

Researcher

VOL. 47 | NO. 4 | 2011

What Next?



1957



2011

Choosing Our Transportation Future

Progress Isn't Always Pretty

On the cover of this issue of the *Texas Transportation Researcher*, you see two very different photographs of the same stretch of road. Taken in 1957, the first shows U.S. Highway 81 as it was known then, leading north into Austin. The cars, what few of them are on the road, are made of steel and chrome. All in all, a quaint portrait of America *on the go* you can still see immortalized in television programs of the time like *The Andy Griffith Show* or *Leave It to Beaver*.

Contrast that with the bottom photograph taken in 2011. It's the same section of road, now part of I-35, but a very different image. Not only do the cars have fiberglass bodies these days, but there are a lot more of them. Note particularly the number of semi trucks in this picture — a sign of economic vitality to some; a symbol of sluggish commuting to others. Progress has its ups and downs.

You might be more personally familiar with the second image, particularly if you live in an urban environment and drive to work every day like the Austinites in the photograph. Mobility — or congestion, as we tend to think of “immobility” — is getting worse in our nation. Those semis

are indeed great indicators of an economy on the move, but of traffic on the move? Not always.

This quarter, our newsletter focuses on what the Texas Transportation Institute (TTI) is doing to help solve the problem of congestion on our roadways. The issue's center spread highlights TTI's *2011 Urban Mobility Report* and its findings that our quality of driving life continues to decline due to increasing traffic demands on a finite transportation system. Paired with this article is a story describing how the Texas Legislature has turned to TTI to work in collaboration with the Texas Department of Transportation (TxDOT) to find solutions to this problem. Dubbed



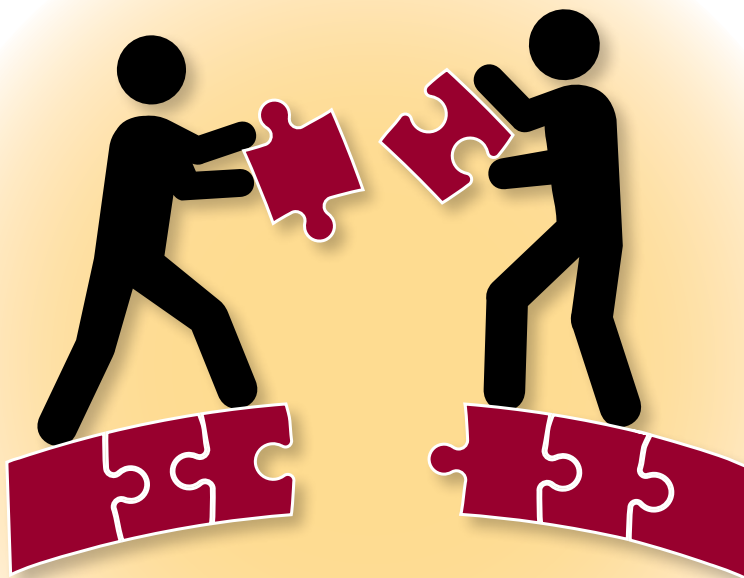
by Dennis Christiansen
Agency Director

the Mobility Investment Priorities study, this new initiative will help prioritize the Lone Star State's most-needed projects aimed at improving how we get from point A to point B.

Specific populations often face unique problems when it comes to mobility. Some rural communities nationwide, particularly those near bigger cities, are seeing rapid growth (resulting in “small town congestion” problems). Other areas, which aren't seeing population increases, are facing commuter challenges related to resident populations growing older. Inside we cover TTI's recent presentation on this topic to the U.S. Department of Transportation.

When a mass evacuation is called for — during a hurricane, for example — mobility can literally be a life or death concern. TTI has developed a prototype design for an urban evacuation model, which is detailed on page 11. We also profile two of TTI's research facilities in this issue: the McNew Laboratory, which tests asphalt mixes, and the Visibility Research Laboratory, which specializes in assessing traffic signs and pavement markings. And last, but certainly not least, getting the word out to practitioners is vital to implementing the Institute's research results. TxDOT's latest tool for doing this is its video summary reports published via YouTube (see page 5).

Looking at those photographs on the cover, it's easy to see how progress sometimes seems to get in its own way. Through research, it's our job at TTI to help progress along by looking past the problem to the solution. We take a broader view and see *beyond* the bigger picture — even when it's a photograph full of bumper-to-bumper traffic. ■





New Texas A&M University System Chancellor John Sharp highlights the achievements of the TTI/TxDOT partnership at Short Course.

We are in the seed-planting process of our modernization effort. This shift in thinking will be a new approach in all of our business aspects. This agency will be better than it is today and [one] that we will all be proud of."

*John Barton,
TxDOT deputy executive director*



TTI Agency Director Dennis Christiansen welcomes attendees to the opening session of Short Course.



FOR MORE INFORMATION
Contact Terri Parker at
(979) 862-8348
or t-parker@tamu.edu.

