

# LOUISIANA TRANSPORTATION RESEARCH CENTER



## 2006 ANNUAL REPORT

# LOUISIANA TRANSPORTATION RESEARCH CENTER



**JOHNNY B. BRADBERRY**  
DOTD SECRETARY



**SEAN O'KEEFE**  
LSU CHANCELLOR

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 is brought to bear on the rapidly evolving challenges in the transportation field.

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-term and long-term research and provides 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.

LTRC merges the resources of the state and local government, universities, and private industry to identify, develop, and implement new technology to improve the state's transportation system. By harnessing these valuable resources, LTRC is empowered to find innovative solutions to Louisiana's transportation problems.

In addition to its affiliation with LSU, LTRC fully participates with other universities in Louisiana. By combining their resources with those of DOTD, the center eliminates duplication of effort and provides a richer 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, and environmental studies.

To enhance the center as the focus for transportation-related research, technology transfer, and education in Louisiana, the LTRC foundation, a non-profit organization, has been established. 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.

For additional information, contact  
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# 20 Years of Excellence



This publication is a report of the transportation research, technology transfer, education, and training activities of the Louisiana Transportation Research Center for the calendar year 2006. The center is sponsored jointly by the Louisiana Department of Transportation and Development and Louisiana State University.

# 2006

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# DIRECTOR'S MESSAGE

To

**Mr. Johnny B. Bradberry**

Secretary, DOTD

**Mr. Sean O'Keefe**

Chancellor, LSU

**Mr. William Temple, P.E.**

Chief Engineer, DOTD

**Dr. Zaki A. Bassiouni, P.E.**

Dean, College of Engineering, LSU



From

**Harold "Skip" Paul, P.E.**

Director, LTRC



**I**t is with great pleasure and pride in the accomplishments of my staff that I present this year's annual report. This has been an exciting first for me personally, in the position of Director, and for LTRC as a premier research, technology transfer and education and Training Center. I will bring your attention to several highlights and then let the remainder of the report speak for itself.

Beginning in the first week in January, we opened the doors of the Transportation Training and Education Center, TTEC and delivered our first classes in this state-of-the-art training and education facility. Towards the end of the year this facility was running full bore with an increase of National Highway Institute offerings of 50 percent accommodating several hundred additional employees or 40 percent increase. We anticipate even more

NHI offerings in the future as a Memorandum of Understanding was signed with the NHI to make the LTRC TTEC, with its distance learning capabilities, a regional NHI center. We are one of only two such designated centers in the country. Most computer training is also held at TTEC computer classroom such that contracts for external teaching space have been reduced by half.

A grand opening of TTEC was held in October highlighted by presentations from Mr. Johnny Bradberry, Secretary DOTD, Dr. William Jenkins, LSU System President, Senator Noble Ellington, Senate Transportation Committee Chair, and Mr. Joe Baker, past LTRC Director who presented a history of TTEC from conception through the opening. Mr. William Temple, DOTD Chief Engineer, presented awards of recognition to our industry partners who contributed to the LTRC Foundation above the bronze level. An open house followed along with a reception hosted by our industry partners.

I would like to welcome Dr. Vijaya (V.J.) Gopu, P.E., former Professor and Chair of the Department of Civil and Environmental Engineering and Distinguished Scholar in the Center for Bioenvironmental Research at Tulane University in New Orleans. Dr. Gopu joined our staff in the fall of 2006 when we re-established the position of Associate Direc-

tor for External Funding Program in order to have a senior university faculty member on board to assist in advancing the mission and goals of LTRC. In addition to enhancing external research funding, Dr. Gopu's goal is to engage/pursue activities to support the center in operating the University Transportation Center and develop strategies/proposals for securing a Regional Transportation Center at LTRC. He will also be working with the administration/faculty at the state universities to establish the Master of Civil Engineering Professional Degree program.

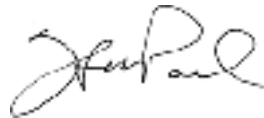
As part of the expanding, externally funded research program, LTRC was awarded four additional projects this year under the FHWA Innovative Bridge Research and Construction Program totaling \$800,000. These projects are 100 percent federally reimbursed.

I would also direct your attention to the Featured Research article. In response to concern of ongoing construction projects which were submerged after Hurricane Katrina, the LTRC Pavements Unit conducted some initial forensic work and found weakened pavement structures. Using additional structural data obtained under contract, they developed a methodology to demonstrate damage incurred on most of the 238 miles of DOTD roads in New Orleans which were submerged for up to

six weeks. This work has led to increased emergency recovery funds for this system, and potentially, FEMA funding for the local road system. This unit was presented the DOTD Headquarters Unit of the Quarter Award.

As we work toward the future goals we've set forth, we welcome input from the entire transportation community to improve our service. Thank you for your continued support.

Respectfully submitted,

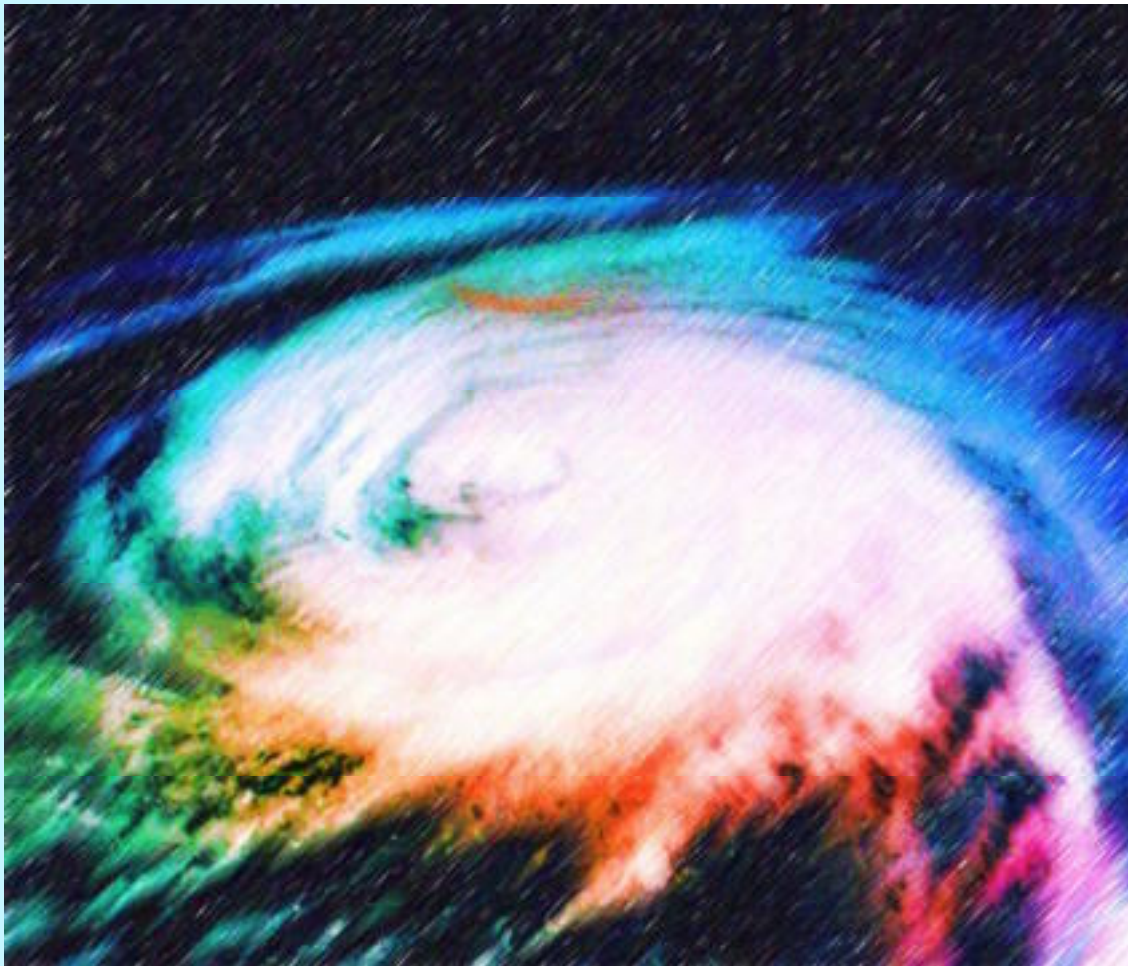


Harold "Skip" Paul, P.E.

Director



## Pavement Damage From Katrina Assessed



On August 29, 2005, Hurricane Katrina devastated New Orleans and southeastern Louisiana, leaving hundreds of thousands of people displaced or homeless. Nearly four weeks later, Hurricane Rita made landfall in the southwestern portion of the state, further damaging Louisiana's infrastructure and impacting the New Orleans area. In response, LTRC personnel conducted pavement testing on several ongoing construction projects (that were submerged) to determine if contract modifications would be necessary to address damage impact. Damage was found in asphalt and concrete layers, and sub-grades were found to be very weak. For one project, LA 46, LTRC had "before and after" data which indicated that the damage incurred was equivalent to three inches of asphalt concrete. As a result, DOTD contracted with Fugro Consultants, LP, to conduct testing on 238 miles of state highways in New Orleans at 0.1 mile intervals.

Fugro conducted Falling Weight Deflectometer, Ground Penetrating Radar, and Dynamic Cone Penetrometer testing and cored selected loca-



# FEATURED RESEARCH

tions for thickness and damage verification to determine the extent of structural damage to the pavements. Because there was no “before” data, a traditional forensic type analysis could not be undertaken.

