

2020/2021



LTRC Annual Report

www.ltrc.lsu.edu



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.





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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, the newest 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.



Click on the video above, or visit LTRC's YouTube channel to watch our overview video to learn more about us:
<https://youtu.be/OzTPkIj-OSI>

Director's Message



As we continue to navigate our way through the COVID-19 pandemic, it is with great pleasure that I present the 2020-2021 LTRC annual report.

Inside this report, you will find featured articles on the research program, education 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 has and will continue its committed support of higher education and solving Louisiana's transportation problems. Within this annual

report, it is shown that LTRC has completed 14 research projects and has 53 active on-going research projects. In addition, LTRC supported 44 undergraduate and graduate students through research projects during fiscal year 2020-2021. LTRC research projects were associated with 18 dissertations or theses this reporting period. Louisiana continues to be the lead pooled-fund state for the Southeast Transportation Consortium study. These pooled-fund studies are a collaborative effort between the Federal Highway Administration (FHWA) and state departments of transportation.

The Louisiana Department of Transportation and Development (DOTD) fully adopted HeadLight based on LTRC's research findings and recommendations. HeadLight is a mobile e-construction inspection system. It has shown a 28% increase in productivity while collecting almost twice the amount of jobsite information. The HeadLight research project received an American Association of State Highway and Officials (AASHTO) Sweet Sixteen Award in July 2020.

Additional highlights shown in the 2020-2021 LTRC annual report are as follows:

- Workforce development completed 28 projects, has 27 on-going projects, and is developing 11 new courses.
- The external training program impacted almost 5,800 individuals (departmental, state, local, and transportation community partners) through over 300 programmatic initiatives.
- The Louisiana Local Technical Assistance Program (LTAP) impacted over 2,000 individuals through various in-person and virtual training platforms this program year. In addition, LTAP hosted 5 conferences this reporting period and gave 14 presentations at national and statewide conference meetings.

In the area of technology transfer, LTRC staff and contract researchers published 55 journal articles and completed 49 presentations this reporting period. In-house, LTRC published 23 final reports and technical summaries, 13 project capsules, 1 technical assistance report, 1 annual report, and 4 *Technology Today* newsletters. In addition, LTRC filmed and produced 25 DOTD informational videos, 1 Transportation Talk video featuring the DOTD Secretary, and 5 videos for interdepartmental use along with Secretary Dr. Shawn Wilson and Dr. Eric Kalovoda's TRB and AASHTO virtual addresses.

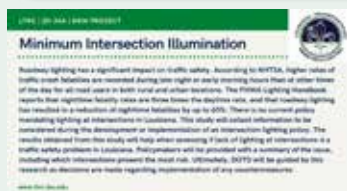
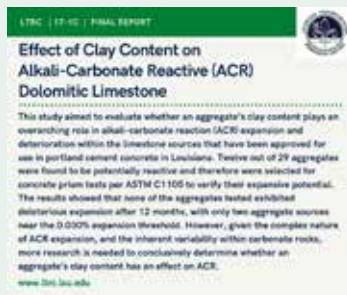
Please feel free to follow LTRC's latest news via our website, www.ltrc.lsu.edu, and through social media. You will also see some new interactive features in the online edition of this annual report to engage with web and video content.

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

Completed 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. The listings on the following pages include the LTRC project number, project title, and the principal investigator and his/her affiliation. Click on the project title to view the related publication online.

Get Research Updates Online



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



CONCRETE

17-1C: Effect of Clay Content on Alkali-Carbonate Reactive (ACR) Dolomitic Limestone
Jose Milla, LTRC

GEOTECHNICAL

13-3GT: Finite Element Analysis of the Lateral Load Test on Battered Pile Group at I-10 Twin Span Bridge
Murad Abu-Farsakh, LTRC

POOLED FUND

14-5PF: Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents and/or RAS
Louay Mohammad, LTRC

SAFETY

18-2SA: Louisiana's Alcohol-Impaired Driving Problem: An Analysis of Crash and Cultural Factors
Eva Shipp, Texas A&M Transportation Institute

18-5SA: Evaluating Pedestrian Crossings on High Speed Urban Arterials
Julius Codjoe, LTRC

19-5SA: Young Driver Crashes in Louisiana: Understanding the Contributing Factors to Decrease the Numbers
Elisabeta Mitran, ULL/LTRC

19-4SA: Impact of Center Line Rumble Strips And Shoulder Rumble Strips On All Roadway Departure Crashes in Louisiana Two-Lane Highways
Xiaoduan Sun, ULL

