



COVER

Louisiana Transportation Research Center
Annual Report 2021-2022



Shawn Wilson, Ph.D.
DOTD Secretary



William F. Tate IV, Ph.D.
LSU President

The Louisiana Transportation Research Center (LTRC) is a research, technology transfer, and training center administered jointly by the Louisiana Department of Transportation and Development (DOTD) and Louisiana State University (LSU). LTRC provides a setting in which the thresholds of technology can be explored and applied in practical ways. By merging the resources of DOTD and LSU, a versatile core of facilities and expertise addresses the rapidly evolving challenges in the transportation field.

In addition to its affiliation with LSU, LTRC participates fully with other universities in Louisiana that house engineering programs: Louisiana Tech University, McNeese State University, Southern University, Tulane University, University of Louisiana at Lafayette, and University of New Orleans. By combining their resources with those of DOTD, the center eliminates duplication of effort and provides a broader base of support. The center also provides an avenue for multi-disciplinary support from universities to meet the practical and academic needs of the transportation industry in such areas as engineering, law, business and management, basic sciences,

planning, environmental studies, safety, ITS, and technology transfer.

Since its creation by the Louisiana legislature in 1986, LTRC has gained national recognition through its efforts to improve transportation systems in Louisiana. The center conducts short- and long-term research while providing technical assistance, training, continuing education, technology transfer, and problem-solving services to DOTD and the transportation community at large. The center is largely supported through funding authorized by DOTD and the Federal Highway Administration (FHWA).

The LTRC Foundation, a non-profit organization, enhances the center as the focus for transportation-related research, technology transfer, and education in Louisiana. The foundation provides an excellent partnership opportunity for DOTD, state universities, and the private sector.

In these and other ways, LTRC is paving the way for more efficient and beneficial research and training, thanks to a combination of modern techniques, locally available resources, and a wide pool of support.

LTRC



Facilities



Director's Message



Research



Workforce Development



LTAP



Professional Memberships



Staff

Facilities



Located on the LSU campus in Baton Rouge, LTRC provides researchers and students access to excellent laboratories and state-of-the-art research equipment.

The full resources of LSU as a Carnegie Designated Doctoral/Research Extensive Institution are also available. The unique position of LTRC provides access to virtually all of DOTD and LSU's resources to pursue the center's mission.

LTRC houses more than 90 employees and up to 30 students in two adjacent facilities. The LTRC Administration building is a 25,300-square-foot facility that includes five research laboratories, a conference room, and offices. The laboratories are used to conduct advanced research into asphalt, concrete, soils, pavements, and ITS topics. The 14,000-square-foot Transportation Training and Education Center (TTEC) houses a lecture hall, computer-based training classroom, two general classrooms, and conference room that are all equipped with advanced education and training equipment and distance learning/video-conferencing capabilities. A comprehensive transportation library office is also included.

TTEC greatly enhances LTRC's mission by facilitating the delivery of training, professional development opportunities, and technology transfer to engineers, technicians, undergraduate and graduate students, and professionals from both the public and private domains.

LTRC has identified research areas of strategic importance and has developed expanded capabilities for concentration in several areas: the Engineering Materials Characterization Research Facility (EMCRF), a laboratory facility specializing in fundamental materials characterization; the Geotechnical Engineering Research Laboratory (GERL), a laboratory focusing on transportation earthworks, structural foundations, and geosynthetics; and the Intelligent Transportation Systems (ITS) lab, designed to evaluate traffic data collected from Louisiana's traffic management centers. Although remote from the center, the Louisiana Pavement Research Facility is an important facility that streamlines pavement loading research by compressing years of road wear into months of testing. The six-acre facility is located on the west side of the Mississippi River and incorporates an Accelerated Loading Facility (ALF™) for testing flexible pavements and the ATLaS30 for testing rigid pavements.

LTRC is a budget division of the Louisiana Department of Transportation and Development. Funding is a combination of State Planning and Research (Part B, Federal), Innovative Bridge Research and Deployment (Federal), Surface Transportation Program (STP-Federal), and external contracts and grants, such as the National Cooperative Highway Research Program, Federal Agency Grants, and the National Science Foundation.



Director's Message



It is with great pleasure that I present the 2021-2022 LTRC annual report. Inside this report, you will find featured articles on the research program, technology transfer and training, and technology transfer activities.

In addition, you will find completed and active research projects, training accomplishments, and support of higher education, publications, and presentations.

LTRC continues its committed support of higher education and solving Louisiana's transportation problems. In this reporting period, LTRC supported 44 undergraduate and graduate students through research projects. LTRC also completed 15 research projects and continues work on 49 active research projects. LTRC research projects were associated with 6 theses or dissertations during fiscal year 2021-2022. In addition, LTRC staff and contract researchers published 44 journal articles and completed 54 presentations.

In March of this fiscal year, Louisiana hosted the 2022 Louisiana Transportation Conference (LTC) in a virtual format. The 2022 LTC virtual conference was held over 2 days with 800 participants, which included 16 sessions and 49 speakers. The theme of the conference was "Reshaping Transportation in Louisiana." DOTD Secretary Shawn Wilson, Ph.D., provided an opening address and highlighted DOTD's centennial, funding methods, and major projects in the capital region. In addition, Dr. Wilson's address included a live conversation with other industry leaders about state-of-the-art electronic systems, such as electric vehicles (EV).

LTRC's "Accelerated Load Testing of Geosynthetic Base Reinforced/Stabilized Unpaved Pavement Test Sections" project (LTRC Report 603) received an American Association of State Highway and Officials (AASHTO) High Value Research Award (formerly called the Research "Sweet 16") in 2022. Typically, Louisiana stabilizes or treats the upper bounds of the subgrade with cement or lime due to Louisiana roads being built over weak subgrade soils. However, under certain conditions an alternative solution is necessary, such as the use of geosynthetics. This project evaluated the benefits of using geosynthetic materials to reinforce/stabilize base course aggregate layers and/or stabilize weak subgrade soils. In addition, the benefits were quantified within the framework of the 1993 AASHTO pavement design guide and the AASHTO Pavement M-E design.

Additional highlights shown in the 2021-2022 LTRC annual report are as follows:

- Workforce Development completed 29 web-based training courses and has 8 on-going projects and 21 new courses being developed. In addition, 47 presentations/classes were given.
- The External Training Program impacted almost 7,500 individuals (departmental, state, local, and transportation community partners) through over 300 programmatic initiatives.
- The Louisiana Local Technical Assistance Program (LTAP) impacted over 2,300 individuals through various in-person and virtual training platforms, which included 86 classes (67 in-person and 19 virtual), this program year. In addition, LTAP hosted 2 conferences and 7 virtual showcases and gave 17 presentations at national and statewide conference meetings. LTAP provided almost 11,000 hours of in-person training as well as over 1,000 hours of virtual training to our departmental, state, and local transportation community partners.