With the use of GIS mapping and NOAA flood mapping, data points could be identified as either submerged or non-submerged. The non-submerged data points were then considered as a control set, and the submerged data points were considered as the experimental set. In this manner, the data could be tested using standard analysis of variance techniques to test the hypothesis that the submerged pavements were weaker and therefore damaged as a result of the hurricanes. It is noted that this methodology does not imply that the non-submerged pavements were not damaged but provides a relative damage estimate. Once weaker strength parameters were determined, standard pavement design methods were applied to the structural numbers and sub-grade moduli to determine an equivalent amount of asphalt concrete for this strength loss.

In general, it was found that asphalt pavements had strength loss equivalent to about two inches of new asphalt concrete. Very little relative damage was detected for the PCC pavements. The composite pavements demonstrated no need for additional structure in the pavement layers; how-

ever, a weaker sub-grade for the submerged areas equivalent to nearly one inch of asphalt concrete was identified.



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# RESEARCH HIGHLIGHTS

**T**hrough its transportation-based science and technology program, LTRC's research section serves the transportation field by furthering knowledge and solving problems encountered by DOTD and the general transportation community. Input is solicited from DOTD, universities, and industry.

In addition, a major portion of LTRC's budget is used to fund contract research studies with Louisiana universities. The research section is organized in two major groups—Materials, which incorporates asphalt, concrete, and structures research; and Pavements & Geotechnical. Other research areas include Management & Policy Analysis.



## Comparative Evaluation of Subgrade Resilient Modulus from Nondestructive, In-situ, and Laboratory Methods

**A** study was done in an effort to provide assessment methodologies that could be used by design, construction, or maintenance groups to accurately and consistently determine the resilient modulus of subgrade soils from nondestructive and in-situ testing devices

without having to perform costly, time consuming laboratory tests. This was achieved by prosecuting a statistically viable testing factorial that provided correlation equations between laboratory tests and the falling weight deflectometer, Dynaflect, miniature cone penetrometer, and dynamic cone penetrometer. Obtaining accurate resilient modulus readings can enhance pavement performance and the judicious usage of fiscal resources by preventing the pavement structure from being either under-designed or over-designed. Over-designs waste scarce resources by placing excessive amounts of pavement in design locations, and under-designs lead to premature pavement failures and excessive maintenance costs.

## The Stability of Calcium Sulfate Base Course in a Wet Environment

**B**lended calcium sulfate (BCS) is fluorogypsum (FG), an industrial byproduct, blended with lime or limestone. Approximately 90,000 metric tons (100,000 tons) of FG are generated annually in the United States, posing a serious problem for environmental disposal.



# RESEARCH HIGHLIGHTS

The Louisiana Department of Transportation and Development (LA DOTD) has been using BCS in pavement construction over the last 15 years. While this material has performed satisfactorily in general post-construction conditions, its moisture sensitivity concerns LA DOTD engineers because it creates difficulty in wet environments.

Laboratory tests were conducted in an effort to identify factors that significantly affect the



strength development of raw BCS and to discover a suitable stabilization scheme for ameliorating water susceptibility of raw BCS. Laboratory tests also investigated the resilient modulus and permanent deformation characteristics of stabilized BCS. Samples tested in the laboratory had been molded in the laboratory and cored at the test site of the Pavement Research Facility (PRF) at the Louisiana Transportation Research Center (LTRC).

The field test program included two parts: (1) building a full scale test section at the PRF site according to proposed construction specifications and (2) evaluating the performance of stabilized BCS base courses through in-situ tests, such as DCP, FWD, and Dynaflect, to characterize strength and structural properties.

The results from the study indicate that moisture content controlled the strength of raw BCS, although factors such as dry unit weight also influenced the result. Curing conditions affect the strength of raw BCS through the change of moisture content in the material. The loss and regaining of strength is generally a reversible process, and the presence of free water among gypsum crystal particles is the reason for this phenomenon. BCS stabilized by 10 percent 120-grade GGBFS by volume can serve as a good pavement base. It achieves a higher level of stiffness, and a structural level coefficient of 0.30 can be used for

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# RESEARCH HIGHLIGHTS



pavement design purposes. The tentative construction specifications used in the study proved to be adequate for the field construction.

Researchers recommend that the LA DOTD consider building several field test sections in different traffic and environmental conditions using the GGBFS-stabilized BCS as pavement base course.

## Evaluation Of The Traffic Safety Benefits Of A Lower Speed Limit And Restriction Of Trucks To Use Of Right Lane Only On I-10 Over The Atchafalaya Basin

The goal of this study is to measure the safety impact of a lower speed limit and the restriction of trucks to the right lane only over the elevated section of the I-10 over the Atchafalaya basin. Six radar cameras positioned along the elevated section are being used to observe and transmit real-time data back to a base computer at LSU. The data will be used to observe compliancy, traffic characteristics (headways, speed, speed differential,) and safety (incidents, unsafe traffic behavior).



# RESEARCH HIGHLIGHTS

## Statewide Traffic Safety Study – Phase 2

Crash characteristics in Louisiana have been compared with those in peer states, and with the nation as a whole, to identify in what aspects Louisiana's road safety is different to those elsewhere in the nation. Initial findings suggest that fatal, alcohol-related crashes in Louisiana are over-represented in re-

lation to elsewhere in the country. In terms of all kinds of crashes (fatal, injury, and property-damage-only), sideswipe and rear-end type collisions, and crashes in work zones, are over represented. Models of crash severity are being built which will identify and quantify the factors contributing to crash severity in Louisiana. An effort will be made to identify countermeasures and to quantify the improvement they are expected to make.



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# COMPLETED RESEARCH



## **Assessing the Needs for Intermediate Diaphragms in Pre-stressed Concrete Bridges**

*Principal Investigator: Steve Cai, Ph.D., P.E. (LSU)*

*Co-Principal Investigator: Rick Avent, Ph.D., P.E. (LSU)*

*Project Manager: Walid Alaywan, P.E.*

## **Comparison of the In-situ Strength and Laboratory Mechanistic Properties of Asphalt Concrete Mixtures and Support Study**

*Principal Investigators: Louay N. Mohammad, Ph.D. (LTRC) and Jamal Khattak, Ph.D. (ULL)*

*Project Manager: Chris Abadie, P.E.*

## **Comparative Evaluation of Subgrade Resilient Modulus from Non-destructive, In-situ and Laboratory Methods**

*Principal Investigator: Kevin Gaspard, P.E.(LTRC)*

*Co-Principal Investigator: Louay Mohommad, Ph.D, (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

## **Development of a Statewide Transportation Data Warehousing and Mining System under the Louisiana Transportation Information System (LaTIS) Program**

*Principal Investigator: Bill P. Buckles,, Ph.D. (Tulane)*

*Co-Principal Investigator(s):*

*Stephanie Smith, (Tulane)*

*Sherif Ishak, Ph.D. (LSU)*

*Project Manager: Chester Wilmot, Ph.D., P.E.*

## **Evaluation of HMA Longitudinal Joint Construction in Louisiana**

*Principal Investigator: Sam Cooper, P.E. (LTRC) and Louay N. Mohammad, Ph.D. (LTRC)*

*Project Manager: Chris Abadie, P.E.*

# COMPLETED RESEARCH

## **Modeling Hurricane Evacuation Traffic**

*Principal Investigator: Chester G. Wilmot, Ph.D., P.E. (LTRC)*

*Co-Principal Investigators:*

*P. Brian Wolshon, Ph.D., P.E. (LSU)*

*Sherif Ishak, Ph.D. (LSU)*

*Project Manager: Chester G. Wilmot, Ph.D., P.E.*

## **Modeling Hurricane Evacuation Traffic: Testing the Gravity and Intervening Opportunity Models as Models of Destination Choice in Hurricane Evacuation**

