Center for Transportation Research
Annual Report
Fiscal Year 2007

FY2007 Annual Report

This report documents CTR's notable accomplishments during fiscal year 2007, running from September 1, 2006 through August 31, 2007. Also presented are the activities and results of the Center's work, including events hosted and assets gained. CTR works in cooperation with several other UT research centers to develop groundbreaking research; those centers' accomplishments are described as well.

Directors Report

Fiscal year 2007 saw a balanced program overall in terms of research topics. A broad array of subjects is being addressed, ranging from pavements and bridges to bicycle facilities, from inland ports to international container shipments, and from economic justice to innovative public-private partnerships.

Furthermore, CTR is undertaking highly relevant projects, the outcomes of which are pertinent not only within the state but nationwide. These projects are a reflection of the Center's strong relationship with the Texas Department of Transportation (TxDOT).

- **National economics:** CTR is addressing all modes of transportation, including multi-modal processes. One groundbreaking project is determining the financial impact of Texas ports on both the regional and national economy.
- **Demographic forecasting:** Transportation is a derived demand so demographic developments are essential to forecasting—and meeting—transportation needs. CTR is assisting on a UTSA project to develop Texas demographic patterns, essentially drawing a picture of what TxDOT will be focused on in 20 years.
- **Making room:** The seemingly impossible is happening: Texas is running out of room. Given this unprecedented situation in the largest of the contiguous states, rights-of-way (R/W) are an important topic right now. CTR researchers are investigating R/W encroachments in an attempt to plan now for future growth.

Out of the research emerge highly usable publications that shine a bright light on the path to implementation. One standout example is the Guidebook for Identifying, Measuring and Mitigating Environmental Justice Impacts of Toll Roads (0-5208-P2).

Another achievement of FY 2007 is the continued success of student involvement in the research program. CTR actively recruits and retains graduate research assistants, who are a critical element of the program. CTR is producing the next generation of engineering professionals.

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In particular, the TxDOT State Planning and Research (SPR) program is the cornerstone of CTR's research activities. Smaller program elements such as the Southwest University Transportation Centers (SWUTC) Program are essential to program vitality.

The SWUTC program is part of a major national initiative designed to foster university-based, long-term research that encompasses all transportation modes, and to attract the nation's best students to the study of transportation. During FY 2007, 11 research professionals and 22 students participated in this program.

The SWUTC sponsors the Advanced Institute for Transportation Infrastructure Engineering and Management (AI), a program whose mission is to increase the number, quality, and diversity of professionals entering the transportation sector. During FY 2007, 24 graduate students and 7 undergraduate students participated in the AI program.

Through the education component of its program, CTR is training tomorrow's transportation professionals.

CTR's commitment to education is notable, as the per-person costs of supporting the education component are increasing faster than the contracted amounts. On average, more than 250 research personnel were supported each of the last six years. However, due to recent increases in student stipends, salaries, and—most significantly—tuition, the number of students supported decreased in FY 2007 as compared to the last 10 years, during which the number supported rose steadily.

FY 2006* CTR Staff

Faculty participating in program	58
Code 1000 researchers (FTE)	26
Non-code 1000 technical (FTE)	17
Graduate researchers	124
Undergraduate researchers	61
TOTAL	286

**Most recent figures available*

Year at a Glance

New Researchers

UT Faculty

Dr. John Taylor: Research interests include implementation of technological innovations; organizational learning and adaptation in project networks; the affiliation dynamics of individuals, teams, and organizations in project networks; and off-shoring of information technology in project networks.

Dr. Cindy Menches: Research interests include contingency engineering and construction management during emergency response; collaboration in project planning and management; management and mitigation of a construction workforce shortage; and construction process efficiency strategies.

CTR Researchers

Seong Cheol Choi: Research interests include time-dependent behavior of early-age concrete; creep and shrinkage of early-age concrete; effect of environmental loadings (temperature and moisture) on CRCP behavior and performance; and experimental evaluation of concrete properties and behavior.

Active Projects

CTR had 119 active contracts during FY 2007, which fell into the following categories:

- TxDOT Research (59)
- TxDOT Implementation (11)
- SWUTC (14)
- IACs (22)
- Other unique funding sources (13)

A complete list of CTR's active FY 2007 projects is included as Appendix A to this document. The Center maintains a list of the current fiscal year's active TxDOT projects on the Current Projects page in the Research section of the CTR Web site.

Financial Data

The most recent available figures are for FY 2006 and include recorded expenditures of $11,981,866 and total awards of $14,973,605. The following chart depicts funding sources as percentages of the total amount contracted.

