The background of the cover is a solid brown color. Overlaid on this are numerous white, hand-drawn style lines that create a complex, abstract pattern. These lines vary in thickness and curvature, some forming loops and others crossing straight across. The overall effect is reminiscent of a technical drawing or a map of a network, possibly representing a transportation system.

For Loan Only:  
CTR Library

# **ANNUAL REPORT 2001-2002**

**Center for Transportation Research**  
The University of Texas at Austin



To: CTR Patrons

Subject: Message from the Directors

Positive change has been the watchword at the Center for Transportation Research (CTR) in 2002. Administrative initiatives continue to focus daily operations and the annual program on service and support for our faculty, students, and research staff.

Along with improved service came substantial growth: the 2002 program expanded to 136 projects (a 10 percent increase) with revenues exceeding \$11 million (an 18 percent increase), which supported 65 faculty, 12 research staff, and 156 students. Of those students, almost one quarter were women and nearly one half were Ph.D. candidates.

We are pleased to see the addition of new researchers and faculty, who are taking on new responsibilities. New research staff also complement the existing faculty profile, and provide flexibility in developing new research initiatives at a time when some senior faculty enter retirement or undertake new responsibilities at other universities.

As you will see in the following pages, CTR and its affiliated centers and programs have had an active, productive year. We hope you enjoy examining this report and learning more about CTR's almost 40-year record of advanced transportation research, education leadership, and service to the people of Texas.



Dr. Randy B. Machemehl, Director  
[rbm@mail.utexas.edu](mailto:rbm@mail.utexas.edu)



Robert Harrison, Deputy Director  
[harrison@mail.utexas.edu](mailto:harrison@mail.utexas.edu)

The Center for Transportation Research has adopted the UT College of Engineering's "ram's horn" as a symbol of its commitment to excellence. Just what is the "ram's horn?" It is a tradition that dates back to the tenure of T. U. Taylor, the first engineering faculty member and first dean of the College (1906-1936). Dean Taylor had a habit of marking an exaggerated checkmark on student papers he deemed outstanding. When Dean Taylor one time overheard a student exclaim he had earned a "ram's horn," the mark evolved into a symbol that from that day forward came to symbolize excellence. The Center for Transportation Research is proud to adopt this symbol and the high standards it represents.

# News

## Governor Perry's Plan Based on CTR Research

In January 2002, **Governor Rick Perry** released a \$175 billion plan, based partly on CTR research, to overhaul Texas's transportation infrastructure. Central to the plan is a proposed Trans-Texas Corridor: six highway lanes and six rail lines spanning 4,000 miles. Located away from urban centers and existing highways, the corridor would enable safer, faster transport of hazardous materials and would reduce congestion and air pollution.

"This plan is as big as Texas," Perry said.

CTR explored the idea of multimodal transportation corridors in a 1996 report (#1326-3F). **Dr. Frank McCullough**, who served as CTR Director at the time and co-authored the report, says the plan is crucial for the state's economy.

## CTR Symposium Addresses "September 11"

CTR hosted its 2002 symposium, "Converging Responses," at the J. J. Pickle Research Campus of The University of Texas at Austin on April 9, 2002. More than 200 attendees represented a wide cross-section of the transportation industry and gave the annual symposium its strongest attendance to date. Two outstanding keynote speakers—**Lt. Gen. (Ret.) Ken Eickmann**, Director of the Construction Industry Institute and **Dr. Shyam Sunder**, Chief of the Structures Division of the Building and Fire Research Laboratory—addressed the special public policy concerns

facing all disciplines following the terrorist attacks of September 11, 2001. Subsequent presenters addressed the performance of stay cables, integrated land use, and 3-D modeling for construction activities, among other topics.

This year's **M. D. "Mac" Shelby Award** was presented at the Symposium to **Dr. Moon Won** for his outstanding performance as Project Director of a Texas Department of Transportation (TxDOT) project investigating prevention of premature concrete deterioration. The award was presented by **Don Shelby**, son of TxDOT research engineer, Mac Shelby.

For more information about CTR's Annual Symposium, go to: [www.utexas.edu/research/ctr/symposium](http://www.utexas.edu/research/ctr/symposium).

## CTR Library's Online Catalog and TxDOT Collection

CTR's library launched an online catalog in June 2002 that provides easy access to its diverse holdings. The site features a useful search engine, as well as links to many recent CTR reports available for free download in Adobe Acrobat PDF format. These web enhancements ensure that the library's holdings are made available to a global audience. In addition, CTR has become the official depository for the Texas Department of Transportation library collection. Altogether, the CTR library contains nearly 28,000 volumes of transportation-related materials.

Access the library online at [www.utexas.edu/research/ctr](http://www.utexas.edu/research/ctr). Reference questions and material requests may be emailed to the library at [ctrlib@uts.cc.utexas.edu](mailto:ctrlib@uts.cc.utexas.edu).

## And the award goes to...

### Advanced Institute Fellow Honored

**Nathan N. Huynh**, Ph.D. candidate and fellow of the Advanced Institute, received a number of honors this year, including "Outstanding Ph.D. Student of the Year" by the Southwest University Transportation Center, and the first Robert Herman Endowed Scholarship from The University of Texas at Austin.

### Dr. Kara Kockelman Honored

*Technology Review*, Massachusetts Institute of Technology (MIT) magazine of innovation listed **Dr. Kockelman**—UT's Clare Boothe Luce Professor of Civil Engineering—among the world's top 100 young innovators in technology and business for 2002.

In addition, Dr. Kockelman received a \$200,000 National Science Foundation Faculty Early Career Development (CAREER) Award in 2001 to develop improved transportation and urban planning modeling. NSF CAREER awards are given to exceptional young faculty members.

**Aruna Sivakumar**, doctoral candidate in Civil Engineering, received the 2001 Milton Pikarsky Memorial Award for the best

transportation M.S. thesis in North America in the science and technology category. The thesis is titled "A Fractional Split Distribution Model for Statewide Commodity Flow Analysis."

**Rob Harrison**, Deputy Director of CTR, and **Jerry Jamieson**, Graduate Research Assistant at CTR, along with Stephen Fuller, Professor of Agricultural Economics at Texas A&M, received the "Best Paper in Rural and Agricultural Transportation" award at the TRF Annual Conference in Williamsburg, VA in October 2001. The report, "Grain Transportation in Texas: Survey Results, Future Trends, and Policy Prescriptions," is based on a larger study of grain transportation in Texas.

**Dr. Kevin Folliard**, Assistant Professor of Engineering at UT, received the Young Member Award for Professional Achievement from the American Concrete Institute.

**Dr. John E. Breen**, holder of the Nasser I. Al-Rashid Chair in Civil Engineering at UT, has been elected to receive the ACI

Structural Engineering Award for his work on the paper, "Example Applications of Aesthetics and Efficiency Guidelines."

**Dr. Kenneth H. Stokoe, II**, a professor in UT's department of civil engineering, was awarded a \$2.94 million National Science Foundation grant to study earthquake effects. On this project, Dr. Stokoe will be joined by two co-principal investigators from UT: **Dr. Ellen M. Rathje**, Assistant Professor in the Department of Civil Engineering, and **Dr. Clark R. Wilson**, Wallace E. Pratt Professor in Geophysics. Using massive earthquake simulation equipment, the researchers hope to learn how soil interacts with buildings, bridges, and other structures during earthquakes.