Transportation Short Course Highlights Change



TxDOT Deputy Executive Director John Barton addresses Short Course.

With a new executive director, chancellor, chairman and commissioner sharing the same stage, *change* was the dominant feature of the 85th Annual Transportation Short Course's opening session. Short Course was held at the Brazos County Expo Complex Oct. 11-12.

Hosted by the Texas Transportation Institute (TTI), the Texas Department of Transportation's (TxDOT's) yearly gathering began with a 10-minute video that discussed the agency's new modernization effort, which includes a different leadership approach, organizational structure and work process.

"We are in the seed-planting process of our modernization effort," TxDOT Deputy Executive Director John Barton told the crowd. "This shift in thinking will be a new approach in all of our business aspects." Barton urged employees to be patient, saying "this agency will be better than it is today and [one] that we will all be proud of."

Phil Wilson, former Texas secretary of state, officially became executive director for TxDOT Oct. 17. "It's incumbent upon us to tell the story of the great work being done and the challenges before us," he said, noting that he will enact some changes within the agency and will have an open-door policy that encourages new ideas from employees.

"Short Course is always a highlight of TTI's year and a visible example of the continuing partnership between TxDOT and the universities," TTI Agency Director Dennis Christiansen said, pointing out that the TTI/TxDOT partnership began over 60 years ago. "[It] remains a model the rest of the country tries to emulate."

In one of his first appearances as the new chancellor for The Texas A&M University System, John Sharp applauded both TTI and TxDOT for the work they do. "It is my pleasure to be with the two finest state agencies in Texas and the country," he said, continuing Christiansen's theme by pointing to TxDOT and TTI as model organizations. "No two agencies in this nation have saved more lives or produced more economic development."

Sharp credited TTI and TxDOT for helping to save his life years ago after a car he was riding in hit a roadside safety device called a sand-filled attenuator. "Speaking as someone who is here because of the work of these two agencies — thank you." ■

Video Summary Reports Catch On

TxDOT Shares Best Practices and Research Results on YouTube

You might not expect to find many folks on YouTube interested in “automated flagger assistance devices” or “development of very thin overlay systems.” But that’s not the case on a newly launched YouTube channel sporting these very titles.

The channel, titled “bestpracticesvrs,” is sponsored by the Texas Department of Transportation (TxDOT) Office of Research and Technology Implementation (RTI) as part of its implementation support and technology transfer of the department’s state- and federally funded research program. To date, after a year online, the channel is experiencing a significant and steady number of hits — considering the limited interest the public generally has in such focused and technical subjects.

What exactly are video summary reports, or VSRs as they have been coined?

“It’s a two- to three-minute video that highlights a best practice from a TxDOT district, a worthwhile research finding, or successful implementation of a new technology,” explains David Dennis, the coordinator of electronic media at the Texas Transportation Institute (TTI). Dennis has worked for the last year with RTI staff, TxDOT research project directors and researchers from TTI, as well as those from other universities participating in the Research Management Committee (RMC) program, to populate the YouTube channel. The results are a variety of transportation topics from all around Texas representing multiple TxDOT districts and universities.

RTI began this technology transfer initiative a few years ago as the social media wave geared up, and YouTube’s popularity spread to the business and corporate world. The first three research-related VSRs were produced on contract by TTI, pilot-tested with a limited internal TxDOT audience and then shared by RTI briefly at a national

U.S. Department of Transportation peer exchange meeting. “The enthusiastic and positive response to the pilot is what led us to expand the effort with more VSRs, and to include best practices, so that districts have a venue for exchanging ideas and solutions to problems,” says Rick Collins, director of TxDOT RTI. “We are getting a lot of good feedback that tells us this is an effective way to deliver a targeted, simple message, and for TxDOT staff to share information and success stories.”

VSRs are unscripted, short, impactful and inexpensive and always involve a TxDOT research project director or employee that has a story to tell. “We don’t tell them what to say — we just shoot the relevant footage and create a clear and interesting message,” says Dennis. “It’s not intended for training or complicated details, but only to pique someone’s interest so they know where to go if they need more information.”

Proof of success for this new technology transfer tool is in the numbers. YouTube statistics over the last three months on selected VSRs reveal that most postings are averaging about three to six

“We are getting a lot of good feedback that tells us this is an effective way to deliver a targeted, simple message, and for TxDOT staff to share information and success stories.”

