/30/2018		E-4
					$457,623	**$713,904**	**TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS**						
STP: TT-Fed	P	TT	DOTDLT10 00117	17-TTRF	$100,000	$100,000	LTRC	Sam Cooper, Jr.	Technology Transfer Registration Fees	7/1/2016	6/30/2017		E-6
STP: TT-Fed	P	TT	DOTDLT10 00122	17-PONTIS	$125,000	$125,000	LTRC	Sam Cooper, Jr.	AASHTO PONTIS Agreement	7/1/2016	6/30/2017		E-7
STP: TT-Fed	P	TT	DOTDLT10 00118	17-COOP	$200,000	$200,000	LTRC	Sam Cooper, Jr.	LADOTD CO-OP Program	7/1/2016	6/30/2017		E-8
STP: TT-Fed	P	TT	DOTDLT10 00116	17-2TT	$147,000	$147,000	LTRC	Sam Cooper, Jr.	LTRC Student Program	7/1/2016	6/30/2017		E-9
STP: TT-Fed	P	TT	DOTDLT10 00115	17-1WDC	$3,177,806	$3,177,806	LTRC	Sam Cooper, Jr.	Workforce Development Contracts	7/1/2016	6/30/2017		E-10
STP: TT-Fed	P	TT	DOTDLT10 00113	17-1WD	$995,549	$995,549	LTRC	Sam Cooper, Jr.	Workforce Development	7/1/2016	6/30/2017		E-13
STP: TT-Fed	P	TT	DOTDLT10 00121	17-1TT	$37,500	$37,500	LTRC	Sam Cooper, Jr.	Support for Senior Project Courses	7/1/2016	6/30/2017		E-14
STP: TT-Fed	P	TT	DOTDLT10 00119	17-1TSQ	$495,542	$495,542	LTRC	Sam Cooper, Jr.	Technology Transfer Program and Operations (DOTD)	7/1/2016	6/30/2017		E-15
STP: TT-Fed	P	TT	DOTDLT10 00123	17-1SWD	$1,520,000	$1,520,000	LTRC	Sam Cooper, Jr.	DOTD Staff Support for Workforce Development	7/1/2016	6/30/2017		E-17
					$6,798,397	**$6,798,397**	**TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS**						
					$7,256,020	**$7,512,301**	**STP: TT-FED ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

100% Federal

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Safety													
100% Federal	P	SA			$1,500,000	$1,500,000		Dortha Cummins	Safety Center Management of Traffic Records Projects	4/1/2016	9/30/2016		F-2
					$1,500,000	**$1,500,000**		**SAFETY BUDGET TOTALS**					
					$1,500,000	**$1,500,000**		**100% FEDERAL PROPOSED BUDGET TOTALS**					

LTRC ANNUAL RESEARCH PROGRAM

Self-Generated

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Bituminous													
NCHRP	A	B	30001505	14-2B	$40,000	$186,407	LTRC	Louay Mohammad	Field Implementation of the Louisiana Interface Shear Strength Test	8/9/2013	8/8/2015	12/31/2016	G-2
					$40,000	**$186,407**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Geotechnical													
CALTRANS	A	GT	DOTLT1000055	15-3GT	$21,520	$70,598	LTRC	Murad Abu-Farsakh	Calibration of LRFD Geotechnical Axial (Tension and Compression) Resistance Factors (φ) for California	1/16/2015	1/15/2017		G-3
					$21,520	**$70,598**	**GEOTECHNICAL BUDGET TOTALS**						
					$61,520	**$257,005**	**SELF-GENERATED ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

Other DOTD Sections

FISCAL YEAR 2016-2017

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Geotechnical													
Emergency Fund	A	GT	30000980	13-9GT	$4,000	$474,380	LSU	Joshua Kent	CORS 911: Continuously Operating Reference Stations for the Bayou Corne Sinkhole	3/18/2013	3/17/2014	9/30/2016	H-2
					$4,000	**$474,380**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Safety													
Safety	A	SA	DOTLT100 0111	16-1STFS	$793,509	$1,263,287	LTRC	Dortha Cummins	FHWA Safety Transfer Fund Support for LCTS		12/31/2017		H-3
					$793,509	**$1,263,287**	**SAFETY BUDGET TOTALS**						
					$797,509	**$1,737,667**	**OTHER DOTD SECTIONS ACTIVE BUDGET TOTALS**						
Project Type: Special Studies													
Highway/Rail Safety	P	SS			$50,000	$100,000	LTRC	Julius Codjoe	Exploring the Use of Pavement Markings in the Dynamic Envelope of a Railroad Crossing to Enhance Safety	7/1/2016	6/30/2018		H-4
Port Priority Program	P	SS			$50,000	$75,000	LSU	James Richardson	Economic Evaluation of Applicants to the Port Construction and Development Priority Program	7/1/2016	12/31/2017		H-5
					$100,000	**$175,000**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Other													
Safety	P	Other	DOTDLT10 00120	16-LRSP	$338,440	$338,440	LTRC	Marie Walsh	Louisiana Local Road Safety Program	1/1/2016	12/31/2017		H-6
					$338,440	**$338,440**	**OTHER BUDGET TOTALS**						
					$438,440	**$513,440**	**OTHER DOTD SECTIONS PROPOSED BUDGET TOTALS**						

FHWA

Part II SPR Funded Research Program

ADMINISTRATIVE LINE ITEMS AND RESEARCH SUPPORT STUDIES

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Program Management	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000125**		Project Start Date:		7/1/2016
Research Project Number:	17-1PM		Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$748,000	**Total**		**$747,949**
	(revised)				
Est. Expended to Date			Salaries		$737,949
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$10,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To cover administrative costs of the staff members involved in the planning and supervision of the SPR Program. This item will cover all general expenditures incurred in the management of the SPR Program, including the expense of the Policy committee and Project Review Committees.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Managed the Louisiana Transportation Research Center's (LTRC) research program including administrative duties, business activities, and financial responsibilities.
-Updated LTRC Manual of Research Procedures
-Participated in Transportation Research Board (TRB)activities;
-Participated in LADOTD committees;
-Participated in regional and national RAC task group activities;
-Managed the Southeast Transportation Consortium activities; and
-Administered the University Transportation Center Funding.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue to manage and administer the SPR Research Program;
-Continued implementation the 2015 RPIC results;
-Staff participation in External Peer Exchanges;
-Continued support for Transportation Research Board activities;
-Continued support for regional and national RAC task group activities;
-Continued support for Southeast Transportation Consortium;
-Continued support for AASHTO RAC activities; and
-Start the 2017 RPIC process.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Technology Transfer and Research Implementation**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000128**		Project Start Date:		7/1/2016
Research Project Number:	17-1TTRI		Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$425,000		**Total**		**$425,000**
	(revised)					
Est. Expended to Date				Salaries		$410,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		$15,000
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

To cover costs incurred in providing research implementation activities, technology transfer seminars, and participation in external research / training activities (NCHRP, FHWA, Panels, TRB Meetings, Technical Conferences, and Research Review Committees)

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS
-Developed strategies for implementation of research projects; -Developed distribution of Research Implementation Impacts brochure; -Developed and submitted projects to AASHTO High Value Research solicitation; -Tracked implementation progress on completed research projects for previous five years; -TRB committee AFD60 Unsaturated Soils, committee attendance and paper reviews; -TRB Committee AFD80 Strength and Deformation Characteristics of Pavement Sections, committee attendance and paper reviews; -TRB committee AFD90 (Surface properties and Vehicle Interaction) paper reviews; -TRB Committee, AFS10 Transportation Earthwork, committee member and paper review; -TRB Committee, AFS30 Foundations of Bridges and Other Structures, committee member and paper reviews; -TRB Committee, AFS30 Committee Communication Coordinator; -TRB Committee, AFN30 and AFN10 - Paper reviews and committee member; -NHI Training course, Soil and Foundations workshop; -Grant proposal writing workshop; –Implementation of New Asphalt Test procedures; –Developed workshops and training seminars; –Participated and presented at SEAUPG Annual Meeting; -Participated and presented at ACPA National Convention; -Participated and presented at Texas Cement Council / TXDOT 2016 Concrete Conference; –Presented and participated at TRB Annual meeting; –Participated and presented at LAPA Annual Meeting; –Participated in AAPT Annual Meeting; –Participated at Binder ETG meeting; -Participated at precast Pavement ETG meeting; –Participated in RPIC, PRC meetings; –Tested masters PE review classes; –LADOTD training and CPTP classes; –Various Other Webinars; –NAPA Sustainability Conference; –NCHRP Panel Participation (D18-17); and –TTCC/NCC Fall (Milwaukee, WI) and Spring (Columbus, OH) Meetings;
FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue research implementation activities; -Develop and host Technology Transfer Seminars; -Participate in external research / training activities: (NCHRP Panels, TRB Meetings, Meetings, and Technical Conferences; and -Continue to seek venues for our presentations that effectively communicate the Louisiana Transportation Research center's (LTRC) vision.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Technical Research Surveillance**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000131**	Project Start Date:		7/1/2016
Research Project Number:	17-1TRS	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$400,000	**Total**		**$400,000**
	(revised)				
Est. Expended to Date			Salaries		$400,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To cover costs incurred in providing Administration of the Louisiana Transportation Research Center (LTRC) Research Project Contracts, preparation of research proposals, participation on LTRC Project Review Committees and participation on LTRC Report Review Committees. To provide laboratory and field assistance to LTRC contract researchers on projects funded by LTRC.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Published 23 final reports;
-Managed research projects with a contract budget of 5 million;
-Initiated 22 new research projects; and
-Project management for 64 on-going research projects.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Provide management of LTRC research project contracts;
-Prepare new research proposals for initiation of new projects in accordance with proposed in-house projects as approved in this Annual Work Program document;
-Participation on LTRC Project Review Committees; and
-Participation on LTRC Report Review Committees.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Technical Assistance**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000127**	Project Start Date:		7/1/2016
Research Project Number:	17-1TA	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$370,000	**Total**		**$370,000**
	(revised)				
Est. Expended to Date			Salaries		$362,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$8,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To cover costs incurred in providing laboratory, field testing, and forensic testing analysis in direct response to departmental inquiries for assistance on the Louisiana Department of Transportation and Development (LADOTD) projects which are not related to formal research studies. To provide assistance to state university requests for laboratory or field testing on research projects not funded by the Louisiana Transportation Research Center (LTRC).

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Batch ticket analysis on I-49 footing, column, and bridge segments (H.011111);
-Compression testing of concrete from I-49 segments (H.011111);
-ACR/ASR investigation for control section on Jefferson highway;
-ACR/ASR investigation for control section on interstate 10 near Acadian thruway;
-Coring on I-10 on the approach to the MRB in WBR parish for suspected voids beneath pavement (H.011955.6).
Literature review on Reinforced Concrete Pipe for the DOTD construction group;
-Rapid Chloride Permeability tests (4 sets) for Route US 80 in
District 04 (H.000101.6);
-Rapid Chloride Permeability tests (2 sets) for Luling bridge in District 02;
-Surface resistivity tests for Luling bridge overlay (2 mixes);
-Implemented and tested beam specimens (ASTM C1609) for the Luling bridge overlay (H.010498);
-Fatigue testing on RCC beams for the 12-7P project;
-Verification of fine and coarse aggregate specific gravities for the materials laboratory;
-Compression testing and absorption on CMUs for FHWA (H.002132.6);
-Attended meetings/on-site visit for the new Precast Concrete Pavement specification;
-ASTM C1260 for source approval of material obtained from the materials laboratory;
-Actuator re-sealing for Murad's MTS plate load tester at ALF;
-LSU studies;
-LA 413, H.010435,;
-Cane mill to LA 416, Pointe Coupee Parish;
-Assessment of Pavement depressions on H.011464 Fourchon Road;
-H.011137 & H.011152 I-12 Widening (LA 21 to LA 59) Friction Number Request;
-I-20, SP 451-08-0078;
-I-10, West Baton Rouge Parish, PCC slab issues;
-LA 454: Avoyelles Parish: H:011068;
-West Baton Rouge Parish line to Rama (CS 450-07);
-I-10,450-08;
-Mile Post 149 to 144;
-CSLM 7.080 to 2.080;
-Transportation Infrastructure Asset Damage Cost Recovery Correlated with Shale Oil Recovery Operations in
Louisiana;
-New Orleans Submerged Roads;
-Repairs to the Waylink Computer;
-Attempts to repair the Darwin computer;
-Attempts to repair the Pavement Unit's High Speed Laser Profiler; and
-Location of Voids over drainage pipes.
• Cyclic Load Testing, LSU Jongwon Jung
• DCP Testing, District 61 Marta Vasquez
• DCP loan, LSU Sogand Karbalaieali
• Large Direct Shear Testing, District 04 John Holley
• Large Direct Shear testing, LSU Jongwon Jung
• Lightweight Embankment Section follow-up, District 02
• Material Testing, LSU Natalie Desrosiers/ Marwa Hassan
• Material Testing, LSU Sogand Karbalaieali/Jongwon Jung
• Subgrade Treatment Testing, District 61 Keith Palermo
• Vane Shear loan, LSU Jongwon Jung

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Respond to requests for laboratory, field work, and forensic analysis on LADOTD projects not related to a formal research project;
-Field testing (Skid, FWD, Profiler, etc.) in support of District requests;
-Respond to requests for laboratory , field work, and analysis for university requests not related to a LTRC formal research project; and
-Provide general assistance to other public entities not related to research.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	DOTD Staff Support for Research	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000132**		Project Start Date:		7/1/2016
Research Project Number:	17-1SSR		Completion Date	(original)	6/30/2017
Research Agency:	DOTD		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$100,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To cover the costs incurred by the Louisiana Department of Transportation and Development (LADOTD) staff participating in the Louisiana Transportation Research Center (LTRC) support committees and advisory panels such as Project Review committees (PRC), Research Project Identification Committee (RPIC), and LTRC Policy Committee. These committees and panels provide technical and policy support for development of the LTRC work program, development and conduct of specific research projects, of the participation of LADOTD staff on strategic planning functions for the research program conducted by LTRC. This shall not be used by LTRC/LADOTD employees (i.e. Section 19 and Section 33 employees)

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

LADOTD Participation in the project review committees to provide technical review and direction on new, on-going and completed research studies:

- •Attend PRC meetings;
- •Define the objective and scope;
- •Identify potential research teams;
- •Assist in the development of the RFP for those problem statements selected for contract research;
- •Review and suggest improvements to proposals;

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Participate in Project Review Committees to provide technical direction to research projects; and
-Participate in LTRC Policy Committee meetings to provide strategic direction to the research program.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	New Products Evaluation	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000130**	Project Start Date:		7/1/2016
Research Project Number:	17-1NPE	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$72,000	**Total**		**$72,000**
	(revised)				
Est. Expended to Date			Salaries		$72,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To support evaluation of products for the Louisiana Department of Transportation and Development (LADOTD) New Products Evaluation Committee. To provide general evaluation of new products or technologies not associated with a research project.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continue managing the necessary evaluations of new products submitted to the Louisiana Transportation Research Center (LTRC) by the LADOTD New Products Evaluation Committees including on-going evaluations.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Research Laboratory and Field Test Support	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000126**	Project Start Date:		7/1/2016
Research Project Number:	17-1LFT	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The broad objectives of this study are to provide general assistance to other Louisiana public research entities such as laboratory testing, field work, and analysis for Louisiana universities to promote engineering education in the field of transportation. Such support is not related to a Louisiana Transportation Research Center (LTRC) funded research study.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-AC rutting on I-20 near Minden, LA.;
-Providing lab support for local high school science fair project;
-Science fair mentor (participants are headed to two international science fairs);
-Extreme rutting and distress of I-10 requiring FWD and AC core testing;
-Long term monitoring of US 90 Embankments with various light-weight fills and fabrics; and
-Jefferson Highway and I-10 PCC distress.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continue to provide general assistance to other Louisiana public research entities as requested in accordance with the mission and founding legislation of LTRC.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Equipment Management**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT100012**	Project Start Date:		7/1/2016
Research Project Number:	17-1EQM	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$375,000	**Total**		**$375,000**
	(revised)				
Est. Expended to Date			Salaries		$325,000
FY 2015 - 2016 Budget			Equipment	(expendable)	$50,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To cover costs incurred to provide support for the purchase, fabrication, evaluation, and maintenance of rolling equipment, special equipment, and instrumentation for research projects. To provide for participation in standardized testing programs for laboratory certification (Co-Op, AMRL, CCRL).

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Proficiency testing within the AASHTO Materials Reference Library (AMRL and CCRL);
-Participation in LADOTD State Cooperative Testing Program;
-General Equipment Calibration and Maintenance;
-Vehicle Inspection Reports;
-Calibration of United Testing System;
–CCRL round robin testing and certification program;
–Equipment maintenance to maintain accreditation;
-Installation of new Materials Testing System (MTS) for Concrete lab; and
–Installation of chiller to connect MTS.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Perform routine and unscheduled maintenance of LTRC research laboratory and field equipment;
-Developed plans, prepared specifications and purchase lab equipment as necessary to maintain state-of-the–art laboratory facilities;
-Participate in State Coop and CRRL testing programs;
-Safety Training and Reporting Duties;
-Calibration of Profiler, FWD, Dynaflect, and Friction Tester;
-Calibration of Mobile Imaging System;
-Calibration of Profiler, FWD, Dynaflect, and Friction Tester; and
-Perform routine and unscheduled maintenance of LTRC research laboratory and field equipment.

FHWA

Part II SPR Funded Research Program

CONTINUING RESEARCH

Title:	**Incorporating the Site Variability and Laboratory/In-situ Testing Variability of Soil Properties in Geotechnical Engineering Design**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000112**	Project Start Date:		7/1/2016
Research Project Number:	16-6GT	Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	12/31/2018
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$476,813	**Total**		**$193,000**
	(revised)				
Est. Expended to Date			Salaries		$193,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The main objective of this research is to evaluate the different sources of geotechnical variability and quantify the variability of soil properties for inclusion in the analysis and design of different geotechnical engineering systems. This generally includes:
-Evaluating operator-induced variations on design soil properties;
-Evaluating equipment-induced variations on design soil properties;
-Evaluating site/spatial variations of design soil properties;
-Developing QA/QC guidelines for laboratories; and
-Incorporating site variability and measurement error into LRFD geotechnical design.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Start the a comprehensive literature review on relevant published works on laboratory and site variability;
-Start evaluating the measurement error of lab and in-situ tests from existing lab test database;
-Start performing laboratory tests to study measurement variation of specific lab tests (i.e., water content, total and dry unit weight, UU test, consolidation test, direct shear test, resistivity, CBR);
-Start performing in-situ tests to study measurement variation of specific in-situ tests (i.e., LFWD, DCP, DSPA, NDG, VST and SASW);
-Start evaluating site variability from lab and in-situ measurements; and
-Start evaluating the QC/QA guidelines for lab tests.

Title:	**Corrosion Map for Metal Pipes in Coastal Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000094**		Project Start Date:		1/25/2016
Research Project Number:	16-5GT		Completion Date	(original)	4/25/2017
Research Agency:	LTU		Completion Date	(revised)	
Principal Investigator:	Sanjay Tewari				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$49,999		**Total**		**$30,000**
	(revised)					
Est. Expended to Date		$19,999		Salaries		$30,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$19,999		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$19,999		Other		

PURPOSE AND SCOPE

Metal culverts can corrode over time and at various rates based on their environmental conditions (corrosive nature of coastal soils, high water table, salt water intrusion, subsidence, tidal flows and frequent hurricane surge issues). The salinity and likelihood of flooding in the Louisiana Department of Transportation and Development (LADOTD) coastal parishes has led to a policy of disallowing the use of metal pipes for new drainage installations.

District 02 is mostly coastal. Other districts (07, 03, 61, and 62) have some coastal edges, but extend far enough north where environmental issues are less corrosive. Delineating a break point boundary line is necessary to promote competition in the north, and provide/ensure durable material for our coastal pipes.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

This project began in January of 2016. The Principal Investigator is collecting information from the coastal districts, and conducting his research and review. A Project Review Committee meeting will be held to update all on the status of the project.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

The project will continue and support will be provided to the researcher. A Project Review Committee meeting will be held to update all on the status of the project. The project is scheduled to end on April 27, 2017.

Title:	**Lime Utilization in the Laboratory, Field, and Design of Pavement Layers**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000049**		Project Start Date:		2/16/2015
Research Project Number:	15-2GT		Completion Date	(original)	2/15/2016
Research Agency:	LSU		Completion Date	(revised)	7/31/2016
Principal Investigator:	Mostafa Elseifi				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$48,493		**Total**		**$16,800**
	(revised)					
Est. Expended to Date		$31,683		Salaries		$16,800
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$48,493		Equipment	(non-expendable)	
	(revised)	$48,493		Travel		
Est. FY Expenditure		$31,683		Other		

PURPOSE AND SCOPE

The objective of this study is to review and report the best practices of using lime to dry soil, in working tables, and in pavement applications. The project also aimed to review the incorporation of lime in pavement design in other states as well as test methods, field application, and evaluation techniques to assess the quality of field construction. Based on this review, this study will provide a knowledge base that can be used by the Department to modify and improve current state specifications

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Tasks 1 to 5 have been successfully completed. A meeting was scheduled with the Project Review Committee on March 8, 2016 to present the findings of this study and to discuss offered recommendations. The Final Report is currently being prepared by the research team (Task 6).