**Dr. G. Edward Gibson**, Associate Professor of Civil Engineering, is the recipient of the 2002 National Society of Professional Engineers/Professional Engineers in Education/Sustaining University Program Engineering Education Excellence Award.

## New Research Staff and Faculty

CTR is pleased to welcome several staff researchers and faculty—some new faces and some old friends—to its Red River office location. These include Research Associate **Ron White**; Research Associate **Jolanda Prozzi**; Research Associate **Dr. Khali Persad** (former manager of the TxDOT Research Implementation Program); Research Associate **Dr. David Luskin**; Research Associate **Dr. Alexei Tsyganov**; **Dr. William R. Hudson** (Dewitt C. Greer Centennial Professor Emeritus in Transportation Engineering); and **Dr. Clyde Lee** (founder of CTR and Nasser I. Al-Rashid Centennial Professor Emeritus in Transportation Engineering). **Dr. Jorge Prozzi** also joins the faculty of The University of Texas at Austin as an Assistant Professor in the Department of Civil Engineering.

## Dr. Thomas W. Kennedy Retires

**Dr. Thomas W. Kennedy**, Engineering Foundation Professor, retired from The University of Texas at Austin after 37 years of outstanding service. He was honored by many of his colleagues, friends and family at a retirement party on August 19, 2002. Dr. Kennedy was best known as the Principal Investigator of the A-001 Management for the Strategic Highway Research Program.

## Free CD-ROM Showcases CTR

It's a good thing and it comes in a convenient, small package! CTR has developed an interactive CD-ROM featuring transportation research report abstracts for the years 1995–2001. A keyword search engine provides access to eleven research categories ranging from airports to traffic management. Built-in web links take users to full copies of CTR reports online, CTR's website, and the CTR library's online catalog. To obtain a free copy of the CD, visit the CTR website, [www.utexas.edu/research/ctr](http://www.utexas.edu/research/ctr); or contact the CTR Library at (512) 232-3126, or email: [ctrlib@uts.cc.utexas.edu](mailto:ctrlib@uts.cc.utexas.edu).



## CTR in Focus

The July 2002 issue of the U.S. Department of Transportation's *Focus* magazine featured CTR Research Associate **Dave Merritt's** study on the feasibility of using precast concrete pavements for roadway repair and reconstruction. The study revealed several benefits of precast concrete pavements, including faster construction, reduced user costs, reduced thickness of sections, controlled concrete fabrication conditions, and improved performance. For more information: [www.utexas.edu/research/ctr/merritt](http://www.utexas.edu/research/ctr/merritt).

## TxDOT Top Innovation Awards

**Robert Harrison**, Deputy Director of CTR, received a Top Innovation Award for his project, "Criteria and Design for a Model Border Crossing." The expected benefits of this research include pre-clearing trucks by use of an express lane, saving both time and money, reducing air pollution, and improving international relations.

"The One-Stop Border Crossing represents innovative technology, increased coordination, and plain old common sense,"

said Senator Eliot Shapleigh. "This model will make a big difference in the quality of all our lives."

**Dr. Chandra Bhat**, Associate Professor of Civil Engineering and Chairman of Administration and Planning, was awarded a Top Innovation Award for his project, "Transportation Control Measure Effectiveness in Ozone Nonattainment Areas." This project developed a method for transportation and emissions modeling to assess the impact of transportation control measures on mobility and emissions.

TxDOT also recognized **Dr. Richard E. Klingner**, Professor of Structural Engineering, with a Top Innovation Award for his work with "Structural Assessment of In-Service Bridges with Premature Concrete Deterioration." The outcome of this research has the potential to save TxDOT money in replacement costs and expensive load testing for in-service bridges that show signs of premature concrete deterioration.

## New NAE Inductees

Two CTR-associated faculty members within the University of Texas Civil Engineering Department have been elected to the National Academy of Engineering (NAE), one of the highest professional distinctions accorded an engineer.

**Ned H. Burns**, Zarrow Centennial Professor of Engineering, has been elected for contributions to development and education in prestressed concrete, including unbonded tendon building slabs and high-performance concrete bridges.

**Joseph A. Yura**, Warren S. Bellows Centennial Professor in Civil Engineering, has been elected for research and educational contributions on bracing and stability design for steel structures.





# About the Center for Transportation Research



Since its inception in 1963, the Center for Transportation Research (CTR) at The University of Texas at Austin has evolved into one of the leading university-based transportation research facilities in the U.S. Its ongoing mission remains:

- to provide educational opportunities for University of Texas students,
- to conduct industry-leading transportation research, and
- to serve the public through research that responds to the transportation needs of Texas travelers.

## **Research Program**

For the 2002 fiscal year, CTR administered 136 research projects and interagency contracts with combined budgets of more than \$11 million. Current and ongoing projects address virtually all aspects of transportation research including: economics, multimodal systems, traffic congestion relief, transportation policy, materials, structures, transit, environmental impacts, driver behavior, land use, geometric design, accessibility, and pavements.

In addition to its own faculty and staff researchers, the Center taps an extraordinary reservoir of expertise in multiple disciplines by collaborating with the research teams featured in this annual report.

Collaboration with other University of Texas component institutions and with Texas A&M University also remains an important part of the CTR program.

## **Education**

CTR's record of linking transportation research with education is unmatched in Texas. With more than 140 graduate students and up to 20 undergraduate students engaged by its research programs annually, the Center plays a critical role in developing and maintaining a qualified pool of engineers and researchers to serve the state's future transportation needs.

## **Public Service**

Publication of reports in print and online allows advanced research to benefit all who build or rely upon a sound transportation infrastructure. In fiscal year 2002 CTR published 65 such reports, more than in any previous year. To showcase innovative research undertaken for the Texas Department of Transportation and other transportation constituents, CTR hosts a symposium each spring.

## **Where the Rubber Meets the Road**

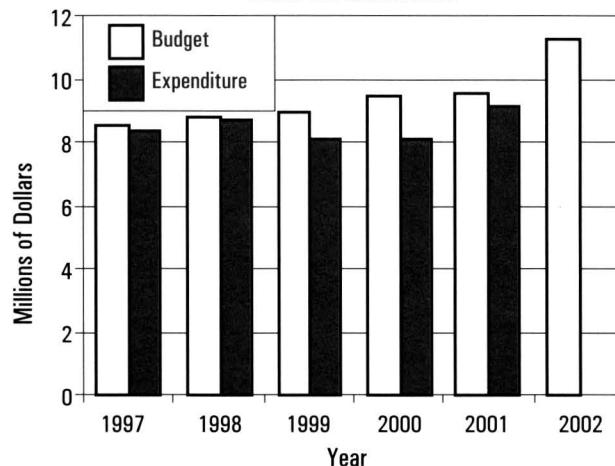
A robust transportation infrastructure lies at the heart of a strong economy. Toward that end, CTR's students, researchers, and faculty are committed to maintaining Texas's leadership in transportation and transportation research.

# Budget

CTR receives funding from a variety of sources. Its primary sponsor remains the Texas Department of Transportation, which has established itself as a national leader in transportation research. CTR also undertakes important research for such sponsors as the Federal Highway Administration, Texas Natural Resource Conservation Commission, U.S. Department of Transportation, Texas Aerospace Commission, Lockheed, Goodyear, Asphalt Institute, National Cooperative Highway Research Program, and the U.S. Department of Defense.

