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The Rolling Wheel Deflectometer consists of a 55-ft. long semitrailer applying a standard 18,000-lb. load on a pavement structure by means of a regular dual-tire assembly over the rear single axle.

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UPCOMING EVENTS



Louisiana Transportation Conference

February 25 - 28, 2018

Raising Cane's River Center

http://www.ltrc.lsu.edu/ltrc_18/reg.html

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

RESEARCH

LTRC Finds New Pavement Structural Testing Device Leads to Better Decisions for Road Repair and Design

Researchers create new pavement structure health model that provides clear information for determining overlay procedures, resulting in healthier roads and potential cost savings for state

For the last 20 years, DOTD has monitored Louisiana's network of pavements every two years. The data gathered during these evaluations go into the state's Pavement Management System (PMS) and gives engineers an idea of which pavements need improvement. Over time, the collected data was transformed into carefully created tables and indexes (or models), giving clear information to decision makers. However, until recently, this PMS health index only considered surface-level conditions. With the help of LTRC research and a new device that measures the entire structural health of a pavement—the Rolling Wheel Deflectometer (RWD)—engineers are now able to take into account a pavement's surface as well as its load-carrying ability or current service life. This information enables the Department to identify and properly repair structurally-deficient roads prior to failure.

By simply observing surface cracking, such as alligator cracking and rutting, a couple of problems can occur. Principal investigator Mostafa A. Elseifi, Ph.D., P.E.,

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explained, “This may lead to two types of errors and loss of state funds because of the lack of consideration of structural conditions: adding structure to a pavement that does not require it (Type I error – False Positive) and not adding structure to a pavement that requires it (Type II – False Negative).”

Dr. Elseifi’s project, “Assessment of Continuous Deflection Measurement Devices in Louisiana – Rolling Wheel Deflectometer,” not only examined how well the RWD compared to current pavement structure health methods, but he and his team added new information [a new index called the Structural Condition Index (SCI)] to the PMS following their research that allows for easier decisions that will not waste or overestimate overlay designs. “Based on this evaluation, modifications were introduced for the most promising structural capacity indicator in order to improve identification of structurally deficient sections,” explained Dr. Elseifi. “The effective pavement structural number is recommended to be considered in the overlay design procedure instead of the current practice of assuming 50% loss in the original structural capacity.”

Among the pre-developed structural capacity indicators, the SN_{RWD} was found to be the most promising model. Modifications were introduced to the SN_{RWD} model to improve its capability in identifying structurally-deficient pavements and to allow for predicting the Structural Number (SN) at a 0.1-mile interval. Researchers also developed a specific model for estimating the subgrade resilient modulus (M_r).

By evaluating the RWD and developing a framework in order to facilitate implementation of the RWD testing results in the Louisiana PMS and the state overlay design procedure, Louisiana became one of the only

states to have this information. Project Manager and Pavement Research Manager Kevin Gaspard, P.E., explained, “We’ve been contacted by several other states that are very interested in the models we’ve produced since we’re one of the first to put this information out.”

The report also analyzed costs associated with identifying and repairing structurally-deficient sections prior to reaching very poor conditions. Dr. Elseifi explained, “The RWD can result in significant savings to the Department if implemented in testing medium to high traffic volume roads with an annual average daily traffic (AADT) of 5,000 or more.” He also recommends that road segments with an AADT of 5,000 or more should be tested every four years. Additionally, Dr. Elseifi determined that continuous deflection data should be incorporated into the Louisiana PMS for treatments’ selection as well as the state overlay design procedure. According to Dr. Elseifi, these proposed modifications are not only implementation-ready but would also allow the Department to maximize savings for the state.

For more information about this project, please visit http://www.ltrc.lsu.edu/pubs_final_reports.html and select Final Report and Technical Summary 581 (14-2P) or contact Kevin Gaspard at kevin.gaspard@la.gov or 225-767-9104.



Former LTRC Director Harold “Skip” Paul named to Modified Asphalt Hall of Fame and 2018 AMAP Person of the Year

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The Association of Modified Asphalt Producers will honor Harold “Skip” Paul for his body of work and significant contributions to the ongoing quest for better highway performance. Paul will be inducted into the Modified Asphalt Hall of Fame and receive AMAP’s Lifetime Achievement Award during the 2018 AMAP Conference and Workshop at the Sheraton Grand Hotel in Phoenix, February 6-8, 2018. Paul will be honored at the awards luncheon on Wednesday, February 7, followed by a reception in his honor that evening.



TECH TRANSFER

Heat Straightening Workshop Hosted at LTRC

Over 50 bridge design and bridge maintenance professionals gathered to learn time-tested repair techniques thanks to LTRC-sponsored research

On Wednesday, November 1, 2017, DOTD bridge professionals and local consultants gathered for a two-day heat straightening workshop led by Rick Avent, Ph.D., with both classroom training and hands-on demonstration of heat-straightening repairs, explaining the basics of heat straightening techniques and when they are applicable.

