DOTD Geotechnical Information Database Expands

Accessing historical geotechnical data and combining it with new data for the purpose of design, analysis, visualization, and reporting has proven difficult over the years because the data has been generated by disparate systems and stored as hard copies, scanned images, various digital formats, or other non-digital formats such as microfilm. To alleviate this problem, an initial geotechnical database was completed by LTRC in 2008 to preserve and allow quick access to some historical data via a geographic information system (GIS). Subsequent requests from the Louisiana Department of Transportation (DOTD) Geotechnical Design section and inspiration from similar work by the Kentucky Transportation Cabinet, led to this follow-up study to expand the geotechnical information system and database.

Senior Geotechnical Research Engineer Gavin Gautreau, P.E., explained, “The goal of this project was to create an enterprise GIS-based geotechnical data management...
system that allows for the integration of historically acquired (likely in non-digital format), recently acquired (likely in digital format), and future acquired data (in digital format) to create a composite database for a particular project that not only benefits that project, but also becomes part of a larger knowledge base available for use on other future projects undertaken by DOTD.”

Dataforensics was contracted to conduct the research and create a plan to integrate and implement a customized data management system for DOTD. The work incorporated tasks and strategies that required expertise in geotechnical engineering, database systems, GIS technologies, process flow, as well as software development and integration.

“This project ultimately developed a comprehensive geotechnical data management system to streamline the processes for borehole, lab testing, CPT, in-situ vane, and test pile load test data, while providing long-term availability of the data via a web-based GIS portal,” said Gautreau. “By standardizing the database structure, incorporating validation rules, and creating custom reports, DOTD personnel in various sections can more easily access and report their geotechnical data while simultaneously improving the quality and reliability of the data.”

The GIS interface can access many different sources and types of data within and outside the Department. The quick and easy access to valuable data, including the mapping applications in the GIS, will streamline and facilitate the analysis of data. This enterprise GIS-based geotechnical data management system is comprised of various off-the-shelf software packages including PLog Enterprise, RAPID CPT, gINT, ArcGIS, and ArcGIS Server.

The project is currently being utilized by the Geotechnical Design section and Materials Testing section, and it will allow for more accurate and cost effective design decisions. This database resource tool will continue to grow over time as more data is uploaded/entered by DOTD and its consultant partners. Additionally, this project archived data compiled in the 03-1GT and 06-6GT projects as the first data loaded into the system. If DOTD were to try to re-create this same data by reinvestigating the same sites (~600 boreholes and ~1100 CPT soundings), the cost is estimated at $9,300,000 ($10,000 per borehole/$3,000 per CPT sounding). Accordingly, the potential benefit of this work is extraordinary as approximately $200,000 was expended to turn $9,300,000 worth of data into a usable asset. The return on investment of this asset going forward will be realized as new projects utilize the geotechnical database to supplement knowledge and reduce the amount of future site investigations needed for the design analysis.

A follow-up project is anticipated to further expand the utilization of the Department’s geotechnical data, and eventually open the website to the public, after efforts regarding internal security and firewalls are resolved.

To learn more about this study and its findings, you can download Final Report or Technical Summary 498 at LTRC publications page (http://www.ltrc.lsu.edu/publications.html) or contact Gavin Gautreau at gavin.gautreau@la.gov.
Louisiana Represented at 93rd Annual TRB Meeting

LTRC and DOTD engineers, contract researchers, and officials represented Louisiana at the Transportation Research Board (TRB) 93rd Annual Meeting in Washington, D.C., January 12-16, 2014. Nearly 12,000 policy makers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions attended the meeting, which was held at the Washington Marriott Wardman Park, Omni Shoreham, and Hilton Washington hotels. More than 4,500 presentations in 800 sessions and workshops covering all aspects of transportation were given during the meeting. The spotlight theme for 2014 was Celebrating Our Legacy, Anticipating Our Future.

The following LTRC research was presented at this year’s meeting:

Understanding Your Deployment Strategy from Research Initiation to Project Delivery
Mark Morvant, presenter

Prep-ME: Status of Pooled-Fund Project TPF-5(242) and Implementation Experience of Software Users
Zhongjie “Doc” Zhang, presenter

Use of Rolling Wheel Deflectometer Deflection Data in Pavement Management Systems for Flexible Pavement
Zhongjie “Doc” Zhang, presenter

Louisiana Legislature Acts on Research to Add Axle to Overloaded Sugar Cane Trucks
Bill King, presenter

Effects of Gauge Length and Specimen Orientation on Laboratory-Measured Dynamic Modulus of Asphalt Mixtures
Sam Cooper, III, presenter

Balanced Asphalt Mixture Design through Specification Modification: Louisiana’s Experience
Sam Cooper, III, presenter

Why Pavement Fails: Why Pavement Fails: A Case Study in Louisiana
MD Kabir, presenter