*Principal Investigator: C.G. Wilmot., Ph.D., P.E.*

*N. Modali, and B. Chen (LTRC)*

*Project Manager: Walid Alaywan, P.E.*

## **Monitoring System to Determine Impact of Sugarcane Truckloads on Non-Interstate Bridges**

*Principal Investigator: Aziz Saber, Ph.D, P.E. (LTU)*

*Project Manager: Walid Alaywan, P.E.*

## **Stabilization of Sulfate-containing Soil with Slag-Cement Mixtures: Application of Laboratory Results**

*Principal Investigator: Amitava Roy, J., Ph.D. (LSU)*

*Co-Principal Investigator: Gavin Gautreau, P.E, (LTRC)*

*Project Manager: Gavin Gautreau, P.E.*



# COMPLETED RESEARCH

## Support Study for Bridge Deck Replacement Using FRP Materials

*Principal Investigator: Guoqiang Li, Ph.D. (LSU)*

*Project Manager: Walid Alaywan, P.E.*

## Support Study for the Stability of Calcium Sulfate Base Course in Wet Environment

*Principal Investigator: Amitava Roy, J., Ph.D. (LSU)*

*Co-Principal Investigator: Zhongjie "Doc" Zhang, Ph.D., P.E. (LTRC)*

*Project Manager: Zhongjie "Doc" Zhang, Ph.D., P.E.*

## Transport, Treatability, and Toxicity of Storm Water Discharged to Receiving Waters Across Louisiana

*Principal Investigator: Dixie M. Griffin, Jr., Ph.D., P.E. (LTU)*

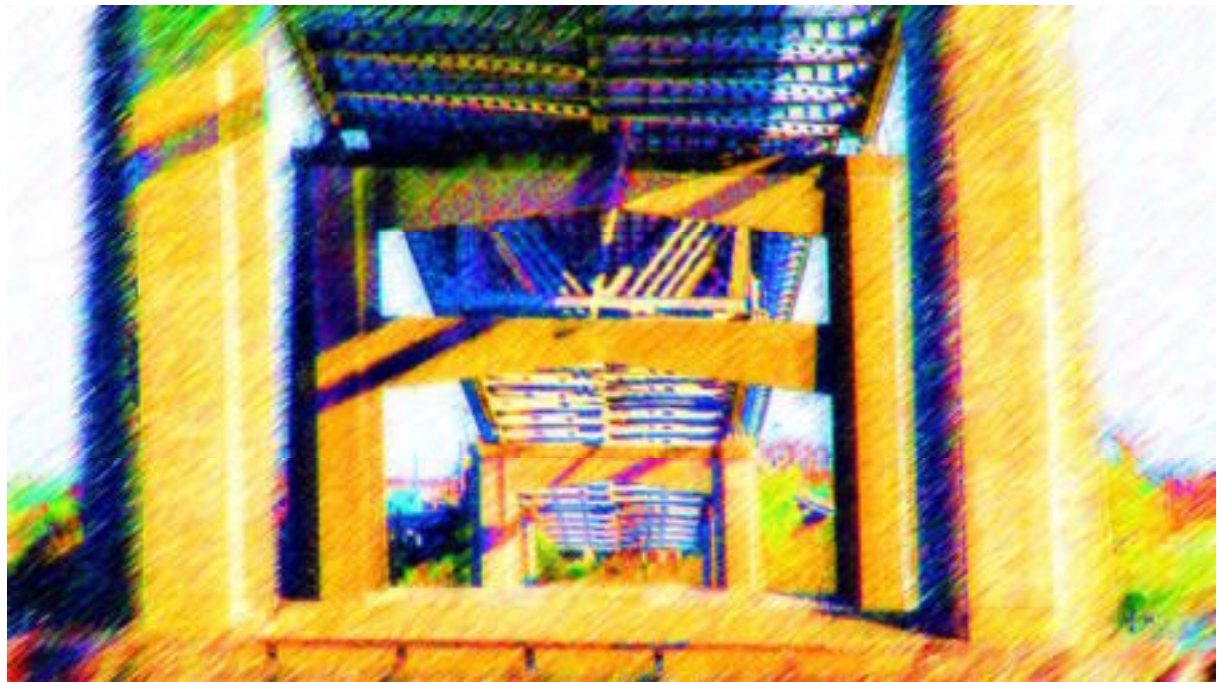
*Co-Principal Investigator: John Sansalone, Ph.D., P.E. (LSU)*

*Project Manager: Chester G. Wilmot, P.E., Ph.D.*

## New Product Evaluation

NPE: Chemical admixture - Xypex

NPE: Chemical admixture - Conex





# ACTIVE RESEARCH

## **Accelerated Loading Evaluation of a Subbase Layer on Pavement Performance**

*Principal Investigator: Zhong Wu, Ph.D., P.E. (LTRC)*

*Co-Principal Investigators:*

*Gavin Gautreau, P.E. (LTRC)*

*Louay Mohommad, Ph.D. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

## **Air Void Analyzer For Plastic Concrete**

*Principal Investigator: John Eggers, P.E. (LTRC)*

*Project Manager: Chris Abadie, P.E.*

## **Calibration of Resistance Factors Needed in the LRFD design of Driven Piles**

*Principal Investigator: Murad Abu-Farsakh, Ph.D., P.E. (LTRC)*

*Co-Principal Investigators:*

*Ching Tsai, Ph.D., P.E. (LA DOTD)*

*Sungmin Yoon, Ph.D., P.E. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*



## **Control of Embankment Settlement: Field Verification of PCPT Prediction Methods**

*Principal Investigator: Abu-Farsakh, M. Y., Ph.D., P.E. (LTRC)*

*Co-Principal Investigator: Gavin Gautreau, P.E. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

# ACTIVE RESEARCH

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## **Developing a Comprehensive Highway Accident Data Analysis System with GIS: Phase III**

*Principal Investigator: Xiaoduan Sun, Ph.D., P.E. (UL Lafayette)*

*Project Manager: Chester G. Wilmot, Ph.D., P.E.*

## **Development of Advanced Grid Stiffened (AGS) FRB Tube-Encased Concrete Columns**

*Principal Investigator: Guoqiang Li, Ph.D. (LSU)*

*Project Manager: Walid Alaywan, P.E.*

## **Development of Geotechnical Information Database: Subgrade Soil Survey Computer Program**

*Principal Investigator: Gavin Gautreau, P.E. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

## **Development and Performance Evaluation of Fiber Reinforced Polymer Bridge**

*Principal Investigator: Steve Cai Li, Ph.D. P.E. (LSU)*

*Project Manager: Walid Alaywan, P.E.*

## **Development of Uniform Sections for PMS Inventory and Applications**

*Principal Investigator: Mohammad Jamal Khattak, Ph.D., P.E. (UL Lafayette)*

*Co-Principal Investigators:*

*Xiaoduan Sun, Ph.D., P.E. (UL Lafayette)*

*Gilbert Y. Baladi, Ph.D., P.E.*

*(Michigan State University)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

## **Effect of Drainage in Unbound Aggregate Bases on Flexible Pavement Performance**

*Principal Investigator: Mingjiang Tao, Ph.D., (LTRC)*

*Co-Principal Investigators: Murad Abu-Farsakh,, Ph.D, P.E. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

## **Elimination of Deck Joints Using a Corrosion Resistant FRP Approach**

*Principal Investigator: Guoqiang Li, Ph.D., P.E. (Southern)*

*Project Manager: Walid Alaywan, P.E.*

# ACTIVE RESEARCH

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## Evaluation of Superpave Mixtures Containing Hydrated Lime

*Principle Investigators:*

*Louay N. Mohammad, Ph.D. (LTRC)*

*Sam Cooper, P.E. (LTRC)*

*Project Manager: Chris Abadie, P.E.*



## Evaluation of the Base/Subgrade Soil under Repeated Loading

*Principal Investigator: Abu-Farsakh, M. Y., Ph.D., P.E. (LTRC)*

*Project Manager: Zhongjie "Doc" Zhang, Ph.D., P.E.*

## Evaluation of the Traffic Safety Benefits of a Lower Speed Limit and Restriction of Trucks to Use of Right Lane Only on I-10 Over the Atchafalaya Basin

*Principal Investigator: Sherif Ishak, Ph.D. (LSU)*

*Co-Principal Investigators:*

*P. Brian Wolshon, Ph.D., P.E. (LSU)*

*Xiaoduan Sun, Ph.D., P.E. (UL Lafayette)*

*Project Manager: Chester G. Wilmot, Ph.D., P.E.*

## Evaluation of the Effect of Heavy Sugar Cane Truck Operations on Repair Cost of Low Volume Highways

*Principal Investigator: Freddy Roberts, Ph.D., P.E. (LTU)*

*Project Manager: Zhongjie "Doc" Zhang, Ph.D., P.E.*



# ACTIVE RESEARCH



## **Feasibility of Tubular Fender Units for Pier Protection Against Vessel Collision**

*Principal Investigator: George Voyiadjis, Ph.D. LSU*

*Project Manager: Walid Alaywan, P.E.*

## **Field Verification of the Effectiveness of Continuity Diaphragms for Skewed Continuous Concrete Girder Bridges.**

*Principal Investigator: Aziz Saber, Ph.D., P.E. (LSU)*

*Project Manager: Walid Alaywan, P.E.*

## **Flexural Strength and Performance of Steel Fiber Reinforced Concrete ('04 Hale Boggs Deck)**

*Principal Investigator: John Eggers, P.E. (LTRC)*

*Project Manager: Chris Abadie, P.E.*

## **Finite Element Simulation of Structural Performance on Flexible Pavements with Stabilized Base/ Treated Subbase Materials under Accelerated Loading**

*Principal Investigator: Zhong Wu, Ph.D., P.E. (LTRC)*

*Project Manager: Zhongjie "Doc" Zhang, Ph.D., P.E.*

## **Implementation of Warranties in State Contracts for Highway Construction**

*Principal Investigator: Mark Martinez, E.I. II (LTRC)*

*Project Manager: Zhongjie "Doc" Zhang, Ph.D., P.E.*

## **In-Place Cement Stabilized Base Reconstruction Techniques**

*Principal Investigator: Kevin Gaspard, P.E. (LTRC)*

*Project Manager: Zhongjie "Doc" Zhang, Ph.D., P.E.*

# ACTIVE RESEARCH

## **Long Term Monitoring of HPC Charenton Bridge**

*Principal Investigator: Walid Alaywan, P.E. (LTRC)*

*Project Manager: Walid Alaywan, P.E..*

## **Mechanical Flexible Pavement Overlay Design Program**

*Principal Investigator: Zhong Wu, Ph.D., P.E. (LTRC)*

*Co-Principal Investigators: Kevin Gaspard, P.E. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*

