

TEXAS TRANSPORTATION

Researcher

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The Texas Department of Transportation's

SPECIAL SECTION

Dallas High Five Construction Project

Implementing Research *for the Transportation System*

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FOCUSING
ON

IMPLEMENTATION

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The research community has long recognized that tangible benefits must come from research. Jack Keese, Texas Transportation Institute (TTI) director from 1962 to 1976, always emphasized that research has no inventory value. Research needs to solve problems and be implemented in the real world. How to do this most effectively has long been a challenge for both the community sponsoring research and those conducting research.

TTI has always had a philosophy of transferring research results into practice as quickly as possible. The Transportation Short Course, in its 78th year, represents one of the oldest ongoing technology transfer forums in the country. Roadside safety devices developed at the institute are helping save lives on roadways throughout the country.

More than ever, agencies are focusing on implementing research results. A research organization that desires to offer a full set of services needs to find ways to help assure that the results of research are transferred into practice. At the same time,

research sponsors are broadening desired services, particularly with the involvement of researchers in implementing research findings and products within sponsors' organizations. This subtle transformation is being driven by continually growing pressures within state departments of transportation and other agencies to achieve more with a given amount of resources. As the world of the research sponsor changes, opportunities arise for sponsors and researchers to identify and pursue new approaches to promote the implementation of research findings.

Evidence of this slow transformation can be seen at both

Falling weight deflectometer



Anti-ram wall crash test



Driving simulator



the state and national levels. A number of state departments of transportation are developing programs to accelerate the implementation of research innovations. For example, an implementation program was initiated in 1999 by the Texas Department of Transportation (TxDOT) to plan, fund and accelerate the implementation of selected innovations and improved technologies. Researchers are often involved in these implementation projects although it is not a requirement of the program. Research products selected for accelerated implementation are chosen by a high-level TxDOT committee chaired by the deputy executive director. The program is funded separately from the TxDOT research program and is approximately one-fifth the size of the research program budget.

At the national level, the American Association of State Highway and Transportation Officials (AASHTO) formed a Technology Implementation Group (TIG) three years ago to identify and publicize high-payoff innovations that should be implemented nationally. The TIG has established an effective process and annually selects new, proven innovations to publicize across the country.

While there is a growing need to accelerate the implementation of better and more efficient procedures and equipment, many state transportation departments are finding it increasingly more dif-

ficult to assign adequate resources to effect changes within their organizations. Manual revisions, training courses, specification development, workshops, and equipment purchasing are often prerequisites to placing research products into everyday operation. Much of this activity requires time from a department's most valuable and limited resource, their experienced and technically proficient professionals. Herein is a primary impetus for agencies to increase the involvement of the research community in implementation activities.

TTI continues to focus on helping TxDOT and other agencies implement research results. The institute currently has 19 implementation projects with TxDOT, and TTI looks forward to assisting in many more projects. To help promote implementation activities, the institute established the manager of research implementation position. This position will assist researchers and sponsors in exploring new and innovative approaches to implementation.

There are obvious benefits to combining sponsor and research community resources in implementing research findings. In addition to freeing busy department personnel of some of the implementation tasks, the researcher may be in a better position to prepare materials needed for effective implementation. Of course, the researcher also continues to learn

more about the sponsor's operations, challenges and organization, and receives immediate feedback from users of the new product during implementation activities. The researcher then becomes a more valuable asset to the sponsor on future projects.

The culmination of most research projects is an applied new product, policy, procedure or technique. Accelerating the implementation process allows the research sponsor to benefit sooner, and involving the researcher in the process better equips the researcher for future research. It's a cycle in which everyone benefits. As Jack Keese would say, "research has no inventory value." **R**



Paul E. Krugler recently retired from TxDOT to serve as manager of research implementation for TTI.



(Left) TTI's Steve Roop and Rollin Bredenberg of BNSF welcome council members.



(Right) David Laney leads an afternoon discussion.

(Bottom) Council members gather following the meeting on the Bay View of BNSF.

TTI COUNCIL

rides the rail



On April 1, over 20 members of the Texas Transportation Institute Advisory Council boarded a special Burlington Northern Santa Fe Railway Company (BNSF) train to participate in the annual meeting. Rollin Bredenberg, vice president of BNSF, made the train available for the meeting and a reception the night before. Over 20 members of the council participated in a day that focused primarily on railroad issues and research.



A wide range of transportation experts focused on problems and solutions.

(Above) L-R: Lawrence Olsen, Arnold Oliver, Hugh McCulley and Roger Hord.

(Above right) Mike Behrens.

(Right) L-R: Mary Lou Ralls, Margaret Lonerio and Alan Clark.



Arnold Oliver, retired Texas Department of Transportation (TxDOT) executive director, currently serves as chair of the council to which TTI looks for guidance in the development and conduct of its programs. This council is comprised of distinguished, high-level transportation professionals from across the state and nation.

Following introductions and a TTI overview from TTI Director Herb Richardson, Mike Behrens, executive director of TxDOT, spoke to the group about the status of the TransTexas Corridor proposal. This concept is in the very early stages of public meetings and evaluation of possible corridors, with particular focus on determining rural opinions and perceptions. Behrens also discussed new transportation financing options now available, such as toll equity and regional mobility authorities.

Rollin Bredenberg reported on the state of the rail industry in Texas, pointing to a 12 to 13 percent growth in freight shipments on major corridors over the last few years. David Laney, chairman of the Amtrak Board of Directors, informed the group about the current issues facing passenger rail service in the United States. Security and scarce resources are high on the list of concerns that need to be addressed by railroads.

After lunch, TTI Assistant Director Steve Roop gave an overview of research initiatives within TTI's multimodal programs, which include the Rail Research/ Association of American Railroads Affiliated Laboratory, the Center for Ports and Waterways, the National Pipeline Center, and the intermodal trucking initiative. In addition, he gave an overview of a project in east Harris County to help enhance rail operations and safety. The day ended with a lively dialogue among members as they shared their general comments and observations on planning, finance, security and the decision-making process. Members also stressed the need to continue conducting research and educating the general public on transportation issues.

"TTI interacts with many of the council members on a regular basis," notes TTI Deputy Director Dennis Christiansen. "Once a year the council comes together as a group. Their background, knowledge and contacts are invaluable to the institute as we identify and pursue research opportunities."

For a complete listing of the TTI Advisory Council membership, see http://tti.tamu.edu/inside/tti_advisory_council/. **R**

TEXAS TRANSPORTATION INSTITUTE ADVISORY COUNCIL

The Texas Transportation Institute (TTI) wishes to recognize members of the TTI Advisory Council by featuring profiles in each issue of the *Texas Transportation Researcher*. The TTI Advisory Council meets once a year to hear updates on research projects and program initiatives, discuss critical transportation issues facing Texas, and provide guidance on potential future research efforts.



JACK ALBERT is president of Reece Albert, Inc., a family-owned heavy construction firm founded in 1940. The company performs state, federal, municipal and commercial work throughout West Texas. He also serves as president of CSA Materials, Inc., a materials company providing limestone and hot-mix products to the heavy construction industry.

Albert earned his bachelor's degree in geology and mathematics in 1959 from Texas Tech University. He began his career with Reece Albert, Inc., upon graduating and has been pivotal to the growth of the company, which currently employs 350 people and operates over an 80,000-square-mile area in West Texas.