*Rick Collins,
director of TxDOT RTI*

hits a day, for a total of around 100 hits a month — even a full month or two after the initial posting. With subject matter like effluent limitation and cable median barriers, it’s actually quite phenomenal that the total upload views for the channel now exceed 3,000. ■



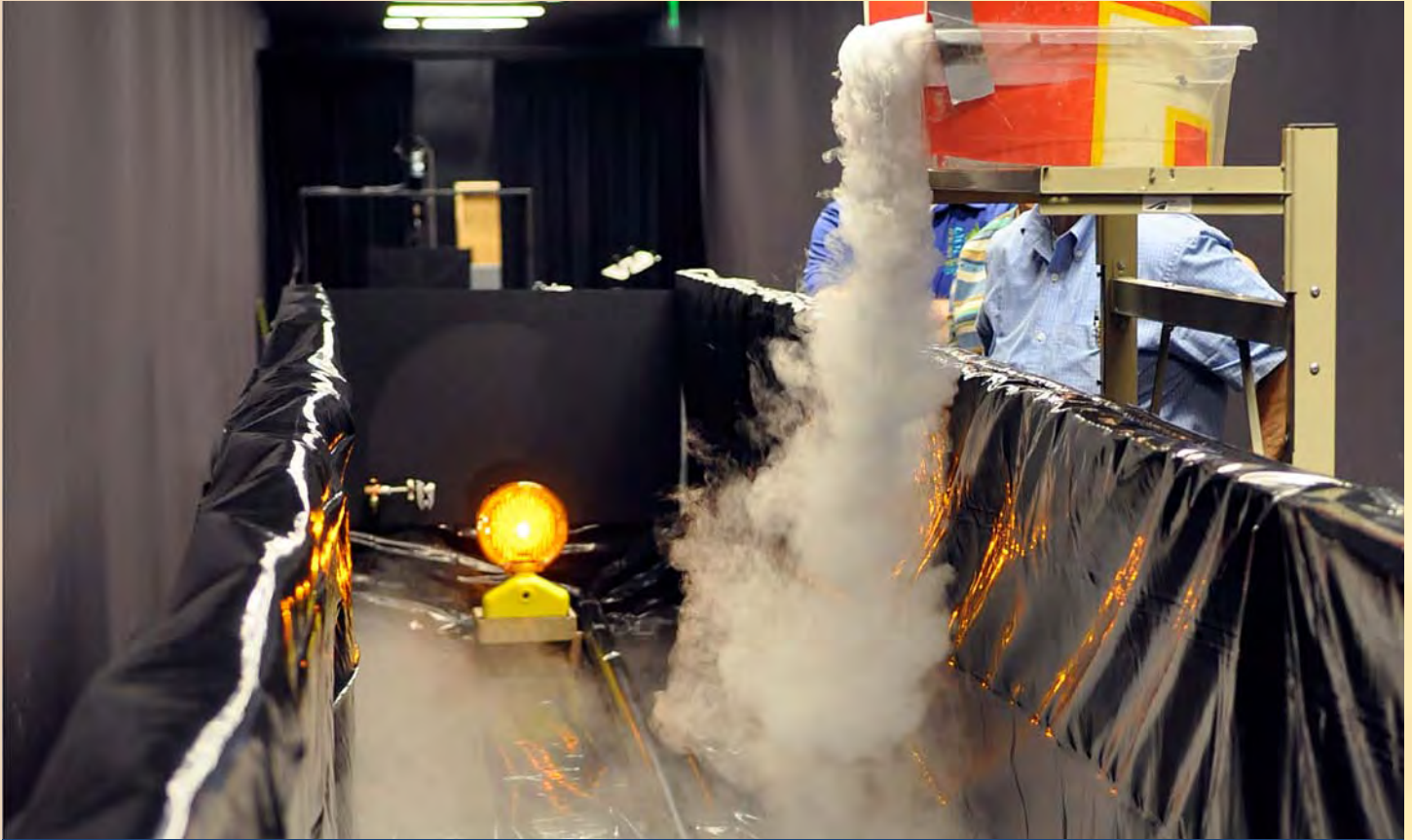
FOR MORE INFORMATION

Contact David Dennis at (979) 845-6513 or david_dennis@tamu.edu.



View more video summary reports on RTI's YouTube channel at www.youtube.com/user/bestpracticesvrs.

TTI's Visibility Research Laboratory Puts Safety in the Spotlight Worldwide



TTI researchers prepare to measure a flashing beacon through a dense fog.

When you're driving, you have to see to be safe. From speed limits to where the roadway curves, traffic signs and pavement markings communicate critical information to help drivers get safely where they're going. But if the signs and markings aren't visible, they might as well not be there at all. And at night, "invisible" signs can be particularly dangerous.

Retroreflectivity refers to the ability of a traffic sign to reflect light back to a driver. The Federal Highway Administration (FHWA) has established minimum sign retroreflectivity, and these standards are being phased in over time. FHWA has also started rule making to add minimum pavement marking retroreflectivity requirements to a future edition of its *Manual on Uniform Traffic Control Devices*. As a result, the Texas Transportation Institute's (TTI's) Visibility Research Laboratory — the only one of its kind in the nation — is quickly becoming the go-to facility for testing how well signs and pavement markings maintain their "sight value" as agencies strive to meet the new standard.