## **New Testing Methodology for the Determination of the Fracture and Fatigue Resistance of Asphalt Pavements**

*Principal Investigator: Louay Mohammad, Ph.D. (LTRC)*

*Project Manager: Chris Abadie, P.E.*

## **Optimization of Asphalt Mixture Designs for the Louisiana ALF Test Sections**

*Principal Investigator: Louay Mohammad, Ph.D. (LTRC)*

*Project Manager: Chris Abadie, P.E.*



## **Optimization of Tack Coat for HMA Placement (NCHRP project 9- 40)**

*Principal Investigator: Louay Mohammad, Ph.D., (LTRC)*

*Project Manager: Chris Abadie, P.E*

# ACTIVE RESEARCH

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## **Statewide Traffic Safety Study – Phase 2**

*Principal Investigator: Chester G. Wilmot, Ph.D., P.E. (LTRC)*

*Project Manager: Chester G. Wilmot, Ph.D., P.E.*

## **Strengthening of Bridge Beams Using Fiber Reinforced Polymers**

*Principal Investigator: V.J. Gopu, Ph.D., P.E. (Tulane)*

*Project Manager: Walid Alaywan, P.E.*

## **Structural Monitoring of the Rigolets Pass Bridge**

*Principal: Robert Bruce, Ph.D. (Tulane)*

*Project Manager: Walid Alaywan, P.E.*

## **The Rideability of a Deflected Bridge Approach Slab**

*Principal Investigator: Mark Martinez E.I. II (LTRC)*

*Co-Principal Investigator: Zhongjie “Doc” Zhang, Ph.D., P.E. (LTRC)*

*Project Manager: Zhongjie “Doc” Zhang, Ph.D., P.E.*



# ACTIVE RESEARCH

## Update of Correlations between Cone Penetration and Boring Log Data

*Principal Investigator:* Khalid A. Alshibli, Ph.D., P.E. (LSU)

*Co-Principal Investigators:* Ayman Okeil, Ph.D., P.E. (LSU)

*Project Manager:* Zhongjie “Doc” Zhang, Ph.D., P.E.

## Use of Reinforced Soil Foundation (RSF to Support Shallow Foundation

*Principal Investigator:* Abu-Farsakh, M.Y., Ph.D., P.E. (LTRC)

*Project Manager:* Zhongjie “Doc” Zhang, Ph.D., P.E.



## PPM 59 Review Completed

**T**he DOTD's Policy and Procedure Memorandum (PPM) No. 59, Workforce Development, represents the department's belief that professional development, structured training for engineering technicians, continuing education, and on-the-job training are essential to maximizing employee potential and providing qualified personnel crucial to the effective management of the transportation system. Because they are dynamic, these training programs must be reviewed periodically for any necessary changes to ensure that they are meeting employees' professional development needs.

In 2006, LTRC representatives completed a review by hosting a series of meetings with department administrators, division heads, section heads, and district administrators to discuss several topics, including the following:

- o DOTD's philosophy regarding training and continual learning

- o Parity of training requirements for structured training programs under different jurisdictions
- o Replacement of existing courses with more appropriate materials
- o Grandfathering
- o Exceptions, substitutions, and assessments/testing out

LTRC compiled and released the meeting comments in a report covering a modified version of PPM No. 59 and training requirements to the Secretary, Executive Committee, and district administrative officials in the fall of 2006. The revised PPM was approved and will be implemented in January 2007 along with revisions to many structured training programs.

# FEATURED TECH TRANSFER

## Pavement Performance Seminars Provide Technical Leadership

**A**s part of a series of focused technical conferences, LTRC held the Pavement Performance Seminar in several areas of the state, including Ruston, Alexandria, and Baton Rouge. This seminar was part of LTRC's ongoing initiative to provide technical leadership through a forum that demonstrates new technologies, implements and publicizes LTRC research, discusses and resolves problems, imports the best practices of others, and partners with the transportation community.

Approximately 200 engineers, technicians, contractors, material and equipment suppliers, and other transportation industry representatives attended the Pavement Performance Seminar which was held at no charge to the attendees. Session topics included: Dynamic Cone Penetrometer; Recent Developments in Soil Stabilization; Measurements, Methods, and Materials; and Pavement Preservation.





# TECH TRANSFER HIGHLIGHTS

**A**s LTRC's formal research program continues to investigate solutions to Louisiana's transportation problems, the technology transfer program serves the wider transportation community by implementing these research findings and technological innovations. Whether through technical assistance on DOTD projects, publications and videos, or seminars and workshops, technology transfer's ultimate goal is to disseminate practical knowledge to municipalities, parishes, and the transportation industry at large.

## Recertification Program

**T**he Construction and Materials Training Unit has implemented the "Recertification" program through which certified department and non-department inspector/technicians are now required to take an exam in order to keep their certifications from expiring. This includes all department inspectors who had indefinite certifications. A major effort was undertaken to have everyone's certifications updated by December 31, 2006. A total of 900 recertification tests were taken in the districts and processed through LTRC.

With the pending implementation of the *Standard Specifications for Roads and Bridges - 2006 Edition*, the process of updating training materials to reflect this edition of the specifications was begun. The *Application of Quality Assurance for Portland Cement Concrete and Structures* manual will be completed early next year and the *Introduction to the Standard Specifications for Roads and Bridges - 2006 edition* was completed and will be implemented with the 2006 Standard Specifications book. Work on the remaining two Quality Assurance manuals is ongoing, as is revisions to all certification exams and relevant training materials.

## Planning of the 2007 Transportation Engineering Conference

**T**he biennial DOTD Transportation Engineering Conference represents a premier tech transfer opportunity for LTRC, which is charged with the accountability for planning, coordinating, and managing the conference. Attendees represent the public, private, and academic sectors from Louisiana and the nation.

The 2006 conference was delayed by Hurricane Katrina until February 2007. However, during



# TECH TRANSFER HIGHLIGHTS

2006, LTRC and DOTD staff engaged in preparation for the conference, quite an undertaking with a conference of this magnitude and its expected 1,600 attendees. Contracts were negotiated with the conference facility during this year; the venue was prepared; the web site was designed/launched to allow online registration for participants/speakers for the conference, and staff designed and printed publications for the event.

## Technical Assistance Projects

The LTRC's technical assistance program provides laboratory testing, field testing, and forensic investigation in direct response to Departmental inquiries for expert analysis on DOTD projects. LTRC also provides assistance to state universities for laboratory or field testing on research projects not funded by LTRC. Ninety percent of the over 100 requests received have been completed with results and/or recommendations provided. A few highlights of these requests are presented below.

### High Performance Concrete Durability Testing

The LTRC Concrete Lab has continued its technical assistance pursuit in implementing HPC (High Performance Concrete) for DOTD's structures. Combining durability and performance goals from Bridge Design Engineers with concrete materials

expertise at LTRC has led to a collective and collaborative effort resulting in HPC specifications for structures in Louisiana. This effort led to special provision specifications for Mass Concrete, High-Strength Concrete, Self-Consolidating Concrete and the permeability of the concrete.

Primarily, permeability testing for concrete materials used in our bridge structures is the best indicator of long-term durability. The objective of permeability testing is to assess and quantify the concrete's capability to resist and prolong the intrusion of chloride ions that initiate and feed the oxidation or corrosion process of the reinforcing steel. In this regard, the LTRC Concrete Lab has had the responsibility for permeability testing of hundreds of submitted mix designs resulting in either their rejection or acceptance. This ongoing process has further led to an increase in collaboration between the LTRC Concrete Lab, materials suppliers and the DOTD Construction Section with purpose, objectives and transfer of technology as the beneficial consequence of this cooperative dialogue.

### Hot Mix Asphalt Mixture Prices

The rise in oil prices and the increased construction cost associated with the demands of rebuilding Louisiana in the wake of Hurricanes Katrina and Rita have put undue budgetary stress on the Department. There is an increasing need for

20 Years of Excellence

# TECH TRANSFER HIGHLIGHTS



overlay and surface rehabilitation throughout the State; however Louisiana's budget remains stagnant prohibiting the necessary increase in pavement rehabilitation.

Responding to this reality, the Chief Engineer formed a task team to facilitate the development of HMA mixture specifications that would lower initial cost and yet remain viable for "farm to market" highways. After several meetings between Headquarters, LTRC, Materials, Design, and Construction sections, a low-cost HMA mixture specification was developed along with changes in the Quality Acceptance parameters.

The results of this work will be seen in next year's construction. LTRC will continue to examine different methods in an effort to reduce initial costs associated with highway construction while maintaining quality.

## Profiler Certification Process Improvements

In April 2006, the LTRC pavement unit was contacted by the DOTD Materials section for assistance in updating their contractor profiler certification process. After examining methods used by other states, LTRC modified the Department's current procedure. In doing so, IRI reference values were obtained using the ARRB Walking Profiler on the two 528-foot sites used for certification of contractor's profilers. A 300-foot "lead out" section was added to the end of the 528-foot section, in addition to the 300-foot "lead in" section already in place from previous years in order to accommodate the reverse filtering technique used by the Ames profilers.

DOTD contractors currently use profilers manufactured by three different companies (Ames, Dynatest, and ICC) with Ames profilers accounting for approximately 75 percent of the profilers used by Louisiana contractors.