Validity of Multiple Stress and Creep Recovery Test for Louisiana DOTD Asphalt Binder
MD Kabir, presenter

Evaluation of PMS Pavement Rehabilitation Recommendation Using RWD Deflection Data for Flexible Pavement
Zhongjie “Doc” Zhang, presenter

A Case Study on Instrumenting and Testing Full-Scale Test Piles for Evaluating Set-up Phenomenon
Murad Yusuf Abu-Farsakh, presenter

Accelerated Load Testing of Geosynthetic–Reinforced and Stabilized Unpaved Roads Built over Native Soft Soil
Xiaochao Tang, presenter

Evaluation of Performance of Geosynthetict-Reinforced Unpaved Roads Using Plate Load Tests
Qiming Chen, presenter

Foundation Load Test Databases: Applications, Contents, and Development
Naser Abu-Hejleh, presenter

Evaluation of AASHTO Pavement M-E for Louisiana Rigid Pavement Design
Zhong Wu, presenter

Approaches to Relate Cumulative Traffic Loading to Performance for Pavements Designed Using MEPDG
Danny Xiao, presenter

Laboratory Performance of Asphalt Mixtures Containing Recycled Asphalt Shingles
Samuel B. Cooper, Jr., presenter
Recognized for his leadership and distinguished service to TRB, Harold “Skip” Paul was the 2013 recipient of the W.N. Carey, Jr., Distinguished Service Award. Paul, recognized for his outstanding service to transportation research and to TRB, received the award on January 15, 2014, during the Chairman’s Luncheon at the TRB 93rd Annual Meeting in Washington, D.C.

Created by the TRB Executive Committee in 1972 as the Highway Research Board Distinguished Service Award, the award was renamed in 1987 to honor W. N. Carey, Jr., who served with distinction as the TRB Executive Director from 1967 until 1980.

Paul has served the Transportation Research Board tirelessly for more than 25 years in a variety of roles. The consummate TRB state representative, he has long been the Louisiana Department of Transportation and Development’s voice in TRB and a key contributor to the Board’s strong continuing partnership with the states, both through his work in that post and through his leadership roles on the American Association of State Highway and Transportation Officials Research Advisory Committee (RAC) and Standing Committee on Research (SCOR).

Those two groups, which develop the National Cooperative Highway Research Program, have benefited from Paul’s thoughtful and far-reaching contributions as the current RAC Chair and SCOR Vice-Chair.

Paul has served as a member or chair of more than 30 TRB councils, groups, sections, committees, panels, and task forces. As Chairman of the Division A Council—now the Technical Activities Council—from 1999 to 2002, he initiated the effort that led to the reorganization of TRB’s standing technical committees and task forces into the current 11 group functional and modal structure.

The enhanced structure has been credited with creating a new synergy among the groups, enabling the standing committees to address a wider variety of transportation research issues. In 2001, he was named a National Associate of the National Research Council of the National Academies.

Paul began his career with the Louisiana Department of Transportation and Development in 1977. In 1986 his responsibilities within the department grew with the creation of the Louisiana Transportation Research Center, where he was named Director in 2006. Paul is a former board member of the Association of Asphalt Paving Technologists and has participated on many Federal Highway Administration advisory groups. Captain Paul is a retired Navy Reserve Intelligence Officer with 42 years of service. He is a graduate of Lehigh University where he earned a Bachelor of Science degree in mechanical engineering (1976) and a Bachelor of Arts degree in English (1976).
**2014 SASHTO Sponsorship and Trade Show Opportunities**

The SASHTO Executive Committee is pleased to announce that the 2014 annual SASHTO conference will be held August 23-27, 2014, at the New Orleans Sheraton. The theme for the conference is Transportation Innovation: Building the Future. The 2014 SASHTO conference is ready to begin accepting corporate sponsorships. Gain valuable exposure for your company and brand by being a SASHTO 2014 sponsor. Multiple levels of sponsorship will be available with varying benefits.

To view details on each level of sponsorship benefits, please visit the 2014 SASHTO website at www.ltrc.lsu.edu/sashto2014/sponsors.html

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In addition to sponsorship opportunities, your business may be interested in a trade show booth. The trade show will be held in the Sheraton New Orleans Hotel Grand Ballroom. The trade show will run Monday, August 25, 2014, 7:00 a.m. - 5:00 p.m. through Tuesday, August 26, 2014, 7:00 a.m. - 3:30 p.m. Please visit our trade show information page at www.ltrc.lsu.edu/sashto2014/trade_show.html to learn more specifics on this event.

Be sure to visit the conference Web site at www.ltrc.lsu.edu/sashto2014 to get more information about the conference and New Orleans. The Web site will be updated frequently as the conference approaches. We look forward to seeing you in New Orleans at the 2014 SASHTO conference!
Staff Updates and Accomplishments

Samuel Cooper, III, P.E., passed his Professional Engineers exam in Civil Engineering and has been promoted to Engineer 3.