**Budget and Expenditure (1997 – 2002)**

*Source: CTR Financial Office*





# Affiliated Centers

## Ferguson Structural Engineering Lab

*Director: Dr. Michael Kreger*

What happens when heavy storms hit stay-cable bridges? How might the high vulnerability of steel trapezoidal girders during erection be minimized? These are among the questions that Ferguson Structural Engineering Laboratory (FSEL) is answering. In recent studies, FSEL investigated damage caused by storm-induced, large-amplitude vibrations of stay cables, and devised better methods for bracing girders during construction to greatly reduce cost.

Finding cost-effective ways to renew or rehabilitate the nation's decaying transportation infrastructure is one of the most important challenges facing the transportation industry. The lab's research is helping chart solutions to these problems, in addition to fulfilling its mission to conduct state-of-the-art structural engineering research while training tomorrow's structural engineers, researchers, and educators.

Situated on the J. J. Pickle Research Campus of The University of Texas at Austin, the Ferguson lab is one of the largest and most active structural engineering facilities in the world. Its faculty has been awarded more than thirty national and international research medals, while three current members have been honored by election to the National Academy of Engineering. In addition to a distinguished faculty, the facility sponsors more than sixty part-time graduate research assistants each year selected from among the best structural engineering students in the U.S. and abroad.



FSEL, J. J. Pickle Research Campus  
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[www.utexas.edu/research/fsel](http://www.utexas.edu/research/fsel)

## International Center for Aggregates Research

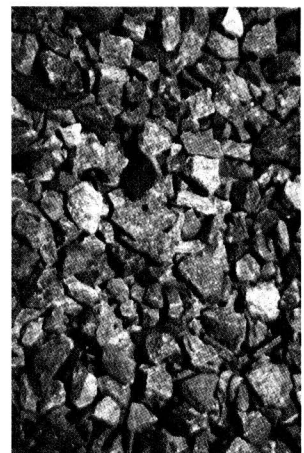
*Director: Dr. David Fowler*

*Managing Associate Director: Dr. John J. Allen*

Research by the International Center for Aggregates Research (ICAR) has recently produced a number of benefits for aggregates-related industries. Among these is the development of a structural model that accurately characterizes unbound aggregate bases for evaluation against other types of layers in flexible and rigid pavements. This model will help maintain aggregates' competitive stance under the imminent AASHTO 2002 *Guide for the Design of Pavement Structures*.

Other recent research at the center has focused on successfully increasing single-lift thicknesses for unbound aggregates in pavements; use of higher amounts of fines in concrete to fill voids between coarser aggregate particles to produce a workable mix without increasing water content; and dramatically reducing test times needed to determine alkali silica reactivity, which is crucial to determining an aggregate's suitability for portland cement concrete.

ICAR, a joint operation of The University of Texas at Austin and Texas A&M University, was established to conduct scientific and technical research related to aggregates and functions as a central clearinghouse for aggregates technology.



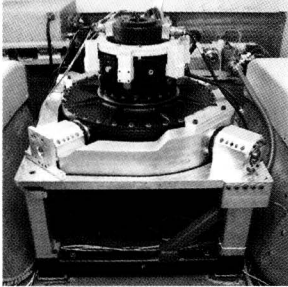
ICAR, ECJ 5.200  
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[www.ce.utexas.edu/org/icar](http://www.ce.utexas.edu/org/icar)



# Affiliated Centers

## Center for Electromechanics

*Director: Dr. Robert Hebner*



As 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, the Center for Electromechanics (CEM) continues its record of success with a number of recent projects.

The Center is developing software to simulate innovative vehicle-loop interactions and demonstrate detection strategies that permit much larger loop perimeters. Active suspension systems developed at the Center have been shown to reduce vehicle bounce ten-fold in military testing, which permits better high-speed handling, fuel economy, and shows promise of improving pavement life by reducing impact stresses.

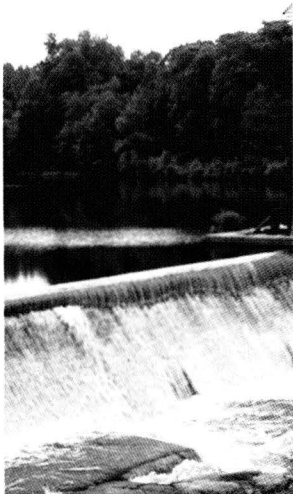
In the area of hybrid vehicles, researchers have developed a flywheel battery system for a hybrid bus that outperforms other batteries in terms of weight, size, and longevity. CEM has demonstrated 112,000 charge-discharge cycles for the system, which represents at least a five- to ten-fold improvement over the life of chemical batteries used in transportation applications.

While CEM initially focused on stationary power issues for science and defense, the program has expanded into mobile applications, focusing on vehicles and roadway surface interaction, as well as advancing the overall mission of The University of Texas at Austin, including objectives in research, education, and service.

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r.hebner@mail.utexas.edu  
www.utexas.edu/research/cem

## Center for Research in Water Resources

*Director: Dr. David Maidment*



The Center for Research in Water Resources (CRWR) carries out advanced research, education, design, and planning in water resources and waste management, primarily related to Texas, but also including national and international issues.

The mission of CRWR is to:

- serve as the central focus for environmental and water resources research at the university;
- communicate the results of its advanced research to government, industry, and other educational institutions;
- work with other agencies and institutions in Texas to solve the state's complex water problems;
- act as a regional center for water-related research, education, planning, and practical design; and
- share relevant experience and provide support to graduate students of the University of Texas by involving them in applied research.

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# Affiliated Programs

## Dallas High Five

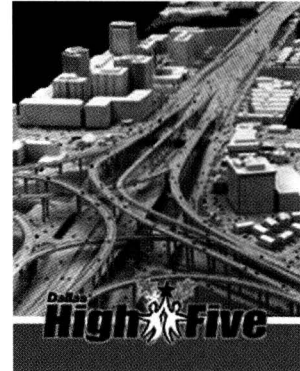
*Field Manager: Nabeel Khwaja*

The Lyndon Baines Johnson/Central Expressway Interchange in Dallas routinely experiences traffic jams and backed-up loop ramps that give drivers no end of headaches. Add dead-end frontage roads and confusing left-hand exits and you have a situation desperately in need of change.

To remedy these problems, TxDOT began the Dallas High Five Project, the single largest construction contract it has yet undertaken, and brought CTR on board to assist with various initiatives at the conclusion of the design phase. Previous collaborations between the two organizations have proven very successful on urban highway construction projects, garnering numerous awards, including the NQI Gold, AASHTO Value-Engineering, and AGC Marvin M. Black awards.

CTR's main objectives with the Dallas High Five are to: maximize mobility for drivers throughout the construction process; carefully analyze various stages of construction; improve cost- and time-efficiency; and mitigate impacts on users and abutting businesses. In each of these areas, CTR draws upon a wide range of expertise and tools—traffic simulation and modeling, scheduling techniques, business impacts analysis, etc.—to identify opportunities for improvement.

The payoff for Texans will be sizable: completion of the project is expected to produce millions of dollars of road-user cost savings, in addition to improving safety, mobility, air quality, and flexibility to meet future traffic needs.



Dallas High Five  
Texas Department of Transportation  
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nkhwaja@dot.state.tx.us  
www.dallashighfive.org

## Texas Accelerated Pavement Testing Center

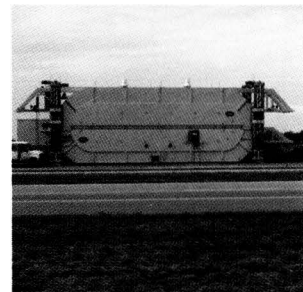
*Director: Dr. W. Ronald Hudson*

Pavement engineers have struggled with insufficient failure analysis data for years. To address these issues, TxDOT developed a Mobile Load Simulator (MLS), which has been operating on Texas highways for the past several years. This device is useful for rapidly testing pavements to estimate their performance.

