LTRC Annual Research Program

Fiscal Year July 1, 2017 - June 30, 2018

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 2017

LOUISIANA TRANSPORTATION RESEARCH CENTER

Research, Technology Transfer, Education & Training

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

May 10, 2017

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

Attention: Ms. Mary Stringfellow

RE: FY 2017-2018 Louisiana Transportation Research Center Work Program

Dear Mr. Bolinger:

Enclosed please find the FY 2017-2018 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

4101 Gourrier Avenue • Baton Rouge, Louisiana 70808 • (225) 767-9131 phone • (225) 767-9108 fax
Sponsored jointly by the Louisiana Department of Transportation and Development and Louisiana State University

U.S. Department of Transportation
Federal Highway Administration

Louisiana Division Office

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Baton Rouge, LA 70808
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June 29, 2017

In Reply Refer To:
HDA-LA

Dr. Shawn D. Wilson, Secretary
Louisiana Department of Transportation and Development (DOTD)
Baton Rouge, LA

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

Attention: Dr. Eric Kalivoda

This letter is in response to Mr. Sam Cooper's letter regarding the review and approval of the Fiscal Year (FY) 2017-2018 Statewide Planning and Research (SPR) Work Program Part II. We have reviewed the subject work program and all Research projects in the work program can move forward, except for the following:

- For all Research projects that have an amount of $5000 or greater in the Equipment (non-expendable) line, a detailed listing of the equipment and costs must be provided to our office for further review and approval.

- For all Research projects that have an amount in the Other category that is 20% or greater than the total cost of the research project, a detailed listing of what these expenses consist of must be provided to our office for review and approval.

Please provide this additional information by July 28, 2017.

We would also like to discuss the possibility of DOTD's SPR Part II Work Program being a 2-year program, rather than a 1-year program.

A separate request from your federal-aid section will be required to process the fiscal documents necessary to obligate the SPR & STP funds. Should you have any questions regarding this matter, please contact me at (225) 757-7610.

Sincerely Yours,

Mary M Stringfellow

Digitally signed by MARY M STRINGFELLOW
DN: c=US, o=U.S. Government, ou=DOT FHWABatonRougeLA, ou=FHWA FHWABatonRougeLA, cn=MARY M STRINGFELLOW
Date: 2017.06.30 08:49:53 -05'00'

Mary M. Stringfellow
Program Delivery Team Leader

cc: Mr. Sam Cooper, LTRC
Mr. Tyson Rupnow, LTRC

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	$756,246
Research Support Studies Budget	$1,693,000
Active Studies Budget	$5,413,609
Proposed Studies Budget	$3,126,685
Pooled Fund Lead State Studies Budget	$172,500
Total SPR Budget	**$11,162,040**

SPR External Collaboration Budget Recap	Total
Pool Funded Studies	$188,000
TRB Correlations	$137,823
NCHRP	$784,747
Total SPR External Collaboration Budget	**$1,110,570**

FHWA Funding

LTAP Budget Recap	Total
LTAP	$673,940
LTAP Program Total	**$673,940**

STP: Technology Transfer Program Budget Recap	Total
Technology Transfer Program and Operations	$1,312,502
Workforce Development Program	$5,750,578
Student Support Programs	$210,000
Total STP Budget	**$7,273,080**

Self-Generated Funding

Self-Generated Budget Recap	Total
Active Studies Budget	$118,500
Proposed Studies Budget	$30,000
Total Self-Generated Budget	**$148,500**

Other DOTD Sections Funding

Other DOTD Sections Budget Recap	Total
Active Studies Budget	$3,321,806
Proposed Studies Budget	$491,465
Total Other DOTD Sections Budget	**$3,813,271**

LTRC ANNUAL RESEARCH PROGRAM

Administrative SPR:TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

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	DOTLT10001 82	18-1PM	$756,246	$756,246	LTRC	Tyson Rupnow	Program Management	7/1/2017	6/30/2018		C-2
					$756,246	**$756,246**	**ADMINISTRATIVE BUDGET TOTALS**						
Project Type: Research Support													
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 85	18-1TTRI	$390,000	$390,000	LTRC	Tyson Rupnow	Technology Transfer and Research Implementation	7/1/2017	6/30/2018		C-3
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 88	18-1TRS	$440,000	$440,000	LTRC	Tyson Rupnow	Technical Research Surveillance	7/1/2017	6/30/2018		C-4
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 84	18-1TA	$305,000	$305,000	LTRC	Tyson Rupnow	Technical Assistance	7/1/2017	6/30/2018		C-5
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 89	18-1SSR	$100,000	$100,000	LTRC	Tyson Rupnow	DOTD Staff Support for Research	7/1/2017	6/30/2018		C-7
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 87	18-1NPE	$82,000	$82,000	LTRC	Tyson Rupnow	New Product Evaluation	7/1/2017	6/30/2018		C-8
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 83	18-1LFT	$26,000	$26,000	LTRC	Tyson Rupnow	Research Laboratory and Field Test Support	7/1/2017	6/30/2018		C-9
SPR: TT-Fed/TT-Reg	P	RS	DOTLT10001 86	18-1EQM	$350,000	$350,000	LTRC	Tyson Rupnow	Equipment Management	7/1/2017	6/30/2018		C-10
					$1,693,000	**$1,693,000**	**RESEARCH SUPPORT BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

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	DOTLT1000165	17-2GT	$140,000	$455,673	LTRC	Murad Abu-Farsakh	Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features	6/1/2017	5/31/2019		C-12
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000144	17-1GT	$43,000	$247,771	LTRC	Murad Abu-Farsakh	Verification and Implementation of Set-Up Empirical Models in Pile Design	8/1/2016	6/30/2017	7/31/2018	C-14
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000112	16-6GT	$130,000	$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-16
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000097	16-1GT	$45,000	$79,987	GeoStellar Engineering,	Ed Tavera	LADOTD Geotechnical Design Manual	10/6/2016	1/5/2018		C-18
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000048	15-1GT	140,000	$200,000	Dataforensics, LLC	Scott Deaton	pLog Enterprise - Enterprise GIS-Based Geotechnical Data Management System Enhancements	7/31/2015	8/1/2017		C-20
SPR: TT-Fed/TT-Reg	A	GT	30000981	13-5GT	$49,025	$302,200	LTRC	Murad Abu-Farsakh	Monitoring of In-Service Geosynthetic Reinforced Soil (GRS) Bridge Abutments in Louisiana	10/1/2014	9/30/2016	12/31/2017	C-21
SPR: TT-Fed/TT-Reg	A	GT	DOTLT1000103	13-3GT	$80,500	$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-23
SPR: TT-Fed/TT-Reg	A	GT	30000135	11-3GT	$0	$686,957	LTRC	Murad Abu-Farsakh	Accelerated Load Testing of Geosynthetic Base Reinforced Pavement Test Sections	12/1/2010	5/31/2012	12/31/2017	C-25
SPR: TT-Fed/TT-Reg	A	GT	30000661	11-1GT	$45,000	$354,679	LTRC	Murad Abu-Farsakh	In Situ Evaluation of Design Parameters and Procedures for Cementitiously Treated Weak Subgrades using Cyclic Plate Load Tests	3/18/2013	9/17/2015	12/31/2017	C-26
SPR: TT-Fed/TT-Reg	A	GT	30000111	10-1GERL	$163,500	$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-28
					$836,025	**$17,055,616**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Pavements													
SPR: TT-Fed/TT-Reg	A	P	1000150	17-3P	$77,843	$155,686	LSU	Marwa Hassan	A Decision-Making Tool for Incorporating Sustainability Measures into Pavement Design	8/1/2016	7/31/2018		C-29
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000147	17-2P	$77,528	$82,528	LTRC	Mark Martinez	Implementation of a Localized Roughness Specification for use on Louisiana Bridges	8/1/2016	7/31/2017	7/31/2018	C-31
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000145	17-1P	$115,000	$250,000	LSU	Mostafa Elseifi	Improving the Use of Crack Sealing to Asphalt Pavement in Louisiana	11/1/2016	1/31/2019		C-32
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000107	16-6P	$95,300	$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-33
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000089	16-5P	$110,000	$199,997	ULL	Mohammad Khattak	Pavement Service Life Extension Due to Asphalt Surface Treatment Interlayer	7/1/2016	6/30/2018		C-34
SPR: TT-Fed/TT-Reg	A	P	DOTLT1000146	16-2P	$70,500	$190,950	LTRC	Zhong Wu	Transportation Infrastructure Asset Damage Cost Recovery Correlated with Shale Gas/Oil Recovery Operations in Louisiana	8/1/2016	7/31/2018		C-36

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

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	DOTLT1000009	14-2P	$30,000	$197,145	LSU	Mostafa Elseifi	Assessment of Structural Capacity Indicators from Rolling Wheel Deflectometer Data Collection in Louisiana	7/1/2014	12/31/2015	12/31/2017	C-37
SPR: TT-Fed/TT-Reg	A	P	30000729	12-3P	$33,400	$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-39
SPR: TT-Fed/TT-Reg	A	P	30000425	12-2P	$119,617	$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-40
SPR: TT-Fed/TT-Reg	A	P	30000607	12-1P	$89,005	$516,642	LTRC	Kevin Gaspard	Assessment of Pavement Distresses caused by Trees on Rural Highway	2/1/2012	7/1/2014	6/30/2019	C-41
SPR: TT-Fed/TT-Reg	A	P	30000610	12-11P	$5,910	$287,799	LTRC	Mark Martinez	Field Validation of Equivalent Modulus for Stabilized Subgrade Layer	5/1/2012	4/30/2014	12/31/2017	C-42
SPR: TT-Fed/TT-Reg	A	P	30000141	10-1ALF	$671,000	$16,682,103	LTRC	Zhong Wu	Management and Operation of the Pavement Research Facility	7/1/2009	6/30/2015	6/30/2018	C-43
					$1,495,103	**$19,538,896**	**PAVEMENTS BUDGET TOTALS**						
Project Type: Bituminous													
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000166	17-3B	$12,500	$25,000	LTU	Nazimuddin Wasiuddin	DOTD Support for UTC Project: Development of a Revised RTFO Protocol for Foam-Based Warm Mix Asphalt	3/15/2017	12/14/2017		C-44
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000163	17-2B	$70,772	$141,544	LTRC	David Mata	Evaluation of Non-Destructive Density Determination for QA/QC Acceptance Testing	3/15/2017	7/5/2018	3/14/2018	C-46
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000059	15-2B	$33,071	$210,937	LSU	William Daly	Support Study for Evaluation of Crumb Rubber Modification of Louisiana Mixtures	4/15/2015	7/14/2017	12/31/2017	C-47
SPR: TT-Fed/TT-Reg	A	B	DOTLT1000054	15-1B	$21,500	$186,408	LTRC	Saman Salari	Evaluation of Crumb Rubber Modification of Louisiana Mixtures	4/15/2015	4/14/2017	12/17/2017	C-48
SPR: TT-Fed/TT-Reg	A	B	30000112	10-1EMCRF	$155,000	$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-49
					$292,843	**$15,365,700**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Structures													
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000109	16-4ST	$102,589	$172,589	LSU	George Voyiadjis	Overheight Impact Avoidance and Incident Detection System	7/1/2016	6/30/2018		C-50
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000108	16-3ST	$144,484	$264,484	LSU	Ayman Okeil	Live Load Rating of Cast-in-Place Concrete Box Culverts in Louisiana	5/16/2016	6/30/2017	8/16/2017	C-51
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000099	16-1ST	$231,396	$169,172	Texas A&M Transportation Institute (TTI)	William Williams	Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems	7/1/2016		6/30/2018	C-52
SPR: TT-Fed/TT-Reg	A	ST	DOTLT1000043	15-3ST	$50,000	$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-53
SPR: TT-Fed/TT-Reg	A	ST	30001660	14-1ST	$59,991	$179,991	LSU	Ayman Okeil	Evaluating Louisiana New Continuity Detail for Girder Bridges	4/21/2014	12/31/2016	12/31/2017	C-54
					$588,460	**$936,236**	**STRUCTURES BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

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: Special Studies													
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000168	17-6SS	$404,630	$1,235,895	LTRC	Tyson Rupnow	Evaluation of HeadLight: An E-Construction Inspection Technology	4/1/2017	8/31/2018		C-55
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000167	17-5SS	$42,000	$199,947	LSU	Sherif Ishak	Development of Guidelines for Ramp Metering Implementation and Performance Evaluation on I-12	3/1/2017	8/31/2019		C-57
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000160	17-4SS	$108,000	$133,955	GIS Engineering, LLC	Mohan Menon	Dredging Louisiana's Navigable Waterways - A Statewide Systematic Approach to Meeting Dredging Needs	4/4/2017	7/3/2018		C-58
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000159	17-3SS	$150,000	$381,374	LSU	Chester Wilmot	Hurricane Evacuation Modeling Package	2/1/2017	8/31/2018	1/31/2019	C-59
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000098	16-5SS	$79,718	$355,607	LTRC	Ravindra Gudishala	Diverted Traffic Measurement	1/1/2016	6/30/2017	12/31/2017	C-61
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000046	15-2SS	$76,400	$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-63
SPR: TT-Fed/TT-Reg	A	SS	DOTLT1000104	14-3SS	$30,000	$233,614	LTRC	Chester Wilmot	Development of a Mode Choice Model to Estimate Evacuation Transit Demand	3/1/2016		2/28/2018	C-64
SPR: TT-Fed/TT-Reg	A	SS	30000140	10-6SS	$96,000	$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-65
SPR: TT-Fed/TT-Reg	A	SS	30000125	10-1PLAN	$120,000	$7,006,861	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-66
					$1,106,748	**$10,405,158**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Concrete													
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000155	17-1C	$58,713	$467,176	LTRC	Amar Raghavendra	Effect of Clay Content on Alkali-Carbonate Reactive (ACR) Dolomitic Limestone	11/1/2016	6/29/2018	10/31/2019	C-68
SPR: TT-Fed/TT-Reg	A	C	DOTLT1000142	16-1C	$118,713	$165,312	LTRC	Amar Raghavendra	Radio-frequency Identification (RFID) Tagging for Material Tracking and Future Asset Management	7/1/2016	4/30/2018	6/30/2018	C-69
SPR: TT-Fed/TT-Reg	A	C	30001663	14-4C	$60,000	$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-70
					$237,426	**$901,671**	**CONCRETE BUDGET TOTALS**						
Project Type: Other													
SPR: TT-Fed/TT-Reg	A	Other	DOTLT1000154	17-1Other	$52,894	$528,935	LTRC	Tyson Rupnow	Primavera P6 Upgrade and Cloud Migration Project	11/30/2016	4/30/2017	6/30/2017	C-71
SPR: TT-Fed/TT-Reg	A	Other	30000169	11-1AD	$286,000	$3,726,356	LTRC	Vijaya Gopu	Administration of LTRC External Funding Programs	1/1/2008	6/30/2009	6/30/2021	C-72
					$338,894	**$4,255,291**	**OTHER BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

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													
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000162	17-2SA	$30,000	$48,044	LSU	Julius Codjoe	Support Study for Pedestrians and Bicyclists Count: Developing a Statewide Multimodal Count Program	2/1/2017	6/30/2017	12/31/2017	C-74
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000149	17-1SA	$24,000	$196,722	LTRC	Julius Codjoe	Evaluating the Effectiveness of Regulatory and Warning Signs on Driver Behavior near Highway/Rail crossings	11/1/2016	6/30/2017	10/31/2018	C-75
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000105	16-5SA	$98,919	$293,359	LSU	Yimin Zhu	Highway Work Zone Construction Safety Research and Training: A Driving Simulator Study	7/1/2016	9/30/2018	12/31/2018	C-76
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000141	16-4SA	$91,543	$142,463	UNO	Tara Tolford, MURP, AICP	Pedestrians and Bicyclists Count: Developing a Statewide Multimodal Count Program	7/1/2016	12/31/2017	5/31/2018	C-77
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000110	16-3SA	$11,000	$167,514	LTRC	Julius Codjoe	Evaluating Cell Phone Data for AADT Estimation	5/1/2016	12/31/2016	7/31/2017	C-79
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000143	16-1SA	$60,858	$117,006	LSU	Helmut Schneider	Highway Construction Work Zone Safety Performance and Improvement in Louisiana	7/1/2016	4/30/2018	6/30/2018	C-80
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000087	15-3SA	$60,000	$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		7/30/2017	C-81
SPR: TT-Fed/TT-Reg	A	SA	DOTLT1000088	15-2SA	$38,000	$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	11/30/2017	C-82
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-83
					$518,110	**$1,494,849**	**SAFETY BUDGET TOTALS**						
					$5,413,609	**$69,953,417**	**SPR: TT-FED/TT-REG ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

Funding	.	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: Geotechnical													
SPR: TT-Fed/TT-Reg	P	GT		18-1GT	$80,000	$180,000			Analysis of Driven Pile Capacity within Pre-bored Soil	8/1/2017	6/30/2019		C-86
SPR: TT-Fed/TT-Reg	P	GT			$83,987	$70,000	LTRC	Gavin Gautreau	Geotechnical Asset Management	7/1/2017	6/30/2019		C-87
SPR: TT-Fed/TT-Reg	P	GT			$70,800	$200,000	LTRC	Adele Lee	Developing, Upgrading, and Maintaining Softwares for Transportation Applications	7/1/2017	6/30/2020		C-89
SPR: TT-Fed/TT-Reg	P	GT			$22,156	$50,000	LTRC	Murad Abu-Farsakh	Develop a Synthesis on the Application of PCPT Technology for Geotechnical Engineering Design	10/2/2017			C-90
SPR: TT-Fed/TT-Reg	P	GT			$53,800	$250,000	LTRC	Murad Abu-Farsakh	Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling	9/1/2017	8/31/2020		C-91
SPR: TT-Fed/TT-Reg	P	GT			$37,000	$200,000	LTRC	Murad Abu-Farsakh	Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation	1/1/2018	12/31/2020		C-93
SPR: TT-Fed/TT-Reg	P	GT			$75,000	$150,000			Predicting, Monitoring, and Rehabilitating Highway Embankment Slopes - RPIC 17-050	7/1/2017	6/30/2019		C-95
SPR: TT-Fed/TT-Reg	P	GT			$14,310	$15,900	LSU		DOTD Support for UTC Project: Prediction and Rehabilitation of Highway Embankment Slope Failures in a Changing Climate	7/1/2017	6/30/2018		C-97
SPR: TT-Fed/TT-Reg	P	GT			$45,000	$85,000	Tulane University		DOTD Support for UTC Project: Synthesis of Fault Traces in SE Louisiana Relative to Infrastructure	7/1/2017	6/30/2018		C-98
					$482,053	**$1,200,900**	**GEOTECHNICAL BUDGET TOTALS**						
Project Type: Pavements													
SPR: TT-Fed/TT-Reg	P	P			$70,000	$100,000			Support to Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	9/1/2017	12/31/2018		C-99
SPR: TT-Fed/TT-Reg	P	P			$50,000	$50,000	LTRC	Zhongjie Zhang	Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	8/1/2017	6/30/2018		C-100
SPR: TT-Fed/TT-Reg	P	P			$66,300	$200,000	LTRC	Zhong Wu	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach	7/1/2017	6/30/2019		C-101
SPR: TT-Fed/TT-Reg	P	P			$87,500	$200,000	LTRC	Zhong Wu	Application of Mechanistic-Empirical Pavement Design Approach into RCC Pavement Thickness Design	7/1/2017	6/30/2019		C-102
					$273,800	**$550,000**	**PAVEMENTS BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

Funding	.	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: Bituminous													
SPR: TT-Fed/TT-Reg	P	B		17-4B	$63,865	$143,000	LTRC	Saman Salari	Development of a 4.75mm Asphalt Mixture Design	6/1/2017			C-103
SPR: TT-Fed/TT-Reg	P	B	DOTLT1000161	17-1B	$127,000	$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-104
SPR: TT-Fed/TT-Reg	P	B			$99,100	$220,000	LTRC	Louay Mohammad	Develop a Fracture Mechanic Based Test for the Evaluation of Moisture Sensitivity in Asphalt Mixtures				C-105
SPR: TT-Fed/TT-Reg	P	B			$118,200	$233,000	LTRC	Louay Mohammad	Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures	7/1/2016			C-106
SPR: TT-Fed/TT-Reg	P	B			$156,504	$279,000	LTRC	Louay Mohammad	Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature	7/1/2017	6/30/2019		C-107
SPR: TT-Fed/TT-Reg	P	B			$130,100	$270,000	LTRC	Louay Mohammad	Assessment of Long-Term Performance of Louisiana Asphalt Pavements	7/1/2017	6/30/2019		C-109
SPR: TT-Fed/TT-Reg	P	B			$70,000	$350,000	LTRC	Louay Mohammad	Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading	1/1/2018	6/30/2020		C-111
SPR: TT-Fed/TT-Reg	P	B			$20,000	$20,000	LTU	Nazimuddin Wasiuddin	DOTD Support for UTC Project: Development of a Standard Test Method for Characterization of Asphalt Modifiers and Aging-Related Degradation Using an Extensional Rheometer	7/1/2017	6/30/2018		C-113
SPR: TT-Fed/TT-Reg	P	B			$35,000	$38,000	LSU	Marwa Hassan	DOTD Support for UCT Project: Improving Durability and Extending the Service Life of Asphalt Pavements Through the Use of Innovative Light Induced Self-healing Material	7/1/2017	6/30/2018		C-114
SPR: TT-Fed/TT-Reg	P	B			$35,000	$38,000	LSU	Marwa Hassan	DOTD Support for UTC Project: Development of Self-Healing and Rejuvenating Mechanisms for Asphalt Mixtures Containing Recycled Asphalt Singles	7/1/2017	6/30/2018		C-115
					$854,769	**$1,791,000**	**BITUMINOUS BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

Funding	.	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: Structures													
SPR: TT-Fed/TT-Reg	P	SA	DOTLT1000204	18-3ST	$9,724	$9,724	ULL	Ayman Okeil	Bridge Inspection with Unmanned Aerial Vehicles - II	7/1/2017	6/30/2018		C-116
SPR: TT-Fed/TT-Reg	P	ST			$15,000	$15,000	LSU	Ayman Okeil	DOTD Support for UTC Project: A Comprehensive Framework for Corrosion Damage Monitoring and Reliability-Based Repair Design of Reinforced Concrete Structures	7/1/2017	6/30/2018		C-117
SPR: TT-Fed/TT-Reg	P	ST			$6,980	$6,980	ULL		DOTD Support for UTC Project: Bridge Inspection with Unmanned Aerial Vehicles	7/1/2017	6/30/2018		C-118
SPR: TT-Fed/TT-Reg	P	ST			$100,000	$200,000			Load Rating of Existing Continuous Stringers on Louisiana's Bridges	7/1/2017	6/30/2019		C-119
SPR: TT-Fed/TT-Reg	P	ST			$100,000	$200,000			Development of Rating Strategies of Existing Bridges	7/1/2017	6/30/2019		C-120
					$231,704	**$431,704**	**STRUCTURES BUDGET TOTALS**						
Project Type: Special Studies													
SPR: TT-Fed/TT-Reg	P	SS			$100,000	$100,000			Tactile Clues for the Visually Impaired to Align Properly for Street Crossings	7/1/2017	6/30/2018		C-121
SPR: TT-Fed/TT-Reg	P	SS			$12,400	$15,900	LSU		DOTD Support for UTC Project: Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies	7/1/2017	6/30/2018		C-122
SPR: TT-Fed/TT-Reg	P	SS			$14,300	$15,900	LSU	Sherif Ishak	DOTD Support for UTC Project: Promoting Economic Development in the Baton Rouge Area, LA: Improving the Performance of the Transportation System through Supply-oriented, Demand-oriented, and Economic Measures for Mitigating Traffic Congestion	7/1/2017	6/30/2018		C-123
SPR: TT-Fed/TT-Reg	P	SS			$65,000	$80,000			Departmental Applications for Unmanned Aerial Systems	8/1/2017	10/31/2018		C-124
SPR: TT-Fed/TT-Reg	P	SS			$85,000	$125,000			Evaluation and Guidance of Planning-Level Cost Estimation	7/1/2017	12/31/2018		C-125
SPR: TT-Fed/TT-Reg	P	SS			$37,000	$80,000	LTRC	Julius Codjoe	Evaluation of DOTD's Existing Queue Estimation Procedures	7/1/2017	6/30/2019		C-126
SPR: TT-Fed/TT-Reg	P	SS			$86,000	$86,000	LTRC	Julius Codjoe	Development of a CAV Roadmap for Louisiana DOTD	7/1/2017	6/30/2018		C-127
SPR: TT-Fed/TT-Reg	P	SS			$16,000	$47,270	LTRC	Julius Codjoe	Determine Louisiana's Roundabout Capacity	1/1/2018	6/30/2019		C-129
SPR: TT-Fed/TT-Reg	P	SS			$13,000	$47,000	LTRC	Julius Codjoe	Permitted/Protected versus Protected Left Turns	1/1/2018	12/31/2018		C-130
SPR: TT-Fed/TT-Reg	P	SS			$100,000	$200,000	LTRC	Chester Wilmot	Louisiana Trip Generation Rates	6/1/2017	5/31/2019		C-131