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

This project is scheduled to be completed on July 31, 2016. The Final Report will be submitted in May, 2016 and the Project Review Committee comments will be addressed by the research team.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**pLog Enterprise - Enterprise GIS-Based Geotechnical Data Management System Enhancements**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000048**		Project Start Date:		7/31/2015
Research Project Number:	15-1GT		Completion Date	(original)	8/1/2017
Research Agency:	Dataforensics, LLC		Completion Date	(revised)	
Principal Investigator:	Scott Deaton				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$200,000		**Total**		**$50,000**
	(revised)					
Est. Expended to Date		$150,000		Salaries		$42,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$150,000		Equipment	(non-expendable)	
	(revised)			Travel		$8,000
Est. FY Expenditure		$150,000		Other		

PURPOSE AND SCOPE

The research will address the needs of HQ Pavement and Geotechnical and expand on work developed under the initial and Phase 2 projects. The research would add modules to the system. Specifically: shallow soil subgrade survey data, including Dynamic Cone Penetrometer (DCP) data, and district auger boring information. This data should be incorporated into the database; and like deep borings, be plotted and added to the plans, via a standardized template accessible to districts and designers for analysis. There will likely be some linkage to ongoing work by the Materials Lab on Materials Manager/ Laboratory Information Management System (LIMS) in order to access the data without replication or duplication of data. Pile load test data, driving records, Ground Penetrating Radar (GPR), and other information could also be added to the database and be made digitally available and accessible via GIS systems. A tracking system/template, incorporated with SharePoint (software already within the department) will also be addressed. Security issues within IT regarding public access to geotechnical borings logs will also be addressed.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Meetings were held with critical/experienced personnel within the Districts, the Materials Lab, Geotechnical Design and the Pavement Management Groups. Information was collected and will be formulated into a comprehensive interim report that will outline several options on how to proceed.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

The project will implement the activities recommended by the Project Review Committee, toward the completion of the Geotechnical Database.

Title:	Support Study to ITRS proposal on "An Integrated Computational and Experimental Study of Pile Setup in Soft Clays"	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	30001220		Project Start Date:		2/18/2013
Research Project Number:	13-7GT		Completion Date	(original)	2/17/2016
Research Agency:	LTRC		Completion Date	(revised)	6/30/2017
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$50,000	**Total**		**$9,217**
	(revised)	$90,000			
Est. Expended to Date		$53,137	Salaries		$9,217
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$8,668	Equipment	(non-expendable)	
	(revised)	$11,804	Travel		
Est. FY Expenditure		$11,804	Other		

PURPOSE AND SCOPE

This support study is setup to provide the additional support fund for the CO/PI: Dr. Murad Abu-Farsakh during the three years duration of the Board of Regents funded proposal on “An Integrated Computational and Experimental Study of Pile Setup in Soft Clays”. The objectives of the research project, as stated in the proposal, are:

-To develop, via laboratory testing, field instrumentation and testing, and numerical modeling, a fundamental understanding of the physical and scientific mechanisms underlying the pile setup phenomenon;
-To formulate an analytical model/equation for estimating and predicting pile setup with time, which can be transferred to various private sectors for the design and construction of driven pile foundations; and
-To establish the plans and mechanisms for transforming the research findings into exploitable, commercially feasible technologies to enhance the economic development in Louisiana and the nation.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Installed instrumentations for the test piles at Baton Rouge site;
-Conducted in-situ and laboratory tests to characterize the soil type at Baton Rouge site; and
-Conducted finite element numerical modeling.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Install instrumentations in the surrounding soils for the Baton Rouge site;
-Install the test piles at the Baton Rouge site;
-Start testing the piles at Baton Rouge site; and
-Conduct in-situ and laboratory tests to characterize the soil type at New Orleans site.

Title:	**Monitoring of In-Service Geosynthetic Reinforced Soil (GRS) Bridge Abutments in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000981**		Project Start Date:		10/1/2014
Research Project Number:	13-5GT		Completion Date	(original)	9/30/2016
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$232,200		**Total**		**$54,895**
	(revised)	$302,200				
Est. Expended to Date		$206,300		Salaries		$54,895
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$103,277		Equipment	(non-expendable)	
	(revised)	$135,000		Travel		
Est. FY Expenditure		$137,600		Other		

PURPOSE AND SCOPE

Traditional bridge construction can be slow, expensive, and complex. Researchers at the Federal Highway Administration (FHWA) recognized that bridges could be built better, faster, and for less money. In 2010, the FHWA introduced an initiative "Every Day Counts" (EDC) to promote technologies that speed up the design and construction of highway projects such as bridge abutments, while at the same time reducing their costs. One promising technology is to use Geosynthetic Reinforced Soil (GRS) in the Integrated Bridge Systems (IBS). The use of GRS can also help in eliminating/minimizing the roadway and bridge "bump" problem. The purpose of this research study is to apply the GRS technology in the design and construction of bridge abutments in Louisiana; and evaluate the performance of GRS abutments during construction and under service loads. The project will include instrumenting and monitoring selected GRS bridge abutment at Maree Michel Bridge.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Conducted literature review relevant to the geosynthetic reinforced soil and its application for bridge abutments;
-Prepared an instrumentation plan for monitoring the GRS bridge abutment at the Maree Michel Bridge GRS abutment;
-Installed the instrumentations (e.g., pressure cells, piezometers, SAA, strain gauges) in the GRS abutment at the critical locations to obtain reliable and meaningful important measurements;
-Conducted static load tests on the GRS-IBS abutment using a heavy weight dump truck and the 20 ton cone truck, stationed at different locations along the bridge and from the centerline;
-Started monitoring the performance of the GRS-IBS abutment at Maree Michel Bridge; and
-Started analyzing the data collected during the static load tests and measurements of instruments during monitoring.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue literature review relevant to the geosynthetic reinforced soil and its application for bridge abutments; -Continue monitoring and collecting data for the Maree Michel GRS Bridge abutment site; -Continue analyzing the collected field data; -Plan for another loading on the GRS bridge abutment; and -Start the finite element parametric study.

Title:	**Finite Element Analysis of the Lateral Load Test on Battered Pile Group at I-10 Twin Span Bridge**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000103**	Project Start Date:		3/1/2016
Research Project Number:	13-3GT	Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	5/31/2018
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$260,368	**Total**		**$82,160**
	(revised)				
Est. Expended to Date		$20,000	Salaries		$79,160
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$20,000	Equipment	(non-expendable)	$3,000
	(revised)		Travel		
Est. FY Expenditure		$20,000	Other		

PURPOSE AND SCOPE

A unique full-scale lateral load test was conducted at M19 pier of the new I-10 Twin Span Bridge over Lake Pontchartrain to assess the current methodology used in the design and analysis of batter pile group foundations and to evaluate their performance under lateral loading. Measurements obtained from instrumentations (inclination and strains) can provide valuable information for use in the analysis of lateral behavior of battered pile foundations and for back-calculating the soils' p-y curves. Two approaches can be used to analyze the lateral behavior of piles: simplified p-y methods and continuum-based FE methods. The simplified methods are based on the theory of subgrade reaction, in which soils surrounding piles are simplified as a set of linear or nonlinear springs resenting the soils' resistances (assumed p-y curves) to lateral movement of piles. With the development of computer softwares, such as LPile and FB-MultiPier, this approach has been widely used for design of laterally loaded piles. However, the p-y method cannot describe the three dimensional nature of the problem, pile geometry, different boundary conditions, continuum behavior of soil, soil-structure interface effect and soil-porewater pressure interaction. The continuum-based FE analysis is desirable for a better understanding of the problem. The continuum-based methods treat the soils surrounding piles as elastic or elasto-plastic continuums using constitutive models that can describe the actual behavior of soils under any loading.

In order to better understand the behavior of batter pile group foundations subjected to lateral loading, we propose to develop a three-dimensional finite element model to analyze the lateral load test that was conducted at M19 pier. The finite element technique is a powerful tool that can simulate the behavior of complex soil-structure interaction problems. The piles and foundation (pile cap) will be simulated as solid elements. The surrounding soils will be treated as a continuum media (instead of springs), representing the actual soil properties and their behavior will be described using the elasto-plastic anisotropic modified cam clay model. The soil-pile interaction will be also simulated using Mohr Coulomb frictional criteria. The finite element model will be first calibrated using the results of full-scale test at M19 pier. Once the model is calibrated, it will then be used to conduct a comprehensive finite element parametric study to evaluate the effect of different variables and parameters on the lateral performance of batter pile group foundations. The results from parametric study will be used to evaluate the group effect of piles (p-multipliers), evaluate the contribution of lateral loads transferred to battered piled in axial direction, and develop p-y curve models that represent the different soil type and conditions in Louisiana for implementing in the FB-MultiPier and other programs for future analysis and design of batter pile group foundations.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS
-Started literature review relevant to the lateral behavior of single and group of piles; -Started the development of three-dimensional finite element numerical models to simulate the lateral behavior of vertical and battered pile group foundations; and -Started Verifying the finite element model using the results of a full-scale static lateral load test that was conducted at I-10 Twin Span Bridge.
FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue literature review relevant to the lateral behavior of single and group of piles; -Complete the development of three-dimensional finite element numerical models to simulate the lateral behavior of vertical and battered pile group foundations; -Verify the finite element model using the results of a full-scale static lateral load test that was conducted at I-10 Twin Span Bridge; and -Start the finite parametric study to evaluate the lateral behavior of battered pile group foundations as compared to vertical pile group foundations and single vertical pile.

Title:	**Accelerated Load Testing of Geosynthetic Base Reinforced Pavement Test Sections**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000135**		Project Start Date:		12/1/2010
Research Project Number:	11-3GT		Completion Date	(original)	5/31/2012
Research Agency:	LTRC		Completion Date	(revised)	6/30/2016
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$297,579		**Total**		**$37,398**
	(revised)	$656,370				
Est. Expended to Date		$631,369		Salaries		$37,398
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$95,800		Equipment	(non-expendable)	
	(revised)	$95,000		Travel		
Est. FY Expenditure		$95,000		Other		

PURPOSE AND SCOPE

The main objective of this research study is to evaluate the benefits of geosynthetics stabilization and reinforcement of subgrade/base aggregate layer in flexible pavements build on weak subgrades, and the effect of pre-rut of pavement sections prior to the construction to HMA layer on geosynthetics benefits and performance. This will be achieved through conducting accelerated load testing on geosynthetic reinforced unpaved and pavement test sections to be constructed at the ALF site. Different types of geogrids and geotextiles will be considered for base reinforcements. Another objective is to evaluate the design parameters of geosynthetic reinforced flexible pavement in terms of the 1993 AASHTO Pavement Design Guide and possibly the MEPDG that can provide a more suitable pavement structure design responsive to site conditions and projected loading.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Conducted accelerated load tests on the paved test lane sections. Completed 210,000 passes on lane 1, 360,000 passes on lanes 2, 3, and 4, 410,000 passes on lane 5, and 75,000 passes on lane 6;
-Completed all the six field cyclic plate load tests on the test lane sections at ALF;
-Completed the laboratory resilient modulus tests on subgrade and base materials;
-Completed the dynamic test on asphalt material;
-Worked on analyzing the experimental test results;
-There were several delays on accelerated load testing due to the need for machine maintenance and repairs; and
-The criteria for accelerated load testing were increased from 0.75 inch to 1 inch rut depth.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue performing accelerated load testing on the paved test lane sections to achieve the new criteria of 1 inch rut depth;
-Continue analyzing the experimental test results;
-Study the cost benefit of geosynthetic reinforced pavements; and
-Prepare a draft final report.

Title:	In Situ Evaluation of Design Parameters and Procedures for Cementitiously Treated Weak Subgrades using Cyclic Plate Load Tests	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	**30000661**		Project Start Date:		3/18/2013
Research Project Number:	11-1GT		Completion Date	(original)	9/17/2015
Research Agency:	LTRC		Completion Date	(revised)	12/31/2016
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$294,679	**Total**		**$41,523**
	(revised)	$354,679			
Est. Expended to Date		$222,400	Salaries		$39,523
FY 2015 - 2016 Budget			Equipment	(expendable)	$2,000
FY Funds	(original)	$83,000	Equipment	(non-expendable)	
	(revised)	$22,500	Travel		
Est. FY Expenditure		$22,400	Other		

PURPOSE AND SCOPE

The purpose of this research study is to evaluate the design parameters and procedures for cementitious treated soft subgrade soil using cyclic plate load tests. This includes evaluating the composite resilient modulus (Mr)of various cementitious (cement, lime, flyash)treated soft subgrade materials for inclusion in the pavement design. A treated subgrade soil has many characteristics that contribute to the performance of the pavement structure. As such, an adequate evaluation of the design parameters of treated subgrade soils is necessary in pavement analysis and design. The resilient modulus is a key input parameter for subgrade soil in both the 1993 AASHTO and the Mechanistic-Empirical Pavement Design Guide (MEPDG). Therefore, the determination and use of the "composite" resilient modulus of cementitious treated soft subgrades can provide a more suitable pavement structure design responsive to site conditions and projected loading is crucial in pavement design process. The work program includes conducting in-box resilient and permanent deformation tests using cyclic plate load tests on sections build inside a steel test box with dimensions of 6.5 ft (length) × 6.5 ft (width) × 5.5 ft (height. Laboratory unconfined compression tests, resilient mod repeated plate load tests will be also conducted on cementatious treated soft subgrade samples. In addition, Dynamic Cone Penetrometer (DCP), Light Falling Weight Deflectometer (LFWD), Geogauge, Portable Seismic Pavement Analyzer (PSPA) tests, and repeated triaxial load tests will be conducted.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Completed phase 1 of the study. Evaluated the resilient modulus of cementitious treated hauled soil for phase 1;
-Completed the laboratory repeated load triaxial tests to evaluate the resilient modulus and permanent deformation of treated in-situ wet soils for phase 2;
-Completed the shrinkage and tube section tests;
-Prepared an interim report for the laboratory testing of phase 1 & 2;
-The Phase II cyclic plate load testing of this project was temporary on hold due to the use of this facility in another research project; and
-Repaired the oil leak of the cyclic plate load testing facility.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Purchase the instrumentations needed for phase II cyclic plate load tests; -Construct eight cementitious treated subgrade soil sections at ALF site; and -Conduct cyclic plate load tests on cementitious treated subgrade soil sections.

Title:	**LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000111**		Project Start Date:		7/1/2010
Research Project Number:	10-1GERL		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2018
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$523,000		**Total**		**$224,051**
	(revised)	$13,991,168				
Est. Expended to Date		$1,060,000		Salaries		$156,051
FY 2015 - 2016 Budget				Equipment	(expendable)	$50,000
FY Funds	(original)	$170,000		Equipment	(non-expendable)	
	(revised)			Travel		$18,000
Est. FY Expenditure		$170,000		Other		

PURPOSE AND SCOPE

The objectives of this research are to:
-Perform support studies to meet the beneficiary requirements for geotechnical and geosynthetic testing, technical assistance and research;
-Advance the state-of-the-art in geotechnical and geosynthetic research;
-Provide development, support and training of new and innovative techniques, software and equipment for advancing the performance of the transportation system, and
-Develop problem statements and research proposals.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Provided geotechnical testing support and technical assistance for the Louisiana Department of Transportation and Development (LADOTD);
-Published several technical papers/proceedings/reports on findings of the Louisiana Transportation Research Center (LTRC) research projects;
-Developed potential ideas and problem statements for future LTRC research projects;
-Developed research proposal on "Finite Element Analysis of the Lateral Load Test on Battered Pile Group at I-10 Twin Span Bridge", "Incorporating the Site Variability and Laboratory/In-situ Testing Variability of Soil Properties in Geotechnical Engineering Design", and "Verification and Implementation of Pile Set-up Analytical Estimation Methods"; and
-Maintained software's related to CPT application.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Provide geotechnical and geosynthetic testing support and technical assistance for LADOTD;
-Provide support and training for implementation of research results;
-Develop research proposals and problem statements for future activities;
-Publish research findings on technical papers and reports; and
-Maintain and upgrade CPT software's.

Title:	**Quality Management of Cracking Distress Survey in Flexible Pavements Using LTRC Digital Highway Data Vehicle**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000107**		Project Start Date:		4/1/2016
Research Project Number:	16-6P		Completion Date	(original)	3/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zhong Wu				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$170,588		**Total**		**$94,500**
	(revised)					
Est. Expended to Date		$9,000		Salaries		$94,500
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$64,324		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$28,333		Other		

PURPOSE AND SCOPE

The Louisiana Department of Transportation and Development (LADOTD) is currently implementing the AASHTO's new Mechanistic-Empirical pavement design software- Pavement ME, which was locally calibrated based on the PMS database. The objectives of this research are to compare and validate cracking survey results on selected flexible pavements obtained from the Louisiana Transportation Research Center (LTRC) data collection system and from the Louisiana current contracted application; to investigate the feasibility of converting the existing PMS cracking data to comply with the MEPDG definition of cracking; and to recommend a cracking analysis procedure for flexible pavements using LTRC's Digital Highway Data Collection System.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Conducted literature review; and
-Selected asphalt pavement test sections.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Collect Pavement Images Using LTRC's Digital Highway Data Vehicle; and
-Validate the Cracking Distress from LTRC's Data Collection System and LADOTD Current Contracted Pavement Distress Analysis Application.

Title:	**Assessment of Structural Capacity Indicators from Rolling Wheel Deflectometer Data Collection in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000009**	Project Start Date:		7/1/2014
Research Project Number:	14-2P	Completion Date	(original)	12/31/2015
Research Agency:	LSU	Completion Date	(revised)	6/30/2017
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$103,287	**Total**		**$82,000**
	(revised)	$170,213			
Est. Expended to Date		$88,280	Salaries		$82,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$33,220	Equipment	(non-expendable)	
	(revised)	$33,220	Travel		
Est. FY Expenditure		$33,220	Other		

PURPOSE AND SCOPE

This project evaluated structural capacity indicators in predicting pavement structural deficiency based on RWD measurements. Based on this evaluation, the research team introduced modifications to improve prediction of pavement structural deficiency. This project will develop a methodology to integrate the most promising structural capacity indicators into the Louisiana Pavement Management System (PMS). In addition, this project will assess the cost-efficiency of RWD testing in identifying and repairing structurally-deficient sections prior to reaching very poor conditions.

A project modification was approved by the Project Review Committee (PRC) to complement the research activities currently conducted under LTRC Project 14-2P by investigating the feasibility of determining the subgrade modulus from RWD data and by analyzing deflection measurements that will be conducted in the near future using the TSD in the State.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

A meeting was held with the PRC on February 23, 2016 to present the results of the study and to discuss the proposed project modification. During this meeting, the cost efficiency of RWD was presented and a new methodology to implement RWD into PMS and the design of overlays was discussed. Findings of the study will be presented in an interim report, which will be submitted in early May to the PRC.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop a methodology for predicting the Subgrade modulus from RWD Data;
-Analyze TSD measurements to be collected in Louisiana;
-Establish the relationship between TSD and FWD measurements
-Develop a methodology to back calculate layer moduli from TSD; and
-Investigate the rate of deterioration for selected pavement sections from the original testing program in 2009 to the new testing program to be conducted in summer 2016;

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Roller Compacted Concrete Over Soil Cement Under Accelerated Loading	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	30000682		Project Start Date:		5/1/2012
Research Project Number:	12-7P		Completion Date	(original)	4/30/2014
Research Agency:	LTRC		Completion Date	(revised)	7/31/2016
Principal Investigator:	Zhong Wu				

BUDGET STATUS

Total Budget				Estimated 2016-2017 Budget		
Total Cost	(original)	$363,959		**Total**		**$8,200**
	(revised)	$476,270				
Est. Expended to Date		$437,000		Salaries		$8,200
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$100,283		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$91,000		Other		

PURPOSE AND SCOPE

The objective of this research is to document the experience of mix design and construction practice of a new RCC-surfaced pavement type for the Louisiana Department of Transportation and Development (LADOTD) and evaluate the structural performance and load carrying capacity of RCC surfacing soil cement base pavements under accelerated pavement testing. Six RCC accelerated pavement testing (APT) sections (each of 71.7-ft long and 13-ft wide) will be constructed for this research study.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Completed the accelerated loading of 4" RCC over 12" cement treated soil section (Section 3);
-Completed the accelerated loading of 6"RCC over 12" cement treated soil section (Section 2); and
-Partially loaded the accelerated loading of 8"RCC over 12" cement treated soil section(Section 1).

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Prepare the final report.