To improve cost-effectiveness and productivity of the MLS equipment, TxDOT decided in 2002 to move the MLS equipment to a fixed pavement testing facility. To this end, TxDOT chose the Center for Transportation Research to manage a five-year project to construct and operate the Texas Accelerated Pavement Test Center (TxAPT) at the University of Texas Pickle Research Campus (PRC) in Austin.

TxAPT will accommodate a minimum of four test pads for pavement evaluation and research. The TxAPT facility will be an "open shop" where any state research agency may submit proposals to conduct research at this facility. As part of this program, TxAPT will:

- help researchers develop test plans;
- work with paving contractors and oversee the construction of test pavements;
- coordinate and organize laboratory testing to characterize materials properties; and
- perform ongoing and continuous quality checks to ensure data integrity and safety.



Texas Accelerated Pavement Test Center  
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# Affiliated Programs



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[www.utexas.edu/research/superpave](http://www.utexas.edu/research/superpave)



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## Superpave Asphalt Technology Program

*Coordinator: Dr. Yetkin Yildirim*

The Superpave Asphalt Technology Program is currently engaged in several key projects that extend its leadership position in Superpave research and implementation.

Significant recent projects include research on *Toner Modified Asphalt*, the *Effect of Crushed Aggregate Percent on Performance of HMA Mixtures*, the *Correlation of Field Performance to Hamburg Wheel-Tracking Results*, and a *Comparison of Hot Poured Crack Sealant to Emulsified Asphalt Crack Sealant*.

The 2002 program was pleased to host three esteemed visiting scholars: Dr. Mehmet S. Culfik and Dr. Sinan Hınıslıoğlu from Turkey, and Andre Smith from South Africa. In addition, a long-term aggregate research project is now underway in collaboration with the Texas Transportation Institute and Texas Tech University.

In keeping with its mission, the program maintains state-of-the-art transportation materials, teaching, and research facilities. The program laboratory is fully equipped to perform a wide variety of asphalt binder and mixture testing.

## Advanced Institute for Transportation Infrastructure Engineering and Management

*Director: Dr. Mike Walton, (outgoing Director: Dr. Hani S. Mahmassani)*

The Advanced Institute for Transportation Infrastructure Engineering and Management continues its mission to increase the number, quality, and diversity of professionals entering the transportation sector with its annual "Undergraduate Summer Internship in Transportation" program. As evidence of its success, 100 percent of the Institute's undergraduate fellows in 2000 continued their studies in transportation research.

Nathan N. Huynh, a Ph.D. candidate and fellow of the Advanced Institute, received a number of honors in 2002, including Outstanding Ph.D. Student of the Year by the Southwest University Transportation Center, and the first Robert Herman Endowed Scholarship from The University of Texas at Austin.

The Advanced Institute is part of a national program that recruits, teaches, and mentors students entering the transportation field, with special emphasis placed on the quality and diversity of that professional pool. Established in 1990 in the Department of Civil Engineering at The University of Texas at Austin and funded by the U.S. Department of Transportation (USDOT), the Institute is part of the Southwest Region University Transportation Center (SWUTC) established by USDOT.



# Affiliated Programs

## Construction Materials Research Group

*Director: Dr. David W. Fowler*

How smart is your concrete? If you're not sure how to answer that question, you should know about the Construction Materials Research Group (CMRG), which is developing smart polymer concrete that responds "intelligently" to stimuli such as strain and temperature.

Other recent projects are evaluating mitigation strategies for internal expansion mechanisms in concrete; investigating methods to control shrinkage cracking in concrete bridge decks; and proportioning concrete mixtures, with an emphasis on high micro fines contents.

Looking toward the future, the team will be adding a new faculty member, Assistant Professor Maria Junger, whose expertise in cement chemistry and microexamination of the cement hydration process will be especially valuable. Upcoming research studies will focus on integrating realistic aggregate properties to the NIST-developed Virtual Cement and Concrete Testing Laboratory; and developing a more practical method for measuring the workability of concrete, especially low slump concretes.

With projects encompassing the entire range of concrete materials, CMRG seeks to integrate education for civil engineers with advancements in construction materials technology. If its previous record is any indicator, within the next five years CMRG will be a world leader in concrete durability, use of aggregates in concrete, virtual testing/proportioning of concrete mixtures, and concrete repair.



CMRG

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[www.utexas.edu/research/cmrg](http://www.utexas.edu/research/cmrg)

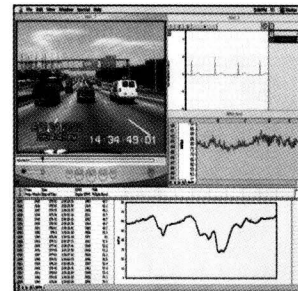
## Traffic Operation, Safety, and Driver Psycho-Physiology Laboratory

*Coordinator: Dr. Alexei Tsyganov*

If you're commuting along a busy Texas highway and happen to notice a fellow driver sporting electrical wires and bio-tech sensors attached to head, arms, and chest, along with video cameras mounted inside the vehicle, don't worry—you haven't stumbled upon yet another reality TV show. Instead, you've encountered a test vehicle collecting data for the Traffic Operation, Safety, and Driver Psycho-Physiology Laboratory.

Brainchild of Dr. Alexei Tsyganov, the lab has arisen in response to predominant theories of traffic flow and highway design, which are based on the performance characteristics of *vehicles* with limited regard for the characteristics of the *drivers* operating those vehicles. By collecting quantifiable data describing drivers' vital statistics, reactions, expectations, and perceptions in real time alongside simultaneous video footage inside and outside the vehicle in motion, the lab is developing user-oriented parameters to improve highway design and maintenance standards.

One aspect of the lab's research involves developing new traffic control plan standards for work zones on urban arterial streets. In 2003, it will investigate traffic characteristics and driver behaviors and reactions when proposed and current traffic control plans are utilized.



Traffic Operation, Safety, and Driver

Psycho-Physiology Laboratory

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Email: [Alexei.Tsyganov@mail.utexas.edu](mailto:Alexei.Tsyganov@mail.utexas.edu)

[tsyganov@mail.utexas.edu](mailto:tsyganov@mail.utexas.edu)

# Affiliated Programs

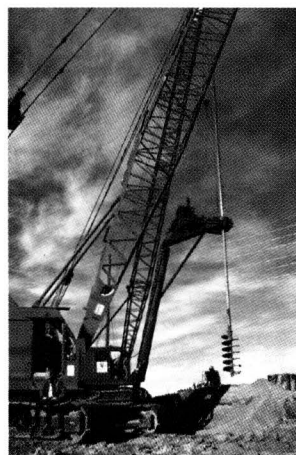
## Emulsified Diesel Emission Testing and Evaluation Project

*Research Supervisor: Dr. Ron Matthews*

Both Houston and Dallas have struggled with pollution problems and have failed to meet federal Clean Air Act standards. As part of an air quality improvement plan, which is now required of these cities by federal law, Texas Governor Rick Perry directed TxDOT to implement an experimental diesel fuel program in twelve affected counties. The fuel—an emulsified mixture of water, additive, and standard diesel—promises to reduce emissions by 15-20 percent. However, questions regarding the fuel's performance, engine power loss, operational costs, engine durability, and fuel separation are being examined.