In the area of Technology Transfer, LTRC published 11 final reports and technical summaries, 6 project capsules, 1 technical assistance report, 1 annual report, and 4 Technology Today newsletters. In addition, LTRC filmed and produced 21 DOTD informational videos, 38 various training and informational videos, and completed post-production of 35 virtual Zoom presentations for the 2022 LTC.

I encourage you to follow LTRC's latest news via our website, www.ltrc.lsu.edu, and through social media channels.

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

Research



The LTRC research program emphasizes applied research and technology transfer to further knowledge in the field of transportation and to solve transportation problems encountered by DOTD and the general transportation community. Input for research programs is solicited from state and local government, universities, and private industry. Click on the project titles below to view the related publication online (if available).

COMPLETED RESEARCH

Bituminous

18-5B: Evaluation of Asphalt Rubber and Reclaimed Tire Rubber in Chip Seal Applications
Mostafa Elseifi, LSU

20-2B: Feasibility and Performance of Low Volume Roadway Mixture Design
Corey Mayeux, LTRC

Geotechnical

18-4GT: Geotechnical Asset Management for Louisiana through Dynamic Shear Rheometer
Gavin Gautreau, LTRC

19-2GT: Quality Control/Assurance on Base Course and Embankment with the Dynamic Cone Penetrometer
Nick Ferguson, LTRC

20-4GT: Feasibility Study on Geophysical Methods to Estimate Geotechnical Properties in Louisiana
Nick Ferguson, LTRC

20-1GT: Literature Search on Use of Flexible Pipes in Highway Engineering for DOTD's Needs
Navid Jafari, LSU

Safety

19-2SA: Reduce Pedestrian Fatal Crashes in Louisiana by Improving Lighting Conditions
Raju Thapa, LTRC

Pavement

16-6P: Quality Management of Cracking Distress Survey in Flexible Pavements Using LTRC Digital Highway Data Vehicle
Zhong Wu, LTRC

18-4P: Cost-Effective Detection and Repair of Moisture Damage in Pavements
Mostafa Elseifi, LSU

19-1P: Application of Mechanistic-Empirical Pavement Design Approach into RCC Pavement Thickness Design
Zhong Wu, LTRC

Special Studies

10-6SS: Establishing an Intelligent Transportation Systems (ITS) Lab at LTRC (Phase II)
Julius Codjoe, LTRC

21-1SS: The Impact of the Louisiana Grade Crossings: A Synthesis and System Analysis
Guang Tian, UNO

21-5SS: Determining the True Cost and Benefit for Collecting and Maintaining Non-Road and Non-Bridge Asset Data
Ruijie "Rebecca" Bian, LTRC

21-4SS: Develop and Evaluate Performance Measures for Intelligent Transportation Systems (ITS) in Louisiana
Raju Thapa, LTRC

Structures

16-1ST: Retrofit of Existing Statewide Louisiana Safety Walk Bridge Barrier Railing Systems
William Williams, Texas A&M (TTI)

During fiscal year 2021-22, 44 students (undergraduate and graduate) were supported by LTRC research projects. LTRC staff and contract researchers published 44 journal articles and completed 54 presentations (primarily virtual). LTRC research projects were associated with 6 dissertations or theses. Click on the icon to view a listing of items, or visit www.ltrc.lsu.edu/pdf/21_22.pdf.



Follow LTRC social media channels to receive updates on new and completed research projects.



ACTIVE RESEARCH

Bituminous

17-4B: Development of a 4.75-mm Asphalt Mixture Design

Saman Salari, LTRC

20-4B: Low and Intermediate Temperature Evaluation of Binders through Dynamic Shear Rheometer-Support Study

Nazimuddin Wasiuddin, LTU

20-3B: Low and Intermediate Temperature Evaluation of Binders through Dynamic Shear Rheometer

Saman Salari, LTRC

20-1B: Evaluate Performance and Life Cycle Cost of Asphalt (8/18 Specifications)

Corey Mayeux, LTRC

21-6B: A New Generation of Porous Asphalt Pavement - OGFC Support Study

Mostafa Elseifi, LSU

21-5B: Improvement of Open-Graded Friction Course (OGFC) Performance and Durability through Materials, Design, and Maintenance

Corey Mayeux, LTRC

21-4B: Development of a Standard Practice for the Design of Durable Open-Graded Friction Course (OGFC) Mixtures with Epoxy Asphalt-Support Study

Louay Mohammad, LTRC

21-3B: Use of an Innovative Recycling Agent for Improving the Sustainability and Durability of Asphalt Pavements

Louay Mohammad, LTRC

21-1B: Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature

Louay Mohammad, LTRC

19-4B: Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures

Louay Mohammad, LTRC

19-2B: Development of a Moisture Sensitivity Test for Asphalt Mixtures

Louay Mohammad, LTRC

22-1B: Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of Asphalt Binders in Louisiana

Saman Salari, LTRC

23-1B: Effect of Mineral Fillers on the Moisture Resistance and Performance of HMA

Mostafa Elseifi, LSU

ACTIVE RESEARCH

Concrete

20-2C: Using the Portable XRF to Identify/Verify Field Material Properties

Jose Milla, LTRC

20-1C: Evaluation of the Miniature Concrete Prism Test (MCPT) for Use in LADOTD

Jose Milla, LTRC

22-1C: Influence of Internal Curing on Concrete's Permeability in Simulated Field Conditions

Jose Milla, LTRC

22-2C: Influence of Aggregate Gradation to Reduce Concrete's Permeability

Jose Milla, LTRC

Geotechnical

16-6GT: Incorporating the Site Variability and Laboratory/ In-situ Testing Variability of Soil Properties in Geotechnical Engineering Design

Murad Abu-Farsakh, LTRC

17-2GT: Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features

Murad Abu-Farsakh, LTRC

19-1GT: Maintenance of Roadway Edge Drop-Off Utilizing Readily Available Materials

Gavin Gautreau, LTRC

20-3GT: Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling

Murad Abu-Farsakh, LTRC

20-2GT: Instrumentation and Modeling of Geosynthetic Load Transfer Platform Performance