Title:	**Minimizing Shrinkage Cracking in Cement-Stabilized Bases Through Micro-Cracking**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000729**	Project Start Date:		11/1/2012
Research Project Number:	12-3P	Completion Date	(original)	4/30/2016
Research Agency:	LTRC	Completion Date	(revised)	10/31/2017
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$200,000	**Total**		**$58,500**
	(revised)	$275,773			
Est. Expended to Date		$190,600	Salaries		$58,500
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$33,132	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$33,000	Other		

PURPOSE AND SCOPE

Micro-cracking is a construction process used to reduce the severity of shrinkage cracking problems associated with pavements that have cement-treated or stabilized bases. Several research studies have reported that micro-cracking improves the performance of soil cement layers by reducing the crack width, reducing the total length, or both. Through these mechanisms, the micro-cracking process possesses a great potential to reduce the risk of reflective cracking on soil cement pavements in Louisiana.
The main purpose of this study is to document the micro-cracking process in Louisiana and evaluate the effectiveness of using micro-cracking to reduce shrinkage/reflective cracking problems on soil cement pavements through field test sections. Several new cement-stabilized base construction projects will be identified and selected for this study. After placement and satisfactory compaction of cement stabilized layer, it should be moist-cured 2 or 3 three days before and after micro-cracking. In situ deflection tests will performed before and after the micro-cracking to monitor the base strength changes. Reflective cracking of pavements after one year in-service will be collected and compared.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Monitored ALF Micro-cracking test sections: Performed NDT testing (FWD, and LFWD) at different curing times, and Conducted visual crack-mapping for the ALF sections;
-Constructed another field Micro-cracking test section including five sub test sections: control of cement stabilized design, or CSD, Micro-cracking CSD, CSD with Double-layer AST, Control of Cement Treated Design, or CTD, and Micro-cracking CTD; and
-Performed FWD on field test sections.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue monitoring the ALF and two field Micro-cracking test sections; and
-Analyze the collected pavement performance data.

Title:	**Assessment of Environmental, Seasonal and Regional Variations in Pavement Base and Subgrade Properties**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000425**	Project Start Date:		9/1/2011
Research Project Number:	12-2P	Completion Date	(original)	8/31/2013
Research Agency:	LTRC	Completion Date	(revised)	6/30/2018
Principal Investigator:	Kevin Gaspard			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$262,210	**Total**		**$90,414**
	(revised)	$529,685			
Est. Expended to Date		$400,000	Salaries		$85,414
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$118,956	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$130,000	Other		$5,000

PURPOSE AND SCOPE

The purpose of this project is to validate the prediction of seasonal variation strengths in the base course and subgrade, validate MEPDG provided soil properties and strengths, validate soil properties and locations from Soil Unit Maps, link soil unit maps with the Louisiana Department of Transportation and Development (LADOTD) Geotechnical data base, document water table depths, and obtain Level 2 modulus inputs with data from the Falling Weight Deflectometer (FWD) and Dynamic Cone Penetrometer (DCP). A companion study will be conducted through the Southeast Superpave Pool Fund Study to refine the historical climatic model and build new future climatic models to be utilized in the MEPDG.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Finish laboratory testing on the 14 research sites; and
-Write interim report.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Finish laboratory testing on 14 research sites;
-Collect FWD and DCP data on research sites seasonally; and
-Finish installing TDRS and suction gauges.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Assessment of Pavement Distresses caused by Trees on Rural Highway	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	30000607		Project Start Date:		2/1/2012
Research Project Number:	12-1P		Completion Date	(original)	7/1/2014
Research Agency:	LTRC		Completion Date	(revised)	6/30/2018
Principal Investigator:	Kevin Gaspard				

BUDGET STATUS

Total Budget				Estimated 2016-2017 Budget		
Total Cost	(original)	$341,459		**Total**		**$81,279**
	(revised)					
Est. Expended to Date		$190,000		Salaries		$76,279
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$81,181		Equipment	(non-expendable)	$5,000
	(revised)	$130,000		Travel		
Est. FY Expenditure		$100,000		Other		

PURPOSE AND SCOPE

Pavement surface and foundation distresses due to shrinking and swelling soils are an issue on certain Louisiana Highways which is the focus of this study. Desiccation is a common phenomenon due to diurnal changes in soil moisture content and can be caused by three primary sources (Evaporation, Transpiration, Water Table Fluctuations), hereafter referred to as Evapotranspiration . Expansive clay soils (PI>20) are particularly vulnerable to changes in moisture content; shrinking during the drying cycles (desiccation) and swelling during wetting cycles (recharge). While research has been conducted in these areas, though sometimes sparingly, assessment guidelines for soil characterization, environmental factors, and the stress state of the pavement system coupled with appropriate cost effective mitigation methods for evapotranspiration distresses on Highways will be provided through a comprehensive report and technical assistance to the Districts.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Instrument the six test sections on LA 493 and complete soil laboratory testing on the soils. Monitor the test sections seasonally, (January, March, June, and September.) In addition to collect data from the data loggers, elevations will be taken on the sections, and the pavement will be monitored for cracking with our imaging and profiling vehicle.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Monitor LA 493 and LA 454 instrumentation and survey every 3 months; and
-Complete soil testing on LA 493 and LA 454.

Title:	**Field Validation of Equivalent Modulus for Stabilized Subgrade Layer**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000610**		Project Start Date:		5/1/2012
Research Project Number:	12-11P		Completion Date	(original)	4/30/2014
Research Agency:	LTRC		Completion Date	(revised)	5/1/2017
Principal Investigator:	Mark Martinez				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$263,502		**Total**		**$24,297**
	(revised)	$287,799				
Est. Expended to Date		$250,411		Salaries		$24,297
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$40,840		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$26,413		Other		

PURPOSE AND SCOPE

The central objective of the research is to validate the newly developed Modulus Analysis spreadsheet through comparison to field collected data so that current pavement design strategies and policies can be updated and modified in an effort to improve long-term performance and increase benefit-cost ratios on future pavement projects. It is also an objective of this research to develop a subgrade stabilization specification (lime and\or cement) of the Louisiana Department of Transportation and Development (LADOTD) that will allow the Department to take design advantage of the structural improvements that subgrade treatment applications provide.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Task 2: Continued HWD and DCP testing on relevant projects. Progress in this area was severely hampered by a chronic long-term problem with the FWD. As a result, FWD was replaced with an HWD. HWD compatibility with FWD checked. Testing resumed;
-Task 3: Continued compilation of empirical data and continued estimate projections made. Comparison of results attempted and ongoing; and
-Task 4: Continued development of usage model based on data already collected.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 2: Continued HWD and DCP testing on relevant projects;
-Task 3: Continued compilation of empirical data and continued projections. Comparison of results to continue; and
-Task 4: Continued development of usage model based on data already collected.

Title:	**Management and Operation of the Pavement Research Facility**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000141**	Project Start Date:		7/1/2009
Research Project Number:	10-1ALF	Completion Date	(original)	6/30/2015
Research Agency:	LTRC	Completion Date	(revised)	6/30/2018
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$1,730,000	**Total**		**$662,000**
	(revised)	$16,682,103			
Est. Expended to Date		$655,000	Salaries		$450,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$746,000	Equipment	(non-expendable)	$100,000
	(revised)		Travel		$12,000
Est. FY Expenditure		$740,000	Other		$100,000

PURPOSE AND SCOPE

The Pavement Research Facility (PRF) is a full scale test facility site designed to test any and all types of pavements using the Australian designed ALF. The purpose of the Louisiana Transportation Research Center's (LTRC's) Pavement Research Facility is to investigate and evaluate economic and practical alternatives to current design and construction practices.
The objective of this study is to provide for the management and operation structure of the PRF site in performing full-scale accelerated pavement testing.
A manager and two operators will be funded in this study. The scope of the work includes management of the facility, maintenance and operation, preparations of plans for individual experiments, construction and instrumentation activities and planning.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Completed the loading on RCC test sections;
-Continued the ALF loading on Geo-grid reinforced test sections; and
-Constructed three test sections of bonded concrete overlay and started the ATLaS30 loading.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-ATLaS30 loading of the bonded overlay sections;
-Completion of ALF loading on Geo-grid reinforced test sections; and
-Prepare new concrete test sections.

Title:	**Evaluation of Non-SBS Modified Binders using the Multiple Stress Creep Recovery Test**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000095**		Project Start Date:		9/30/2015
Research Project Number:	16-4B		Completion Date	(original)	9/30/2016
Research Agency:	LTRC		Completion Date	(revised)	11/30/2016
Principal Investigator:	Samuel Cooper, III				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$84,065		**Total**		**$55,500**
	(revised)	$85,797				
Est. Expended to Date		$24,500		Salaries		$55,500
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$68,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$24,500		Other		

PURPOSE AND SCOPE

The objective of the research is to characterize the elastic response of Crumb Rubber Modified (CRM) and Latex modified binders used in the Louisiana Department of Transportation and Development (LADOTD) asphalt mixtures using the MSCR. Additionally, force ductility and DSR phase angle data of unaged binders will be collected and used to verify the DSR phase angle or MSCR recovery criteria for the replacement of force ductility with. CRM and Latex modified binders will be obtained from asphalt contractors around the state. For each binder type Force Ductility, Elastic Recovery and other sample verification test results will be collected and compared with MSCR test result for binder characterization.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Conducted literature review;
-Developed the test factorial; and
-Began laboratory testing and data analysis.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continued collection, evaluation, and analyses of non-sbs modified asphalt cement binders;
-Compare binder performance to laboratory mixture performance testing; and
-Prepare draft report.

Title:	**Support Study for Evaluation of Crumb Rubber Modification of Louisiana Mixtures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000059**		Project Start Date:		4/15/2015
Research Project Number:	15-2B		Completion Date	(original)	7/14/2017
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	William Daly				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$160,866		**Total**		**$86,500**
	(revised)					
Est. Expended to Date		$83,000		Salaries		$82,000
FY 2015 - 2016 Budget				Equipment	(expendable)	$4,500
FY Funds	(original)	$85,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$68,000		Other		

PURPOSE AND SCOPE

The objective of this research is to provide chemical support to LTRC Project No. 15-1B entitled “Evaluation of Crumb Rubber Modification of Louisiana Mixtures”. This research will also evaluate potential methods for quality control/quality assurance (QC/QA) of binders modified with crumb rubber. The binder evaluation will include standard SHRP Superpave rheometer testing and comprehensive chemical analysis, CRM binder blends and cements will be laboratory aged, the binder will be extracted, and the extent of ageing will be assessed using FTIR , DTA and SEM techniques.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Continue compiling relevant literature;
-Continue material collection; and
-Begin laboratory evaluation.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete literature review;
-Continue material collection and testing;
-Evaluate the impact of aging on crumb rubber modified binders;
-Begin draft final report.

Title:	**Evaluation of Crumb Rubber Modification of Louisiana Mixtures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000054**		Project Start Date:		4/15/2015
Research Project Number:	15-1B		Completion Date	(original)	4/14/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Samuel Cooper, III				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$186,408		**Total**		**$61,500**
	(revised)					
Est. Expended to Date		$102,500		Salaries		$61,500
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$90,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$78,500		Other		

PURPOSE AND SCOPE

The objective of this research is to evaluate the effect of using Crumb Rubber Modified (CRM) on Louisiana asphalt mixtures. The evaluation will include impacts of modification on design volumetric, LWT performance, and SCB performance. Dense graded and gap graded mixtures will be evaluated.
This research will also evaluate potential methods for quality control/quality assurance (QC/QA) of binders modified with crumb rubber. The binder evaluation will include standard SHRP Superpave Rheometer testing, chemical evaluation, and extraction.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Finalized mixture designs;
-Continued compiling relevant literature; and
-Continued specimen preparation and laboratory evaluation.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue evaluation of various crumb rubber sources;
-Continue mixture testing and analysis; and
-Begin draft report generation.

Title:	**Effects of Temperature Segregation on the Quality of Asphalt Mixtures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000008**	Project Start Date:		8/5/2014
Research Project Number:	14-1B	Completion Date	(original)	8/4/2016
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$352,662	**Total**		**$65,000**
	(revised)				
Est. Expended to Date		$287,662	Salaries		$55,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$109,000	Equipment	(non-expendable)	
	(revised)	$118,000	Travel		
Est. FY Expenditure		$118,000	Other		$10,000

PURPOSE AND SCOPE

Segregation in asphalt mixtures is a non-uniform distribution of coarse and fine aggregates all through its mass, i.e., concentration of coarse materials in some area and fine materials in others. Coarse materials tend to cool more rapidly than fine materials, causing temperature segregation, i.e. temperature differentials. Excessive temperature differentials cause variation in the density levels of pavements during construction. These variations in pavement temperature lead to inconsistent compaction levels. A lack of density in the cooler areas of the pavement can cause premature deterioration of those pavement areas such as moisture damage, fatigue cracking, rutting, raveling, pothole, etc. The objective of this study is to determine the effects of temperature segregation on densification and mechanistic properties of asphalt mixtures in Louisiana. Asphalt paving projects across the State will be selected for mat temperature scanning for a reliable analysis on various contributing factors to the temperature segregation. Three test sections from each project will be identified. Cores across the mat from each test section will be secured for density measurements and mechanistic properties from tests such as the Hamburg type loaded wheel tracking and semi-circular bending

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Conducted thermal profile scanning for three field projects (LA 1053, LA 411, LA 940/939);
-Ascertained areas of thermal segregation;
-Collected field cored from non-segregated and thermally segregated areas;
-Performed density and mechanistic tests;
-Conducted preliminary data analysis;
-Delivered presentation at the 2016 TRB Annual Meeting; and
-Delivered invited presentation at National Asphalt Pavement Association Talks Webinar.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue thermal profile scanning for selected field projects as per test factorial; -Ascertain areas of thermal segregation; -Collect field cored from non-segregated and thermally segregated areas; -Perform density and mechanistic tests; and -Conduct data analysis; and -Prepare draft final report.

Title:	**Evaluation Of Asphalt Mixtures Containing Recycled Asphalt Shingles**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000007**	Project Start Date:		4/8/2014
Research Project Number:	12-1B	Completion Date	(original)	4/7/2016
Research Agency:	LTRC	Completion Date	(revised)	4/7/2017
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$219,476	**Total**		**$50,000**
	(revised)				
Est. Expended to Date		$151,447	Salaries		$48,500
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$65,000	Equipment	(non-expendable)	
	(revised)		Travel		$1,500
Est. FY Expenditure		$65,000	Other		

PURPOSE AND SCOPE

The objective of this research project is to evaluate the potential use of roofing shingle in asphalt concrete mixtures. The roofing shingles may be blended with asphalt binder through a wet process, in which the ground recycled material is blended with a virgin binder at high temperature prior to mixing with the aggregates. To achieve this objective, this research will measure experimentally the rheological and mechanical properties of asphalt binders and aggregates extracted from three contrasting sources of Recycled Asphalt Shingles (RAS). The ground recycled material will then be blended with virgin asphalt binder at high temperature and at different RAS content levels. The chemical and physical interaction mechanisms taking place in the blending process will be characterized using rheological testing and GPC. Rheological and mechanical characterization of asphalt binders and aggregates extracted from three contrasting sources of RAS will be performed. In addition, the mechanical properties of asphalt/aggregate mixtures with and without RAS will be evaluated at high, intermediate and low temperatures.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Characterized the rheological and mechanical properties of asphalt binders and aggregates extracted from four contrasting sources of RAS and/or RAP;
-Prepared asphalt mixtures containing RAS and/or RAP;
-Performed chemical and rheological tests on asphalt binders extracted from the above mixtures;
-Performed the mechanical tests (LWT, SCB, TSRST) on asphalt mixtures containing RAS and/or RAP; and
-Delivered presentations at FHWA Asphalt Mixture Expert Task Group, 2016TRB Annual meeting, and 2016 AAPT Annual Meeting.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue the evaluation of recycling agents as per the test factorial; -Perform chemical and rheological characterization of the extracted binders as per the test factorial; -Perform high, intermediate, and low-temperatures mechanical tests on asphalt mixtures containing RAS and/or RAP; -Perform data analysis; and -Prepare draft final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Pavement Materials Research Using Special Equipment at the Engineering Materials Characterization Research Facility	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	30000112		Project Start Date:		7/1/2009
Research Project Number:	10-1EMCRF		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2018
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				Estimated 2016-2017 Budget		
Total Cost	(original)	$345,000		**Total**		**$143,000**
	(revised)	$14,801,811				
Est. Expended to Date		$14,801,811		Salaries		$127,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$345,000		Equipment	(non-expendable)	$10,000
	(revised)			Travel		$6,000
Est. FY Expenditure		$345,000		Other		

PURPOSE AND SCOPE

The Engineering Materials Characterization and Research Facility (EMCRF) provides a multi-disciplinary expertise and state-of-the-art research capabilities to assess the fundamental engineering properties of materials used in the transportation industry in Louisiana. EMCRF plays an important role in the evaluation of the engineering properties of materials used in the LTRC's regional pavement testing facility, ALF. In addition, EMCRF provides specialized analytical expertise for on-going as well as newly initiated in-house research projects; develops new software to be used by DOTD engineers; provides experimental design and analysis; provide training for the Department of Transportation and Development (LADOTD) employees for the purpose of adopting newly developed technology and implementation methodology into the daily operations of LADOTD, and, assists in-house Louisiana Transportation Research Center (LTRC) Principal Investigators (PI's) to develop thorough research programs.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Participated in the Louisiana LADOTD Parts five and ten Specification Committee;
-Participated in the organization of the Dynamic Shear Rheometer (DSR) Workshop;
-Developed and submitted proposals to NCHRP; and
-Participated in several technical assistance projects.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue participation in the LADOTD Asphaltic Concrete Specification Committee;
-Continue participation in technical assistance projects;
-Develop and submit proposals for external funding; and
-Conduct workshops and seminars.

Title:	**Rehabilitation of Deteriorated Timber Piles using Fiber Reinforced Polymer (FRP) Composites**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000043**	Project Start Date:		8/3/2015
Research Project Number:	15-3ST	Completion Date	(original)	8/2/2017
Research Agency:	West Virginia University	Completion Date	(revised)	
Principal Investigator:	Hota-WVU GangaRao			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$150,000	**Total**		**$90,000**
	(revised)				
Est. Expended to Date		$30,000	Salaries		$75,000
FY 2015 - 2016 Budget			Equipment	(expendable)	$10,000
FY Funds	(original)	$40,000	Equipment	(non-expendable)	
	(revised)		Travel		$3,000
Est. FY Expenditure		$28,300	Other		$2,000

PURPOSE AND SCOPE

Timber bridge piles are highly susceptible to decay in the vicinity of the waterline, and replacement of these piles typically requires cutting out the damaged section and replacing with new wood. Even for this code approved approach, certain stringent restrictions are in order. This process is difficult to complete and is not a long-term solution as the exposed heart wood tends to rot. Using Fiber Reinforced Polymer (FRP) wraps to reinforce the decayed area with filler materials to arrest future rot can be a cost effective and long-lasting method for repair of timber piles. However, the installation methods and design guidelines for load enhancement through FRP repair of piles are severely lacking.

The objectives of this research project are:
-Determine the best materials and rehabilitation techniques to be used for FRP repair through literature review and laboratory testing.
-Develop simplified design methods for rehabilitating deteriorated timber piles using FRP wraps for use by the LADOTD.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Task 1: Literature Review; and
-Task 2: Axial Load Carrying Capacity.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 2: Axial Load Carrying Capacity;
-Task 3: Filler Selection;
-Task 4: Design Methodology; and
-Task 5: Guide Document.

Title:	**Live Load Monitoring of the I-10 Twin Span Bridge**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30001123**		Project Start Date:		8/4/2014
Research Project Number:	13-2ST		Completion Date	(original)	8/3/2016
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Steve Cai				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$172,209	**Total**		**$60,000**
	(revised)				
Est. Expended to Date		$90,000	Salaries		$45,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$65,000	Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure		$50,000	Other		$14,000

PURPOSE AND SCOPE

The proposed work is a continuation of previous work done on the I-10 Twin Span Bridge where the Louisiana Department of Transportation and Development (LADOTD),through its contractor Geocomp Corporation, has installed a comprehensive health monitoring system at Pier M19 of the eastbound lanes on the I-10 Twin Span Bridge. The system is instrumented from deck to piles to capture bridge response to live load.

The objective of this of this project is to: (1) validate the performance of the monitoring system and the OSMOS WIM; (2) develop a data interface tool to easily produce data downloads in table and graphical formats; and (3) determine the effects of traffic loads on instrumented components of the structure.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Understood the instrumentation details and assessed the performance of the instrumentation system;
-Collected field measurement data and made recommendation to improve the system;
-Developed strategies to utilize the data to assess vehicle information; and
-Assessed the performance of bridge components and system.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Since the BWIM is not working currently, we will further assess the performance of the other instrumentation system;
-Further collect field measurement data;
-Further develop strategies to utilize the data to assess vehicle information;
-Further assesse the performance of bridge components and system; and
-Prepare and complete the final report.

Title:	**Cost and Time Benefits for using Subsurface Utility Engineering in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000046**	Project Start Date:		1/28/2016
Research Project Number:	15-2SS	Completion Date	(original)	6/30/2016
Research Agency:	LTRC	Completion Date	(revised)	1/28/2018
Principal Investigator:	Kirk Zeringue			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$75,000	**Total**		**$76,600**
	(revised)	$152,922			
Est. Expended to Date		$16,000	Salaries		$55,600
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$70,000	Equipment	(non-expendable)	
	(revised)	$32,000	Travel		
Est. FY Expenditure		$16,000	Other		$21,000

PURPOSE AND SCOPE

The purpose of the project is to : (1) establish a record of all major projects that DOTD has utilized SUE services; (2) compare the return on investment of applying SUE services in Louisiana to that of the Federal Highway Administration (FHWA), (Purdue) study; and (3) identify project types where the net benefits ar the greatest and the type of services that provide the greatest savings in time and cost.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

The project started in February 2016. A literature review is underway and we have been working with the Louisiana Department of Transportation and Development (LADOTD) Utilities section to identify/categorize QL A/B projects (Task 1).