Brightening the Night in Alaska

Keeping drivers safe during winter is a challenge for the Alaska Department of Transportation and Public Facilities (Alaska DOT&PF). In northern climates, where winter maintenance activities such as snow plowing are frequent, retroreflectivity becomes difficult to maintain for road-stripping crews.

"Many northern states are concerned about FHWA's pending minimum pavement marking standards," explains Paul Carlson, head of TTI's Traffic Operations and Roadway Safety Division. "Alaska was proactive in approaching us about helping them figure out if the proposed standards are reasonable for their unique conditions."

TTI recently completed a project for Alaska DOT&PF to determine the visibility of in-service pavement markings along lighted and unlighted highway sections. Researchers compared the visibility of in-service pavement markings to FHWA's proposed minimum pavement marking retroreflectivity levels.

The project team custom-built a specialized piece of data collection equipment consisting of an industrial-quality hand

truck, a regulated switching power supply, a global-positioning system receiver, a photometrically calibrated light source, a laptop computer and a charged couple device photometer.

“We used the Visibility Research Laboratory to design and calibrate the equipment,” says Carlson. “If we didn’t have this facility, it would’ve been almost impossible to build the testing equipment.”

The test sites measured were in compliance with the FHWA proposal for minimum pavement marking retroreflectivity levels.

“We now know that our areas with continuous roadway lighting have more than adequate visibility through contrast and reflectivity provided by highway lighting, despite having low retroreflectivity levels,” says Alaska DOT&PF Central Region Traffic Engineer Scott Thomas.

An American Challenge, a Spanish Solution

Carlson and his team also recently completed testing an automated, mobile sign retroreflectivity measurement system carried onboard an instrumented vehicle. The technology is currently used to measure the visibility of traffic signs in Europe. Spain’s Center for Automotive Research and Development, in cooperation with DBi Services of Hazelton, Penn., has developed the van-mounted technology for testing U.S. road signs.

“Measuring sign retroreflectivity from a moving vehicle has some advantages that you just don’t get from handheld devices,” states Carlson, “not the least of which is the inherent reality testing you get assessing retroreflectivity from, literally, the driver’s seat.”

However, measuring retroreflectivity from a moving vehicle can produce slightly different results when compared to standing at the sign and using a handheld device. Handheld devices are built to specific, standard geometries that can be inconsistent with actual roadway design and sign positioning. Measuring retroreflectivity from a moving vehicle provides the actual geometries that are defined by the roadway and sign position.

In the open-road testing, for example, over 100 signs were evaluated with handheld retroreflectometers and mobile testing. The results showed that in most cases, non-contact measurement equipment — mounted on vehicles, for example — will produce slightly lower results than handheld measurement devices. However, the repeatability of the mobile measurements was within the range of repeatability for the handheld devices.

“The lower mobile measurements actually show the system is probably functioning as it should,” says Carlson. “The mobile measurements are more representative of the nighttime drivers’ experience.”

TTI’s findings also suggest that FHWA should consider establishing minimum luminance (or brightness) values to more accurately assess how visible a sign really is to a nighttime driver. While retroreflectivity values are based on luminance, they also depend on certain assumptions about sign placement and roadway design that might or might not be true outside a textbook.

“TTI was integral to helping us evaluate this technology for application in the United States,” says Louis Fuselier of DBi Services. “We couldn’t have done it without them.”

Helping Drivers See Through the Fog

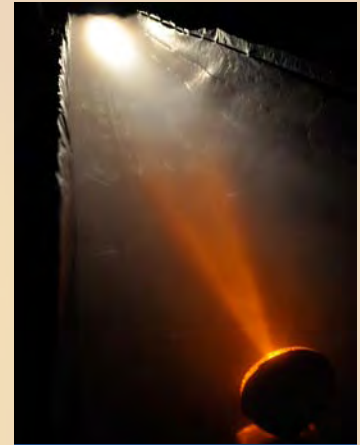
Protecting workers and drivers in a work zone is challenging, especially when nighttime or weather conditions obscure a driver’s vision. The Florida Department of Transportation (FDOT) currently mandates the installation of warning lights in work zones to raise driver awareness at night. But after implementing other improved delineation technologies, FDOT has tasked TTI with evaluating the continued need for warning lights.

Fog is one of the primary weather challenges to seeing clearly while driving, especially at night. For example, turning on your high beams during foggy conditions can actually decrease visibility as the light reflects back from the condensed water vapor (fog) hanging in the air. Associate Research Engineer LuAnn Theiss and her team are looking at how certain weather conditions and maintenance practices impact the value of warning lights in alerting drivers.

“We’ve all experienced driving through work zones in bad weather and having difficulty seeing where we’re going,” explains Theiss. “Instinctively we as human beings know that the better we can see, the safer we can drive.”