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

Funding	.	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	PageNo.
SPR: TT-Fed/TT-Reg	P	SS			$75,000	$150,000			LADOTD Plan Development Consultant Contract Process Review	10/1/2017	3/31/2019		C-132
SPR: TT-Fed/TT-Reg	P	SS			$65,000	$125,000			Competition Among Transportation Modes for State Funding	10/1/2017	12/30/2018		C-134
					$668,700	**$1,072,070**	**SPECIAL STUDIES BUDGET TOTALS**						

Project Type: Concrete

SPR: TT-Fed/TT-Reg	P	C			$22,151	$100,000	LTRC	Amar Raghavendra	Development of Prediction Models and Design Guides for RCC Pavements	7/1/2017	6/30/2018		C-136
SPR: TT-Fed/TT-Reg	P	C			$27,040	$100,000	LTRC	Amar Raghavendra	Implementation of Roller Compacted Concrete by LADOTD	7/1/2017	6/30/2019		C-137
SPR: TT-Fed/TT-Reg	P	C			$34,301	$100,000	LTRC	Amar Raghavendra	Influence of Internal Curing on measured resistivity	7/1/2017	6/30/2019		C-138
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			C-139
SPR: TT-Fed/TT-Reg	P	C			$18,000	$30,000	LSU	Marwa Hassan	DOTD Support for UTC Project: Self-Healing Microcapsules as Concrete aggregates for Corrosion Inhibition in Reinforced Concrete	7/1/2017	6/30/2018		C-140
SPR: TT-Fed/TT-Reg	P	C			$41,000	$49,000	LSU		DOTD Support for UTC Project: Evaluation of the Performance and Cost-Effectiveness of Engineered Cementitious Composites (ECC) Produced from Region 6	7/1/2017	6/30/2018		C-142
					$172,492	**$409,000**	**CONCRETE BUDGET TOTALS**						

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			C-143
					$50,000	**$150,000**	**OTHER BUDGET TOTALS**						

Project Type: Safety

SPR: TT-Fed/TT-Reg	P	SA			$85,962	$153,820	LSU	Sherif Ishak	Crash Risk Assessment and Quantification Using the SHRP2 Naturalistic Driving Study Data	7/3/2017	3/29/2019		C-145
SPR: TT-Fed/TT-Reg	P	SA			$80,000	$200,000			Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors	9/1/2017	9/30/2019		C-146
SPR: TT-Fed/TT-Reg	P	SA			$18,000	$88,000	LTRC	Julius Codjoe	Pedestrian Crossings for High Speed Urban Arterials	1/1/2018	6/30/2019		C-147
SPR: TT-Fed/TT-Reg	P	SA			$60,000	$150,000			Intersection on Horizontal Curves: Problems and Potential Solutions	8/1/2017	1/31/2019		C-148
					$243,962	**$591,820**	**SAFETY BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

Funding	.	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: TIRE													
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000194	18-5TIRE	$29,345	$29,345	LTU	Sanjay Tewari	Identification of Transportation Infrastructure at Risk Due to Sea Level Rise and Subsidence of Land in Coastal Louisiana	7/1/2017	6/30/2018		C-149
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000193	18-4TIRE	$30,000	$30,000	LTU	Joan Lynam	Evaluating Using Louisiana-Sourced Lignin as Partial Replacement in Asphalt Binder and as an Antioxidant	7/1/2017	6/30/2018		C-150
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000192	18-3TIRE	$29,941	$30,000	LTU	Arden Moore	Rapid, Safe Inspection of Water-Spanning Infrastructure via Amphibious Unmanned Aerial Vehicle	7/1/2017	6/30/2018		C-152
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000191	18-2TIRE	$29,999	$30,000	ULL	Jovan Tatar	Improvement of Concrete Bridge Girder Serviceability through Strengthening with Near-Surface Mounted (NSM) Shape Memory Alloy Multi-strand Cables	7/1/2017	6/30/2018		C-154
SPR: TT-Fed/TT-Reg	P	TIRE	DOTLT1000190	18-1TIRE	$29,920	$30,000	ULL		Development of High Performance Impact Resistant Concrete Mixtures for Crash Barrier Application	7/1/2017	6/30/2018		C-155
					$149,205	**$149,345**	**TIRE BUDGET TOTALS**						
					$3,126,685	**$6,344,780**	**SPR: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: Pooled Fund: TT-Fed

FISCAL YEAR 2017-2018

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	$72,000	$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-157
SPR: Pooled Fund: TT-Fed	A	PF	DOTLT1000002	14-5PF	$90,500	$506,812	LTRC	Louay Mohammad	Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents and/or RAS	11/1/2014	10/31/2017		C-159
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-161
					$172,500	**$956,812**	**SPR: POOLED FUND: TT-FED ACTIVE BUDGET TOTALS**						
					$172,500	**$956,812**	**POOLED FUND BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

LTAP: TT-Fed/TT-Reg

FISCAL YEAR 2017-2018

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	DOTLT1000171	18-LTAP	$673,940	$673,940	LTRC	Marie Walsh	Local Technical Assistance Program (LTAP)	1/1/2017	12/31/2017		D-2
					$673,940	**$673,940**	**LTAP BUDGET TOTALS**						
					$673,940	**$673,940**	**LTAP: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

STP: TT-Fed

FISCAL YEAR 2017-2018

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	DOTLT1000026	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	$100,000	LTRC	Tyson Rupnow	Technology Transfer & Research Implementation Support for Louisiana Universities	1/1/2010	12/31/2013	6/30/2019	E-4
STP: TT-Fed	A	TT	30000320	08-1TSQ	$364,359	$353,904	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (LSU)	7/1/2015	6/30/2018		E-5
					$468,149	**$703,904**	**TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS**						
STP: TT-Fed	P	TT	DOTLT1000174	18-TTRF	$100,000	$100,000	LTRC	MaryLeah Coco	Technology Transfer Registration Fees	7/1/2017	6/30/2018		E-7
STP: TT-Fed	P	TT	DOTLT1000179	18-PONTIS	$125,000	$125,000	LTRC	MaryLeah Coco	AASHTO PONTIS Agreement	7/1/2017	6/30/2018		E-8
STP: TT-Fed	P	TT	DOTLT1000175	18-COOP	$200,000	$200,000	LTRC	MaryLeah Coco	LA DOTD CO-OP Program	7/1/2017	6/30/2018		E-9
STP: TT-Fed	P	TT	DOTLT1000173	18-2TT	$147,000	$147,000	LTRC	MaryLeah Coco	LTRC Student Program	7/1/2017	6/30/2018		E-10
STP: TT-Fed	P	TT	DOTLT1000172	18-1WDC	$3,080,571	$3,080,571	LTRC	MaryLeah Coco	Workforce Development Contracts	7/1/2017	6/30/2018		E-11
STP: TT-Fed	P	TT	DOTLT1000170	18-1WD	$1,056,217	$1,056,217	LTRC	MaryLeah Coco	Workforce Development	7/1/2017	6/30/2018		E-14
STP: TT-Fed	P	TT	DOTLT1000178	18-1TT	$37,500	$37,500	LTRC	MaryLeah Coco	Support for Senior Project Courses	7/1/2017	6/30/2018		E-15
STP: TT-Fed	P	TT	DOTLT1000176	18-1TSQ	$538,643	$538,643	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (DOTD)	7/1/2017	6/30/2018		E-16
STP: TT-Fed	P	TT	DOTLT1000180	18-1SWD	$1,520,000	$1,520,000	LTRC	MaryLeah Coco	DOTD Staff Support for Workforce Development	7/1/2017	6/30/2018		E-18
					$6,804,931	**$6,804,931**	**TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS**						
					$7,273,080	**$7,508,835**	**STP: TT-FED ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

Self-Generated

FISCAL YEAR 2017-2018

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	$18,500	$186,407	LTRC	Louay Mohammad	Field Implementation of the Louisiana Interface Shear Strength Test	8/9/2013	8/8/2015	7/31/2017	F-2
					$18,500	**$186,407**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Structures													
NSF	A	ST	DOTLT1000101	16-2ST	$100,000	$337,312	LTRC	Vijaya Gopu	Field Monitoring and Measurements Education: A Model for Civil and Environmental Engineering	2/15/2016		8/14/2019	F-3
					$100,000	**$337,312**	**STRUCTURES BUDGET TOTALS**						
					$118,500	**$523,719**	**SELF-GENERATED ACTIVE BUDGET TOTALS**						
Project Type: Bituminous													
Wisconsin Dot	P	B			$30,000	$30,000	LTRC	Louay Mohammad	Investigation of Tack Coat Materials on Tracking Performance	7/1/2017	6/30/2018		F-6
					$30,000	**$30,000**	**BITUMINOUS BUDGET TOTALS**						
					$30,000	**$30,000**	**SELF-GENERATED PROPOSED BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

Other DOTD Sections

FISCAL YEAR 2017-2018

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: Special Studies													
Safety	A	SS	DOTLT1000151	17-2SS	$2,750,000	$8,291,932	Highway Safety Research	Helmut Schneider	Louisiana Traffic Records Management System Support		9/30/2019		G-2
Port Priority Program	A	SS	DOTLT1000148	17-1SS	$43,732	$83,732	LSU	James Richardson	Economic Evaluation of Applicants to the Port Construction and Development Priority Program	7/1/2016	12/31/2017	6/30/2018	G-3
					$2,793,732	**$8,375,664**	**SPECIAL STUDIES BUDGET TOTALS**						
Project Type: Safety													
Safety	A	SA	DOTLT1000111	16-1STFS	$513,378	$1,263,287	LTRC	Dortha Cummins	FHWA Safety Transfer Fund Support for LCTS		12/31/2017		G-4
					$513,378	**$1,263,287**	**SAFETY BUDGET TOTALS**						
Project Type: Geotechnical													
Emergency Fund	A	GT	30000980	13-9GT	$14,696	$474,380	LSU	Joshua Kent	CORS 911: Continuously Operating Reference Stations for the Bayou Corne Sinkhole	3/18/2013	3/17/2014	9/30/2017	G-6
					$14,696	**$474,380**	**GEOTECHNICAL BUDGET TOTALS**						
					$3,321,806	**$10,113,331**	**OTHER DOTD SECTIONS ACTIVE BUDGET TOTALS**						
Project Type: Other													
Safety	P	Other	DOTLT1000177	17-LRSP	$361,465	$361,465	LTRC	Marie Walsh	Louisiana Local Road Safety Program	1/1/2017	12/31/2017		G-8
					$361,465	**$361,465**	**OTHER BUDGET TOTALS**						
Project Type: Safety													
Safety	P	SA		18-1SA	$100,000	$150,000	LSU	Helmut Schneider	Assessing the Economic Impacts of J-turns in Louisiana	7/3/2017	12/31/2018		G-10
					$100,000	**$150,000**	**SAFETY BUDGET TOTALS**						
Project Type: Special Studies													
Highway/Rail Safety	P	SS			$30,000	$100,000	LTRC	Julius Codjoe	Exploring the Use of Pavement Markings in the Dynamic Envelope of a Railroad Crossing to Enhance Safety	1/1/2018			G-11
					$30,000	**$100,000**	**SPECIAL STUDIES BUDGET TOTALS**						
					$491,465	**$611,465**	**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 2017-2018

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

SIO:	**DOTLT1000182**		Project Start Date:		7/1/2017
Research Project Number:	18-1PM		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$756,246		**Total**		**$756,246**
	(revised)					
Est. Expended to Date				Salaries		$756,246
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Program Management

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Program Management

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Program Management

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000185**	Project Start Date:		7/1/2017
Research Project Number:	18-1TTRI	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$390,000	**Total**		**$390,000**
	(revised)				
Est. Expended to Date			Salaries		$390,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Technology Transfer and Research Implementation

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Technology Transfer and Research Implementation

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Technology Transfer and Research Implementation

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000188**	Project Start Date:		7/1/2017
Research Project Number:	18-1TRS	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$440,000
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$440,000**
Salaries		$440,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

Technical Research Surveillance

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Technical Research Surveillance

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Technical Research Surveillance

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000184**		Project Start Date:		7/1/2017
Research Project Number:	18-1TA		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$305,000		**Total**		**$305,000**
	(revised)					
Est. Expended to Date				Salaries		$305,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Technical Assistance

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
-Long-term performance monitoring of FRP anchorage for Bayou Ramos Rehab Project -16-03TA-C - Evaluation of Cores from Jefferson Highway Near Airline Highway -I-20 precast project - Preconstruction meeting in Shreveport, LA -Micro capsule study – LSU, -ASTM C1567 testing, -Fiber reinforced RCC fatigue testing -Fibercrete -Reclaimed fly ash -Precision Statement ASTM C1761-15 -Dense concrete lunch and learn -Internally cured bridge decks for LCG -Effect of vibrations on setting reinforced concrete -I-49 Section J Cracking Investigation -Temperature Segregation Analysis on Lightweight MTV – Evaluation of alternative Lightweight MTV in regards to the new specification -Government St. – Fiber Crete – Fiber Crete examined to see if HMA caused it to soften and cause rutting -Special Permit Task Force -2016 Specification Book – Parts 5 and 10 -Tack Coat issues – requests for information regarding potential alternative tack coats, or the placement of the incorrect tack coat -CRM issues – requests for information regarding CRM technologies and potential mixture designs -Latex issues – requests for information regarding Latex polymer dosage and potential mixture designs -Laboratory performance of asphalt mixtures containing REOB -17-03TA-P Assessment of stripping that is used for rumble strips -17-02TA-P Method to assess flooded roadways for GOSHEP -16-10TA-P District 04, Evaluate Multi-head breaker developed by David Madden -16-09TA-P Rubblization Evaluation, H.010480, I-20, Dixie Inn to Bienville Parish Line -16-08TA-P LA 19: Forensic pavement analysis for overlay design -16-07TA-P Friction testing on I-10 bridges over Manchac Bayou, LA 73, and LA 928 -16-06TA-P LA 645, H.012496 Typical section design -16-05TA-P LA 157 Friction testing -I-49 (District 04), Direct Shear Testing - 6 Samples (3 points min each) -US 80 (District 05), Direct Shear Testing -Historical Photo & Quad Review -LSU - Ravindra Gudishala – ITS: Hardware Installation Support -LSU – Marwa Hassan – Self Healing Concrete: LTRC Oven Support -LSU – Mostafa Elseifi – Groundwater Table Map: Review and Comment -LSU – Navid Jafari – Consolidation Testing Support -LA 3276 (District 04) Cracking Shoulders with Patches -US 171 to I-49, Forensic Analysis
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Technical Assistance

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000189**	Project Start Date:		7/1/2017
Research Project Number:	18-1SSR	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$100,000
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$100,000**
Salaries		$100,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

LADOTD Staff Support for Research - Specifically UTC Support

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

LADOTD Staff Support for Research - Specifically UTC Support

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000187**		Project Start Date:		7/1/2017
Research Project Number:	18-1NPE		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$82,000		**Total**		**$82,000**
	(revised)					
Est. Expended to Date				Salaries		$82,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

New Product Evaluation

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Thermoplastic stripping rumble strips
-Super Slurry – Cement Slurry
-Florida Marine Transporters - Fluidized Bed Combustion Ash
-Honeywell/Scott Brown
-Omega Paving – Pavezyme
-Red Mud

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

New Product Evaluation

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Research Laboratory and Field Test Support**	**Project Status:**	**Proposed**

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

SIO:	**DOTLT1000183**		Project Start Date:		7/1/2017
Research Project Number:	18-1LFT		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$26,000		**Total**		**$26,000**
	(revised)					
Est. Expended to Date				Salaries		$26,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Research Laboratory and Field Test Support

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Research Laboratory and Field Test Support

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Research Laboratory and Field Test Support

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000186**		Project Start Date:		7/1/2017
Research Project Number:	18-1EQM		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$350,000		**Total**		**$350,000**
	(revised)					
Est. Expended to Date				Salaries		$350,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

Equipment Management

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Equipment Management

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Equipment Management

FHWA

Part II SPR Funded Research Program

CONTINUING RESEARCH

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000165**		Project Start Date:		6/1/2017
Research Project Number:	17-2GT		Completion Date	(original)	5/31/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$455,673		**Total**		**$140,000**
	(revised)					
Est. Expended to Date				Salaries		$125,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$15,000
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 a 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 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Conduct comprehensive literature reviews relevant to the application of CPT technology and available direct Pile-CPT methods for estimating the nominal tip and side resistances of driven piles, literature review on the effect of scour on pile resistance, and use of Kriging technique to generate synthetic CPT profiles, -Start collecting all available pile load test data and CPT data from previous and new sites in Louisiana to establish a database for evaluating the Pile-CPT methods, -Start modifying the LPD-CPT software to incorporate new features such as LRFD design methodology and scour effect, -Identify old and new project sites with pile load tests for possible re-visit to perform PCPT, and -Start evaluating the newly developed pile-CPT methods and re-evaluate previously implemented pile-CPT methods.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Verification and Implementation of Set-Up Empirical Models in Pile Design**	**Project Status:**	**Ongoing**

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

SIO:	**DOTLT1000144**	Project Start Date:		8/1/2016
Research Project Number:	17-1GT	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	7/31/2018
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$247,771
	(revised)	
Est. Expended to Date		$65,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$69,494
	(revised)	
Est. FY Expenditure		$65,000

Estimated 2017-2018 Budget		
Total		**$43,000**
Salaries		$38,000
Equipment	(expendable)	$5,000
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

Piles driven into saturated cohesive soils typically experience a time-dependent increase in pile resistance (set-up) after installation, which contributes to the long-term resistance of the piles. Field observations showed that pile set-up is significant and continues to develop for some time after installation, especially for fine-grained soils (clays and silts). An accurate assessment of pile set-up with time is very important in the design and construction of economical pile foundations in Louisiana.

Incorporating pile set-up in the design of pile foundations can result in significant cost savings. The current engineering practice for design of piles in Louisiana is based on analyzing test piles 14 days after driving, and ignoring any pile set-up after that time period. A more reliable design methodology that accounts for the effect of time-dependent increase of pile resistance is needed.

The Louisiana Department of Transportation and Development (LADOTD) realized the importance of incorporating the increase in pile resistance with time into more economical pile foundation design. For this purpose, a comprehensive research project (11-2GT) “Field Instrumentation and Testing to Study Set-up Phenomenon of Piles Driven into Louisiana Clayey Soils,” was recently completed at the Louisiana Transportation Research Center (LTRC)in which empirical models were develop to evaluate set-up based on typical soil properties.

The main objectives of this research are: perform static and dynamic load tests on newly instrumented test piles to better understand the set-up mechanism for individual soil layers, verify or re-calibrate the previously-developed empirical set-up models for piles driven in soft cohesive soils, and develop an analytical methodology to estimate the duration of pile set-up.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
-Conducted literature review relevant to pile setup focusing on recently published articles, and Conducted literature review related to t-z and q-z load transfer curves, -A new site was identified (i.e., LA-1 Phase-2) for conducting pile setup study for verification and implementation phase, -Developed the instrumentation plan for the test piles at LA-1 - Phase-2 site, and purchased the required instrumentations, -Started collecting data from the existing pile setup project from head quarter with sufficient soil information, -Collected piezocone excess pore water pressure dissipation data to analyze the time frame for set-up, and started analyzing the excess pore water pressure dissipation data to develop a model to predict the time frame duration of setup, -Started analyzing the strain gauge data for t-z curve load transfer, -Started analyzing the strain gauge data for the q-z plot, and -Started collecting data to analyze the a and ß parameters from strain gauge reading and load transfer.
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Continue conducting literature review relevant to pile setup and t-z and q-z load transfer curves, -We are waiting for the LA-1 - Phase-2 to start for instrumenting and testing the piles. The research team is also looking for other sites to perform field study, -Continue collecting data from the existing pile setup project from head quarter with sufficient soil information, -Continue collecting piezocone excess pore water pressure dissipation data to analyze the time frame for set-up, -Continue analyzing the excess pore water pressure dissipation data to develop a model to predict the time frame duration of setup, -Continue analyzing the strain gauge data for t-z curve load transfer, and -Continue analyzing the strain gauge data for the q-z plot.

LTRC Annual Research Program
Fiscal Year 2017-2018

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)	12/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$476,813	**Total**		**$130,000**
	(revised)				
Est. Expended to Date		$127,000	Salaries		$130,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$193,000	Equipment	(non-expendable)	
	(revised)	$130,000	Travel		
Est. FY Expenditure		$127,000	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 2016 - 2017 ACCOMPLISHMENTS

-Conducted literature review relevant to the in-situ testing devices (e.g., LWD, DCP, DSPA, Geogauge), site variability, and lab/in-situ testing variability,
-Visited the Louisiana Department of Transportation and Development's (LADOTD's) materials lab to observe sample handling/preparation and testing practice,
-Prepared a draft document of observations from material lab visits,
-Conducted ten in-box tests to study measurement variation of shallow in-situ tests (DCP, LWD, DSPA, Geogauge, and NDG) in the lab,
-Conducted field tests on three cementitious treated sections at ALF and one section on construction site to study measurement variation of shallow in-situ tests in the field,
-Started conducting extensive CPTs and soil borings at LA 1 inter coastal for evaluating site variability for deep foundation application, and
-Started collecting CPT and boring data from LADOTD headquarters for different projects to study site variability.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Continue conducting literature review relevant to site, laboratory and in-situ testing variability, -Continue conducting lab in-box tests for measurement variation study of shallow in-situ tests, -Start lab variability study by conducting selected geotechnical lab tests (e.g., CBR, UU, consolidation etc.), -Construct more field sections at ALF to study measurement variation of shallow in-situ tests in the field, -Look for new construction sites to study measurement variation of shallow in-situ tests, -Continue collecting CPT and boring data from LADOTD headquarters, -Continue evaluating the observations from LA DOTD materials lab for sample handling/preparation and testing practice, -Look into the QC/QA guidelines and practices of other states and agencies, -Start collecting data from LA DOTD headquarter for evaluating QC/QA and laboratory/site variability, and -Start preliminary analysis on the completed tests and collected data.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000097**		Project Start Date:		10/6/2016
Research Project Number:	16-1GT		Completion Date	(original)	1/5/2018
Research Agency:	GeoStellar Engineering, LLC		Completion Date	(revised)	
Principal Investigator:	Ed Tavera				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$79,987	**Total**		**$45,000**
	(revised)				
Est. Expended to Date		$34,987	Salaries		$43,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$34,987	Equipment	(non-expendable)	
	(revised)		Travel		$2,000
Est. FY Expenditure		$34,987	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
-Field and Laboratory Testing Procedures
-Material Description-Classification-Logging
-GeoMechanics
-Geotechnical LRFD Design
-Geotechnical Resistance Factors
-Geotechnical Performance Limits
-LA Geology and Seismicity
-Shallow Foundations
-Deep Foundations
-Embankments
-Project Specific Specifications List
-Geotechnical Template Plans
-Reinforced Soil Slopes,
-MSE Walls
-Geotechnical Design Section Forms
-Geotechnical Software
-Construction Monitoring and Instrumentation
-Construction QA-QC
-Specifications and Special Provisions
-Plan Preparation
-Geotechnical Reports
-Geosynthetic Design
-Ground Improvement
-Earth Retaining Structures

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Conducted regular meetings with Section 67 regarding the Design Manual chapters and content.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Develop the Design Manual and provide a brief final report as the manual is the documentation.

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 2017-2018 Budget**		
Total Cost	(original)	$200,000		**Total**		**$140,000**
	(revised)					
Est. Expended to Date		$60,000		Salaries		$92,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$40,000
FY Funds	(original)	$175,000		Equipment	(non-expendable)	
	(revised)			Travel		$8,000
Est. FY Expenditure		$60,000		Other		

PURPOSE AND SCOPE

This research will address the needs of the HQ Pavement and Geotechnical and expand on work developed under the initial and Phase 2 projects. This research will 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 (a 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 2016 - 2017 ACCOMPLISHMENTS

Meetings were held with critical/experienced personnel within the Districts, the Materials Lab, Geotechnical Design and the Pavement Management Groups. The interim report was presented and the research team began work.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Implement the results and finalize the report.

LTRC Annual Research Program
Fiscal Year 2017-2018

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)	12/31/2017
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$232,200
	(revised)	$302,200
Est. Expended to Date		$249,900
FY 2016 - 2017 Budget		
FY Funds	(original)	$54,895
	(revised)	
Est. FY Expenditure		$55,000

Estimated 2017-2018 Budget		
Total		**$49,025**
Salaries		$49,025
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
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 2016 - 2017 ACCOMPLISHMENTS

-Conducted literature review relevant to the geosynthetic reinforced soil and its application for bridge abutments,
-Conducted the second 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,
-Continued monitoring the performance of the GRS-IBS abutment at Maree Michel Bridge,
-Continued analyzing the data collected during the static load tests and measurements of instruments during monitoring,
-Performed 2-D finite element analysis to simulate the behavior of the GRS-IBS abutment at Maree Michel Bridge under various loading conditions, and
-Developed a 3-D finite element model to simulate the 3-D performance of Maree Michel Bridge.