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete Task 1: Identify/Categorize QL A and B projects;
-Complete Task 2: Determine Time/Cost for identifying utilities in Task 1;
-Complete Task 3: Sample LADOTD projects using QL C and D; and
-Begin Task 4: Determine Time/Cost for identifying utilities in Task 1.

Title:	**Development of a Mode Choice Model to Estimate Evacuation Transit Demand**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000104**	Project Start Date:		3/1/2016
Research Project Number:	14-3SS	Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	2/28/2018
Principal Investigator:	Chester Wilmot			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$182,742	**Total**		**$116,307**
	(revised)	$233,614			
Est. Expended to Date		$25,000	Salaries		$114,207
FY 2015 - 2016 Budget			Equipment	(expendable)	$100
FY Funds	(original)	$117,307	Equipment	(non-expendable)	$1,000
	(revised)		Travel		$1,000
Est. FY Expenditure		$40,000	Other		

PURPOSE AND SCOPE

To develop a mode choice model of hurricane evacuation behavior and demonstrate its use in New Orleans, Louisiana.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Preparation of proposal;
-Literature review;
-Acquisition of data from hurricane Irene.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Prepare data bases including the acquisition of data from hurricane Sandy and supplemental data to both hurricane Irene and hurricane Sandy that describes dynamic storm characteristics, transportation supply, emergency manager actions, and social characteristics of the population;
-Review alternative model formulations; and
-Estimate models on data.

Title:	**Establishing an Intelligent Transportation Systems (ITS) Lab at LTRC (Phase II)**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000140**		Project Start Date:		8/20/2010
Research Project Number:	10-6SS		Completion Date	(original)	11/19/2011
Research Agency:	LSU		Completion Date	(revised)	6/30/2018
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$87,474		**Total**		**$178,285**
	(revised)	$704,983				
Est. Expended to Date		$248,792		Salaries		$118,778
FY 2015 - 2016 Budget				Equipment	(expendable)	$3,000
FY Funds	(original)	$179,726		Equipment	(non-expendable)	$20,000
	(revised)	$179,726		Travel		$2,000
Est. FY Expenditure		$100,000		Other		$34,507

PURPOSE AND SCOPE

The primary goal of this research project is to establish a state-of-the-art Intelligent Transportation Systems (ITS) Lab at the Louisiana Transportation Research Center (LTRC), where data will be collected, analyzed, and reported as part of the ITS effort in Louisiana. The ITS Lab was established at LTRC in 2012 with the intention to serve as a central repository for traffic data collected in the state of Louisiana. The data can be transformed into useful information that is instrumental to procedures and applications that benefit the Department of Transportation and Development (LADOTD), the local government, and the general public. The lab is a valuable tool to retain, recruit, and inspire interest in the field of advanced traffic management systems for students in Louisiana as well as potential graduate students from outside Louisiana.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Managed the ITS lab;
-Developed a draft Strategic Plan for the ITS Lab;
-Conducted transportation engineering research projects;
-Developed a research problem statement and proposal;
-Supervised a Graduate Research Assistant;
-Performed and provided traffic and ITS technical advice in response to requests from LADOTD; and
-Disseminated research results via conference presentations.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue to manage the ITS lab; -Finalize and implement the Strategic Plan for the ITS Lab, in conjunction with the Project Review Committee. Specifically, for the East Baton Rouge parish, (i) Identify all archived data user systems; (ii) Establish a data collection system with all archived data user systems; (iii) Establish data needs of potential end users; and (iv) Develop a workforce to meet data needs; -Continue to conduct transportation engineering research projects as Principal Investigator or Co-Principal Investigator; -Continue to develop research problem statements and proposals as necessary; -Continue to supervised Graduate Research Assistants in the execution of research; -Continue to perform and provide traffic and ITS technical advice in response to requests from LADOTD; and -Continue to disseminate research results.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	LTRC Proposal for the Support of Research and Development in Transportation Planning	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	**30000125**		Project Start Date:		7/1/2010
Research Project Number:	10-1PLAN		Completion Date	(original)	6/30/2015
Research Agency:	LTRC		Completion Date	(revised)	6/30/2018
Principal Investigator:	Chester Wilmot				

BUDGET STATUS

Total Budget				Estimated 2016-2017 Budget		
Total Cost	(original)	$358,462		**Total**		**$528,401**
	(revised)	$6,977,821				
Est. Expended to Date		$5,194,113		Salaries		$524,401
FY 2015 - 2016 Budget				Equipment	(expendable)	$2,000
FY Funds	(original)	$519,453		Equipment	(non-expendable)	
	(revised)			Travel		$2,000
Est. FY Expenditure		$293,594		Other		

PURPOSE AND SCOPE

This project provides long-term professional assistance to the Louisiana Department of Transportation and Development (LADOTD) on transportation planning and other matters, and permits teaching of courses in the Department of Civil and Environmental Engineering at Louisiana State University (LSU) on a case by case basis depending on the work schedule. Such exposure encourages graduate students to participate in the Louisiana Transportation Research Center (LTRC) research program and affords LTRC the opportunity to support the enhancement of higher education. The Principal Investigator (PI)of this projector reports to the Director, LTRC. Research is conducted on topics from LTRC's research program, technical assistance requests from LADOTD, and external research solicitations.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Taught CE 7640, Transportation Policy and Planning, at LSU in Fall 2015;
-Taught CE 7641, Urban Transportation Planning Models, at LSU in Spring 2016;
-Prepared draft final report on project 15-3SS, Investigation into legislative action needed to accommodate the future safe operation of autonomous vehicles in the state of Louisiana;
-Prepared proposal for project 14-3SS, Development of a Mode Choice Model to Estimate Evacuation Transit Demand; and
-Assisted in the preparation of the ABET report for accreditation of the Department of Civil and Environmental Engineering at LSU.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Teach CE 7621, Mass Transit Systems, in Fall 2016;
-Teach CE 7600, Data Collection Methods, in Spring 2017;
-Prepare proposal on a highway evacuation modeling package incorporating all the evacuation models developed at LTRC into a computer package that facilitates the application of the individual models.

Title:	**Evaluation of Bonded Concrete Overlays over Asphalt under Accelerated Loading**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30001663**		Project Start Date:		4/8/2014
Research Project Number:	14-4C		Completion Date	(original)	4/7/2016
Research Agency:	LTRC		Completion Date	(revised)	12/31/2017
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$269,183	**Total**		**$125,000**
	(revised)				
Est. Expended to Date		$68,000	Salaries		
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$144,792	Equipment	(non-expendable)	
	(revised)	$23,346	Travel		
Est. FY Expenditure		$25,000	Other		$125,000

PURPOSE AND SCOPE

This project will investigate concrete overlays of various thicknesses under accelerated loading. Thicknesses to be investigated include 2 inch, 4 inch, and 6 inches. The base course will be identical under all three sections and includes a 3 inch dense graded HMA over crushed stone. The sections will be loaded progressively until failure to show performance and identify, based on ESALS or load to failure, locations to implement the selected design thicknesses across the State.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Sections have started being tested as of April 1, 2016.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue and fail all sections; and
-Start data analysis and develop a draft final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Administration of LTRC External Funding Programs	Project Status:	Ongoing
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30000169**		Project Start Date:		1/1/2008
Research Project Number:	11-1AD		Completion Date	(original)	6/30/2009
Research Agency:	LTRC		Completion Date	(revised)	6/30/2018
Principal Investigator:	Vijaya Gopu				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$211,428	**Total**		**$270,000**
	(revised)	$2,780,222			
Est. Expended to Date		$272,000	Salaries		$199,800
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$287,821	Equipment	(non-expendable)	
	(revised)		Travel		$10,000
Est. FY Expenditure		$272,000	Other		$60,200

PURPOSE AND SCOPE

To cover administrative costs handled under contract to support the LTRC research, development and technology transfer expansion funding programs.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Collaborated in submission of three UTC-Tier 1 proposals;
-Coordinated the funding of three new projects with supplemental funding from NCITEC our UTC headquarters;
-Managed the certification of the overall matching for the UTC award by reviewing individual project budgets and match commitments.;
-Coordinated the TIRE Program and managed the four TIRE projects awarded in 2015;
-Serving as the PI on a NSF award dealing with FMM education;
-Served on several NSF proposal review panels and site visit teams dealing with MRI program and the National Hazard Research Engineering Infrastructure Program;
-Presented several technical papers dealing with timber bridge issues and autonomous vehicles at national and international meetings; and
-Coordinated/chaired three technical sessions at the Louisiana Transportation Conference and presented two talks at the LTC.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Coordinate new UTC projects that are likely to be awarded;
-Coordinate all activities on the NSF project on FMM education;
-Continue coordination of TIRE program and TIRE projects;
-Hold LTRC town hall meetings at all state universities with engineering programs;
-Review and submit IDEA proposal for the upcoming cycle;
-Coordinate submission of NSF MRI proposal; and
-Initiate work on NDE of capacity of deteriorated timber piles.

Title:	**Evaluating Cell Phone Data for AADT Estimation**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000110**		Project Start Date:		5/1/2016
Research Project Number:	16-3SA		Completion Date	(original)	12/31/2016
Research Agency:	LTRC		Completion Date	(revised)	7/31/2017
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$100,000		**Total**		**$95,114**
	(revised)	$155,114				
Est. Expended to Date				Salaries		$60,000
FY 2015 - 2016 Budget				Equipment	(expendable)	$1,000
FY Funds	(original)	$60,000		Equipment	(non-expendable)	
	(revised)	$60,000		Travel		$1,000
Est. FY Expenditure		$60,000		Other		$33,114

PURPOSE AND SCOPE

The purpose of this study is to validate the Annual Average Daily Traffic (AADT) reported by Streetlytics, by using Baton Rouge Metropolitan Area (BRMA) as a test case. For select roadways in BRMA with available AADT (from either the Louisiana Department of Transportation and Development (LADOTD) or local authority), the study will conduct a calibration analysis to verify whether Streetlytics' corresponding AADT is valid. Where significant differences exist, the study will seek to identify patterns to account for the differences. If successful, the research findings may recommend a statewide adoption of Streetlytics and provide a readily available tool that will ensure accurate AADTs across all roadways.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Purchase 1-year Streetlytics subscription; and
-Begin literature review.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete literature review;
-Develop sample list of roadways to be used for the analysis;
-Obtain traditional traffic count data for the developed sample list of roadways;
-Retrieve Streetlytic's traffic data for the developed sample list of roadways;
-Undertake comparative analysis between the traditional and Streetlytic's data; and
-Submit final report.

Title:	**Investigating Safety Impacts of Centerline Rumble Strip, Lane Conversion, Roundabout and J-turn Features on Louisiana Highways**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000087**	Project Start Date:		5/1/2015
Research Project Number:	15-3SA	Completion Date	(original)	
Research Agency:	ULL	Completion Date	(revised)	4/30/2017
Principal Investigator:	Xiaoduan Sun			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$130,000	**Total**		**$80,000**
	(revised)	$129,876			
Est. Expended to Date		$50,000	Salaries		$55,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$60,000	Equipment	(non-expendable)	
	(revised)		Travel		$100
Est. FY Expenditure		$50,000	Other		$24,900

PURPOSE AND SCOPE

The goal of this project is to evaluate few relatively new crash countermeasures on Louisiana highways including the centerline rumble strip, lane conversion (four to three and additional analysis on four to five lane), and the restrictive median opening on high speed corridors. This study focus on the Louisiana rural two-lane highways, urban and suburban roadways and high speed corridors within the Louisiana Department of Transportation and Development (LADOTD) system.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-The team has finished information review and project identification on all four selected crash countermeasures; and
-The data analysis for center line rumple strip for rural 2-lane highways was 80% completed, for J-turn 50%, lane conversion 30% and roundabout 30%.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete all crash data analysis and Benefit-cost analysis; and
-Prepare the final report.

Title:	**Development of a Simulation Test Bed for Connected Vehicles using the LSU Driving Simulator**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000088**	Project Start Date:		6/1/2015
Research Project Number:	15-2SA	Completion Date	(original)	5/30/2017
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Sherif Ishak			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$150,000	**Total**		**$42,000**
	(revised)	$149,865			
Est. Expended to Date		$6,935	Salaries		$42,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$80,000	Equipment	(non-expendable)	
	(revised)	$80,000	Travel		
Est. FY Expenditure		$42,000	Other		

PURPOSE AND SCOPE

The main focus of this study is to develop a driving simulator-based test bed for connected vehicles research in the areas of operation and safety. The specific objectives are to develop connected vehicle simulation test bed using a driving simulator; create some of the connected vehicle safety related applications in the driving simulator environment such as intersection movement assist, DO NOT PASS, and blind spot warning applications; create some of the emergency-related applications in the simulator environment such as eco-approach and eco-departure at signalized intersections; and test the impacts and benefits of each specific application on drivers' behavior.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Task 1: Literature Review is 100% complete;
-Task 2: Develop a Virtual Driving Simulator Scenario, 70% complete; and
-Task 3: Create Connected Vehicles in Driving Simulator Network, 100% complete;

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete Task 2: The realistic network development will be completed in the simulator environment to fulfill the requirements of the connected vehicle applications' simulation;
-Start Task 4: The required procedures to collect data from the connected vehicle type will be in real time will be developed in order to present it to the simulator's drivers;
-Start Task 5: Licensed drivers will be recruited to perform the required experiments on the selected connected vehicle applications; and
-Start Task 6: The research effort will be reported in the final report as all the work is finished.

Title:	**Exploring Naturalistic Driving Data for Distracted Driving Measures**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000053**		Project Start Date:		2/16/2015
Research Project Number:	15-1SA		Completion Date	(original)	8/15/2016
Research Agency:	LSU		Completion Date	(revised)	2/15/2017
Principal Investigator:	Sherif Ishak				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$99,521		**Total**		**$53,000**
	(revised)	$124,321				
Est. Expended to Date		$6,280		Salaries		$38,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$70,282		Equipment	(non-expendable)	
	(revised)	$88,882		Travel		
Est. FY Expenditure		$53,000		Other		$15,000

PURPOSE AND SCOPE

A recent study funded by the Louisiana Transportation Research Center (LTRC) and University Transportation Consortium (UTC), “Distracted Driving and Associated Crash Risks”, concluded that texting and talking to passengers while driving impaired driving performance but failed to find any significant effects for cell phone conversation. The study was however unable to make any statistical findings on the driving performance based on demographics and road facility type because of the limited sample utilized. With the recent availability of data from the Strategic Highway Research Program (SHRP 2) Naturalistic Driving Studies (NDS), there may be ample opportunity to utilize a bigger sample size in a further study that will allow statistical conclusions to be drawn on various strata including gender, road facility type, age, and time of day. However, the SHRP 2 data is relatively new and it is not clear whether the data needs for the further study can be met solely from what is available. Therefore, this study proposes a comprehensive exploration of the SHRP 2 NDS data with the view of identifying if it can provide the data required for an enhanced study on the crash risks of distracted driving. This analysis will also include an outline for the development of a distraction index which will be based on the crash risk potential of several identified distraction factors as well as the combined effect of several performance measures (surrogate measures of distraction).

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Task 1: Literature Review, 100% complete;
-Task 2: Data Exploration, 100% complete; and
-Task 3: Identification of Surrogate Measures of Distraction, 30% complete.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete Task 3: Identification of Surrogate Measures of Distraction;
-Start task 4: Distraction Index; and
-Start Task 5: Prepare Final Report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Louisiana Center for Transportation Safety	Project Status:	Ongoing
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30001501**		Project Start Date:		7/1/2014
Research Project Number:	12-1SA		Completion Date	(original)	12/31/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Dortha Cummins				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$250,000	**Total**		**$103,790**
	(revised)				
Est. Expended to Date		$106,617	Salaries		$72,137
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$112,617	Equipment	(non-expendable)	$10,000
	(revised)	$136,149	Travel		$1,500
Est. FY Expenditure		$81,510	Other		$20,153

PURPOSE AND SCOPE

The Louisiana Center for Transportation Safety (LCTS))will provide a structure for Louisiana's research universities to collaborate on safety related projects and leverage resources. Supported by research and technology transfer, the LCTS will provide enhanced technical assistance to federal, state and local transportation agencies and will be available to work to meet other state and regional needs. An expanded training and education program which includes the new multi-disciplinary highway safety professional curriculum being developed by the Transportation Research Board (TRB) will be made available to transportation professionals on a national basis. The Louisiana Department of Transportation and Development (LADOTD), Louisiana Transportation Research Center (LTRC), and the Transportation Training and Education Center (TTEC) in Baton Rouge, Louisiana will serve as the nucleus for these activities.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Fully staffed the LCTS;
-Develop a draft Strategic and Work Plan for the LCTS; and
-Began marketing and outreach of LCTS across state.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Finalize the Strategic and Work Plan;
-Develop workforce development/training plan; and
-Expand marketing and outreach of LCTS across state and region.

FHWA

Part II SPR Funded Research Program

PROPOSED RESEARCH

Title:	**LADOTD Geotechnical Design Manual**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000097**		Project Start Date:		7/1/2016
Research Project Number:	16-1GT		Completion Date	(original)	
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$85,000		**Total**		**$85,000**
	(revised)					
Est. Expended to Date				Salaries		$85,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The Consultant shall be responsible for the following:
-Organization and recording of regularly scheduled technical sessions with the Louisiana Department of Transportation and Development (LADOTD) Geotechnical Design staff. The consultant shall meet with the LADOTD Geotechnical staff to discuss the various subject/chapters to be included in the manual;
-Submittals and electronic drafts of each chapter based on technical content included in all previous sessions for comment by the LADOTD Geotechnical staff. Interim drafts shall be submitted for review and comment in accordance with the schedule to be determined by the Project Manager;
-Independent research and recommendations on select subject matter;
-Submittal of final draft in written and electronic linkable hypertext format; and
-Continuing maintenance for duration of the contract. This will include, but may not be limited to, periodic review, and incorporation if necessary, of AASHTO LRFD Bridge design specification revisions, attendance at technical meetings with Pavement and Geotechnical Services Section to review and discuss revisions or updates to the Manual, and independent research as requested by LADOTD Pavement and Geotechnical Services Section on subjects to be added or updated within the manual.

Minimum Personnel Requirements: At least one Principal or a Responsible Member of the Prime Consultant must meet the following requirements:
-Registered Professional Civil Engineer in the State of Louisiana;
-A minimum of ten years' experience in geotechnical design;
-Prior experience in the development of a Geotechnical Design Manual;
-Working knowledge of the AASHTO LRFD Bridge Design Specifications;
-Proven project management skills; and
-Technical writing skills including the capability of producing the document in the specified formats.
Minimum Content Requirements: The manual shall include at least the following topics:

-Table of Contents	-Project Coordination Process	-Consultant Services and Review
-Subsurface Investigation Guidelines	-Embankments	-Deep Foundations
-Field and Laboratory Testing Procedure;	-Shallow Foundations	-GeoMechanics
-Geotechnical LRFD Design	-Ground Improvement	
-Geotechnical Resistance Factors	-Geotechnical Performance Limits	
-LA Geology and Seismicity	-Material Description-Classification-Logging	
-Earth Retaining Structures	-Geotechnical Software	
-Geosynthetic Design;	-Geotechnical Reports	
-Plan Preparation	-Specifications and Special Provisions	
-Construction QA-QC	-Construction Monitoring and Instrumentation	
-Geotechnical Design Section Forms	-Project Specific Specifications List	
-Reinforced Soil Slopes		
-Geotechnical Template Plans		

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS
The Project Review Committee has met and reviewed the proposals. The winning proposal was selected. Once awarded, the Project Review Committee will meet with the researcher to begin the project.
FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
Develop the Design Manual.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Data Collection and Analysis of Driven Pile Behavior within Pre-bored Soil**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		8/1/2016
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$180,000	**Total**		**$90,000**
	(revised)				
Est. Expended to Date			Salaries		$90,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

It is expected that the relative strength of the soil as well as the diameter of the pilot hole relative to the pile will have an impact on pile drivability and its long-term load carrying capacity. Quantifying such an impact will greatly help geotechnical design engineers to understand the interactions among the factors of pre-boring, pile size, soil conditions, pile driving, etc. and improve the design and construction qualities of pile foundations in hard/dense soils.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Start research activities.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		9/1/2016
Research Project Number:		Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$250,000	**Total**		**$48,146**
	(revised)				
Est. Expended to Date			Salaries		$45,146
FY 2015 - 2016 Budget			Equipment	(expendable)	$3,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Gesynthetic reinforcement has been used for the past three decades or so to improve the performance of paved and unpaved roadways. Although the benefits of geosynthetics reinforcement have been well-realized in terms of increasing the pavement's service life, reducing the thickness of base course layer, and stabilizing and allowing construction over soft subgrade layer, unfortunately, there is no nationally acceptable design method until now for geosynthetic reinforcement/stabilization of pavement. There is several design methods proposed by the geosynthetic manufacturers that need to be verified, modified and/or develop new design methods. The MEPDG did not consider geosynthetic reinforced pavement due to the lack of understanding the geosynthetic mechanism and lack of quantifying the benefits of geosynthetic.