A program was purchased from Dynatest to merge the separate wheel path Walking Profiler



# TECH TRANSFER HIGHLIGHTS

files into one file with both wheel paths. This file was then filtered by each of the three manufacturers filter programs, and then run through ProVal to produce a reference IRI for the three different profilers. Using this method, the reference IRI each profiler had to match was derived using the same filtering algorithm that it would use to collect IRI values for acceptance on construction projects. This method produced better results in that fewer contractors had problems passing the certification process. Personnel from the Materials section were trained in the new process by the LTRC pavement unit, and they will assume responsibility in 2007.

Using the revised method the contractor certification program took far less time and achieved better results. This method also assures the Department that the IRI smoothness values collected by contractors on DOTD construction projects are reliable and accurate. The end results are smoother riding roads, which have been proven to last longer.

## US 190 Evaluation

In late 2006, an LTRC team composed of the Pavement, Geotechnical, Materials, and EMCRF groups, in cooperation with DOTD Construction Engineers, evaluated several pavement sections on US 190 near Erwinville, Louisiana, which ex-

perienced early rutting. The objective of the evaluation was to determine which layer(s) in the pavement cross-section was contributing to the rutting problem. The team used the pavement surface profiler, Falling Weight Deflectometer (FWD), and Dynamic Cone Penetrometer (DCP) to provide a quick and minimally intrusive examination of the problematic areas, reducing collection time. The FWD and DCP results were compared with pavement surface profiles across the project's different material cross-sections, and against known material target values. The DCP and FWD results indicated some existing weak,



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# TECHNOLOGY TRANSFER

subsurface layers, but did not answer why rutting occurred in stiffer areas. These initial tests either eliminated or identified areas for further study. Specifically, three sites were selected for further study by trench excavations: a Blended Calcium Sulfate (BCS) base, Stone Base, and BCS with a treated subbase, all of which experienced rutting at the surface. The objective of the trenching was to identify the exact location of failure in the pavement cross-section. Trench observations indicated failure in the asphalt layers, while laboratory strengths and moduli for the asphalt material of field-cored samples were low

in some areas, but not outside acceptable limits. The failure within the asphalt layers was attributed to moisture, and insufficient bond strength between asphalt layers. Overall, there were multiple factors attributing to the problems at the site including design, construction, and material issues. Monitoring continues at the site, and standard specification changes have been recommended to prevent failures from occurring in future projects, including requiring cement treated sub-grade layers and more stringent quality limits on asphalt.



## Dissemination of Information

Technology transfer's ultimate goal is to disseminate practical knowledge to municipalities, parishes, and the transportation industry at large. It falls to LTRC's Publications and Digital Media Development Program to meet DOTD's informational and training needs through newsletters, brochures, annual reports, capsules, and other technical publications.

## Publications / Graphics

In the area of publishing, LTRC produced and distributed quarterly/periodic newsletters, Technology Today (LTRC), Technology Exchange (LTAP),

# TECHNOLOGY TRANSFER



and Quality Matters (Mat Lab). As resident editors for LTRC, the staff also edited five research final reports, ten research project capsules, and miscellaneous journals and papers.

## Web Development

The staff continued to enhance online registration capabilities, database development, presentation pages, and evaluation surveys developed for DOTD and LTRC conferences and seminars. One of the major online projects developed this year was the Change Management Survey—Process Improvement for DOTD Contracts and Agreements, an extensive survey by which the Depart-

ment will improve how to handle legal agreements and contracts.

## Video Production / Photography

Throughout the year, LTRC documented various DOTD projects with video, such as the investigation of possible saltwater contamination of Juban Road piers and the documentation of field samples for the I-10 / Piccardy overpass safety review.

One video highlight of 2006 was a special production for the Federal Highway Administration, "The 50th Anniversary of the Interstate System; Elevated Roadways In Louisiana," which was a look back at the past half century in the life of the interstate system.



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# LA TECHNICAL ASSISTANCE PROGRAM

LTAP – New Road  
Safety Program  
Enhances  
Traditional  
Technical and  
Safety Program



## Louisiana Local Technical Assistance Program (LTAP)

**T**he Louisiana Local Technical Assistance Program (LTAP) is one of 58 centers in a national network that provides services to the local transportation community in each state, Puerto Rico and the Native American Tribal areas.

Each center operates independently to develop and implement programs that best meet the needs of the local transportation agencies while sharing a common national mission “to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce.” LTAP also shares four national focus areas that include infrastructure maintenance, safety, workforce development, and value delivery.

# LA TECHNICAL ASSISTANCE PROGRAM

The LTAP provides an array of services geared specifically to the local agencies and personnel that manage and maintain Louisiana's local roads and transportation system. Training classes and workshops have been primary services offered since the program began in 1986. Classes are routinely offered at eight locations around the state as part of the ongoing "Roads Scholar" program. Special topic classes are also offered, and on-site on-demand workshops are also available. In 2006, over 3,863 participants attended nearly 18,242 hours of technical and safety training. LTAP also provides technical assistance on request, publishes a quarterly newsletter, and maintains a publication and video library.

SAFETEA-LU, the most recent federal transportation bill, provided LTAP with new opportunities to bring road safety assistance to the local road community. Working closely with the LA DOTD's Office of Highway Safety, LTAP coordinated the implementation of the new Louisiana Local Road Safety Program (LRSP). This first year of the LRSP included delivery of basic road safety training classes, technical assistance, state-wide informational meetings and funding through DOTD for local road safety improvement projects. Local agencies were encouraged to identify low cost road safety improvement projects and submit applications through LTAP. Applications for

54 projects were received, and 41 were found to be eligible for funding. Projects included installation of improved signs and pavement markings, traffic studies, line of sight improvement, warning signs, crash data collection and management systems, sidewalk construction, and new guardrail installation.

Louisiana is a leader in utilizing the opportunities provided by SAFETEA-LU to address safety on the local roads. The new LRSP will continue to provide training and technical assistance free of charge.





# EDUCATION & TRAINING

**B**ecause training is a necessary component of career advancement, 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 the individual working in the transportation industry.

LTRC manages DOTD's Structured Training Programs; develops maintenance and construction training materials and programs; coordinates seminars, workshops, and conferences for continuing education and professional development; and contracts with the private and public sectors for unique training needs.

## **DOTD Structured Training Programs**

The DOTD Structured Training Program (STP) is a department-sanctioned, progressive training curriculum that requires specific work-related training to be completed at each level of an employee's career path. DOTD 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 department supports and

promotes an environment of continual learning in order for employees to maximize their potential and provide qualified personnel crucial to the effective management of the transportation system.

The program continues to manage the following work force development programs:

- Leadership Training Program
- Engineering Technician Training Program
- Maintenance Training Program





# EDUCATION & TRAINING

- Engineer Intern Training Program
- Weights & Standards Training Program

## Construction & Maintenance Course Development

There were 12 courses developed in 2006, 9 construction course and 3 maintenance courses:

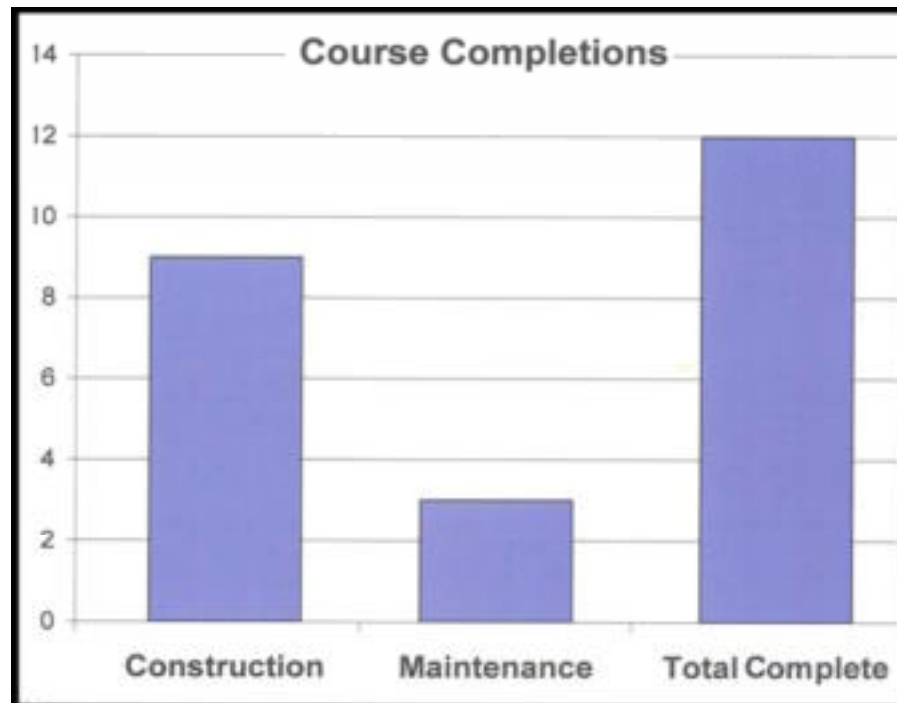
### Construction Courses/Projects Completed

- o Implemented recertification exams for six certification areas for use in recertifying construction inspectors
- o *Introduction to the Standard Specifications for Roads and Bridges* training manual-revision for 2006 specifications
- o *Construction Contract Administration* Course
- o *Introduction to Form 2059* training course
- o Update of specialty area tests for asphaltic concrete paving and structural concrete
- o Location and Design Basic Math converted from SI Metric units to English units
- o Location and Design Advanced Math-Algebra and Trigonometry converted from SI Metric units to English units

- o E-Learning Sandbox Project using Macromedia Breeze
- o DOTD Strategic Advisor to the Louisiana Recovery Authority (mid-December 2005 to April of 2006)