Throughout his career, Albert has served many industry organizations in leadership positions. He is past president and past chairman of the Associated General Contractors (AGC) of Texas-Highway Division and is the chairman of the AGC/Texas Department of Transportation Joint Committee. He has served as a director for the AGC of America and the Texas Asphalt Pavement Association. Albert served as the western regional vice chairman, co-chaired the Reauthorization Task Force, was first vice chairman and senior vice chairman, is on the executive committee and board of directors, and serves on the AIR 21 Task Force-Long Range Planning Committee of the American Road and Transportation Builders Association. ■



ROLLIN BREDEBERG was appointed to his current position of vice president for service design and performance of the Burlington Northern Santa Fe Railway Company (BNSF) in June 1999. He and the service design and performance team are responsible for scheduling railroad operations to meet customer expectations and market requirements and to optimize use of the BNSF network.

Bredenberg began his career in the railroad industry with Southern Pacific, spending 29 years in various management positions in San Antonio, Ennis and Houston. He was named general manager at Houston in 1982 and vice president of Southern Pacific's Mexico business unit in 1990.

He joined Santa Fe in 1994 as assistant vice president for intermodal operations. From October 1995 to April 1997 he served as vice president for transportation. In April 1997, he was appointed vice president for Operations in the South.

Bredenberg received his bachelor of science degree in transportation from Northwestern University.

He is a member of the board of directors of the Fort Worth Hispanic Chamber of Commerce, the board of trustees of the Barriger National Transportation Library and the board of operations of the Port Terminal Railroad Association of Houston. ■



RICK COLLINS is the director of the Research and Technology Implementation Office of the Texas Department of Transportation (TxDOT). In this capacity, he oversees and directs the development and operation of the department's research, technology implementation and new product evaluation programs.

Collins earned his bachelor's degree in civil engineering in 1981 from Texas A&M University and his master's degree in engineering from The University of Texas at Austin in 1988. He began his career with TxDOT as an engineering assistant in the Design Division.

He worked for Murfee Engineering Company, Inc., in Austin from 1985 to 1987. In 1987, he returned to the department where he became the safety and programs engineer in the Traffic Operations Division. Collins served as the railroad liaison engineer from 1995 to 1997. He served as the director of the Traffic Engineering Section from 1997 to 2004.

Collins represents TxDOT as a member of the American Association of State Highway and Transportation Officials (AASHTO) Research Advisory Committee and is the state representative to the Transportation Research Board. He has also represented TxDOT as a member of the AASHTO Traffic Engineering Subcommittee and the National Committee on Uniform Traffic Control Devices. He is a member of the Institute of Transportation Engineers. ■



THOMAS L. JOHNSON is the executive vice president of the Associated General Contractors of Texas. At the direction of the board of directors, he manages the day-to-day operations of the association.

The association represents highway-heavy contractors and related industries in Texas. The membership traditionally builds over 85 percent of the highways in Texas. The association works with agencies such as the Texas Department of Transportation, the Texas Commission on Environmental Quality, cities, counties, and legislators on both the state and national levels, and the executive branches of government on both the state and national levels.

He earned his bachelor's degree from Texas A&M University in 1959 and served in the U.S. Army, achieving the rank of first lieutenant.

Previously, he served on bank boards, the Chamber of Commerce, associations and other civic boards.

Currently, he serves on the National Park Foundation Board, appointed by Secretary of the Interior Gale Norton. ■

Transportation leaders selected for **HALL OF HONOR** induction



Top row, L-R: Bill Garbade, Roger Welsch, Arnold Oliver, Marcus Yancy, Mike Behrens and Dan Reagan.
Bottom row, L-R: Luther DeBerry, Mark Goode, Mary Ann Stotzer, Frank Holzmann, Ray Barnhart, Byron Blaschke and Mayor Robert Lanier.



(Above) L-R: Rory Haecker, Nicolle Haecker, Mary Ann Stotzer, Susan Null and Chris Keller.



(Left) L-R: Mallory Rousselot, Ray Barnhart and Jacqueline Barnhart.

Two of the transportation industry's prominent contributors, Ray Barnhart and Raymond Stotzer, were recently inducted into the Texas Transportation Hall of Honor. The ceremony took place on April 19 at the Dewitt C. Greer Building in Austin.

Barnhart was a former administrator for the Federal Highway Administration (FHWA), and Stotzer was a former engineer-director for the Texas Department of Transportation (TxDOT). The Hall of Honor was established in 2000 by the Texas Transportation Institute (TTI).

"The Hall of Honor is intended to recognize that small group of people whose vision and exceptional leadership made possible the outstanding transportation system we have today," TTI Deputy Director Dennis Christiansen said. "We are proud and thankful to recognize these great leaders for what they've given the people of Texas and the nation."

As administrator of FHWA from 1981 to 1987, Barnhart earned praise from associates for his strong leadership, easy manner and extraordinary communication skills. His tenure was marked by efforts to protect the integrity of the Highway Trust Fund, streamline procedures, shorten delays and return management authority

to the states. During his tenure at FHWA, Barnhart established 42 technology transfer centers at U.S. colleges and universities, and restructured and strengthened the agency's motor carrier and international highway programs.

Stotzer's service to TxDOT spanned more than 40 years. He began as an entry-level engineer in 1947 and became district engineer in 1968, serving in that leadership position for both the Pharr and San Antonio Districts. He led the development and construction of the Queen Isabella Causeway, Texas' longest bridge, and he addressed congestion in San Antonio by improving major freeways. Stotzer, colleagues note, was willing to take risks to pursue innovative ideas in areas such as organizational structure, highway design and right-of-way acquisition.

For more information on the Hall of Honor, please see http://tti.tamu.edu/hall_of_honor/. 

TEXAS TRANSPORTATION

HALL OF HONOR

2004 INDUCTEES



RAY A. BARNHART

Ray Barnhart (Marietta College '50 University of Houston '51) combined political skills with a career-long transportation interest to significantly impact our transportation system. An Eagle Scout, he was a Texas state representative (1972-73) and a commissioner of the Texas Department of Highways and Public Transportation (1979-81).

In 1981, President Reagan nominated Ray Barnhart as the Federal Highway Administrator (FHWA). He served in this capacity from 1981 to 87. Barnhart insisted that transportation policy be based upon engineering and economic principles. Under his stewardship, Congress agreed to increase motor fuel taxes. He established the Federal/State Technology Transfer Center Program, fought to preserve the sanctity of the Highway Trust Fund, insisted on returning decision-making power to the states and initiated the nationwide effort to stop the theft of fuel taxes.

Upon his retirement from FHWA, the U.S. House of Representatives noted in a resolution that "the United States Government expresses its gratitude to Ray A. Barnhart for his honest, effective and meaningful efforts to preserve and improve the Federal-Aid System — one of the Nation's most vital assets..."

As a private citizen, Barnhart continues to identify and advocate solutions to transportation issues. ■



WALTER J. HUMANN

Walter J. "Walt" Humann (MIT '59) has had two simultaneously successful careers in Dallas. One is in business, and the other is in public service. He heads his own firm, WJH Corporation, and has held top management positions in several corporations as well as serving on both corporate and non-profit boards.

In his public service career, Humann has the quiet tenacity and perceptive vision to develop private-public partnerships to address pressing urban problems. He has spearheaded significant community improvements in the areas of transportation — reconstruction of North Central Expressway, and creation and implementation of DART (Dallas Area Rapid Transit) — education, community and race relations, government reorganization, and urban planning, design and beautification. He has applied his considerable skills and finesse to develop consensus on complex transportation issues among groups with diverse opinions.

