



TECHNOLOGY TODAY

VOLUME 36
ISSUE 4

A publication of the Louisiana Transportation Research Center



Photo: DOTD

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UPCOMING EVENTS

*National Highway Institute Course No. 380032A—
Roadside Safety Design*
March 19-21, TTEC 100

Emotional Intelligence
March 26, TTEC 175

*To view more events, please visit
<http://www.ltrc.lsu.edu>.*

RESEARCH

Louisiana researchers find cable median barriers save lives

Cable median barriers are lane-departure safety countermeasures installed to prevent cross-median crashes, which usually result in more fatalities and serious injuries compared to other crash types. Cross-median crashes occur when vehicles leave the roadway on the left shoulder, traverse the median of divided highways, and collide into fixed objects or other vehicles traveling in the opposite direction. To prevent such crashes, the Louisiana Department of Transportation and Development (DOTD) has been implementing cable median barriers since 2008, reaching approximately 623 miles of cable barriers in 2022. The goal was to install nearly 731 miles throughout the state by the end of 2023. Researchers at LTRC assessed how well these safety countermeasures have met their expected purpose in Louisiana and found that cable median barriers are effective in reducing cross-median crashes and mitigating crash severities.

In their study “Safety Effectiveness of Cable Median Barriers in Louisiana,” researchers Elisabeta Mitran, Ph.D., Xiaoduan Sun, Ph.D., P.E., and Safkat Tajwar Ahmed

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performed a comprehensive evaluation to ascertain the performance of cable median barriers in Louisiana from traffic safety and economic standpoints.

With at least six years of crash data, this study focused on three crash statistics: total number of crashes, median-related crashes, and cross-median crashes. Lead researchers Dr. Mitran and Dr. Sun pointed out, “The cable median barriers prevented 100% of cross-median fatal and severe injury crashes and reduced total cross-median crashes by 62%, demonstrating that the implementation of cable median barriers is highly effective in reducing fatal and severe injury crashes in Louisiana. Furthermore, the reductions in head-on crashes were 37% total crashes, 88% median-related crashes, and 88% for cross-median crashes, respectively.” Median-related fatal and serious injury crashes also decreased significantly; however, property damage-only crashes increased in this case.

Dr. Sun explained, “To account for the change in traffic volumes during the before and after the cable median barriers installation periods, an improved prediction model was used to accurately estimate the crash modification factors, or CMF. At 95% confidence, the upper bounds of estimated CMF for all severity levels of cross-median crashes were less than one, which demonstrates a notably impressive performance of cable median barriers.”

A benefit-cost analysis, using both economic units and comprehensive crash costs, was conducted to evaluate the cost-effectiveness of cable median barriers. “Using the Louisiana comprehensive crash unit costs, the estimated benefit-cost ratios were considerably greater than one, proving that cable median barriers are not only lifesaving but also cost-effective countermeasures,” said Dr. Mitran.

Researchers explain that there is sufficient evidence that cable median barriers are economically justified countermeasures effective in reducing cross-median crashes; therefore, DOTD should continue implementing cable median barriers along the state’s rural interstate systems where feasible.

**This document, and the information contained herein, is prepared for the purpose of identifying, evaluating, and planning safety improvements on public roads, which may be implemented utilizing federal aid highway funds. This information shall not be subject to discovery or admitted into evidence in a Federal or State court pursuant to 23 U.S.C. § 407.*

For more information on this project, please visit www.ltrc.lsu.edu/pubs_final_reports.html and select Final Report 684. Or contact Dr. Elisabeta Mitran at 225-767-9129 or elisabeta.mitran@la.gov.



TRAINING

Migration to new training system a success

by Claire Dixon

During fiscal year 2022-23, the Office of Technology Services (OTS) selected a new Learning Management system (LMS), SuccessFactors, for use by all state agencies to facilitate training and report training compliance. Although SuccessFactors provides many significant improvements over the previous LMS, the implementation of this new system required a complete restructure of the agency’s long-established approach to training.