FISCAL YEAR 2017-2018 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, -Continue performing the 3-D finite element to simulate the performance of Maree Michel Bridge the finite element parametric study, 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)	5/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$260,368		**Total**		**$80,500**
	(revised)					
Est. Expended to Date		$112,227		Salaries		$78,500
FY 2016 - 2017 Budget				Equipment	(expendable)	$2,000
FY Funds	(original)	$82,160		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$75,000		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 software's, 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-pore water 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 2016 - 2017 ACCOMPLISHMENTS
-Conducted literature review relevant to the lateral behavior of single and group of piles (both vertical and battered), -Developed three-dimensional finite element numerical models to simulate the lateral behavior of vertical and battered pile group foundations, -Verified the finite element model using the results of a full-scale static lateral load test that was conducted at I-10 Twin Span Bridge, -Performed finite element analysis to evaluate the lateral behavior of battered pile group foundations as compared to vertical pile group foundations and single vertical pile, -Started the finite parametric study to evaluate the pile group effect (p-multiplier) in terms of pile row and column spacing and soil type, and -Started evaluating the contribution of lateral loads transferred to battered piled in axial direction.
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Continue literature review relevant to the lateral behavior of single and group of piles, -Complete the finite element analysis to evaluate the lateral behavior of battered pile group foundations as compared to vertical pile group foundations and single vertical pile, -Complete the finite parametric study to evaluate the pile group effect (p-multipliers) in terms of pile row and pile column spacing and soil type, -Continue evaluating the contribution of lateral loads transferred to battered piled in axial direction, -Start the development of p-y curves for use in analysis and design of battered pile group foundations subjected to lateral loads, and -Perform three-dimensional finite element numerical model to simulate the lateral response of battered pile group foundation subjected to dynamic barge impact.

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)	12/31/2017
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$297,579
	(revised)	$686,957
Est. Expended to Date		$686,957
FY 2016 - 2017 Budget		
FY Funds	(original)	$37,398
	(revised)	
Est. FY Expenditure		$37,398

Estimated 2017-2018 Budget		
Total		
Salaries		
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
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 2016 - 2017 ACCOMPLISHMENTS

-Conducted accelerated load tests on the paved test lane sections. Completed 360,000 passes on lanes 1, 2, 3, and 4, 410,000 passes on lane 5, and 75,000 passes on lane 6,
-Completed all the field cyclic plate load tests on the six test lane sections at ALF,
-Worked on analyzing the experimental test results, and
-There were several delays on accelerated load testing due to the need for machine maintenance and repairs,

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Cut trenches to all test lane sections,
-Study the cost benefit of geosynthetic reinforced pavements, and
-Prepare a 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)	12/31/2017
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$294,679	**Total**		**$45,000**
	(revised)	$354,679			
Est. Expended to Date		$267,400	Salaries		$45,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$41,523	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$45,000	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 2016 - 2017 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, -Performed cyclic plate load tests on four cement stabilized based sections at ALF, -Purchased the instrumentations needed for phase II cyclic plate load tests at ALF, -Constructed and start testing of several cementitious (cement/lime/fly ash) treated subgrade sections at ALF, -Start analyzing the results of cyclic plate load tests on ALF sections, and -There was a delay to this project and was temporary put on hold due to the use of the cyclic plate load facility on testing geosynthetic reinforced test sections for another research project. In addition, there was several months of delay for repairing the oil leak of the cyclic plate load testing facility.
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Continue constructing the rest of cementitious (cement/lime/fly ash) treated subgrade soil sections at ALF site, -Conduct cyclic plate load tests on the cementitious treated subgrade soil sections at ALF, and -Continue analyzing the results of the cyclic plate load tests on ALF test sections.

LTRC Annual Research Program
Fiscal Year 2017-2018

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		
Total Cost	(original)	$523,000
	(revised)	$13,991,168
Est. Expended to Date		$1,380,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$225,000
	(revised)	
Est. FY Expenditure		$320,000

Estimated 2017-2018 Budget		
Total		**$163,500**
Salaries		$81,500
Equipment	(expendable)	$62,000
Equipment	(non-expendable)	
Travel		$20,000
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 2016 - 2017 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 LTRC research projects,
-Developed potential ideas and problem statements for future Louisiana Transportation Research Center Transportation and Development (LADOTD),
Transportation and Development (LADOTD),
-Developed research proposal on "Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features", and "Verification and Implementation of Pile Set-up Analytical Estimation Methods", and
-Maintained software's related to CPT application.

FISCAL YEAR 2017-2018 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 the CPT software's.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	A Decision-Making Tool for Incorporating Sustainability Measures into Pavement Design	Project Status:	Ongoing
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	1000150		Project Start Date:		8/1/2016
Research Project Number:	17-3P		Completion Date	(original)	7/31/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$155,686	**Total**		**$77,843**
	(revised)				
Est. Expended to Date		$77,843	Salaries		$65,000
FY 2016 - 2017 Budget			Equipment	(expendable)	$4,843
FY Funds	(original)	$77,843	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$77,843	Other		$8,000

PURPOSE AND SCOPE

The objective of the proposed study is to conceive and develop a decision-making tool for evaluating sustainability of pavement designs based on a cradle to grave analysis. This tool will utilize Environmental Product Declarations (EPD) to enhance the reliability of the assessment data and will be integrated within state of the art pavement design methods such as Pavement ME. The proposed tool will be easy to use by pavement designers and decision makers for evaluating alternative designs.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

A Project Review Committee (PRC) meeting is being scheduled in the last week of May, 2017. Here is a summary of work accomplished in this fiscal year to date:

-The team has completed the literature review. A literature review report will be given to the Louisiana Transportation Research Center (LTRC) by May 1, 2017,

-Designed an EPD database, (will be completed for concrete mixes June, 2017),

-A concrete product EPD database has been compiled for all concrete EPD's available nationwide. The team is adding more Louisiana concrete mixes to the EPD by working with district offices and Athena. Once this is accomplished, it will allow pavement designers in Louisiana access to environmental performance of concrete mixes commonly used in Louisiana,

-Integrated the use of EPDs in pavement design methodology, and

-Developed a tool to evaluate the environmental performance of concrete mixes.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Design an EPD database, (completed for concrete mixes June, 2017), -The research team is talking to NAPA to get access to their tool quantifying asphalt database. if NAPA agrees, there will be additional cost paid to NAPA & Trisight Engineering, (their software developer) to allow them to create a user interface that integrates the software the Louisiana State University (LSU) is developing with their software EPD database, -Integrate the use of EPDs in pavement design methodology. A cost analysis module will be developed in the tool and integrated with the environmental module, -Demonstrate the use of the tool using case studies. This task will start in 2017-2018, and -Prepare Final Report, recommendations, and implementation plan.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	DOTLT1000147	Project Start Date:		8/1/2016
Research Project Number:	17-2P	Completion Date	(original)	7/31/2017
Research Agency:	LTRC	Completion Date	(revised)	7/31/2018
Principal Investigator:	Mark Martinez			

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$82,528	**Total**		**$77,528**
	(revised)				
Est. Expended to Date		$2,341	Salaries		$77,528
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$82,528	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$5,000	Other		

PURPOSE AND SCOPE

The ultimate objective of this research is to improve smoothness on Louisiana's bridge inventory. A supplementary objective is to improve the benefit-cost figures associated with attaining said smoothness. More immediate objectives will to refine and prove the bridge roughness specification so that it can be put into widespread use across the state. This will entail trialing said specification on a series of pilot projects, working up an implementation strategy for the new specification and developing a benefit-cost assessment based on expected impact that the revised specification will have.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Selection of Field Projects: Bridges suitable for testing have been selected based on expected site classification (sagging, joint separation, curling, cambering, etc…).

NOTE: Project progress has been delayed because the required high speed laser profiler (HSLP) has not been available since time of project launch. A new HSLP is on order and progress should advance once the new device is secured and staff has been properly trained in its use. The delays will likely require a project extension.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Selection of Field Projects: Preliminary testing will proceed once the HSLP becomes available. Bridges already selected will be HSLP tested to ensure that classifications are correct. Once confirmed, Task two will proceed, and
-Assessment of Roughness: Roughness on the bridges will be assessed using the new HSLP. Collected profiles will be evaluated using the Federal Highway Administration's ProVAL software. The profiles will be assessed both in terms of standard IRI as well as IRI25-ft in accordance to the stipulations of the draft specification.

Title:	**Improving the Use of Crack Sealing to Asphalt Pavement in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000145**	Project Start Date:		11/1/2016
Research Project Number:	17-1P	Completion Date	(original)	1/31/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$250,000	**Total**		**$115,000**
	(revised)				
Est. Expended to Date		$20,000	Salaries		$115,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$58,000	Equipment	(non-expendable)	
	(revised)	$40,000	Travel		
Est. FY Expenditure		$40,000	Other		

PURPOSE AND SCOPE

The main objective of this study is to quantify the performance and benefits of using crack sealing and other impermeable surface treatments (e.g., chip seal) under various groundwater table conditions and to develop a user guideline for applying impermeable surface treatments to Louisiana highways. While the study focuses on the analysis of historical data, the RFP mentions the development of an experimental plan for field evaluation of crack sealing.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

The research team held a Project Review Committee (PRC) meeting on March 29, 2017. In this meeting, the researchers presented the findings of the literature review as well as challenges faced during the analysis of the historical and PMS data. The PRC recommended two approaches to resolve these challenges:
-Conduct a detailed performance and cost analysis of the identified sections,
-Construct field sections to supplement the results of the historical data analysis, and
-An interim report was submitted and has been reviewed by the PRC.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

The research team will focus on addressing the PRC comments by conducting a more detailed analysis of the identified sections through PMS data and by coordinating a field experiment with the interested districts. As instructed by the PRC, drainage conditions and GWT of the identified sections will be assessed through a review of available data. In addition, the researchers will undertake the scheduled tasks including laboratory characterization of crack sealants.

If the field experiment is constructed, the researchers will assess the short-term performance of the constructed sections.

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 2017-2018 Budget**		
Total Cost	(original)	$170,588	**Total**		**$95,300**
	(revised)				
Est. Expended to Date		$45,000	Salaries		$95,300
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$94,240	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$60,000	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 2016 - 2017 ACCOMPLISHMENTS

-Collected ADA cracking data for nine in-service projects,
-Compared the ADA cracking data vs. manually-determined cracking data, and
-Installed Vision software and started to compare cracking data collected from PMS survey.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Compare ADA and Vision Software,
-Evaluate the alligator cracking model in Pavement ME using LTRC measured data and update the calibration coefficients accordingly,
-Develop conversion correlation models for different cracking measurements at LTRC and LADOTD, and
-Develop final report.

Title:	**Pavement Service Life Extension Due to Asphalt Surface Treatment Interlayer**	**Project Status:**	**Ongoing**
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:	ULL		Completion Date	(revised)	
Principal Investigator:	Mohammad Khattak				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$199,997		**Total**		**$110,000**
	(revised)					
Est. Expended to Date		$37,283		Salaries		$59,500
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$98,916		Equipment	(non-expendable)	
	(revised)			Travel		$500
Est. FY Expenditure		$90,000		Other		$50,000

PURPOSE AND SCOPE

The overall goal of the study is to use the Louisiana Department of Transportation and Development (LADOTD) time dependent pavement management data to develop, for each pavement distress and condition type, statistical performance prediction models of pavement structures with and without asphalt surface treatment (AST) interlayers over soil-cement. The development of such models will draw on the state of the practice of the LADOTD. Further, the performance models will be complemented by cost data to evaluate the cost-effectiveness of the AST interlayers over-soil cement base.

-Conduct a comprehensive review of the state-of-the-practice of DOTD districts and other US State Highway Agencies (SHA) about AST interlayers practices over soil-cement bases for flexible pavements, its performance, and selection of candidate projects,
-Identify pavement projects with and without AST interlayers over soil-cement bases for flexible pavements with sufficient historical records (e.g., traffic, age, pavement structure and materials, cost data, etc.) and pavement performance data by exploring the information available in LADOTD's databases,
-Perform extensive evaluation of performance of the selected projects with and without AST interlayer treatment over soil-cement bases. Such evaluation will be based on comprehensive analysis of the time series distress data (roughness, cracking, and rutting) available from the PMS database,
-Develop performance prediction models for each distress type based on the available pavement distress data. The models will make it possible to estimate the benefits and the life-cycle costs of the projects with and without AST interlayer and its impact on the pavement service life and remaining service life,
-Develop guidelines for the implementation of cost-effective utilization of AST interlayer that would maximize the user and agency benefits and minimize their costs, and
-Develop implementation plan to integrate the developed performance models into the DOTD PMS, Pavement Preservation system, and Pavement design system.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
-Review of the literature and state of practice related to AST on soil cement bases through- out the USA, -Review of current practices of AST on soil cement bases within the state, -Conduct, analyze and document the results of the district Survey related to pavement treatments, and -Identification and selection of projects with sufficient historical records (e.g., traffic, age, pavement structure and materials, cost data, etc.) and pavement performance data by utilizing the information stored in LADOTD's databases.
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Conduct regression analysis to develop models for each pavement type and distress type. The models will make it possible to estimate the benefits and remaining service life of treatment, -The life-cycle costs of the projects with and without AST interlayer and its impact on the pavement service life and remaining service life will be analyzed, -Develop guidelines for the implementation of cost-effective utilization of AST interlayer that would maximize the user and agency benefits and minimize their costs, and -Propose implementation plan to integrate the developed performance models into the LADOTD PMS, Pavement Preservation system, and Pavement design system.

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

SIO:	**DOTLT1000146**	Project Start Date:		8/1/2016
Research Project Number:	16-2P	Completion Date	(original)	7/31/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$190,950	**Total**		**$70,500**
	(revised)				
Est. Expended to Date		$30,000	Salaries		$70,500
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$67,500	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$67,500	Other		

PURPOSE AND SCOPE

The objectives of this study are to quantify the pavement damage caused by shale oil/gas recovery activities; to estimate the costs of the pavement damage and recommend a strategy of fiscal remedies; and to forecast the impact of future shale oil/gas well development activities on Louisiana roadways and validate the recommended strategy of fiscal remedies.

-Collect project information about shale oil/gas operations and any past studies that evaluated the impact of those operations on roadways,
-Determine distresses due to design traffic and the design traffic plus extra traffic generated from the oil/gas activities,
-The damage cost will be subsequently analyzed, and a strategy of fiscal remedies will be proposed based on the cost analysis.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Oversize/overload truck information were collected from the LADOTD Permit Office, and the overload truck traffic counts specifically related to the shale gas/oil activities in Northwest region of Louisiana were retrieved and mapped into each project interested using ARCGIS software. Pavement damage due to extra truck traffic is under the investigation.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue performing pavement damage estimation using different pavement design and analysis software tools,
-Perform FWD tests on selected pavement projects,
-Fiscal remedy strategy will be proposed based on cost analysis, and
-Prepare final report.

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)	12/31/2017
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$103,287
	(revised)	$197,145
Est. Expended to Date		$178,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$82,000
	(revised)	$134,145
Est. FY Expenditure		$134,145

Estimated 2017-2018 Budget		
Total		**$30,000**
Salaries		$30,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

This project evaluated structural capacity indicators in predicting pavement structural deficiency based on RWD and TSD measurements. Based on this evaluation, the research team introduced modifications to improve prediction of pavement structural deficiency. This project also developed a methodology to implement RWD measurements into the Louisiana Pavement Management System (PMS) and to predict the subgrade resilient modulus from RWD measurements. In addition, this project assessed the cost-efficiency of RWD testing in identifying and repairing structurally deficient sections prior to reaching very poor conditions. The researchers were also tasked to assess the Traffic-Speed Deflectometer (TSD) based on limited data collected in District 05.

A Project Review Committee (PRC) meeting was held on December 13, 2016. A project modification was approved by the PRC to complement the research activities currently conducted under 14-2P by developing a separate methodology to implement RWD in Pavement Management System (PMS) treatment selection and in overlay design procedure. In addition, the research team will re-conduct the analysis per control sections and quantify type I and II errors in PMS decisions. Further, researchers will evaluate and quantify the cost savings for implementing RWD in PMS treatment selection and in overlay design separately. The final report for the RWD will be submitted in April, 2017.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

The research team completed all the tasks related to RWD. The research team submitted the final report for RWD-related tasks. A meeting was held with the PRC on December 13, 2016, to present the results of the study and to discuss the findings. The PRC provided comments on the Final Report for the RWD-related tasks. In addition, the PRC requested some changes to the analysis to ensure that the findings are ready for implementation. The revised report will be submitted by April, 2017.

TSD measurements have been collected in District 05 and data are being analyzed by the researchers to develop a back calculation procedure based on TSD data and to predict pavement structural number.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Upon complementation of RWD-related tasks, the research team is also working on the tasks related to TSD measurements and will start preparing the final report for the TSD-related tasks. As instructed by the PRC, the researchers will submit two stand-alone reports, one dealing with RWD and one dealing with TSD. This will ensure that no confusion is created by combining both methods in a single 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 2017-2018 Budget**		
Total Cost	(original)	$200,000		**Total**		**$33,400**
	(revised)	$275,773				
Est. Expended to Date		$215,000		Salaries		$33,400
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$58,400		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$45,000		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 a 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 2016 - 2017 ACCOMPLISHMENTS

-Field monitoring tests were performed,
-Mechanism of using micro cracking in mitigate the shrinkage cracking of soil cement was investigated, and
-Numerical simulation model of micro cracking pavements is under development.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue data analysis and model development, and
-Prepare final report.

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 2017-2018 Budget**		
Total Cost	(original)	$262,210		**Total**		**$119,617**
	(revised)	$529,685				
Est. Expended to Date		$402,867		Salaries		$93,617
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$90,414		Equipment	(non-expendable)	$16,000
	(revised)	$50,000		Travel		
Est. FY Expenditure		$45,000		Other		$10,000

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 2016 - 2017 ACCOMPLISHMENTS

-Conducted laboratory tests on samples from field locations,
-Collected FWD and DCP data on research sites, and
-Monitored TDRS and suction gauges.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Finish Laboratory testing,
-Conduct field data collection seasonally until December 31, 2017, and
-Compose final report.

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)	6/30/2019
Principal Investigator:	Kevin Gaspard			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$341,459	**Total**		**$89,005**
	(revised)	$516,642			
Est. Expended to Date		$293,731	Salaries		$64,005
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$81,279	Equipment	(non-expendable)	$25,000
	(revised)	$70,000	Travel		
Est. FY Expenditure		$69,000	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 2016 - 2017 ACCOMPLISHMENTS

-Monitor LA 493 and LA 454 instrumentation and survey every 2 months, and
-Complete soil testing on LA 493 and LA 454.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Monitor LA 493 and LA 454 every two months,
-Complete GIS software which displays locations of tree distresses from District survey, and
-Begin laboratory program and field program to determine subgrade moisture content from field GPR data.

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)	12/31/2017
Principal Investigator:	Mark Martinez			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$263,502
	(revised)	$287,799
Est. Expended to Date		$281,889
FY 2016 - 2017 Budget		
FY Funds	(original)	$40,840
	(revised)	
Est. FY Expenditure		$34,930

Estimated 2017-2018 Budget		
Total		**$5,910**
Salaries		$5,910
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
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 2016 - 2017 ACCOMPLISHMENTS

-Task 2: Continued HWD and DCP testing on relevant projects,
-Task 3: Continued processing of collected data, and
-Task 4: Continued development of usage model.

Final report is largely written. There is still a need to collect eight final DCP tests and two final FWD tests to complete the report. The delays were due to issues relating to test equipment (DCP and FWD). 12-11P was scheduled to close during the 2016-2017 fiscal cycle. However, due to the equipment issues, a project extension will be called for.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 2: Finish HWD and DCP testing on relevant projects,
-Task 3: Finish processing of collected data,
-Task 4: Finish development of usage model,
-Deliver final report and benefit-cost analysis, and
-Call final PRC meeting.

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		
Total Cost	(original)	$1,730,000
	(revised)	$16,682,103
Est. Expended to Date		$330,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$662,000
	(revised)	
Est. FY Expenditure		$650,000

Estimated 2017-2018 Budget		
Total		**$671,000**
Salaries		$459,000
Equipment	(expendable)	
Equipment	(non-expendable)	$100,000
Travel		$12,000
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 2016 - 2017 ACCOMPLISHMENTS

-Completed the loading on RCC test sections, performed trench survey and collected extra cores,
-Completed the ALF loading on Geo-grid reinforced test,
-Failed the 4-inch bonded concrete overlay section,
-Applied significant amount of loading on the 6-inch bonded concrete overlay section,
-Upgraded the ALF chain system, and
-Replaced two rail wheels and Motor fan on ATLaS.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue testing of the 6-inch bonded concrete overlay section,
-Loading of the 2-inch bonded concrete overlay section,
-Start testing two 8-inch RCC test sections,
-Trench survey for Geo-grid reinforced test sections, and
-Prepare plans for next APT project.

Title:	**DOTD Support for UTC Project: Development of a Revised RTFO Protocol for Foam-Based Warm Mix Asphalt**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000166**	Project Start Date:		3/15/2017
Research Project Number:	17-3B	Completion Date	(original)	12/14/2017
Research Agency:	LTU	Completion Date	(revised)	
Principal Investigator:	Nazimuddin Wasiuddin			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$25,000
	(revised)	
Est. Expended to Date		$12,500
FY 2016 - 2017 Budget		
FY Funds	(original)	$21,706
	(revised)	
Est. FY Expenditure		$12,500

Estimated 2017-2018 Budget		
Total		**$12,500**
Salaries		$6,000
Equipment	(expendable)	$2,600
Equipment	(non-expendable)	
Travel		$200
Other		$3,700

PURPOSE AND SCOPE

Warm mix asphalt (WMA) is one of the Every Day Counts (EDC) technologies announced by the Federal Highway Administration (FHWA) and it is becoming increasingly popular in every states. Asphalt binder performance grading (PG) tests are based on hot mix asphalt (HMA) temperatures. In PG tests, asphalt binder samples for low temperature cracking test (using a bending beam rheometer), fatigue cracking test (G*sinδ using a dynamic shear rheometer) and rutting susceptibility test (G/sinδ using a dynamic shear rheometer) are all prepared following the rolling thing film oven (RTFO) aging procedure (AASHTO T240). Rolling thin film oven (RTFO) aging that represents aging during production, is performed at 163°C at which hot mix asphalt is prepared. Warm mix asphalt is prepared at lower temperatures and therefore, there is a need for developing a revised RTFO aging test procedure for WMA binders for accurate performance grading and for determining if grade bumping is necessary. The objective of this study is to investigate the aging during foam-based warm mix asphalt production in the field and during laboratory short-term oven aging and develop a revised RTFO protocol to simulate these aging. A method will be developed that will determine if asphalt binder grade bumping is necessary. The method will require the use of the revised RTFO procedure. The specific tasks that will be performed are as follows to attain these objectives:

-Extraction of binders from laboratory short term aged mix and field mix,
-Perform rheological tests on extracted binders,
-Perform RTFO (AASHOT T240) tests and develop a revised method,
-Develop a method for determining if grade bumping is necessary, and
-Investigate effects of reduced aging on rutting susceptibility, fatigue and low temperature cracking resistance (only for WMA with high temperature reduction).

The outcome ‘a revised RTFO test method for determination of grade bumping of asphalt binder in warm mix asphalt’ will help implement warm mix asphalt without sacrificing any of the benefits of the hot mix asphalt.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
Initiate laboratory research work.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Continue laboratory research work. Complete the following specific tasks: -Extraction of binders from laboratory short term aged mix and field mix, -Perform rheological tests on extracted binders, -Perform RTFO (AASHOT T240) tests and develop a revised method, -Develop a method for determining if grade bumping is necessary, -Investigate effects of reduced aging on rutting susceptibility, fatigue and low temperature cracking resistance (only for WMA with high temperature reduction), and -Complete final report.

Title:	**Evaluation of Non-Destructive Density Determination for QA/QC Acceptance testing**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000163**	Project Start Date:		3/15/2017
Research Project Number:	17-2B	Completion Date	(original)	7/5/2018
Research Agency:	LTRC	Completion Date	(revised)	3/14/2018
Principal Investigator:	David Mata			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$141,544
	(revised)	
Est. Expended to Date		$20,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$95,000
	(revised)	$70,772
Est. FY Expenditure		$20,000

Estimated 2017-2018 Budget		
Total		**$70,772**
Salaries		$70,772
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The objective of this study is to evaluate low to non-nuclear density gauges for soil and asphalt density measurements in the expectation to improve current Louisiana Department of Transportation and Development (LADOTD) QA/QC procedures. This study will utilize intensive field tests and core samples to compare density measurements, determine effectiveness benefits, and examine implementation potential for QA/QC applications within DOTD. The successful completion of this research will provide DOTD recommendations to current QA/QC procedures and expects to provide economic savings to the state.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Conduct literature review,
-Develop experimental factorial,
-Identify field projects,
-Conduct field work,
-Conduct laboratory testing, and
-Perform data analysis.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Finalize experimental factorial,
-Identify additional field projects,
-Conduct field work,
-Conduct laboratory testing,
-Perform data analyses,
-Evaluate economic feasibility, and
-Prepare final report and technical summary.