Using the lab’s specialized equipment, researchers are actually creating the foggy conditions drivers experience on the road and then quantifying the impacts of the fog on channelizing devices with and without warning lights. When combined with other data collected on the project, the research should indicate whether the continued use of the warning lights provides a significant benefit to drivers.

“Safety is one of the most important aspects of what we transportation engineers do,” says Stefanie Maxwell, specialty engineer with FDOT’s State Construction Office. “TTI’s work will help us determine if we need to continue using warning lights to help keep drivers and workers safe in work zones.”



Light from the beacon is scattered through the fog, reducing the beacon’s visibility.

“Safety is one of the most important aspects of what we transportation engineers do. TTI’s work will help us determine if we need to continue using warning lights to help keep drivers and workers safe in work zones.”

*Stefanie Maxwell,
specialty engineer with FDOT’s
State Construction Office*



FOR MORE INFORMATION

Contact Paul Carlson at (979) 847-9272 or p-carlson@ttimail.tamu.edu, or LuAnn Theiss at (979) 845-9949 or l-theiss@tamu.edu.

MOBILITY STUDY

Traffic Problems Tied to the Economy, Study Says



Even though it's not cited along with monthly job statistics, traffic congestion is a sign of economic prosperity — and it's also a vivid reminder of how it is possible to have too much of a good thing.

In the wake of several consecutive months of U.S. job growth, the Texas Transportation Institute's (TTI's) annual study on congestion suggests that too little progress is being made toward ensuring that the nation's transportation system will be able to keep up with such growth in a revived economy.

TTI's *2011 Urban Mobility Report* illustrates congested conditions from 2010 on a number of national levels:

- The amount of delay endured by the average commuter was 34 hours, up from 14 hours in 1982.
- The cost of congestion is more than \$100 billion, nearly \$750 for every commuter in the United States.
- "Rush hour" is six hours of not rushing anywhere.
- Congestion is becoming a bigger problem outside of rush hour, with about 40 percent of the delay occurring in the midday and overnight hours, creating an increasingly serious problem for businesses that rely on efficient production and deliveries.

The typical commuter feels the impact of congestion in the form of stress and wasted time. But for manufacturers and shippers, that wasted time has a direct bottom-line impact. Efficiency suffers, prices go up, and employment weakens.

"If you invest in roads and transit, you get better service and access to more jobs," says Senior Research Engineer Tim Lomax, one of the study's authors. "Traffic

"The only way U.S. companies have been able to keep their products competitive in the face of increasing traffic congestion and rising transportation costs is to squeeze every ounce of efficiency they can out of their supply chain. But there is a limit to efficiency, and without additional transportation capacity, transportation costs will increase significantly. The result will be higher prices and lost jobs."

*David Ellis,
TTI research scientist*

management and demand management should be part of the mix, too. Generally speaking, mobility investments in congested areas have a high return rate."

That connection was well illustrated in the 1960s, when the nation experienced its longest uninterrupted expansion in history, fueled in part by federal investment in the Interstate Highway System.

The Interstate Highway System grew rapidly from the late 1950s to the mid-1980s, and the U.S. economy grew along with it. Since then, growth in the

interstate system has virtually stopped. "The only way U.S. companies have been able to keep their products competitive in the face of increasing traffic congestion and rising transportation costs is to squeeze every ounce of efficiency they can out of their supply chain," says TTI Research Scientist David Ellis. "But there is a limit to efficiency, and without additional transportation capacity, transportation costs will increase significantly. The result will be higher prices and lost jobs."

The *Urban Mobility Report* uses traffic volume data from the states and traffic speed data from INRIX, a leading private-sector provider of travel-time information. The combination produces a thorough and detailed illustration of traffic problems in 439 U.S. urban areas.

The most economical and effective congestion solutions involve traditional road building and transit use, combined with traffic management strategies such as signal coordination and rapid crash removal, and demand management strategies like telecommuting and flexible work hours. Land use and development patterns can play a positive role, as well.

"The solution mix may be different for each city, but the one thing they all share in common is urgency," Lomax says. "If we want a strong economy, doing nothing is not a productive option." ■



FOR MORE INFORMATION

Contact Tim Lomax at
 (979) 845-9960 or
 t-lomax@tamu.edu.

RIDER 42

Legislative Action Focuses on Highest-Priority Mobility Needs

Traffic congestion problems in Texas are nothing new. What is new is the approach being taken by state leaders in their efforts to address them.

In May, the 82nd Texas Legislature set aside \$300 million to “acquire right of way, conduct feasibility studies and project planning, and outsource engineering work for the most congested roads in each of the four most congested regions of the state.” As part of that goal, the Texas Legislature directed Texas Transportation Institute (TTI) to be a facilitator and coordinator of studies designed to:

- determine which projects will offer the greatest results in congestion relief, economic benefits, user costs, safety and pavement quality;
- identify funding options to support the projects and suggest the best use of future revenues for the projects;
- ensure that the best practices in traffic management and demand management are getting the most efficient possible use of the current roadway system;
- ensure open and transparent public participation; and
- make recommendations to the Texas Department of Transportation (TxDOT) at major decision points.