Completed Research

SPECIAL STUDIES

18-3SS: Evaluation of DOTD's Existing Queue Estimation Procedures
Julius Codjoe, LTRC

18-4SS: Trip Generation Modification Factors for Louisiana
Chester Wilmot, LSU/LTRC

19-2SS: Determining Louisiana's Roundabout Capacity
Julius Codjoe, LTRC

19-3SS: Exploring Non-Traditional Methods of Obtaining
Vehicle Volumes
Julius Codjoe, LTRC

STRUCTURES

15-3ST: Rehabilitation of Deteriorated Timber Piles using Fiber
Reinforced Polymer (FRP) Composites
Hota GangaRao, West Virginia University

18-4ST: Load Rating of Existing Continuous Stringers on Louisiana's
Bridges
C. Shawn Sun, Louisiana Tech University

20-2ST: Skew Detection System Replacement on Vertical Lift
Bridges (Phase 1)
Gareth Rees, Wiss, Janney, Elstner Associates, Inc.



During fiscal year 2020-21, 44 students (undergraduate and graduate) were supported by LTRC research projects. LTRC staff and contract researchers published 55 journal articles and completed 49 presentations (primarily virtual). LTRC research projects were associated with 18 dissertations or theses. Click on the icon to view a listing of items, or visit www.ltrc.lsu.edu/pdf/20_21.pdf.

55

*Journal
Articles*

64

Presentations

17

*Dissertations/
Theses*

Active Research

Click on the project title to view the related publication online.



BITUMINOUS (ASPHALT)

17-4B: Development of a 4.75-mm Asphalt Mixture Design
Saman Salari, LTRC

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

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

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

Active Research

Bituminous, continued

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



CONCRETE

20-3C: Feasibility and Advantages of Accepting Concrete Other Than 28 Days

William Saunders, LTRC

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



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

18-4GT: Geotechnical Asset Management for Louisiana through Dynamic Shear Rheometer

Gavin Gautreau, LTRC



Active Research



Geotechnical, continued

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

19-1GT: Maintenance of Roadway Edge Drop-Off Utilizing Readily Available Materials
Gavin Gautreau, LTRC

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

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



21-1GT: Internal Friction Angle of Sands with High Fines Content
Murad Abu-Farsakh, LTRC

PAVEMENT

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

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

Active Research

Pavement, continued

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

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



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

Active Research



Safety, continued

19-2SA: Reduce Pedestrian Fatal Crashes in Louisiana by Improving Lighting Conditions

Raju Thapa, LTRC

SPECIAL STUDIES

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

Julius Codjoe, LTRC

19-5SS: Assessing the Economic Benefits of the TIMED Program

Chester Wilmot, LSU/LTRC

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

Guang Tian, UNO

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

21-5SS: 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

21-3SS: Evaluating Permitted/Protected versus Protected Left Turn Signals in Louisiana

Raju Thapa, LTRC



Active Research

Special Studies, continued

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

STRUCTURES

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

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



Research in Practice

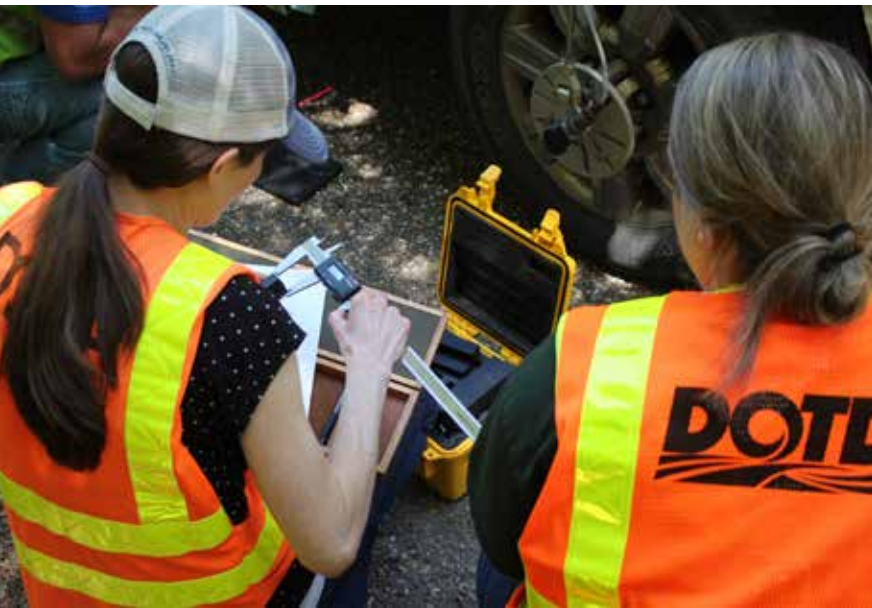
Based on research findings and recommendations from LTRC, the Louisiana Department of Transportation and Development has fully adopted HeadLight, a mobile e-construction inspection system. Based on data from the pilot projects, inspectors using HeadLight experienced a 28% increase in productivity when creating and submitting daily work reports, collecting 1.9 times more jobsite information. HeadLight's benefits were particularly useful with the challenges of the COVID-19 pandemic and five hurricanes in 2020. Read the story from Engineering News-Record online at www.enr.com/articles/51552-la-dot-fully-adopts-cloud-based-documentation-tool-headlight, or click on the photo to the right.