Walt Humann has received numerous civic awards, including the prestigious Linz Award in 1997 for his leadership in bringing North Central Expressway and DART to fruition.

For over 30 years, Humann has had an ongoing, positive influence on the quality of life in Dallas and North Texas by facilitating improvements in the transportation infrastructure. ■



HAROLD J. MCKENZIE

A native Texan, Harold McKenzie's (Texas A&M '27) career in the railroad industry spanned the period from 1926 to 1969. While working for the Texas and New Orleans Railroad, he served as project engineer for the replacement of the spectacular Pecos River bridge.

A hands-on leader and a man of vision and innovation, in 1951 he was named president of the Cotton Belt Railroad. Harold McKenzie reorganized the company and moved the headquarters from St. Louis to Tyler. He turned this railroad into one of the country's best-run properties. In 15 years, the Cotton Belt doubled tonnage carried and net income, while reducing the number of employees by half. At the same time, the railroad emphasized safety and received five significant safety awards.

His contributions to improving the railroad's service area were also substantial. An example was his role in securing right-of-way for the Dallas North Tollway, and its main plaza was subsequently named the "McKenzie Plaza."

Upon retirement in 1969, he devoted his talents to civic affairs in Tyler and was a leader in establishing The University of Texas at Tyler. ■



RAYMOND E. STOTZER, JR.

Raymond Stotzer (Texas A&M '46) began his career with the Texas Highway Department in 1947. He served as district engineer in both Pharr (1968-74) and San Antonio (1974-86), and was engineer-director from 1986 until his death in 1989. He was a charismatic leader who excelled in promoting relationships of mutual trust and respect.

Stotzer led the development and construction of the Queen Isabella Causeway, Texas' longest bridge, and he addressed congestion in San Antonio by improving major freeways. He was willing to take risks to pursue innovative ideas in areas such as organizational structure, highway design and right-of-way acquisition.

As engineer-director, he achieved a reputation for deftly balancing the interests of rural and urban districts. Priority was given to enhancing urban mobility, and as retirements increased, Stotzer created programs to train and educate young engineers and technicians.

Stotzer was a recipient of numerous awards, including being named a Distinguished Alumnus of the College of Engineering at Texas A&M. Gov. Clements observed that "Texans today and for years to come will reap the benefits of his engineering talents." ■

DALLAS HIGH FIVE

A Vital Economic Link for North Texas



A HEAD OF SCHEDULE AND ON BUDGET. WHAT MORE COULD ANYONE ASK EXCEPT: WHEN WILL THE CONSTRUCTION BE FINISHED? The answer: early 2006, some nine months ahead of schedule if the current construction goals are met.

The \$261 million interchange reconstruction, known as the Texas Department of Transportation's High Five project, where U.S. 75 North (North Central Expressway) and I-635 (LBJ Freeway) intersect, is the single largest construction project ever attempted in Dallas. Once complete, the five-level interchange will complement the long-awaited and highly praised improvements along Central Expressway.



(Left) Aerial photo of the U.S. 75 North and I-635 interchange before construction began. (Right) Early 2004 photo of the High Five construction project.

“Without the High Five, it would have been an imperfect outcome to what is a perfect solution,” says Walt Humann, chairman of the North Central Task Force. Humann, a Dallas business and community leader, has been at the center of a decades-old political and economic struggle to solve the agonizing traffic problems along Central Expressway.

When Central Expressway opened in the late '40s, some local leaders considered it a road to nowhere. However, a *Dallas Times Herald* editorial promoted the new highway as an avenue to relieve traffic congestion and promote city growth. And that's what happened.

The highway's impact was dramatic. And so were the ever-growing traffic congestion burdens as development in the corridor grew. So, in the mid-'80s, a highly motivated task force of Dallas business leaders, government officials, transportation engineers and neighborhood associations accomplished what many said was impossible: come up with a plan to expand the capacity of Central Expressway without shutting down traffic and damaging the region's economy and with minimal right-of-way purchases.

“We proved to ourselves and to the citizens that the Texas Department of Transportation (TxDOT), the cities and the private sector can attain the impossible dream and do it in a quality way,” says Humann. His broad-based team effort and incorporating Dallas Area Rapid Transit's (DART) light rail, running parallel to the expressway, proved to be an invaluable component in easing growing traffic fears.

BUILDING PARTNERSHIPS

That same team effort is in overdrive in the High Five interchange reconstruction. Had it not been for an extraordinary partnership that included city, county and federal governments, metropolitan planning organizations, business interests, utility companies, homeowners, and TxDOT, the High Five would have never been built. “That public-private partnership was essential in the reconstruction of Central and is a key factor in the success of the High Five,” says Humann.

When first recommended in the early '90s, highway planners proposed a complex, two-contractor, eight-year project complete with a five-level network of bridges, con-

necting ramps and frontage roads. The timeline was ultimately reduced to five years with a single contractor. And according to current estimates and progress, construction could be complete nine months ahead of schedule.

SURVIVING CONSTRUCTION

Dallas drivers, local businesses and nearby neighborhoods survived reconstruction of Central Expressway. Could they survive five more years of lane closures and narrow lanes of traffic with the High Five? “This project has taken a lot of time and coordination with the contractor as well as various neighborhood groups and businesses that are affected by years of construction,” says Praxedis Garza, P.E., TxDOT's northwest area engineer. The prime contractor, Zachry Construction, is accustomed to working in highly congested traffic corridors, says Garza.

“This is a complex construction project, more so than what we saw on Central Expressway,” says Brian Salerno, P.E., project director for Zachry Construction Corporation.

The use of on-site pre-cast bridge segments, specially designed retaining walls, nighttime construction schedules, modified traffic control, significant financial incentives for the contractor and public outreach helped speed up the project and ease construction fears. “I was expecting more complaints from the public on this project,” says Salerno. “We've had tremendous positive feedback about traffic control and the way construction has been handled. The communication plan and public outreach has made a big difference,” he said.

PUBLIC INVOLVEMENT

Proactive communication is proving to be a key asset in the planning and construction of the High Five. Texas Transportation Institute (TTI) Research Engineer Cliff Franklin brought his experience with the expansion of Central Expressway to the construction of the High Five. His role is to help maintain mobility for the people who travel through the interchange or live and work in the area. “The perception prior to construction was that it would be terrible,” says Franklin. “Perceptions have not become reality, and most people are saying how well traffic is moving considering the amount of construction.”



<http://dallashighfive.org>

Successful highway construction projects present unique challenges among transportation engineers, designers, contractors and community outreach professionals. Listed below are some of the lessons learned in the High Five reconstruction project.

Teamwork: Reconstruction of a major urban highway or interchange is so large and complex that no one individual can manage all aspects of a project. Committed teamwork is essential.

Project Champion: Major projects need someone to champion the cause to keep it on track. There will be those who predict doom and gloom. In the North Central corridor, private-sector leadership has been crucial.

Communication: Open lines of communication are vital between governmental agencies, the public and the business community. Some give-and-take compromise is necessary. A foundation of trust must be developed. Planners should take advantage of the Internet, e-mail, one-on-one discussions and regularly scheduled neighborhood meetings. Portable message signs along the construction corridor provide future traffic changes and up-to-the-minute information.