Two experimental research projects (05-5GT, 11-3GT) had been conducted at the Louisiana Transportation Research Center (LTRC) using cyclic plate load testing and accelerated load testing on geosynthetic reinforced test sections for the purpose of evaluating the benefits of geosynthetic reinforcement in flexible pavements constructed over weak subgrades. However, the tested sections in these studied included only 2 and 3 inch thick AC layers and 12 and 18 inch thick base course layers build over weak subgrade, which will make it difficult to develop a generalized design methodology for geosynthetic reinforced pavement involved sections with different AC and base layers thicknesses, and different subgrade strength/stiffness condition.

The finite element method is a powerful technique that can be used to simulate and model difficult geotechnical and pavement engineering problems. The objective of this study is to develop a finite element numerical model to study geosynthetic reinforced pavement. The numerical model will be first verified and calibrated using the results of experimental test sections conducted at LTRC. The model will then be used to perform comprehensive parametric study on the effect of different variables and parameters contributing to the benefits of geosynthetic reinforcement of pavement including stiffness and thickness of AC layer, stiffness and thickness of base layer, tensile modulus and location of geosynthetics and strength of subgarde layer (for low volume to high volume roads). The results of finite element parametric study can be used to quantify the geosynthetic benefits and develop a comprehensive design method for geosynthetic reinforced pavement that can be incorporated into the context of AASHTO 1993 Design Guide and MEPDG.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Conduct literature review relevant to experimental, analytical and finite element analysis of geosynthetic reinforced pavements; -Develop a finite element numerical model to simulate geosynthetic reinforcement of pavements; -Verify the model using the results of in-box and field accelerated load testing on geosynthetic reinforced pavements; and -Start the parametric study.

Title:	**Development of Software Solutions for Pile Design in Louisiana**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$250,000	**Total**		**$110,600**
	(revised)				
Est. Expended to Date			Salaries		$106,600
FY 2015 - 2016 Budget			Equipment	(expendable)	$4,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

A research project (FHWA/LA.99/334) was completed in 1999 to evaluate eight different direct CPT methods for estimating the pile resistance in Louisiana, which resulted in implementing three CPT methods into visual basic software (LPD-CPT). However, the evaluation was based on estimating the total pile resistance using scanned CPT data (no electronic files), which recently showed discrepancy in estimating frictional and end bearing components of instrumented piles. Since 1999, many new CPT methods have been developed (Eslami & Fellenius, Almeida et al., Powell et al., UWA-05, UF, etc.), and a lot of new pile load tests with electronic CPT data are available that warrant re-evaluating the CPT – pile estimation methods. The effect of scour on pile resistance was not considered. In addition, it is to use data from multi-CPT tests (spatial variation) to estimate the nominal resistance of all piles in the specific project and incorporating the LRFD resistance factors for pile design in the LPD-CPT software.

There is a need to re-evaluate the CPT methods including previously evaluated and recent developments for estimating the nominal end bearing resistance, nominal side friction resistance and total resistance of driven piles in Louisiana using the updated pile load test -CPT databases including instrumented piles. The research study will identify the best CPT method, modifications or developing a different CPT method, if needed, to best estimate the pile resistance in Louisiana. The effect of scour depth on pile resistance (overburden pressure) will be incorporated into the selected/developed CPT methods that will be implemented into the LPD-CPT. The LPD-CPT will be modified to include the capability of using multi-CPT data (and possibly soil borings and SPT data) to estimate the nominal pile resistances of all piles in a specific project considering site variation. The LPD-CPT method will also be updated to incorporate the default and user selectable resistance factors for LRFD design of piles. Other software usability enhancements such as cone factor override and batch processing will be implemented.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Conduct literature review relevant to the application of CPT technology and available direct CPT methods for estimating the nominal tip and side resistances of driven piles; -Start collecting available pile load test data and CPT data from all previous and new sites in Louisiana to establish a database for evaluating the Pile-CPT methods; -Start modifying the LPD-CPT software to incorporate LRFD design methodology and scour effect; and -Start evaluating the newly developed pile-CPT methods and re-evaluate previously implemented pile-CPT methods.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Quality Control/Assurance on Base Course and Embankment with the Dynamic Cone Penetrometer	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$100,000	**Total**		**$31,545**
	(revised)				
Est. Expended to Date			Salaries		$31,545
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Current QA/QC processes on base courses and subgrades are based on densities and moisture contents obtained from the nuclear gauge. Nuclear gauges utilize radioactive materials to determine the density and moisture contents. These gauges are expensive to maintain and dispose of. The DCP is a simple tool, relatively inexpensive compared to nuclear devices, and can be used in areas where nuclear devices cannot. Furthermore, nuclear gauges produce average values for the layer that the probe is inserted to while the DCP produces the entire stiffness profile.

The DCP has been utilized in both research and construction projects for over 10 years in Louisiana. Currently, DCP readings are required on certain subgrade soil surveys and on all projects which are assessed for rubblization.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

This project is proposed.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Begin the research.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Implementation of Pile Set-up Analytical Models in Design**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2016
Research Project Number:		Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$150,000	**Total**		**$69,494**
	(revised)				
Est. Expended to Date			Salaries		$49,494
FY 2015 - 2016 Budget			Equipment	(expendable)	$20,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

A research project was recently conducted at the Louisiana Transportation Research Center (LTRC), (LTRC Project 11-2GT) to study the set-up phenomenon (i.e., increase of pile resistance with time) of piles driven into Louisiana soils. The project involved instrumenting and testing twelve pre-stressed concrete (PSC) test piles driven in different soil conditions of Louisiana soils. Several dynamic and static load tests were performed at different times after EOD to quantify the amount of increase in side resistance with time (side resistance set-up) as compared to EOD resistance. The focus was to quantify the side resistance set-up of individual soil layers along the pile length. The set-up parameter "A" was correlated with different soil properties such as undrained shear strength, plasticity index, coefficient of consolidation, sensitivity and over consolidation ratio (OCR). Based on results of field measurements, several empirical models were developed to estimate the magnitude of pile set-up with time for individual soil layers. The main objective of the proposed research project is to verify, validate and re-calibrate the findings of the previous research project on evaluating pile set-up (LTRC Project 11-2GT). This includes: (1) pile instrumenting and testing to evaluate pile set-up at LA-1 Phase 2c site and other possible sites, (2) compare between the measured pile set-up and set-up predicted using the empirical models for verification, (3) re-calibrate the set-up empirical models as needed, and (4) develop an analytical model to estimate the time frame for the consolidation phase of pile set-up.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Conduct literature review on pile set-up;
-Prepare instrumentation plan for test piles at LA-1 Phase 2c site;
-Purchase the instrumentations for LA-1 Phase 2c project; and
-Start working on developing a model to estimate the time frame for the consolidation phase of pile set-up.

Title:	**Develop a Synthesis on the Application Of PCPT Technology for Geotechnical Engineering Design**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2016
Research Project Number:			Completion Date	(original)	8/31/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$40,000	**Total**		**$34,500**
	(revised)				
Est. Expended to Date			Salaries		$34,500
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The Piezocone Penetration Tests (PCPT) has been widely considered for many years as the most useful in situ testing device for subsurface investigation and soil characterization. The CPT is a robust, simple, fast, reliable, and economical test that can provide continuous soundings of subsurface soil with depth. The piezocone penetrometer is capable of measuring the cone tip resistance (qc), sleeve friction (fs), and pore pressures at different locations, depending on the location of the pressure transducer (at the cone face (u1) or behind the base (u2)). These measurements can be effectively utilized for soil stratification and identification, evaluation of different soil properties such as strength and consolidation design parameters of soils, and direct applications to geotechnical engineering design such as the estimation of ultimate pile resistance. The main objective of this research project is to synthesize the various applications of the CPT technology for geotechnical engineering analysis and design. This includes evaluating soil classification, undrained shear strength, preconsolidation pressure (or OCR), coefficient of lateral earth pressure (ko), constrained modulus (M), small-strain shear modulus (Go), coefficient of consolidation (Cv), relative density and friction angle of sand, direct methods for estimating of ultimate pile resistance, and evaluating the bearing capacity of shallow foundations.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Start the project.

Title:	**Cost Effectiveness of Mitigating Reflective Cracking when Asphalt Surface Treatment Interlayers are Utilized on Soil Cement Base Courses**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000089**		Project Start Date:		7/1/2016
Research Project Number:	16-5P		Completion Date	(original)	6/30/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:	Mohammad Khattak				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$200,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Louisiana has used many different types of treatments attempting to mitigate reflective cracking in Asphaltic Concrete (AC) pavements with soil cement base courses. One popular treatment method is to place an asphalt surface treatment (AST) interlayer over the soil cement prior to placing AC pavement over it. Though this treatment has been used on many projects, the benefit of doing so has not been quantified. The purpose of this project is as certain the benefits of using AST interlayers. This will be accomplished using data from the pavement management system to compare the differences in distress between treated and untreated soil cement base courses.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Start the research activities.

Title:	**Implementation of a Localized Roughness Specification for use on Louisiana Bridges**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Mark Martinez				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$82,528		**Total**		**$82,528**
	(revised)					
Est. Expended to Date				Salaries		$82,528
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

This proposal represents an attempt to develop a specification and implementation strategy that assesses the newly developed bridge roughness specification for use on Louisiana bridges. there are to be two components to the specification. The first comprises a standard IRI component that assesses overall bridge smoothness. The second comprises a localized IRI component utilizing a 25 foot basis (IRI25-ft) that assesses bridge localized roughness (bumps, faults, slope changes, etc.). This proposal seeks to assess the draft specification on pilot projects so as to refine the draft and to assess its strengths and weaknesses.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1 – Select Field Projects;
-Task 2 – Assess Roughness;
-Task 3 – Conduct Statistical Analysis;
-Task 4 – Prepare Summary of Findings;
-Task 5 – Prepare Final Report; and
-Task 6 – Prepare Benefit/Cost Analysis.

Title:	**Development and Implementation of a Shadow Specification that utilizes the Localized Roughness Index (LRI) to Locate Bumps on Louisiana Highways**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$36,954		**Total**		**$36,954**
	(revised)					
Est. Expended to Date				Salaries		$36,954
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

This proposal represents an attempt to develop a shadow specification and implementation strategy that utilizes the Louisiana Transportation Research Center's (LTRC's) newly developed Localized Roughness Index (LRI) for use on Louisiana roads.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1 – Develop LRI Software;
-Task 2 – Develop a Draft LRI Specification;
-Task 3 – Identify Field Projects;
-Task 4 – Conduct Field Assessment of traditional grinding methods without use of LRI;
-Task 5 – Conduct Field Assessment of non-traditional grinding methods incorporating LRI;
-Task 6 – Carry out Comparative Analysis and Conduct Follow-up Testing;
-Task 7 – Prepare Interim Report and/or Hold PRC Meeting;
-Task 8 – Develop a Roughness Specification utilizing LRI
-Task 9 – Prepare Final Report; and
-Task 10– Prepare Benefit/Cost Analysis.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Improving the Use of Crack Sealing to Asphalt Pavement in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		8/1/2016
Research Project Number:			Completion Date	(original)	7/31/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$180,000		**Total**		**$90,000**
	(revised)					
Est. Expended to Date				Salaries		$90,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The main objective of the proposed research is to determine the service life extension of directly or indirectly sealing cracks in AC pavements as well as perform cost-benefits analyses on each method. The research will entail locating projects where direct and indirect crack sealing has been performed and establish the service life extension of each method. the final product should include the guideline of selecting proper roadways for crack sealing or similarly treatment.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Start the research activities.

Title:	**Transportation Infrastructure Asset Damage Cost Recovery Correlated with Shale Gas/Oil Recovery Operations in Louisiana**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zhong Wu				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$125,000		**Total**		**$67,600**
	(revised)					
Est. Expended to Date		$1,000		Salaries		$67,600
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The objectives of this study are (1) to quantify the pavement damage caused by the extra truck trips due to the shale oil/gas development activities; (2) to estimate the damage costs and recommend a strategy of fiscal remedies; and (3) to forecast the impact of the future shale oil/gas development activities on the Louisiana roadways and validate the strategy of fiscal remedies.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Conducted literature review; and
-Developed a research plan to quantify the extra truck trafficking due to shale oil/gas development activities in Haynesville Shale play in Louisiana.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Traffic Data collection;
-Transportation modeling for identified damaged roads in Haynesville Shale play in Louisiana; and
-Pavement life and cost analysis on damaged roads.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$233,000		**Total**		**$116,500**
	(revised)					
Est. Expended to Date				Salaries		$91,500
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		$25,000

PURPOSE AND SCOPE

Louisiana's Quality Control and Quality Assurance (QC/QA) practice for asphalt mixtures in pavement construction is mainly based on controlling physical properties of plant produced asphalt mixtures that include gradation and asphalt content, voids filled with asphalt, air voids, moisture susceptibility tests, and roadway density. These physical properties have served Louisiana well, however, with the increase use of recycled materials in asphalt mixtures such as crumb rubber modified asphalts, reclaimed asphalt pavement (RAP), and recycled asphalt shingles, the Louisiana Department of Transportation and Development (LADOTD) has recently proposed specification changes to incorporate the use of the semi-circular bend (SCB) test at intermediate temperature (LA DOTD TR 330) in order to ensure cracking resistance of the designed mixtures. The objective of this study is to evaluate the SCB test results from several pilot projects selected for the implementation of the new specifications.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1 – Conduct Literature review;
-Task 2 – Identify Field Projects and Material Collection; and
-Task 3 – Conduct of Laboratory Investigation.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Development of a 4.75mm Asphalt Mixture Design	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/5/2016
Research Project Number:		Completion Date	(original)	7/5/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	David Mata			

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$143,000	**Total**		**$71,000**
	(revised)				
Est. Expended to Date			Salaries		$71,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objective of this research is to develop a mix design criteria for 4.75 mm NMAS mixtures. Criteria targeted in the research will be gradation controls, volumetric property requirements (air voids, VMA, VFA, and dust-to-binder ratio) and mechanical tests. The mechanical tests include the Loaded Wheel Track (LWT) test, Semi-Circular Bend (SCB) test, and Dynamic Modulus. Local aggregates and asphalt cements will be evaluated to determine the most economical mix. The primary aggregate types that will be examined are gravel and limestone because of their prevalence in Louisiana. Asphalt binder grades tested will follow Louisiana standard specifications which include PG 64-22, PG 76-22, and PG 82-22crm.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop proposal;
-Conduct literature review;
-Collect local aggregate and asphalt cement; and
-Begin design and reporting.

Title:	**Develop a Fracture Mechanic Based Test for the Evaluation of Moisture Sensitivity in Asphalt Mixtures**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$220,000		**Total**		**$110,000**
	(revised)					
Est. Expended to Date				Salaries		$100,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		$10,000

PURPOSE AND SCOPE

Moisture induced damage of asphalt mixtures is a significant distress affecting not only the long-term performance of asphalt pavements, but also the safety of traveling public. The issue has been studied extensively for decades by numerous researchers), and standard test methods have been used to evaluate the moisture sensitivity of asphalt mixtures. The modified Lottman test (AASHTO T283-Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage) is one of the most widely used methods, which uses the Tensile Strength Ratio (TSR) of moisture conditioned specimen to dry specimen to evaluate the moisture sensitivity. Several studies indicated that the TSR is not a consistent and reliable indicator of moisture sensitivity of asphalt mixtures. Moreover, the moisture conditioning procedure of the modified Lottman test has been also criticized for the impracticality and incapability of simulating the moisture damage in field. The objective of this study is to develop a new standardized fracture mechanics-based laboratory test procedure to evaluate the moisture of asphalt mixtures

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Conduct literature review;
-Evaluate existing moisture damage test methods;
-Develop laboratory test procedure for moisture damage;
-Develop laboratory experimental plan; and
-Performing laboratory tests.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Develop a Cost Effective Perpetual Pavement Design**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2016
Research Project Number:		Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$234,000	**Total**		**$131,000**
	(revised)				
Est. Expended to Date			Salaries		$131,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Perpetual pavements are used to reduce maintenance cost and rehabilitation activities through the increase in the service life of the pavement structures. Currently the Louisiana Department of Transportation and Development (LADOTD) assign 15 to -20 years design life for asphalt mixture in a pavement structure. It is reported that the use of perpetual pavements can increase the performance life up to 30 years with no major structural rehabilitation. It is noted that the initial costs of current perpetual pavement designs are reported to be prohibitive. The objective of this research is to examine potential cost savings in the material selection, design and construction methods in the development of asphalt mixture specifications for perpetual pavement structures. Potential materials include: high RAP, use of mineral fillers such as hydrated lime, elastomeric polymer modification, crumb rubber modifications, and warm mix additives. Further, the design process would incorporate mechanistic evaluation to optimize mixture design. Construction techniques utilized will ensure that a uniform, increased surface density.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Conduct Literature Review;
-Develop Test Factorial;
-Conduct Laboratory Experiment;
-Perform Data Analysis;
-Develop specification for the LADOTD specifications for Roads and Bridges for the Use of Perpetual Pavements; and
-Prepare Final Report.

Title:	**Evaluation of Non-destructive Test Methods for Asphalt Pavement Density Measurements**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/5/2016
Research Project Number:			Completion Date	(original)	7/5/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$190,000	**Total**		**$95,000**
	(revised)				
Est. Expended to Date			Salaries		$95,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Non-destructive testing of asphalt pavement density has the potential to be safer and less time consuming than conventional destructive methods. Advancements in non-destructive technologies have improved the reliability and accuracy of non-destructive density measurements. This research will investigate the available non-destructive density measurement options to be potentially implemented by the Louisiana Department of Transportation and Development (LADOTD).

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop proposal;
-Conduct literature review;
-Develop experimental factorial; and
-Identify field projects.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Field Implementation of Handheld FTIR Spectrometer for Polymer Content Determination and for Quality Control of RAP Mixtures**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/5/2016
Research Project Number:			Completion Date	(original)	7/5/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$200,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this research project is to determine if the FTIR can be implemented in Louisiana for polymer content determination and for quality control of recycled mixtures. The FTIR spectrometer has the advantage of being faster, easier to handle, and inexpensive than current testing methods, but requires further researching of its capabilities. The FTIR will need to be tested for precision, testing time, and cost effectiveness versus the other asphalt binder testing devices.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop proposal;
-Conduct literature review;
-Develop experimental factorial; and
-Identify field projects.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000099**	Project Start Date:		10/1/2015
Research Project Number:	16-1ST	Completion Date	(original)	
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$169,172	**Total**		**$21,000**
	(revised)				
Est. Expended to Date			Salaries		$17,000
FY 2015 - 2016 Budget			Equipment	(expendable)	$100
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$3,900

PURPOSE AND SCOPE

The purpose of this research project is to evaluate the current strength and performance of the most common types of vintage concrete safety walk barriers currently in use by the Louisiana Department of Transportation (LADOTD). These designs will be evaluated with respect to MASH TL-3 and 4 Specifications. For the common rail types that do not meet the requirements, retrofit bridge railing options will be engineered, design and detailed. These retrofit options will be developed to improve the strength and crash performance of the barrier systems with respect to MASH TL-4. The retrofit options developed for this project will improve the crash performance of the bridge rail systems and maintain the safety walk areas. The retrofit options will be designed to be cost effective to fabricate and install. We understand the proposed retrofits developed for the safety rails selected for this project will consider the us(continued use) of the safety walk for maintenance activities or emergency vehicular stoppages.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 2: Literature Review of LADOTD Database of Bridges with Safety Walk Barriers; and
-Task 3: Bridge Rail Analyses, Design & Detailing (System Development).