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)	12/31/2017
Principal Investigator:	William Daly				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$160,866		**Total**		**$33,071**
	(revised)	$210,937				
Est. Expended to Date		$193,111		Salaries		$25,920
FY 2016 - 2017 Budget				Equipment	(expendable)	$750
FY Funds	(original)	$93,400		Equipment	(non-expendable)	
	(revised)	$110,400		Travel		
Est. FY Expenditure		$110,000		Other		$6,401

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 2016 - 2017 ACCOMPLISHMENTS

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

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Complete wet process crumb product.
-Evaluate dry process crumb products, and
-Complete 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)	12/17/2017
Principal Investigator:	Saman Salari				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$186,408		**Total**		**$21,500**
	(revised)					
Est. Expended to Date		$165,000		Salaries		$21,500
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$61,500		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$50,000		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. The modification was performed in both dry and wet blending methods. Dense graded, gap graded and OGFC mixtures were 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 2016 - 2017 ACCOMPLISHMENTS

-Continued evaluation of various crumb rubber sources,
-Continued mixture testing and analysis, and
-Began draft report generation.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue evaluation of dry crumb rubber sources,
-Continue mixture testing and analysis for dry blend of crumb rubber,
-Analyze the behavior of modified binders and mixtures based on performed testing methods,
-Propose methods for control/quality assurance of Crumb Rubber Modified mixtures, and
-Finalize the report.

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 2017-2018 Budget**		
Total Cost	(original)	$345,000		**Total**		**$155,000**
	(revised)	$14,801,811				
Est. Expended to Date		$345,000		Salaries		$119,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$30,000
FY Funds	(original)	$157,000		Equipment	(non-expendable)	
	(revised)			Travel		$6,000
Est. FY Expenditure		$157,000		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 the Louisiana Department of Transportation and Development (LADOTD) engineers; provides experimental design and analysis; provide training for the 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 2016 - 2017 ACCOMPLISHMENTS

-Participated in the Louisiana DOTD Parts five and ten Specification Committee,
-Developed and submitted proposals to NCHRP, and
-Participated in several technical assistance projects.

FISCAL YEAR 2017-2018 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:	**Overheight Impact Avoidance and Incident Detection System**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000109**		Project Start Date:		7/1/2016
Research Project Number:	16-4ST		Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	George Voyiadjis				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$172,589		**Total**		**$102,589**
	(revised)					
Est. Expended to Date		$70,000		Salaries		$65,589
FY 2016 - 2017 Budget				Equipment	(expendable)	$12,000
FY Funds	(original)	$45,000		Equipment	(non-expendable)	$23,000
	(revised)	$70,000		Travel		$1,000
Est. FY Expenditure		$70,000		Other		$1,000

PURPOSE AND SCOPE

During construction there is a tendency for construction containment and work platforms with reduced vertical clearance to be impacted by over height loads. This may also be true for select truck routes where the bridge superstructure is legal, but lower than expected. The impact vehicle is usually not loaded correctly and can damage the members hit and put workers at risk.

The proposed research would investigate and pilot a laser device that could be set up well in advance of a construction site to identify vehicles that will impact the overhead obstacle. This device, when triggered, would set off an alert system (flashing lights and warning information) that would notify the vehicle of an impending collision and direct them to pull over to the shoulder, stop and the system calls the police. The system would include a camera recording system to document any damage the may occur to the bridge and identify the vehicle causing the damage.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-A literature review of existing smart alerting systems, along with their advantages and limitations are done. The review is included in the interim report,
-A draft interim report is being finalized for submission to the Louisiana Transportation Research Center (LTRC). The main objectives of this interim report are: (1) provide a literature review of the state-of-the-art vehicle detection and alert systems, and (2) recommend three alternate systems, and
-Based on this review three novel alert systems are recommended. The recommended systems have better performance and functionality, compared to available ones.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 3: System(s) Installation,
-Task 4: Monitor System(s), and
-Task 5: Final Report.

Title:	**Live Load Rating of Cast-in-Place Concrete Box Culverts in Louisiana**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000108**		Project Start Date:		5/16/2016
Research Project Number:	16-3ST		Completion Date	(original)	6/30/2017
Research Agency:	LSU		Completion Date	(revised)	8/16/2017
Principal Investigator:	Ayman Okeil				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$264,484		**Total**		**$144,484**
	(revised)					
Est. Expended to Date		$120,000		Salaries		$80,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$20,000
FY Funds	(original)	$120,000		Equipment	(non-expendable)	$15,000
	(revised)			Travel		$25,000
Est. FY Expenditure		$120,000		Other		$4,484

PURPOSE AND SCOPE

The purpose of the study is to perform a live load rating of selected cast-in-place concrete box culverts.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Finish collecting and analyzing data for remaining selected box culverts.
-Submit a draft final report to the Louisiana Transportation Research Center (LTRC), and
-Provide computation and justification to FHWA for no load posting of similar culverts.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Finish collecting and analyzing data for remaining selected box culverts,
-Submit a draft final report to LTRC, and
-Provide computation and justification to FHWA for no load posting of similar culverts.

Title:	**Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000099**	Project Start Date:		7/1/2016
Research Project Number:	16-1ST	Completion Date	(original)	
Research Agency:	Texas A&M Transportation Institute (TTI)	Completion Date	(revised)	6/30/2018
Principal Investigator:	William Williams			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$169,172	**Total**		**$231,396**
	(revised)				
Est. Expended to Date		$400,568	Salaries		$100,000
FY 2016 - 2017 Budget			Equipment	(expendable)	$101,396
FY Funds	(original)	$21,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$26,000	Other		$30,000

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 and Development (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 2016 - 2017 ACCOMPLISHMENTS

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

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 5: Static Load Testing of Post Retrofit Design(s),
-Task 6: Computer Simulation of a Single Retrofit Bridge Rail Option (1 Design),
-Task 7: Full Scale Testing of Select Bridge Rail Retrofit Design for MASH TL-4,
-Task 8: Develop Retrofitting Methods for Single Bridge Rail Design, and
-Task 9: Final Report & Technical Summary.

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 2017-2018 Budget**		
Total Cost	(original)	$150,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date		$150,000	Salaries		$30,000
FY 2016 - 2017 Budget			Equipment	(expendable)	$20,000
FY Funds	(original)	$85,000	Equipment	(non-expendable)	
	(revised)	$100,000	Travel		
Est. FY Expenditure		$100,000	Other		

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, and
-Develop simplified design methods for rehabilitating deteriorated timber piles using FRP wraps for use by the Louisiana Department of Transportation and Development (LADOTD).

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Task 6: Conduct Workshops, and
-Task 7: Submit draft final report.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 5: Guide Document,
-Task 6: Workshops, and
-Task 7: Final Report.

Title:	**Evaluating Louisiana New Continuity Detail for Girder Bridges**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**30001660**		Project Start Date:		4/21/2014
Research Project Number:	14-1ST		Completion Date	(original)	12/31/2016
Research Agency:	LSU		Completion Date	(revised)	12/31/2017
Principal Investigator:	Ayman Okeil				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$179,991		**Total**		**$59,991**
	(revised)					
Est. Expended to Date		$120,000		Salaries		$40,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$10,000
FY Funds	(original)	$25,000		Equipment	(non-expendable)	$5,000
	(revised)	$50,000		Travel		
Est. FY Expenditure		$50,000		Other		$4,991

PURPOSE AND SCOPE

The main objective of the proposed research is to evaluate the field performance of a continuity detail that will be included in the new Louisiana Bridge Design and Evaluation Manual(BDEM). The new detail is different from the standard continuity detail in the current Bridge Design manual (BDM).

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Task 3: Development of GUI Data Tool,
-Task 4: Conduct Static Live Load Test (if bridge is completed), and
-Task 5: Data Collection, Processing, and Link Slab Evaluation.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 5: Data Collection, Processing, and Link Slab Evaluation,
-Task 6: Final Report, and
-Task 7: Training of LADOTD Personnel and Transferring Control to LTRC/LADOTD.

Title:	**Evaluation of HeadLight: An E-Construction Inspection Technology**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000168**		Project Start Date:		4/1/2017
Research Project Number:	17-6SS		Completion Date	(original)	8/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$1,235,895		**Total**		**$404,630**
	(revised)					
Est. Expended to Date		$679,000		Salaries		$15,290
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$679,282		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$679,000		Other		$389,340

PURPOSE AND SCOPE

Project delivery and inspection is a challenging, resource intensive job and the information collected in the field is valuable with significant impacts for the Louisiana Department of Transportation and Development (LADOTD). LADOTD's current processes for capturing field data still relies heavily on a paper-based process and does not properly leverage technologies that would prevent laborious and inefficient practices, nor integrate with any existing work flow procedures. A central focus of the research is to understand the key impacts of the collection and utilization of digital project data from end to end. In addition, the construction data collected has high value beyond a project's completion during the maintenance phase of the asset life-cycle. This research will also explore how the construction data collected can effectively be provided to assist in the maintenance of LADOTD transportation assets.

As part of the research, LADOTD will evaluate and use a new e-construction technology called HeadLight, leveraging 200 field inspectors and their project teams over 12-18 projects across the state. This system will enable LADOTD to capture field inspection information digitally from active project jobsites, send it back to agency project offices in real-time, and provide project insights to help make engineering decisions as projects are in-progress. The research will enable the agency to effectively determine the long-term viability of an agency-wide deployment of the innovation.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

The project has started and a contract with Pavia has been signed. Project identification will be complete by the end of the FY and training will be fully underway for those involved with the respective pilot projects.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Filed projects will have been identified and training will commence on use of the software. The bulk of the data collection will be completed this FY with analysis starting as data is collected. Regular project progress updates will be made to the e-construction implementation team at LADOTD in charge of the EDC initiative.

Title:	**Development of Guidelines for Ramp Metering Implementation and Performance Evaluation on I-12**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000167**		Project Start Date:		3/1/2017
Research Project Number:	17-5SS		Completion Date	(original)	8/31/2019
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Sherif Ishak				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$199,947		**Total**		**$42,000**
	(revised)					
Est. Expended to Date		$6,000		Salaries		$40,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$2,000
FY Funds	(original)	$100,000		Equipment	(non-expendable)	
	(revised)	$42,000		Travel		
Est. FY Expenditure		$42,000		Other		

PURPOSE AND SCOPE

Based on the findings of LTRC Projects 11-2SS and 14-1SS, the Project Review Committee (PRC) recommended this proposed project as part of the implementation of those projects.
The main focus of the research is the development of guidelines for ramp metering implementation in Louisiana and a performance evaluation along I-12. The specific objectives of this research are to: (1) evaluate the performance of the currently implemented ramp metering and queue override strategies on I-12 using recently collected traffic data, (2) evaluate the impact of the existing geometric conditions on ramp metering performance, (3) examine the feasibility of several control solutions at congested ramp junctions, and (4) develop guidelines for ramp metering implementation and performance evaluation in Louisiana and make final recommendations.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

The project started on March 1, 2017 and the Literature Review and Data Collection is underway.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 1: Literature Review,
-Task 2: Data Collection,
-Task 3: Performance Evaluation of the Current Ramp Metering Implementation, and
-Task 4: Simulation Model and Calibration.

Title:	**Dredging Louisiana's Navigable Waterways - A Statewide Systematic Approach to Meeting Dredging Needs**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000160**		Project Start Date:		4/4/2017
Research Project Number:	17-4SS		Completion Date	(original)	7/3/2018
Research Agency:	GIS Engineering, LLC		Completion Date	(revised)	
Principal Investigator:	Mohan Menon				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$133,955		**Total**		**$108,000**
	(revised)					
Est. Expended to Date		$8,000		Salaries		$107,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$75,000		Equipment	(non-expendable)	
	(revised)	$25,000		Travel		$1,000
Est. FY Expenditure		$25,000		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 2016 - 2017 ACCOMPLISHMENTS

The project was kick-off in April 2017, and the Literature review is underway.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

All tasks will be completed during the 2017-2018 fiscal year.

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

SIO:	**DOTLT1000159**		Project Start Date:		2/1/2017
Research Project Number:	17-3SS		Completion Date	(original)	8/31/2018
Research Agency:	LSU		Completion Date	(revised)	1/31/2019
Principal Investigator:	Chester Wilmot				

BUDGET STATUS

Total Budget		
Total Cost	(original)	$381,374
	(revised)	
Est. Expended to Date		$25,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$187,893
	(revised)	
Est. FY Expenditure		$25,000

Estimated 2017-2018 Budget		
Total		**$150,000**
Salaries		$143,000
Equipment	(expendable)	$2,000
Equipment	(non-expendable)	
Travel		$2,000
Other		$3,000

PURPOSE AND SCOPE

The purpose of this project is to incorporate the set of hurricane evacuation models developed at the Louisiana Transportation Research Center (LTRC) over the last decade into a single user-friendly computer package that can be used to estimate the impact of alternative emergency management decisions in terms of traffic conditions and evacuation effectiveness. The package is capable of being applied in different locations but its initial developed and test application will be for a hurricane threatening the New Orleans metropolitan area

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Task 1: Identify a suitable computer package platform. Task completed with the choice of TransCAD and TransModeler from Caliper Corporation as the platforms on which the models will operate,
-Task 2: Develop data base. Operation of the population synthesizer in TransModeler in the New Orleans area has been successfully conducted. Access to storm information from the National Hurricane Center's website has been successfully conducted. Work on acquiring census data to categorize communities on social network characteristics, general demographics, and transit level of service is 90 percent complete. The highway network has been successfully uploaded but incorporating the traffic signal settings at signalized intersections are only 50% complete, and
-Task 3: Estimate the parameters of the models in the package. The joint destination type mode choice model has been estimated on multiple data sets but the time-dependent evacuation demand model will still need to be estimated on multiple data sets.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Task 2: Complete incorporating the traffic signal settings at signalized intersections and test the impact of using the traffic signal settings versus the default option that assumes a 4-way stop operation at intersections with significant traffic on each approach, -Task 3: Estimate the parameters of the models in the package. Estimate the time-dependent evacuation demand model will still need to be estimated on multiple data sets, -Task 4: Determine the output the package will produce. A presentation of the developing package will be presented at the National Hurricane Conference in New Orleans on April 20, 2017, and input from Emergency Managers at the conference will be sought to determine what output they would find useful. The PRC will also be used in this role, and -Task 5: Write programs to integrate the models. Some computer code to operate the models and update the data as conditions change, has already been written but a Computer Science graduate was appointed in March 2017 to complete the task.

Title:	**Diverted Traffic Measurement**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000098**	Project Start Date:		1/1/2016
Research Project Number:	16-5SS	Completion Date	(original)	6/30/2017
Research Agency:	LTRC	Completion Date	(revised)	12/31/2017
Principal Investigator:	Ravindra Gudishala			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$198,000
	(revised)	$355,607
Est. Expended to Date		$276,470
FY 2016 - 2017 Budget		
FY Funds	(original)	$118,707
	(revised)	
Est. FY Expenditure		$79,718

Estimated 2017-2018 Budget		
Total		**$79,718**
Salaries		$77,718
Equipment	(expendable)	$1,000
Equipment	(non-expendable)	
Travel		$1,000
Other		

PURPOSE AND SCOPE

The purpose of the project is to determine the extent to which local arterials can substitute for lack of capacity on urban freeways. Motorists, and particularly motorists making local trips, are likely to use local arterials in preference to a freeway if the congestion is much higher on the freeway. This project is aimed at measuring the level of diversion that occurs when congestion levels on the I-10 freeway between the Mississippi Bridge and the I-10/I-12 split in Baton Rouge, Louisiana rises higher than on parallel arterials. Measurements will be aimed at identifying at what level of difference in congestion does diversion of traffic begin to occur, what is the time lag between the onset of congestion and diversionary behavior, and how stable is the behavior from event to event. Incidents on the freeway and on arterials can provide the conditions in which meaningful measurements can be made. The scope of the project will be limited to the I-10 freeway between the Mississippi Bridge and the I-10/I-12 split because the issue of increasing the capacity of the I-10 in that vicinity is not favored and alternative solutions, such as increasing the capacity of parallel arterials, could be more cost-effective.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Identify candidate parallel arterials to the I-10 freeway between the Mississippi Bridge and the I-10/I-12 split,
-Divide the selected arterials between those serving eastbound and those serving westbound traffic on the I-10, and select up to 4 of those arterials in each direction,
-Identify and purchase traffic counting equipment that can be installed on the on- and off-ramps of the I-10 freeway between the Mississippi Bridge and the I-10/I-12 split and which is capable of recording the volume in 15-minute intervals,
-Install 2 Bluetooth detection devices on each of the 4 selected arterials and on the I-10 freeway between the Mississippi Bridge and the I-10/I-12 split, in a particular direction (i.e. either eastbound or westbound), and
-Observe travel times on the I-10 and on the arterials using the Bluetooth devices and the volume of traffic on each on- and off-ramp by 15-minute time period.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Collect travel time and traffic count data on the identified arterials, -Conduct analysis on collected data to test the main hypothesis of the research, -Summarize results, and -Develop a draft 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		
Total Cost	(original)	$75,000
	(revised)	$152,922
Est. Expended to Date		$72,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$76,600
	(revised)	
Est. FY Expenditure		$76,600

Estimated 2017-2018 Budget		
Total		**$76,400**
Salaries		$76,400
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The purpose of the project is to: (1) establish a record of all major projects that the Louisiana Department of Transportation and Development (LADOTD) 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 are the greatest and the type of services that provide the greatest savings in time and cost.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Established a record and supporting documentation of all QL A and B projects in Louisiana., and
-Began analyzing the data and developing strategies for determining the value of utilizing SUE in LA.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Complete all remaining tasks and deliver the final report.

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 2017-2018 Budget**		
Total Cost	(original)	$182,742		**Total**		**$30,000**
	(revised)	$233,614				
Est. Expended to Date		$161,000		Salaries		$28,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$116,317		Equipment	(non-expendable)	
	(revised)			Travel		$2,000
Est. FY Expenditure		$99,000		Other		

PURPOSE AND SCOPE

The purpose of this project is to develop a joint mode/destination type choice model for hurricane evacuation and then to test its application in the New Orleans area. Although the project was initially proposed as a model of mode choice only, it became apparent that mode choice and destination type choice (e.g. shelter, home of friend or relative) are integrally linked, so a joint model was set as the goal of the project. The model aimed to include social network factors as well as level of service of the evacuation transit service and characteristics of the population. The model was estimated on data from different studies in different locations to get greater diversity in the data, a larger data set, and sufficient users of public transportation to determine the factors driving their choice. Key to this collection of diverse data was obtaining data from New York city during hurricane Sandy where at least 20 percent of the evacuees used transit.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Task 1: Conduct literature review. 100 percent complete,
-Task 2: Identify candidate behavioral variables. 100 percent complete,
-Task 3: Identify hurricane evacuation behavioral study data to use in this study. 100 percent complete. Data from New York and New Jersey during hurricane Irene and hurricane Sandy was used in combination with data from hurricane Gustav and Georges in New Orleans,
-Task 4: Estimate a joint mode/destination type choice model. 100 percent complete, and
-Task 5: Apply the model to a past storm. 100 percent complete. The model was applied to a second data set of hurricane Sandy evacuation in New Jersey and New York.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 6: Document the study in a final report.

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 2017-2018 Budget**		
Total Cost	(original)	$87,474		**Total**		**$96,000**
	(revised)	$704,983				
Est. Expended to Date		$467,000		Salaries		$46,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$178,285		Equipment	(non-expendable)	$10,000
	(revised)			Travel		$10,000
Est. FY Expenditure		$23,000		Other		$30,000

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 2016 - 2017 ACCOMPLISHMENTS

-Continued 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, (1) Identify all archived data user systems; (2) Establish a data collection system with all archived data user systems; (3) Establish data needs of potential end users; and (4) 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.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue 2016-2017 tasks.

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 2017-2018 Budget**		
Total Cost	(original)	$358,462		**Total**		**$120,000**
	(revised)	$7,006,861				
Est. Expended to Date		$6,971,520		Salaries		$116,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$2,000
FY Funds	(original)	$150,000		Equipment	(non-expendable)	
	(revised)			Travel		$2,000
Est. FY Expenditure		$120,000		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 course 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 higher education. The Principal Director of this project 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 2016 - 2017 ACCOMPLISHMENTS

-Completed project 14-4SS "Identifying local transit resources for evacuation" and documented the findings in Final Report 556,
-Completed project 15-3SS "Investigation into legislative action needed to accommodate the future safe operation of autonomous vehicles in the state of Louisiana", and documented the findings in Final Report 571,
-Initiated project 17-3SS, "Hurricane Evacuation Modeling Package",
-Initiated project "Louisiana Trip Generation Rates",
-Taught CE 7621, Mass Transit Systems, Fall 2016, and
-Taught CE 7600, Data Collection Methods, Spring 2017.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Complete project 14-3SS "Development of a mode choice model to estimate evacuation transit demand", -Complete project 15-2SS "Cost and time benefits for using subsurface utility engineering in Louisiana", -Complete project 16-5SS "Diverted Traffic Measurement", -Continue project 17-3SS, "Hurricane Evacuation Modeling Package", -Continue project "Louisiana Trip Generation Rates", -Teach CE 3600, "Principles of Highway and Traffic Engineering", Fall 2017, and -Teach CE 7641, "Urban Transportation Planning Models", Spring 2018.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000155**		Project Start Date:		11/1/2016
Research Project Number:	17-1C		Completion Date	(original)	6/29/2018
Research Agency:	LTRC		Completion Date	(revised)	10/31/2019
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$467,176		**Total**		**$58,713**
	(revised)					
Est. Expended to Date		$37,636		Salaries		$58,713
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$337,636		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$280,136		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 2016 - 2017 ACCOMPLISHMENTS

-XRF purchase in progress, and
-Material testing in progress.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue to acquire more aggregate sources, and
-Continue length change testing.

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

SIO:	**DOTLT1000142**		Project Start Date:		7/1/2016
Research Project Number:	16-1C		Completion Date	(original)	4/30/2018
Research Agency:	LTRC		Completion Date	(revised)	6/30/2018
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$165,312		**Total**		**$118,713**
	(revised)					
Est. Expended to Date		$52,656		Salaries		$58,713
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$112,656		Equipment	(non-expendable)	$60,000
	(revised)			Travel		
Est. FY Expenditure		$52,656		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 2016 - 2017 ACCOMPLISHMENTS

-Performed literature review, and
-In the process of acquiring RFID systems.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Complete acquisition of RFID systems, and
-Conduct field testing.

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		
Total Cost	(original)	$269,183
	(revised)	
Est. Expended to Date		$204,285
FY 2016 - 2017 Budget		
FY Funds	(original)	$125,000
	(revised)	
Est. FY Expenditure		$47,000

Estimated 2017-2018 Budget		
Total		**$60,000**
Salaries		$60,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

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 2016 - 2017 ACCOMPLISHMENTS

The 4-inch section has been tested to failure. The 6-inch section is currently under the loading device and being tested. The 2-inch section will be tested next.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Complete all accelerated loading, analysis of results, and publication of the final report.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Primavera P6 Upgrade and Cloud Migration Project	Project Status:	Ongoing
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000154**		Project Start Date:		11/30/2016
Research Project Number:	17-1Other		Completion Date	(original)	4/30/2017
Research Agency:	LTRC		Completion Date	(revised)	6/30/2017
Principal Investigator:	Tyson Rupnow				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$528,935		**Total**		**$52,894**
	(revised)					
Est. Expended to Date		$475,000		Salaries		
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$528,935		Equipment	(non-expendable)	
	(revised)	$476,042		Travel		
Est. FY Expenditure		$475,000		Other		$52,894

PURPOSE AND SCOPE

Upgrade, migrate, and deploy the P6 application in the Oracle Cloud for Industries environment.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

The work is progressing as required in the contract. Full implementation and training is expected to take place in early FY 2018.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Implementation, rollout, and training.

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)	6/30/2021
Principal Investigator:	Vijaya Gopu			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$211,428
	(revised)	$3,726,356
Est. Expended to Date		$1,957,800
FY 2016 - 2017 Budget		
FY Funds	(original)	$270,000
	(revised)	
Est. FY Expenditure		$270,000

Estimated 2017-2018 Budget		
Total		**$286,000**
Salaries		$205,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		$10,000
Other		$71,000

PURPOSE AND SCOPE

To cover administrative costs handled under contract to support the Louisiana Transportation Research Center (LTRC) research, development and technology transfer expansion funding programs.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Coordinated the preparation and submission of four LTRC's Site proposals for the Regional UTC,
-Coordinated the TIRE Program and managed the five TIRE projects awarded in 2016,
-Serving as the PI on a NSF award dealing with FMM education. Developed educational modules for delivery in CE classes,
-Served on several NSF proposal review panels and site visit teams dealing with MRI, CAREER, National Engineering Hazard Research Infrastructure Programs at NSF,
-Presented several technical papers dealing with timber bridge issues and autonomous vehicles at national and international meetings, and
-Coordinated/chaired two technical sessions at the Tulane Engineering Forum.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Coordinate the new UTC projects and UTC support studies that have been awarded, -Continue coordination of the preparation and submission of new LTRC Site proposals for the Regional UTC, -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 that is being transferred to LTRC by UL-Lafayette, -Initiate work on NDE of capacity of deteriorated timber piles, and -Review the work being conducted at the University of West Virginia on FRP repair of timber piles and ensure project objectives are met.