The research project associated with this development also received an American Association of State Highway and Transportation Officials' (AASHTO) annual Sweet Sixteen Award in July 2020. AASHTO Research Advisory Committee (RAC) each year asks states to identify and document recently completed "high-value" research projects. RAC publishes an annual compilation, which provides substantial value to state DOTs, serves as a quick reference to HVR projects, and helps eliminate or reduce duplication of research. From these submittals, each RAC region selects its top four projects to create the "Sweet Sixteen." Visit research.transportation.org/sweet-sixteen-2020/ to learn more about Louisiana and winners from other regions for the 2020 session.

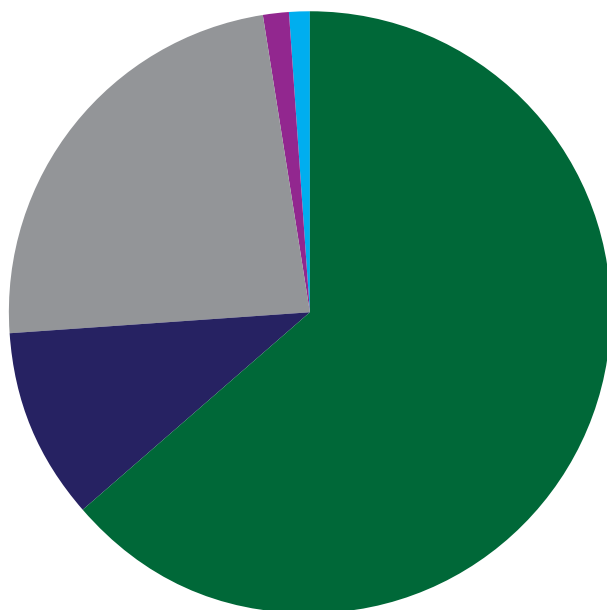
Workforce Development

Training is a critical component of career advancement, and DOTD supports and promotes an environment of continual learning. This atmosphere allows employees to maximize their potential and provide qualified personnel crucial to the effective management of the transportation system. Through specialized and intensive job-specific training and education programs, LTRC reaches out to individuals working in the transportation industry. In addition, each year, the External Training Program hosts programmatic initiatives for over 10,000 individuals (state, local, federal, and industry) and is a progressive partnering effort between the public and private sectors of the transportation industry.



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.



- Current (2,425, 64%)
- At Level (393, 10%)
- More Time (896, 24%)
- Pre-Booked/Booked (55, 1%)
- Past Due (36, 1%)

Workforce Development

Construction and 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 2020-21, LTRC processed 132 requests for new certifications and 245 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	1
PCC Field Tester	0	0	13	17
Nuclear Device Operator	0	0	2	7
PCC Technician	6	1	4	0
District Laboratory	0	6	0	1
Embankment & Base Course	23	33	4	11
Structural Concrete	23	21	5	10
PCC Paving	18	13	5	5
HMA Concrete Paving	27	45	6	28
HMA Concrete Plant	17	12	1	2

Statewide Strategic Program

Competency Model

Through the Competency Model project, LTRC individually meets 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 identify a need for future training to be developed. Ultimately, LTRC assists the section create a structure of knowledge transfer that will help flatten any learning curve for employees in their section. Currently, Section 24 – Road Design and Section 30 – Location and Survey are in progress, and Section 25 – Bridge Design and Section 80 – Contract Services will be addressed next.

Structured Training Program Needs Assessment

LTRC will begin assessing the structured training programs (STP) 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 will look at 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 Louisiana Community and Technical College System (LCTCS) 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, contractors, and transportation partners, 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 roadmap for potential employees in the transportation community will be developed allowing LCTCS to offer an educational path through to hiring.



Workforce Development

Workforce Development Program

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

The LTRC Transportation Curriculum Council (TCC) held its first meeting on September 1, 2010. It has an active council consisting of 13 members from Louisiana State University, transportation partners, and DOTD management. There are six subcommittees from: 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.