Partnerships: Build partnerships through communication. Extensive plans must be incorporated into construction projects to provide accurate information in a timely manner to residents, businesses and travelers in the corridor.

Safety: During construction, safety is a top priority for the traveling public and the contractor's personnel.

Mobility: Projects should be designed to minimize the need to close traffic lanes and reduce capacity during construction. Freeway main-lane closures can be managed by assessing the contractor a lane rental charge for each lane or lanes closed based on the time of day.

Business Challenges: Access to adjacent properties must be maintained during business hours throughout the construction. Communication and coordination with property owners are critical.

Lighting: Roadway lighting should be maintained during construction to enhance safety and mobility for nighttime driving.

Incident Management: A motorist incident management program should be provided to keep traffic moving by assisting drivers in stalled vehicles and by assisting police to clear up accidents.

Milestones: Construction goals and incentives should be established for specific elements critical to the completion of the overall project.

TxDOT maintains an Internet site (<http://www.DallasHighFive.org>) complete with up-to-date information about detours, lane closures and construction locations that could affect local businesses and neighborhoods.

Franklin helps coordinate that information, acting as a middleman, making sure those affected are informed. "Public outreach is very important whether it's to a mass audience through the local media, scheduled meetings or one-on-one contact," says Franklin. "We are out front and proactive, saying to people this is what's about to happen. People want to know what's going to happen because they don't want to go to work one day and see their driveway closed."

"We have a lot of people following the progress of construction, and they want to know what we are doing from day to day," says Dan Peden, P.E., TxDOT's project manager. "Every complaint we get starts off with what a tremendous job we're doing thus far." "TTI's hard work in keeping the lines of communication open has made our job more manageable," says Garza. "Building trusting relationships has been a key factor in this project's success."

Local businesses and property managers are looking at the reconstruction project as an opportunity. A number of companies and corporations are working with TxDOT to coordinate construction plans of their own. "It's definitely affected our plans," says Joel B. Austin, vice president and general manager of leasing and management for Jones, Lang and LaSalle. Several major corporations lease office space in buildings he manages, Park Central 7, 8 and 9, all near the High Five construction site. "We look at it as a way to redevelop or reposition our properties to tie in with the highway construction," says Austin. "Our capital project schedule coincides with the highway construction, so when their project is complete, we'll be in the position to take advantage of the huge benefit of improved highway infrastructure."

North Central Expressway and LBJ Freeway are vital economic links to north Dallas and the greater Dallas-Fort Worth metropolitan area. What seemed to be an impossible task is now a reality accomplished through public-private partnerships, community buy-in and an effective communication plan. Everyone affected by the construction is learning valuable lessons. Communication among all stakeholders is at the top of the list. **R**

MORE INFORMATION

Contact Praxedis Garza, Dallas TxDOT northwest area engineer, at (972) 479-9747 or pgarza@dot.state.tx.us; Dan Peden, TxDOT High Five project manager, at (972) 490-7400 or dpeden@dot.state.tx.us;

Brian Salerno, Zachry Construction project manager, at (972) 262-8898 or salernob@zachry.com; or

Cliff Franklin, TTI mobility coordinator, at (972) 994-0034 or cfranklin@tamu.edu.

EXPLODING ROADS

RESEARCH IMPLEMENTATION, STATEWIDE TRAINING



Left: Closeup of heave on U.S. 67. Right: U.S. 67 near Waxahachie shows evenly spaced vertical heaves.

Texas Department of Transportation (TxDOT) engineers are moving quickly to learn more about how to solve what is turning out to be a bigger problem than first thought: exploding roadways!

In non-scientific terms, the “explosions” are expansions that occur beneath roadways causing the pavement above to “heave.” Sections affected sometimes rise as much as a foot, resulting in dangerous driving conditions and costly maintenance problems.

“Exploding” roads have been a worldwide engineering challenge for more than 20 years. The phenomenon occurs when calcium-based stabilizers (such as lime or cement) are used to treat soils rich in gypsum or other sulfate minerals.

Over time and in the presence of moisture, a secondary chemical reaction occurs, and a highly expansive mineral, “ettringite,” is formed. This reaction causes the soil to swell. In a three-year study sponsored by TxDOT, a team of researchers at the Texas Transportation Institute (TTI) have come up with some solutions.

Rapid soil tests, a key component of the research, were developed. The test kits measure the presence of sulfates in the soil in a fraction of the time required by existing tests, saving time and allowing increased frequency of testing. Once the presence of significant levels of sulfates have been identified, appropriate methods can be applied to prevent highway “heave,” thus saving valuable construction dollars.

TxDOT and TTI recently completed statewide training programs in an effort to spread the word about sulfate’s destructive effects, the use of soil tests and stabilization possibilities. “The training has been very helpful,” says Caroline Herrera, TxDOT’s director of geotechnical, soils and aggregates branch.

Pockets of sulfate soils can be found all over the state. Most were thought to be concentrated in West Texas and a wide swath stretching from northeast of Dallas to the Mexican border. “We thought it was more localized in the metroplex, but it seems more widespread,” says Tom Scullion, a TTI researcher.

TxDOT has also uncovered additional problems in Lufkin, Paris, Childress, El Paso and Laredo. “There are a number of locations across Texas where you drive and experience that ‘roller coaster’ effect,” says Herrera. “We have always had these problems in varying degrees. We just did not know what caused them,” she said.

“We’ll be able to make on-the-job determinations of sulfate content during construction with timely results for the contractor and the department,” says Bob Boykin, the TxDOT Dallas District field construction engineer who is the project director. “The elimination of the sulfate-induced heave problems in the Dallas District alone could result in an annual savings of \$10.5 million.

Multiply that estimate statewide and the savings could be astronomical according to Herrera. “It’s important that we get the word out so that engineers can make important stabilization decisions during a roadway rehabilitation project and prior to construction during the design phase,” she says. **R**



MORE INFORMATION

Contact Tom Scullion at TTI at (979) 845-9913 or t-scullion@tamu.edu, or Pat Harris at TTI at (979) 845-5845 or pat-harris@tamu.edu.



For more information contact Caroline Herrera at TxDOT at (512) 506-5907 or cherrer@dot.state.tx.us, or Mike Arelleno at (512) 506-5902 or marella@dot.state.tx.us.

HOT Challenges

on Houston's HOV Lanes

While Houston is home to some of the most successful High Occupancy Vehicle (HOV) lanes in the nation, Houston METRO and the Texas Department of Transportation (TxDOT) see the need to continue enhancing their HOV systems to meet the needs of tomorrow.

In 1996, TxDOT, Houston Metro and the Federal Highway Administration (FHWA) sponsored a feasibility study of a high-occupancy toll (HOT) lane on the Katy (IH 10) and Northwest Freeways (US 290). The study, conducted by the Texas Transportation Institute (TTI), resulted in a value pricing demonstration called QuickRide, initiated in 1998.

QuickRide allows two-person carpools (HOV2) to use the HOV lane for \$2.00 per trip, while carpools with three or more persons (HOV3+) and buses use the HOV lane for free. These HOT lanes are the first in Texas and among the first in the United States. However, the current reconstruction of the Katy Freeway, coupled with increasing congestion on both the Katy and Northwest corridors, pose an even greater mobility challenge.