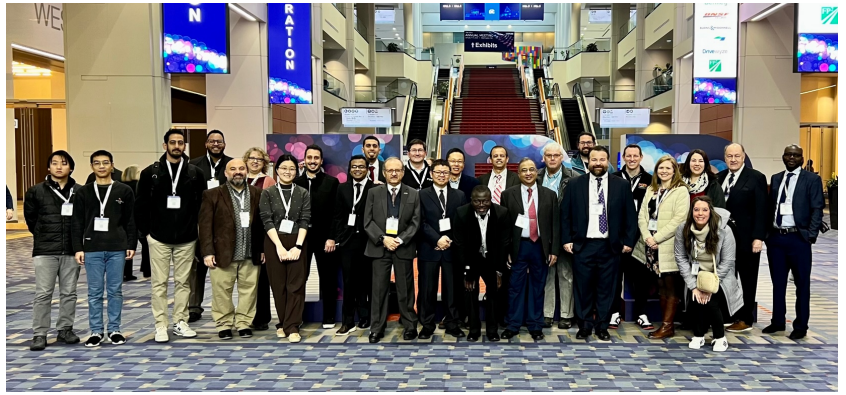
When OTS implemented SuccessFactors, there was a gap in the records that were migrated over from the state’s previous LMS (known as LSO). Any training records that had not been active in LSO were not transferred to the new (SuccessFactors) platform. As a result, when an employee’s training records eventually appeared in SuccessFactors, these records were missing a vast amount of data. Correctly assigning training to over 4,200 DOTD employees in a system that displayed incomplete training histories presented a challenging task.

However, LTRC staff was able to devise a way to efficiently manually upload all of the missing data. As a result, DOTD’s SuccessFactors records now display complete credit for all courses and programs each employee has finished. This action has

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RESEARCH

LTRC represented at 103rd TRB meeting



The 103rd annual meeting of the Transportation Research Board (TRB) took place January 7-11, 2024, at the Walter E. Washington Convention Center in Washington, DC. This event catered to thousands of transportation administrators, practitioners, policymakers, and researchers, featuring over 600 workshops, lectern sessions, committee sessions, and poster sessions. The following is a list of presentations made by LTRC staff members and contract researchers:

“Feasibility Study on the Use of Drone-Based Infrared Thermography for Soil Moisture Detection in Highway Embankment and Dam Inspection” (Qiming Chen and Zhongjie Zhang)

“A Holistic and Practical Approach for Assessing Flood Risks of Low-Volume Roads” (Qiming Chen, Mingjiang Tao, and Rajib Mallick)



“Non-Destructive Techniques for Evaluating Pavements with Unusual Surface Distresses: Two Case Studies in Louisiana” (Moses Akentuna, Qiming Chen, Zhongjie Zhang, and Tyson Rupnow)

“Exploring Tree-Based Machine Learning Models to Predict Load-Settlement Behavior of Piles from Cone Penetration Test Data” (Murad Abu-Farsakh and Mohammad Moontakim Shoaib)

“Implementing Site Variability into LRFD Design of Shallow Foundations on Cohesive Soils” (Murad Abu-Farsakh, Md. Habibur Rahman, Masoud Nobahar, and Ayman Okeil)

“Develop Regression Models to Evaluate the Undrained Shear Strength of Clay Soils from Cone Penetration Tests” (Md. Imran Hossain and Murad Abu-Farsakh)

“Development of Reduction Factors for Sublayers of MEPDG Rutting Equations in Geosynthetic Reinforced/Stabilized Pavements” (Mehdi Zadehmohamad, Murad Abu-Farsakh, and George Voyiadjis)

“A Case Study on Instrumenting and Monitoring Geosynthetic-Reinforced Pile-Supported MSE Wall Built over Soil” (Mohammad Izadifar, Murad Abu-Farsakh, and Shengli Chen)

“Evaluation of Design Parameters (α and β) for Analysis and Design of Piles on Soft Clays” (Md. Nafiu Haque and Murad Abu-Farsakh)

“Assessment of Axial Resistance of Piles Considering Consolidation Setup and Aging Setup Using Direct Pile-CPT Methods” (Isam Khasib and Murad Abu-Farsakh)

“Update the Louisiana Pile Design from Cone Penetration Test (LPD-CPT) Software” (Murad Abu-Farsakh, Jesse Rauser, and Gavin Gautreau)

“Forensic Investigation of a Cracked Highway Embankment Pavement in Louisiana: A Case Study” (Jesse Rauser, Gavin Gautreau, and Masoud Nobahar)