Murad Abu-Farsakh, LTRC

21-1GT: Internal Friction Angle of Sands with High Fines Content

Murad Abu-Farsakh, LTRC

Pavement

18-1P: Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management

Zhongjie Zhang, LTRC

18-2P: Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish

Qiming Chen, LTRC

19-2P: Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach

Zhong Wu, LTRC

20-4P: Assessment of DOTD's Friction Aggregate Sources through Laboratory and Accelerated Testing

Zhong Wu, LTRC

21-2P: Correlation of Rut Depths Measured by the Profilers of LTRC and DOTD PMS

Qiming Chen, LTRC

21-1P: Prediction of Road Conditions and Smoothness For Flexible and Rigid Pavements in Louisiana Using Neural Networks

Zhong Wu, LTRC

22-1P: Performance Index Rating and Maintenance Cost Assignment for Ramps, Acceleration and Deceleration Lanes in Louisiana

Moses Akentuna, LTRC



ACTIVE RESEARCH

Safety

21-1SA: Highway Safety Culture Assessment through Louisiana's Regions
Helmut Schneider, LSU

20-3SA: Minimum Intersection Illumination
Hany Hassan, LTRC

20-1SA: Evaluation of Traffic Crash Characteristics on Elevated Sections of Interstates in Louisiana
Julius Codjoe, LTRC

19-3SA: Pedestrians and Bicyclists Count, Phase 2: Implementing and Applying Multimodal Demand Data
Tara Tolford, UNO

22-1SA: Safety Effectiveness of Cable Median Barriers in Louisiana
Elisabeta Mitran, LTRC

Structures

16-2ST: Field Monitoring and Measurements Education: A Model for Civil and Environmental Engineering
Vijaya Gopu, LTRC

20-1ST: Developing The Load Distribution Formula for Louisiana Culverts
Ayman Okeil, LSU

22-3ST: Evaluation of Embedded Pile Resistance on Scour Critical Bridges
Murad Abu-Farsakh, LTRC

22-2ST: Skew Detection System Replacement on Vertical Lift Bridges Phase 2
Gareth Rees, Wiss, Janney, Elstner Associates, Inc.

22-1ST: Investigating and Developing a MASH Compliant Contraflow Ramp Closure Gate
Maysam Kiani, Texas A&M Transportation Institute (TTI)

Special Studies

19-5SS: Assessing the Economic Benefits of the TIMED Program
Chester Wilmot, LSU/LTRC

20-1SS: The Future of the Louisiana Waterways Transportation System: A System Analysis and Plan to Move Commerce by Water
Ricardo Cruz, Moffatt & Nichol

20-2SS: Provision of Transportation Data Analytics to the Louisiana Department of Transportation and Development
Michael Pack, University of Maryland

22-1SS: Portable WIM Installation and Site-Specific Traffic Data Collection for DOTD
Lubinda Walubita, Texas A&M Transportation Institute

21-3SS: Evaluating Permitted/Protected versus Protected Left Turn Signals in Louisiana
Raju Thapa, LTRC

21-2SS: Evaluate the Impacts of Complete Street Policy in Louisiana
Ruijie "Rebecca" Bian, LTRC

22-5SS: Analyzing Human Mobility for Active Transportation Planning in Louisiana
Ruijie "Rebecca" Bian, LTRC, and Tara Tolford, UNO

22-2SS: Economic Evaluation of Applications to the Port Construction and Development Priority Program
Stephen Barnes, ULL



Workforce Development



DOTD Structured Training Unit

The DOTD Structured Training Program is a department-sanctioned, progressive training curriculum that requires specific work-related training be completed at each level of an employee's career path. DOTD supports and promotes an environment of continual learning and feels that training is a necessary component and an integral part of career advancement. Structured training can involve professional development, technical skills training, continuing education, and hands-on and on-the-job training. The program manages the work force development for personnel in construction, maintenance, and supervisory/leadership positions. The program also provides liaison assistance to headquarters personnel and district training personnel for policy interpretation and compliance decisions.



Construction & Materials Training Program

The Construction and Materials Training Program manages the Inspector/Technician Certification Program for DOTD and the Louisiana transportation industry. This program develops construction and materials training materials and coordinates the training, testing, authorization, certification, and re-certification of inspectors and technicians on a statewide level in each area of construction. During fiscal year 2021-2022, LTRC processed 109 requests for new certifications and 308 requests for re-certifications.

	Re-certifications		Certifications	
	Non-DOTD	DOTD	Non-DOTD	DOTD
Authorized Aggregate Tester	0	0	3	5
Authorized Asphalt Concrete Plant Tech	0	0	2	0
PCC Field Tester	0	0	6	10
Nuclear Device Operator	0	0	2	16
PCC Technician	12	3	11	3
District Laboratory	2	5	0	2
Embankment & Base Course	26	47	4	15
Structural Concrete	17	37	5	17
PCC Paving	16	19	4	8
HMA Concrete Paving	19	12	12	2
HMA Concrete Plant	28	65	8	28

Maintenance Training Program

The Maintenance Training Program focuses on the development of new job-specific courses related to job functions, work processes and safe operation of equipment used by maintenance field personnel. These courses promote an awareness of safe practices and attitudes needed for maximum job performance. This training program also assists with the Equipment Operation Certification Program to standardize and improve equipment training for maintenance functions.

Workforce Development Program

This program functions to serve as liaison to LTRC Transportation Curriculum Council (TCC) as outlined in PPM 47 and acts as a liaison between LTRC and the HQ sections to provide assistance with conformance to structured training requirements.

The TCC consists of 13 members from Louisiana State University, transportation partners, and DOTD management. There are six subcommittees: Engineering, Operations, Multimodal, Management and Finance, Core Skills, and Leadership and Outreach. The purpose of the committee and related subcommittees is to advise and assist LTRC in the identification, prioritization, development, evaluation, and implementation of transportation-related technology transfer, training, work development, and educational services for DOTD and its public and private transportation industry partners. The TCC held two meetings this fiscal year, in December 2021 and June 2022.

This program also assists section heads and designated section training liaisons in providing their employees the training prescribed by the training programs governing their employees' positions. This program provided the following for the Headquarters sections:

ORIENTATION

Trained 119 new employees on respective training programs and how to fulfill individual training requirements.

Provided 92 new supervisors with information about their supervisory responsibilities as they relate to training programs and annual reporting requirements for PES.

SUBSTITUTION REQUESTS

Reviewed substitution requests from 6 employees this fiscal year, which resulted in a total of 41 courses being requested to substitute for required training.