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 – Monthly presentation at New Employee Orientation and quarterly presentation at New Supervisor Orientation. This year, during the monthly New Employee Orientation sessions, our staff provided 159 new employees information about respective training programs and how to fulfill individual training requirements. Additionally, during the quarterly New Supervisor Orientation sessions, our staff provided 95 new supervisors with information about their supervisory responsibilities as they relate to training programs and annual reporting requirements for PES.
- Training Exception Requests – If an employee's training is incomplete at the time of a proposed personnel action, such as a reallocation or promotion, an exception may be allowed if it is the result of circumstances over which the employee has no control, such as scheduling or unavailability. Training records of 5 employees were reviewed and 4 exceptions were granted this fiscal year.
- Training Substitution Requests – If an employee has completed formal coursework or training and wishes to have those credentials recognized as a substitution to coursework required to be completed as part of the structured training program, the employee may submit a request for a training substitution. Substitution requests from 13 employees were reviewed this fiscal year, which resulted in a total of 54 courses being requested to substitute for required training. After reviewing each request, a total of 50 courses were approved to substitute for coursework required through the employees' STPs.
- Testing – Testing sessions are held 3 times a month for self-study courses. Employees were given 151 tests for different courses this fiscal year.
- Instructor-Led Training – This fiscal year 28 instructor-led classes were conducted to train employees in various topics which include: Project Management, Facilitation Skills, Basic Flagging Procedures, Hot Mix Asphalt (HMA) Plant Certification, Hot Mix Asphalt (HMA) Paving Certification, Asbestos Awareness, Power Line Safety, Chainsaw Safety and Operations, Dump Truck Safety and Operations, and Confined Spaces.

Workforce Development

Management Development Training Program

This program oversees several mandatory supervisory, management development, and career development training programs: Management Development Training program, a structured training program for DOTD employees in a professional job series; the Engineering Technician Supervisory Training program, a supervisory training program for DOTD Engineering Technicians; and the Civil Service Supervisory training program for supervisors.

During fiscal year 2020-2021, 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.

There were 1,026 employees subscribed to the Management Development Program, and there were 484 employees subscribed to the Management Development Technician Program. In FY 2020-2021, 129 employees completed the course requirements for the Management Development Program, and 29 employees completed the course requirements for the Management Development Technician Program.

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

Number of employees in CPTP Supervisory Group Programs FY 2020-2021:	
CPTP Supervisory Group 1	566
CPTP Supervisory Group 2	259
CPTP Supervisory Group 3	68
Number of employees who completed their Supervisory Group programs FY 2020-2021:	
CPTP PES Supervisory Group	83
CPTP Core Supervisory Group	57
CPTP Supervisory Group 1	43
CPTP Supervisory Group 2	12
CPTP Supervisory Group 3	2
Number of employees who completed continuing education in FY 2020-2021:	
	540

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.

Completed Presentations/Classes

- 7 Basic Flagging Procedures
- 5 Project Management
- 4 Facilitation Skills
- 3 Asbestos Awareness
- 2 Hot Mix Asphalt (HMA) Plant Certification
- 2 Powerline Safety
- 2 Chainsaw Safety and Operations
- 1 Dump Truck Safety and Operations
- 1 Confined Spaces
- 1 Asphalt Paving Certification



Workforce Development

Completed Projects

Course Revisions

- *Base Course Inspection Manual*
- *Preventative Maintenance of Light Vehicles Web-Based Training (WBT)*
- *Project Delivery – Stage 3 WBT*
- *Workplace Safety WBT*
- *Ethics for Construction Personnel WBT*
- *Project Management course manual*
- *Introduction to Surveying WBT*
- *Basic Flagging Refresher WBT*
- *Beating a Blowout WBT*
- *Safety Made Simple, The ABCs of Work Zone Safety WBT*
- *Bees With an Attitude - Africanized Honey Bees WBT*
- *One Step From Death WBT*
- *Transport Trailer Safety WBT*
- *DOTD TR 645 - Dynamic Cone Penetrometer (DCP) Operation WBT*
- *DOTD TR 322 - Determining the Effects of Moisture on Asphaltic Concrete Paving Mixtures WBT*
- *Density Testing for Embankment and Base Course WBT*
- *Sampling and Testing of Plastic Concrete WBT*
- *DOTD TR 120 - Soils Sand Equivalent Test Procedure WBT*
- *Sampling Soils and Aggregates WBT*
- *Heat Stress WBT*
- *Tort Liability Depositions WBT*
- *Poisonous Plant Safety WBT*
- *Handling Hazardous Chemicals WBT*
- *Tort Liability for Maintenance WBT*
- *Lowboy Trailer WBT*
- *Asbestos Awareness Instructor-Led Training (ILT)*
- *Power Hand Tool Safety WBT*
- *Basic Asphalt Plant Inspection course manual*