“Evaluation of Lightweight Aggregate with the Dynamic Cone Penetrometer (DCP)” (Gavin P. Gautreau, Nick Ferguson, and Masoud Nobahar)

“Geotechnical Asset Management (GAM) in Louisiana” (Gavin P. Gautreau)

“Prediction of Network-Level Cracking Performance for Flexible and Rigid Pavements in Louisiana Using Neural Network Models” (Zhong Wu)

“Investigating Older Driver Crashes on High-Speed Roadway Segments Using Random Parameter Ordered Probit Model” (Ahmed Hossain, Xiaoduan Sun, Subashish Das, Monire Jafari, and Julius Codjoe)



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“Prediction of Alligator Cracking Index for Asphalt Overlay Pavements in Louisiana Using Markov Chain Models” (Hang Lu and Zhong Wu)

“A Comprehensive Analysis of Fatal Crashes Involving Child Restraints” (Subasish Das, Valerie Vierkant, and Ashifur Rahman)



“Analyze Crashes during Extreme Weather: Introducing the CREW Dashboard Developed for Louisiana” (Ruijie Bian)

“A Comprehensive Investigation of Pedestrian Hit-and-Run Crashes: Applying XGBoost and Binary Logistic Regression Model” (Ahmed Hossain, Xiaoduan Sun, Ahmed Sajid Hasan, Mohammad Jalayer, and Julius Codjoe)

“Investigating Pedestrian-Vehicle Crashes on Interstate Highways: Applying Random Parameter Logit Model” (Ahmed Hossain, Xiaoduan Sun, Subasish Das, Monire Jafari, and Ashifur Rahman)

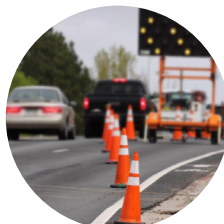
“Exploring the Context of Roadway Geometry and Operational Characteristics in Severe Pedestrian Crashes: Application of Association Rule Mining” (Ashifur Rahman, Ahmed Hossain, Elisabeta Mitran, Julius Codjoe, Subasish Das, and Xiaoduan Sun)

“Exploring Factors Contributing to Frontage Roadway Crashes Using a Probabilistic Graphical Model” (Subasish Das, Ahmed Hossain, Ashifur Rahman, and Xiaoduan Sun)

“Evaluating the Safety Effectiveness of Control of Access Fencing Using a Propensity Scores Framework” (David Appiah, Milhan Moomen, Ashifur Rahman, and Julius Codjoe)

“Investigating Key Factors of Large Truck Rollover Crashes on Interstates: A Study Using the Random-Parameter Binary Probit Model” (Ashifur Rahman, Milhan Moomen, Vijay Gopu, and Julius Codjoe)

“Examining Encroachment-Related Work Zone Crash Contributing Factors Using Probabilistic Graphical Method” (Subasish Das and Ashifur Rahman)



“Effectiveness of Red-Light Cameras in Lafayette” (Farooq Azam Khanzada, Xiaoduan Sun, and Julius Codjoe)

“Analyze Crashes during Extreme Weather: Showcasing Work of Undergraduate Students” (Magret Blouin, Morgan Domingue, and Ruijie Bian)

“Impacts of Large-Scale Transportation Infrastructure Investments on Communities” (Armaghan Monshizadegan, Ruijie Bian, Peter Stopher, and Hany Hassan)

“Understanding Social Impacts of Major Disruptions from the Perspective of Destination Access” (Manika Rana Bhat, Ruijie Bian, Tara Tolford, and Hany Hassan)

“Design and Evaluation of MASH TL-3 Retrofit Bridge Rail for Vintage Concrete Post and Beam Bridge Rail with Safety Walk for Louisiana Department of Transportation” (William Williams, Sana Moran, and Walid Alaywan)

“Predicting Vehicle Miles Traveled: Traditional Statistical Models Versus Machine Learning Approaches” (Guang Tian, Bob Danton, Bin Li, Vijaya Gopu, and Julius Codjoe)

“Long-Term Performance of Flexible Pavements Containing Crumb Rubber Modified Asphalt in Louisiana” (Shasank Pant, Moses Akentuna, Louay N. Mohammad, Samuel B. Cooper, III, and Samuel B. Cooper, Jr.)