Approximately 20 years ago, Dr. Avent, a retired LSU professor and former civil engineering department head, conducted research initiated by the FHWA and sponsored by LTRC/DOTD on heat straightening, a less expensive and speedier bridge repair method. There are approximately 1,800 steel bridges in Louisiana. However, a major problem associated with these bridges is damage caused by overloads, vehicle impact, mishandling, or fire. Over the span of his research, it was concluded that heat straightening is and continues to be an effective, safe, and favorable alternative for repairing damaged bridges.

As a result of Dr. Avent's findings, he created a training manual, which includes an interactive CD and technical guide, and a workshop that has been conducted over 50 times throughout the U.S. and

Canada. During his first workshop in Louisiana, Dr. Avent's training aimed at providing the basics of heat straightening for DOTD engineers who make decisions on bridge repair alternatives, bridge inspectors, bridge maintenance personnel who might conduct heat-straightening repairs, supervisors of bridge repairs, and consultants involved in bridge repairs.

The coordinator of the workshop and Senior Structures Research Engineer Walid R. Alaywan, Ph.D., P.E., explained, "This workshop demonstrated the principles upon which heat straightening is based; outlined standards of practice for heat-straightening repair; demonstrated the procedures and technical basis for repairing the more common types of bridge damage; and presented procedures for analyzing damage, supervising repairs, and preparing specifications."

The most popular portion of the workshop included the hands-on demonstration where attendees were able to see the techniques of heat straightening that Dr. Avent developed in action. Participants were able to take a blowtorch and put it to the damaged steel member example and get a feel for the specific heat application.

To learn more about the workshop or techniques discussed, please contact Dr. Walid Alaywan at walid.alaywan@la.gov or 225-767-9106.

TRAINING

Sit-down Spotlight: ERDP and Co-op Program

Rebecca Rizzuto was recently hired as the Education Outreach Program Manager. Her desire to connect students and recent graduates through DOTD internships and special programs makes her a valuable asset to the Department as an important link between real-world opportunity and fresh talent entering the engineering world.

In your position, you spend a lot of time attending Louisiana College Career fairs. What do you think draws students to your programs?

Our programs offer students and engineering interns a unique experience in gaining exposure and experience in the engineering field. I believe students are drawn to the Co-op program because it gives them real-world engineering experience working alongside Professional Engineers while in school. The Engineering Resource Development Program (ERDP) allows EIs the opportunity to rotate through many DOTD HQ sections as well as a district giving them insight into many aspects of the Department.

What is the difference between the ERDP and Co-op Programs?

The Co-op program is for junior and senior engineering students, while the ERDP is for individuals who have graduated from an accredited university with a degree in engineering and have also received their FE.

What does a typical day or week look like for you?

As the manager for the Co-op, ERDP, and TRAC and RIDES programs, I am in constant communication between students, section supervisors, and schools. The behind-the-scenes paper work and communication to keep the programs moving forward fills my days. However, on any given day, I am coordinating rotation schedules for our EIs in the ERDP, checking in on our



Co-op students, and communicating with elementary, middle, and high schools regarding participation in the TRAC and RIDES program and workshops. I also attend career fairs, answer questions, coordinate with HR, and promote these programs.

How would you like to see your position evolve over time?

I see my position as a unique opportunity to foster the love of transportation engineering throughout a student's entire educational life. I would love to see a streamline from our elementary schools to ERDP. It would be wonderful to have students attend an elementary school that exposes them to transportation engineering through the RIDES STEM program, cultivate that interest in middle and high school in the TRAC program, have them gain hands-on engineering experience in the Co-op while in college, and once receiving their FE, go through the ERDP rotation to find a permanent home at DOTD.

What do you enjoy most about your position?

I enjoy having the opportunity to expose students to transportation engineering in all levels of education. I enjoy putting tools in the hands of teachers to utilize in their classrooms. I love helping students and EIs have opportunities to gain engineering experience.

What has surprised you most about working with the ERDP and Co-op Programs?

It has been a wonderful surprise to see and hear the support throughout the Department for both programs.

What is the most challenging aspect of your job?

The most challenging aspect of my job is letting people know the programs are full. Whether it is a Co-op, ERDP, or TRAC and RIDES, it is difficult letting someone know there is no more room in the program.

What do you wish other people knew about ERDP and the Co-op?

I would love for others to know the wonderful history of how the programs have given engineers the opportunities to grow through professional experience from college to career. For over 20 years, these programs have enriched not only the Department, but also the entire transportation community.



Former participants weigh-in

Why do you think the Co-op/ERDP programs are important?

“It gives an important indication of what we like or dislike. It also gives an excellent perspective of how the Department functions and how every section in the department is important in the big picture.”

Hadi Shirazi, Traffic Engineering Management Manager, Section 77, Traffic Engineering Management

Participated in the first Engineering Rotational Program under Joe Baker in 1990

“It [ERDP program] allows you to learn the function of DOTD as a whole and you get familiar with people to develop a working relationship. The Co-op program is equally as important because it gives students real-world experience and the opportunity to learn the purpose and function of DOTD.”