This prompted TxDOT and METRO to enlist the help of TTI to explore additional ways to improve HOV lane utilization and operations. "The assistance TTI provided TxDOT with in exploring additional ways to improve HOV lane utilization and operations was important for meeting Houston's transportation challenges today while preparing to accommodate for the future operation of managed lanes," says Sally Wegmann, director of transportation operations, TxDOT Houston District.

The following outlines some of the improvements and technologies recommended for implementation. The purpose of these measures is to help reduce congestion, move more people, maintain reliable travel times for transit and aid air quality.

Enforcement

METRO is upgrading current enforcement with new technology to better assist police officers in identifying violators in the HOT lane. Additionally, METRO is standardizing policing procedures, providing officer handouts, and distributing letters on the QuickRide program to encourage violators to comply and/or join the program.

Modernizing Equipment

To better operate in the ever-changing construction environment, TxDOT is converting to radar-based overhead vehicle detectors, used to monitor traffic in the lanes, and incorporating wireless communication and solar power.

Toll Collection

The existing automatic vehicle identification system, used to measure speeds for the Internet speed map, is being upgraded to serve as an accurate electronic toll collection system, saving TxDOT and METRO the substantial expense of installing a new toll collection system.

Expanding QuickRide Operations

To maximize the use of HOV lanes while maintaining a faster and reliable travel time, extending the QuickRide operating hours is being considered.

Pricing

Variable pricing is also being considered to manage the traffic volumes on the lane, by monitoring HOT lane congestion and changing tolls to encourage or discourage use. TTI is developing a computer algorithm for TxDOT that takes vehicle counts, computes the appropriate price, and then sends the price to changeable message signs to help manage and maximize traffic flow.

Driver Communications

Drivers need effective signage so they can safely identify if the HOV lane is open, determine the current price, and make a choice of whether to use it or not. Hybrid signs that incorporate both static and dynamic messages are being developed to dramatically improve the quality and timeliness of QuickRide information, including the current price and occupancy requirement.

Public Education

Public education is a critical element in the success of implementing these changes. The public must understand the program and realize the many benefits HOT lanes provide as a travel option. **R**



MORE INFORMATION

For more information, contact Bill Stockton at (979) 845-9947 or bill.stockton@tamu.edu.

More information on QuickRide is available at www.QuickRide.org.

Bridging the Gap Between Box-Beam and Concrete Barriers



A barrier crash test is performed at the TTI Proving Grounds Research Facility.

“I’ll bet I can make it.” Staring at a stretch of flooded roadway, many people have thought that. *“It doesn’t look that deep.”* Some, after flooding their engines and soaking their floorboards, have regretted the attempt. A few may have even lost their lives.

The Texas Department of Transportation (TxDOT) was faced with this very problem along the Winter’s Freeway near Abilene. Before construction contracts could be let, TxDOT had to meet the flood permitting requirements of the Federal Emergency Management Agency (FEMA). The low-lying roadway between two bridges was flooding regularly, stifling traffic flow and impeding economic development.

The need was clear: a longitudinal barrier was needed along the roadway between the two bridges that would 1) minimize median crossover collisions and 2) allow floodwaters to drain off — a rather unique set of requirements. But the Texas Transportation Institute (TTI) had previously tested a similar solution for the Wyoming Department of Transportation and proposed its adaptation here.

“This is a great example of the ‘bang for the buck’ theory,” explains Gene Butth, head of TTI’s Safety and Structural Systems Division and principal investigator on the project. “The Wyoming Box-Beam Median

Barrier was easily adapted for Texas and can further be adapted for other states — ‘develop once, implement many,’ as it were.”

Then came the real challenge: creating a transition piece to connect the box-beam barrier to the concrete barriers on each of the surrounding bridges. Since the 3,000-foot stretch of road bisects a location where serious accidents and deaths had occurred when people either attempted to walk or pedal their bicycles across, time was critical to solve the flooding problem. The solution was discussed, developed and successfully crash tested in less than a year.

Researchers designed a transition piece and tested it under real-world crash-test conditions at TTI’s Proving Grounds Research Facility. Once it passed the safety standards set forth by the National Cooperative Highway Research Program, TxDOT’s Bridge Division immediately put the Wyoming Box-Beam Median Barrier and the Texas Transition piece into the field.

The New York Department of Transportation and other state

DOT’s have plans to implement this approach on their roadways.

“Other state DOTs have asked how we achieved such a quick development time from problem identification to solution,” explains Mark Bloschock, TxDOT’s director on this project. “The answer is simple: the close working relationship of TxDOT and TTI and the absolute trust TxDOT has in TTI’s abilities to meet its needs.”

So confident was TxDOT in TTI that the department did not even require a crash-tested transition be detailed in the initial construction plans. Rather TTI was given the flexibility to let the testing determine the end result, and an innovative solution that can be applied in similar situations across the United States was developed.

When asked if this solution will save lives, Bloschock is confident but philosophical. “We often say in the safety field that we almost never meet people whose lives we’ve saved,” he says, “but we’re certain that we shake hands with them every day.” ■



MORE INFORMATION

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or g-butth@tamu.edu.

Cars that go

BUMP

in the night ... and day



An overpass on State Highway 6 shows the characteristics of a "bridge bump."

Fuh-thoom!

That's one sound you do not want to hear when you are driving over a bridge, but more than likely you have heard it before. It's the sound your car makes when you run over a depression in the roadway. Thank goodness for shock absorbers, right? But what about that burning coffee on your hand....

These days one of the most prevalent and costly road maintenance issues is the "bump at the end of the bridge." In a project sponsored by the Texas Department of Transportation (TxDOT), Texas Transportation Institute (TTI) researchers have developed and implemented new construction standards that minimize this problem.

When the ground settles at a faster rate under one portion of the bridge, the structure begins to bend downward with gravity. This "bump" can not only create convenience and comfort problems, but can also cause safety concerns. "The sudden vertical acceleration experienced by drivers is comparable to that felt by astronauts on the launch pad, albeit of a much shorter duration," explains Jean-Louis Briaud, the research supervisor on the project. In layman's terms, you might want to wear gloves if you plan on drinking that cup of coffee while crossing the bridge.

Of the 40,000 bridges in Texas, approximately 10,000 bridges, or

25 percent, have a bump at the end of the bridge. TxDOT spends \$7 million a year in maintenance to repair them. TxDOT is currently implementing the results of TTI's research in the majority of new bridge projects in TxDOT's Houston District.

"TTI's recommendations are currently being implemented by TxDOT to improve safety and ride quality, and to reduce maintenance expenditures," explains Jon Holt, TxDOT's director on the project.

The solution is twofold: ensuring that backfill used at the bridge site is properly compacted (or supplemented with cement) to minimize soil settling beneath the bridge and creating a single 20- to 40-foot-long slab that spans the bump zone. "By spanning across the bump zone," says Briaud, "we can minimize the structure's reliance on the potentially shifting soil below."

To test the proposed approach during development, TTI researchers created the Bridge to Embankments Simulator of Transition

(BEST) device to simulate the bump problem. BEST works like a merry-go-round — there is a small "car" that drives in a circle, first over a simulated bridge and then over a simulated pavement resting over soil, with the "bump" being where the two meet. This device was integral to testing the proposed approach under simulated conditions without having to implement costly trials on actual bridges.

Like those in Texas, approximately 25 percent of the nation's bridges have this problem. Assuming a per-bridge cost similar to Texas' maintenance costs, the research results could save up to \$112.5 million dollars nationally in annual maintenance costs.