“The Influence of Petroleum-Based and Bio-Derived Recycling Agents on Performance of High Reclaimed Asphalt Pavement Asphalt Mixtures” (Ibrahim Elnaml, Jun Liu, Louay N. Mohammad, Gaylon L. Baumgardner, Samuel B. Cooper, III, and Samuel B. Cooper, Jr.)

“Effect of High Polymer, Crumb Rubber, and Epoxy-Modified Asphalt Binders on Laboratory Performance of Open-Graded Friction Course Mixtures” (Anas Abualia, Jun Liu, Louay N. Mohammad, Gaylon L. Baumgardner, Samuel B. Cooper, III, and Samuel B. Cooper, Jr.)

“Field Validation of Louisiana’s Specified Asphalt Balanced Mix Design Criteria” (Shasank Pant, Moses Akentuna, Louay N. Mohammad, Samuel B. Cooper, III, and Samuel B. Cooper, Jr.)

COMMUNITY

Louisiana students receive scholarships by SASHTO and DOTD



The Louisiana Department of Transportation and Development (DOTD), in conjunction with the Louisiana Transportation Research Center (LTRC) and the Southeastern Association of State Highway Transportation Officials (SASHTO), has awarded \$1,000 scholarships to 12 students from five Louisiana universities. These annual scholarships are given to outstanding junior and senior civil engineering students who demonstrate an interest in the field of transportation.

“Congratulations to these 12 outstanding engineering students who have received these SASHTO scholarships,” said DOTD Secretary Joe Donahue. “Civil engineering is an important discipline, and countless individuals benefit from this field every moment of every day. We know these fine students will use their knowledge in their careers to continue making our state even better for everybody.”

Funding for these scholarships is provided by SASHTO, which has given over 300 scholarships since 2003, totaling \$317,000.

Students who receive the scholarships must be in good academic standing at their respective universities, and their grade point averages are taken into consideration when their applications are reviewed. Each prospective scholarship recipient must also submit a one-page description stating how their university courses reflect their interest in transportation. Those students who have participated in DOTD’s summer engineering and co-op programs receive extra credit.

Congratulations to the following Louisiana students who received scholarships:

- **Louisiana State University**—Myandra Gildon, Nathan Mahony, Gabriel O’Regan, and Ryan Churchman
- **University of Louisiana at Lafayette**—Grantt Chelette and Colin Kramer
- **Louisiana Tech University**—Trevor Fortier
- **McNeese State University**—Connor Broussard, Christina Canale, and Kade Hunter
- **Southern University**—Iyanla Bailey Williams and Ja’Porcha Joubert

We know these fine students will use their knowledge in their careers to continue making our state even better for everybody.

—DOTD Secretary Joe Donahue

allowed LTRC to create and assign appropriate training programs in SuccessFactors with ease, ultimately resulting in a very smooth transition to the new LMS.

Specifically, the transition required the complete restructure of 112 legacy training programs for implementation in SuccessFactors, resulting in the creation of 119 new assignment profiles (employee training requirements associated with a specific job title or job code), 116 programs (specialized training for job titles), and 32 curricula (recurring training requirements) to support agency training and certification. Additionally, LTRC modified and manually uploaded content for 117 ADA-compliant, web-based training courses to SuccessFactors.

Despite the challenges associated with the transition to SuccessFactors, LTRC was able to ensure a 2023 fiscal year training compliance rate of 98.4% and a 2023 calendar year training compliance rate of 100%.

STAFF NEWS

Updates and Accomplishments

Associate Director of External Programs **Vijaya (V.J.) Gopu**, Ph.D., P.E., was recently elected as Fellow of the Structural Engineering Institute (SEI). He also chaired the meeting of the Industrial Advisory Board of the Center for Integration of Composites in Infrastructure (CICI) held at Texas A&M University in December 2023.

Gavin P. Gautreau, P.E., was selected to serve as an incoming co-chair of the Transportation Research Board (TRB) Joint Section Subcommittee on Geotechnical Asset Management (GAM)-AKG00(1) at the 2024 Annual Meeting in Washington DC.

Welcome to **Todd Blount**, the new Manager of Technical Publications for Section 33.

Congratulations to **Dimetrie Chopin** on his promotion to SuccessFactors & Specialized Training Program Manager in Section 33.