While emulsified diesel had been placed in service in many TxDOT vehicles as of July 1, 2002, TxDOT requested that an independent party analyze the fuel's benefits, detriments, and real-world operational characteristics. The team assembled to undertake this research is comprised of some of the leading engines and fuels research groups in the country, including the University of Texas Engines Research Program, the Center for Transportation Research, Southwest Research Institute, and Eastern Research Group.

The study, begun in August 2002, aims to answer two main questions: (1) Is the use of emulsified diesel a cost-effective emissions reduction strategy? and (2) How do the costs compare to the costs of other emission reduction strategies?



Emulsified Diesel Emission Testing and Evaluation Project, CTR  
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## Southwest Region University Transportation Center

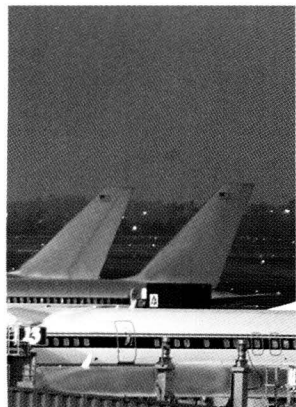
*Associate Director: Dr. Randy Machemehl*

The Southwest Region University Transportation Center (SWRUTC) continued developing its theme, "Sustainable Transportation for Mobility and Economic Strength," with several new projects. Among these was a study of several difficult problems associated with NAFTA and Texas-Mexico border crossing in the project, "Monitoring U.S. Safety Rules for Mexican Trucks."

Researchers also developed models and analyzed potential impacts upon airport terminal operation caused by new passenger aircraft larger than Boeing 747s in the project, "Evaluating the Performance of Arrival Passenger Processing Facilities for Large Aircraft."

Dr. Frank McCullough, Professor Emeritus and former CTR Director, was pleased to learn that a concept for inter-city transportation supercorridors that he examined in one of the early SWRUTC studies (CTR Report 1326-3F, 1996) was incorporated into an ambitious plan approved by Governor Rick Perry and the Texas Transportation Commission in January 2002.

The Southwest Region University Transportation Center is one of fourteen competitively selected centers of excellence established by the U.S. Department of Transportation. The center represents Region Six of the parent University Transportation Centers program, which is 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.



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# Affiliated Programs

## **SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER PROGRAM FY 2002 Programs**

*A Methodology to Analyze the Effectiveness of Roadway Pricing Control Strategies Using Travel Survey Data*, Chandra Bhat

*Impacts of Latin American Trade on the Southwest Region's Economy and Transportation System: Case Studies*, Leigh Boske

*The Education of Transportation Professionals*, Susan Handy

*Using the Gulf Intracoastal Waterway (GIWW) to Move Containers to Gulf Ports*, Robert Harrison

*Uncertainty in Integrated Land Use-Transport Models*, Kara Kockelman

*Adaptive Traffic Signal Control Development and Evaluation*, Randy Machemehl

*Characterizing Transit Passenger Access Decisions*, Randy Machemehl

*Freight Transportation and Logistics Implications of Electronic Commerce and Virtual Supply Chains*, Hani Mahmassani

*Integrating Real-Time Information with Dynamic Fleet Decision Systems for Intermodal Freight Mobility*, Hani Mahmassani

*Emerging Models for Provision of Real-Time Traveler Information Services: Transportation System Management Implications*, Hani Mahmassani

*Design and Implementation of an Intelligent Parking System for a Major Activity Center*, C. Michael Walton

*Impact of New Large Aircraft on Arrival Passenger Flows at Airport Terminals*, C. Michael Walton

*Restricting the Use of Reverse Thrust as an Emissions Reduction Strategy for Airports*, C. Michael Walton

*Develop A Dynamic System to Simulate the Life-Cycle Performance of Pavements*, Zhamnin Zhang

## **SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER PROGRAM FY 2002 Published Reports**

*GIS to Identify Strategic Freight Corridors in Texas*,  
Brian W. Craig and C. Michael Walton  
The University of Texas at Austin  
February 2002

*Dynamic Decision and Adjustment Processes in Commuter Behavior Under Real-Time Information*,  
Karthik K. Srinivasan and Hani S. Mahmassani  
The University of Texas at Austin  
February 2002

*Impact of Electronic Commerce on Logistics Operations: A Focus on Vendor Managed Inventory (VMI) Strategies*,  
Mouhamad Y. Rabah and Hani S. Mahmassani  
The University of Texas at Austin  
February 2002

*Limits on Access in Low-Income Neighborhoods and the Travel Patterns of Low-Income Households*,  
Kelly Clifton and Susan Handy  
The University of Texas at Austin  
September 2001

*Life Cycle Cost Analysis of Portland Cement Concrete Pavements*,  
William James Wilde, Steve Waalkes and Rob Harrison  
The University of Texas at Austin  
August 2001

*Truck Trade Corridors Between the U.S. and Mexico*,  
Miguel Andres Figliozzi and Robert Harrison  
The University of Texas at Austin  
August 2001

*Modeling Attraction-End Choice for Urban Recreational Trips: Implications for Transportation, Air Quality and Land-Use Planning*,  
Michael A. Pozsgay and Chandra R. Bhat  
The University of Texas at Austin  
August 2001

# TxDOT Projects

## Texas Department of Transportation Cooperative Research Program

The Texas Department of Transportation (TxDOT) remains CTR's major research partner. Collaborating in the highly successful Cooperative Research Program, TxDOT and CTR have established a mutually beneficial relationship. As a long term partner, CTR continues to assist the agency in its efforts to provide quality transportation for the benefit of Texas travelers and transportation users throughout the United States.

### New Contract Research with TxDOT

**0-1401** *Determination of Fatigue Damage in Cable Stays*, Principle Investigators: Sharon L. Wood, Eric Williamson, Michael E. Kreger, and John E. Breen

**0-1405** *Durability Design of Post-Tensioning Sub-Structure Elements*, Principle Investigators: John E. Breen, Michael E. Kreger

**5-1517** *Feasibility of Precast Slabs in PRC Pavements*, Principle Investigator: B. Frank McCullough

**0-1700** *Improving Portland Cement Concrete Pavement Performance*, Principle Investigators: B. Frank McCullough, David W. Fowler, and Terrence E. Dossey

**0-1707** *Long Term Research on Bituminous Course Aggregate*, Principle Investigators: Yetkin Yildirim with TTI

**5-1738-03** *Center for Research in Water Resources*, Principle Investigators: David R. Maidment and Francisco Olivera

**0-1774** *Effect of Wrapping Chloride Contaminated Structural Concrete with Multiple Layers of Glass Fiber/Composites and Resins*, Principle Investigators: James O. Jirsa, David W. Fowler, and Harovel G. Wheat

**0-1778** *TxDOT Rigid Pavement Database*, Principle Investigators: B. Frank McCullough and Terrence E. Dossey

**0-1790** *ITS Benefits*, Principle Investigators: TTI Lead with C. Michael Walton

**0-1810** *Highway Cost Allocation in Texas*, Principle Investigators: C. Michael Walton, Zhanmin Zhang, and David Luskin

**0-1857** *Structural Assessment of In-Service Bridges with Premature Concrete Deterioration*, Principle Investigators: Richard E. Klingner and Timothy Fowler

**0-1892** *Inspecting FRP Composite Structures with Nondestructive Testing*, Principle Investigators: Tess Moon and Timothy Fowler with TTI