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Live Load Rating of Cast-In-Place Concrete Box Culverts in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		5/2/2016
Research Project Number:			Completion Date	(original)	7/31/2017
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Ayman Okeil				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$264,484		**Total**		**$252,886**
	(revised)					
Est. Expended to Date				Salaries		$84,210
FY 2015 - 2016 Budget				Equipment	(expendable)	$43,900
FY Funds	(original)			Equipment	(non-expendable)	$90,000
	(revised)			Travel		$3,500
Est. FY Expenditure				Other		$31,276

PURPOSE AND SCOPE

The objective of this study is to assess live load effects on cast-in-place concrete box culverts. Field load testing of the culverts selected by the Louisiana Department of Transportation (LADOTD), will be conducted after instrumenting to monitor their response. Understanding the response of the culverts will provide insight as to how the live loads are actually distributed as well as the actual rigidity of the box corner connections.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 2: Select Representative Culverts (Coordinated by LADOTD Bridge Design Section);
-Task 3: Develop Instrumentation Plan and Specifications;
-Task 4: Procurement of Monitoring System; and
-Task 5: Inspect, Instrument, and Conduct Load Test.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Evaluating the Effectiveness of Regulatory and Warning Signs on Driver Behavior near Highway/Rail crossings**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$75,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	$24,000
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Regulatory signs and warning signs are tools designers use to relay information to drivers about hazards that may not be readily apparent or to elicit certain driver behavior that will improve the probability of safely traversing a crossing. These signs are widely used and are believed to be effective; however, the proposed study seeks to quantify their effectiveness. While the results of the research will not result in a new device, the research has the potential to impact if and when Warning or Regulatory signs are used near highway/rail crossings. The results will give designers a better understanding of the impacts of the signs and allow for optimal utilization of the signs.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Identify crossings where the Traffic Safety group or Highway/Rail Safety Unit would like to install signage; -
-Install cameras and record the vehicles/drivers before the signs are deployed;
-Install the signs, allow for a short adjustment period for drivers;
-Record any changes in drivers' behavior; and
-Analyze data to determine if there is any change in drivers' behavior.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Dredging Louisiana's Ports**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2015
Research Project Number:			Completion Date	(original)	
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$75,000		**Total**		**$75,000**
	(revised)					
Est. Expended to Date				Salaries		$75,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of the study is to investigate the feasibility of the Louisiana Department of Transportation and Development (LADOTD), (or other agencies) purchasing, owning, and operating a dredge to assist in the effort to adequately maintain navigable channels to authorized dimensions. It is anticipated that the research will include: (1) a review of available dredging equipment/technology; (2) an assessment of ownership costs (i.e. purchasing, permitting, maintenance, operation, etc.); (3) a comparison to contracting out the dredging operations; and (4) a review of existing legislation and recommendations for required legislation.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

The Project Review Committee has met to begin developing the Request for Proposal (RFP). A site visit was conducted at the Port of Morgan City and on a working dredge near the port to help inform the RFP development process.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

To be determined.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Louisiana Trip Generation Manual**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		8/1/2016
Research Project Number:			Completion Date	(original)	1/31/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$125,000	**Total**		**$90,000**
	(revised)				
Est. Expended to Date			Salaries		$90,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Trip generation rates play an important role in transportation planning, which can help in making informed decisions about future transportation investment and design. However, sometimes the rates are derived in the ITE TGM from small sample sizes or may not be reflective of the size of the location under consideration. While using local data in the planning process is desirable, it is often difficult to obtain a sufficient, useful sample size.

Louisiana mandates the use of the ITE Trip Generation Manual (TGM). The TGM appears to be very conservative on the number of trips that occur at developments during peak hours. This project proposes to take major categories out of the ITE Trip Generation Manual and do real counts around Louisiana to confirm the numbers in the book. If need be, continue this to create a Louisiana-specific Trip Generation Manual. A Louisiana-specific TGM could result in developers not having to make so many major improvements due to the large trip generation.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

The Project Review Committee has met and is developing the Request for Proposal (RFP).

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

To be determined.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Louisiana Highway Construction Work Zone Mobility Impact Assessment Tool**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2015
Research Project Number:			Completion Date	(original)	
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$125,000	**Total**		**$90,000**
	(revised)				
Est. Expended to Date			Salaries		$90,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this proposed project is to develop a method and tool for estimating highway work zone mobility impact on a regional road network. In addition, the Louisiana Department of Transportation and Development's (LADOTD's) existing queue estimation procedures will be evaluated and compared to actual queues using video camera footage.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

The Project Review Committee has met and the Request for Proposal (RFP) is currently under development.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

To be determined upon proposal selection.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Evaluation and Guidance of Planning-Level Cost Estimation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2016
Research Project Number:			Completion Date	(original)	2/28/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$125,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$75,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Transportation agencies begin planning projects as much as 25 years into the future. The purpose of transportation planning is to identify a set of the most cost-effective projects and approaches that achieve the state goals. Planning-level cost estimates can have a significant effect on the overall transportation program and on the ability of the Louisiana Department of Transportation and Development (LADOTD) to meet the transportation needs for the state. The accuracy of planning-level or conceptual estimating can affect if and how a project will be built and the amount of other projects that can be funded and built that are to become a part of the Statewide Transportation Improvement Plan (STIP). The overall approach and management philosophy towards cost estimation needs to be consistent so that estimates more closely match the actual budget and cost of a project once construction begins. The lack of a consistent and statewide program for planning-level cost estimation can hinder the abilities of the state transportation agency and may result in projects utilizing more public funds than they should. The public perception of funds not being used efficiently can have a negative and lasting impact, making it difficult to gain legislation to collect additional public funding in the future.

This study is to survey the current practices that LADOTD uses for planning-level cost estimates for transportation projects. Further, this study will investigate other state transportation agencies (STA's) to synthesize the best practices used for planning level estimating. The collected information from LADOTD and other STA's will then be formulated into a resource guide that can be utilized by LADOTD staff throughout the state.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS
The Project Review Committee has been established and Request for Proposal (RFP) development will commence in May, 2016.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
To be determined based on the selected proposal.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Highway Evacuation Modeling Package	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2016
Research Project Number:			Completion Date	(original)	8/31/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Chester Wilmot				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$200,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$72,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	$1,000
	(revised)		Travel		$2,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To develop a computerized hurricane evacuation modeling package that incorporates the hurricane evacuation models developed at the Louisiana Transportation Research Center (LTRC) over the last 10 years and demonstrate its use in a trial application.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Prepare synthetic population data for New Orleans metropolitan area;
-Prepare evacuation network for New Orleans metropolitan area; and
-Prepare input data files in the required format and automate the dynamic updating of the input files.

Title:	**Radio-frequency Identification (RFID) Tagging for Material Tracking and Future Asset Management**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		5/1/2016
Research Project Number:	16-1C		Completion Date	(original)	4/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$165,312		**Total**		**$112,656**
	(revised)					
Est. Expended to Date				Salaries		$52,656
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	$60,000
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

This project will study the feasibility of using RFID technology to track the Louisiana Department of Transportation and Development (LADOTD) pavement materials and highway assets. RFID tagging will allow the department to lookup mixture design and construction information of the materials used on the highway system in an efficient and cost-effective way. The research will identify the RFID tags and readers suitable for use on above-ground and underground highway elements. Additionally, the research will also study the possibility of inventorying these assets from a moving vehicle.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Gathered pertinent information from vendors and other states using RFID technology for asset management.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Perform literature review;
-Acquire RFID systems;
-Choose site(s) for field trial; and
-Start field testing.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Evaluation of CFRCP: Phase II Accelerated Loading**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$250,000		**Total**		**$33,000**
	(revised)					
Est. Expended to Date				Salaries		$33,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this project is to determine the fatigue failure mechanism of CFRCP under accelerated loading. Additionally, cracking patterns for long pavement sections will also be identified and documented. The performance of the sections will be determined under heavy load accelerated loading.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop proposal;
-Design sections; and
-Construct sections.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Development of Prediction Models and Design Guides for RCC Pavements**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$100,000		**Total**		**$47,000**
	(revised)					
Est. Expended to Date				Salaries		$42,000
FY 2015 - 2016 Budget				Equipment	(expendable)	$5,000
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this project is to use load related research data to predict performance of RCC pavements leading to the development of design software that has the ability to quickly compare various design methods for multiple types of pavements under heavy loads. Additionally, properties of RCC related to fatigue will be investigated.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop proposal;
-Fabricate test beams; and
-Program test equipment to perform fatigue tests.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Feasibility and Advantages of Acceptance of Concrete Beyond 28 Days**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zachary Collier				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$30,000		**Total**		**$30,000**
	(revised)					
Est. Expended to Date				Salaries		$30,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this study is to perform a literature review and determine best practices for acceptance criteria for PCC materials. Increased cement substitution may require a changed date for acceptance from say 28-days to 56-days of age. This project would look at the feasibility of this change.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Develop proposal;
-Perform literature review;
-Prepare final report; and
-Develop implementation statement.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Reliable Early Opening Strength for Concrete Pavements and Patch Work**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zachary Collier				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$40,894		**Total**		**$40,894**
	(revised)					
Est. Expended to Date				Salaries		$40,894
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

This research will provide a literature survey of the latest agency requirements along with a state highway agency survey. The transportation agency has a need to specify early opening strengths and would benefit from understanding the latest thinking and practices adopted by similar agencies.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Perform literature review;
-Survey states;
-Analyze data; and
-Prepare final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Effect of Clay Content on Alkali-Carbonate Reactive (ACR) Dolomitic Limestone**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/29/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$600,000		**Total**		**$500,000**
	(revised)					
Est. Expended to Date				Salaries		$100,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	$400,000
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

This project will investigate the hypothesis that clay content plays and overarching role in ACR expansion and deterioration. Beams will be produced and tested in long term ACR expansion.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Purchase XRF and produce beams.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Establishment of the Center for Sustainable Pavement Materials and Technologies	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$150,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The transportation infrastructure in Louisiana includes 60,925 miles of streets, roads, and highways, as well as more than 13,426 bridges. Annually, freight transportation in this system carries over 360 million tons of goods valued at approximately 96 billion dollars; 49% of these goods are transported by trucks. The State economy relies completely on our ability to move goods, fuel, and people freely and inexpensively to every corner of our State. Therefore, efficient operation of the highway network is critical for the viability of the State economy and its growth and productivity. The inadequacy of many of the existing roads and the escalating costs of materials and energy provide a great motivation for exploring new innovative techniques and methods for design, building, and preserving roads that ensure its sustainability. In recent years, many state agencies and the Federal Highway Administration (FHWA) have emphasized the importance of pavement sustainability and recycling. The recent increase in energy prices and the gradual depletion of natural resources have also pressed the need to conserve energy in highway construction activities and to adopt methodologies that would be beneficial to the environment, to the users, and to the industry. Using recycled materials and sustainable methodologies will not only reduce help to overcome the current rapid escalation of the costs for building with new virgin highway materials, but it will also maximize the usage of our existing pavement assets in our rehabilitation strategies. In addition, by incorporating sustainable and recyclable materials and technologies into transportation infrastructure, those structures will have a significant impact on the viability and longevity of our society. The use of sustainable and recycled materials will reduce the amount of materials to be quarried, processed, and transported and protect the environment and scarce natural resources. In addition, energy consumption and greenhouse gas emission are also reduced as a result of the use of sustainable alternatives. Therefore, the proposed center will focus on conducting research into the concepts of sustainable material development and how it can be applied to the practice of pavement design, engineering, and construction.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Establish of the Center for Sustainable Pavement Materials and Technologies; -Develop proposals for external funding for the center; Conduct research relevant to the Center theme and LADOTD needs; and -Develop and Promote effective Sustainable Pavement Technologies for managing and preserving the infrastructure.

Title:	**A State-of-the-Art Virtual Environment for Highway Work Zone Construction Safety Research, and Training**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		4/1/2016
Research Project Number:	16-5SA		Completion Date	(original)	9/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Sherif Ishak				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$280,900		**Total**		**$151,232**
	(revised)					
Est. Expended to Date				Salaries		$69,693
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$25,000		Equipment	(non-expendable)	$62,860
	(revised)			Travel		
Est. FY Expenditure				Other		$18,679

PURPOSE AND SCOPE

The purpose of this project is to determine the effectiveness of an integrated virtual environment as a potential research apparatus for studying highway work zone safety and support the decision-making of transportation administration agencies as well as to determine the potential of incorporating the integrated virtual environment in safety training for the Louisiana Department of Transportation and Development.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Research proposal was developed for this project; and
-Project Review Committee (PRC) meeting was held April 18, 2016 to discuss the scope of work with the research team and review the proposal.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete Task 1 - Literature review;
-Complete Task 2 - Design of a virtual environment;
-Complete Task 3 - Equipment installation;
-Complete Task 4 - Simulation interface integration; and
-Complete Task 5 - Develop a risk-assessment approach.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Pedestrians and Bicyclists Count**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		1/18/2016
Research Project Number:	16-4SA		Completion Date	(original)	
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$150,000		**Total**		**$100,000**
	(revised)					
Est. Expended to Date				Salaries		$100,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$10,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this project is to research methods of counting bicycles and pedestrians, research best practices for state count program, identify funding sources for conducting counts and potential partners, provide information needed to develop an efficient and cost-effective bicycle and pedestrian count program, and identify opportunities to integrate counting with existing vehicular counting program.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

A Project Review Committee (PRC) meeting was held on February 18, 2016 to develop the scope of work.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

To be determined.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Highway Construction Work Zone Safety Performance and Improvement in Louisiana	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		9/1/2015
Research Project Number:	16-1SA		Completion Date	(original)	4/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Helmut Schneider				

BUDGET STATUS

Total Budget				Estimated 2016-2017 Budget		
Total Cost	(original)	$112,300		**Total**		**$56,148**
	(revised)					
Est. Expended to Date				Salaries		$56,148
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of this project is to provide a review of current practices for reporting work zone crashes on the Louisiana crash reports by police officers, to review literature to obtain the state of knowledge on work zone crashes and reporting practices, to identify factors associated with work zone crashes in Louisiana that can be used to develop strategies to reduce work zone crashes and injuries, and to develop recommendations for improved reporting of work zone related crashes.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Two Project Review Committee meetings were held, one on September 21, 2015 to develop the scope of the work for this project, and one on December 7, 2015 to discuss the scope of the work with the Principal Investigator; and
-A research proposal was developed and is now under PRC review.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete Task 1 - Literature Review;
-Complete Task 2 - Data Selection;
-Complete Task 3 - Interim Report; and
-Start Task 4 - Data Analysis.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Failure Prevention for Sensitized Structural Alloys used in Coastal Transportation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:	17-5TIRE		Completion Date	(original)	6/30/2017
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$29,968		**Total**		**$29,968**
	(revised)					
Est. Expended to Date				Salaries		$25,468
FY 2015 - 2016 Budget				Equipment	(expendable)	$1,000
FY Funds	(original)			Equipment	(non-expendable)	$3,500
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of the project is to conduct a systematic study to precisely correlate ultrasound parameters with Mass Loss in sensitized alloys, precisely AA5xxx–series alloys used in coastal transportation vehicles.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1: Four ultrasonic parameters will be measured: wave velocity for shear and longitudinal waves as well as attenuation coefficient for shear and longitudinal waves;
-Task 2: Two materials will be tested, both used in the construction of efficient vehicles and affected by sensitization: AA5083 (4 - 4.9 wt.% Mg) and AA5456 (4.7 - 5.5 wt.% Mg). Three temperatures will be used: low (100 oC), intermediate (135 oC), and high (170 oC). The sensitization will be lab-produced through controlled incremental heating in a programmable oven. Measurements (P-E and RUS) will be taken after each heat treatment. For each point on the heating-time axis, the G67 test will be performed on parallel samples made from the exact same lot, heat-treated at the same time and under the same conditions. The calibration between heating time (in hours) and Mass Loss (in mg/cm2) will be obtained; and
-Task 3: Prepare and submit final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**A Data-driven Framework for Damage Diagnosis and Prognosis of Coastal Bridges**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2016
Research Project Number:	17-4TIRE	Completion Date	(original)	6/30/2017
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to develop a novel data-driven framework to implement damage diagnosis (estimating the damage location and severity) and prognosis (predicting the remaining useful life) of coastal bridges.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1: Create a benchmark bridge model with damage on load-carrying members (represented by corrosion cracks);
-Task 2: Create a Finite Element (FE) model for the benchmark bridge subjected to various loading scenarios to obtain the structural responses which will be used as observational data for analysis;
-Task 3: Process the data using established data-driven algorithms to extract the damage features and to identify the damage location and extent;
-Task 4: Establish a probabilistic future loading model based on previously observational data;
-Task 5: Incorporate all the data and information into the developed DP framework and predict the remaining useful life of the bridge; and
-Task 6: Prepare and submit final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Design and Investigation of a Fuel-Flexible Injection System for Low-Emission Vehicles**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2016
Research Project Number:	17-3TIRE	Completion Date	(original)	6/30/2017
Research Agency:	ULL	Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$29,990	**Total**		**$29,990**
	(revised)				
Est. Expended to Date			Salaries		$26,190
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	$3,800
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of the project is to develop a fuel-flexible aerodynamic fuel injection system supplying continuous sprays for clean vehicles such as micro turbine-driven hybrid vehicles (cars, trucks, and boats) and airplanes powered by jet engines.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1: design and fabrication of swirling air paths in a FB injector for atomization enhancement;
-Task 2: integration of the injection system with the lab-scale micro turbine burner being established in Mechanical Engineering at UL Lafayette;
-Task 3: investigation of spray characteristics involving spray angle and droplet size;
-Task 4: measurement of combustion exhaust gas temperature and emissions with the varying injector geometry (swirling angles, locations);
-Task 5: data analysis and documentation of spray features (angles and droplet size), emission and flame temperature results corresponding to various/no swirler angles and locations in the FB injector; and
-Task 6: Prepare and submit final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Drones for Automatic Pothole Detection and Road Construction Monitoring	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2016
Research Project Number:	17-2TIRE		Completion Date	(original)	6/30/2017
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Supratik Mukhopadhyay				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The goal of the project is to develop fully autonomous drones for automatically detecting potholes in Louisiana roads and marking them up for possible repairs as well as tracking the progress of road construction and repair projects and improving their safety by discovering and reporting dangerous conditions and hazardous objects before they can cause catastrophic incidents.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1: Development of an image stabilization module;
-Task 2.1: Development of an Advanced Computer Vision System for Detecting Objects;
-Task 2.2: Development of an algorithm for autonomous navigation of drones;
-Task 3: Integration of hardware and software and development of battery replacement mechanism;
-Task 4: Experimentation with the system, its evaluation, and its deployment in the real world; and
-Task 5: Prepare and submit final report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Advanced Modeling of Piezocone Penetration Test Using Cavity Expansion Theory and Interpretation Simulator Development**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2016
Research Project Number:	17-1TIRE		Completion Date	(original)	6/30/2017
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$30,000		**Total**		**$30,000**
	(revised)					
Est. Expended to Date				Salaries		$27,622
FY 2015 - 2016 Budget				Equipment	(expendable)	$2,378
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The goal of this project is to conduct an exploratory study on the application of the derived exact elastoplastic solutions for cavity expansion problems to the interpretation of and maximum benefit extraction from the piezocone penetration tests.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1: Rigorous analytical solution for spherical cavity expansion;
-Task 2: Interpretation of piezocone test results;
-Task 3: Piezocone interpretation simulator development; and
-Task 4: Prepare and submit final report

FHWA

Part II SPR Funded Research Program

POOLED FUND
LOUISIANA
LEAD STATE RESEARCH

Title:	**Development of a Guidebook for Determining the Value of Research Results**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: Pooled Fund: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000090**	Project Start Date:		1/4/2016
Research Project Number:	16-1PF	Completion Date	(original)	3/30/2017
Research Agency:	West Virginia University	Completion Date	(revised)	1/3/2018
Principal Investigator:	Yoojung Yoon			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$150,000
	(revised)	
Est. Expended to Date		
FY 2015 - 2016 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2016-2017 Budget		
Total		**$78,400**
Salaries		$54,540
Equipment	(expendable)	
Equipment	(non-expendable)	$5,100
Travel		$3,500
Other		$15,260

PURPOSE AND SCOPE

The primary objective of this project is to develop a guidebook used by all Southeast Transportation Consortium (STC) research sections that will allow a consistent approach for measuring and documenting the value of completed research. Therefore, the specific aims of the work proposed are as follows:
-Investigate all possible aspects (e.g., state DOT organizational structures, state/national transportation missions, research objectives, research attributes such as qualitative or quantitative) to develop a list of research project;
-Define the parameters required for determining the values of research projects in relationship tables/diagrams;
-Develop a straightforward decision matrix to guide public agencies from a starting point (e.g., research categories) to an end point (e.g., measure quantification methods) with examples; and
-Develop a rating method to determine research values by integrating all of the qualitative and quantitative measures.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Perform literature and discovery search including questionnaire surveys;
-Development of research project categories;
-Development of value of research measures;
-Gap analysis on existing quantification process;
-Interim report; and
-Development of measurement processes.

Title:	**Prep-ME Software Implementation and Enhancement**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: Pooled Fund: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000057**	Project Start Date:		8/1/2015
Research Project Number:	15-1PF	Completion Date	(original)	12/31/2016
Research Agency:	Oklahoma State University	Completion Date	(revised)	10/31/2016
Principal Investigator:	Joshua Li			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$142,202	**Total**		**$23,113**
	(revised)	$91,953			
Est. Expended to Date		$24,910	Salaries		$13,474
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$78,799	Equipment	(non-expendable)	
	(revised)	$78,799	Travel		$2,379
Est. FY Expenditure		$68,840	Other		$7,260

PURPOSE AND SCOPE

Pavement ME Design (previously MEPDG/DARWin-ME) is a significant advancement in pavement design, but requires much more inputs from various sources. Through the transportation pooled fund study TPF-5(242), the Phase II final deliverable Prep-ME software is capable of pre-processing, importing, checking the quality of raw Weigh-In-Motion (WIM) traffic data, and generating three levels of traffic data inputs with in-built clustering analysis methods for Pavement ME Design. This software complies with the Federal Highway Administration (FHWA) Traffic Monitoring Guide (TMG) and TMAS for quality assurance and quality control (QA/QC), and can be used by state highway agencies for the QA/QC of traffic data collection, analysis of truck loading data, and preparation of input for AASHTO Pavement ME software.