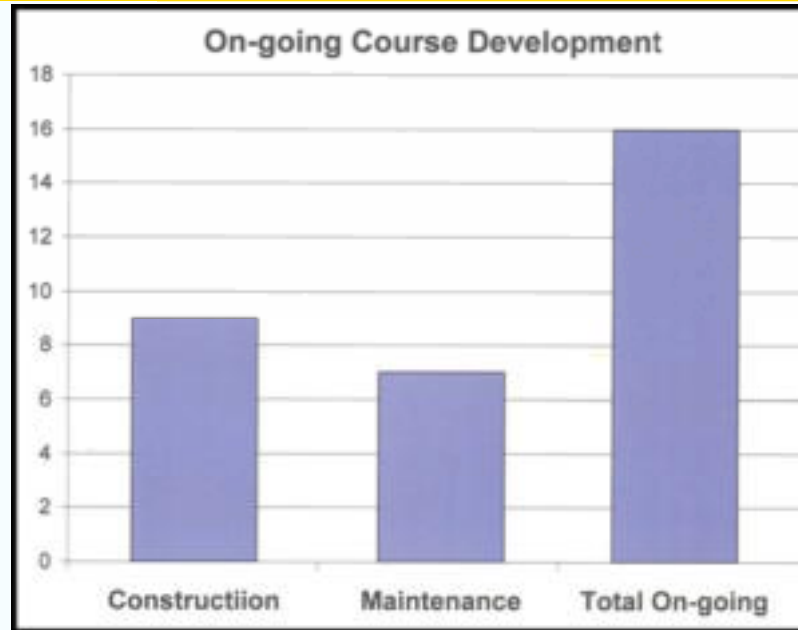
### Maintenance Courses/Projects Completed

- o Maintenance Math Review Classes
- o What's Wrong with This Picture? (HAZ MAT training)
- o Pilot course for literacy skills upgrade software



# EDUCATION & TRAINING

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## Current/Ongoing Projects

A total of 16 development projects are currently ongoing, 9 construction, 7 maintenance.

### Construction Current/Ongoing Projects

- o Management of the Inspector/Technician Certification Program for DOTD and the Louisiana transportation industry
- o *Base Course Inspection*
- o *Application of Quality Assurance Specifications for Portland Cement Concrete and Structural Concrete* – Update to latest specifications

- o *Application of Quality Assurance Specifications for Asphaltic Concrete* – Update to latest specifications
- o *Application of Quality Assurance Specifications for Embankment and Base Course* – Update to latest specifications
- o Specialty Area Tests for all Certification Areas – Updated to latest specifications
- o Introduction to Surveying – course revision
- o Survey Math – course revision
- o Training for the Automated Lightweight Profiler

### Maintenance Current/Ongoing Projects

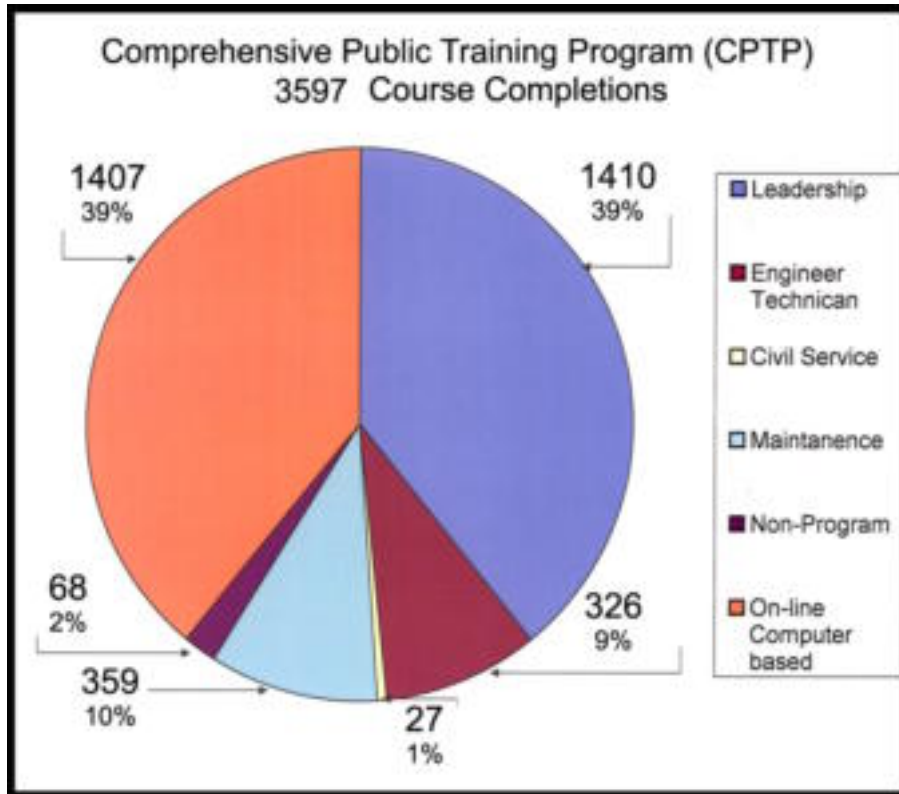
- o International Municipal Signal Association (IMSA) Test Administration and Certification
- o Needs Assessment for Trades Functions
- o Traffic Signal Preventive Maintenance
- o Work Site Safety for Superintendents and Supervisors
- o Safe Operating Checklists
  - Herbicide Rig
  - Air-jet Pothole Patcher
  - Sewer Jet

# EDUCATION & TRAINING

- o Mobile Radio Procedures
- o Letter Bid Study Guide

## Leadership Training

In 2006, there were 2,180 new registrants received for the leadership training program. This brings the total number of registrants for the Comprehensive Public Training Program (CPTP) Leadership program to 4,185.

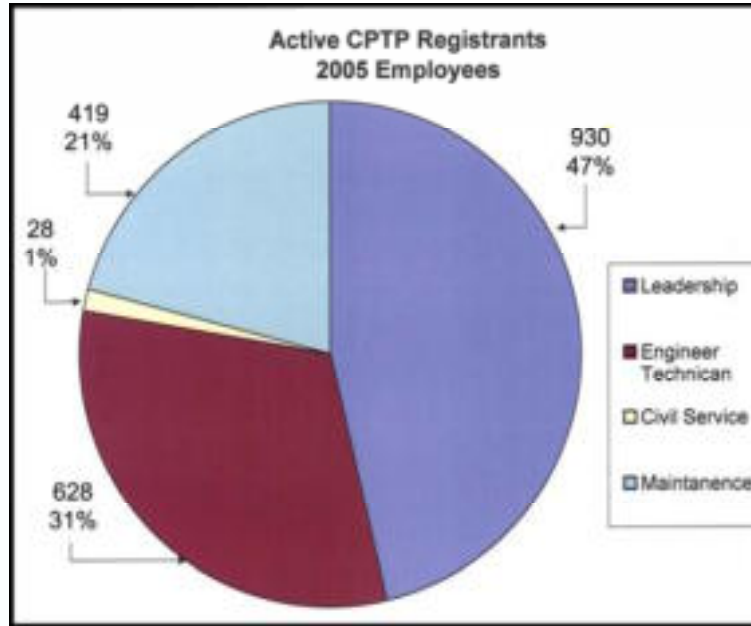


Of the 3,597 CPTP course completions this year, with 78 percent of this training being divided between leadership and on-line computer-based training (equally 39 percent each). Maintenance and Engineering Technician comprised a total 19 percent of the training program; 10 percent and 9 percent respectively.



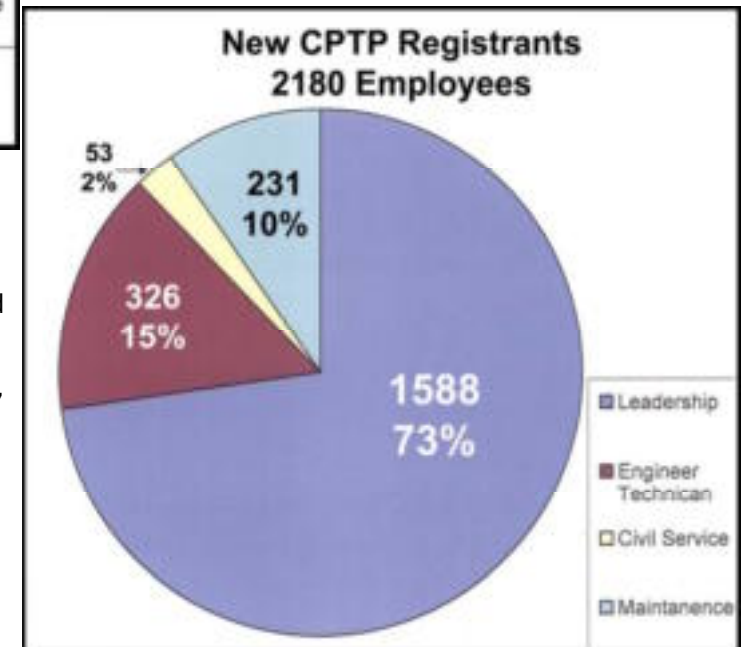
# EDUCATION & TRAINING

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The chart above illustrates that of the 2,005 active CPTP registrants this year, 47 percent were involved in Leadership Programs; 31 percent and 21 percent of the applicants were active in the Engineer Technician and Maintenance Programs, respectively.