**0-1895** *Evaluate the Effects of Allowing the Use of 12sqrt of f sub c primed to Load Rate Prestressed Concrete Bridges*, Principle Investigators: Michael E. Kreger, John E. Breen, and Sharon L. Wood

**0-1896** *Field Monitoring of Trapezoidal Steel Box Beams*, Principle Investigators: Karl H. Frank and Joseph Yura

**0-1898** *Simplified Details for Trapezoidal Steel Box Beams*, Principle Investigators: Joseph Yura, Karl H. Frank, and Eric Williamson

**0-2109** *Evaluate the Effects of Channel Improvement, Especially Channel Transitions, on Culverts and Bridges*, Principle Investigators: Randall J. Charbeneau and Edward R. Holley

**0-2135** *Guidelines for Inspection of Fracture Critical Steel Trapezoidal Girders*, Principle Investigators: Karl H. Frank and Lance Manuel

**7-2941** *Long-term Behavior of HPC Bridges*, Principle Investigators: David Whitney and Ned H. Burns

**5-2990** *Training for Seismic Refraction Instrument to Determine Bedrock Depth Beneath Roads*, Principle Investigator: Jeffrey Paine

**5-3933** *Toner Modified Asphalt*, Principle Investigators: Thomas W. Kennedy and Yetkin Yildirim

**0-4021** *Traffic Control for Complex Work Zones*, Principle Investigators: TTI Lead with Robert Harrison, Randy B. Machemehl, and Alexei Tsyganov

**0-4035** *Further Development of Post-Tensioned Prestressed Concrete Pavements in Texas* Principle Investigators: B. Frank McCullough, Ned H. Burns, and Terrence E. Dossey

**0-4054** *Using Real-Time Traffic Data for Transportation Planning*, Principle Investigator: Hani S. Mahmassani

**0-4061** *Comparison of Hot Poured Crack Sealant to Emulsified Asphalt Crack Sealant*, Principle Investigators: Thomas W. Kennedy, Mansour Solaimanian, and Yetkin Yildirim

**0-4069** *Mitigation Techniques for In-Service Structures with Premature Concrete Deterioration*, Principle Investigators: Richard E. Klingner, Michael E. Kreger, and Timothy Fowler

**0-4070** *Improved Inductive Loop Design for High-Bed and Light Vehicles*, Principle Investigators: Robert Hebner and Mack Grady

**0-4078** *Behaviorally-Consistent Integrated Transportation-Land Use Models*, Principle Investigator: Kara Kockelman

**0-4080** *Activity-Based Travel Demand Modeling for Metropolitan Areas in Texas*, Principle Investigator: Chandra R. Bhat

**0-4083** *Impacts of Inland Ports on Trade Flows and Transportation in Texas*, Principle Investigators: Robert Harrison, Chandra R. Bhat, C. Michael Walton, John McCray, and Russell Henk

**0-4085** *Preventing Premature Concrete Deterioration Due to ASR/DEF in New Concrete*, Principle Investigators: Kevin Folliard, David W. Fowler, and Zhanmin Zhang



**0-4086** *Allowable Design Release Stresses for Pretensioned Concrete Beams*, Principle Investigators: Michael E. Kreger, John E. Breen, and Sharon L. Wood

**0-4096** *Evaluation and Monitoring of Texas Major and Unique Bridges*, Principle Investigators: Sharon L. Wood, Karl H. Frank, Michael E. Kreger, and John E. Breen

**0-4098** *Use of Innovative Materials to Control Drying Shrinkage Cracking of Concrete Bridge Decks*, Principle Investigators: Kevin Folliard, David W. Fowler, John E. Breen

**0-4156** *Integration of Point-Based and Link-Based Vehicle Detection Data*, Principle Investigators: Hani S. Mahmassani, Carl Haas, and Thomas W. Rioux

**0-4176** *Development of Precast Bridge Construction Systems*, Principle Investigators: Michael E. Kreger, John E. Breen, and Sharon L. Wood

**0-4177** *Use of Recycled Asphalt Pavement and Crushed Concrete as Backfill for Mechanically Stabilized Earth Retaining Walls*, Principle Investigators: Ellen Rathje, Alan F. Rauch, and Kevin Folliard

**0-4178** *Structural Fatigue Details*, Principle Investigator: Karl H. Frank

**0-4185** *Correlation of Field Performance to Hamburg Wheel-Tracking Results*, Principle Investigators: Thomas W. Kennedy, Mansour Solaimanian, and Yetkin Yildirim

**0-4186** *Cradle-to-Grave Monitoring of Pavements and PMIS Functionality Enhancement Planning*, Principle Investigators: Zhanmin Zhang and Randy B. Machemehl

**0-4197** *Environmental Benefits of Intelligent Transportation Systems (ITS)*, Principle Investigators: Hani S. Mahmassani, Chandra R. Bhat, C. Michael Walton, and Susan Handy

**0-4200** *Metropolitan Planning Organization (MPO) Strategies for Addressing Federal Requirements*, Principle Investigators: Susan Handy, Chandra R. Bhat, and C. Michael Walton

**0-4252** *Process Framework for Identifying and Prioritizing Water Quality Improvements for Meeting TMDL's in Texas*, Principle Investigators: Michael Barrett, Joseph Malina, George Ward, and Randall Charbeneau

**0-4266** *Improving Urban Intersection and Arterial Traffic Control Plans*, Principle Investigators: Randy B. Machemehl, Alexei Tsyganov, and Katherine Liapi

**0-4297** *Tools for Contracting with Consultant for Engineering Services on Highway Projects*, Principle Investigators: TTI Lead with Nabeel Khwaja and Frederick Hugo

**0-4307** *Steel Trapezoidal Girders: State of the Art*, Principle Investigators: Joseph Yura with U of H

**0-4322** *Develop a New Methodology for Characterizing Pavement Structural Condition for Network-Level Applications*, Principle Investigator: Zhanmin Zhang

**0-4357** *Further Development of the Rolling Dynamic Deflectometer (RDD) to Increase Test Speed*, Principle Investigator: Kenneth H. Stokoe, II

**0-4365** *Urban Intersection Design Guidance*, Principle Investigators: TTI with Randy B. Machemehl

**0-4371** *Examination of the AASHTO LRFD Strut and Tie Specification*, Principle Investigators: Oguzhan Bayrak, James Jirsa, John E. Breen, and Sharon Wood

**0-4375-CT** *Innovative Design and Construction Methods for Off-System Bridges*, Principle Investigators: Karl H. Frank, Michael E. Kreger, Sharon Wood, and James Jirsa

**0-4377** *Develop GIS-Integrated Traffic Models for MOBILE6-Based Air Quality Conformity and TCM Analysis*, Principle Investigator: Chandra R. Bhat

**0-4381** *Develop an Automated System for Updating Pavement Layer Data*, Principle Investigators: Zhanmin Zhang and Terrence Dossey

**0-4382** *Establish an Acceptable Pavement Thickness Tolerance to Allow for Non-Destructive Continuous Concrete Pavement Thickness Measurements*, Principle Investigators: B. Frank McCullough, Seong-Min Kim and Terrence E. Dossey

**0-4386** *Expediting Highway Construction While Retaining Quality*, Principle Investigators: Carl Haas, Edward Gibson, James O'Conner, and Zhanmin Zhang

**0-4392** *Use of Fibers in Concrete Pavement*, Principle Investigators: Kevin Folliard, David W. Fowler, B. Frank McCullough, and David Whitney