TTI’s Mobility Investment Priorities (MIP) study is designed to get the state’s highest-priority roadway projects moving. Those projects are drawn from TxDOT’s 100 Most Congested Roadways list. The purpose of the study is to complement — but not to replace — efforts already underway by local agencies.

The TTI team conducting the MIP study is led by Senior Research Engineer Tim Lomax and includes co-principal investigator David Ellis, Executive

Associate Director Bill Stockton and Senior Research Scientist Cathy Reiley. Local efforts in Austin, Dallas-Fort Worth, Houston and San Antonio are led by experienced researchers in each of the metro areas. Further support is provided by subject matter experts in traffic and demand management, as well as public engagement and communication. The

specialty list runs the gamut from signal operations to social media. Shannon Crum of TxDOT’s Transportation Planning and Programming Division is coordinating the MIP effort with a variety of other projects, programs and planning efforts.

“What the legislature has directed us to do involves a different approach to project development,” says Lomax. “That’s because many

of the needed projects are so big that they don’t readily fit into the traditional and financially constrained regional planning process. TTI’s work on this study is designed to augment that process.”

The MIP study is one element in a \$3 billion appropriation — outlined in Rider 42 of the state budget — that also provides for other mobility needs, bridge improvements, statewide connectivity projects and maintenance, rehabilitation, and safety needs.

“Traditional revenue sources for transportation have been stretched to their limits in recent years,” says Stockton. “And the more severe this funding shortage becomes, the more important it becomes to invest those limited dollars in the most effective way possible. The MIP study is designed to help the state ensure that effectiveness.”

“Traditional revenue sources for transportation have been stretched to their limits in recent years. And the more severe this funding shortage becomes, the more important it becomes to invest those limited dollars in the most effective way possible. The MIP study is designed to help the state ensure that effectiveness.”

*Bill Stockton,
TTI executive associate director*



FOR MORE INFORMATION
Contact Bill Stockton at
(979) 845-9947 or
stockton@tamu.edu.



Our Changing Rural Areas

Facing the Challenges That Lie Ahead

Rural communities like Eustace, Texas, face unique mobility challenges in the 21st century as they continue to grow and their resident demographic continues to skew upward in age.

The United States continues to face population increases and changing demographics. This trend is particularly true in Texas, where the population boom of the past 10 years has resulted in a rapid urbanization of rural areas. At the same time, some rural parts of the state have experienced population decreases.

This trend has become a hot topic for transportation planners seeking to find proactive solutions for transit in rural America, the theme of a recent presentation by Texas Transportation Institute (TTI) Transit Mobility Program Manager Linda Cherrington. On Aug. 17, Cherrington spoke to representatives from the U.S. Department of Transportation (U.S. DOT) about challenges and opportunities for transit in

rural America. The lecture was sponsored by the U.S. DOT Research and Innovative Technology Administration as part of the Transportation Innovation Series. The opportunity was facilitated by Melissa Tooley, director of TTI's University Transportation Center for Mobility.

"There is still a two-pronged challenge to transit in rural America," says Cherrington. "One is that there are parts of rural America that are growing in

population, particularly around metropolitan areas. Transportation planners face a new set of challenges in meeting their needs. The other side of the coin is that there are areas that are not increasing in population, but where the population continues to age. People in these areas tend to become more isolated but still have travel needs for basic activities. Rural transit providers have to deal with both issues."

According to Cherrington, Texas is an ideal case study because the state's recent population trends match that of the United States.

"Texas has rapidly growing urban centers such as the I-35 corridor, and then we have large areas that are losing populations," says Cherrington. "We have done a lot of research that is Texas focused but can be applied on a national level."

In her presentation, Cherrington noted the opportunities for transit, which include:

- providing basic mobility options — increasingly important for an older population,
- providing a link between workers and rural-area industries,
- pooling resources to more efficiently serve a given region and prevent service duplication, and
- using transit to provide access to the diverse array of opportunities found in urban areas to those living in rural communities.

To view a webcast of Cherrington's presentation, visit <http://mediasite.yorkcast.com/webcast/Viewer/?peid=40833c39bea6443a997901e6b8315de01d>.



Rural transit in isolated communities helps the elderly, often unable to drive themselves, get where they need to go.



FOR MORE INFORMATION
 Contact Linda Cherrington
 at (409) 740-4734 or
 l-cherrington@tamu.edu.

Prototype Design for a Predictive Model to Improve Evacuation Operations



This summer, many Texans may root for storms in the Gulf of Mexico to find their way to Texas. While area government officials would no doubt welcome the rainfall, past experiences involving mass evacuations along the Texas coast have taught them to be prepared for a difficult challenge should a hurricane hit.