A total of 37 courses were approved to substitute for coursework required through the employees' STPs.

INSTRUCTOR-LED TRAINING

Conducted 47 instructor-led classes to train employees in various topics that include: Aerial Lift Safety, Asbestos Awareness, Basic Flagging, Chainsaw Safety and Operations, Confined Spaces Training, Cybersecurity, Facilitation Skills for Managers, Forklift Safety, Lock-out/Tag-out Training, Personal Fall Arrest Safety, Power Hand Tool Safety, Power Line Safety, Project Management, Scaffolding Safety, and Traffic Control Through Maintenance Work Areas.

TESTING

Held testing sessions 3 times a month for self-study courses. Gave employees 102 tests for different courses this fiscal year.

Management Development Training Program

This program oversees several mandatory supervisory, management development, and career development training programs. During fiscal year 2021-2022, courses for these training programs were delivered through several sources: the Civil Service Comprehensive Public Training Program (CPTP), the DOTD Human Resources Section, and in-house training courses developed by LTRC.

1 Management Development Training Program
A structured training program for DOTD employees in a professional job series.

983 employees subscribed
 140 employees completed the course requirements

2 Engineering Technician Supervisory Training
A supervisory training program for DOTD Engineering Technicians.

489 employees subscribed
 70 employees completed the course requirements

3 Civil Service Supervisory Training Program for Supervisors

DOTD supervisory employees are also required to participate in the CPTP Supervisory Programs and Continuing Education each year after the Supervisory Programs are completed.



Employees in CPTP Supervisory Group Programs	
CPTP Supervisory Group 1	561
CPTP Supervisory Group 2	276
CPTP Supervisory Group 3	70
Employees who completed their Supervisory Group Programs	
CPTP PES Supervisory Group	81
CPTP Core Supervisory Group	88
CPTP Supervisory Group 1	72
CPTP Supervisory Group 2	24
CPTP Supervisory Group 3	3
Employees who completed Continuing Education	
	540

Completed Projects

Course Revisions

- Aerial Lift WBT (web-based training)
- Backhoe Loader WBT
- Bucket Truck WBT
- Crane WBT
- Excavator WBT
- Forklift WBT
- Front End Loader WBT
- Low Boy Trailer WBT
- Rigging Safety WBT
- Skid Steer WBT
- SMT Trailer Mounted Attenuator Video/WBT
- Tractor WBT
- Truck Mounted Boom WBT
- Confined Spaces WBT
- Lock-out/Tag-out WBT
- Trenching and Shoring WBT
- LTAP Basic Flagger Refresh WBT
- Handling Hazardous Chemicals WBT
- Personal Fall Arrest WBT
- Scaffolding Safety WBT
- Traffic Control Through Work Maintenance Areas Course/WBT
- Work Zone Safety WBT
- Asbestos Awareness WBT
- Driving Safety WBT
- Electrocutation Prevention WBT
- Hand and Power Tools WBT
- Heat Stress WBT
- Office Safety WBT
- Slips, Trips and Falls WBT

New Course Developments

- Introduction to Louisiana Road Safety WBT
- Basic Crash Data Training Course Videos
- EEO Biennial Meeting 2022-2023 WBT
- DOTD STL Hazard Material Full Course WBT
- Fundamentals of Negotiation Skills WBT
- Project Delivery (Stage 0) WBT
- Loss Prevention Training
- Incident Management Training
- Road Maintenance Tasks Training
- Storm and Winter Weather Operations Training
- Maintenance Supervisor Orientation Training
- Maintenance Academy Pilot Course
- Tort Liability for Depositions Video
- Tort Liability for Maintenance Video
- Engineering Project Management Training

Presentations/Classes

- 2 Aerial Lift
- 2 Asbestos Awareness
- 6 Basic Flagging
- 2 Chainsaw Safety and Operations
- 2 Confined Spaces Safety
- 5 Cybersecurity
- 2 Facilitation Skills for Managers
- 2 Forklift Safety
- 2 Lock-out/Tag-out Safety
- 2 Personal Fall Arrest Safety
- 2 Power Hand Tool Safety
- 2 Power Line Safety
- 6 Project Management
- 2 Scaffolding Safety
- 8 Traffic Control Through Work Maintenance Areas

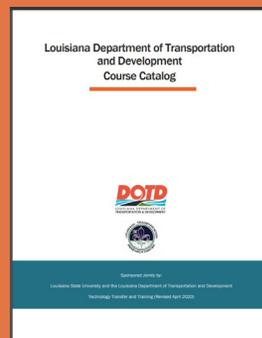
Ongoing Projects

Course Revisions

- Base Course Inspection Manual update
- Facilitation Skills for Managers redesign
- Highway Plan Reading 1 Manual update
- Maintenance of Small Traffic Signs Manual update
- Preventative Maintenance of Light Vehicles WBT update
- Portland Cement Concrete (PCC) Paving Inspection Manual update
- Survey Manual Suite review

New Course Developments

- District Lab Certification guide
- DOTD HQ Training Liaison Guide WBT
- Historical Bridge Training WBT
- Project Delivery (Stage 1)
- Project Delivery (Stage 2)
- Substance Abuse for Supervisors (assistance to Human Resources)



The complete DOTD Course Catalog is available online at www.ltrc.lsu.edu/pdf/DOTD_Course_Catalog.pdf. The searchable catalog is a comprehensive listing of structured training offerings.

Statewide Strategic Program

Needs Assessment

LTRC began assessing the structured training programs (100+) and offered courses throughout DOTD. All STPs will be reviewed with the help of the DOTD training coordinators, section heads, and a cross sections of employees within each STP. This review is looking at the frequency of courses taken, updates needed, impact of the trainings and STPs, consistency of trainings and positions, and more.

EDC-6 Initiative

LTRC, LTAP, DOTD, FHWA, and LCTCS (Louisiana's Community and Technical College System) have teamed up to work towards meeting the goals of the Every Day Counts 6: Strategic Workforce Development initiative. In communication with the committee and other local agencies and contractors, Louisiana DOTD will identify current and future needs for entry level engineering interns across the state to support the transportation community. DOTD will identify trainings that may match current DOTD courses, identify other trainings that may be useful, and work with LTAP (LPESA) and other local agencies and contractors to identify needed or useful trainings. Through this, a road map for potential employees in the transportation community will be developed allowing LCTCS to offer an educational path through to hiring. LCTCS and DOTD are working on a curriculum that includes a list of core courses and 5 elective paths (Concrete, Concrete Reinforcement and Repair, Survey, Mobile Equipment Operator, and Leadership).