"We'd be glad to talk to any organization in the country about how we can simulate their unique conditions using BEST," says Briaud. "Working together, we can decrease maintenance costs to DOTs nationwide and maybe keep you from scalding your hand with coffee at the same time." **R**



MORE INFORMATION

Contact Jean-Louis Briaud at (979) 845-3795 or briaud@tamu.edu.

Smart Course for Smart GROWTH

Workshops highlight concepts for improving neighborhood design

Smart growth neighborhoods are pretty easy to spot. Often called “livable communities,” these neighborhoods seem to effortlessly offer the permanent resident or daytime shopper a mix of attractive, landscaped neighborhoods, a blend of residential and commercial properties, and a design that promotes walking, bicycling and transit use.

To help share results on the potential benefits of urban smart growth, the Texas Department of Transportation (TxDOT) sponsored a series of workshops in Austin, Arlington, Houston and El Paso. The Austin, Arlington and Houston workshops focused on department and other agency staff, while the El Paso workshop, co-sponsored by the El Paso Metropolitan Planning Organization (MPO), was geared toward elected officials. The workshops were led by Brian Bochner, a senior research engineer at the Texas Transportation Institute (TTI), and Robin Rabinowitz, a TTI assistant transportation researcher.

Andrew A. (Drew) Canon, transportation planner for TxDOT’s Transportation Planning and Programming Division, says exploring smart growth concepts in a workshop setting is an important step toward transferring smart growth research into planning efforts. “The workshops were useful to TxDOT as an implementation project,” says Canon. “They afforded the opportunity for TxDOT employees from various divisions and districts to get together and meet with local planners and government officials to discuss innovative transportation planning options.”

“The workshops provided the opportunity to talk with people and show examples — to discuss the concept of smart growth — rather than just sending out a

report,” says Bochner. “The discussion, amplification and clarification with individuals in the workshop was necessary for a full understanding of the conceptions and misconceptions about smart growth and its relationship to transportation.”

For attendees, the workshops were a catalyst for discussion and cooperation among agencies with differing interests, working toward the common goal of improving development patterns to improve quality of life.

“The Smart Growth Workshop provided elected and appointed representatives and the staffs of member MPO cities with timely information on growth concepts to help them address the double- and triple-digit growth rates

they are experiencing,” says Ricardo Dominguez, transportation planning manager for the El Paso MPO. “City representatives and their staff commented that the smart growth concepts presented can be followed by this area.”

Smart growth developments in Maryland, Oregon, California and Texas served as case study examples that attendees analyzed for smart growth pointers.

A mock case study redesigning an aging downtown to accommodate new development provided participants with the opportunity to apply newly learned smart growth strategies. **R**



MORE INFORMATION

For more information, contact Brian Bochner at (979) 458-3516 or b-bochner@tamu.edu.

The research is documented in Report 4238-1, *Introducing Smart Growth to Texas: Research Report*, and in Project Summary Report 4238-S, *Introducing Smart Growth to Texas: PROJECT SUMMARY REPORT*.

Stemming the tide

Erosion and sediment control classes share best management practices



Workshop example of an improperly installed soil retention blanket.

A gorgeous slide of the Grand Canyon fills the screen in a darkened room, providing workshop attendees with an example of erosion on a magnificent scale. The next slide shows the destructive force of erosion with half a roadway vanished down a muddy hill. Controlling erosion and sediment runoff is the key concept behind Texas Department of Transportation (TxDOT) workshops conducted by the Texas Transportation Institute (TTI).

“Two things came together and prompted us to develop these courses,” says Harlow Landphair, head of TTI’s Environmental Management Program. “First, strict federal requirements were put in place for temporary erosion and sediment control on construction sites. Second, TTI researchers gained a wealth of knowledge about sediment and erosion control in over 10 years of the TxDOT testing program. We recognized the need and developed the course targeted toward TxDOT and other organizations such as the Associated General Contractors and the General Land Office.”

Instructors from TTI have shared best practice environmental regulations with more than 1,000 TxDOT participants. According to Jett McFalls, TTI associate transportation researcher who oversees TTI’s Hydraulics and Erosion Control Laboratory at the Riverside Campus, he and fellow instructors Beverly Storey, TTI associate transportation researcher, and Ming-Han Li, TTI assistant research engineer, will teach more than 1,600 participants before the TxDOT course schedule is completed.

“These courses help us gain a better understanding and knowledge of the technical reasons, methods and legal bases for the TxDOT policy of implementing proper storm water pollution prevention plan (SW3P) practices in our projects,” says Michael Graham, environmental specialist for TxDOT’s Laredo District. “We feel the course explains and reinforces, in the engineering sections especially, the need for proper implementation of SW3P practices in TxDOT projects.”

TTI maintains close contact with TxDOT and the Texas Commission on Environmental Quality (TCEQ), the state’s environmental enforcement and regulatory agency, to ensure the accuracy and timeliness of the course materials. “TxDOT and TCEQ are working closely together on storm water issues,” says Monica Harris, storm water investigation program coordinator for TCEQ. “TCEQ staff benefit from the expertise of TTI researchers, who are nationally recognized researchers in the area of water quality, sediment and erosion control.”

According to McFalls, the workshops build upon the ongoing relationship between TxDOT and TCEQ. The workshops provide an opportunity for TCEQ inspectors to interact with TxDOT engineers and personnel in a more relaxed and congenial setting.

“The ongoing relationship between TCEQ and TxDOT has, with the help of the workshops, been very beneficial,” says Norm King, supervisor of the water resources management branch of TxDOT’s Environmental Affairs Division. “These courses result in increased knowledge on the part of our district personnel in solving and maintaining storm water best management practices.” **R**



MORE INFORMATION
Contact Harlow Landphair at (979) 845-7871 or h-landphair@tamu.edu, or Jett McFalls at (979) 847-8709 or j-mcfalls@ttimail.tamu.edu.

Safety, reasonable access and mobility

Workshops build dialogue and share research concepts



Workshops gave attendees hands-on examples to implement access management techniques.

As part of an implementation project sponsored by the Texas Department of Transportation (TxDOT), the Texas Transportation Institute (TTI) developed and taught statewide access management workshops in the fall of 2003. Access management is the process of providing access to roadways by balancing the need for roadway mobility with access to adjacent land uses.

Bill Frawley, a research scientist at TTI, and Bill Eisele, an associate research engineer at TTI, teamed with Mark Marek, TxDOT's deputy director of design, and Rory Meza, TxDOT's director of roadway design, to conduct 17 workshops for more than 500 attendees throughout TxDOT districts.

The workshop discussion emphasized the opportunity access management affords the districts to work closely with cities to design and improve roadways for better safety and mobility while encouraging future economic development with reasonable access.

"The idea of using workshops as a tool for implementing access management research came about because of the newly adopted *TxDOT Access Management Manual*," says Frawley. "The manual was developed as an outcome of a TxDOT-sponsored research project. The workshops are part of the natural flow from a research project into an implementation project."

According to Marek, the diverse TxDOT perspectives present at the workshops strengthened the course.

"Maintaining long-term safety, mobility and reasonable access are at the forefront of all TxDOT access management efforts," says Marek. "The workshops, which share the research conducted nationally and at TTI, have been a platform for closer working relationships among all TxDOT attendee, and individuals from cities, counties, metropolitan planning organizations and private development interests."