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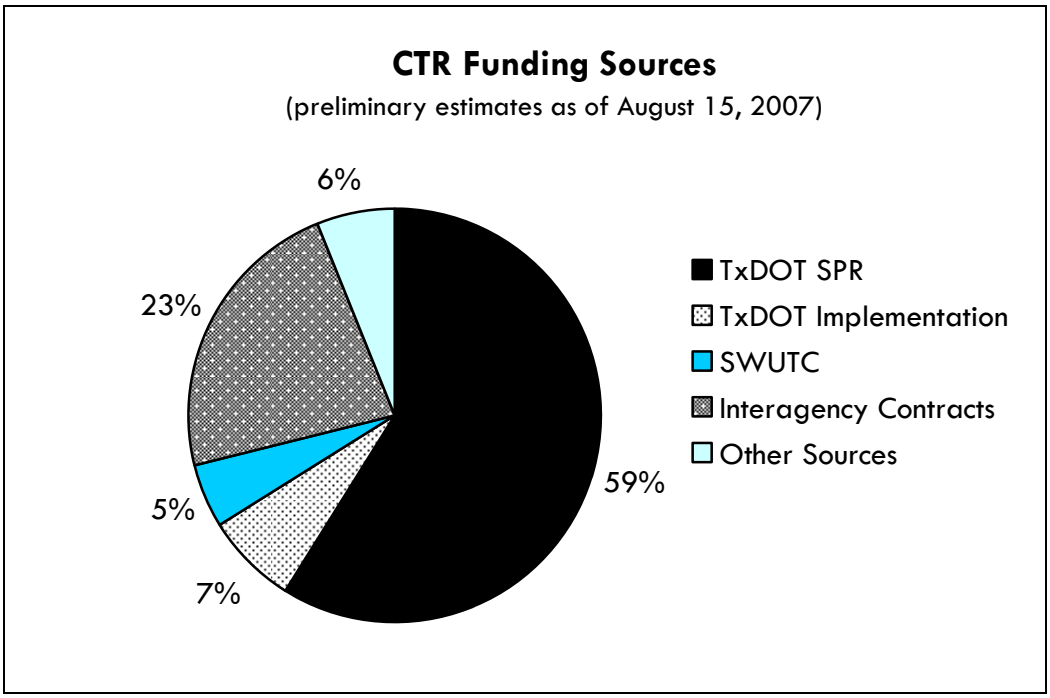

Research Deliverables

As of August 15, 2007, CTR has published 54 reports and 71 products. The products category includes implementation-focused items such as handbooks, software, CD-ROMS, and user manuals. Some examples of products include:

- Field Manual for Crack Sealing in Asphalt Pavements (0-4061-P3)
- TAM User's Manual (0-5178-P3)
- Guidebook for Identifying, Measuring and Mitigating Environmental Justice Impacts of Toll Roads (0-5208-P2)

All CTR reports and some products are published online. These publications are listed on the CTR Reports Online page in the Research section of the CTR Web site.

CTR Programs

Cooperative Research Program

The research conducted for the Texas Department of Transportation (TxDOT) remains the cornerstone of the CTR program; for any given year, CTR's TxDOT program comprises more than 70 projects, excluding interagency and other informal agreements. These investigations span all the agency's research areas and range from traditional subjects like pavements to the newer areas of intelligent transportation systems (ITS), air quality, and rail planning.

Southwest University Transportation Centers Program (SWUTC)

The Southwest University Transportation Center is one of fourteen centers of excellence established by the U.S. Department of Transportation (USDOT). The program is a vehicle for both innovative research and student support.

As the following table shows, SWUTC research tends to have a social or economic focus. This emphasis is due to the USDOT mandate that these items not duplicate other research being conducted; most other research is in hard materials such as pavement. Also, the majority of SWUTC projects are initiated by UT's Civil Engineering faculty and by the School of Architecture and the LBJ School of Public Affairs.

SWUTC Reports Completed in FY 2007
An Investigation on the Environmental Benefits of a Variable Speed Control Strategy
Enhanced Freight Sketch Planning Tool for Assessing Multimodal Investment Strategies
A Comprehensive Analysis of Built Environment Characteristics on Household Residential Choice and Auto Ownership Levels
The Impact of Demographics, Built Environment Attributes, Vehicle Characteristics, and Gasoline Prices on Household Vehicle Holdings and Use
Can Transit-Oriented Developments Reduce Austin's Traffic Congestion?
Robust Design and Evaluation of Transportation Networks with Equilibrium Under Demand Uncertainty
Development of a Phase-by-Phase, Arrival-Based, Delay-Optimized Adaptive Traffic Signal Control Methodology with Metaheuristic Search
Characterizing Truck Traffic in the U.S.-Mexico Highway Trade Corridor and the Load Associated Pavement Damage

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SWUTC is one of the very few funding sources that allow the researchers to generate the topics. Typically, the source of funds (i.e., the sponsor) presents a problem description and allocates funds to those research centers that indicate they can best provide a solution. SWUTC funds are used to fund the doctoral student program (all of CTR's UTC funds go to the doctoral program) and the candidates' work must be cutting edge, so UTC projects are usually quite innovative in nature.

Advanced Institute for Transportation Infrastructure Engineering and Management (AI)

The Advanced Institute is part of the SWUTC program. AI recruits, teaches, and mentors students entering the transportation field, with special emphasis placed on the quality and diversity of that professional pool. Its mission is to increase the number, quality, and diversity of professionals entering the transportation sector with its annual Undergraduate Summer Internship in Transportation. A high percentage of the Institute's undergraduate fellows continue their studies in transportation research.

Texas Pavement Preservation Center (TPPC)

The Texas Pavement Preservation Center (TPPC) was officially established August 11, 2005 in joint partnership with CTR and the Texas Transportation Institute (TTI) of Texas A&M University. TPPC is run by the same team that administered the Superpave Asphalt Technology Program. The 2007 Pavement Preservation Seminar will be held on October 8-9, 2007, at the Austin Convention Center, in conjunction with the 24th Annual Association of General Contractors of Texas Trade & Equipment Show.