Researchers at the Texas Transportation Institute (TTI) recently concluded a three-year project that produced a prototype design for an evacuation model for urban areas to use in the event of a threatening hurricane.

Sponsored by the Federal Highway Administration and the Texas Department of Transportation, the research was performed cooperatively with the University of Houston.

“We had a large, diverse panel that was very helpful in assisting us with our case study of the Houston-Galveston region,” says TTI Senior Research Engineer Russell Henk. “This region represents the most complex evacuation scenario. If we can make our model work here, we can make it work along the entire Texas coast.”

According to Henk, one of the more notable challenges is the decision-making process related to calling for contraflow operations on strategic evacuation routes. (Contraflow operations convert all roadway lanes into a single direction to facilitate evacuation.)

“Implementing contraflow operations is an expensive, resource-intensive undertaking,” says Henk. “Consequently, key operating agencies (and decision makers) involved in such

deliberations are understandably hesitant to call for contraflow operations unless there’s strong evidence of the need to do so.”

The prototype model involves a number of inputs such as strength and size of the storm, human factors, and traffic conditions (both real time and predicted).

“The traffic simulation model we developed was the largest of its kind anywhere to date and essentially modeled the eastern portion of Texas, from the Houston-Galveston coastal area all the way inland to San Antonio, Austin and Dallas,” says Henk. “Running a simulation model that size takes a full day to run a scenario. It’s obviously a massive undertaking.”

Even though Henk says the goals of the project were met, there is still work to be done. “While this was a good starting point, and several scenarios (such as Hurricane Rita and Hurricane Ike) were selected to simulate past hurricane-evacuation scenarios, these events are rarely similar,” says Henk. “A much broader range of scenarios will need to be developed and examined before there’s a reasonable level of confidence that the new tool can be used on a widespread basis.” ■



FOR MORE INFORMATION

Contact Russell Henk at (210) 979-9411
or r-henk@tamu.edu.

Saving Time, Money and Resources



TxDOT sees immediate benefits in corridor analysis projects and new lab equipment at TTI

TTI researchers are conducting a corridor analysis study on I-10 in the Odessa District.

Many roadway segments on Texas highways have exceeded their design lives and are in need of rehabilitation. To assist in this critical task, the Texas Department of Transportation (TxDOT) contracted with the Texas Transportation Institute (TTI) to initiate a groundbreaking corridor analysis project on the I-20 corridor in the Odessa District.

“This corridor studies project is really an in-depth analysis of the existing pavement structure,” says Bryan Raschke, director of operations with the TxDOT Odessa District. “The process looks at the durability and deterioration level of the pavement. Then we can look at that and apply new strategies to roadway reconstruction.”

The research team initially conducted a full ground-penetrating radar survey. Then, after meeting with district personnel to discuss roadway history and priorities, the team executed a falling weight deflectometer test program to evaluate the in situ structural strengths and conducted a verification field-sampling program. For each section, the cause of the distress, the most appropriate repair strategy and the priority of the work were reported to senior district personnel.

“The length of the roadway was 165 miles and consisted of 20 different pavement sections, each with different layer thicknesses and maintenance histories,” says Tom Scullion, the

senior research engineer at TTI leading this effort. “The goal of the study was to develop a 10-year pavement rehabilitation plan for each section based on determining the underlying cause of the pavement problems.”

“A corridor study is a tool that can be used by any of the districts out there. It’s looking at what’s there, where the problems are, and just how deep we need to dig to get down to the root of the problem. Then we can address it with a product that will last another 20 years.”

*Bryan Raschke,
director of operations with the
TxDOT Odessa District*

Raschke echoes Scullion’s proactive rehabilitation approach and notes that it has already yielded positive results by allowing district personnel to plan repairs for specific roadway sections.

“A corridor study is a tool that can be used by any of the districts out there,” says Raschke. “It’s looking at what’s there, where the problems are, and just how deep we need to dig to get down to the root of the problem. Then we can address it with a product that will last another 20 years.”

Based on the success of the I-20 project, additional corridor analyses have been completed for I-10 in the Odessa District, US 60 and US 84 in the Lubbock District, and I-45 in the Bryan District. In each study the corridor is broken into projects, and their optimum rehabilitation needs and priorities identified.

The TTI team is currently evaluating the US 59 corridor in the Lufkin District and I-37 in the San Antonio District. This innovative interagency agreement is being directed by TxDOT Pavements and Materials Manager Magdy Mikhail. ■



FOR MORE INFORMATION

For more information on corridor analysis or the McNew Laboratory equipment, contact Tom Scullion at (979) 845-9913 or t-scullion@tamu.edu, or Cindy Estakhri at (979) 845-9551 or c-estakhri@tamu.edu.

McNew Research Laboratory

The Materials and Pavements Division's McNew Research Laboratory has recently added several new pieces of asphalt testing equipment.