The objective of proposed Phase III project is to assist participating state DOTs on the full implementation of Prep-ME software for traffic data collection and Pavement ME Design and to deliver new generation of Prep-ME software with enhanced and customized features for each individual state.

Upon completion of this project, participating state DOTs will have a software and database tool set used not only by pavement design engineers to prepare input for Pavement ME Design, but also traffic data collection engineers to collect better traffic data and manage those data for other applications.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Developed updated Prep-ME software with the capability to import WIM data based on both TMG 2001 and TMG 2013 format. Since the release of TMG 2013, several participating states have been collecting WIM data in accordance with the TMG 2013 format. This new capability has been tested with sample TMG 2013 WIM data from Kentucky and Wisconsin, which shows that Prep-ME is capable to automatically differentiate the WIM data formats and correctly import the WIM data into the Prep-ME SQL database;
-A portable version of Prep-ME has been developed to assist field traffic data collection and WIM sensor calibration. The software has been distributed to participating states for testing and comments;
-The research team has coordinated with all the participating states on Prep-ME on-site trainings. Several states, including Nevada, Kentucky, North Carolina, have received the training. State WIM data were requested and used for the training to demonstrate the software functionality and how the software can be utilized by pavement design and traffic data collection engineers to improve operation productivities. Desired enhancements of software capabilities were discussed during the training for each state and several updates of the software were released based on the comments. The training for Michigan and Louisiana are scheduled in May and July 2016 respectively; and
-Continued providing technical support on a need basis to help state DOTs deploy the Prep-ME software. In particular, the team worked closely with MDSHA, KYTC, Wisconsin DOT, NVDOT on the issues and questions encountered during the implementation of Prep-ME for their daily usage. Several bugs were fixed and improvements made during the past fiscal year. In addition, several new features requested by participating states were added to enhance the existing capabilities in Prep-ME.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Complete on-site training for the remaining states who would like to have on-site training, and provide online webinar training for all participating states and other users. The comments from all participating states will be addressed and necessary changes will be made in Prep-ME;
-Integrate the states' comments and deliver a final version of Portable Prep-ME to aid states in field data collection and WIM sensor calibration;
-Deliver a final version of Prep-ME software for Phase III of TPF-5(242) with enhanced capabilities requested by participating states;
-Continue providing technical support on a need basis in a timely manner to help states implement Prep-ME for daily traffic data collection and ME based pavement design; and
-Propose new Scope of Work for Task 4 of TPF-5(242) and gather feedback and comments from participating states. Many participating states are actively implementing the Prep-ME software and have demonstrated their intentions to continue supporting the development of Prep-ME for new features and technical support.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents and/or RAS	Project Status:	Ongoing

Funding Source:	SPR: Pooled Fund: TT-Fed	Budget Category:	FHWA

SIO:	DOTLT1000002		Project Start Date:		11/1/2014
Research Project Number:	14-5PF		Completion Date	(original)	10/31/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$306,812	**Total**		**$100,000**
	(revised)				
Est. Expended to Date		$125,000	Salaries		$98,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$66,000	Equipment	(non-expendable)	
	(revised)		Travel		$2,000
Est. FY Expenditure		$66,000	Other		

PURPOSE AND SCOPE

Despite recent advancements in the design of asphalt mixtures containing Reclaimed Asphalt Pavement (RAP), many states are still cautious in their regulations to avoid durability problems related to the recycling process. In many states, RAP is currently not allowed in highest-class asphalt mixtures and in polymer-modified asphalt products. In addition, high percentages of RAP exceeding 25% are not commonly used in practice. On the other hand, many state agencies are taking a more aggressive approach by considering increasing the allowable percentages of RAP in asphalt mixture to take full advantage of this promising technology. For instance, up to 50% RAP has been used in some asphalt mixtures, which produced an acceptable level of performance. In addition, reclaimed asphalt shingles (RAS), defined by the The American Association of State Highways and Transportation Officials (AASHTO) MP 15-09 “Standard Specification for Use of Reclaimed Asphalt Shingles as an Additive in Hot-Mix Asphalt (HMA)” as “any type of waste roofing asphalt shingles that have been processed into a recyclable product,” have become another promising candidate of recycling, also because of the high compatibility with paving asphalt mixtures. However, to ensure successful use of RAP and/or RAS, confidences in the mixture design procedure require addressing many concerns related to the interaction between virgin and recycled materials and durability of the produced mixture. Current AASHTO recommendations make it difficult to design asphalt mixtures with high-RAP and/or RAS contents. Modifications to the current specifications are needed to assure agencies that satisfactory performance will result from the use of high-RAP and/or RAS content asphalt mixes. The objectives of this study are to 1) establish mechanistic test criteria for asphalt mixtures (warm and hot) containing high-RAP content and/or reclaimed asphalt shingles (RAS); and 2) propose asphalt mixture specifications that incorporate the mechanistic test criteria as tested on plant produced specimen and/or roadway cores based on the results of the study.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Continued collecting data from a variety of sources to review completed and on-going laboratory and field studies on the design, characterization, and fatigue/fracture performance of HMA and WMA incorporating high percentages of RAP and/or RAS;
-Continued communications with participating states personnel from Florida, Colorado, and Louisiana to provide assistance and guidance in identifying two field projects from each state as per the test factorial. Further, FHWA joined this project and provided eleven mixtures from on-going project FHWA-PROJ-11-0070 “Advance Use of Recycled Asphalt in Flexible Pavement Infrastructure: Develop and Deploy Framework for Proper Use and Evaluation of Recycled Asphalt in Asphalt Mixtures”;
-Tested mixtures from Lanes 1-5 and 9 of FHWA-ALF lanes for dynamic modulus and S-VECD fatigue characterization. The SCB tests for Lane 7 and 9 have also been completed; and
-Preliminary data analyses were performed. Dynamic modulus master curves and the damage characteristic curves have been constructed using available data. Tests results are found to be sensitive to material composition (WMA vs. HMA, and RAP content). Further, parameters were developed for the score card analysis of each test that included specimen preparation, instrumentation, standard test method, testing, training, interpretation, sensitivity to mix composition parameters, routine application, correlation to field performance, data analysis, cost, and repeatability, In addition four levels of evaluation were established for each parameter.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue identification of field projects and material collection from participating states; and
-Perform laboratory experiment on mixtures collected from participation states as per test factorial.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Southeast Transportation Consortium	Project Status:	Ongoing
Funding Source:	**SPR: Pooled Fund: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**30000281**		Project Start Date:		9/1/2009
Research Project Number:	09-1PF		Completion Date	(original)	8/30/2012
Research Agency:	LTRC		Completion Date	(revised)	8/30/2018
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$150,000	**Total**		**$10,000**
	(revised)	$300,000			
Est. Expended to Date		$55,000	Salaries		
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$10,000	Equipment	(non-expendable)	
	(revised)		Travel		$10,000
Est. FY Expenditure		$10,000	Other		

PURPOSE AND SCOPE

Southeast Transportation Consortium's (STCs) objectives are to pool financial, professional, and academic resources to coordinate research and develop improved methods of addressing common problems in the planning, design, construction, maintenance, management, and operation of transportation systems in participating states. The program is intended to supplement ongoing state, federal, and university research activities and other national programs such as the National Cooperative Highway Research Program. It is intended to reduce duplication of research and provide means for better communication of on-going research activities in the state research programs. The cooperative and collaborative objectives of the STC program are to develop synergy and provide for a more efficient use of resources. STC projects are funded individually with specific research proposals. This project funds the management and costs incurred for the annual meeting.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Managed STC pooled fund consortium;
-Presented update at the regional conference calls and Annual TRB meeting; and
-Started pooled fund project "Development of a Guidebook for Value of Research"

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Present status of activities at the Annual Research Advisory Committee Meeting;
-Complete interim report and meeting;
-Initiate RFP's;
-Hold interim report meeting; AND
-Plan and hold STC annual meeting for 2017.

FHWA

LTAP Funded Program

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Local Technical Assistance Program (LTAP)**	**Project Status:**	**Proposed**
Funding Source:	**LTAP: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000114**	Project Start Date:		1/1/2016
Research Project Number:	17-LTAP	Completion Date	(original)	12/31/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Marie Walsh			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$570,644	**Total**		**$570,644**
	(revised)				
Est. Expended to Date			Salaries		$258,833
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$23,313
Est. FY Expenditure			Other		$288,498

PURPOSE AND SCOPE

To provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality public transportation and public works agencies through training, technical assistance and information dissemination.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Partnered with the Louisiana Department of Transportation and Development (LADOTD) Bridge Inspection and Maintenance (I&M) Section and district personnel to develop and deliver over eight (8) Roads Scholar #13-Inspection of Local Bridges classes to 199 participant stakeholders through 2000 hours as part of the NBIS Compliance Program;
-Partnered with the LADOTD Bridge Inspection and Maintenance Section to update and deliver the class, Roads Scholar #14-Bridge Maintenance and Repair to 160 local bridge personnel for 966 hours of training;
-Partnered with the DOTD Bridge Inspection and Maintenance and the Bridge Design Sections to develop and deliver the "Overview of Bridge Load Rating for Local Bridges" to over 100 participants for 624 hours, as part of the DOTD NBIS Compliance Program;
-Sponsored two Louisiana Parish Engineers and Supervisors statewide technical conferences for over 150 attendees;
-Coordinated FHWA Everyday Counts Technology Transfer Webinar and Demonstration Showcase got GRS/IBS Technology. Sixty (60) federal, state, and local personnel participated;
-Co-sponsored the FHWA Complete Streets Peer Exchange for 89 federal, state, and local participants over two days and over 900 contact hours;
-Presented three (3) Local Public Agency (LPA) Core Training Classes at agency request. 136 people attended with over 900 hours of training;
-Delivered three day LPA Training Program to 130 people for 900 hours;
-Completed transfer of Local Road Safety Program back to LTAP for future coordination with DOTD Safety Section;
-Implemented regional public works responder training in Capital Region for APWA Public Works week for 700 plus public works employees; and
-Developed and delivered new equipment preventive maintenance training for Capital Region supervisors and equipment operators. 250 plus people trained.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Develop and deliver 8 sessions of Road Safety 365; -Deliver 8 sessions of new MUTCH and sign installation class, Roads Scholar #9: The Road to Better Signing; -Complete update of Roads Scholar #3: Drainage Class and schedule and offer at 8 statewide locations; -Update LTAP Supervisor Training class and offer statewide in 8 locations; and -Work with LADOTD's Bridge Inspection and Bridge Maintenance departments to develop a class on revised software for bridge inspections to bring statewide to 8 locations; -Bring statewide to 5 locations Heavy Equipment Preventative Maintenance classes

FHWA

STP Funded
Technology Transfer &
Education Program

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Workforce Development Support For Safety Center	Project Status:	Ongoing
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000026**		Project Start Date:		7/1/2014
Research Project Number:	15-1WDSC		Completion Date	(original)	12/31/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Dortha Cummins				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$250,000	**Total**		**$93,790**
	(revised)				
Est. Expended to Date		$82,725	Salaries		$72,137
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$102,823	Equipment	(non-expendable)	
	(revised)		Travel		$1,500
Est. FY Expenditure		$58,041	Other		$20,153

PURPOSE AND SCOPE

The Louisiana Center for Transportation Safety (LCTS) will provide a structure for Louisiana's research universities to collaborate on safety related projects and leverage resources. Supported by research and technology transfer, the LCTS will provide enhanced technical assistance to federal, state and local transportation agencies and will be available to work to meet other state and regional needs. An expanded training and education program which includes the new multi-disciplinary highway safety professional curriculum being developed by the Transportation Research Board (TRB) will be made available to transportation professionals on a national basis. The Louisiana Department of Transportation and Development (LADOTD), Louisiana Transportation Research Center (LTRC), and the Transportation Training and Education Center (TTEC) in Baton Rouge, Louisiana will serve as the nucleus for these activities.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Held staff meetings to begin development of a Workforce Development Plan; and
-Assisted Safety Section in conduct of 2 multi day training sessions.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Finalize Workforce Development plan.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Technology Transfer & Research Implementation Support for Louisiana Universities**	**Project Status:**	**Ongoing**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**30000241**		Project Start Date:		1/1/2010
Research Project Number:	10-4AD		Completion Date	(original)	12/31/2013
Research Agency:	LTRC		Completion Date	(revised)	6/30/2016
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$110,000		**Total**		**$10,000**
	(revised)					
Est. Expended to Date		$40,115		Salaries		
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$10,000		Equipment	(non-expendable)	
	(revised)			Travel		$10,000
Est. FY Expenditure		$4,000		Other		

PURPOSE AND SCOPE

The purpose of the project is to provide travel funds to university research principal investigators for dissemination of research results at various technology transfer events. This project provides a mechanism to fund technology transfer travel for university faculty to deliver research results to state and national audiences such as Transportation Research Board (TRB) Annual Meeting, Louisiana Transportation Conference (LTC), Louisiana Transportation Research Center (LTRC) Seminar Series, and Louisiana Department of Transportation and Development (LADOTD) Implementation meetings and training. Travel funds are dispersed on a case by case basis as it applies to providing a benefit to Louisiana.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continue to provide support technology transfer travel for university faculty to deliver research results to state and national audiences.

Title:	**Technology Transfer Program and Operations (LSU)**	**Project Status:**	**Ongoing**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**30000320**	Project Start Date:		7/1/2015
Research Project Number:	08-1TSQ	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$353,904	**Total**		**$353,833**
	(revised)				
Est. Expended to Date			Salaries		$312,833
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$353,904	Equipment	(non-expendable)	$15,000
	(revised)		Travel		$6,000
Est. FY Expenditure		$353,904	Other		$20,000

PURPOSE AND SCOPE

The objectives of this study are to:
-Disseminate information on new technologies and methodologies to Louisiana Department of Transportation and Development (LADOTD) and other transportation-oriented agencies;
-Improve communications on technical, transportation-related issues between the department and other agencies;
-Encourage implementation of new procedures and technologies; and
-Disseminate information on transportation subjects to appropriate managers and engineers in the department.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Publication chair for 2016 Transportation Conference;
-Sponsorship coordinator for 2016 Transportation Conference;
-Assisted in all 2016 Transportation Conference committees;
-Developed all LTC 2016 publications, website, registration, e-commerce and mobile device development;
-Published 4 Tech Today Newsletters;
-Published 2015 Annual Report;
-Set up registration for 17 NHI/other training, and 13 LTAP training classes;
-Photographed all LTRC events;
-Launched LTRC Mobile App;
-Launched redesigned LTRC website;
-Filmed and produced 15 DOTD informational videos;
-Published 19 Project Capsules;
-Published 21 Final Reports;
-Published 2 Tech Assistance Reports; and
-Published 1 TIRE report.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Assist in development of 2 LTRC seminar series; -Continue development of all LTC 2016 -2017 publications, website, registration, e-commerce and mobile device development; -Continue maintenance of LTRC website; -Assist Secretary's office in development of 3 promotional videos; -Continue to edit and distribute project capsules, technical summaries, final reports, and technical assistance reports; -Publish 4 Tech Today newsletters; -Photograph all LTRC events; and -Video all LTRC events.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Technology Transfer Registration Fees**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000117**	Project Start Date:		7/1/2016
Research Project Number:	17-TTRF	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$100,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$100,000

PURPOSE AND SCOPE

To provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality public transportation and public works agencies through training, technical assistance and information dissemination.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Provided cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality public transportation and public works agencies through training, technical assistance and information dissemination.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continue to provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality public transportation and public works agencies through training, technical assistance and information dissemination.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**AASHTO PONTIS Agreement**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000122**	Project Start Date:		7/1/2016
Research Project Number:	17-PONTIS	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$125,000	**Total**		**$125,000**
	(revised)				
Est. Expended to Date			Salaries		
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$125,000

PURPOSE AND SCOPE

AASHTO PONTIS Agreement

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

AASHTO PONTIS Agreement

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

AASHTO PONTIS Agreement

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**LADOTD CO-OP Program**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000118**	Project Start Date:		7/1/2016
Research Project Number:	17-COOP	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$200,000	**Total**		**$200,000**
	(revised)				
Est. Expended to Date			Salaries		$200,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The Louisiana Department of Transportation and Development (LADOTD) CO-OP program is a cooperative endeavor between the LADOTD and Louisiana Universities, providing practical experience to junior and senior level undergraduates through part-time employment in public transportation engineering work. This program is intended to enhance the educational process by providing opportunities for participants to explore their interest in transportation engineering through practical experience. This program also provides opportunities for LADOTD to evaluate participants of this program as potential employees.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-17 students participated in CO-OP at various LADOTD sections throughout Louisiana.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Place CO-OP approximately 20 students in various LADOTD Sections across the state;
-Continue end of semester presentations; and
-Retain students in CO-OP.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**LTRC Student Program**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000116**	Project Start Date:		7/1/2016
Research Project Number:	17-2TT	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$147,000	**Total**		**$147,000**
	(revised)				
Est. Expended to Date			Salaries		$147,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

To pay for salaries for undergraduate students employed to provide support to various Louisiana Transportation Center (LTRC) projects.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

Thirty (30) undergraduate students were employed by LTRC to provide support in fulfilling necessary job tasks on various LTRC projects.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continue to pay for salaries for undergraduate students employed to provide support to various LTRC projects.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Workforce Development Contracts	Project Status:	Proposed
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000115**		Project Start Date:		7/1/2016
Research Project Number:	17-1WDC		Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$3,177,806	**Total**		**$3,177,806**
	(revised)				
Est. Expended to Date			Salaries		$1,215,571
FY 2015 - 2016 Budget			Equipment	(expendable)	$207,500
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$35,000
Est. FY Expenditure			Other		$1,719,735

PURPOSE AND SCOPE

The purpose of this study is to provide contractual services through federal, university and private sector suppliers for continuing education, professional development, technical skills, software, leadership, management, supervisory training. The scope of this project also includes providing individual registration fees for Louisiana Department of Transportation and Development (LADOTD) employees to attend workshops, courses and conferences to enhance their professional and technical development.