Interagency Contracts (IAC)

Through an IAC, CTR develops implementations based on research performed. CTR researchers will likely have more opportunities to assist TxDOT through IACs. During FY 2007, the contracted amount for the 22 IACs was nearly $3,000,000.

During FY 2007, the Austin IAC program developed an analysis of the Austin arterial street system employing state-of-the-art modeling techniques. This effort establishes the base to develop recommendations to improve arterial functionality.

An example of an IAC is the Austin IAC, which is an agreement between CTR and the Austin District of TxDOT. CTR will provide technical assistance to the District with a series of identified tasks, serving in many respects as a staff extension. The contract has 12 major tasks, primarily related to construction management and traffic operations. Construction-related tasks include improving construction scheduling and estimating, and workload analysis. Traffic operations tasks include evaluation of ITS strategies and miscellaneous traffic studies.

Another IAC is the Dallas program, which assisted the Dallas District with its High Five Project, the single largest construction contract undertaken by TxDOT. CTR assisted TxDOT with various initiatives to improve the Lyndon Baines Johnson/Central Expressway Interchange in Dallas. The following photograph was taken during the construction, which was completed 13 months ahead of its original 60-month construction schedule.

The Dallas High Five Project tied for Texas Construction magazine's Best of 2006 Award in Construction

The current Dallas IAC is a multi-faceted program that continues the technical assistance offered during major reconstruction projects and also includes technical services for other departments within the Dallas District. These services range from construction schedule monitoring to pavement forensic studies to economic impact analysis. Examples of systems and models to be developed include a lane closure guidance system, a traffic impacts model, a project development scheduling (PDS) system, 4D/CAD interchange models, and a constructability lessons-learned system.

Transportation Planning and Research

A subsidiary of the TxDOT Cooperative Research Program, this program conducts research for TxDOT specifically in the areas of transportation planning, borders, ports, economic issues, and container shipping.

Library Report

The CTR Library is the official depository for the TxDOT research program. Publications generated by TxDOT-funded research at research centers statewide are available at the CTR Library. The library also acts as an archive for TxDOT materials.

Library at a Glance: FYO7

- **Number of patron reference requests fulfilled:** Approximately 1,700
- **Number of items cataloged:** Nearly 2,000 new items were added to the web catalog and two new collections to physical holdings—the NAFTA and the International sections.
- **Web site enhancements:** Two RSS feeds were added to the library site—Transportation News, and Recently Cataloged CTR Reports. The RSS feeds enable patrons to subscribe to a summary of transportation-related news and information.

Developing Resource Networks

Manager of Library Services Louise Rosenzweig has been involved this year with the establishment of the Western Transportation Knowledge Network (WTKN), a new resource-sharing group for the American Association of State Highway and Transportation Officials (AASHTO) Region 4 librarians. Goals of the WTKN are to share library resources and enable participants to develop common principles, standards, and cooperative agreements. Members are working to improve the transfer of information among member organizations.

Library staff continues to be active in the Special Libraries Association, both on a national and state level.

Additionally, the library staff is looking forward to becoming active in the Transportation Research Board (TRB) Library and Information Services for Transportation Group in the coming year.

Conference Participation

The CTR library staff participated in the ninth International Conference on Low-Volume Roads (see description in the Event Highlights section of this document). This was a great opportunity to promote the research of CTR and TxDOT as well as the services of the library. Staff noted that attendees were quite interested in the library and were excited to learn that the library offers services to the public. Visitors were also impressed by the tremendous resource that the Web catalog represents, particularly the direct links to research materials in PDF form. Library staff talked with researchers from all over the world, including Canada, Tanzania, South Africa, Australia, Iceland, and Mexico, as well as attendees from the Bureau of Indian Affairs

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and from other U.S. states, including Oklahoma, Florida, Oregon, and Kansas. The following materials were distributed:

- Approximately 300 CTR Library brochures and 62 CTR Library magnets were distributed in the registration packets and directly to attendees. Many attendees took additional brochures with them to share with peers.
- Approximately 134 CTR and TechMRT research reports were given to attendees, thus sharing valuable research with a global audience.

Manager of Library Services Louise Rosenzweig
at the 9th International Conference on Low-Volume Roads

Field Advisor for Capstone Project

In the spring 2007 semester, Ms. Rosenzweig acted as the Field Advisor to graduate student Brent Lipinski for his School of Information Capstone Project. The goal of a Capstone Project is to complete "an academically rigorous, professional-level project, and receiving in return valuable mentoring in a real-world setting." The student cataloged the International Section, adding approximately 800 new items to the web catalog, and reorganized the Reference Section. This project was a excellent opportunity to fulfill CTR's mission of providing educational opportunities for University of Texas students.

Initiatives FY2008

In the coming year, library staff will be working on projects to ensure consistency and accuracy in the web catalog, as well as finding additional ways to bring information to patrons. An electronic archive project is in the development phase as well. The CTR Library will continue to expand its participation in transportation knowledge networks, so that CTR will stay in the forefront of transportation information services.

Awards and Recognition

TxDOT Top Research Innovations and Findings Awards

FY 2007 began auspiciously with a news release announcing that four CTR research teams received 2005 TxDOT Top Research Innovations and Findings Awards. Following are descriptions of the award-winning projects.