**0-4398** *Develop Guidelines for Designing and Constructing Thin Asphalt Pavement (ACP) Overlays on Continuous Reinforcement Concrete Pavement (CRCP)*, Principle Investigators: B. Frank McCullough, Terrence Dossey, Zhanmin Zhang, Yetkin Yildirim, Frederick Hugo, and Thomas W. Kennedy

**0-4403** *Characteristics of Compost: Moisture Holding and Water Quality Improvements*, Principle Investigators: Joseph Malina and Michael Barrett

**0-4410** *Containerized Freight Movement in Texas*, Principle Investigators: Robert Harrison and Chandra Bhat with TTI

**0-4416** *Development of Improved Information for Estimating Construction Time*, Principle Investigators: James O'Connor, and John Borchering

**7-4904** *Feasibility of Hot-Dipped (Zinc) Galvanizing and Other Coatings for the Protection of Reinforcing Steel*, Principle Investigators: Harovel G. Wheat, Robert Sarcinella, David W. Fowler, and James O. Jirsa

**7-4938** *Development of an Urban Accessibility Index*, Principle Investigators: Chandra R. Bhat, Susan Handy, Kara Kockelman, and Hani S. Mahmassani

**7-4975** *Implementation of an Automated Pavement Surface Rating System for Asphaltic Pavements*, Principle Investigators: Bugao Xu and Huang-Hsiung Lin

**5-9010** *White-topping Concrete Overlay*, Principle Investigators: B. Frank McCullough and Terrence E. Dossey

**5-9014** *Criteria and Design for a Model Border Crossing*, Principle Investigators: Robert Harrison with TTI

**0-4418** *Bridge Slab Behavior at Expansion Joints*, Principle Investigator: Oguzhan Bayrak

**0-4420** *Techniques for Mitigating Urban Sprawl*, Principle Investigators: Susan Handy, Chandra Bhat, Kara Kockelman, and Paterson

**5-1833** *Infrastructure Impacts and Operational Requirements Associated With the Next Generation Containerships*, Principle Investigator: Robert Harrison

**5-1924** *Implementation of a Fixed Site for the TxMLS*, Principle Investigator: W. Ronald Hudson

**5-1873** *Freeway Design Decisions for Revised Frontage Road Policy*, Principle Investigator: Kara Kockelman

**0-4569** *Design of Bridges for Security*, Principle Investigator: Eric Williamson

**0-4576** *Emulsified Diesel Emission Testing, Performance, Evaluation, and Operational Assessment*, Principle Investigator: Ronald Matthews

**5-1869-03** *Implementation of a Web-Based Site for pavement Design and Analysis*, Principle Investigator: Terrence E. Dossey

# Published Reports

## 1250-5

*Mixing and Compaction Temperatures for Hot Mix Asphalt Concrete*, by Mansour Solaimanian, Yetkin Yildirim, and Thomas W. Kennedy  
November 15, 2001

## 1265-S

*Corrosion Performance of Epoxy-Coated Reinforcement: Summary, Findings, and Guidelines*, by Enrique Vaca-Cortés, James O. Jirsa, Harovel G. Wheat, and Ramon L. Carrasquillo,  
September 20, 2001

## 1395-2F

*Top Lateral Bracing of Steel U-Shaped Girders* by Brian S Chen, Joseph A. Yura, and Karl H. Frank

## 1501-S

*Evaluation of Fillet Weld Requirements*, by Heather E. Gilmer and Karl H. Frank

## 1517-S

*Feasibility of Precast Prestressed Concrete Panels for Expediting PCC Pavement Construction*, by B. Frank McCullough, Dave Merritt, Ned H. Burns, and Anton K. Schindler,  
February 5, 2002

## 1706-3

*Evaluating Performance-Based Test and Specifications for Sulfate Resistance in Concrete*, by John B. Stevens and Ramon L. Carrasquillo,  
September 14, 2001

## 1714-S

*Match-Cure and Maturity: Taking Concrete Strength Testing to a New Level*, by Russell Kehl, Cesar A. Constantino, and Ramon L. Carrasquillo,  
February 5, 2002

## 1739-2

*A Sensitivity Analysis of the Rigid Pavement Life Cycle Cost Analysis Program*, by Steve Waalkes, Terrence E. Dossey, and B. Frank McCullough,  
September 7, 2001

## 1739-S

*A Life Cycle Cost Analysis of Rigid Pavements*, by Robert Harrison, Steve Walkes, and Jim Wilde,  
October 29, 2001

## 1746-3

*Lateral Load Distribution on Transverse Floor Beams in Steel Plate Girder Bridges*, by K. R. Pennings, Karl H. Frank, Sharon L. Wood, and Joseph Yura,  
January 14, 2002

## 1747-2

*Geographical Information Systems (GIS) Needs Assessment for TxDOT Pavement Management Information Systems*, by Michael T. McNerney and Thomas W. Rioux,  
May 7, 2002

## 1747-3

*GIS Implementation Plan for PMIS*, by Zhanmin Zhang, Xudong Zhang, and W. R. Hudson,  
April 29, 2002

## 1747-S

*Summary of the GIS Implementation Plan for TxDOT PMIS*, by Zhanmin Zhang, W. R. Hudson, and Michael McNerney,  
February 5, 2002

## 1748-2

*Development of a Precast Bent Cap System*, by Michael E. Kreger, E. E. Matsumoto, Sharon L. Wood, Mark C. Waggoner, G. Sumen, and John E. Breen,  
October 16, 2001

## 1748-S

*Development of a Pre-cast Bent Cap System*, by Eric E. Matsumoto, Mark C. Waggoner, Michael E. Kreger, and John E. Breen,  
June 6, 2002

## 1774-1

*Evaluation and Performance Monitoring of Corrosion Protection Provided by Fiber-Reinforced Composite Wrapping*, by S. M. Verhulst, L. A. Fuentes, James O. Jirsa, David W. Fowler, Harovel G. Wheat, and Tess Moon,  
February 19, 2002

## 1776-1

*Use of Carbon Reinforced Polymer Composites to Increase the Flexural Capacity of Reinforced Concrete Beams*, by Sergio F. Brena, Regan M. Bramblett, Michael A. Benouaich, Sharon L. Wood, and Michael E. Kreger,  
October 4, 2001

## 1776-2

*Increasing the Flexural Capacity of Typical Reinforced Concrete Bridges in Texas Using Carbon Fiber Reinforced Polymers*, by Sergio F. Brena, Sharon L. Wood, and Michael E. Kreger,  
November 15, 2001

## 1790-3

*Intelligent Transportation Systems (ITS) in Texas: Deployment Summary and Case Study of Deployment Methodologies*, by David T. Ory, William Stockton, and C. Michael Walton,  
June 1, 2002

## 1805-1

*Backwater Effects of Piers in Subcritical Flow*, by Edward R. Holley and Randall J. Charbeneau,  
March 14, 2002



**1810-1**

*A Framework for the Texas Highway Cost Allocation Study*, by David Luskin, Alberto Garcia-Diaz, Dongju Lee, Zhanmin Zhang, and C. Michael Walton, September 20, 2001

**1812-S**

*Recommendations for Establishing the Texas Roadway Research Implementation Center*, by Joe Allen, Andre Smit, and Paige Warren, September 24, 2001

**1814-1**

*Report on a Comparison of the Effectiveness of Two Pavement Rehabilitation Strategies on US 281 Near Jacksboro*, by Frederick Hugo, Dar Hao Chen, André de Fortier Smit, and John Bilyeu, March 1, 2002