New Course Developments

- *Grammar and Writing Skills Part 3 WBT*
- *HMA Testing & Analysis 1 WBT*
- *HMA Testing & Analysis 2 WBT*
- *Powerline Safety WBT*
- *Project Delivery - Stage 4 WBT*
- *LTRC Workplace Safety WBT*
- *Motor Grader/Roller - Video Add-On WBT*
- *DOTD STL Hazard Material Annual Refresher WBT*
- *Road Safety 101 - Module 1*
- *Project Delivery - Stage 5 WBT*
- *DOTD Fundamentals of PCC Mixture Design course manual*

Workforce Development

On-Going and Current Projects

Course Revisions

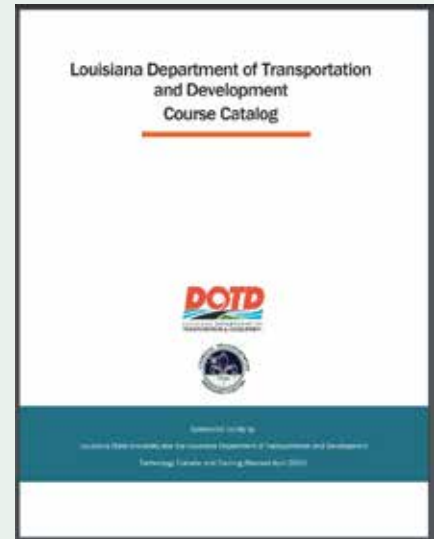
- *Portland Cement Concrete (PCC) Paving Inspection* course manual
- *Traffic Control Through Maintenance Work Areas* course materials
- *Bees With an Attitude - Africanized Honey Bees* WBT course overhaul
- *Poisonous Plant Safety* WBT course overhaul
- *Maintenance of Small Traffic Signs* course manual
- *Forklift Safety* WBT
- *Facilitation Skills* ILT course redesign
- *Highway Plan Reading 1* course manual

New Course Developments

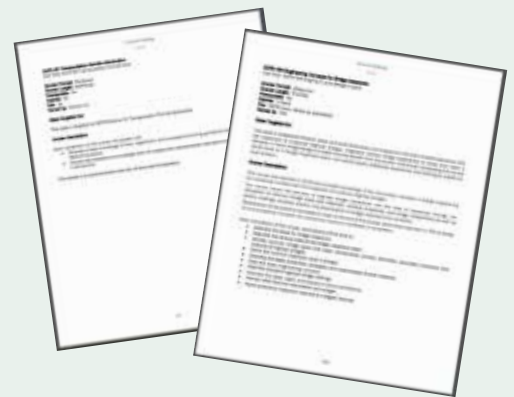
- *Road Safety 101 – Module 2*
- *LPA CE&I*
- *Asphalt Surface Maintenance* WBT
- *DOTD STL Hazardous Materials Full Course* WBT
- *Introduction to Pile Driving Inspection* WBT
- *Chainsaw Safety* WBT
- *Fundamentals of Negotiation Skills* WBT
- *DOTD HQ Training Liaison Guide* WBT
- *What You See Affects What You Hear: An Inside-Out Approach* WBT
- *EEO Biennial Meeting 2022-2023* WBT
- *Project Delivery - Stage 0* WBT
- *Project Delivery - Stage 1* WBT
- District Lab Certification preparation materials
- *Math for Construction Personnel 1* WBT
- *Math for Construction Personnel 2* WBT
- *Historic Bridge Training* WBT
- Assisting Human Resources in creating *Substance Abuse for Supervisors* WBT

Other Projects

- Creation of Equipment Certification Documents for the Equipment Operator Certification Program
- Management of LTRC's Test.com E-Testing System management
- LEO and DTRN support and training
- Participate in Competency Modeling for identified Departmental Sections
- Participate in Needs Assessment Review of all Departmental Structured Training Programs (STPs)
- Review training exception requests as needed
- Review training substitution requests as needed
- Continue to deliver training courses as required in all STPs



The complete DOTD Course Catalog is available online at www.ltrc.lsu.edu/pdf/DOTD_Course_Catalog.pdf (click on the image above to visit the link). The searchable catalog is a comprehensive listing of structured training offerings.