Artificial Lighting for TxDOT's Automated Pavement Crack Rating System

This project developed a light bar that enables TxDOT to collect time-independent and weather-invariant cracking data. If the new device optimizes routine and preventative maintenance, as anticipated, the estimated savings to TxDOT will be approximately $600,000 per year. *CTR Researchers: R.S. Bugao Xu, Yaxiong Huang, and Yuequi Zhong.*

Light bar installed on front bumpers

Model for Predicting Operational and Safety Impacts When Retrofitting Bicycle Lanes

By observing bicyclists in test sites, CTR researchers were able to build a model that predicts the lateral positions of both the cyclist and the motorist when sharing the roadway. The model, along with the accompanying user guide, provides valuable information to designers, planners, and engineers considering on-street bicycle facilities. *CTR Researchers: R.S. Randy Machemehl, Ian Hallett, David Luskin, and Khali Persad.*

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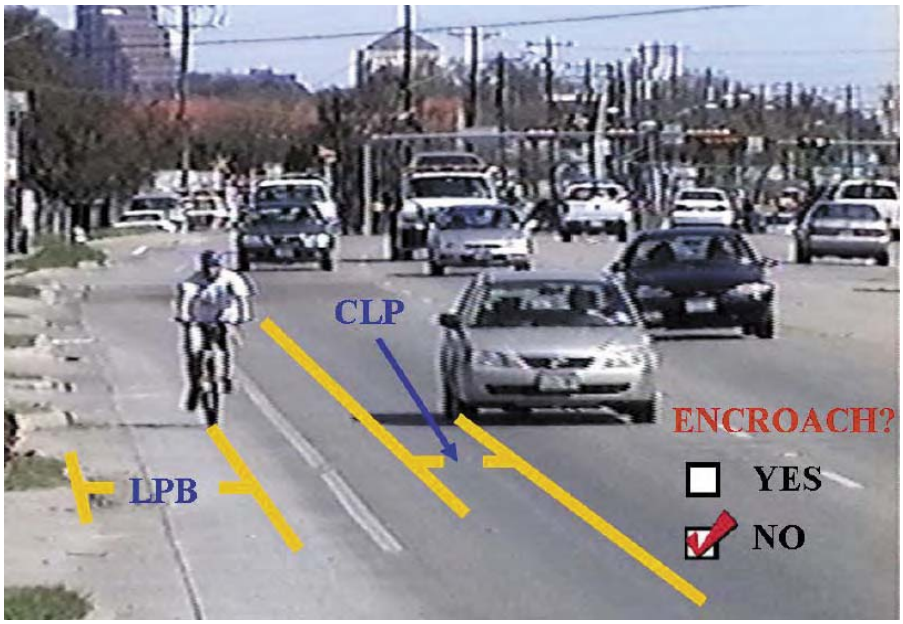
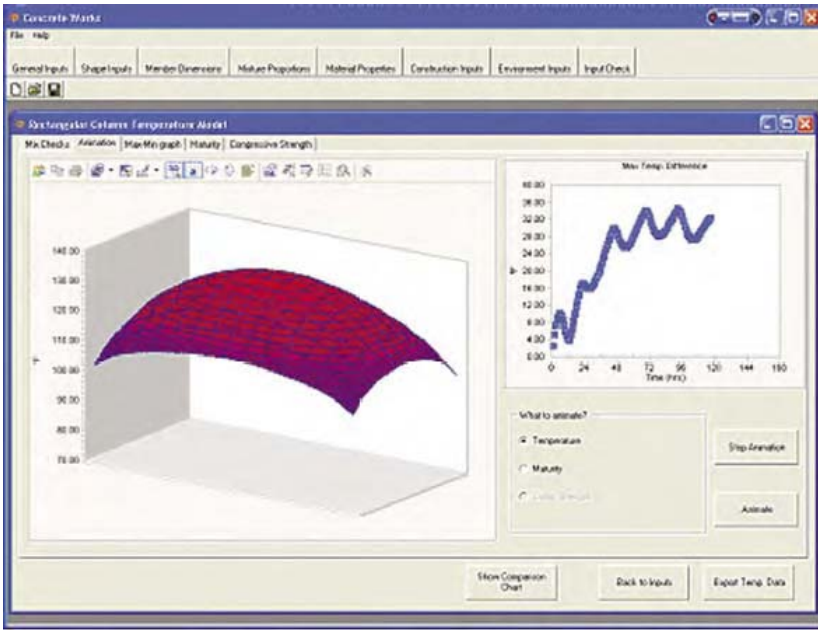


Observations taken from the field video included the lateral position of the bicyclist (LPB) relative to the curb, the change in lateral position of the motorist (CLP) in the course of passing the cyclist, and whether or not the motorist encroached (ENCROACH?) on the adjacent motor vehicle lane.

ConcreteWorks Software

ConcreteWorks is a suite of Windows-based concrete technology programs designed to improve the constructability and durability of concrete. It provides tools for designing concrete mixtures, predicting heat generation in mass concrete, and integrating durability into concrete design. ConcreteWorks is available for free on the ConcreteWorks site: www.texasconcreteworks.com. *CTR Researchers: R.S. Kevin Folliard, Maria Juenger, Kyle Riding, Jonathon Poole, David Fowler, Loukas Kallivokas, and David Whitney.*



An output screen from ConcreteWorks, graphically representing the temperature distribution within a rectangular column.