The chart below shows that in 2006, there were 2,180 new registrants for the CPTP program. Of the 2,180 registrants shown, 1,588 (73 percent) are in the Leadership Program; 326 (15 percent) registered for the Engineer Technician Program; and 231 (10 percent) applied for Maintenance Training.



# TRANSPORTATION TRAINING & EDUCATION CENTER

## Transportation Training and Education Center (TTEC)

This past year brought a new season of training as LTRC's newly constructed Transportation Training and Education Center (TTEC) began offering classes at its state-of-the-art facilities next door to LTRC. The result has been a significant savings to DOTD since off-site rental of meeting facilities became the exception rather than the rule.

The facilities of TTEC were further enhanced with the installation of the state-of-the-art audio visual system which has provided full rich media, mixed delivery capability to instructors in each of the classrooms, the 100 student auditorium, and the conference room. Also installed was the robust capability to send or receive full web-based transmissions for distance learning, e-learning, and teleconferencing.

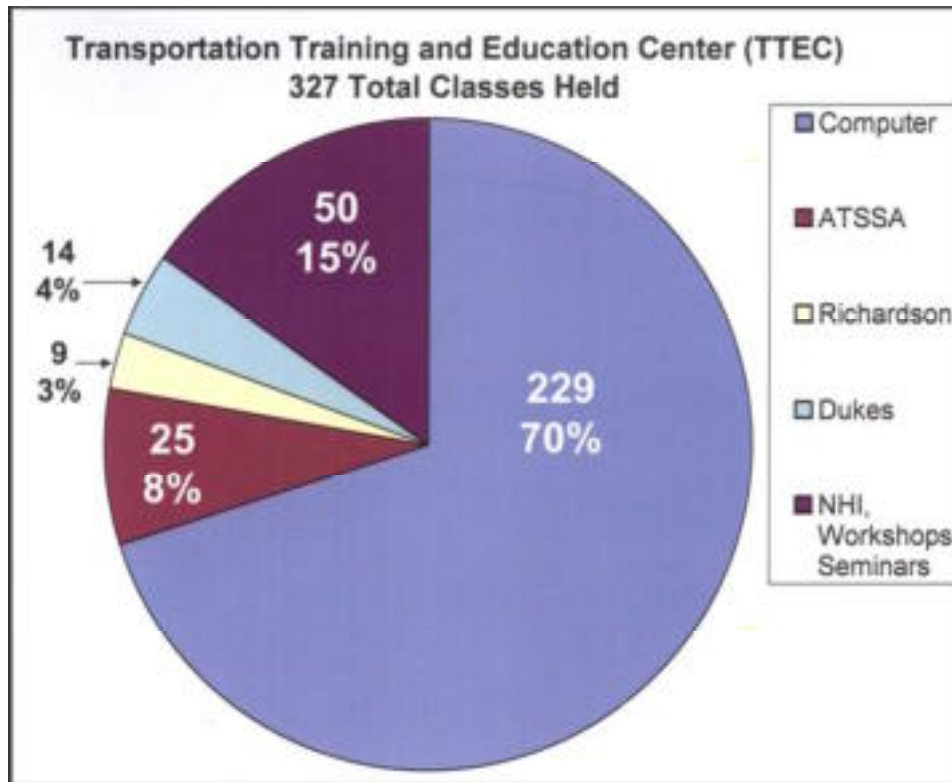
### Grand Opening of TTEC

The official grand opening ceremony of the Center was held October 19, 2006, and was attended by the DOTD Secretary, distinguished members of the Louisiana Senate and House of



Representatives, the President of the Louisiana State University System, representatives of the Federal Highway Administration, Deans from various Louisiana engineering colleges, and honored members of the engineering community, including members of the Louisiana Transportation Research Center Foundation, and of course, DOTD employees.

# TRANSPORTATION TRAINING & EDUCATION CENTER



## Individual Registration:

In addition to managing courses in-house, the center provides the opportunity to attend courses, conferences, seminars, and other educational and training opportunities offered by outside parties. In 2006, LTRC managed over 150 registrations for employees to attend approximately 82 conferences, courses, seminars, and other educational and training opportunities offered by outside parties.





# FACILITIES AND FUNDING



**L**ocated on the LSU campus in Baton Rouge, the Louisiana Transportation Research Center (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 Extension Institution are also available. The unique position of LTRC provides access to virtually all of LSU and DOTD's resources to pursue its mission.

LTRC houses more than 90 employees and up to 30 students in two adjacent facilities. The LTRC building is a 25,300 square foot facility that includes five research laboratories, a classroom, a conference room, and offices. The laboratories are used to conduct advanced research in asphalt materials, concrete, soils, pavements, and geotextiles. The newly constructed 14,000 square foot Transportation Training and Education Center (TTEC) houses a lecture hall, a com-

Total expenditures for  
FY 2005 – 2006:

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Research  
\$ 5.18 million

Tech Transfer & Training  
\$ 3.04 million

# FACILITIES AND FUNDING

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puter-based training classroom, and two general classrooms that are all equipped with advanced education and training equipment and distance learning/video-conferencing capabilities. A comprehensive transportation library and offices are also included.

LTRC has identified research areas of strategic importance and has developed expanded capabilities for concentration in several areas: the Engineering Materials Characterization and Research Facility (EMCRF), a laboratory facility specializing in fundamental materials characterization and Strategic Highway Research Program (SHRP) implementation of the SHRP asphalt testing suite for binders and mixtures; the Geotechnical Engineering Laboratory (GERL), a laboratory focusing on transportation earth-works, structural foundations, and geosynthetics; with mobile equipment, including the large electronic cone and mini-cone intrusion technologies for in-situ characterization of geomedia; and Pavement on the Move (POM), a multi-use mobile laboratory for collecting data from field construction projects as well as research and training.

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™), the second of its kind in the nation.

The addition of 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 is a budget entity of the Louisiana Department of Transportation and Development.

Funding is a combination of State, State Planning and Research (Part II, Federal) 100 percent federal, Surface Transportation Program (STP-federal), and external contracts and grants, such as the National Cooperative Highway Research Program and the U.S. Army Corp of Engineers.



# ORGANIZATIONS & COMMITTEE MEMBERSHIPS

## Committee Chair

- o ASTM D 04.25 on Analysis of Bituminous Mixtures

## NCHRP Project Panel Chair

- o Project 9-36 on the Improved Procedure for Laboratory Aging of Asphalt Binders in Pavements
- o Project 10-63 on Heat Straightening Repair of Damaged Steel Bridge Girders: Fatigue and Fracture Performance

## NCHRP Project Panel Member

- o Project 9-39 on Development of Procedures for Determining the Mixing and Compaction Temperatures of Superpave Asphalt Binders in Hot Mix Asphalt
- o Project 1-42A on Models for Predicting Top-Down Cracking of Hot-Mix Asphalt Layers
- o Project 20-05/Synthesis Topic 38-09, FY 2006, Correlation for Resilient Modulus Values of Subgrades and Unbound Pavement Materials
- o Project 20-71, FY 2007, A Manual for Methodology of Experimental Design and Analysis Consortium of Accelerated Pavement Testing (CAPT) and Technical Exchange Partnership

## Board Member

- o Asphalt Pavement Analyzer User Group
- o LA Engineering Society (LES)
- o Research Advisory Group of the National Stone Sand, and Gravel Association

- o Southeastern Asphalt User Producer Group
- o Concrete Pavement Technology Center

## Organization Member

- o American Society of Civil Engineers
- o ASCE Bituminous Materials Committee (BMC)
- o Association of Asphalt Paving Technologists (AAPT)
- o Geo-Institute
- o International Society of Asphalt Pavement
- o LA DOTD, St. Francisville Bridge Design Build Selection Team, Technical Review Committee 2006
- o LA Engineering Society
- o LSU, Communication across the Curriculum Engineering Communication Advisory Council
- o National Society of Professional Engineers
- o Southeast Asphalt User Producer Group
- o International Steering Committee for Travel Survey Conferences

## TRB

- o A2L01, Exploration and Classification of Earth Materials
- o A2K05, Modeling Techniques in Geomechanics
- o A2B09, Full-Scale Accelerated Pavement Testing
- o ABJ70 Artificial Intelligence and Advanced Computing Applications

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# ORGANIZATIONS & COMMITTEE MEMBERSHIPS

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- AFD40, Committee on Full-Scale Accelerated Pavement Testing
- AFD40(2), Sub-Committee on the APT International Alliance
- AFD40, Sub-Committee on the 3<sup>rd</sup> International APT conference
- AFK10 General Issues in Asphalt Technology
- AFK30 Characteristics of Non Bituminous Components of Bituminous Paving Mixtures
- AFK40 on Characteristics of Bituminous-Aggregate Combinations to Meet Surface Requirements
- AFK50 on Characteristics of Bituminous Paving Mixtures to Meet Structural Requirements
- AFK60 Flexible pavement construction and rehabilitation
- AFK80 Basic Properties of Concrete
- AFS70(2), Geosynthetics in Flexible Pavement Systems
- AFS70: Committee on Geosynthetics
- AHB20 Freeway Operations Committee
- AHD20 on Pavement Maintenance Committee
- ANB10 (4) Subcommittee on Emergency Evacuation
- Committee on International Transportation
- Engineering Geology and Site Characterization
- Highway Safety Manual Task Force
- Subcommittee A2B09, International Conferences on Accelerated Pavement Testing

## ASCE

- ASCE Construction Institute Bituminous Committee
- Baton Rouge Branch Geotechnical Chair
- Transportation and Development Institute, Planning and Economics Committee

## IEEE

- IEEE Computer Society
- IEEE Computer Society's Award Committee
- IEEE Computer Society's History Committee

## Training Memberships

- DOTD Certification Committee
- DOTD Testing Procedures Committee
- DOTD Loss Prevention Committee
- CDL AD Hoc Committee
- LA Comprehensive Public Training Program Curriculum Committee
- Southeast Task Force on Technician Training and Qualification

## FHWA

- Federal Advisory Committee : Impacts of Climate Variability and Change on Transportation Systems and Infrastructure—Gulf Coast Study, Phase I.