Title:	**Support Study for Pedestrians and Bicyclists Count: Developing a Statewide Multimodal Count Program**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000162**	Project Start Date:		2/1/2017
Research Project Number:	17-2SA	Completion Date	(original)	6/30/2017
Research Agency:	LSU	Completion Date	(revised)	12/31/2017
Principal Investigator:	Julius Codjoe			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$29,462
	(revised)	$48,044
Est. Expended to Date		$3,700
FY 2016 - 2017 Budget		
FY Funds	(original)	$30,000
	(revised)	
Est. FY Expenditure		$19,000

Estimated 2017-2018 Budget		
Total		**$30,000**
Salaries		$30,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

The primary objective of this study is to research the feasibility of developing automated pedestrian and cyclist counts from archived video footage. This is a support study for completing Task 3 in LTRC project 16-4SA which is being conducted by the University of New Orleans (UNO). 16-4SA is evaluating available count technology equipment options and identify preferred alternatives suitable for statewide deployment.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Literature review.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Acquire & Pre-process Sample Video Data,
-Mount and Collect Video Data from Case Study Sites,
-Development of Zone Detection & Filter Algorithm,
-Development of Classification & Counting Algorithm,
-Refine Detection and Counting Capability,
-Validate Data from Case Study Sites, and
-Develop Final Report.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Evaluating the Effectiveness of Regulatory and Warning Signs on Driver Behavior near Highway/Rail Crossings**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000149**		Project Start Date:		11/1/2016
Research Project Number:	17-1SA		Completion Date	(original)	6/30/2017
Research Agency:	LTRC		Completion Date	(revised)	10/31/2018
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$196,722		**Total**		**$24,000**
	(revised)					
Est. Expended to Date		$27,000		Salaries		$24,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$75,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$80,000		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 2016 - 2017 ACCOMPLISHMENTS

-Identify crossings where the Traffic Safety group or Highway/Rail Safety Unit would like to install signage, and
-Install cameras and record the vehicles/drivers before the signs are deployed.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Install the signs, allow for a short adjustment period for drivers,
-Record any changes in drivers' behavior,
-Analyze data to determine if there is any change in drivers' behavior, and
-Issue Final Report.

Title:	**Highway Work Zone Construction Safety Research and Training: A Driving Simulator Study**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000105**	Project Start Date:		7/1/2016
Research Project Number:	16-5SA	Completion Date	(original)	9/30/2018
Research Agency:	LSU	Completion Date	(revised)	12/31/2018
Principal Investigator:	Yimin Zhu			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$280,859
	(revised)	$293,359
Est. Expended to Date		$6,299
FY 2016 - 2017 Budget		
FY Funds	(original)	$151,232
	(revised)	
Est. FY Expenditure		$6,299

Estimated 2017-2018 Budget		
Total		**$98,919**
Salaries		$69,693
Equipment	(expendable)	
Equipment	(non-expendable)	$12,500
Travel		
Other		$16,726

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 2016 - 2017 ACCOMPLISHMENTS

-Literature review: The task is completed. The outcome of the task is a list of factors that have significant importance to work zone safety according to previous studies. The project team reported the results to the Project Review Committee (PRC). Per PRC's request, a survey has been conducted and results are analyzed to identify major factors affecting work zone safety. These identified factors will be selected for implementation,
-Design of a virtual environment: This task is on-going. The project team has collected data for simulation. Currently, the team is designing experiment procedures, and
-Equipment installation: The driving simulator has been relocated to a location outside the PTH building. The project team is working with the vendor to finish the upgrading process.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-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.

Title:	**Pedestrians and Bicyclists Count: Developing a Statewide Multimodal Count Program**	**Project Status:**	**Ongoing**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000141**		Project Start Date:		7/1/2016
Research Project Number:	16-4SA		Completion Date	(original)	12/31/2017
Research Agency:	UNO		Completion Date	(revised)	5/31/2018
Principal Investigator:	Tara Tolford, MURP, AICP				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$142,463		**Total**		**$91,543**
	(revised)					
Est. Expended to Date		$20,920		Salaries		$62,535
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$100,000		Equipment	(non-expendable)	$3,000
	(revised)	$50,920		Travel		$1,799
Est. FY Expenditure		$50,920		Other		$24,209

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.

Specifically, the objectives of the study include:
-To research established and emerging methodologies for counting bicycles and pedestrians and identify best practices for statewide count programs,
-To evaluate available count technology equipment options and identify preferred alternatives suitable for statewide deployment, and
-To identify potential funding sources for the implementation of a multimodal count program and opportunities to integrate active transportation counts into existing vehicular count programs.

The following tasks comprise the scope of this research:
-Task 1: Literature Review,
-Task 2: Bicycle and Pedestrian Counting Research Methods Exploration,
-Task 3: Video-Based Count Detection Assessment,
-Task 4: Identify Funding Sources, and
-Task 5: Case Study.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
-Task 1: Literature Review - Status: Tasks 1 & 2 have been functionally combined to aid organization of findings and are approximately 90% complete. An inventory detailing existing state and regional count programs have been developed, and a comprehensive bibliography of literature related to pedestrian and bicycle monitoring was reviewed. Evaluation of literature pertaining specifically to data processing and application (e.g. extrapolation factoring and exposure analyses) has been completed, and is currently being integrated into the draft program methodology which will be applied to completion of the case study and modified for final report recommendations, -Task 2: Bicycle and Pedestrian Counting Research Methods Exploration. Status: 90% complete. Methods for counting were reviewed, including review of existing count report documents, discussions with program contacts, researchers, and nationally respected practitioners (including extensive discussions at TRB). An updated inventory of equipment options was developed including updated pricing information, and identification of new technologies which may not appear in existing validation studies or project reports. Based on best practices from literature and top researchers and practitioners in the field, a draft methodology for short and long-term data collection was developed for application in Task 5 and equipment needed to conduct this research was identified, -Task 3: Video-Based Count Detection Assessment. Status: The Principal Investigator (PI) met with Bryan Lagarde of Project Nola to discuss opportunities to utilize existing crime camera video feeds in service to the Louisiana Transportation Research Centers (LTRC's) analysis of automated video image counting. The PI continues to coordinate with LTRC on this task in order to align data collection locations and dates, -Task 4: Identify Funding Sources. Status: In progress; research on program costs, funding mechanisms (federal, state, and local), and potential partnership opportunities is underway, -Task 5: Case Study. Status: In progress. A case study proposal has been developed and submitted to the PRC for review. A quote for required equipment to complete the case study has been procured (PO pending) and a list of potential study locations in New Orleans and Baton Rouge has been developed. In addition, a detailed benefit-cost analysis methodology is under development, -Task 6: Final Report. Status: Not yet initiated, and -PRC meetings were held in September and November, 2016, in order to plan the 2016-2017 work program and evaluate preliminary task results.
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Task 1: Literature Review: Lessons from this task will be applied to ongoing case study activity and key findings will be incorporated into the final report and guide (proposed methodology), -Task 2: Bicycle and Pedestrian Counting Research Methods Exploration: Additional findings will be added to this task report as the work progresses and a summary of this task will be included in the final report and guide (proposed methodology), -Task 3: Video-Based Count Detection Assessment: The PI will continue to collaborate with LTRC to align case study activities and data analysis with the work product of this task and incorporate Dr. Codjoe's findings into the final report and guide (proposed methodology), -Task 4: Identify Funding Sources: Additional information will be integrated into this task prior to submission of this task report as available, -Task 5: Case Study: Data will be collected at 2-3 case study locations in New Orleans and Baton Rouge using infrared and Pneumatic sensor equipment, in combination with video data were available, to pilot test recommended methodology for short-duration data collection, processing, analysis, and ROI evaluation. Recommendations for short and long-duration non-motorized data collection will be refined based on outcomes of this case study, including identification of data gaps and resource needs. Findings will be synthesized into a guide to non-motorized count data collection (i.e. Proposed Methodology for Evaluating Multimodal Demand, Safety, and Exposure), and -Task 6: Final Report: Findings from all previous tasks will be synthesized into a final research report documenting the research effort and summarizing all tasks with evidence-based recommendations for future research and program implementation.

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 2017-2018 Budget**		
Total Cost	(original)	$100,000		**Total**		**$11,000**
	(revised)	$167,514				
Est. Expended to Date		$136,000		Salaries		$11,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$95,114		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$83,900		Other		

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 2016 - 2017 ACCOMPLISHMENTS

-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, and
-Undertake comparative analysis between the traditional and Streetlytic's data.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Submit final report.

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

SIO:	**DOTLT1000143**		Project Start Date:		7/1/2016
Research Project Number:	16-1SA		Completion Date	(original)	4/30/2018
Research Agency:	LSU		Completion Date	(revised)	6/30/2018
Principal Investigator:	Helmut Schneider				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$117,006		**Total**		**$60,858**
	(revised)					
Est. Expended to Date		$3,924		Salaries		$26,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$56,148		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$56,148		Other		$34,858

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 2016 - 2017 ACCOMPLISHMENTS

-Task 1-Literature Review - Completed review of current literature on topic,
-Task 2-Data Selection - Work zone sites identified for study. Crash reports printed for crashes that occurred at the identified work zone sites,
-Task 3-Interim Report - Continued updates and writing the interim report, and
-Task 4-Data Analysis - Began reading crash report narratives to identify that crashes occurred in work zone. Began identifying crash characteristics from crash reports. Began identifying vehicle and driver characteristics from crash reports.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 2-Data Selection - Complete task,
-Task 4-Data Analysis - Complete task, and
-Task 5-Final Report - Submit 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)	7/30/2017
Principal Investigator:	Xiaoduan Sun				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$130,000		**Total**		**$60,000**
	(revised)	$129,876				
Est. Expended to Date		$50,000		Salaries		$59,800
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$60,000		Equipment	(non-expendable)	
	(revised)	$60,000		Travel		$200
Est. FY Expenditure		$60,000		Other		

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 2016 - 2017 ACCOMPLISHMENTS

-The team has finished comprehensive data analysis on all four selected crash countermeasures,
-Benefit-cost analysis has also been estimated, and
-Final report has been completed 90%.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Complete 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)	11/30/2017
Principal Investigator:	Sherif Ishak				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$150,000		**Total**		**$38,000**
	(revised)	$149,865				
Est. Expended to Date		$112,000		Salaries		$38,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$42,000		Equipment	(non-expendable)	
	(revised)	$38,000		Travel		
Est. FY Expenditure		$38,000		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 2016 - 2017 ACCOMPLISHMENTS

-Complete Task 2: The realistic network development will be completed in the simulator environment to fulfill the requirements of the connected vehicle applications' simulation,
-Complete Task 4: The required procedures to collect data from the connected vehicle type in real time has been developed in order to present it to the simulator's drivers,
-Complete Task 5: Licensed drivers were recruited to perform the required experiments on one connected vehicle application. Experiments are still in progress for the second application, and

-Start Task 6: The research effort is being reported in the final report as all the work is finished.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 5: the experiments for the second connected vehicle application will continue to completion, and
-Task 6: the final report will be completed and submitted three months before the project end date.

LTRC Annual Research Program
Fiscal Year 2017-2018

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 2017-2018 Budget		
Total Cost	(original)	$250,000	**Total**		**$103,790**
	(revised)				
Est. Expended to Date		$229,339	Salaries		$72,137
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$103,790	Equipment	(non-expendable)	$10,000
	(revised)		Travel		$1,500
Est. FY Expenditure		$63,445	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 2016 - 2017 ACCOMPLISHMENTS

-Facilitated safety Project Review Committee (PRC) meetings, started four safety projects from 2015 RPIC list,
-Used Constant Contact and GoTo Meetings to collaborate and disseminate information and resources to stakeholders,
-Designed and delivered a multi-component training curriculum on using the SHSP Data Dashboard,
-Developed outline and worked with national trainer to deliver three part communications training to SHSP stakeholders,
-Investigated WFD pooled fund with Louisiana serving as lead state,
-Managed SHSP Communications Coordinating Council (facilitated conference calls and meetings, developed consolidated safety calendar, assisted with development and distribution of three safety PSA campaigns), and
-Attended statewide and regional SHSP meetings.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Manage ongoing research projects and start project from 2017 RPIC process, -Move forward with WFD pooled fund, -Support LADOTD Highway Safety Section by developing matrix of training needs and competencies, -Work on LA specific Road Safety 101 course, -Continue supporting DOTD Highway Safety Section and regional coordinators in implementation of SHSP, and -Support the LADOTD Transportation Safety Summit and Transportation Conference.

FHWA

Part II SPR Funded Research Program

PROPOSED RESEARCH

Title:	**Analysis of Driven Pile Capacity within Pre-bored Soil**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		8/1/2017
Research Project Number:	18-1GT		Completion Date	(original)	6/30/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$180,000		**Total**		**$80,000**
	(revised)					
Est. Expended to Date				Salaries		$80,000
FY 2016 - 2017 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. Since the field testing data is not readily available, a finite element analysis on pre-bored piles will be conducted for a sensitivity analysis based on various field conditions.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Start research activities.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Gavin Gautreau				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$70,000	**Total**		**$83,987**
	(revised)				
Est. Expended to Date			Salaries		$83,987
FY 2016 - 2017 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) has many elements that compose the transportation system. A management system for assets like retaining walls, slopes, and other geotechnical elements that could affect our highway corridors does not exist within the state.

This project will search how other states manage these items, and develop a system to inventory and store information into a Geotechnical Asset Management Database. The goal is to track the design life of these structures to be more proactive in their life's maintenance.

Starting with low hanging fruit the project will document existing wall locations. Secondly, a rough assessment of how they are performing, then basic construction parameters.

Ideally, the research will establish a system to identify and catalog items within the state utilizing the resources of the Districts and HQ. The research will identify sensitive elements like: location, height, slope, construction, structure integrity and stability, etc. These elements must be quantified and statistically analyzed to determine the level of risk and repair priority associated with each. Certain elements will have more detailed and complex sensitivity levels, based on available data/method. The researcher will evaluate the sensitivity of each element to identify critical elements and methods for level analysis (ex. Level 1 has no data, Level 2 has some data, Level 3 has good data, Level 4 recommended data level). Then, provide LADOTD with a logical method to evaluate and rate the elements of their existing system and compare those ratings against associated risks as compared to minimum safety standards.

This action plan will guide the LADOTD through a phased implementation of a comprehensive geotechnical asset management system to analyze and manage elements/data. The analysis/management tool will be used to rate and evaluate elements as a highway network, and identify locations of risk (red flags) based on existing and collected information when compared against best practices and acceptable standards.

When the threat analysis/management tool combines the socio-economic consequence of failure, the tool will be used to prioritize risks (red flags) and allocate available funding, and more detailed engineering analysis, to the most critical areas of the highway system in Louisiana.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Starting with low hanging fruit the project will document existing wall locations. Secondly, a rough assessment of how they are performing, then basic construction parameters.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Developing, Upgrading, and Maintaining Software's for Transportation Applications**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2020
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Adele Lee				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$200,000		**Total**		**$70,800**
	(revised)					
Est. Expended to Date				Salaries		$70,800
FY 2016 - 2017 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 fiscal year structured resource allocation plan for transportation applications originally developed at Louisiana Transportation Research Center (LTRC). The activities will cover development, upgrading, implementation, and maintenance.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Technical consultation for TranSET Project Tracking System (through August 2017),
-Software programming to upgrade LTRC geotechnical software's (SoilCPT, Embankment Settlement),
-Technical supervision of graduate student development of GIS visualization of pavement measurement data,
-Technical consultation on software development for LTRC Project 17-3SS,
-Implementation of GIS data for LTRC Project 14-4SS,
-Software programming to update capabilities on PMTS, and
-Maintain Server Frameworks (GIS, PMTS).

LTRC Annual Research Program
Fiscal Year 2017-2018

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:		10/2/2017
Research Project Number:			Completion Date	(original)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$50,000		**Total**		**$22,156**
	(revised)					
Est. Expended to Date				Salaries		$22,156
FY 2016 - 2017 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, pre-consolidation 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 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Start the project with conducting comprehensive literature review on the use of CPT and PCPT technologies on various geotechnical engineering applications such as: evaluating the strength and consolidation properties of soils, evaluating pile resistance, evaluating embankment settlement, etc.

LTRC Annual Research Program
Fiscal Year 2017-2018

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:		9/1/2017
Research Project Number:			Completion Date	(original)	8/31/2020
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$250,000	**Total**		**$53,800**
	(revised)				
Est. Expended to Date			Salaries		$50,800
FY 2016 - 2017 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 are 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 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 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.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	12/31/2020
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$200,000		**Total**		**$37,000**
	(revised)					
Est. Expended to Date				Salaries		$22,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$15,000
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The piezocone penetration test (PCPT or CPTu) has been recognized as the most common in-situ testing for subsurface soil characterization, especially for clayey soils. It provides continuous measurements of tip resistance (qc), sleeve friction (fs) and excess porewater pressure (u) that can be interpreted for soil stratification and evaluation of different soil properties, such as strength, stiffness and consolidation parameters. The addition of geophone sensor to the piezocone body (seismic piezocone penetration test, SCPTu) will enhance the geotechnical site investigation by providing vertical profiles of four independent measurements with depth: qc, fs, u, in addition to downhole shear wave velocity (Vs). The shear wave is a fundamental nondestructive property of geomaterials that corresponds to the small-strain stiffness of the material. The Vs can be used to evaluate the small-strain shear modulus (Go), constrained modulus (M) and damping coefficient (C). The Go (also known as maximum modulus, Gmax, or initial tangent dynamic shear modulus, Gdyn) can be applies to both static and dynamic properties, as well as to both undrained and drained loading conditions. Evaluating the initial stiffness in terms of Go is appropriate to analyses involving foundation systems, retaining walls, and problems involving cyclic and seismic loading conditions such as evaluating foundations for vibrating equipment. The current practice of the Louisiana Department of Transportation and Development (LADOTD) in analyzing PDA and CAPWAP is based on estimating the Go and damping coefficients based on soil classification, which can lead to variations and inaccurate interpretations. With the use of CPT-qc data and the hyperbolic degradation of stiffness approach, the axial load deformation curves and lateral p-y curves for piles/drilled shafts can be established. The Spectral Ratio Slope (SRS) method in combination with Fourier transforms of measured Vs can be used to determine the variation of soil damping ratio with depth for application in dynamic analysis of piles.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Conduct comprehensive literature review on the use of Seismic Piezocone Penetration Testing (SCPTu) for geotechnical engineering applications such as evaluating the static and dynamic soil properties, establish pile load-deformation curve, etc., -Purchase the Seismic Piezocone Penetration Test device, -Incorporate and start using the SCPTu for field investigation, and -Start collecting in-situ data from SCPTu.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Predicting, Monitoring, and Rehabilitating Highway Embankment Slopes - RPIC 17-050	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$150,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$75,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

High-plasticity clays have been used by the Louisiana Department of Transportation and Development (LADOTD) to construct highway embankments. The many cycles of wetting and drying periods in Louisiana have caused these soils to weather and desiccate, which ultimately reduced shear strengths from peak values to fully softened strengths. Because of the significantly lower strength and rapid pore pressure increase after rainfall events, slope stability problems have existed within the state. In particular, highway maintenance crews continue to spend many hours fighting this problem annually (LTRC/DOTD Workshop, January 2017).

This research will investigate the stability of highway embankments to develop guidelines for predicting high failure probability zones and cost-effective remedial techniques. The research will be focused on developing a predictive tool and rehabilitation methods for highway embankments. A systematic review of the LADOTD documented failures will be performed using the approach in Stark et al. (2014) and Stark et al. (2016). An instrumented site is proposed because of the lack of field verification from previous slope failures and remedial repairs. In particular, a number of remedial measures have been performed over the years. The effectiveness of each method will be investigated and evaluated with newer technologies, e.g., value engineering. The back-analyzed shear strengths along with index properties and weather conditions will be used to develop correlations, e.g., Gamez and Stark (2014), which will be used to predict high probability locations for slope instability.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Begin the research including a literature review and inventory of failed sites and repairs conducted by the LADOTD.

Title:	**DOTD Support for UTC Project: Prediction and Rehabilitation of Highway Embankment Slope Failures in a Changing Climate**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$15,900		**Total**		**$14,310**
	(revised)					
Est. Expended to Date		$15,900		Salaries		$11,540
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		$2,770

PURPOSE AND SCOPE

The objective of this study is to (a) develop a framework that predicts which locations have a high risks of slope failure and demonstrate its functionality in Region 6; and (b) identify cost-effective rehabilitation techniques for repairing slides. These objectives will be achieved through the following activities:

-Review of documented embankment failures and remediation techniques,
-Laboratory fully softened shear strength testing and development of empirical correlation,
-Laboratory unsaturated hydraulic properties,
-Development of predictive framework,
-Implementation of research results; and
-Workforce development and education.

The objectives are accomplished by conducting six specified tasks in Phase 1 and three tasks in Phase 2.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate project work and complete all project tasks in Phase 1.

Title:	**DOTD Support for UTC Project: Synthesis of Fault Traces in SE Louisiana Relative to Infrastructure**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	Tulane University		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$85,000		**Total**		**$45,000**
	(revised)					
Est. Expended to Date				Salaries		$25,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		$20,000

PURPOSE AND SCOPE

The objective of this project is to determine locations of geological faults in southeastern Louisiana (Fig.1) through the compilation of existing literature and, in particular, the synthesizing of recent university research on surface and near-surface faults mapped using high-quality energy industry data sets. This will include the development of best practices and methodologies for describing and characterizing the attributes of faults and quality of geological interpretations. The synthesis will form a knowledge base of surface fault locations in relation to critical infrastructure in the coastal zone of southeastern Louisiana.

An additional aim is the development of a list of potential mitigation techniques to assist in the preliminary design phase for critical infrastructure projects. In-place infrastructure that may be affected by faults will also be identified, and a list of potential mitigation and rehabilitation techniques for critical infrastructure projects will be generated.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Initiate project tasks and collaborate with Tulane, UNO and ULL investigators, and
-Accomplish all Year 1 tasks.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Support to Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		9/1/2017
Research Project Number:			Completion Date	(original)	12/31/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$100,000	**Total**		**$70,000**
	(revised)				
Est. Expended to Date			Salaries		$60,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$10,000

PURPOSE AND SCOPE

This project is to hire sub-contractor for his/her drone and remote sensing technologies to monitor the variation of surface moisture on embankment slopes.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Prove the concept and collect field data.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		8/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zhongjie Zhang				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$50,000	**Total**		**$50,000**
	(revised)				
Est. Expended to Date			Salaries		$50,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Many Louisiana highway embankments were built with high plastic soils due to historical reasons. Many of them have been experiencing surface sliding failures, which become a safety issue and cause traffic disruptions. Since no warning system is available for this type of failures, the Louisiana Department of Transportation and Development (LADOTD) can only respond to them after the fact with costly remediation.

Since the surface slide of embankment can only occur when the once compacted soils of slope close to be fully softened due to the dry and wet cycles of the climate, the capability of surface soils to store water (surface moisture) can be a good indicator of health condition of embankment slopes. A long term monitoring system on highway embankments can be built on this indicator and this challenging job can be accomplished using remote sensing and drone technologies with proper sensors.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

The planned work includes:
-Literature search,
-Identifying and selecting proper technology and sub-contractor for remote sensing,
-Collecting and analyzing historic space and field data,
-Identifying and selecting proper technology and sub-contractor for drone technology with proper sensors, and
-Plan for next phase study.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach**	**Project Status:**	**Proposed**

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

SIO:		Project Start Date:		7/1/2017
Research Project Number:		Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$200,000	**Total**		**$66,300**
	(revised)				
Est. Expended to Date			Salaries		$66,300
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The proposed research work aims at facilitating the design approach transition by characterizing the performance of thin and intermediate asphalt overlays using both 1993 AASHTO pavement design and locally-calibrated Pavement ME approaches.