RUDI—Right-of-Way and Utility Adjustment Duration Information System

The Right-of-Way Utility Adjustment Duration Information system (RUDI) combined with the Stratified and Integrated R/W and Utility Adjustment Process Flow Map, provide a decision-making instrument that can reduce the time from planning to construction of a project. This, in turn, facilitates public commerce and reduces adverse traffic problems and their associated costs. *CTR Researchers: R.S. Edward Gibson, James O'Connor, Nabeel Khwaja, and Khali Persad.*

The RUDI project developed tools to improve TxDOT's ability to forecast crucial construction dates.

Faculty and Researcher Awards

Dr. Chandra Bhat, CTR faculty researcher and civil engineering professor, was given the 2007 Outstanding Graduate Teaching Award by the Graduate School at The University of Texas at Austin. Professor Bhat also received the Lockheed Martin Aeronautics Company Award for Excellence in Engineering Teaching.

Dr. Oguzhan Bayrak received the College of Engineering Award for Outstanding Teaching by an Assistant Professor.

Dr. Kevin Folliard received the Texas Blazers Outstanding Faculty Award.

Dr. Maria Juenger was elected Chair of the Cement Division of The American Ceramic Society by written ballot of its members.

Dr. Kara Kockelman received the 2007 Harland Bartholomew Award from the American Society of Civil Engineers (ASCE). Professor Kockelman also received the 2006 Geoffrey J.D. Hewings Award from the Regional Science Association International (RSAI).

Dr. Joseph F. Malina, P.E., DEE, C.W., was recognized by the American Academy of Water Resources Engineers as an eminent water resources engineer based on his advanced expertise and extensive experience in water resources engineering and certified as a Diplomate, Water Resources Engineer (D.WRE).

Dr. Lance Manuel and his student, Korn Saranyasoontorn, who earned his civil engineering doctorate in May 2006, won the Best Journal Paper for 2006 from the American Society of Mechanical Engineers' Technical Committee on Wind Energy (Solar Energy Division).

Dr. Travis Waller was been selected as one of the nation's brightest young engineers to take part in the National Academy of Engineering's 13th annual U.S. Frontiers of Engineering symposium.

Event Highlights

CTR Symposium

CTR hosted its annual symposium on April 4, 2007. There were 135 participants. The theme of this year's symposium was "Smart Highways." Keynote Speaker Gregory Krueger, Manager of the Statewide ITS Program for the Michigan Department of Transportation, presented *The DOT of the 21st Century: Innovative Technology to Improve Safety and Mobility on Our Roads*. The keynote's subject is one close to every commuter's heart: highway construction costs, particularly recent developments and the future outlook. CTR researchers also addressed other topics that affect Texas drivers' daily driving experiences.

The Mac Shelby Award for outstanding TxDOT Project Director was presented to Mr. Carol Nixon.

CTR Director Randy Machemehl (left) with Shelby Award winner Carol Nixon.

Breakout Session Topics

- *Methods to Develop Composite Action in Non-Composite Bridge Floor Systems,* presented by Dr. Michael Engelhardt of UT's Cockrell School of Engineering
- *Remote Detection of Ice Formation in Porous Pavements,* presented by Terry Dossey, Research Scientist at the Center for Transportation Research
- *Workforce Development Partnership: What the Construction Industry Can Share with the Transportation Industry,* presented by Dr. Cindy Menches, P.E., of UT's Cockrell School of Engineering
- *Shifting Trade Flow in Texas: Impact on Transportation Infrastructure,* presented by Dr. John McCray of The University of Texas at San Antonio

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- *Just Riding Along: Cyclist and Motorist Interaction during Passing Maneuvers,* presented by Ian Hallet, Research Fellow Associate at the Center for Transportation Research
- *Improving Roadside Characteristics Using Native Plants,* presented by Dr. Steven Windhager, Director of Landscape Restoration at the Lady Bird Johnson Wildflower Center

Dr. Steven Windhager presenting at Symposium

Low-Volume Roads Conference

CTR hosted the ninth International Conference on Low-Volume Roads June 24-27, 2007, at the downtown Austin Sheraton Hotel. More than 200 delegates attended, from 6 continents and more than 40 countries. Presentations included the examination of new technologies and new techniques in the planning, design, construction, operation, maintenance, and administration of low-volume roads. Emphasis was given to discussing case studies and finding practical solutions to common road problems.

Seminar presentation

The keynote speaker was Dr. Maryvonne Plessis-Fraissard, Senior Advisor on Sustainable Development at the World Bank. She spoke on planning roads for rural communities.

"As the state with the most extensive farm-to-market road network in the U.S.," said conference organizer Jolanda Prozzi, "Texas was considered the ideal site for the ninth Low-Volume Roads Conference."

Poster session

The conference was the ninth in a series of Low-Volume Roads Conferences that began in 1975 and have since been held every four years. Organized by the Transportation Research Board, the Low-Volume Roads Conferences provide a unique opportunity for transportation professionals world-wide to network, exchange best practices, discuss research results, share innovations, and explore lessons learned.