Competency Model

Through the Competency Model project, LTRC individually meets with the various sections throughout DOTD in order to develop a comprehensive list of technical competencies unique to each section. This list is created through interviews, reviewing necessary literature, and in-depth research. Then, training initiatives are matched to each competency to help meet any deficiency of knowledge or practice that may exist. Any competencies with gaps or minimal matches may help prove a need for future training to be developed. Ultimately, LTRC helps the section create a structure of knowledge transfer that will help flatten any learning curve for employees in their section. During this fiscal year, Section 30 – Location and Survey was completed. Section 24 – Road Design and Section 80 – Contract Services are in progress.

External Training Program Overview

7,500

*Individuals
(departmental, state, local, and
transportation community partners)*

300

Programmatic initiatives

DOTD National Highway Institute Program

The National Highway Institute Program covers programmatic areas that are offered statewide to DOTD employees, municipal employees, private engineering firms, and other transportation partners. This program has various courses that are required in departmental structured training programs. These courses address Louisiana-specific material while also incorporating the necessary federal guidelines as well.

327
participants in
13
courses

NHI Courses FY 21-22	Participants
No. 131139V–Constructing and Inspecting Asphalt Paving Projects (virtual delivery)	36
No. 133122V–Traffic Signal Timing Concepts (virtual delivery)	25
No. 380032A–Roadside Safety Design	27
No. 130056–Safety Inspection of In-Service Bridges for Professional Engineers	21
No. 380091V–Planning and Designing for Pedestrian Safety (virtual delivery)	19
No. 130055 Safety Inspection of In-Service Bridges	29
No. 130053 Bridge Inspection Refresher Training	30
No. 135056 Culvert Design	29
No. 130125 Tunnel Safety Inspection Refresher	17
No. 132034 Ground Modification Methods	14
No. 135027 Urban Drainage Design	30
No. 130081 LRFD for Highway Bridge Superstructures	20
No. 130078 Fracture Critical Inspection Techniques for Steel Bridges	30

Other Courses, Workshops, and Events FY 21-22

Title		Title	
Professionalism and Ethics	28	Northwestern TTES 2	10
TRAC and Rides	32	Pavement Striper	37
PE Review 2022	25	IMSA Signal Inspector	20
Mechanics Class	12	Traffic Engineering Process and Report (TEPR)	38
Individual Registration (158 course offerings/events)	573	Vision Roadware	23
Northwestern TTES	12	Vision 5	62

872
participants

DOTD Work Zone Safety Program

Through the DOTD Work Zone Safety Program, the following Louisiana-specific courses are required for departmental employees and any other non-departmental entity that will work on a departmental project: Louisiana Traffic Control Technician, Louisiana Traffic Control Supervisor, Louisiana Traffic Control Design Specialist, Louisiana Guardrail Installation Training, and Louisiana Nighttime Traffic Control.

Work Zone Safety classes are required for contractor, consultant, and DOTD personnel, enabling highway workers to provide for the safety of motorists, workers, and pedestrians. In contract documents for the contractors and consultants, the verbiage specifically states they must have Louisiana-specific training as it relates to the MUTCD, and the DOTD Work Zone Safety Program provides this specific training through a contract with ATSSA, the only organization that offers this Louisiana-specific training.

202
participants in
7
courses

DOTD District Sign Specialists' Certification Program

The DOTD District Sign Specialists' Certification Program plays a critical role in Traffic Operations. Not only must these employees perform manual labor and operate equipment, they must know, understand, and apply critical traffic engineering principles and details of sign installation as outlined in the Manual on Uniform Traffic Control Devices. In addition, district sign specialists are required to testify in court, and this ATSSA certification covers trial and deposition testimony.

37
participants in
2
courses

DOTD Nuclear Gauge and Radiation Program

The DOTD Nuclear Gauge and Radiation Program is a vital program that assists departmental employees who are authorized to use a nuclear gauge for density testing on Louisiana's highway construction projects. It is one of the most important quality assurance tools an inspector has to ensure that the foundation of the road will perform as designed. The use of any device containing nuclear material requires compliance with the federal Nuclear Regulatory Commission regulations and safety precautions, enforced by the Louisiana Department of Environmental Quality and DOTD. To ensure that overexposure to radiation does not occur, DOTD monitors over 450 nuclear gauge operators with a dosimeter badge. DOTD is also concerned with the public's exposure to radiation from Department-owned nuclear gauges.

12
participants in
1
course

DOTD ArcGIS Program

The DOTD ArcGIS Program is guided by Map 21 and is federal-regulations based. These regulations and Map 21 are moving state transportation agencies into a GIS-based environment for asset management, performance management, inventory, and operations. Transportation-related GIS technologies rely on a linear referencing method to associate legacy data systems with GIS technologies. DOTD has GIS uses in almost all of its engineering and business sections.

143
participants in
12
courses

DOTD PC/Microsoft Structured Training Program

The DOTD PC/Microsoft Structured Training Program is strategically mapped to various employee category structured training programs. These courses are required for departmental engineers, engineering technicians, administrative staff, and support personnel. The course requirements vary by employee category.

676
participants in
83
courses

DOTD CO-OP Program

The DOTD Co-op Program is a cooperative endeavor between DOTD and seven Louisiana universities with engineering departments. The Co-op program provides practical experience to students through employment in public sector transportation engineering work. The program is intended to enhance the educational process by providing opportunities for participants to explore their interest in transportation engineering through practical work experience. The program also provides opportunities for DOTD to evaluate participants as potential employees. To participate in the program, the students must have the endorsement of their university and be classified as a junior or senior. The students are employed year round in positions related to their major engineering field of study and must give a presentation at the end of the semester or quarter.

34
students

Engineering Rotational Development Program (ERDP)

This program provides new engineers with an invaluable introduction to DOTD employment. The ERDP is a 32-week rotation program designed to offer entry-level engineers an opportunity to experience several engineering functional areas within DOTD prior to placement.

After orientation at LTRC, new hires spend 1 to 3 weeks in 19 different sections. To be employed into the ERDP, the applicant has to have successfully passed the Fundamentals of Engineering (FE) exam in and hold an active FE certification.

4
new hires with
4
hired in
permanent
positions

Leadership Development Program (LDP)

This program provides participants a process of continuous learning and the ability to apply the leadership methods discussed. In addition, the Leadership Development Program aims for everyone within DOTD to adopt new behaviors and beliefs toward effective leadership and extend them to the highest levels of achievement.