It is envisioned that historic and on-going pavement rehabilitation projects will be considered for this study. The existing pavement structures before overlay can be either flexible or rigid pavements. FWD tests will be performed on selected pavement sites to determine the existing pavement conditions for the M-E design inputs. The overlay thicknesses will be then determined based on Louisiana local pavement design practice and the predicted performance over design life will be compared with the available PMS data.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Literature Review,
-Projection selection and data collection, and
-FWD esting.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Application of Mechanistic-Empirical Pavement Design Approach into RCC Pavement Thickness Design	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zhong Wu				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$200,000	**Total**		**$87,500**
	(revised)				
Est. Expended to Date			Salaries		$87,500
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

As Louisiana Department of Transportation and Developments (LADOTD's) pavement design approach is in the transition from the 1993 AASHTO design procedure to a newly-calibrated Pavement ME method, there is a need to develop a ME based thickness design procedure for RCC pavement applications in Louisiana. For this purpose, the scope will include (1) accelerated loading on two 8-inch thick RCC test sections by heavy ATLaS loads and collecting load-induced pavement responses under a suite of different load magnitudes; (2) Develop finite element simulation models to predict RCC pavement responses; (3) Develop M-E distress models to predict fatigue cracking, erosion and surface roughness in a similar fashion as those used in the Pavement ME method.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Literature review,
-Accelerated loading on RCC sections, and
-Analysis of testing results based on M-E approach.

LTRC Annual Research Program
Fiscal Year 2017-2018

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:		6/1/2017
Research Project Number:	17-4B	Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Saman Salari			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$143,000	**Total**		**$63,865**
	(revised)				
Est. Expended to Date			Salaries		$63,865
FY 2016 - 2017 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 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 2016 - 2017 ACCOMPLISHMENTS

-Completed project proposal, and
-Held PRC kickoff meeting.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue literature review,
-Collect local aggregate and asphalt cement, and
-Begin design and testing.

LTRC Annual Research Program
Fiscal Year 2017-2018

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:	**DOTLT1000161**	Project Start Date:		7/5/2016
Research Project Number:	17-1B	Completion Date	(original)	7/5/2018
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$200,000	**Total**		**$127,000**
	(revised)				
Est. Expended to Date			Salaries		$37,510
FY 2016 - 2017 Budget			Equipment	(expendable)	$54,000
FY Funds	(original)		Equipment	(non-expendable)	$2,890
	(revised)		Travel		$500
Est. FY Expenditure			Other		$32,100

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 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

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

LTRC Annual Research Program
Fiscal Year 2017-2018

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 2017-2018 Budget**		
Total Cost	(original)	$220,000		**Total**		**$99,100**
	(revised)					
Est. Expended to Date				Salaries		$99,100
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		

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 have 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 2016 - 2017 ACCOMPLISHMENTS

FISCAL YEAR 2017-2018 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 2017-2018

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)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$233,000	**Total**		**$118,200**
	(revised)				
Est. Expended to Date			Salaries		$93,200
FY 2016 - 2017 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 semicircular bend (SCB) test at intermediate temperature (ASTM d 8044, 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 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Task 1 – Conduct Literature review,
Task 2 – Identify Field Projects and Material Collection,
Task 3 – Conduct of Laboratory Investigation,
Task 4 – Perform Data analyses, and
Task 5 – Prepare Draft Final Report.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$279,000	**Total**		**$156,504**
	(revised)				
Est. Expended to Date			Salaries		$96,504
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	$60,000
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Currently, the Louisiana Department of Transportation and Development (LADOTD) specifications for roads and bridges, Section 502, require the use of Semi-Circular Bending (SCB) test as a part of asphalt mixture design (Table 502-6). This test is traditionally conducted in a monotonic, displacement-controlled mode at intermediate temperature to assess the fatigue crack resistance of asphalt concrete. However, fatigue damage is essentially deterioration in material integrity as a result of repeated loading. As such, monotonic loading may not realistically simulate the effects of traffic loading compared to cyclic loading. Notched beams under cyclic loading has been used to investigate fracture propagation characteristics in asphalt concrete. Compared to beam, use of SCB specimens has the advantages of less material use, simpler test set-up, and absence of the sagging problem. It is proposed to use cyclic SCB test coupled with fracture mechanics principles to establish crack propagation laws and quantify material's crack resistance in a more realistic manner.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Conduct a comprehensive literature review on notched beam fatigue test, cyclic SCB test, and mechanistic modeling effort related to fatigue cracking, -Acquire and set up a Digital Image Correlation (DIC) measurement system that is optimized or cyclic SCB testing, -Develop and conduct experimental factorial, -Use finite element analysis to obtain the critical strain energy release rate (Jc) for each cycle, -Establish crack propagation laws and develop new parameters as indicators for material's crack resistance under cyclic loading condition, and -Validate the test and analysis results utilizing statistical analysis with the following mixture components: nominal maximum aggregate size, binder type, and aggregate type and test conditions notch depth and loading rate.

Title:	**Assessment of Long-Term Performance of Louisiana Asphalt Pavements**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$270,000		**Total**		**$130,100**
	(revised)					
Est. Expended to Date				Salaries		$105,100
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		$25,000

PURPOSE AND SCOPE

Recent Louisiana Transportation Research Center (LTRC) research studies identified effects of various asphalt pavement construction factors on the mixture mechanical properties such as dynamic modulus (|E*|), rut depth (RD) measured by a Hamburg Wheel-Tracking device, indirect tensile strength (ITS), and fracture resistance at intermediate temperature measured by the semi-circular bend (SCB Jc) test.

LTRC study FHWA/LA.15/553 “Evaluation of Warm Mix Asphalt Technology in Flexible Pavements,” evaluated several warm mix asphalt (WMA) technologies that showed WMAs mixtures exhibited similar or better laboratory performance as compared to conventional hot-mix asphalts (HMAs).

LTRC study 14-1B “Effects of Temperature Segregation on Volumetric and Mechanistic Properties of Asphalt Mixtures,” ascertained temperature zones that negatively affected laboratory measured properties such as density, rut depth, and SCB Jc of field cores collected after construction.

The objective of this proposed study is to re-visit field projects included in these two studies to collect field performance data (rutting, cracking, etc.) in order to link and verify laboratory-measured properties to field performances.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Review the two previous LTRC studies: LTRC Projects 07-1B and 14-1B, -Obtain PMS data and analyzing: mapping of distress trends in the field projects, -Perform field forensic investigations and distress surveys on select field projects: for verification of PMS distress database and/or to acquire the initial distress data from recently constructed pavement sections, -Obtain field samples (as needed) and conducting follow-up laboratory tests, and -Perform data analysis.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	6/30/2020
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$350,000	**Total**		**$70,000**
	(revised)				
Est. Expended to Date			Salaries		$70,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Recycling of construction materials in pavements is not only a cost-saving alternative, but also a key element in the sustainability of transportation infrastructure, since it reduces the use of virgin materials and eliminates the needs for landfill areas. One of the most recycled materials in pavements is the Reclaimed Asphalt Pavement (RAP) because of its high compatibility with the newly produce asphalt mixtures. Further, Reclaimed Asphalt Shingles (RAS) have become another promising candidate of recycling also because of the high compatibility with paving asphalt mixtures. The objective of the proposed ALF experiments is to assess the applicability of “green” construction alternatives such as RAS and increased amount of RAP in Louisiana asphalt paving projects. The applicability will be evaluated by comparing the long-term performance of asphalt pavement sections constructed with combinations of RAS and/or RAP to that of conventional pavement under accelerated loading. Five test lanes with various percentages of RAP and/or RAS are proposed to be constructed.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Task 1 – Conduct Literature review, -Task 2 – Develop experimental factorial, -Task 3 – Perform laboratory asphalt mixture design and performance testing for mixtures to be used in Task 4, -Task 4 – Prepare construction documents for construction of test lanes, and -Task 5 – Monitor construction of test lanes as per bid documents.

Title:	DOTD Support for UTC Project: Development of a Standard Test Method for Characterization of Asphalt Modifiers and Aging-Related Degradation Using an Extensional Rheometer	Project Status:	Proposed

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTU		Completion Date	(revised)	
Principal Investigator:	Nazimuddin Wasiuddin				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$20,000	**Total**		**$20,000**
	(revised)				
Est. Expended to Date			Salaries		$20,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The objective of this study is to:
-Characterize modified asphalt binders in relation to their aging-related degradation, and
-develop a new standard and specification to supplement the knowledge gap in the performance grade (PG) system for modified asphalt binders.
The specific objectives are as follows:
-Develop a new test method that can identify the effect of modifier type and the influence of dosage rate on the performance based test parameter,
-In addition to modifier type, a test that can characterize polymer microstructure (linear, radial, etc.) will be developed using extensional rheometer.,
-Develop a test method to fulfill the knowledge gap in current Performance Grading System and replace the PG Plus tests by exploring different potential extensional rheology parameters,
-Develop test parameters that can measure degradation of asphalt modifiers due to short and long term aging, and
-Develop a low temperature cracking susceptibility test using extensional rheology fixture.

The project work is carried out through eight tasks in Phase 1 and four tasks in Phase 2.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate work on the project and complete all eight tasks in Phase 1.

Title:	**DOTD Support for UCT Project: Improving Durability and Extending the Service Life of Asphalt Pavements Through the Use of Innovative Light Induced Self-Healing Material**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$38,000	**Total**		**$35,000**
	(revised)				
Est. Expended to Date		$38,000	Salaries		$26,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$9,000

PURPOSE AND SCOPE

The objectives of the project are to:
-Develop an optimized synthesis procedure for the production of UV light induced self-healing polymers,
-Examine the thermal stability of the produced polymer during asphalt pavement mixing processes,
-Evaluate the effect of self-healing polymer on the rheological properties of the binder,
-Evaluate the effect of self-healing polymer on the mix mechanical properties, and
-Evaluate the effect of UV light induced polymer on self-healing capabilities of asphalt mixture.

To achieve the objectives, the investigators will conduct seven tasks in a Phase 1 effort and three tasks in Phase 2 effort.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate project tasks and complete all seven Phase 1 tasks.

Title:	**DOTD Support for UTC Project: Development of Self-Healing and Rejuvenating Mechanisms for Asphalt Mixtures Containing Recycled Asphalt Singles**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$38,000	**Total**		**$35,000**
	(revised)				
Est. Expended to Date			Salaries		$24,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$11,000

PURPOSE AND SCOPE

The objectives of the project are:
-Develop a synthesis procedure for production of sodium-alginate hollow-fibers containing an asphalt rejuvenator;
-Evaluation of thermal stability and the resistance to mixing processes of the fibers;
-Evaluation of the performance against fatigue cracking, low temperature cracking, and rutting susceptibility of HMA with fibers will be assessed through laboratory tests; and
-Evaluation of self-healing efficiency of hollow-fibers, through crack healing and stiffness recovery of damaged mixture specimens under two different healing conditions.

The investigator plans to accomplish these objectives by undertaking six tasks in Phase 1 and three tasks in Phase 2.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate project work and complete all six tasks in Phase 1.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Bridge Inspection with Unmanned Aerial Vehicles - II	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000204**	Project Start Date:		7/1/2017
Research Project Number:	18-3ST	Completion Date	(original)	6/30/2018
Research Agency:	ULL	Completion Date	(revised)	
Principal Investigator:	Ayman Okeil			

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$9,724	**Total**		**$9,724**
	(revised)				
Est. Expended to Date			Salaries		$5,446
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$4,278

PURPOSE AND SCOPE

The objective of the project is to investigate the potential for deployment of UAVs for bridge inspection. The project will be executed in two (2) phases, i.e. Phase I, i.e. the Research or Technical Phase, and Phase II, i.e. the Implementation Phase.

Phase I will commence with surveys, data gathering, and analysis pursuant to provide recommendations for two instrumented Unmanned Aerial Vehicle Systems (UAVs) for demonstration to determine their application, feasibility, suitability, practicality, and effectiveness according to a defined rubric centered around routine bridge inspection activities. The Research/Technical phase will finish with a report on the findings of the demonstration project, identifying the advantages, disadvantages, and limitations of the use of UAVs in routine bridge inspection work in Louisiana.

The Second phase, i.e. the Implementation Phase, will utilize the informational and educational fruits of the technical research phase for Workforce Development, Outreach Activities, and Education. Workforce development will include disseminating the results through conferences, meetings, workshops, the project website, and webinars to educate and train professionals in the transportation industry, educating students and practicing engineers.

The study will involve four tasks in Phase 1 and three tasks in Phase 2 to accomplish the objective of the research effort.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate project work and complete all tasks in Phase 1.

Title:	**DOTD Support for UTC Project: A Comprehensive Framework for Corrosion Damage Monitoring and Reliability-Based Repair Design of Reinforced Concrete Structures**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Ayman Okeil				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$15,000	**Total**		**$15,000**
	(revised)				
Est. Expended to Date			Salaries		$10,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$150
Est. FY Expenditure			Other		$4,850

PURPOSE AND SCOPE

The objectives of the study are the following:
-Develop a continuous and noninvasive corrosion detection and deterministic-probabilistic quantification model based on materials damage evolution (TAMU),
-Develop a reliability-based service life prediction model using the uncertainties inherent in the parameters identified and quantified from the corrosion detection process TAMU/UNM/LSU), and
-Tie the service life prediction model to the design of repair/strengthening and load rating of RC structures using the reliability-calibrated design factors (LSU/UNM).

The investigators plan to undertake five tasks in Phase 1 and three tasks in Phase 2 to accomplish the project objectives.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate work on the project and complete all five tasks in Phase 1.

Title:	DOTD Support for UTC Project: Bridge Inspection with Unmanned Aerial Vehicles	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$6,980	**Total**		**$6,980**
	(revised)				
Est. Expended to Date			Salaries		
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$6,980

PURPOSE AND SCOPE

The objective of the project is to investigate the potential for deployment of UAVs for bridge inspection. The project will be executed in two (2) phases, i.e. Phase I, i.e. the Research or Technical Phase, and Phase II, i.e. the Implementation Phase.

Phase I will commence with surveys, data gathering, and analysis pursuant to provide recommendations for two instrumented Unmanned Aerial Vehicle Systems (UAVs) for demonstration to determine their application, feasibility, suitability, practicality, and effectiveness according to a defined rubric centered around routine bridge inspection activities. The Research/Technical phase will finish with a report on the findings of the demonstration project, identifying the advantages, disadvantages, and limitations of the use of UAVs in routine bridge inspection work in Louisiana.

The Second phase, i.e. the Implementation Phase, will utilize the informational and educational fruits of the technical research phase for Workforce Development, Outreach Activities, and Education. Workforce development will include disseminating the results through conferences, meetings, workshops, the project website, and webinars to educate and train professionals in the transportation industry, educating students and practicing engineers.

The study will involve four tasks in Phase 1 and three tasks in Phase 2 to accomplish the objective of the research effort.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate project work and complete all tasks in Phase 1.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Load Rating of Existing Continuous Stringers on Louisiana's Bridges**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2017
Research Project Number:		Completion Date	(original)	6/30/2019
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$200,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Several of Louisiana's most important bridges were built using floor beams between main members and continuous stringers that are supported by the floor beams. These stringers are steel rolled I-beam sections. On some of these bridges when the stringers are load rated by the LRFR code using BrR software. The rating comes out very low requiring extremely restrictive load posting of these members and sometimes even requiring them to be closed. The Louisiana Department of Transportation and Development (LADOTD) feels that these rating values do not represent reality. The accuracy of these results must be checked, what the true capacity of the stringers needs to be determined, and an analytical approach needs to be developed so the stringers can be rated without extremely restrictive load postings.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Start Project.

Title:	**Development of Rating Strategies of Existing Bridges**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$200,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Many existing bridges cannot pass capacity rating due to different reasons, such as section deterioration or change of design code that requires higher live loads. For example, the LRFD live load is larger than that of the Load Factor Design (LFD). Many existing bridges were designed with LFD method and may be rated lower using the LRFD methodology, which would require low load posting, strengthening, or replacement of these bridges.

For actual field bridges, there are many beneficial factors (such as capacity contributions from parapets, bearing restraint, and secondary members) that have been ignored in the rating process. Including these factors in the rating would help the bridge pass capacity rating. However, there are no procedures regarding how to quantify these beneficial factors and utilize them in order to reliably rate the capacity rating.

A specific situation is that many “off-system” existing bridges need to be rated for bridge maintenance and management purpose, required by FHWA. However, in many cases we do not have enough information (even without drawings) to rate those bridges and it becomes a challenge and urgent issue.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Start the project

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Tactile Clues for the Visually Impaired to Align Properly for Street Crossings**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$100,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

We request that a study be initiated to determine a cost effective product that would provide a tactile cue and be reasonably maintainable. The ability of a DOTD maintenance crew to maintain this product is essential to a practical implementation. Two scenarios exist. One scenario is a marked crosswalk. The other scenario is an unmarked crosswalk where the tactile cues would not extend past the 2-3 feet from the edge of the roadway/curb.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Start and complete the project with assistance of the School for the Visually Impaired.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**DOTD Support for UTC Project: Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$15,900	**Total**		**$12,400**
	(revised)				
Est. Expended to Date			Salaries		$10,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$2,400

PURPOSE AND SCOPE

The specific objectives of the project are:
-Determine the best practices employed by transportation agencies, other public agencies and organizations, and private firms that lead to recruitment of qualified transportation agency employees,
-Assess current best practices that are used to retain qualified and experienced transportation agency Employees,
-Identify potential institutional barriers that exist within transportation agencies that limit the recruitment and retention of high quality employees, and
-Develop outreach, educational, and workforce development hands-on activities to expose, and engage bright young minds from underrepresented groups to broader fields of transportation and the associated careers.

The project work will include six tasks in Phase 1 and three tasks in Phase 2 to accomplish the stated objectives.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate project work and complete all six tasks in Phase 1.

Title:	DOTD Support for UTC Project: Promoting Economic Development in the Baton Rouge Area, LA: Improving the Performance of the Transportation System through Supply-Oriented, Demand-Oriented and Economic Measures for Mitigating Traffic Congestion	Project Status:	Proposed

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Sherif Ishak				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$15,900	**Total**		**$14,300**
	(revised)				
Est. Expended to Date			Salaries		$11,500
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$2,800

PURPOSE AND SCOPE

This project aims to perform network analysis to identify the extent of the congestion problem in the Baton Rouge area with the focus on the I-10 Mississippi Bridge. Based on that, the research team will:

-Identify the major data sources in the study area
-Compile existing data from critically congested locations at the I-10 Mississippi Bridge;
-Quantify the magnitude and extent of the congestion problem at the bridge;
-Develop a simulation model for the bridge and the surrounding roadway network;
-Identify potential solutions to address the congestion problem at the bridge; and
-Investigate the effectiveness of each solution using the simulation model.

The investigators plan to conduct nine specific research tasks to accomplish the above stated objectives.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate the project work and complete the first seven of the nine project tasks.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Departmental Applications for Unmanned Aerial Systems	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		8/1/2017
Research Project Number:			Completion Date	(original)	10/31/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$80,000	**Total**		**$65,000**
	(revised)				
Est. Expended to Date			Salaries		$60,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	$5,000
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to investigate potential use of unmanned aerial vehicles (drones) for the Louisiana Department of Transportation and Development (LADOTD) applications. It is anticipated that the research will choose a couple of case studies (i.e. bridge inspection, traffic incident management, etc.) for more detailed research. The scope will be further defined once a PRC is convened.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

To be determined based on Project Review Committee (PRC) recommendations.

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:		7/1/2017
Research Project Number:			Completion Date	(original)	12/31/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$125,000		**Total**		**$85,000**
	(revised)					
Est. Expended to Date				Salaries		$85,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$75,000		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 2016 - 2017 ACCOMPLISHMENTS

The RFP is currently being developed.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

To be determined based on the selected proposal.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Evaluation of DOTD's Existing Queue Estimation Procedures	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$80,000	**Total**		**$37,000**
	(revised)				
Est. Expended to Date			Salaries		$36,500
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$500
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This project will review and evaluate the Louisiana Department of Transportation and Developments (LADOTD's) existing queue estimation procedures by comparing to actual queue data using video camera footage.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC).

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Development of a CAV Roadmap for Louisiana DOTD	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$86,000		**Total**		**$86,000**
	(revised)					
Est. Expended to Date				Salaries		$80,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		$6,000
Est. FY Expenditure				Other		

PURPOSE AND SCOPE

The purpose of the project is to develop a road map for connected and automated vehicle (CAV) technology deployment in Louisiana with the main focus on the city of New Orleans. The concept of CAV relies on vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication technologies, which require a robust platform to allow for not only creativity and interoperability, but also the ability to interact with the complex human behavior especially at automation levels from 0 to 3. This project will investigate and report on what steps other state DOT's are implementing to embrace CAV; what state DOT-specific applications are being developed to use the technology; and how state DOT's are adapting their infrastructure to embrace CAV. It will further make recommendations on steps the Louisiana Department of Transportation and Development (LADOTD) can take to implement CAV on its roadways, using New Orleans as a test case.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC). Some preliminary ideas for tasks are as follows: -Perform a thorough review on CAV deployments in other states across the US, -Identify the infrastructure needs for CAV deployment in New Orleans, -Identify the short- and long-term CAV penetration rates in New Orleans, -Develop a road map for CAV technology deployment in New Orleans, -Identify potential stakeholders to support CAV deployment in Louisiana, and -Offer on-going support to DOTD CAV Technology Team.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Determine Louisiana's Roundabout Capacity	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$47,270	**Total**		**$16,000**
	(revised)				
Est. Expended to Date			Salaries		$16,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

There are several equations and software options used to determine capacity of a roundabout. The Louisiana Department of Transportation and Development (LADOTD) uses a "factor of safety" since roundabouts are relatively new. This project takes actual counts at existing roundabouts and compare to software outcomes. Results will assist LADOTD with determining the best design for roundabouts in Louisiana.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC).

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Permitted/Protected versus Protected Left Turns	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	12/31/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$47,000	**Total**		**$13,000**
	(revised)				
Est. Expended to Date			Salaries		$13,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This study investigates safety and operation of existing intersections with protected only, protected/permitted left turns and all of the different geometric features, speeds, etc. The objective is to develop guidance on when protected/permitted is okay versus protected left turns only.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC).

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Louisiana Trip Generation Rates**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		6/1/2017
Research Project Number:		Completion Date	(original)	5/31/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Chester Wilmot			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$200,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$97,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$3,000
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The purpose of this project is to identify the trip generation rates for a selected set of land uses in Louisiana, compare them with the rates in the ITE Trip Generation Manual, identify the factors that account for the difference, develop correction factors, and incorporate the information into a GIS system. The analysis is restricted to Louisiana and will only include those land uses that the Louisiana Department of Transportation and Development (LADOTD) feel display the greatest deviation from national values.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Conduct literature review,
-Design field surveys,
-Incorporate land cover, census, and highway network data into a GIS for the area in which the field surveys will be conducted, and
-Conduct field surveys.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**LADOTD Plan Development Consultant Contract Process Review**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		10/1/2017
Research Project Number:			Completion Date	(original)	3/31/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$150,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$71,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		$3,000

PURPOSE AND SCOPE

In discussions with various Sections of the Louisiana Department of Transportation and Development (LADOTD) responsible for delivering completed plans, many have expressed dissatisfaction with plan quality provided by consultants. The plans may be incomplete or contain errors in quantities. The plans may also not follow LADOTD specific design guidelines or EDSM's. The combination of the aforementioned issues leads to unnecessary delays in project delivery. Consultants have indicated that LADOTD has no transparent and systematic method for documenting and tracking project comments. Consultants receive written and verbal comments independently from all sections involved in the project development process and it is difficult to determine what the priorities are. Consultants have also indicated that past performance ratings are not indicative of work product.

This project will complete a thorough process review of the LADOTD consulting contract process. Input will be gathered from both LADOTD and consultants that perform work for LADOTD in plan development. Potential outcomes of this research project could include but is not limited to the following: (1) A "common" errors checklist for consultants, (2) Evaluation and potential restructuring of the consultant rating system, and (3) Analysis of barriers to expedient delivery including communication, EDSM, design policies, etc.

Implementation of favorable results of this study will enable the Department to expedite project plan delivery. Other potential outcomes include less labor required for plan review due to less errors, a better working relationship between the consultants and LADOTD, and an updated, well defined, consultant rating system.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
To be determined once a Project Review Committee (PRC) has been convened and develops the detailed scope of work.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Competition Among Transportation Modes for State Funding	Project Status:	Proposed
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		10/1/2017
Research Project Number:			Completion Date	(original)	12/30/2018
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$125,000	**Total**		**$65,000**
	(revised)				
Est. Expended to Date			Salaries		$60,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$1,000
Est. FY Expenditure			Other		$4,000

PURPOSE AND SCOPE

The objective of this research is to provide a “state of the industry” summary of how each state allocates funding across all transportation modes, and then provide guidance for state departments on how to justify the need for project funding across all modes when compared with other transportation funding needs.

A two-part approach to this project will be necessary. The first part will include an inventory of current practices for each state in allocating transportation funding. Once the states are identified that are in this competition for funding with other modes of transportation, case studies can be conducted to share success stories in the resulting resource guide. Working from the case studies, an assessment will be made of existing tools and techniques that are being used by individual state mode groups to measure success and comparisons. As part of the research, additional tools and techniques (such as a framework for comparison and metrics to measure benefits by) that can be implemented will be further developed by the research. It is important to note that each state manages budgets differently, and not all of the tools and techniques that may be developed will apply in every scenario.