Workforce Development

External Training Program Activities Overview

In Fiscal Year 2020 - 2021, the DOTD External Programs impacted over 5,800 individuals (departmental, state, local, and transportation community partners) through over 300 programmatic initiatives.

EVENT/CLASS/WORKSHOP	NUMBER OF EVENTS	NUMBER OF PARTICIPANTS
NHI Courses, Contract Classes	15	254
Leadership Development Institute	26	255
LSU CADD	6	52
UNO PC	92	523
ArcGIS	7	48
Workshops and Conferences	26	549
Individual Registrations	—	297
ATTSA	12	410
Mechanics Course	11	713

Tech Transfer: Publications and Multimedia Highlights

- Published 4 *Tech Today* newsletters; 13 project capsules; 23 final reports/technical summaries; 1 tech assistance report; 1 annual report
- Edited 18 final reports/technical summaries
- Continued to apply accessibility requirements for all newly published work and implement new Word template
- Completed redesign of LTAP site; developed new section for Road Scholar on LTAP site
- Created social media-friendly content for LTAP through Adobe Spark
- Designed 4 issues of *Technology Exchange*
- Provided web support for NSF project: Field Monitoring and Measurements (FMM) Education
- Created and managed 4 research surveys
- Managed the LTRC Registration Management System
- Photographed all LTRC events
- Filmed and produced flagger instructional video for LTAP
- Filmed on-site road construction procedures for use in Technology Transfer courses
- Filmed and produced 25 DOTD informational videos
- Produced 3 DOTD/LTRC Zoom Video Presentations
- Filmed and produced 1 Transportation Talk video featuring Secretary Wilson consisting of 3 parts
- Filmed and produced 5 videos for interdepartmental use; Wilson/Kalivoda TRB and AASHTO virtual address, LA Scrapyard video documentation for DEQ purposes
- 956 subscribers on YouTube
- Prepared 15 draft project capsules
- Provided technical review for 18 Final Reports
- Provided Technology Transfer Manager comments for 59 biannual reports (period ending 6/30/20)
- Provided Technology Transfer Manager comments for 65 biannual reports (period ending 12/31/20)

Workforce Development

The following are brief overviews of External Training Program activities managed at LTRC.

National Highway Institute (NHI)

The NHI Program covers the 14 programmatic areas that are offered statewide to DOTD employees, municipal employees, private engineering firms, and other transportation partners. These areas include, but are not limited to, the following:

- Asset Management
- Business, Public Administration, and Quality
- Construction and Maintenance
- Design and Traffic Operations
- Environment
- Freight and Transportation Logistics
- Geotechnical
- Highway Safety
- Hydraulics
- Intelligent Transportation Systems (ITS)
- Pavement and Materials
- Real Estate
- Structures
- Transportation Planning

These courses address Louisiana-specific material and federal guidelines as well. *During fiscal year 2020-2021, 248 participants attended 15 courses.*



CADD/MicroStation Structured Training

Through the DOTD CADD/MicroStation Structured Training Program, this 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. DOTD is one of the few state departments that utilize this product series, and the only industry around that uses these products are the companies that work for DOTD. *During fiscal year 2020-2021, 52 participants attended 6 courses.*

Workzone Safety

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.



Workforce Development

Workzone Safety, continued

Work Zone Safety classes are required for contractor, consultant, and DOTD personnel. This is to inform workers about safety procedures and improve worker knowledge in order to avoid injury during their daily employment activities. Through these efforts, this also enables 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. The DOTD Work Zone Safety Program provides this specific training through a contract with ATSSA, the only organization that offers this Louisiana-specific training. The contract for services contains language on the Louisiana Standard Specifications, the Special Provisions, the Supplemental Specifications, and the Louisiana Specific Traffic Control Details. Also within the contract, there are specific requirements and consequences for the contractor not having Louisiana specific training. ***During fiscal year 2020-2021, 410 participants attended 12 ATSSA courses.***

ArcGIS

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. ***During fiscal year 2020-2021, 48 participants attended 7 courses.***

PC/Microsoft Structured Training

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. ***During fiscal year 2020-2021, 523 participants attended 92 courses.***

Co-op Program

The DOTD Co-op Program is a cooperative endeavor between DOTD and seven Louisiana universities with engineering departments. The program provides practical experience to civil, mechanical, environmental, electrical, industrial, and chemical engineering 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. ***During fiscal year 2020-2021, 7 students participated in the summer, 14 in the fall, and 15 in the spring.***

Workforce Development

Leadership Development Program

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. *During fiscal year 2020-2021, 255 people participated in 26 LDP courses.*