**1814-4**

*Rutting Performance of Dustrol Rehabilitation Under TxMLS Trafficking with Increased Tire Pressure*, by Frederick Hugo, September 20, 2001

**1831-2**

*CRCP-9: Improved Computer Program for Mechanistic Analysis of Continuously Reinforced Concrete Pavements*, by Seong-Min Kim, Moon Won, and B. Frank McCullough, September 7, 2001

**1831-3**

*CRCP-9 Computer Program User's Guide*, by Seong-Min Kim and B. Frank McCullough, November 15, 2001

**1831-4**

*CRCP-10 Computer Program User's Guide*, by Seong-Min Kim, Moon Won, and B. Frank McCullough, April 10, 2002

**1831-5**

*Transformed Field Domain Analysis of Pavements Subjected to Moving Dynamic Tandem Axle Loads and Integrating Their Effects Into CRCP-10 Computer Program*, by Seong-Min Kim, Moon Won, and B. Frank McCullough, April 10, 2002

**1833-3**

*Impact of Containership Size, Service Routes, and Demand on Texas Gulf Ports*, by Michael Bomba and Robert Harrison, January 31, 2002

**1833-5**

*Freight Modal Split: Estimated Results and Model Implementation*, by Aruna Sivakumar, Aruna Srinivasan, and Chandra R. Bhat, February 19, 2002

**1838-5**

*VMT Mix Modeling for Mobile Source Emissions Forecasting: Formulation and Empirical Application*, by Chandra R. Bhat and Harikesh S. Nair, September 27, 2001

**1838-S**

*Transportation Control Measure Effectiveness in Ozone Nonattainment Areas*, by Chandra R. Bhat

**1843-4**

*Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities*, by James Jarrett, Susan Handy, and Salila Vanka, December 13, 2001

**1843-S**

*The Impacts of Highway Relief Routes on Small Towns in Texas*, by Susan Handy

**1844-S**

*Freeway Operational Flexibility Concepts*, by Peiter Poolman, Thomas W. Rioux, and Alexei Tsyganov, October 29, 2001

**1846-1**

*Design Guidelines for Provision of Median Access on Principal Arteries*, by Randy B. Machemehl, Thomas W. Rioux, and Jillyn K. O'Shea, December 13, 2001

**1846-S**

*Design of Medians for Principal Arterials*, by Randy B. Machemehl, Thomas W. Rioux, and Jillyn K. O'Shea, October 29, 2001

**1849-2**

*Domestic and International Best-Practice Case Studies*, by Hani S. Mahmassani, Michael T. McNerney, Keisha Slaughter, and Hussein Chebli, December 7, 2001

**1852-S**

*Summary: High Performance Lightweight Concrete Prestressed Girders and Panels*, by John E. Breen and Ned H. Burns,

**1857-1**

*Bridges with Premature Concrete Deterioration: Field Observations and Large-Scale Testing*, by A. Boenig, L. Funéz, Richard E. Klingner, and Timothy Fowler, August 23, 2002

**1873-2**

*Frontage Roads in Texas: A Comprehensive Assessment*, by Kara Kockelman, Randy B. Machemehl, Aaron Overman, Marwan Madi, Jacob Sesker, Jean Peterman, and Susan Handy, June 3, 2002

**1884-1**

*Transit Scheduling Data Integration: Paratransit Operations Review and Analysis*, by Hani S. Mahmassani, Leon Lason, and Sourav Dutt, September 20, 2001

**2122-1**

*Effects of Truck Size and Weights on Highway Infrastructure and Operations: A Synthesis Report*, by David Luskin and C. Michael Walton, January 15, 2002

**2122-S**

*Effects of Truck Size and Weights on Highway Infrastructure and Operations: Project Summary Report*, by David Luskin and C. Michael Walton, February 5, 2002

**2129-1**

*Project Delivery Methods and Contracting Approaches: Assessment and Design-Build Implementation Guidance*, by G. E. Gibson and John Walewski, March 14, 2002

**2954-2**

*Use of Vegetative Controls for Treatment of Highway Runoff*, by Michael Barrett, P.M. Walsh, Joseph F. Malina and Randall J. Charbeneau, February 19, 2002

**2957-1**

*Improving the Acoustical Performance of Porous Asphalt Pavements*, by Jeff DeMoss, Brian J. Landsberger, and Michael McNerney, November 15, 2001

**2957-2**

*Comparative Field Measurements of Tire/Pavement Noise of Selected Texas Pavements*, by Jeff DeMoss, Brian J. Landsberger, and Michael McNerney, May 2, 2002

**2957-3**

*Feasibility of Using Quiet Pavement Technology to Attenuate Traffic Noise in Texas*, by Michael T. McNerney, Jeff DeMoss, Steve Burscak, Brian J. Landsberger, and Woon Ho Yeo, April 2, 2002

# Published Reports

## **3965-1**

*Validation of Cost-Effectiveness Criterion for Evaluating Noise Abatement Measures*, by Michael McNerney and Brian J. Landsberger, September 1, 2001

## **4080-1**

*Representation and Analysis Plan and Data Needs Analysis for the Activity-Travel System*, by J. Y. Guo and Chandra R. Bhat, November 2, 2001

## **4080-2**

*Activity-Based Travel Demand Modeling for Metropolitan Areas in Texas: Model Components and Mathematical Formulations*, by Chandra R. Bhat, S. Srinivasan, and Jessica Guo, February 19, 2002

## **4083-1**

*The Identification and Classification of Inland Ports*, by Sara Leitner, and Robert Harrison, December 14, 2001

## **4098-1**

*Restrained Shrinkage Cracking of Concrete Bridge Decks: State of the Art Review*, by Michael Brown, Gregory Sellers, Kevin Folliard, and David W. Fowler, April 1, 2002

## **4177-1**

*Results from State-of-the-Art Review and Material Characterization*, by Ellen Rathje, Alan F. Rauch, Kevin Folliard, Chirayus Viyanant, Moses Ogalla, David Trejo, Dallas N. Little, and Michael Esfeller, March 14, 2002

## **4197-1**

*Methodologies for Evaluating Environmental Benefits of Intelligent Transportation Systems*, by Tejas Mehta, Hani S. Mahmassani, and Chandra R. Bhat, December 19, 2001

## **4197-2**

*Immediately Applicable Methods for Evaluating Environmental Impacts of Intelligent Transportation Systems (ITS)*, by Tejas Mehta, Hani S. Mahmassani, and Chandra R. Bhat, June 19, 2002

## **4938-3**

*Assessment of Accessibility Measures*, by Chandra R. Bhat, Susan Handy, Kara Kockelman, Hani S. Mahmassani, Qinglin Chen, Issam Srour, and Lisa Weston, June 4, 2002

## **4957-1**

*Evaluation of AVI for San Antonio's TRANSGUIDE for Incident Detection and Advanced Traveler Information Systems*, by Michael Haynes, Carl Haas, Hani S. Mahmassani, Joseph A. Khoury, Thomas W. Rioux, and H. Logman, March 1, 2002

## **572-3**

*Evaluation of German Cracking Frame: Part II-Evaluation of Slab Cracking Behavior Under Laboratory Conditions*, by Dan G. Zollinger and Shilpa Vepakomma, March 13, 2002

The 2001-2002 Annual Report was produced by the Office of Communications & Media Services of the Center for Transportation Research. The office includes Bruce Franks, Clair LaVaye, Maria Saenz-Farias, and Ashley Williams.



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