As transportation infrastructure continues to age across the country, the need for funding to maintain and improve facilities is greater than ever. When modes must compete against each other for state funding, a lack of hard, comparable data can hinder the likelihood of receiving necessary funding. This research can provide guidance for establishing solid justification for the funding needed across modes.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
To be determined once the Project Review Committee (PRC) has convened to develop a detailed scope of work.

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:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$100,000		**Total**		**$22,151**
	(revised)					
Est. Expended to Date				Salaries		$17,151
FY 2016 - 2017 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 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Develop proposal,
-Prepare test beams, and
-Begin fatigue testing of the beams.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Implementation of Roller Compacted Concrete by LADOTD	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$100,000	**Total**		**$27,040**
	(revised)				
Est. Expended to Date			Salaries		$27,040
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

Industry and government have partnered to construct and test Roller Compacted Concrete (RCC) under accelerated loading at the Pavement Research Facility. This effort demonstrated the superior load carrying capability of RCC under accelerated loading. An implementation effort is required to demonstrate field constructability of RCC on a larger scale.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Develop a pilot program in three areas of the state to demonstrate construction and performance of thin RCC,
-Evaluate existing pavement loading and condition, mix design, and construction process,
-Develop a specification for construction. Evaluate the specification through the construction process,
-Assist in the field inspection of test sections, and
-Field-evaluate sections throughout the course of the project.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Influence of Internal Curing on measured resistivity**	**Project Status:**	**Proposed**

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

SIO:		Project Start Date:		7/1/2017
Research Project Number:		Completion Date	(original)	6/30/2019
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Amar Raghavendra			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$100,000	**Total**		**$34,301**
	(revised)				
Est. Expended to Date			Salaries		$34,301
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

The density of concrete can be influenced by a number of factors. Previous research conducted at LTRC showed a general increase in resistivity values with an increase in the content of lightweight fine aggregate. With interest in Internally Cured Concrete for structural concrete applications, research is needed to better understand the effect of internal curing on surface resistivity.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Develop a test matrix to incorporate various internally cured concrete mixture designs, and
-Test and monitor fresh and hardened properties, including surface resistivity of the developed mixtures.

LTRC Annual Research Program
Fiscal Year 2017-2018

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)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Zachary Collier				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$30,000		**Total**		**$30,000**
	(revised)					
Est. Expended to Date				Salaries		$30,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$30,000		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 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

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

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**DOTD Support for UTC Project: Self-Healing Microcapsules as Concrete aggregates for Corrosion Inhibition in Reinforced Concrete**	**Project Status:**	**Proposed**

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

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:	Marwa Hassan				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$30,000	**Total**		**$18,000**
	(revised)				
Est. Expended to Date			Salaries		$13,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$5,000

PURPOSE AND SCOPE

The main goal of this effort is to validate the performance of corrosion inhibiting self-healing microcapsules capable of enhancing durability and resiliency of RC structures.
The proposed project has the following objectives.
-Optimize the design parameters needed to produce single and/or double-walled corrosion inhibiting self-healing microcapsules to be used in concrete structures,
-Design an electrochemical set up for qualitative/qualitative characterization of concrete additives/microcapsules,
-Perform method of advanced laboratory techniques based on electrochemical and transport phenomena principles,
-Validation of the methodology by testing several conditions and samples with different microcapsules concentrations and formulations,
-Validate the methodology with the existing standard to support the obtained results,
-Apply the methodology to the inhibition mechanism proposed, and
-Plan to include two PhD students and two undergraduate students in the project.

The project involves six tasks in Phase 1 and three tasks in Phase 2 to accomplish the above stated objectives.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Initiate project work and complete all six tasks in Phase 1.

Title:	**DOTD Support for UTC Project: Evaluation of the Performance and Cost-Effectiveness of Engineered Cementitious Composites (ECC) Produced form Region 6**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		7/1/2017
Research Project Number:			Completion Date	(original)	6/30/2018
Research Agency:	LSU		Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$49,000		**Total**		**$41,000**
	(revised)					
Est. Expended to Date		$49,000		Salaries		$21,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure				Other		$20,000

PURPOSE AND SCOPE

The main goal of this project is to develop and characterize cost-effective ECC materials prepared with locally available ingredients by means of the following objectives:

-Develop ECC mix designs implementing locally available materials,
-Evaluate ECC mix designs mechanical properties (ultimate tensile strength and strain, flexural strength, compressive strength),
-Characterize ECC cracks (obtain crack width distribution),
-Identify key parameters affecting ECC properties, and
-Perform a feasibility study for implementation.

The investigators plan to accomplish the objectives by conducting six tasks in Phase 1 and three tasks in Phase 2 of the project.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate work and complete all the six tasks in Phase 1.

LTRC Annual Research Program
Fiscal Year 2017-2018

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)	
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$150,000		**Total**		**$50,000**
	(revised)					
Est. Expended to Date				Salaries		$50,000
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$50,000		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 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 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.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Crash Risk Assessment and Quantification Using the SHRP2 Naturalistic Driving Study Data**	**Project Status:**	**Proposed**

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

SIO:		Project Start Date:		7/3/2017
Research Project Number:		Completion Date	(original)	3/29/2019
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Sherif Ishak			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$153,820	**Total**		**$85,962**
	(revised)				
Est. Expended to Date			Salaries		$65,324
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$20,638

PURPOSE AND SCOPE

The main focus of this study is to perform a comprehensive analysis using the SHRP2 NDS data to identify the factors contributing most to the occurrence of crash/near crash events. Based on this analysis, the study will identify the crash risk associated with the different secondary tasks and evaluate the crash risk quantification methodology. The specific objectives are:
-To analyze the SHRP2 NDS events data and identify the crash risk associated with different secondary tasks,
-To analyze the SHRP2 NDS events data and identify the socioeconomic attributes of significant association with the likelihood of drivers' engagement in secondary tasks,
-To identify all factors significantly associated with the likelihood of drivers' engagement in secondary tasks and crash risk,
- To evaluate the previously outlined methodology for crash risk quantification, and
- To evaluate the in-place state laws related to distracted driving.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 1: Literature Review,
-Task 2: Data Extraction and Preparation,
-Task 3: Comprehensive Association Analysis, and
-Task 4: Identification of Secondary Tasks with Significant Impact on Crash Events.

Title:	**Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:			Project Start Date:		9/1/2017
Research Project Number:			Completion Date	(original)	9/30/2019
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$200,000	**Total**		**$80,000**
	(revised)				
Est. Expended to Date			Salaries		$80,000
FY 2016 - 2017 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 identify underlying individual, peer-to-peer relationship, family relationship, community, cultural, societal, and other institutional factors that influence individuals to engage in excessive drinking and then drive while impaired in Louisiana. Delving into this goal is expected to take the researcher through and far beyond crash factors data analysis and into complex socio-ecological considerations of Louisiana's citizens, including people who engage in impaired driving, people who know those who do, and the general populace. Further, the researcher is expected to identify specific excessive subgroups based on factors such as age, gender, and socioeconomic status to determine if these factors lead to increased levels of alcohol-impaired driving.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

To be determined based on the research proposal.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Pedestrian Crossings for High Speed Urban Arterials	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:			Project Start Date:		1/1/2018
Research Project Number:			Completion Date	(original)	6/30/2019
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Julius Codjoe				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$88,000	**Total**		**$18,000**
	(revised)				
Est. Expended to Date			Salaries		$18,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

PURPOSE AND SCOPE

This project will investigate how to best provide, or exclude, pedestrian crossings for high speed (45mph or higher) urban arterials. Activities include:
-Literature review of industry standards,
-Literature review of state legislation throughout the country,
-Safety analysis to determine historical and existing pedestrian crash rates in urban locations of Louisiana,
-Development of criteria to allow, or disallow, pedestrian crossings based on safety vs. disruption of traffic flow, and
-Analysis of potential alternatives: pedestrian bridges, tunnels, refuge islands, mid-block hybrid crossings, etc.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

The proposed activities will be determined once the detailed scope of work is developed with the Project Review Committee (PRC).

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Intersection on Horizontal Curves: Problems and Potential Solutions**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		8/1/2017
Research Project Number:		Completion Date	(original)	1/31/2019
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget		
Total Cost	(original)	$150,000
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$60,000**
Salaries		$59,500
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		$500
Other		

PURPOSE AND SCOPE

The objective of this project is to quantify safety performance at intersections on curves on all Louisiana's public roads. Recent data collection efforts have resulted in better local road data so this research should address all public roads. Linking crash, roadway, and traffic data, the proposed study will utilize the Louisiana Department of Transportation and Developments (LADOTD's) new Roads and Highway database to identify all intersection and horizontal curve locations, including state and local roads. This research will investigate the magnitude of the problem and identify risk factors that contribute to fatalities and serious injuries at intersections in horizontal curves. In addition, the research should prioritize all locations for consideration of safety improvement.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

To be determined based on the research proposal.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Identification of Transportation Infrastructure at Risk Due to Sea Level Rise and Subsidence of Land in Coastal Louisiana**	**Project Status:**	**Proposed**

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

SIO:	**DOTLT1000194**	Project Start Date:		7/1/2017
Research Project Number:	18-5TIRE	Completion Date	(original)	6/30/2018
Research Agency:	LTU	Completion Date	(revised)	
Principal Investigator:	Sanjay Tewari			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$29,345
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$29,345**
Salaries		$19,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		$10,345

PURPOSE AND SCOPE

The objectives of the proposed study are:
-Investigate the sea level rise and land subsidence trend, variability and uncertainty in the coastal Louisiana, and
-Investigate the potential implications of combined effect of projected sea level rise and land subsidence on the transportation infrastructure in the coastal region,

To accomplish the above objectives, the following tasks will be undertaken:
-Data collection and processing,
-Trend and variability of ground subsidence and sea level rise,
-Evaluate/modify existing models and create a storm surge and sea level rise hazard spatial layer,
-Identification of affected transportation infrastructure in spatial maps and quantification of water level over grounds in the affected areas, and
-Final report preparation and dissemination of results.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate and complete all tasks listed in the Purpose and Scope section.

Title:	**Evaluating Using Louisiana-Sourced Lignin as Partial Replacement in Asphalt Binder and as an Antioxidant**	**Project Status:**	**Proposed**

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

SIO:	**DOTLT1000193**		Project Start Date:		7/1/2017
Research Project Number:	18-4TIRE		Completion Date	(original)	6/30/2018
Research Agency:	LTU		Completion Date	(revised)	
Principal Investigator:	Joan Lynam				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$30,000		**Total**		**$30,000**
	(revised)					
Est. Expended to Date				Salaries		$23,000
FY 2016 - 2017 Budget				Equipment	(expendable)	$3,000
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		$200
Est. FY Expenditure				Other		$3,800

PURPOSE AND SCOPE

The overall objective of this study is to evaluate the effectiveness of using lignin in asphalt binder as a sustainable and renewable paving material. The specific objectives are as follows:
-Investigate and develop chemical treatments necessary for locally available lignin from Louisiana paper mills to be used as a suitable binder material,
-Using a novel deep eutectic solvent process developed at Louisiana Tech University to extract lignin from Louisiana Sugar Cane Bagasse and Louisiana Rice Husks for use in asphalt binder,
-Investigate suitable lignin mixing methods with asphalt binder,
-Investigate antiaging properties of asphalt binder with lignin,
-Evaluate partial asphalt binder replacement capacity of lignin,
-Evaluate asphalt binder grading improvement, if any, and antioxidant properties with replacement with lignin, and
-Evaluate thermal degradation and storage capability of lignin additives.

The following project tasks will be undertaken to accomplish the project objectives:
-Task 1: Selection of Materials and Scale-up of Lignin Processing,
-Task 2: Processing of Required Amounts of Lignin,
-Task 3: Binder Formulation,
-Task 4: Viscosity and Performance Grading Tests of Binders,
-Task 5: Fourier Transform Infrared Spectroscopy (FTIR-ATR) of Binders,
-Task 6: Evaluation of Thermal Degradation of Lignin Additives, and
-Task 7: Final Report Writing.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Initiate and complete all the project tasks listed in the Purpose and Scope section.

Title:	**Rapid, Safe Inspection of Water-Spanning Infrastructure via Amphibious Unmanned Aerial Vehicle**	**Project Status:**	**Proposed**
Funding Source:	**SPR: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000192**		Project Start Date:		7/1/2017
Research Project Number:	18-3TIRE		Completion Date	(original)	6/30/2018
Research Agency:	LTU		Completion Date	(revised)	
Principal Investigator:	Arden Moore				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$30,000		**Total**		**$29,941**
	(revised)					
Est. Expended to Date				Salaries		$18,920
FY 2016 - 2017 Budget				Equipment	(expendable)	$7,500
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		$450
Est. FY Expenditure				Other		$3,071

PURPOSE AND SCOPE

The primary objective of this research is to design, develop, deploy, and evaluate an amphibious unmanned aerial vehicle (UAV) system capable of shooting high-definition video and pictures from multiple viewpoints as part of infrastructure inspection activities for water-spanning infrastructure. The ability to operate from water as well as land makes the envisioned solution especially attractive to the State of Louisiana.

Secondary beneficial objectives include a) the publication and dissemination of findings related to this work for the wider benefit of transportation professionals including experimental data, proof-of-concept, and performance feedback, and b) the professional development of a supported graduate student towards advanced understanding of the specific challenges, priorities, and best practices associated with work in the field of transportation.

The project will be carried out in two phases and will involve five major tasks as listed below:]

Phase I – Realization of the Amphibious UAV Prototype:
-Task 1: Literature Review,
-Task 2: Engineering Design and Analysis, and
-Task 3: Fabrication and Systems Integration.

Phase II – Controlled Testing and Refinement:
-Task 4: Simple Flight Testing, and
-Task 5: Image Capture from Actual Infrastructure.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
Initiate and complete the project tasks listed in the Purpose and Scope Section.

Title:	**Improvement of Concrete Bridge Girder Serviceability through Strengthening with Near-Surface Mounted (NSM) Shape Memory Alloy Multi-strand Cables**	**Project Status:**	**Proposed**

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

SIO:	**DOTLT1000191**		Project Start Date:		7/1/2017
Research Project Number:	18-2TIRE		Completion Date	(original)	6/30/2018
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Jovan Tatar				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$30,000	**Total**		**$29,999**
	(revised)				
Est. Expended to Date			Salaries		$20,600
FY 2016 - 2017 Budget			Equipment	(expendable)	$4,800
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$4,599

PURPOSE AND SCOPE

The project will assess the ability of NiTi shape memory alloy multi-strand cables to accomplish post-tensioning in existing bridge girders without the conventionally experienced problems with anchorages, high material and construction costs, long lane closure times, etc. The project involves the following four tasks to accomplish the project objectives.
-Task 1 – Nitinol multi-strand Cable Mechanical Characterization,
-Task 2 – Construction and Pre-Loading of RC beams,
-Task 3 – Post-tensioning with Nitinol cables, and
-Task 4 – Strength Test.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate and complete the project tasks listed in the Purpose and Scope Section.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	Development of High Performance Impact Resistant Concrete Mixtures for Crash Barrier Application	Project Status:	Proposed
Funding Source:	SPR: TT-Fed/TT-Reg	Budget Category:	FHWA

SIO:	DOTLT1000190	Project Start Date:		7/1/2017
Research Project Number:	18-1TIRE	Completion Date	(original)	6/30/2018
Research Agency:	ULL	Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			Estimated 2017-2018 Budget		
Total Cost	(original)	$30,000	**Total**		**$29,920**
	(revised)				
Est. Expended to Date			Salaries		$16,000
FY 2016 - 2017 Budget			Equipment	(expendable)	$9,400
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$4,520

PURPOSE AND SCOPE

The overall goal of the proposed research is to improve the impact resistance and energy absorption capacity of concrete barriers via incorporating ECC technology. Ultimately, this research aims at reducing the fatalities and injuries of passengers during vehicle-barrier collisions and at the same time, reducing the maintenance cost of the crash barriers. Specifically, the following objectives will be achieved during this one-year project:

-Develop a ECC mixture with high energy absorption capacity and impact resistance using economical and locally accessible raw materials,
-Characterize mechanical properties of the ECC mixture under static and high rate loadings; evaluate the impact resistance and energy absorption capacity of the ECC mixture via direct impact testing, and
-Investigate the long-term impact resistance and energy absorption capacity of the ECC mixture under chloride environment and tropical weather.

The proposed research will serve as an exploratory work that lays a foundation for follow-up projects on development, testing, optimization, and implementation of ECC crash barriers.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Initiate and complete the project tasks outlined in the Purpose and Scope Section.

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		$78,400
FY 2016 - 2017 Budget		
FY Funds	(original)	$78,400
	(revised)	
Est. FY Expenditure		$78,400

Estimated 2017-2018 Budget		
Total		**$72,000**
Salaries		$42,000
Equipment	(expendable)	$1,466
Equipment	(non-expendable)	$4,100
Travel		$4,525
Other		$19,909

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 2016 - 2017 ACCOMPLISHMENTS

For Fiscal Year 2016-2017, the proposed activities include the following 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.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Develop measurement processes for the research categories, -Development and review of quantification measures for the benefit measures, -Development of guideline document, -Final report and guideline document, and -Presentation and training.

LTRC Annual Research Program
Fiscal Year 2017-2018

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 2017-2018 Budget		
Total Cost	(original)	$306,812	**Total**		**$90,500**
	(revised)	$506,812			
Est. Expended to Date		$232,543	Salaries		$90,500
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$91,423	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$91,423	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 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 2016 - 2017 ACCOMPLISHMENTS
-Task 1: Completed Literature Review, -Task 2: Identify Field Projects and Material Collection Collected mixtures from FHWA 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”, (Florida and Colorado), -Task 3: Conducted physical and chemical characterization of extracted binders from Federal Highway Administration (FHWA) mixtures as per experimental factorial. Completed conduct of Semi-circular bend test, Dissipated Creep Strain Energy, Beam Fatigue Test, Texas Overlay Test, Simplified Viscoelastic Continuum Damage fatigue test for the ten FHWA mixtures, and -Task 4: Performed preliminary data analysis and presented findings at ETG, TRB and AAPT meetings.
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Task 2: Continue identification of field projects and material collection from participating states, -Task 3: Perform laboratory experiment on mixtures collected from participation states as per test factorial, and -Task 4 – Perform preliminary data analysis and present findings at national meetings.

LTRC Annual Research Program
Fiscal Year 2017-2018

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 2017-2018 Budget		
Total Cost	(original)	$150,000		**Total**		**$10,000**
	(revised)	$300,000				
Est. Expended to Date		$200,000		Salaries		
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$10,000		Equipment	(non-expendable)	
	(revised)			Travel		$10,000
Est. FY Expenditure		$8,500		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 2016 - 2017 ACCOMPLISHMENTS

-Presented status of activities at the Annual Research Advisory Committee Meeting,
-Completed interim report and meeting, and
-Held interim report meeting in Atlanta in conjunction with the STC Annual Meeting June 2016.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Present status of activities at the Annual Research Advisory Committee Meeting, -Complete interim report and meeting, -Initiate RFP's, -Hold final report meeting, and -Plan and hold STC annual meeting for FY 2018.

FHWA

LTAP Funded Program

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000171**	Project Start Date:		1/1/2017
Research Project Number:	18-LTAP	Completion Date	(original)	12/31/2017
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Marie Walsh			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$673,940	**Total**		**$673,940**
	(revised)				
Est. Expended to Date			Salaries		$302,187
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		$23,313
Est. FY Expenditure			Other		$348,440

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 2016 - 2017 ACCOMPLISHMENTS

-Sponsored two Louisiana Parish Engineers and Supervisors Statewide technical conferences for over 150 attendees,
-Presented (3) Local Public Agency (LPA) Core Training Classes at agency request. 150 people attended with over 900 contact hours of training,
-Delivering one, three-day LPA Training Program to 150 people for 900 contact hours,
-Developed and delivered new equipment preventive maintenance training for Capital Region supervisors and equipment operators. 250 plus people trained,
-Completed update of Roads Scholar #3: Drainage: The Key to Roads That Last Class and presented it at 5 locations with 185 people in attendance for a total of 1,110 contact hours,
-Updated and presented Roads Scholar #8: Successful Supervision for Local Road Supervisors class and offered it statewide in 8 Locations,
-Conducted Roads Scholar #6b Preventive Maintenance of Heavy Equipment for Operators and Supervisors at 7 locations,
-Conducted thirty (30) sessions of Basics of Work Zone Safety plus Flagger Basics workshop to 750 attendees for a total of 2625 contact hours,
-Conducted three sessions of LTAP Roads Scholar 10: Unpaved and Gravel Roads, and
-Conducting four sessions of Chainsaw Safety: Precision Felling and Maintenance class for a total of 400 attendees with 2400 contact hours.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Deliver 8 sessions of new MUTCD and sign installation class, Roads Scholar #9: The Road to Better Signing, -Update LTAP Supervisory Skills Advanced Training class and offer statewide in 8 locations, -Work with LADOTD's Bridge Inspection and Bridge Maintenance sections to develop a class on revised software for bridge inspections to deliver statewide at 8 locations, -Update LTAP Roads Scholar #2: Asphalt Roads for delivery to eight locations Statewide, -Deliver an estimated thirty (30) sessions of Basics of Work Zone Safety plus Flagger Basics workshop at various locations statewide, -Develop a new Basics of Work Zone Safety/Basic Flagger Train-the-Trainer course for delivery at four locations statewide, -Conduct two, three-day LPA Training Program series, -Conduct three additional LPA Core Training classes statewide, -Sponsor two (Fall and Spring) LPESA Meetings including technical agenda, and -Participate in planning of National LTAP/TTAP Conference to be hosted in Louisiana in July, 2018.

FHWA

STP Funded
Technology Transfer &
Education Program

LTRC Annual Research Program
Fiscal Year 2017-2018

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 2017-2018 Budget		
Total Cost	(original)	$250,000	**Total**		**$93,790**
	(revised)				
Est. Expended to Date		$201,047	Salaries		$72,137
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$93,790	Equipment	(non-expendable)	
	(revised)		Travel		$1,500
Est. FY Expenditure		$62,871	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 2016 - 2017 ACCOMPLISHMENTS

-Began implementation of WFD plan,
-Designed and delivered a multi-component training curriculum on using the SHSP Data Dashboard,
-Developed outline and worked with national trainer to deliver three part communications training to SHSP stakeholders, and
-Investigated WFD pooled fund with Louisiana serving as lead state.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Move forward with WFD pooled fund, -Support LADOTD Highway Safety Section by developing matrix of training needs and competencies, and -Work on Louisiana specific Road Safety 101 course.