According to Eisele, group discussions and case studies strengthened the learning environment of each workshop. "Personal interaction was key in the workshops," says Eisele. "It is something you cannot effectively convey in a teleconference. For example, by working in groups of four or five individuals on the case studies, participants could ask questions and get feedback from the instructors."

TxDOT participants, which included district engineers, area engineers, right-of-way personnel, transportation planning and development directors, maintenance supervisors and others, emphasized the benefit they gained from the group case studies. Henry R. (Reggie) Richardson, Jr., director of transportation planning and development for TxDOT's Waco District, noted, "The benefit that we gained from attending the course was the reassurance that we were not alone in facing the new access management challenges." **R**



(L-R): Bill Eisele, TTI; Mark Marek, TxDOT; and Bill Frawley, TTI.

MORE INFORMATION

For more information on the workshops, or to contact the researchers: Bill Frawley at (817) 462-0533 or w-frawley@tamu.edu, or Bill Eisele at (979) 845-8550 or bill-eisele@tamu.edu.



For more information about TxDOT's access management manual, contact TxDOT's Deputy Design Division Director Mark Marek at (512) 416-2653 or mmarek@dot.state.tx.us.

To access TxDOT's access management manual visit <http://manuals.dot.state.tx.us/dynaweb/coldesig/acm/>.

Research related to access management guidelines in Texas is documented in Report 4141-1, *Developing Access Management Guidelines for Texas*; Report 4221-1, *Estimating the Impacts of Access Management Techniques: Methodology and Preliminary Findings*; Report 1847-S, *Summary of Access Management Programs and Practices in the United States*; and Report 3904-S, *A Methodology for Determining the Economic Impacts of Raised Medians: Final Project Results*.

Workshops aimed at shrinking travel time, improving safety

Center for Professional Development offers six best practices courses



Putting the word “consortium” in an organization’s title may call to mind a mysterious group of business partners working in windowless offices. But studying the Transportation Research Implementation Consortium for Operations and Management (TRICOM) more closely reveals an open learning environment fit for transportation field personnel, traffic engineers and traffic operations personnel alike.



TRICOM’s main function is to share research sponsored by the Texas Department of Transportation (TxDOT) and conducted at the Texas Transportation Institute (TTI). More than 400 students have attended 25 workshops since the first one was held in TxDOT’s Abilene District in October 2001. Topics of TRICOM workshops include:

- diamond interchange signal timing,
- traffic signal operations near highway–rail intersections,
- beginning CORSIM training (CORSIM is a traffic simulation technology),
- advanced CORSIM training,
- arterial optimization and
- vehicle video detection.

“The benefits of sharing research in a workshop environment are multifaceted,” says Gary Thomas, director of the Center for Professional Development at TTI. “We present the latest research and share what we learned, and we generate discussion among participants. Successful workshops generate discussions, as

professionals with varying years of experience share lessons learned with each other.”

Thomas says the workshops are usually full with TxDOT employees, but sometimes space allows city employees in and around the district to attend. Traffic technicians, field personnel, district traffic engineers and traffic operations staff from TxDOT interact with TTI instructors during the one- and two-day workshops.

“Using workshops to provide training as a result of research is a good way for TxDOT to get information to the user in the field,” says Al Kosik, traffic management section director for TxDOT’s Traffic Operations Division. “These workshops allow us to bring district users into one location and provide comprehensive training based on the results of research. We also try to scatter workshops around the state so that district personnel do not have to travel so far to attend training.”

TTI instructors from College Station, Arlington, Dallas, Austin and San Antonio present the work-

shops using a hands-on learning format. Thomas says using TTI instructors from different areas provides TRICOM with teachers who are familiar with the people, area and transportation issues of regions all across Texas.

A few of the TRICOM workshops are designed to specifically tackle transportation challenges in Texas, but most are not specifically tailored for Texas. Thus, the research topics covered could apply beyond the state.

“Ultimately, the person who benefits most from these workshop is TxDOT’s customers — the public,” says Thomas. “We hope to impart useful information that TxDOT can put out in the field, thus increasing safety and improving travel time. Our ultimate customer is the person driving down the road.” **R**



MORE INFORMATION
Contact Gary Thomas
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g-thomas@tamu.edu.

New director of RTI visits TTI

Rick Collins, the new director of the Research and Technology Implementation Office (RTI) of the Texas Department of Transportation (TxDOT), visited the Texas Transportation Institute March 3. During his visit, he was briefed on a number of TTI programs and facilities. He also made a presentation to TTI staff and responded to questions.

During his remarks to TTI staff, Collins said he believed a research program should

- meet the needs of TxDOT and universities,
- be responsive in a timely manner, and
- be fair and upfront to all universities.

Collins will oversee and direct the development and operation of the department's research, technology implementation and new product evaluation programs. Den-

nis Christiansen, TTI deputy director, indicated that TTI looks forward to continuing to work closely with TxDOT to help make an excellent research program even better.

Collins earned his bachelor's degree in civil engineering in 1981 from Texas A&M University and his master's degree in engineering from The University of Texas at Austin in 1988. He began his career with TxDOT as an engineering assistant in the Design Division. In 1987, he became the safety and programs engineer in the Traffic Operations Division. Collins served as the railroad liaison engineer from 1995 to 1997 and served as the director of the Traffic Engineering Section from 1997 to 2004. ■



The new director of TxDOT RTI, Rick Collins, addresses TTI staff.

Roschke appointment

Paul N. Roschke, professor and interim head of the Department of Civil Engineering at Texas A&M University and associate research engineer with the Texas Transportation Institute, has been named holder of the A.P. and Florence Wiley Professorship.

Roschke came to Texas A&M in 1987 as an assistant professor of civil engineering. From 1983 to 1986, Roschke was an assistant professor at the University of Texas at El Paso and has also taught at The University of California, Davis, and California State University.

Roschke's research interests are in the areas of intelligent structural systems, magnetorheological dampers, finite element theory, numerical methods for plates and shells, and transportation structures.

A registered professional engineer in Arizona, California, New Mexico and Texas, Roschke is a member of the American Society of Civil Engineers and Sigma Xi, and a university member of the Consortium of Universities for Research in Earthquake Engineering.

Roschke was named the Jaycee Outstanding Young Man of America in 1978 and named to the National Dean's List in 1979. The Uni-



versity of Texas at El Paso named him Civil Engineering Professor of the Year, and its College of Engineering awarded him the Outstanding Faculty Award in 1984. Roschke received the Texas Engineering Experiment Station Select Young Faculty award for 1991-92 and was named to Who's Who Among America's Teachers in 1996. Roschke was the Halliburton Professor in the Texas A&M Dwight Look College of Engineering in 1996 and for 2002-03 was the Ruth and William Neely '52/Dow Chemical Faculty Fellow in the college.