The goal of this program is to introduce and promote competencies that will empower participants to recognize and improve their leadership skills.

159
participants in
19
courses

DOTD CADD/MicroStation Structured Training Program

The DOTD CADD/MicroStation Structured Training Program has developed the Department's current process for obtaining surveying information that utilizes Microstation, Inroads, and Inroads Survey. This process of coding and capturing data continues to evolve as departmental and federal regulations change. Microstation and Inroads are the software backbones for the Department's plan development. It is imperative that the Department identifies where trends are going and how newer software reacts to the current data collection processes. The Department is required to train and test new versions of the software to not only give guidance to DOTD staff but the consultants who work for the Department as well.

80
participants in
8
courses

Tech Transfer: Publications and Multimedia Highlights

- Published 4 *Technology Today* Newsletters
- Social media content development for LTRC and LTAP through Adobe Creative Cloud tools
- Edited and published 11 Final Reports/Technical Summaries
- Published 6 Project Capsules
- Published 1 Tech Assistance Report
- Edited 2 training manuals
- Road Design video scripts
- Watermark and report procedure update
- Enforced accessibility requirements for all newly published work
- Document distribution to library liaisons
- Printed 10 TRB posters for LTRC participants at annual meeting
- Layout for DOTD Maintenance Field Guide (pocket manual format)
- Online scholarship application forms
- Designed 4 issues of *Technology Exchange*
- Provided web support for NSF project: *Field Monitoring and Measurements (FMM) Education*
- Research survey creation and support
- Management of LTRC Registration Management System
- Film and production of Deposition Techniques-Structured Training
- Film production of SMT Trailer Mounted Attenuator Instructional Video–Structured Training
- Film production of TRAC and RIDES Promotional Video- AASHTO
- Film production of Field Monitoring Demo/SAM Module
- Film and production of 2 DOTD Instructional videos
- Film and production of 21 DOTD Public Informational videos
- Film and production of 4 DOTD Innovations videos
- Post production of 2022 LTC Virtual Conference–35 virtual Zoom presentations
- Post production of Engineering Ethics–Zoom Webinar by Norma Jean Mattei and VJ Gopu
- Post production of video formatting and resizing per LEO standards
- Post production for Training/Technology Transfer–23 various training videos
- Post production for 2 DOTD Public Informational Videos
- Post production for LHSC Black History Month–Secretary Wilson interview
- Event Photography for GRITS and TRAC/Rides
- 1,340 Subscribers on YouTube

Through video, publication, and web development, this office expands LTRC's reach by disseminating information and sharing knowledge that spans from emerging research and technology to the grass-roots level of application.



LTC Adapts to Virtual Format for 2022

With over 800 unique views, the 2022 Louisiana Transportation Conference was able to reach a number of transportation professionals through the comfort of their office or home. While this year's conference was held virtually in response to ongoing pandemic concerns, attendees were still able to view a variety of technical sessions, explore an online exhibitor area, attend virtual meetings, and live chat during presentations.

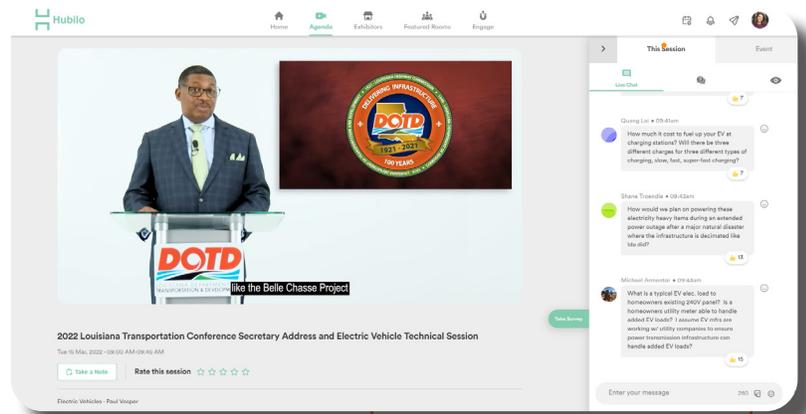
Gaining the most views was Secretary Shawn Wilson's keynote session "2022 Louisiana Transportation Conference Secretary Address and Electric Vehicle Technical Session." Dr. Wilson explained, "This year's theme is 'Reshaping Transportation in Louisiana.' How fitting of a theme that is because it accurately reflects what this administration being led by Governor Edwards has done for the last six plus years." He went on to highlight DOTD's centennial, innovative funding methods, completed projects, and major upcoming projects across the state, including the I-10 widening in the capitol region. "We are changing original infrastructure that was built over 50 years ago that has exceeded its useful life to build a better, more resilient and more community friendly interstate system in our busiest corridor in Louisiana," Dr. Wilson said.

The second part of the secretary's address included a live conversation about the industry of electronic systems, such as electric vehicles (EV). As part of an effort to drastically reduce greenhouse gas emissions by 2050, Dr. Wilson invited Paul Vosper, Juice Bar CEO, and Byron Lee from Airware, LLC to share their expertise and thoughts on EV technology and the vision for opportunities in Louisiana.

Another highly attended session included "Green Book 8 and Road Design Manual Updates" by Robert Iseman, P.E., and David Smith, P.E., where they gave an overview of proposed Green Book 8 as well as information on the latest roadway design guidance, proposed design policy updates, and significant changes to the Road Design Manual.

"Updates on Statewide Highway Safety Initiatives" also gained the attention of a number of attendees. This session was led by Autumn Goodfellow-Thompson, Karla Courtade, Jessica DeVille, and Ralph Mitchell, Jr. The presenters highlighted current initiatives underway in Louisiana to assist planners and engineers, such as the upcoming 2022 Strategic Highway Safety Plan update, Highway Safety Improvement Program activities including the Statewide Pedestrian Crash Assessment, and the new Louisiana Uniform Crash Report and eCrash system rolling out this year across the state.

While many attendees missed the standard in-person conference, there were virtual benefits for some. The event feed allowed a number of participants to engage with speakers and fellow attendees by answering polls, adding comments, and responding to questions in real-time. Attendees also had the opportunity to re-watch anything that was missed as well as watch the conference from their place of choice, avoiding travel. Overall, while the conference will be returning to in-person next year, attendees were able to experience a reimagined LTC and interact with their colleagues and gain information in a new way—all while looking forward to convening again at the Baton Rouge River Center in March 2023.