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"Elimination of Deck Joints Using A Corrosion-Resistant FRP Approach," Project No. 06-2ST.

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## Journals Edited

**Mohammad, L.N.**, Associate Editor, ASCE Journal of Materials in Civil Engineering

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## Presentations / Conference Proceedings

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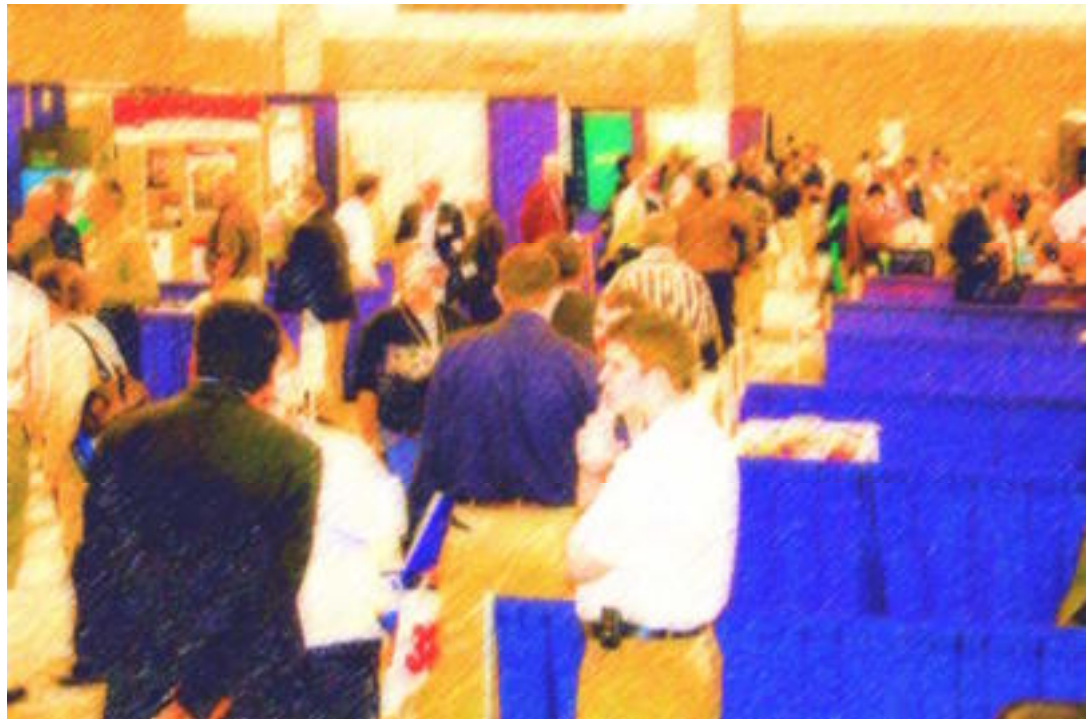
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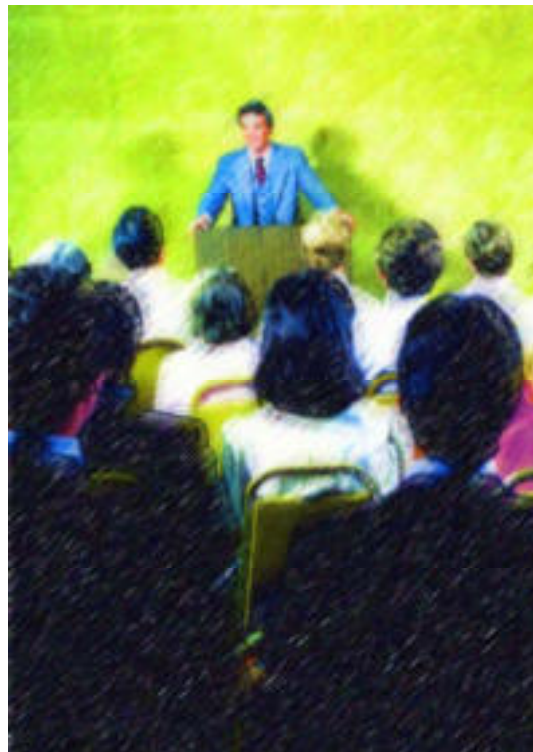
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**Wu, Z.** "LTRC Current APT Project: Accelerated Loading Evaluation of a Sub-base Layer on Pavement Performance," presented at the the Bi-annual meeting of the Consortium of Accelerated Pavement Testing (CAPT) users group, Davis, CA., May 16-17, 2006.

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**Zhang, Z.,** “Build a Reliable Cement-Stabilized Subgrade Layer,” Pavement Performance Seminars in Ruston, Alexandria, and Baton Rouge, LA, April 10, 11 and 12, 2006.

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# LTRC STAFF

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# LTRC STAFF

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Treba Patin, Automation Training & Development Program Manager  
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Nick Champion: Photographer  
Emily Wolfe: Editor/Writer/Designer  
Alainna Giacone: Editor/Writer



The entire LTRC staff contributed  
to this report

# 2006 LTRC POLICY COMMITTEE

*The LTRC Policy Committee was established to advise and make recommendations to LTRC concerning research and technology transfer programs, budgeting, and the policies of the center. The committee meets at least twice a year and is composed of three appointees of the Secretary of DOTD, one appointee of the Chancellor of LSU, six appointees from other state universities, the director of LTRC, and a FHWA-appointed observer.*

## **Bill Temple, P.E. (Chairman)**

Chief Engineer

LA Department of Transportation & Development

## **V.J. Gopu, Ph.D., P.E.**

Department Chair, Professor

Civil and Environmental Engineering Tulane University

## **J.O. Uppot, Ph.D., P.E.**

Professor

Coordinator and Graduate Director

McNeese University

## **Harold Paul, P.E. (Ex-Officio)**

Director

Louisiana Transportation Research Center

## **Eric Kalivoda, Ph. D., P.E.**

Assistant Secretary

Planning and Programming

LA Department of Transportation & Development

## **George Voyiadjis Ph.D., P.E.**

Chair, Civil and Environmental Engineering

Louisiana State University

## **Donald Barbe Ph.D., P.E.**

Civil Engineering Chairman

University of New Orleans

## **Freddy Roberts, Ph.D., P.E.**

T.L. James Professor of Civil Engineering

Louisiana Tech University

## **Ernest Walker, Ph.D., P.E.**

Dean, College of Engineering

Southern University

## **Steve Cumbaa, P.E.**

Deputy Secretary

LA Department of Transportation & Development

## **Jamie Setze (Invited Observer)**

Planning and Environmental Program Manager

Federal Highway Administration

## **Xiaoduan Sun, Ph.D., P.E.**

Professor

Department of Civil Engineering

University of Louisiana at Lafayette



# IN MEMORY OF DR. FREDDY ROBERTS, JR., P.E.

## LTRC Remembers Highly Respected Researcher and Friend

**D**r. Freddy Roberts, a longtime researcher with LTRC, passed away in Ruston, LA, March 16, 2007, following a courageous battle with cancer. He was 65.

Roberts had taught civil engineering at Louisiana Tech University since 1990. In addition to his role at the National Center for Asphalt Technology from 1986-1990, he served on numerous engineering research committees and boards both at the state and national level. He also held the position of T.L. James Eminent Scholar Chair at the university.

Roberts received his Bachelor of Science and Master of Science degrees from the University of Arkansas, and his Ph.D. from the University of Texas. His areas of specialization included pavement management systems, performance of pavements, design of asphalt pavements, and behavior of asphalt, and other pavement materials.

Roberts played a major role in research support for the Louisiana Transportation Research Center. For years, he served as the vice chairman and

chairman of the LTRC Policy Committee. He also worked extensively with LTRC's Accelerated Loading Facility and served as a member of LTRC's statewide master's program in transportation engineering and the Research Problem Identification Committee to evaluate problem statements in the pavements and construction area.

Roberts presented the Transportation Engineering Review materials for the Mississippi Review for the Professional Engineering Exam at the Waterways Experiment Station, Vicksburg, MS. He also presented the Highway Engineering Review materials for Chi Epsilon for the review for the Fundamentals of Engineering Exam, 2004, 2005, and 2006, for Louisiana Tech University.

A well-accomplished man, most recently, Roberts won the 2007 LA Engineering Foundation Engineering Faculty Professionalism Award.

Dr. Roberts was valued in a professional capacity as a researcher with LTRC for many, many years, but he was also considered a true friend to many. We will sorely miss him and extend our condolences to his family.



Dr. Freddy Roberts, Jr., P.E.

*We commemorate Dr Robert's dedication and service. His research projects were of paramount importance in fulfilling LTRC's mission.*

Louisiana Transportation Research Center

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