Engineering Rotational Development Program

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 and holds an active FE certification. *During fiscal year 2020-2021, 4 new hires participated in the ERDP, with 1 hired into a permanent position in the Department and 2 currently in the rotation.*

Other Programs

During fiscal year 2020-2021, 1,262 people participated in the following courses/workshops/events:

- Adobe
- Traffic Engineering Process & Report
- Maintenance and Rehab of Historic Bridges
- Pile Dynamics (PDA)
- H & E Milling and Paver Machines
- Professionalism and Ethics
- AED/CPR
- TRAC and Rides (Fall)
- RIDES (Summer)
- PE Review 2020 (completed 9/2020)
- PE Review 2021
- Mechanics Class
- Individual Registration



Marcus Sylvas, Leadership Development Program Manager, teaches a section of "Managing Across Generations." Read more at www.ltrc.lsu.edu/pdf/2021/TechToday_vol134_issue3_online.pdf or click on the photo above.



TRAC and RIDES are programs used to introduce students in grades K-12 to the work world of transportation and civil engineering and inspire them to consider careers in those fields. Visit www.ltrc.lsu.edu/trac_rides.html to learn more and watch a video about the program, or click on the photo above.

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, Louisiana LTAP is jointly supported by DOTD, FHWA, and LSU. LTAP also supports the DOTD Local Road Safety Program (LRSP), which provides assistance with regional and local agency road safety activities as part of the Louisiana Strategic Highway Safety Program (SHSP).



40

CLASSES

24

IN-PERSON

16

VIRTUAL

2,000+

ATTENDEES

Between July 1, 2020 and June 30, 2021, LTAP hosted two major Louisiana Parish Engineers and Supervisors Association (LPESA) meetings; facilitated two roundtable discussions; and conducted **40 classes** (24 in-person, 16 virtual) attended by more than **2,000 participants** from local and state agencies. These classes included Roads Scholar courses, work zone safety mini-workshops, Road Safety Assessment (RSA) workshops, Local Public Agency (LPA) courses, and Ethics.



14

PRESENTATIONS

LTAP gave **14 presentations** at national and statewide conferences & meetings.

9

MEMBERSHIPS



LTAP maintained active memberships with **9 professional associations** and groups, namely: NLTAPA, NACE, TRB, APWA, ITE, GRITS, ATD, LPESA and SimCap Louisiana.



\$3.3M

LRSP BUDGET PER YEAR

5 = \$980,000

LRSP PROJECTS APPROVED FOR FUNDING

DOTD sets aside a budget of **\$3.3 million per year** for LRSP. In 2020, **5 project applications** were approved for funding, which amounted to around **\$980,000**.



This past year had been unusually challenging, but LTAP successfully hosted a meeting in February 2021 on behalf of the Louisiana Parish Engineers and Supervisors Association (LPESA) in a socially distanced, hybrid format. Click on the photo to learn more about LPESA, or visit www.ltrc.lsu.edu/ltap/lpesa-conferences.html.

LTAP

Conferences Hosted

	<i>Location/Format</i>	<i>Attendees</i>	<i>Length</i>
SimCap Louisiana Educational Meeting # 6	Virtual Meeting	30	1.5 hours
SimCap Louisiana Educational Meeting # 7	Virtual Meeting	25	1.5 hours
SimCap Louisiana Educational Meeting # 8	Virtual Meeting	42	1.5 hours
2021 LPESA Annual Meeting	In Person/Virtual Meeting	40	2 hours
2021 LPESA Spring Conference	In Person Meeting	97	6.5 hours

Training

	<i>Location/Format</i>	<i>Attendees</i>	<i>Length</i>
FHWA Webinar: Focus on Reducing Rural Roadway Departures (FoRRRwD)	Virtual Training	28	8 hours
Roads Scholar #3: Drainage: The Key to Roads That Last	Virtual Training	61	6 hours
Roads Scholar #3: Drainage: The Key to Roads That Last	In-person (4 Locations)	71	6 hours
LPA Qualification Core Training Module	Virtual Training	16	7 hours
LPA Construction, Engineering, and Inspection	Virtual Training	29	6 hours
Basics of Work Zone Safety with Basic Flagger Training	15 sessions statewide	254	3.5 hours
LPESA Virtual Showcase	Virtual Training (7 sessions)	145	1 hour
Roads Scholar #15: Safety for Public Works First Responders	5 sessions statewide	66	6 hours
Professionalism & Ethics	Baton Rouge & Virtual Training	43	1 hour
Webinar: Gamification & Demographics	Virtual Training	13	1 hour
Webinar: Essential Tools to Keeping Training Relevant	Virtual Training	13	1 hour
LPESA Roundtable: Right of Way Issues	Baton Rouge	22	1 hour
Roads Scholar #9: The Road to Better Signing	Lafayette	18	6 hours
Roads Scholar #13: Inspection of Local Bridges Part 1	Virtual Training	70	7 hours
Road Safety Audit	Lake Charles	15	4 hours
DOTD District and Regional Safety Coalitions Safety Road Shows	Statewide (8 locations)	100+	—