LTRC Annual Research Program
Fiscal Year 2017-2018

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)	6/30/2019
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$100,000
	(revised)	
Est. Expended to Date		$48,419
FY 2016 - 2017 Budget		
FY Funds	(original)	$10,000
	(revised)	
Est. FY Expenditure		$5,000

Estimated 2017-2018 Budget		
Total		**$10,000**
Salaries		
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		$10,000
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 2016 - 2017 ACCOMPLISHMENTS

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

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

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

LTRC Annual Research Program
Fiscal Year 2017-2018

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:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$353,904		**Total**		**$364,359**
	(revised)					
Est. Expended to Date				Salaries		$323,359
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$353,833		Equipment	(non-expendable)	$15,000
	(revised)			Travel		$6,000
Est. FY Expenditure		$353,833		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 2016 - 2017 ACCOMPLISHMENTS
-Publication chair for 2018 Louisiana Transportation Conference, -Sponsorship coordinator for 2018 Louisiana Transportation Conference, -Assisting in all 2018 Louisiana Transportation Conference committees, -Published 4 Tech Today Newsletters, -Published 2016 Annual Report, -Set up online registration for 17 NHI/other training, and 12 LTAP training classes, -Launched redesign of LTAP website, -Launched Safety Center web pages, -Photographed all LTRC events, -Maintained the LTRC Mobile App, -Maintained the LTRC website -Filmed and produced 9 LADOTD informational videos, -Filmed and produced 4 Transportation Talk videos featuring Secretary Wilson, -Edited 4 LADOTD videos, -Published 21 Project Capsules, -Published 14 Final Reports, -Published 1 Tech Assistance Reports, and -Published LTRC Research Manual (online only).
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Assist in development of all LTC 2017 publications, website, registration, e-commerce and mobile application, -Implement new online registration system, -Develop training for new online registration system, -Continue maintenance of LTRC, LTAP and Safety Center website, -Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports, -Publish 4 Tech Today newsletters, -Photograph all LTRC events, -Video all LTRC events, -Readily available for any special assistance requested from Secretary's office, and -7 videos currently in production.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000174**		Project Start Date:		7/1/2017
Research Project Number:	18-TTRF		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$100,000		**Total**		**$100,000**
	(revised)					
Est. Expended to Date				Salaries		
FY 2016 - 2017 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 and public works agencies through training, technical assistance, and information dissemination.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

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

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

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

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000179**		Project Start Date:		7/1/2017
Research Project Number:	18-PONTIS		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$125,000		**Total**		**$125,000**
	(revised)					
Est. Expended to Date				Salaries		
FY 2016 - 2017 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 2016 - 2017 ACCOMPLISHMENTS

AASHTO PONTIS Agreement.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

AASHTO PONTIS Agreement.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000175**	Project Start Date:		7/1/2017
Research Project Number:	18-COOP	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$200,000
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$200,000**
Salaries		$200,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
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 2016 - 2017 ACCOMPLISHMENTS

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

FISCAL YEAR 2017-2018 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 2017-2018

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

SIO:	**DOTLT1000173**	Project Start Date:		7/1/2017
Research Project Number:	18-2TT	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$147,000
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$147,000**
Salaries		$147,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

PURPOSE AND SCOPE

To pay salaries for undergraduate students employed to provide support in fulfilling necessary job tasks on various Louisiana Transportation Research Center (LTRC) projects.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

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

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

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

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000172**		Project Start Date:		7/1/2017
Research Project Number:	18-1WDC		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$3,080,571		**Total**		**$3,080,571**
	(revised)					
Est. Expended to Date				Salaries		$1,215,571
FY 2016 - 2017 Budget				Equipment	(expendable)	$157,000
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		$35,000
Est. FY Expenditure				Other		$1,673,000

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, and 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.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS
-Instructed over 340 classes with over 4,900 students, -15 students participated in the CO-OP Program at various LADOTD sections throughout Louisiana, -Hosted end-of-the semester presentations and teleconferenced in outlying students. Increased participation in attending these presentations by advertising department wide, -6 full-time employees hired into the ERDP and rotated through various LADOTD sections throughout Louisiana, -7 ERDP employees successfully hired into LADOTD sections or districts: Road Design (2), Bridge Maintenance and Facilities Maintenance (1), ITS (1), Traffic Engineering Maintenance (1), and D02 Traffic Operations (1), -3 ERDP employees are still in rotation, -Member of TRB Committee ABG40, -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, -Member of TRB, TRT Subcommittee, -Secretary of SLA Transportation division, -Member of ETKN, -Member of AASHTO RAC TKN TF, -Continued course development for the following topics: Contract Negotiations; Critical Conversations; and Being a Change Agent, -FHWA Grant awarded in the amount of: $60,981. Implementation and evaluation of TRAC and RIDES Programs in Schools in the State of Louisiana. Federally funded grant. 8/1/2016-12/31/2016, -Developing training videos for the leadership development institute, -Installed New digital system in Classroom 175 including New Projector, 2 TV's, Crestron Control system, Crestron 16x16 switcher, Crestron DVP-HD for streaming video, new mounts, and cables, -Installed New digital system in Classroom 160 including New Projector, 2 TV's, Crestron Control system, Crestron 16x16 switcher, Crestron DVP-HD for streaming video, new mounts, and cables, -Upgraded Projector in Auditorium to higher lumen solution. Modified programming to accommodate new projector including New Projector, 2 TV's, Crestron Control system, Crestron 16x16 switcher, Crestron DVP-HD for streaming video, new mounts, and cables, -Upgraded Room 101 to all digital format including New Projector, Crestron Control system, Crestron 16x16 switcher, Crestron DVP-HD for streaming video, new mounts and cables, -Attended Crestron 101 training, -Conducted the 2016 5-Day National Transportation Training Directors conference in Providence, Rhode Island for approximately 65 participants and 10 vendors, -NEGOTIATION IN PROGRESS –Secure contract for meeting space for the 2018 Louisiana Transportation Conference – February 2018 – Raising Canes River Center -Baton Rouge, LA – Approximately 1,350 participants and 80 vendors, -NEGOTIATION IN PROGRESS - Secure contract for overnight hotel accommodations for the 2018 Louisiana Transportation Conference – February 2018 – Location(s) TBD – Approximately 900 Room Nights, -Transportation Safety Summit (LA DOTD Highway Safety) - November 2017 – Baton Rouge, LA – Crowne Plaza Baton Rouge – Sent our RFP and negotiated hotel for meeting space, overnight rooms, food/beverage, etc. – Approximately 350 people, -2018 National LTAP/TTAP Association 2018 Annual Conference (LTAP) – July 2018 – New Orleans, LA – Hotel Monteleone – Sent RFP, negotiated hotel meeting space, overnight rooms, food/beverages, etc. – Approximately 150 people, -Added 227 items to the LTRC Library online catalog, -2015 – 2017 Louisiana Chapter of SGMP Board of Directors – Secretary, -2015 – 2017 Louisiana Chapter of SGMP Board Officers – Secretary and President, and -Hired four new students workers,

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Continued additions of library materials into the online catalog, -Conduct 5-Day National Transportation Training Directors conference in Clear Point, Alabama 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 contract for meeting space and overnight hotel accommodations for the 2020 Louisiana Transportation Conference – March 2020 – Location TBD – Approximately 1,350 participants and 80 vendors, -2017 – 2019 Louisiana Chapter of SGMP Board of Directors 1st Vice President, -Place approximately 20 students in the CO-OP Program in various LADOTD sections across the state, -Hire approximately 5 employees to participate in the ERDP, -Upgrade Room 100 (Auditorium) to all digital format to match other classrooms. (Scheduled May 2017), -TRAC and RIDES June Workshop- Registered: TRAC- 9; RIDES-1, and -Host 2018 Louisiana Transportation Conference at the Raising Cane's River Center.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000170**	Project Start Date:		7/1/2017
Research Project Number:	18-1WD	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$1,056,217
	(revised)	
Est. Expended to Date		
FY 2016 - 2017 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2017-2018 Budget		
Total		**$1,056,217**
Salaries		$1,036,217
Equipment	(expendable)	$10,000
Equipment	(non-expendable)	
Travel		$10,000
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 (LTRC's) transportation outreach program.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

-Revised PPM No. 59 – Workforce Development,
-Implemented Revised Location and Design Advanced Math – Geometry manual,
-Implemented 3 Quality Assurance Manuals,
-Implemented Budgeting for Managers,
-Revised Construction Specialty Area and re-certification tests and put into web-based testing platform,
-Completed first training newsletter,
-Implemented Maintenance Planning Manual training,
-Taught 2 Highway Plan Reading classes and 1 Project Management class,
-Taught 2 Superpave Mix Design and Analysis classes,
-Subscribed employees to the correct structured training programs, and
-Awarded 115 construction certifications and 325 re-certifications.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continue to meet with principal customers to prioritize needs 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 2017-2018

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

SIO:	**DOTLT1000178**		Project Start Date:		7/1/2017
Research Project Number:	18-1TT		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$37,500		**Total**		**$37,500**
	(revised)					
Est. Expended to Date				Salaries		
FY 2016 - 2017 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 2016 - 2017 ACCOMPLISHMENTS

Participation from two universities: Louisiana Tech (1 project) and the University of Louisiana at Lafayette (1 project).

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Continue to provide support for senior project engineering courses.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000176**		Project Start Date:		7/1/2017
Research Project Number:	18-1TSQ		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$538,643		**Total**		**$538,643**
	(revised)					
Est. Expended to Date				Salaries		$538,643
FY 2016 - 2017 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,
-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 2016 - 2017 ACCOMPLISHMENTS
-Publication chair for 2018 Transportation Conference, -Sponsorship coordinator for 2018 Transportation Conference, -Assisting in all 2018 Transportation Conference committees, -Published 4 Tech Today Newsletters, -Published 2016 Annual Report, -Set up online registration for 17 NHI/other training, and 12 LTAP training classes, -Launched redesign of LTAP website, -Launched Safety Center web pages, -Photographed all LTRC events, -Maintained the LTRC Mobile App, -Maintained the LTRC website, -Filmed and produced 9 LADOTD informational videos, -Filmed and produced 4 Transportation Talk videos featuring Secretary Wilson, -Edited 4 LADOTD videos, -Published 21 Project Capsules, -Published 14 Final Reports, -Published 1 Tech Assistance Reports, and -Published LTRC Research Manual (online only).
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Assist in development of all LTC 2017 publications, website, registration, e-commerce and mobile application, -Implement new online registration system, -Develop training for new online registration system, -Continue maintenance of LTRC, LTAP and Safety Center website, -Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports, -Publish 4 Tech Today newsletters, -Photograph all LTRC events, -Video all LTRC events, -Readily available for any special assistance requested from Secretary's office, and -7 videos currently in production.

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000180**		Project Start Date:		7/1/2017
Research Project Number:	18-1SWD		Completion Date	(original)	6/30/2018
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$1,520,000		**Total**		**$1,520,000**
	(revised)					
Est. Expended to Date				Salaries		$1,520,000
FY 2016 - 2017 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 (LA DOTD) personnel by non-LTRC employees. This project will not be utilized by LTRC's Section 19 or 33.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Course development and delivery of LPA training;
-LA DOTD employee structured training;
-Human Resources training, maintenance related training; and
-Meeting involvement related to LA DOTD's Transportation Training Curriculum Council.

Self-Generated Funded Research Program

CONTINUING RESEARCH

LTRC Annual Research Program
Fiscal Year 2017-2018

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)	7/31/2017
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$186,407
	(revised)	
Est. Expended to Date		$167,907
FY 2016 - 2017 Budget		
FY Funds	(original)	$41,000
	(revised)	
Est. FY Expenditure		$41,000

Estimated 2017-2018 Budget		
Total		**$18,500**
Salaries		$18,500
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		
Other		

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 2016 - 2017 ACCOMPLISHMENTS

-Completed Task 2: conduct of the approved experimental plan of Task 1,
-Completed Task 3: Monitor field performance, and
-Preparing Draft Final Report.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Complete final report.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Field Monitoring and Measurements Education: A Model for Civil and Environmental Engineering**	**Project Status:**	**Ongoing**
Funding Source:	**NSF**	**Budget Category:**	**Self-Generated**

SIO:	**DOTLT1000101**	Project Start Date:		2/15/2016
Research Project Number:	16-2ST	Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	8/14/2019
Principal Investigator:	Vijaya Gopu			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$337,312
	(revised)	
Est. Expended to Date		$60,000
FY 2016 - 2017 Budget		
FY Funds	(original)	$60,000
	(revised)	
Est. FY Expenditure		$60,000

Estimated 2017-2018 Budget		
Total		**$100,000**
Salaries		$30,000
Equipment	(expendable)	
Equipment	(non-expendable)	
Travel		$5,000
Other		$65,000

PURPOSE AND SCOPE

The goal of this project is to develop a model instructional program, using Structural Engineering and structural Health Monitoring as a test bed, that can be used to educate civil and environmental engineering students in the fundamental principles and technology of field monitoring and measurements (FMM) and to utilize monitoring technology and FMM data to evaluate performance and behavior, analyze problems and design CEE systems. This goal will be achieved by: (1) developing and implementing a modular-based transportable Structural Engineering FMM Instructional Unit for CEE students in a manner that enhances the students' achievement of the traditional expected learning outcomes for the two affected courses and (2) developing a community of scholars that has an interest in and will contribute to the further development of FMM instructional materials.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

The following tasks were accomplished in Fiscal Year 2016-2017:
-Five foundational education modules were developed. ELearning and PowerPoint versions of three of the five modules were developed to assist the students. The remaining two modules were made available as PowerPoint files,
-Two structural engineering education modules were developed. These modules were made available as PowerPoint files,
-Mastery exams and discussion questions were developed for all the modules. All the modules were presented in analysis courses at LSU and UL-Lafayette by the project investigators. Student feedback was sought through an online survey. The investigators conducted an advisory panel meeting and presented the results of their effort at a TRB technical committee meeting.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
The following tasks will be undertaken in 2017-18: -Two structuring engineering assignment modules will be developed, -A test specimen to demonstrate the deployment of sensors will be prepared, -A workshop for faculty members at collaborating universities will be held to present the modules developed and train the faculty in the use of the equipment being made available for classroom use, and -Hold an advisory board meeting to update on the project progress and carry out an evaluation and assessment of the project tasks.

Self-Generated Funded Research Program

PROPOSED RESEARCH

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Investigation of Tack Coat Materials on Tracking Performance**	**Project Status:**	**Proposed**
Funding Source:	**Wisconsin Dot**	**Budget Category:**	**Self-Generated**

SIO:		Project Start Date:		7/1/2017
Research Project Number:		Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2016 - 2017 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 perform a critical evaluation of the materials and application methods used in Wisconsin for tack coats in order to provide recommendations that make tack coat usage more efficient and effective. Three tack coat materials (slow setting, conventional rapid setting, and non-tracking rapid setting) and four pavement surfaces (asphalt pavement: existing, new, milled and PCC) will be selected. The application rates recommended from NCHRP project 9-40 will be sprayed. Rheological tests, tracking test, and interface shear strength tests will be conducted to ascertain the effectiveness of tack cot materials considered.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Task 1: Conduct literature review,
-Task 2: Develop experimental work plan, and
-Task 3: Execute approved experimental work plan.

Other DOTD Funded Projects

CONTINUING RESEARCH

Title:	**Louisiana Traffic Records Management System Support**	**Project Status:**	**Ongoing**
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000151**		Project Start Date:		10/1/2016
Research Project Number:	17-2SS		Completion Date	(original)	9/30/2019
Research Agency:	Highway Safety Research Group		Completion Date	(revised)	
Principal Investigator:	Helmut Schneider				

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$8,291,932	**Total**		**$2,750,000**
	(revised)				
Est. Expended to Date		$1,200,000	Salaries		$2,500,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$2,232,000	Equipment	(non-expendable)	$95,000
	(revised)		Travel		$65,000
Est. FY Expenditure		$2,000,000	Other		$90,000

PURPOSE AND SCOPE

This project will support the efforts to establish and maintain an effective information system that integrates all data relating to highway safety such as crash data, road inventory, COBRA data, traffic citation conviction data, driver's license history files, etc. The scope of the work includes timely collection of crash data, QA of crash information, maintaining LSU's crash database, facilitating integration of crash data with other safety data, problem identification, dissemination of information to stakeholders and the public, and Technical Assistance.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

All tasks were work on continuously during the FY and written monthly progress reports were submitted to Louisiana Department of Transportation and Development (LADOTD) and the Louisiana Transportation Research Center (LTRC).
-Task 1: Literature Review,
-Task 2: Data Collection,
-Task 3: Interim report (monthly),
-Task 4: Data Analysis, and
-Task 5 Final Report (Annual).

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

-Continued Work on all tasks.

Title:	**Economic Evaluation of Applicants to the Port Construction and Development Priority Program**	**Project Status:**	**Ongoing**
Funding Source:	**Port Priority Program**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000148**		Project Start Date:		7/1/2016
Research Project Number:	17-1SS		Completion Date	(original)	12/31/2017
Research Agency:	LSU		Completion Date	(revised)	6/30/2018
Principal Investigator:	James Richardson				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$83,732		**Total**		**$43,732**
	(revised)					
Est. Expended to Date		$35,000		Salaries		$43,732
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$40,000		Equipment	(non-expendable)	
	(revised)			Travel		
Est. FY Expenditure		$35,000		Other		

PURPOSE AND SCOPE

The main objective of this project is to perform research and analysis of the Port Priority Program applications to ensure the State is receiving the required minimum rate of return on the State's investment.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

Analyzed 5 applications (through April 2017).

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Analyze applications as they are submitted to the Louisiana Department of Transportation and Development (LADOTD). The next submittal period closes June 1, 2016.

LTRC Annual Research Program
Fiscal Year 2017-2018

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 2017-2018 Budget		
Total Cost	(original)	$1,263,287		**Total**		**$513,378**
	(revised)					
Est. Expended to Date		$641,221		Salaries		$274,040
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$793,509		Equipment	(non-expendable)	
	(revised)			Travel		$22,000
Est. FY Expenditure		$209,184		Other		$217,338

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 2016 - 2017 ACCOMPLISHMENTS

-Facilitated safety PRC meetings, started four safety projects from 2015 RPIC list,
-Used Constant Contact and Go-To Meetings to collaborate and disseminate information and resources to stakeholders,
-Designed and delivered a multi-component training curriculum on using the SHSP Data Dashboard,
-Developed outline and worked with national trainer to deliver three part communications training to SHSP stakeholders,
-Investigated WFD pooled fund with LA serving as lead state,
-Managed SHSP Communications Coordinating Council (facilitated conference calls and meetings, developed consolidated safety calendar, assisted with development and distribution of three safety PSA campaigns), and
-Attended statewide and regional SHSP meetings.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Manage ongoing research projects and start project from 2017 RPIC process, -Move forward with WFD pooled fund, -Support LADOTD Highway Safety Section by developing matrix of training needs and competencies, -Work on LA specific Road Safety 101 course, -Continue supporting LADOTD Highway Safety Section and regional coordinators in implementation of SHSP, and -Support the LADOTD Transportation Safety Summit and Transportation Conference.

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)	9/30/2017
Principal Investigator:	Joshua Kent				

BUDGET STATUS

Total Budget				**Estimated 2017-2018 Budget**		
Total Cost	(original)	$350,785		**Total**		**$14,696**
	(revised)	$474,380				
Est. Expended to Date				Salaries		$7,047
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)	$4,000		Equipment	(non-expendable)	$7,650
	(revised)			Travel		
Est. FY Expenditure		$4,000		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 2016 - 2017 ACCOMPLISHMENTS

All 5 CORS stations are active and running; and providing reports.

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

Finalize Report and possibly continue monitoring.

Other DOTD Funded Projects

PROPOSED RESEARCH

LTRC Annual Research Program
Fiscal Year 2017-2018

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

SIO:	**DOTLT1000177**		Project Start Date:		1/1/2017
Research Project Number:	17-LRSP		Completion Date	(original)	12/31/2017
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Marie Walsh				

BUDGET STATUS

Total Budget				Estimated 2017-2018 Budget		
Total Cost	(original)	$361,465		**Total**		**$361,465**
	(revised)					
Est. Expended to Date				Salaries		$233,317
FY 2016 - 2017 Budget				Equipment	(expendable)	
FY Funds	(original)			Equipment	(non-expendable)	
	(revised)			Travel		$8,687
Est. FY Expenditure				Other		$119,461

PURPOSE AND SCOPE

To work in cooperation with the 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 2016 - 2017 ACCOMPLISHMENTS
-LRSP 2016-17 Projects - Received, processed, and recommended 4 projects (St. Tammany, Vermilion, Evangeline (2) for further development. There are 65 additional Projects with LADOTD H Numbers at later stages in project management at HQ (as of March 28, 2017), -Road Safety 365 Workshops were developed and held around the State in 10 locations. Of the 234 persons who attended, 185 attendees represented Local agencies, 1 from tribal, 34 State, 10 consultant entities, and 4 represented FHWA, for a total of 1,404 contact hours, -Parish Level Crash Data Network Screenings have been completed and disseminated for all Louisiana's Parishes. These included high PSI locations identified for each parish. Also, from these network screenings Parish Local Road Safety Profiles have been created, distributed and explained to Louisiana's top 21 priority parishes during the Crash Data Workshop process, -Crash Data Workshops were held at ten locations around the State. Of the 180 persons who attended, 102 attendees represented Local agencies, 61 attendees were from State entities, 11 represented consultants, and 6 attendees represented FHWA, for a total of 540 contact hours. These Crash Data Workshops incorporated FHWA and LADOTD approved networking screening process to identify potential local road project locations and prioritize funding, teaching local jurisdictions and Safety Coalition leaders an approved methodology that can be used to conduct their own analyses. As a result, 27 attendees have requested and been granted new access to the LADOTD crash database, -Local Road Safety Plans assisted jurisdictions to develop individual Local Road Safety Programs and Plans, with 5 approved and on file to date, 4 from Top 20 priority parishes and one from a non-top 20 parish with projects, -Hired full time Local Road Safety Program Manager in November, 2016, -Coordinated with LADOTD Highway Safety Section to improve evaluation and rating criteria, and to standardize LRSP project selection process with LADOTD's data driven HSIP project selection process. Edited the LRSP application and guidelines to reflect the updated selection processes, and -Continued development and implementation of the LRSP Outreach Plan that promotes the program at major conferences/summits/meetings (LMA, Smart Growth, PJAL, LPESA meetings).
FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES
-Safety Coalition and Regional Planning Commission/MPO Coordination- Determine needs and establish goals for continued involvement in the planning process, -Conduct Follow-up Data Workshop meetings with safety coalitions and local agencies and provide assistance in developing local safety plans and LRSP applications. Complete local road safety plan development for at least 10 of the top 20 priority parishes, -Continue participation with LADOTD in development of process to disseminate Fugro data to local entities and to incorporate safety data into GIS databases where possible, -Coordinate with LADOTD safety section on utilization of their networking screening process to identify potential local road project locations and to prioritize funding, -Traffic volume data – Implement results of research project to check accuracy of cell phone based traffic count data, and -Investigate use of consultants to develop safety plans/projects for largest urban areas.

LTRC Annual Research Program
Fiscal Year 2017-2018

Title:	**Assessing the Economic Impacts of J-turns in Louisiana**	**Project Status:**	**Proposed**
Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:		Project Start Date:		7/3/2017
Research Project Number:	18-1SA	Completion Date	(original)	12/31/2018
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Helmut Schneider			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$150,000	**Total**		**$100,000**
	(revised)				
Est. Expended to Date			Salaries		$100,000
FY 2016 - 2017 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 assess the economic effects of J-turn installations on businesses located along those corridors. In particular, it will evaluate the impact on businesses' sales along the treatment corridors before and after the installation of the J-turns.

FISCAL YEAR 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 PROPOSED ACTIVITIES

To be determined based on the research proposal.

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:		1/1/2018
Research Project Number:		Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Julius Codjoe			

BUDGET STATUS

Total Budget			**Estimated 2017-2018 Budget**		
Total Cost	(original)	$100,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2016 - 2017 Budget			Equipment	(expendable)	
FY Funds	(original)	$50,000	Equipment	(non-expendable)	
	(revised)		Travel		
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 2016 - 2017 ACCOMPLISHMENTS

N/A

FISCAL YEAR 2017-2018 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 2017-2018

2017 RPIC STATEMENTS

FINAL RANKING	PROBLEM STATEMENT TITLE
1	Development of Rating Strategies of Existing “off-system” Bridges
2	Timber Piling Rehabilitation and Repair
3	LADOTD Plan Development Consultant Contract Process Review
4	Load Rating of Existing Continuous Stringers on Louisiana’s Bridges
5	Pedestrian Crossings for High Speed Urban Arterials
6	Implementation of Roller Compacted Concrete by LADOTD
7	Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors
8	Determine Louisiana's Roundabout Capacity
9	Retaining Wall Inventory - Geotechnical Asset Managment
10	Maintenance of Roadway Edge Drop-off Utilizing Readily Available Materials
11	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach
12	Assessing the Economic Benefits of the Transportation Infrastructure Model for Economic Development (TIMED) Program
13	Development, Implementation and Structural Health Monitoring of a Protection System for Exterior Bridge Girders prone to Over-height Vehicle Collisons
14	Performance and Cost-Effectiveness of Preventive Maintenance Treatments and Implementation into PMS
15	Young Driver Crashes in Louisiana: Understanding the Contributing Factors to Decrease the Numbers
16	Infrastructure Funding for New Industrial and Expansion Projects is Inadequate
17	Comprehensive State of the Practice for Managing Sedimentation in Navigable Waterways
18	Influence of Internal Curing on Measured Resistivity
19	Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation
20	Benefit Cost Analysis of Roadway Striping in Louisiana
21	Strength Assessment of Heat-Straightened Steel Girders
22	Intersection on Horizontal Curves: Problems and Potential Solutions
23	Reduce Pedestrian Fatal Crashes in Louisiana by Improving Lighting Conditions
24	Predicting, Monitoring, and Rehabilitating Highway Embankment Slopes
25	Lacking a Cost-Effective Mobile Flood Monitoring System that Records Real-Time Off-Stream Hydrographs During Severe Floods
26	The Last Mile: Port Access in a Redeveloping New Orleans
27	Field Evaluation of Existing Concrete Overlays
28	Permitted/Protected versus Protected Left Turns
29	Assessment of Long-Term Performance of Louisiana Asphalt Pavements
30	Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.
31	Sustainable Soil-Geopolymer Road Base/Subbase
32	Identifying, Prioritizing and Managing the Largest Risks to the Louisiana DOTD’s Mission
33	Mitigating Pavement Reflective Cracking using a Ductile Fiber Reinforced Concrete Interlayer
34	Visualization and Analyzation of Big Data
35	Competing with other Transportation Modes for State (and Local) Funding

LTRC Annual Research Program

Fiscal Year 2017-2018

2017 RPIC STATEMENTS

FINAL RANKING	PROBLEM STATEMENT TITLE
36	Development of a Design Method for Determining the Optimum Water Content (OWC) and the Optimum Temperature Reduction (OTR) in Foamed WMA
37	Highway Litter Project
38	Implementing Stakeholder-Driven Freight Transportation Policy in the Gulf Coast Megaregion
39	Evaluation of Proposed Modifications to the Hamburg Wheel-Track test equipment and their impacts on Test Results and Acceptance Criteria
40	Performance Evaluation of Currently Approved "Green Products" as Cost Effective Alternatives to Naturally Occurring Stones for the Construction of Roadway Elements Structural Elements