Roschke holds a bachelor's degree from Valparaiso University, and master's and doctoral degrees from Purdue University, all in civil engineering. He did post-doctoral research at Ruhr University. ■

Landphair wins award

Harlow Landphair, a research scientist with the Texas Transportation Institute, received the Distinguished Member of the Year award



from the Texas Chapter of the American Society of Landscape Architects (ASLA) April 15. The award, which is given annually in recognition of outstanding professional achievement, was presented at the Texas ASLA meeting in Dallas. ■

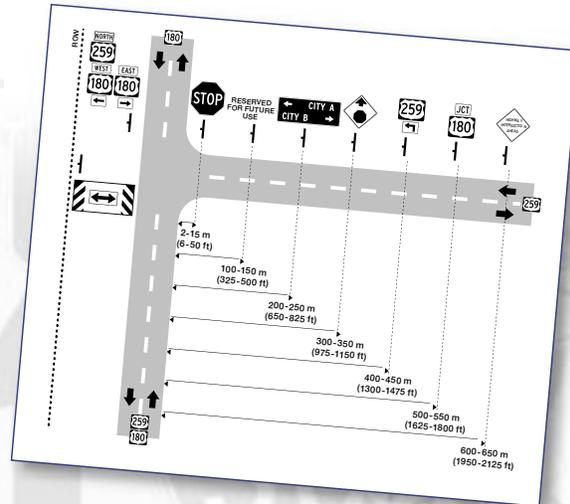
The TxDOT Sign Crew Field Book

Authors: Gene Hawkins, Paul Carlson and Ivan Lorenz

The *TxDOT Sign Crew Field Book* provides field crews with information on sign placement, barrier reflectors and delineation. Content includes

- the field placement of regulatory, warning and guide signs;
- location and placement of object markers, delineators and barrier reflectors; and
- location and installation of mailboxes.

The *TxDOT Sign Crew Field Book* is available from the TxDOT Traffic Operations Division. Contact Jeanne Black at (512) 416-3134 to order a copy of the field book.



“The field book has been very well accepted. Our administration has supported the concept and has referenced it as a primary source for information concerning the placement of signs and roadway delineation.”

Greg Brinkmeyer, engineer of policy and standards at TxDOT Traffic Operations Division

The Pavement Marking Handbook

Authors:
Gene Hawkins,
Tim Gates and
Liz Rose



Developed as part of a TxDOT-sponsored research project focused upon improving the effectiveness of pavement markings in Texas, the *Pavement Marking Handbook* is designed to be a single source of information for anyone involved with pavement markings in Texas. The handbook contains information on pavement marking installation and inspection, and selecting pavement marking materials for various applications.

The *Pavement Marking Handbook* is available online at <http://tcd.tamu.edu/documents/PMH.4150-P1.web.pdf>.

The Freeway Signing Handbook

Authors:
Gene Hawkins,
Garry Ford and
Sue Chrysler



The *Freeway Signing Handbook* was developed as part of a TxDOT-sponsored project focused upon improving the effectiveness of freeway signing in Texas. This handbook is intended to provide TxDOT staff and design consultants with information beyond that contained in the *Texas Manual on Uniform Traffic Control Devices* or the TxDOT Traffic Control Standard Sheets so that freeway signing can be designed and installed in a more uniform manner.

The *Freeway Signing Handbook* is available online at <http://tcd.tamu.edu/documents/FSH.4170-P1.web.pdf>.

Selection of Maintenance Repair Methods of Expansive Subgrades

Author: Stephen Sebesta



The *Selection of Maintenance Repair Methods of Expansive Subgrades* manual, based on research sponsored by TxDOT, is designed to assist TxDOT maintenance section supervisors in the selection of an appropriate maintenance treatment for pavement distresses over expansive subgrade soils. This manual was compiled based upon the responses of a multi-district survey within TxDOT, interviews with district personnel, observations of field performance of various repair methods, and review of existing published guidelines and manuals relevant to pavement rehabilitation.

For more information, contact Stephen Sebesta at (979) 458-0194 or s-sebesta@tamu.edu.

Guidelines for Using Geosynthetics with HMA Overlays

Author: Joe Button



The primary objective of this TxDOT-sponsored research project was to evaluate geotextiles placed under or within a hot-mix asphalt (HMA) overlay to reduce the severity or delay the appearance of reflection cracks. The *Guidelines for Using Geosynthetics with HMA Overlays* is a set of comprehensive guidelines for using geosynthetics with HMA overlays to reduce reflection cracking.

For more information, contact Joe Button at (979) 845-9965 or j-button@tamu.edu.

Flexible Pavement Rehabilitation CD

Author: Tom Scullion



Knowing which field tests to request and correctly analyzing collected data are keys to effective pavement management. The flexible pavement rehabilitation course focuses on tools and strategies that help engineers identify underlying causes of flexible pavement distress, and it looks at some of the equipment used for field tests. Used in the course, the CD helps demonstrate equipment and provides guidelines on how to process data with each of the software packages.

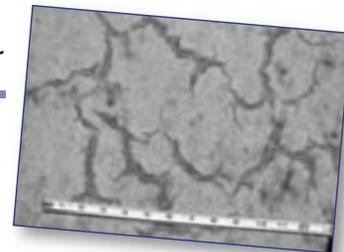
"We are finding that the CD serves as a content refresher for students after they take the flexible pavement rehabilitation course and as a general reference tool."

Andrew Wimsatt, TxDOT Fort Worth District

For more information, contact Tom Scullion at (979) 845-9913 or t-scullion@tamu.edu.

Handbook for Identification of Alkali-Silica Reactivity in Airfield Pavements

Author:
Shondeep Sarkar



The objective of the *Handbook for Identification of Alkali-Silica Reactivity in Airfield Pavements* is to provide step-by-step guidance on how to identify alkali-silica reactivity (ASR) in airfield pavements based on field inspection and laboratory investigation, and then perform ASR distress rating. The handbook has been prepared for airfield engineers and other personnel associated with maintenance of airfield pavements.

For more information, contact Shondeep Sarkar at (979) 845-9966 or s-sarkar@tamu.edu.

THE BACK ROAD



One of the challenges facing any researcher is how to get the results put into practice. It's not enough to do leading-edge research if the end result is a report that sits on a shelf. Over its more than 50-year history, Texas Transportation Institute has earned a reputation for getting state-of-the-art research to those who can implement it by being able to take full advantage of the new knowledge, technology or practice

that came out of a particular project. In recent years, working with our sponsors, we've put added emphasis on speeding up that transition. This issue of the *Researcher* highlights several areas where that implementation emphasis has paid off for Texans.

For example, TTI safety researchers recently helped Texas Department of Transportation (TxDOT) improve a stretch of roadway near Abilene. TxDOT needed help in developing a barrier between two bridges that would minimize median crossover collisions and also allow floodwaters to drain off. Because TTI researchers had previously developed a similar solution for another state, they were able to quickly adapt and test a box-beam median barrier that met TxDOT's needs. The time saved in getting this new application on the highway meant lives as well as money saved.

TTI also assists transportation agencies in managing communications for high-visibility metropolitan projects like the High Five interchange reconstruction in Dallas. A strong and viable public-private partnership was essential to the project's success, so TTI staff helped develop and implement a proactive communication plan that kept all stakeholders involved and aware of the project's progress. TTI's efforts helped to build and maintain the kind of trusting relationships that are so essential to such a project that affects the entire community.

These are just two of many examples of TTI putting research into action or assisting sponsors in a timely and cost-efficient manner. We're proud of our partnerships with TxDOT, Federal Highway Administration and the private sector that enable people all over the nation to benefit from the pioneering research conducted here at TTI.

This issue also includes a report on our TTI Advisory Council, a group of transportation public and private leaders who help guide our research program, and information on the latest distinguished Texans inducted into the Texas Transportation Hall of Fame: Raymond Stotzer and Ray Barnhart.

As always, we welcome your comments about the *Researcher* and look forward to hearing from you if you'd like additional information on any of the subjects in this issue.

Thanks for your continued interest in TTI research.

Researcher

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