-Member of TRB Committee ABG30;
-Member of TRB Committee ABG20;
-Member of TRAC and RIDES Advisory Board;
-President of National Transportation Training Directors ;
-Member of LTRC 16-5SA “Highway Work Zone Construction Safety Research and Training: A Driving Simulator Study”;
-Member of TRB Committee B0002;
-Secretary of SLA Transportation division;
-Member of AASHTO RAC TKN TF;
-Completed and deployed “Transformational Leadership” course;
-Began course development for the following topics: Contract Negotiations; Critical Conversations; and Being a Change Agent;
-Subscribed to new online catalog for the LTRC Library with EOS.Web, and successfully imported records from the original library catalog;
-Received and integrated into the collection approximately 200 boxes of materials from off-site storage;
-FHWA Grant awarded in the amount of: $91,273. Implementation and evaluation of TRAC and RIDES Programs in Schools in the State of Louisiana. Federally funded grant. 8/1/2015-12/31/2015;
-Developing training videos for the leadership development;
-Updated / replaced digital signage system in TTEC Lobby; -Upgrading from system running off an obsolete operating system, moving us to total digital;
-Installed 2 TV’s in TTEC Lobby upgrading to Digital capability;
-Installed New digital system in classroom 179, including New Projector, 2 TV’s, Crestron Control system, Crestron 16x16 switcher, Crestron DVP-HD for streaming video, new mounts and cables;
-Installed new monitor/display in Room 101 to facilitate in presentation;
-Conducted the 2016 Louisiana Transportation Conference – February/March 2016, Baton Rouge River Center, Baton Rouge, LA with approximately 1,350 participants and 87 vendors;
-Secured the 2018 and 2020 dates for the Louisiana Transportation Conference with the Baton Rouge River Center. Contract negotiations to begin in March 2017;
-Local Road Safety Peer Exchange (LTRC/Louisiana Center for Transportation Safety); September 2015, Baton Rouge, LA., LTRC/Transportation Training and Education Center (TTEC), Negotiated overnight hotel rooms;
-2016 Highway Safety Manual (HSM) Implementation Peer Exchange (LA DOTD Highway Safety), May 2016, New Orleans, LA., Location TBD; Sent our RFP and negotiated hotel for meeting space, food/beverage, etc. – 30 people;
-2016 Safety Analysis and Project Development Peer Exchange (LA DOTD Highway Safety); May 2016, New Orleans, LA., Location TBD; Sent out RFP and negotiated hotel for meeting space, food/beverage, etc. – 60 people;
-Southeastern Maintenance Peer Exchange (LA DOTD Maintenance Section); October/November 2016, New Orleans, LA., Location TBD; Sent our RFP and negotiated hotel for meeting space, food/beverage, etc. - 40 people;
-2015 – 2017 Louisiana Chapter of SGMP Board of Directors - Secretary;
-Louisiana Transportation Conference hosted at the Baton Rouge River Center with 1,587 participants; 72 technical sessions; 8 professional development sessions; $155,000 in conference sponsorships.
-Conducted: Course Description(#Students and Courses/Events) TOTAL: 3,582 Students in 290+ Classes and Event
-Highway Safety Manual(48)
-Trafficware (28)
-PE Review (72)
-TIMs (65 in 2 classes)
-Asphalt Pilot Review (43)
-RSA (24)
-Historic Bridges (100 in 4 classes)
-Tensar (20)
-NHI Workshops (Fiscal Year)(426 in 16 classes)
-Individual Registrations (359 Employees in 86 events)
-LSU CADD (190 in 19 classes)
-UNO (1505 in 132 classes)
-Foundations of Leadership Development(343 in 19 classes)
-Emotional Intelligence (248 in 14 classes)
-Organizational Culture (111 in 8 classes)
-6 full-time employees hired into the ERDP and rotated through various LA DOTD sections throughout Louisiana.
-4 ERDP employees successfully hired into LA DOTD sections: Public Works (1); Road Design (2); and Material Lab (1); and
-2 ERDP employees are still in rotation.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continued additions of library materials into the online catalog; -Upgrade Classroom 175 to all digital format to match Room 179; -Upgrade Classroom 160 to all digital format to match Room 179; -Upgrade Projector in Auditorium to higher lumen solution; -Modify programming to accommodate new projector; -Rebuild LTRC Conference room A/V solution; -Attend Crestron 101; -Attend Lectrosonics Digital Sound Processing Training; -Conduct 5-Day National Transportation Training Directors conference in Providence, Rhode Island for approximately 75 participants and 10 vendors; -Complete development of "Being a Change Agent" for Section 17, QCIP; -Complete development of "Crucial Conversations" (title to change) for Janice Williams, Office of Engineering; -Secure hotel contract for meeting space and overnight hotel accommodations for the 2018 Louisiana Transportation Conference, February 2018 – Belle of Baton Rouge Hotel, Baton Rouge, LA - 750 overnight rooms; -Secure hotel contract for overnight hotel accommodations for the 2018 Louisiana Transportation Conference, February 2018, Baton Rouge Hilton, Baton Rouge, LA, 75 overnight rooms; -Secure contract for meeting space for the 2018 Louisiana Transportation Conference February/March 2018, Baton Rouge River Center and Baton Rouge, LA. Approximately 1350 participants and 80 vendors; -Conduct the 2016 Fall LTRC Seminar Series: Geotechnical; -Conduct the 2017 Spring LTRC Seminar Series: Pavements; -Place approximately 20 students in the CO-OP Program in various LA DOTD sections across the state; and -Hire approximately 5 employees to participate in the ERDP.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Workforce Development**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000113**	Project Start Date:		7/1/2016
Research Project Number:	17-1WD	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$995,549	**Total**		**$995,549**
	(revised)				
Est. Expended to Date			Salaries		$975,549
FY 2015 - 2016 Budget			Equipment	(expendable)	$10,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$10,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this study is to provide for the strategic planning, program development and delivery management of the workforce development programs for the Louisiana Department of Transportation and Development (LADOTD) personnel. The scope of this study also includes the development, delivery and administration of the Louisiana Transportation Research Center's (LTRCs) transportation outreach program.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Structured Training Program transfer to LEO/LSO complete;
-Implemented Structured Training Program tracking in LEO/LSO and trained users;
-Implemented 74 revised Structured Training Programs;
-Scheduled, registered, and subscribed employees for leadership, management, supervisory, computer training, NHI, CADD/GIS and other specialty courses;
-120 construction certifications and 350 re-certifications awarded; and
-Implemented revised Location and Design Advanced Math Algebra, Dangerous Insects training, Site Manager Materials training video, and Basic Flagging recertification.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Continue to meet with principal customers to prioritize need to develop training courses, performance evaluations, and safe operating checklists;
-Continue to develop Construction, Materials, and Maintenance Courses;
-Continue to refine Structured training Programs and processes in LEO/LSO; and
-Continue to develop web-based courses where appropriate.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Support for Senior Project Courses**	**Project Status:**	**Proposed**
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000121**	Project Start Date:		7/1/2016
Research Project Number:	17-1TT	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$37,500	**Total**		**$37,500**
	(revised)				
Est. Expended to Date			Salaries		
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$37,500

PURPOSE AND SCOPE

To provide support for senior project engineering courses up to a maximum of $7,500 / university / year.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

No University Participation.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continue to provide support for senior project engineering courses.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Technology Transfer Program and Operations (DOTD)	Project Status:	Proposed
Funding Source:	STP: TT-Fed	Budget Category:	FHWA

SIO:	DOTDLT1000119	Project Start Date:		7/1/2016
Research Project Number:	17-1TSQ	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.			

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$495,542	**Total**		**$495,542**
	(revised)				
Est. Expended to Date			Salaries		$495,542
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objectives of this study are to:
-Disseminate information on new technologies and methodologies to the Louisiana Department of Transportation and Development (LADOTD) and other transportation-oriented agencies;
-Improve communications on technical, transportation-related issues between the department and other agencies;
-Encourage implementation of new procedures and technologies; and
-Disseminate information on transportation subjects to appropriate managers and engineers in the department.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Publication chair for 2016 Transportation Conference;
-Sponsorship coordinator for 2016 Transportation Conference;
-Assisted in all 2016 Transportation Conference committees;
-Developed all LTC 2016 publications, website, registration, e-commerce and mobile device development;
-Published 4 Tech Today Newsletters;
-Published 2015 Annual Report;
-Set up registration for 17 NHI/other training, and 13 LTAP training classes;
-Photographed all LTRC events;
-Launched LTRC Mobile App;
-Launched redesigned LTRC website;
-Filmed and produced 15 DOTD informational videos;
-Published 19 Project Capsules;
-Published 21 Final Reports;
-Published 2 Tech Assistance Reports; and
-Published 1 TIRE report.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Assist in development of 2 LTRC seminar series; -Continue development of all LTC 2016 -2017 publications, website, registration, e-commerce and mobile device development; -Continue maintenance of LTRC website; -Assist Secretary's office in development of 3 promotional videos; -Continue to edit and distribute project capsules, technical summaries, final reports, and technical assistance reports; -Publish 4 Tech Today newsletters; -Photograph all LTRC events; and -Video all LTRC events.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	DOTD Staff Support for Workforce Development	Project Status:	Proposed
Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTDLT1000123**		Project Start Date:		7/1/2016
Research Project Number:	17-1SWD		Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Sam Cooper, Jr.				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$1,520,000	**Total**		**$1,520,000**
	(revised)				
Est. Expended to Date			Salaries		$1,520,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this study is to provide for the strategic planning, program development and delivery management of the workforce development programs for the Louisiana Department of Transportation and Development (LADOTD) personnel by non-LTRC employees. This project will not be utilized by LTRC Section 19 or Section 33.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Course development and delivery of LPA training;
-LADOTD employee structured training;
-Human Resource training, maintenance related training; and
-Meetings involvements related to LADOTD's Transportation Training Curriculum council.

Federal Funded Research Program

PROPOSED RESEARCH

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Safety Center Management of Traffic Records Projects**	**Project Status:**	**Proposed**
Funding Source:	**100% Federal**	**Budget Category:**	**Federal**

SIO:		Project Start Date:		4/1/2016
Research Project Number:		Completion Date	(original)	9/30/2016
Research Agency:		Completion Date	(revised)	
Principal Investigator:	Dortha Cummins			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$1,500,000	**Total**		**$1,500,000**
	(revised)				
Est. Expended to Date			Salaries		$71,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$2,500
Est. FY Expenditure			Other		$1,426,500

PURPOSE AND SCOPE

The Louisiana Center for Transportation Safety (LCTS), shall prepare, manage and coordinate contracts on behalf of the Louisiana Highway Safety Commission (LHSC) utilizing Section 23 USC 405c funds, as approved by the Executive Committee of the Louisiana Traffic Records Coordinating Committee (TRCC) to support the Strategic Highway Safety Plan (SHSP).

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Hire staff person for contract management;
-Attend TRCC meetings and serve on Executive Committee;
-Coordinate with LHSC and TRCC on project selection, contract management, project implementation and monitoring.

Self-Generated Funded Research Program

CONTINUING RESEARCH

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Field Implementation of the Louisiana Interface Shear Strength Test**	**Project Status:**	**Ongoing**

Funding Source:	**NCHRP**	**Budget Category:**	**Self-Generated**

SIO:	**30001505**	Project Start Date:		8/9/2013
Research Project Number:	14-2B	Completion Date	(original)	8/8/2015
Research Agency:	LTRC	Completion Date	(revised)	12/31/2016
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$186,407	**Total**		**$40,000**
	(revised)				
Est. Expended to Date		$14,700	Salaries		$35,800
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$35,000	Equipment	(non-expendable)	
	(revised)		Travel		$2,200
Est. FY Expenditure		$35,000	Other		$2,000

PURPOSE AND SCOPE

The objective of this research is to evaluate the test method developed in NCHRP Project 9-40 in actual field projects to augment their potential implementation. These measurements will be used to validate the proposed test method and criteria, and to relate observed tack coat field performance to the outcomes of these tests. To achieve this objective, field projects will be selected across the US to represent different climatic and traffic conditions and will be monitored for a period of twelve months. .

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Completed Task 1: Develop the experimental plan; and
-Conducted Task 2: conduct of the approved experimental plan of Task 1.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 2: Continue the conduct of the approved experimental plan of Task 1;
-Task 3: Monitor field performance; and
-Task 4: Prepare Draft Final Report.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Calibration of LRFD Geotechnical Axial (Tension and Compression) Resistance Factors (φ) for California**	**Project Status:**	**Ongoing**
Funding Source:	**CALTRANS**	**Budget Category:**	**Self-Generated**

SIO:	**DOTLT1000055**		Project Start Date:		1/16/2015
Research Project Number:	15-3GT		Completion Date	(original)	1/15/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$70,598		**Total**		**$21,520**
	(revised)					
Est. Expended to Date		$50,000		Salaries		$21,520
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$35,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$30,000		Other		

PURPOSE AND SCOPE

The objective of this research project is to recommend revisions to the California Amendments to the AASHTO LRFD Specifications and Caltrans technical documents pertaining to resistance factors used in design and evaluation of deep foundations.

To achieve the objectives of this study, geotechnical information, design report of deep foundation, and load test data, pile driving records and PDA etc. will be collected by working with the Caltrans Foundation Testing Branch (FTB). The collected data will be digitized and compiled into excel files using a standard template for further design capacity analysis including static analysis, dynamic and PDA. The measured nominal resistance can be determined using static load test data or PDA analysis depending on the available load test data. The obtained load test database will be grouped into several subgroups in according to their pile type, soil type, bearing type (axial compression or tension). If enough data is available, resistance factors for each classification group will be calibrated. The predicted and measured resistance will be determined according to the methods provided in the California Amendments. Statistical analyses will be performed to evaluate the performance of each design method. LRFD calibration of resistance factors will be performed using the calibration procedure outlined by the TRB transportation research circular No. E-C079. Each design method will be assessed for the safety and serviceability risks.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Completed literature review relevant to LRFD calibration of driven piles and drilled shafts;
-Continued collecting available drilled shaft cases from California and other states;
-Started analyzing the predicted and measured load carrying capacities of collected drilled shaft cases; and
-Separated the measured and predicted tip and side resistances
from the total shaft capacities.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Continue analyzing the predicted and measured load carrying capacity of drilled shafts; -Prepare database for regression and reliability analysis; and -Calibrate the total, tip and side resistance factors of drilled shafts.

Other DOTD
Funded Projects

Title:	**CORS 911: Continuously Operating Reference Stations for the Bayou Corne Sinkhole**	**Project Status:**	**Ongoing**
Funding Source:	**emergency fund**	**Budget Category:**	**Other DOTD Sections**

SIO:	**30000980**		Project Start Date:		3/18/2013
Research Project Number:	13-9GT		Completion Date	(original)	3/17/2014
Research Agency:	LSU		Completion Date	(revised)	9/30/2016
Principal Investigator:	Joshua Kent				

BUDGET STATUS

Total Budget				**Estimated 2016-2017 Budget**		
Total Cost	(original)	$350,785		**Total**		**$4,000**
	(revised)	$474,380				
Est. Expended to Date		$387,135		Salaries		$4,000
FY 2015 - 2016 Budget				Equipment	(expendable)	
FY Funds	(original)	$49,703		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$45,426		Other		

PURPOSE AND SCOPE

The fundamental objective of this project is to provide long-term monitoring of portions of HWY-70 potentially vulnerable to the Assumption Parish sinkhole. The project includes fabrication, deployment, and maintenance of five (5) continuously operating reference stations (CORS) of GPS receivers and antennae designed to actively monitor and measure surface motions of the route and its bridges. If monitoring reveals movement, implementation of remedial actions may be warranted. However, no implementation activity is currently anticipated.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-All 5 CORS stations are active and running and providing reports; and
-The Final Report is being drafted.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

Continued monitoring will be evaluated by the Emergency Operations group.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	FHWA Safety Transfer Fund Support for LCTS	Project Status:	Ongoing
Funding Source:	Safety	Budget Category:	Other DOTD Sections

SIO:	DOTLT1000111		Project Start Date:		7/1/2015
Research Project Number:	16-1STFS		Completion Date	(original)	12/31/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Dortha Cummins				

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$1,263,287	**Total**		**$793,509**
	(revised)				
Est. Expended to Date		$264,880	Salaries		$271,927
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)	$482,451	Equipment	(non-expendable)	
	(revised)		Travel		$22,000
Est. FY Expenditure		$157,906	Other		$499,582

PURPOSE AND SCOPE

The Louisiana Center for Transportation Safety (LCTS) will provide a structure for Louisiana's research universities to collaborate on safety related projects and leverage resources. Supported by research and technology transfer, the Safety Center will provide enhanced technical assistance to federal, state and local transportation agencies and will be available to work to meet other state and regional needs. An expanded training and education program which includes the new multi-disciplinary highway safety professional curriculum being developed by the Transportation Research Board will be made available to transportation professionals on a national basis. The Louisiana Department of Transportation and Development (LADOTD), Louisiana Transportation Research Center (LTRC) and the Transportation Training and Education Center (TTEC) in Baton Rouge, Louisiana will serve as the nucleus for these activities.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Develop draft Strategic and Work Plan for LCTS;
-Support implementation of SHSP at State level and regionally through nine regional coalitions;

Goals for LRSP
-Assist with transition of program back to LTAP; and
-Provide training and outreach on program as needed.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Finalize Strategic and Work Plan for LCTS;
-Develop Workforce Development Plan for LCTS; and
-Expand marketing and outreach of LCTS across state.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Exploring the Use of Pavement Markings in the Dynamic Envelope of a Railroad Crossing to Enhance Safety**	**Project Status:**	**Proposed**

Funding Source:	**Highway/Rail Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:		Project Start Date:		7/1/2016
Research Project Number:		Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Julius Codjoe			

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$100,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$48,000
FY 2015 - 2016 Budget			Equipment	(expendable)	$1,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to evaluate the effectiveness of the Louisiana Department of Transportation and Development's (LADOTD's) proposed pavement markings in reducing instances of stopped vehicles within the dynamic envelope of at-grade highway-rail crossings at known locations where drivers tend to stop on the tracks. Video data will be collected for a set period before and after the pavement markings have been applied. Data analysis will be undertaken to determine types and frequency of encroachment into the dynamic envelope zone, and comparative analysis will be undertaken to evaluate the effectiveness of the pavement markings.

The literature review will be conducted nationwide. The list of locations to be experimented will be agreed with LADOTD and shall be no more than four. The mounting of traffic data collection devices, along with installation of the dynamic envelope pavement markings and accompanying signage, will be undertaken by LADOTD. The research team assumes LADOTD will obtain any special permits, including environmental clearance and permit for any installations.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Task 1: Perform Literature Review;
-Task 2: Confirm Test Locations;
-Task 3: Mount Data Collection Devices;
-Task 4: Collect Pre-Installation Data;
-Task 5: Install Pavement Markings and Accompanying Signage; and
-Task 6: Collect Post-Installation Data.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	**Economic Evaluation of Applicants to the Port Construction and Development Priority Program**	**Project Status:**	**Proposed**

Funding Source:	**Port Priority Program**	**Budget Category:**	**Other DOTD Sections**

SIO:			Project Start Date:		7/1/2016
Research Project Number:			Completion Date	(original)	12/31/2017
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	James Richardson				

BUDGET STATUS

Total Budget			**Estimated 2016-2017 Budget**		
Total Cost	(original)	$75,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objective of the project is to perform research and analysis of the port priority program application to ensure the State is receiving the required minimum rate of return on the State's investment.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES

-Preliminary meetings with project sponsoring ports;
-Preliminary review of applications;
-Benefit Cost Validity Check;
-Benefit Cost Calculations; and
-Development of Quarterly Reports.

LTRC Annual Research Program
Fiscal Year 2016-2017

Title:	Louisiana Local Road Safety Program	Project Status:	Proposed
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTDLT1000120**	Project Start Date:		1/1/2016
Research Project Number:	16-LRSP	Completion Date	(original)	12/31/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Marie Walsh			

BUDGET STATUS

Total Budget			Estimated 2016-2017 Budget		
Total Cost	(original)	$338,440	**Total**		**$338,440**
	(revised)				
Est. Expended to Date			Salaries		$214,749
FY 2015 - 2016 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$8,687
Est. FY Expenditure			Other		$115,004

PURPOSE AND SCOPE

To work in cooperation with Louisiana Department of Transportation and Development's (LADOTD's) Highway Safety Office to implement and manage the Local Road Safety Program (LRSP) in addition to providing support to other statewide road safety initiatives at both the state and local levels.

FISCAL YEAR 2015 - 2016 ACCOMPLISHMENTS

-Hosted a statewide Local Road Safety Peer Exchange last September 10-11, 2015 which not only generated leads for potential LRSP projects but also fostered partnerships between the MPO's, regional safety coalitions and local public agencies;
-Worked with LADOTD and New Orleans Planning Commission in facilitating a road safety assessment effort that would be replicated across the region;
-Improved the evaluation process and criteria to use for rating project applications;
-Developed and started implementing an Outreach Plan that promoted the program at major conferences/summits/meetings (LMA, Smart Growth, PJAL, LPESA meetings);
-Engaged multidisciplinary partners and facilitated sessions at the Louisiana Highway Safety Summit last October 20-22, 2015;
-Utilized emerging communication trends (Facebook and electronic newsletters) as a way of sharing best practices as well as training information/updates;
-Coordinated with LADOTD Highway Safety Section to standardize project selection process with DOTD's data driven HSIP project selection process;
-Conducted parish level networking screening on five of the top 20 priority parishes; and
-Initiated local road safety plan development process in three of the top 20 priority parishes.

FISCAL YEAR 2016-2017 PROPOSED ACTIVITIES
-Participate with LADOTD in development of process to disseminate Fugro data to local entities; -Coordinate with LADOTD safety section on utilization of networking screening process to identify potential local road project locations and prioritize funding; -Complete local road safety plan development for at least 10 of the top 20 priority parishes; and -Disseminate high PSI locations developed as part of statewide network screening process.

LTRC Annual Research Program

Fiscal Year 2016-2017

2016 RPIC PROBLEM STATEMENTS

FINAL RANKING	PROBLEM STATEMENT TITLE
1	Highway Construction Work Zone Safety Performance and Improvement in Louisiana
2	Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems
3	Pipe Material Zones in Coastal Louisiana
4	Calibration Factors for HSM Intersection SPFs
5	When is the use of AST Interlayers Over Soil Cement Justifiable
6	Louisiana Trip Generation Manual
7	A Highway Construction Work Zone Mobility Impact Assessment Tool
8	Quality control / Quality Assurance on Base Course and Embankments using the Dynamic Cone Pentrometer
9	Estimating Average Daily Traffic Counts Using Cell Phone Data
10	Development of New Software Solutions for Pile Design in Louisiana
11	Radio-frequency Identification (RFID) Tagging for Material Tracking and Future Asset Management
12	Evaluation and Guidance of Planning-Level Cost Estimation
13	Reliable Early Opening Strength for Concrete Pavements and Patch Work
14	Develop a Cost Effective Perpetual Pavement Design and Evaluation of the Structural Coefficient of Asphalt Mixtures
15	Development of Geotechnical Manual for LADOTD
16	Development of a 4.75mm (No. 4) Nominal Maximum Size Mixture
17	Development of Prediction Models and Design Guides for RCC Pavements
18	Overheight Impact Avoidance and Incident Detection System
19	Development of Splices for Precrast Concrete Piles
20	Research and Recommend the Appropriate Type of Dredge Required to Dredge Louisiana's Coastal Ports
21	Mix Specification to Improve Roadway Density
22	Hurricane Evacuation Modeling Package (HEMP)
23	Enhancing Durability of Reinforced Concrete Elements in Louisiana Using Corrosion-Resistant FRP Bars
24	A State-of-the-Art Virtual Environment for Highway Work Zone Construction Safety Research, and Training
25	Pedestrians and Bicyclists Count
26	Feasibility and Advantages of Acceptance of Concrete Beyond 28 Days
27	The Potential Safety Impacts to the State Aviation Transportation System Through the use of Unmanned Aerial Systems (USA) Operations
28	Impermeable Treatments Over Cracked AC Pavements in High Water Table Areas
29	Geotechnical Asset Management
30	Development of a New Travel Time Reliability Measure as an Indicator of Level of Service
31	To Determine the Feasibility of Utilizing Aerial Drones as a Platform for Traffic Cameras
32	Field Implementation of Handheld FTIR Spectrometer for Polymer Content Determination and for Quality Control of RAP Mixes