800
participants

2
days

16
sessions

49
speakers

15
PDHs offered

LTAP



The Louisiana Local Technical Assistance Program (LTAP) is one of 52 centers around the United States dedicated to providing cost-effective training, technical assistance, and organizational support to local government public works and transportation agencies. Based at LTRC, LTAP is jointly supported by DOTD, FHWA, and LSU. LTAP also supports the DOTD Local Road Safety Program, which provides assistance with regional and local agency road safety activities as part of the Louisiana Strategic Highway Safety Program.



LOUISIANA LOCAL TECHNICAL ASSISTANCE PROGRAM (LTAP) ANNUAL REPORT FY 2021-2022

Providing training and technical assistance to Louisiana's local transportation and public works agencies



86

CLASSES

67

IN-PERSON

19

VIRTUAL

2,300+

ATTENDEES

Between July 1, 2021 and June 30, 2022, LTAP conducted 86 classes (67 in-person, 19 virtual) attended by an estimated total of 2,342 participants from local and state agencies. Among these classes were **Roads Scholar Program's** required/elective courses, **Work Zone Safety with Basic Flagging** mini-workshops, **Combating Roadway Departures** workshops, **Local Public Agency (LPA)** courses, and **Chainsaw Safety** classes. LTAP also hosted two conferences and seven virtual showcases on behalf of the **Louisiana Parish Engineers & Supervisors Association (LPESA)**.



17

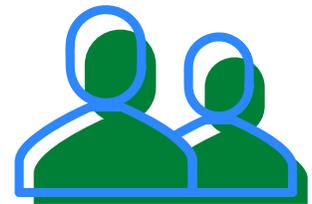
PRESENTATIONS

LTAP gave 17 presentations at national and statewide conferences as well as in DOTD District Safety Road Shows.

12

MEMBERSHIPS

LTAP has been actively involved in 12 professional associations and groups, namely: NLTAPA, NACE, TRB, APWA, ITE, GRITS, ATSSA, ATSIP, ATD, PRSA, LPESA and SimCap Louisiana.



10,903

HOURS OF IN-PERSON TRAINING



1,053

HOURS OF VIRTUAL TRAINING



IN-PERSON TRAINING

LTAP conducted the following in-person Roads Scholar (RS) classes and other courses:

- RS #3: Drainage: The Key to Roads That Last
- RS #5B: Creating a Safe Work Environment
- RS #6: Heavy Equipment Safety & Maintenance
- RS #7: Pavement Preservation & Road Surface Management
- RS #13: Inspection of Local Bridges
- Chainsaw Safety and Precision Felling
- Combating Roadway Departures workshops
- Work Zone Safety with Basic Flagger mini-workshops
- Local Public Agency (LPA) Qualification Core
- LPA Construction, Engineering and Inspection
- LPA Project Delivery for the Responsible Charge

VIRTUAL CLASSES

LTAP hosted the following eLearning opportunities in partnership with LPESA and APWA Louisiana Chapter.

- LPESA Virtual Showcases
- Introduction to Transportation Asset Management
- Using PASER to Evaluate Your Roads
- Disaster Safety Training
- Basics of Pavement Preservation
- Heavy Equipment Safety and Maintenance

PRESENTATIONS

LTAP presented at the following conferences and meetings:

- 2021 NLTAPA Lunch and Learn Webinar Series - "Building a Mousetrap for Your Locals"
- 2021 Virtual NLTAPA Annual Conference
- 2021 Institute of Transportation Engineers (ITE) Annual Meeting
- 2021 GRITS Annual Meeting,
- 2021 Deep South ITE Fall and Winter Meetings
- 2022 TRB Annual Meeting
- 2022 Louisiana Transportation Virtual Conference - "LTAP: Supporting Local Agencies"
- 2022 Southern District ITE Annual Meeting Technical Sessions
- 2022 DOTD Safety Road Shows - "LTAP and the Local Road Safety Program"
- 2022 National Association of County Engineers (NACE)

ROAD SHOWS

LTAP exhibited and provided information at the following conventions and road shows:

- Police Jury Association of Louisiana (PJAL) Convention
- Louisiana Municipal Association (LMA) Convention
- DOTD District and Regional Safety Road Shows

CONFERENCE HOST

LTAP hosted the following conferences and educational meetings:

- LPESA Fall 2021 Conference in Natchitoches
- LPESA Spring 2022 Conference in Sulphur
- SimCap Louisiana Educational Meetings

EDC COORDINATION

LTAP serves on the Statewide Transportation Innovation Council (STIC) and on the Implementation Teams for the following Every Day Counts Round Six (EDC-6) initiatives:

- Crowdsourcing for Advancing Operations
- Next-Generation TIM: Integrating Technology, Data, and Training
- Strategic Workforce Development
- Targeted Overlay Pavement Solutions (TOPS)

Professional Memberships

Transportation Research Board (TRB) Affiliations

- ABG20–Transportation Education and Training
- AFP30–Soil and Rock Properties
- AFS20–Geotechnical Instrumentation and Modeling
- AJE15–Workforce Development and Organizational Excellence
- AJE45–Information and Knowledge Management Committee
- AKB10–Innovative Highway Structures and Appurtenances
- AKB30–Concrete Bridges
- AKD20–Roadside Safety
- AKG40–Mechanics and Drainage of Saturated and Unsaturated Geomaterials
- AKG70–Foundations of Bridges and Other Structures
- AKG80–Geosynthetics
- AKM50–Advanced Concrete Materials and Characterization
- AME20–Women and Gender in Transportation
- AMR20–Standing Committee on Disaster Response, Emergency Evacuations, and Business Continuity
- TRT–Transportation Research Thesaurus Subcommittee
- Information Services Committee
- AFK20–Characteristics of Asphalt Materials (Friend)
- AFK40–Surface Requirements of Asphalt Mixtures (Friend)
- AFK50–Structural Requirements of Asphalt Mixtures (Friend)



LTRC's delegation at the 2022 TRB 101st Annual Meeting in Washington, DC.