Affiliated Research Centers

Center for Electromechanics (CEM)

UT's Center for Electromechanics is one of the world's leading university-based research centers developing new concepts and technologies for the generation, storage, and use of electric and mechanical power. FY 2007 saw the following accomplishments for CEM:

- Signed contract to bring to Texas the first plug-in hybrid bus with fuel cell range extender
- Developed and published simulation approaches to compare flywheels, batteries, and ultracapacitors as energy storage with both fuel cells and hydrogen internal combustion engines on actual bus routes
- Demonstrated performance and reliability of active suspension systems on military vehicles
- Signed contract to bring first hydrogen refueling station to Texas. This effort was part of the TxDOT-CTR Project 0-5590, Strategic Plan Development for Hydrogen Vehicles and Fueling Stations. Report 0-5590-1 is available from the CTR Reports Online page in the Research section of the CTR Web site.

Center for Research in Water Resources (CRWR)

CRWR serves as the central focus for environmental and water resources research at the university and works with CTR and TxDOT to analyze such issues as they pertain to transportation. This year, CRWR researchers participated in four active projects funded by TxDOT. Dr. Michael Barrett, Dr. Randy Charbeneau, and Dr. Joseph Malina participated in the program this year.

Active projects involving CRWR researchers:

- 0-4875 Minimum Longitudinal Grade at Zero Cross Slope in Superelevation Transition
- 0-5492 Hydraulic Performance of Bridge Rails and Traffic Barriers
- 0-5220 Investigation of Stormwater Quality Improvements Utilizing Permeable Pavement and/or the Porous Friction Course (PFC)
- 0-4611 Non-Proprietary, Small Footprint Stormwater Quality Structures for use in Urban Areas

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Construction Industry Institute (CII)

CII is a research consortium based at UT Austin with a mission of improving the safety, quality, schedule, and cost effectiveness of the constructed project. FY 2007 developments included:

- In the last two years, membership has grown to more than 105 members
- In 2006, CEM initiated the CII Executive Leadership Program, a three-week program conducted in association with UT's McCombs School of Business and designed to help nurture and prepare the leaders of tomorrow
- The annual conference was held in Orlando, Florida, from July 31 through August 2, 2007. The theme was "Bringing Value to a Changing Global Landscape."

Construction Materials Research Group (CMRG)

CMRG seeks to integrate education for civil engineers with advancement in construction materials technology.

Located at the J.J. Pickle Research Center, CMRG annually works with more than 20 graduate students in the pursuit of research to advance construction materials technology and concrete durability. Projects funded by TxDOT in 2007 included:

- Prediction Model for Concrete Behavior (0-4563)
- Sulfate Resistance of Concrete Exposed to External Sulfate Attack (0-4889)
- Liquid Nitrogen Effects on Concrete (0-5111)
- Self-Consolidating Concrete for Precast Structural Applications (0-5134)
- Effects of Texas Flyash on Air-Entrainment in Concrete (0-5207)
- Implementing Strategies for Mitigating or Preventing Premature Concrete Deterioration in Texas Bridge Structures (0-5218)
- Rehabilitation Procedures for Longitudinal Cracks and Joints Separation in Concrete Pavement (0-5444)

Ferguson Structural Engineering Lab (FSEL)

The Phil M. Ferguson Structural Engineering Research Laboratory (FSEL), the largest facility of its kind in the world, continues to pursue its mission: to conduct research for improving the analysis, design, and construction of buildings, bridges, and special structures.

During FY 2007, researchers at FSEL participated in 15 active TxDOT-funded projects. Topics included evaluating the redundancy of steel bridges, fatigue life of traffic structures, design for safe and economical construction, extending service life of large structures, corrosion resistance, and prediction models for the behavior of concrete over time. Recently published reports include:

- An Investigation of the Tensile Strength of Pre-stressed AASHTO Type IV Girders at Release (0-5197-2)
- Evaluation of Serviceability Requirements for Load Rating Pre-stressed Concrete Bridges (0-1895-1)

- Structural Reliability Analysis for Vessel Impact on Bridges (0-4650-1)

International Center for Aggregates Research (ICAR)

The Center for Aggregates Research is committed to advancing aggregates research, education, and technology transfer. ICAR serves the industry as a forum for research and discussion where aggregates stakeholders can seek answers to industry concerns. In addition, the center provides the industry with the knowledge to put the latest aggregates technology into practice.

ICAR held its 15th annual symposium at Austin's Hyatt Regency Hotel, April 9–12, 2007. The 140 attendees represented state departments of transportation, federal agencies, universities, and the aggregates industry. In addition to meetings of ICAR's task forces, technical sessions covered a diverse array of topics.