LTAP teamed up with LTRC's multimedia staff to produce an instructional video that can be used in LTAP's "Work Zone Safety with Basic Flagging" classes. Click on the photo to watch the video, or visit youtu.be/-MTCadQ8iIE.



Professional Memberships

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

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 & 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 & 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
- Associate Editor–Bituminous and Flexible Pavement Section for *Journal of Materials in Civil Engineering*
- Member Bituminous Materials Committee

National Cooperative Highway Research Program (NCHRP) Affiliations

- 20-07 Task 422: User Review of the AASHTO Guide for the Local Calibration of the Mechanistic-Empirical Pavement Design
- 20-07 Task 420: Road User Understanding of Bicycle Signal Symbol Indications
- 03-136: Evaluating the Performance of Right-Turn-On-Red Operation at Signalized Intersections (with single and dual right-turn lanes)
- 17-87: Enhancing Pedestrian Volume Estimation and Developing HCM Pedestrian Methodologies for Safe and Sustainable Communities
- 15-62: Design and Access Management Guidelines for Truck Routes
- 18-17: Entrained Air Void System for Durable Highway Concrete
- 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

Transportation Research Board (TRB) Affiliations

Member

- ABG40–Library and Information Sciences for Transportation
- AFD80–Pavement Structure Modeling and Evaluation
- AFP30–Committee on Soil and Rock Properties
- AFS20–Geotechnical Instrumentation and Modeling
- AFS70–Committee on Geosynthetics
- AJE15–Workforce Development and Organizational Excellence
- AJE35–Research Innovations Implementation Management
- AJE45–Information and Knowledge Management Committee
- AKB10–Innovative Highway Structures and Appurtenances
- AKB30–Concrete Bridges
- AKD20–Roadside Safety

- AKR10–Maintenance and Operations
- AKG40–Mechanics and Drainage of Saturated and Unsaturated Geomaterials
- AKG70–Foundations of Bridges and Other Structures
- AKP40–Pavement Structure Testing and Evaluation
- 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

Friend

- ACP15–Intelligent Transportation Systems
- ACP20–Freeway Operations
- ACP40–Highway Capacity and Quality of Service
- ACS20–Safety Performance and Analysis
- AED60– Statistical Methods
- AFK10–Critical Issues and Emerging Technologies in Asphalt
- AFK20–Characteristics of Asphalt Materials
- AFK30–Non-Binder Components of Asphalt Mixtures
- AFK40–Surface Requirements of Asphalt Mixtures
- AFH60–Asphalt Pavement Construction and Rehabilitation
- AKC50–Concrete Pavement Construction and Rehabilitation
- AKM70–Durability of Concrete
- AKM50–Advanced Concrete Materials and Characterization
- AKP10–Pavement Condition Evaluation
- AKM60–Properties of Concrete and Constituent Materials
- AKB20–Steel Bridges
- AKB30–Concrete Bridges
- AKT60–Bridge Preservation
- AR080–Highway/Rail Grade Crossings
- 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)
- Institute of Electrical and Electronics Engineers (IEEE)
- 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 Engineering Society
- Louisiana Parish Engineers and Supervisors Association
- National Association of County Engineers
- National LTAP Association
- National Society of Professional Engineers
- National Transportation Knowledge Network (NTKN)
- National Transportation Training Directors
- Prestressed Concrete Institute (PCI)
- 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
- Tau Beta Pi, College of Engineering Level Honor Society
- Traffic Safety Culture Transportation Pooled Fund, Board Member
- Transportation Curriculum Coordination Council
- USDOT Transportation Disruption and Disaster Statistics (TDADS) Steering Committee
- US Universities Council on Geotechnical Engineering Research (USUCGER)

Other Memberships

- American Concrete Institute
- American Institute of Steel Construction
- American Public Works Association
- Association of Transportation Safety Information Professionals (ATSIP)
- Association for Talent Development
- CAAL Technical Committee
- Construction Certification Committee
- Deep Foundation Institute, DFI
- Deep South Institute of Transportation Engineers
- DOTD Work Zone Task Force

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