Welcome to **Mike Labat**, the new HQ Training /CPTP & Specialized Training Program Manager.

Congratulations to **Corey Mayeux**, P.E., and **Heather Huval** on each graduating with their Master of Science. Corey's is a Master of Science in Civil Engineering with a focus on transportation engineering. Heather's is a Master of Science in Leadership and Human Resource Development. And congratulations to **Marcus Sylvas**, Ph.D., for graduating with his Doctor of Philosophy. The title of his dissertation was "The Influence of Objective Self-Awareness and Select Demographics on Team Psychological Safety Among State Employees in Louisiana."

Congratulations to **Steve Strength**, P.E., on his retirement from LTAP as Program Director after over 10 years of service in the program after 32 previous years with DOTD. And congratulations to **Ted Ball** on his retirement from LTRC after over 32 years of service to the state of Louisiana.

Congratulations to **Marcus Sylvas**, Ph.D., and **Garrett Wheat**, Ph.D., on being elected to new positions in ATD. Dr. Sylvas was selected as the ATD Baton Rouge Chapter President-Elect, and Wheat was elected as the ATD Baton Rouge Chapter Vice President of Special Interest Groups.

Recently Published

Project Capsule 23-1SS

Safety and Traffic Operations at Cloverleaf Interchanges

Hany Hassan, Ph.D., P.E.

Project Capsule 24-1B

Sustainability through Development of Life Cycle

Information Models for Pavements in Louisiana

Louay Mohammad, Ph.D., P.E. (WY), F. ASCE

Project Capsule 24-1P

Evaluation of Louisiana Maintenance and Rehabilitation

Treatment Decision Matrix for Cost-Effective and Timely

Pavement Preservation

Zhong Wu, Ph.D., P.E.

Project Capsule 24-2SA

Older Road Users Safety in Louisiana: Understanding the

Crash Contributing Factors

Elisabeta Mitran, Ph.D.

Project Capsule 24-2SS

Trip Generation for Various Sites

Ruijie “Rebecca” Bian, Ph.D., P.E.

Project Capsule 24-3SS

Evaluating Practical Applications of Unmanned Aerial

Vehicles for Traffic Incident Response and Management

Milhan Moomen, Ph.D.

Project Capsule 24-4SS

Improved Signalized Intersection Performance using

Computer Vision and Artificial Intelligence

Milhan Moomen, Ph.D.

Final Report and Technical Summary 683 (20-1SA)

Evaluation of Traffic Crash Characteristics on Elevated

Sections of Interstates in Louisiana

M. Ashifur Rahman, Ph.D.; Elisabeta Mitran, Ph.D.; Julius

Codjoe, Ph.D., P.E.; Kofi Kakyire Ampofo-Twumasi; and

Safkat Tajwar Ahmed

Final Report and Technical Summary 686 (21-1SA)

Highway Safety Culture Assessment through Louisiana’s
Regions

Helmut Schneider, Ph.D.; T. Scott Smith, Ph.D.; and David
E. Whitchurch

Final Report and Technical Summary 688 (23-3B)

Effect of Longitudinal Joint Construction and Density on
Asphalt Pavement Performance –Phase I–State of the
Practice

Moses Akentuna, Ph.D., P.E., and Saman Salari, P.E.

Final Report and Technical Summary 690 (18-1P)

Exploration of Drone and Remote Sensing Technologies
in Highway Embankment Monitoring and Management

(Phase I)

Zhongjie Zhang, Ph.D., P.E., and Qiming Chen, Ph.D., P.E.



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Technology Today

Publication Statement

Technology Today is a quarterly publication of the Louisiana Transportation Research Center, administered jointly by the Louisiana Department of Transportation and Development and Louisiana State University.

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This public document is published at a total cost of \$1,613.05. Seven hundred and ninety-three copies of the public document were published in this first printing at a cost of \$1,613.05. The total cost of all printings of this document, including reprints, is \$1,613.05. This document was published by Mele Printing, 11930 South Harrell's Ferry Road, Baton Rouge, to report on the research and training of the Louisiana Transportation Research Center, as required in R.S. 48:105. This material was duplicated in accordance with standards for printing by state agencies, established pursuant to R.S. 43:31. Printing of this material was purchased in accordance with the provisions of Title 43 of the Louisiana Revised Statutes.