Appendix A: FY 2007 Funding Sources

TxDOT Research Projects

Project Title	Project Number (if applicable)
1. TxDOT TAP Agreement	0-1755-CT08
2. Methods to Develop Composite Action in Non-Composite Bridge Floor Systems	0-4124
3. Corrosion Resistance of Grouted Post-Tensioning Systems	0-4562
4. Prediction Model for Concrete Behavior	0-4563
5. Non-Proprietary, Small Footprint Stormwater Quality Structures for Use in Urban Areas	0-4611
6. Fabricated Plate Tolerances and Design Slenderness Values for Steel Bridges	0-4638
7. Quantity the Benefits of Using Geosynthetics for Unbound Base Courses	0-4829
8. Material Design and Testing Methods for Home Made and Containerized Cold Mix	0-4872
9. Minimum Longitudinal Grade at Zero Cross Slope in Superelevation Transition	0-4875
10. Sulfate Resistance of Concrete Exposed to External Sulfate Attack	0-4889
11. Performance of Old Concrete Under Thin Overlays	0-4893
12. Effects of Thermal Loads on Texas Steel Bridges (UH Lead)	0-5040
13. Evaluation of Curing Membranes Effectiveness to Reduce Evaporation	0-5106
14. Liquid Nitrogen Effects on Concrete	0-5111
15. Self-Consolidating Concrete for Precast Structural Applications (TTI lead)	0-5134
16. Development of Freeway Traffic Time Prediction Capability in Conjunction with Detector Coverage Analysis	0-5141
17. Noise Level Adjustments for Highway Pavements in TxDOT	0-5185
18. Continuing Research on Allowable Design Release Stresses for Prestressed Concrete Beams	0-5197
19. Effects of Texas Flyash on Air-Entrainment in Concrete	0-5207
20. Vehicle/License Plate Identification for Toll Collection Applications	0-5217
21. Extending Service Life of Large or Unusual Structures Affected by Premature Concrete Deterioration	0-5218
22. Investigation of Stormwater Quality Improvements Utilizing Permeable Pavement and/or the Porous Friction Course (PFC)	0-5220

23. D-Region Strength and Serviceability Design	0-5253
24. Feasibility Study for Development of Marine Exposure Site	0-5266
25. Integration and Consolidation of Border Freight Transportation Data for Planning Applications and Characterization of NAFTA Truck Loads for Aiding in Transportation Infrastructure Management (TTI Lead)	0-5339
26. Development of Simple Bridge Deck Details at Expansion Joints	0-5367
27. Impacts of Current and Future Demographic Trends on Transportation Planning in Texas	0-5392
28. Ramp Treatment and Dynamic Closure Strategies for Incident Traffic Management	0-5422
29. Rehabilitation Procedures for Longitudinal Cracks and Joints Separation in Concrete Pavement	0-5444
30. Project Level Performance Database for Rigid Pavements in Texas	0-5445
31. Evaluation of the Overlay Tester for Adhesion Testing of Crack Sealants	0-5457
32. Optimizing the Identification of Right-of-Way Requirements during the Project Development Process	0-5478
33. Concrete Pavement Overlays over Existing Asphalt Pavement Structures	0-5482
34. Hydraulic Performance of Bridge Rails and Traffic Barriers	0-5492
35. Tracking the Performance of HMA Mixtures in Texas	0-5496
36. Methods of Evaluating the Redundancy of Steel Bridges	0-5498
37. Design of MSE Retaining Walls Placed in Front of a Stable Face	0-5506
38. Development of a Flexible Pavements Database	0-5513
39. Beneficial Use of Scrap Tire Bales in Highway Projects	0-5517
40. Galveston Ferry Operation (GFO) Engine TxLED Failure Assessment, Solution, and Implementation	0-5532
41. The Value of Texas Seaports in an Environment of Increasing Global Trade	0-5538
42. Protecting Rail Corridors Against Encroachment	0-5546
43. Horizontal Cracking in Concrete Pavements	0-5549
44. Guidelines for the use of Fly Ash and Ground Granulated Blast Furnace Slag Blends in Concrete Pavement	0-5550
45. Curved Plate Girder Design for Safe and Economical Construction	0-5574
46. Analysis and Guidelines for Establishing Unified Urban Land-Use and Transportation System Planning Framework and Procedures	0-5667
47. Comprehensive Planning and Design Guidelines for Incorporating a Bus Rapid Transit Scenario to the Analysis of Texas Highway Corridors	0-5668

48. Impacts of Dray System along Ports, Intermodal Yards and Border Ports of Entry	0-5684
49. Utilizing the Data Collected at Traffic Management Centers for Planning Purposes through Non-Traditional Sources and Improved Equipment	0-5686
50. Short Sea Shipping Initiatives and the Impacts on the Texas Transportation System	0-5695
51. Impact of Overhang Construction on Girder Design	0-5706
52. Improving Capabilities of Automated Distress Rating	0-5708
53. Operational and Safety Impacts for Bicyclists Using Roadways with On-Street Parking	0-5755
54. Correlation of Shallow, Low Blow Count Texas Cone Penetrometer Values and Shear Strength for Texas Soils	0-5824
55. Influence of Verification Cores on Point Bearing Capacity of Drilled Shafts	0-5825
56. Estimated and Actual Usage of Toll Facilities	0-6044
57. Reporting, Publications, and Information Services in Support of Research	0-9803-08
58. Coordination of Administrative Services of TxDOT's Program	0-9903-08
59. Investigation of the Fatigue Life of Steel Base Plate to Pole Connections for Traffic Structures	9-1526