Jenny Gilbert, editor, and Emily Wolfe, muti-media specialist, designed and submitted the winning logo design for AASHTO’s National Transportation Product Evaluation Program (NTPEP). In response, DOTD was awarded a scholarship to attend the 2014 annual NTPEP meeting in Greenville, SC.

Wolfe also recently completed the Graphic Design Certificate Program through LSU Continuing Education.

Associate Director of External Programs VJ Gopu, Ph.D., presented a keynote lecture at the 8th Asia Pacific Conference on Wind Engineering held Chennai, India in December 2013.

Engineering Materials Characterization Research Facility (EMCRF) Manager and LSU Civil Engineering Professor Louay Mohammad, Ph.D., was invited to be a panelist at the Transportation Infrastructure Sustainability Summit that was held on October 29, 2013, in Miami, FL. Dr. Mohammad discussed Sustainable Pavement Systems: Material, Design, and Construction.

Recently Published

Project Capsule 12-1SS
DOTD Support for UTC Project: Traffic Counting Using Existing Video Detection Cameras
Sherif Ishak, Ph.D.

Project Capsule 13-2SS
DOTD Support for UTC Project: Travel Time Estimation Using Bluetooth
Chester Wilmot, Ph.D., P.E.

Project Capsule 13-6GT
DOTD Standards for GPS Data Collection Accuracy
Joshua D. Kent, Ph.D.

Project Capsule 14-1SS
DOTD Support for UTC Project: Development of an Optimal Ramp Metering Control Strategy for I-12
Sherif Ishak, Ph.D.

Project Capsule 14-4PF
Mitigation Strategies for Reflective Cracking in Pavements
Mostafa A. Elseifi, Ph.D., P.E.

DOTD Pavement Design Guide
Shashikant Shah

Technical Assistance Report 13-01 TA-B
Evaluation of Rutting Distresses on I-20 near Mound to Delta Scales
William “Bill” King, Jr., P.E.; Md Sharear Kabir, P.E.; Samuel B. Cooper, Jr., P.E.; and Kevin Gaspard, P.E.
Final Report and Technical Summary 453
Development of a Design Methodology for Asphalt Treated Mixtures
Louay N. Mohammad, Ph.D.; Munir D. Nazzal, Ph.D., P.E.; William “Bill” King, Jr., P.E.; and Aaron Austin, P.E.

Final Report and Technical Summary 475
Accelerated Loading Evaluation of Foamed Asphalt Treated RAP Layers in Pavement Performance
Louay N. Mohammad, Ph.D.; Zhong Wu, Ph.D., P.E.; and William “Bill” King, Jr., P.E.

Final Report and Technical Summary 493
Evaluation of Non-Destructive Technologies for Construction Quality Control of HMA and PCC Pavements in Louisiana
Patrick Icenogle, E.I., Md. Sharear Kabir, P.E.

Final Report and Technical Summary 505
Implementation of GPC Characterization of Asphalt Binders at Louisiana Materials Laboratory
Negulescu, Ph.D., and Sreelatha S. Balamurugan, Ph.D.

Final Report and Technical Summary 506
Developing Louisiana Crash Reduction Factors
Xiaoduan Sun, Ph.D., P.E., and Subasish Das

Final Report and Technical Summary 507
Measuring the Effectiveness of Ramp Metering Strategies on I-12
Sherif Ishak, Ph.D., Julius Codjoe, Osama Osman, Marlene Russell, and Jose Rodriguez

Final Report and Technical Summary 509
Load Distribution and Fatigue Cost Estimates of Heavy Truck Loads on Louisiana State Bridge
Aziz Saber, Ph.D., P.E.

Final Report and Technical Summary 510
LTRC Automated Enforcement and Highway Safety
Susan Herbel, Richard Retting, and Elizabeth Wemple, P.E.

Final Report 511
STC Synthesis of Research Results for Water Quality Management at Construction Sites
Alexander M. Aguilar; Richard H. Sheffield, P.E.; and Wilfred M. Welch, III, RPG

Final Report 512
STC Synthesis of Best Practices for Determining Value of Research Results
Baabak Ashuri, Ph.D., DBIA; Mohsen Shahandashti; and Mehdi Tavakolan, Ph.D.

Final Report and Technical Summary 513
Evaluation of Open Graded Friction Course (OGFC) Mixtures
William “Bill” King, Jr., P.E.; Md Sharear Kabir, P.E.; Samuel B. Cooper, Jr., P.E.; and Christopher Abadie, P.E.

Final Report and Technical Summary 514
Bayou Corne Sinkhole: Control Measurements of State Highway 70 in Assumption Parish, Louisiana
Joshua D. Kent

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To view a complete list of LTRC publications, visit the website at www.ltrc.lsu.edu.
Technology Today Publication Statement

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For additional information on material included in this newsletter, contact the public information director at 225.767.9183.


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