American Society for Testing and Materials Affiliations

- D04.20–Empirical Tests of Bituminous Mixtures
- D04.21–Specific Gravity and Density of Asphalt Mixtures
- D04.22–Effect of Water and Other Elements on Bituminous Coated Aggregates
- D04.24–Bituminous Surface Treatments
- D04.25–Analysis of Bituminous Mixtures
- D04.26–Fundamental/Mechanistic Tests
- D04.44–Rheological Tests
- D04.45–Specifications for Modified Asphalt
- D04.46–Durability and Distillation Tests
- D04.99–Sustainable Asphalt Pavement Materials and Construction

American Society of Civil Engineers Affiliations

- ASCE Louisiana
- Transportation and Infrastructure in Cold Regions Engineering Division
- Transportation and Development Institute (T&DI) Executive Committee Member and Past Chairman

National Cooperative Highway Research Program (NCHRP) Affiliations

- 10-104: Recommendations for Revision of AASHTO M 295 Standard Specification to Include Marginal and Unconventional Source Coal Fly Ashes
- 10-110: 3D Modeling Guide for Construction Inspection
- 14-48: Construction Guide Specifications for Pavement Treatments—Sand Seals and Ultra-thin Bonded Surface Treatments
- 20-24 (131): Mapping the Common Interests of AASHTO Committees
- 20-44 (40): Ensuring Essential Capability for the Future Transportation Agency

Other Memberships

- American Concrete Institute
- American Institute of Steel Construction
- American Public Transportation Association
- American Public Works Association
- American Railway Engineering and Maintenance-of-Way Association (AREMA)
- American Traffic Safety Services Association
- Association of Transportation Safety Information Professionals (ATSIP)
- Association for Talent Development
- CAAL Technical Committee
- Construction Certification Committee
- Deep Foundation Institute, DFI
- DOTD Work Zone Task Force
- Equipment Operation Certification Committee
- FHWA Sustainable Pavements Technical Working Group
- Geo-Institute: Engineering Geology and Site Characterization Committee, Geosynthetics Committee, Deep Foundation Committee
- Gulf Region Intelligent Transportation Society (GRITS)
- Heavy Movable Structures
- Institution of Engineering and Technology (IET)
- Institute of Transportation Engineers (ITE)
- International Association of Foundation Drilling
- ITI Technical College, Construction Management Curriculum Council
- Louisiana Association for Talent and Organizational Development (LATOD)
- Louisiana Complete Streets Advisory Committee
- Louisiana Engineering Society (State Board, Continuing Professional Development Committee Chair)
- Louisiana Parish Engineers and Supervisors Association
- Louisiana Professional Engineering and Land Surveying Board
- National Association of County Engineers
- National LTAP Association
- National Transportation Knowledge Network (NTKN)
- National Transportation Training Directors
- Public Relations Society of America
- SimCap Louisiana, Chair
- Society of Government Meeting Professionals (SGMP), First Vice President, Treasurer
- Society for Human Resource Management (SHRM)
- Southeast Task Force on Technician Training and Qualification
- Southeastern Asphalt User Producer Group
- Special Libraries Association (SLA), Transportation Division
- Traffic Safety Culture Transportation Pooled Fund, Board Member
- Transportation Curriculum Coordination Council
- US Universities Council on Geotechnical Engineering Research (USUCGER)

American Association of State Highway Transportation Officials (AASHTO) Affiliations

- Research Advisory Committee (RAC)
- RAC Value of Research Task Force
- Innovation Community of Practice
- Transportation Knowledge Networks
- TRAC and RIDES Advisory Board

Staff



OFFICE OF THE DIRECTOR

Sam Cooper, Jr., Ph.D., P.E., Director

Sheri Hughes, Executive Services Assistant

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Melissa Neyland, Executive Services Assistant

Theresa Rankin, Business Office Manager

Tina Kleinpeter, Business Office Accountant

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Pavement & Geotechnical Research Administrator

Pavement Research

Qiming Chen, Ph.D., P.E.,

Pavement Research Manager

Moses Akentuna, Ph.D., P.E.,

Pavement Research Engineer

Terrell Gorham, Engineering Technician DCL

Biyuan Zhen, Engineering Technician 5

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Accelerated Pavement Research Manager

Moinul Mahdi, Ph.D., PRF Manager

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Research Engineer

Nick Ferguson, P.E., Geotechnical

Research Engineer

Chris Mertz, Engineering Technician 5

Hend Alyousef, Engineering Technician 5

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Ismail Ghaaowd, Research Associate

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Samuel B. Cooper, III, Ph.D., P.E., Materials

Research Administrator

Asphalt Research

Corey Mayeux, P.E., Asphalt Research Engineer

Saman Salari, P.E., Asphalt Engineer

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Jeremy Icenogle, Engineering Technician DCL

Concrete Research

Norris Rosser, Engineering Technician DCL

Austin Gueho, Engineering Technician 5

Aaron Brown, Engineering Technician 5

Engineering Materials Characterization

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Planning/Intermodal Research Manager

ITS & Traffic Research

M. Ashifur Rahman, Ph.D., Research Associate 5

Safety

Elisabeta Mitran, Ph.D., Assistant Professor,

Safety Research Manager

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Garrett Wheat, Ph.D., Statewide Strategic Program Manager

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Paul Hendricks, Computer Manager
David Jumper, Technology Transfer Support Services

Technology Transfer

Michael Boudreaux, P.E., Technology Transfer Engineer

Publications & Digital Media Development

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Jenny Gilbert, Technical Writer
Emily Wolfe, Multi-Media Specialist
Chris Melton, Photographer/Videographer

Structured Training Programs

Kirk Wales, DOTD Structured Training Director
Ted Ball, Management Development Program Manager
John Dean, Construction and Materials Training Program Manager
Heather Huval, Pre-Construction Training Program Manager
Dimetrie Chopin, Asphalt Concrete and Special Topics Training Program Manager
Patrick Frazier, Maintenance Training Program Manager/District Training Liaison
Susan Nichols, Training Records Program Manager

External Educational Resources

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Allison Landry, NHI/Individual Registration/Special Event Program Manager
Melissa Lee, Microsoft/CADD/Special Training Program Manager
Marcus Sylvas, Teaching Associate, DOTD Leadership Development Institute
Sandy Brady, Librarian
Brenda Wolfe, Administrative Assistant
Patrick Mehaffey, Audio Visual Manager
Layne Brown, Training Program Coordinator

Local Technical Assistance Program

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Courtney Dupre, LTAP and LRSP Business Manager
Leonard P. Marretta, LRSP and LPA Program Manager
Rudynah E. Capone, Innovation & Technology Transfer Manager
Mia Bosco, Training Program Manager

Congratulations to
Ural “Renee” Cosse,
Engineering Technician DCL in
Geotechnical Research,
on her retirement with 25 years of
service to DOTD!

Policy Committee

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Chief Engineer
DOTD

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LTRC (ex-officio)

Tyson Rupnow, Ph.D., P.E.

Associate Director, Research
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Laura Phillips, Observer

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