Ty Hampton, Engineer 6, Section 77, Traffic Engineering Management

Participated in the Co-op program from 2007-2008 and ERDP program in 2011

What did you gain from the program you participated in?

“I was able to get a grasp of the different sections within DOTD and learn about the things that each section does to help deliver the mission of the Department.”

Khalil Hanifa, Material Testing Engineer (Engineer 3), Section 22, Materials and Testing Lab

Participated in ERDP from 2007-2008

“The program furthered my own knowledge in a way now that I know someone in almost any section that may be able to help me along the road. Every section has an important part of the project and they all work together, so knowing someone in multiple sections helps a new engineer not only get an idea of the big picture of how a project goes but also gives insight on who to contact for various help.”

Miranda Perkins, Engineer Intern 2, Section 67, Pavement and Geotechnical Design

Participated in ERDP in 2017



Staff Updates and Accomplishments

LTRC would like to welcome **Layne Brown** as the new Training Program Coordinator in Section 33. Layne will be managing special topic classes in the External Training Programs group.

LTRC also welcomes **Nick Ferguson**, E.I., as a recent addition to the LTRC Geotechnical Group as the Geotechnical Research Engineer Intern. Nick graduated from Louisiana State University in Civil Engineering in May 2016, and he was recently part of the Engineering Resource Development Program (ERDP) for DOTD.

In support for Louisiana's Destination Zero Deaths initiative, the Safety Center's Director **Dortha Cummins** (5th from left) and Safety Initiatives Manager **Rudynah Capone** (3rd from left) participated in the Underage Drinking and Driving initiative program held October 31 at Walker High School. This was a collaborative effort between the Livingston Parish Students Against Destructive Decisions (SADD), Southeastern University, Lexlee's Kids, and the Capital Region Transportation Safety Coalition (CRTSC). The event educated approximately 80 young drivers about the consequences of impaired and distracted driving.



Louay N. Mohammad, Ph.D., P.E. (WY), was recently invited to present his research "Evaluation of Various Hamburg Wheel-Tracking Devices and AASHTO T 324 Specification for Rutting Testing of Asphalt Mixtures" at the FHWA Asphalt Mixture Expert Task Group Meeting in Bozeman, Montana, September 20-21. He also delivered an invited presentation titled "Develop Mix Design and Analysis Procedures for Asphalt Mixtures Containing High-RAP Contents" at the 26th Annual RMAUPG Conference in Reno, Nevada, October 18-19.

Vijaya (VJ) Gopu, Ph.D., P.E., Associate Director of External Programs, delivered a keynote lecture at the International Symposium on Global Innovations in Infrastructure with Advanced Composites held in Hangzhou, China, on October 21. He also delivered a keynote lecture and moderated a technical session at the 2017 International Symposium on Advanced Composite Structures held in Nanjing, China, on October 23. Dr. Gopu served on a NSF Proposal Review Panel that met in Washington, D.C. in December 2017.

Recently Published

Project Capsule 17-1B

Field Implementation of Handheld FTIR Spectrometer for Polymer Content Determination and for Quality Control of RAP Mixtures

Nazimuddin Wasiuddin, Ph.D.

Project Capsule 18-3SS

Evaluation of DOTD's Existing Queue Estimation Procedures

Julius Codjoe, Ph.D.

Project Capsule 18-1SA

Economic Effect of Restricted Crossing U-Turn Intersections in Louisiana

Helmut Schneider, Ph.D.

Project Capsule 18-1GT

Analysis of Driven Pile Capacity within Pre-Bored Soil

Shengli Chen, Ph.D.

Project Capsule 17-6SS

Evaluation of HeadLight: An E-Construction Inspection Technology

Tyson Rupnow, Ph.D., P.E., and Mary Leah Coco, Ph.D.

Project Capsule 18-1P

Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management (Phase I)

Zhongjie "Doc" Zhang, Ph.D., P.E.

Final Report and Technical Summary 584

Implementation of Maturity for Concrete Strength Measurement and Pay

Zachary Collier, E.I., Tyson Rupnow, Ph.D., P.E., and Amar Raghavendra, P.E.

Final Report and Technical Summary 564

Validity of Multiple Stress Creep Recovery (MSCR) Test for DOTD Asphalt Binder Specification

Md Sharear Kabir, P.E., and William "Bill" King, Jr., P.E.

Final Report and Technical Summary 582

Prep-ME Software Implementation and Enhancement

Joshua Q. Li, Ph.D., P.E., and Kelvin C. P. Wang, Ph.D., P.E.

Final Report and Technical Summary 581

Assessment of Continuous Deflection Measurement Devices in Louisiana - Rolling Wheel Deflectometer

Mostafa A. Elseifi, Ph.D., P.E., and Omar Elbagalati



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