TxDOT Implementation

Project Title	**Project Number (if applicable)**
1. Implementation of the Electronic Appraisal System	5-1523-01
2. Lean-on Bracing for Steel Bridges	5-1772
3. Construction and Evaluation of Post-Tensioned Prestressed Concrete Pavement	5-4035-01
4. Implementation of the Right of Way and Utility Adjustment Duration Planning Tool	5-4617-01
5. Implementation of Ice Detection Equipment for Pavements and Bridge Decks	5-4834-01
6. Implementation of an Artificial Lighting System for Automated Visual Distress Rating System	5-4958-01
7. Implementation of Best Spall Repair Practices for Concrete Pavement	5-5110-01
8. Measuring Access to Transit Service	5-5178-01
9. Pilot Implementation of Optimized Aggregate Gradation for Concrete Paving	5-9026-01

10. Implementation of the Use of Higher Micro-Fines in Concrete Pavements	5-9029-01
11. Reporting, Publications, and Information Services in Support of Implementation	5-9803-08

Interagency Contracts

Project Title	Project Number (if applicable)
1. Programming for Laboratory Equipment & Further Development of the Laboratory Information Management System	467mTIA008
2. TxDOT Strategic Plan 75-5XXIA001	04-0333
3. Technical Support for Flexible Pavements Branch	04-0352
4. Tub Girder Testing	04-0393
5. RDD/Field Testing Support	06-0020
6. Geographical Information System (GIS) Support for Load Zone	06-0021
7. Perform Geological Studies and Tests	06-0025
8. Technical Support and Training Services for the Construction Division	06-0043
9. Support in Specification, Development, Purchasing, Testing and Calibration of RDD & Construction of Associated Rolling Dynamic Deflectometer	06-0150
10. Disaster Preparedness	06-0170
11. Forensic Evaluations of Concrete Pavement	06-0173
12. Technical Support for Rigid Pavements and Concrete Materials Branch	06-0202
13. Recommended Practice for Sealing Bridge Structures Affected by Alkali-Silica Reaction (ASR) and/or Delayed Ettringite Formation (DEF)	126XXIA013
14. Technical Assistance to the Austin District of TxDOT	14-6XXIA005
15. Technical Assistance to the Dallas District	186XIA001
16. Technical Support and Training Services for the Texas Department of Transportation Construction Division	46-7CSIA001
17. Support for Automated Visual Pavement Distress Measurement Systems	466PVIA005
18. Traffic Materials Testing Support	467MTIA003
19. Develop Guidelines for the Selection of Optimum Concrete Pavement Terminal Type	467MTIA007
20. Tasks for Field Survey and Evaluation of Premature Deteriorated Concrete Bridges	467MTIA009
21. Evaluation of Long-Term Durability of Concrete	467MTIA011
22. Texas Pavement Preservation Center	475XXIA003

SWUTC

Project Title	Project Number (if applicable)
1. Impacts of Demographic Shifts in Metropolitan Areas on the Transportation Network	167260
2. The Role of Air-Cargo Transport in Facilitating Trans-Pacific Trade and Promoting Economic Development in Texas	167261
3. Microsimulation for Coupled Models of Travel and Location Choice Behavior	167262
4. Examining the Disjuncture Between Municipal Planning and School Facility Planning and the Implications on Transportation	167263
5. Calibration of Pavement Response Models for the Mechanistic-Empirical Pavement Design Method	167264
6. Incorporating Environmental Justice Measures into Equilibrium-Based Transportation Network Design Models	167265
7. Simulating Land Use Impacts of Highway Development in the Texas Triangle	167266
8. Develop a System to Support Preparation of Life-Cycle Budget Needs for Highways (continuation)	167267
9. Program Support	167268
10. Direct User-Charging for Commercial Vehicles	USDOT 4
11. The Potential for Improving Rail International Intermodal Services in Texas and the Southwest Region of the United States	USDOT 473700-00076
12. Formulation, Solution Methods, and Applications of the Commuter Rail Circulator Network Design Problem	USDOT 473700-00077
13. Application of Heuristic Solution Methods to the Public Transportation Driver Scheduling Problem	USDOT 473700-00078
14. An Assessment of Cargo Security Procedures for Texas Land and Marine Ports of Entry	USDOT 473700-00095

Unique Projects

Project Title	Project Number (if applicable)
1. Review of Manual of Uniform Traffic Control Devices (MUTCD) and Speed Zoning Procedures	
2. Cosmos Foundation	
3. Accounting for Information and Recourse in the Robust Design and Optimization of Stochastic Transportation Networks	347005
4. Development of the Advanced Construction and Maintenance Technologies in Pavement	06-056

5. Development of the Next Generation of Travel Demand Models for the El Paso Study Area	07-050
6. Evaluation of Long Term Behavior of Pavement Layered Materials by Means of Accelerated Pavement	26827048
7. Modeling Port Security	473700-00075
8. Impacts of Extreme Events: A Systematic Analysis of Individual Travel Choice Decisions	A11401
9. University of Illinois-Champaign Urbana—Dynamic Traffic Models	A7886
10. Accounting for Information and Recourse in the Robust Design and Optimization of Stochastic Trans. Networks	CMS-0347005
11. Toward Behaviorally Consistent Integrated Transport—Land Use Modeling, In Support of Infrastructure System	CMS-9984541
12. Improved Framework and Tools for Highway Pricing	NCHRP 08-57
13. 2004-Star-B1 Regional Development, Population Trend and Technology Change Impacts on Future Air Pollution Emissions	RD-83183901

Center for Transportation Research
3208 Red River, Austin TX 78705
(512) 232-3100
www.utexas.edu/research/ctr