Work over the past 10 years has focused on traditional evaluations of both rutting and cracking potential. The new test provides TTI researchers with additional tools to optimize future surfacing designs.



The rubber wheels inside the cage of the three-wheeled polishing device rotate around a test slab of asphalt.

"Our goal is to develop asphalt mixes that optimize friction and decrease roadway noise," says TTI Recyclable Materials Program Manager Cindy Estakhri. "This equipment allows us to conduct testing in a controlled environment to help us achieve that goal."

The first step in the process is to manufacture 22-by-22-inch slab samples using a rolling wheel compactor. These samples can be made from either lab- or plant-produced samples and compacted to the same density as that anticipated in the field.

Three-Wheeled Polishing Device

This device is an automated hot-mix asphalt slab polisher that consists of three pneumatic rubber tires attached to a turntable. The wheels rotate around a circle with an 11.2-inch diameter. The device is also equipped with a water spray to simulate wear from rainfall coupled with tire wear.

In a typical test, 100,000 applications of the tires are applied. During testing the researchers measure the resulting surface friction loss and change in surface texture using the Circular

Track Meter and Dynamic Friction Tester. Aggregate and mix combinations that have a tendency to polish under wheel loads are readily identified with this test procedure.

Circular Track Meter (CTM)

The CTM is a laser-based device used to measure the depth of a pavement surface. It uses a charged coupled device laser to trace the profile of a circle 11.2 inches in diameter, the same size as the three-wheeled polishing device. The profile is divided into eight segments, and the texture depth of the surface is reported as the average profile depth of these eight segments.

Impedance Tube

The impedance tube is used to measure roadway noise. The tube is placed on top of a test section; then a white noise pulse is sent down the tube, and the resulting "echo" is measured.

"What we are looking for during this test is how quiet the roadway is," says Estakhri. "A certain percentage of voids on the surface of the asphalt test section is desirable to absorb the noise, rather than reflect it." Quiet roadway surfaces are a major concern especially in big cities where often the U.S. Department of Transportation is forced to build very expensive noise walls to mitigate the traffic noise problems. TTI researchers are busy formulating the next generation of low-noise, long-lasting permeable pavement surfaces. The laboratory impedance tube will be a major tool in this design process.

Dynamic Friction Tester (DFT)

The DFT consists of three rubber sliders and a motor that reaches 100 km/h tangential speed. The DFT system can be used to measure friction characteristics of laboratory manufactured samples. The test is started while the rotating disk is suspended over the pavement and driven by a motor to a particular tangential speed.

Water is sprayed on the rubber pad and pavement interface through surrounding pipes to simulate wet weather friction. Then the disk is lowered, and the motor is disengaged. Researchers determine surface friction by measuring the traction force in each rubber slider. Studies at TTI have found that by combining the CTM and DFT data, it is possible to accurately predict the friction in the field that would be measured by an ASTM skid trailer.



The impedance tube is placed on top of a test slab of pavement and measures noise.

Scullion Is Regents Fellow

Internationally known pavement innovator and TTI Senior Research Engineer Tom Scullion was honored with a Regents Fellow Service Award by The Texas A&M University System Board of Regents Nov. 3. The award is the highest honor given by the regents, recognizing employees who have made exemplary contributions to their agency and Texans.

After a 31-year career with TTI, Scullion is responsible for numerous pavement-related inventions, designs, procedures and software that have enhanced the safety and performance of highways. His innovations have saved lives and taxpayer dollars by extending pavement life and improving maintenance procedures for highways around the world. ■



Left to right: Board of Regents Chairman Richard Box, Tom Scullion, Penny Scullion and Board of Regents Vice Chairman Phil Adams.

TTI and PAHO to Collaborate on Roadway Safety Research

The Pan American Health Organization (PAHO), a regional office of the World Health Organization (WHO), and TTI have partnered to collaborate on roadway safety research.

TTI's discussions with PAHO first began in 2007, when the organization expressed an interest in the Teens in the Driver Seat (TDS) program. Because vehicle crashes rank as the number-one cause of death for people under age 25 worldwide, PAHO has a strong interest in roadway safety improvements.

The two institutions will jointly pursue research and program opportunities related to roadway safety. The first venture will be to conduct a binational pilot project in which young drivers in Ciudad Juarez will be introduced to the TDS concept, with TDS students in El Paso being directly involved. ■



Back row (left to right): TTI's Bernie Fette and Russell Henk; PAHO/WHO Health Promotion and Family Health Technical Officer Gustavo Iturralde; and TTI's Irene Rodriguez and John Mounce. Front row (left to right): Chief of the PAHO/WHO U.S.-Mexico Border Office Maria Teresa Cerqueira, TTI's Dennis Christiansen and PAHO/WHO Road Safety Advisor Eugenia Maria Rodrigues.

TTI Receives Prestigious ARTBA Glass Hammer Award



Photo courtesy of ARTBA

Melissa Tooley, TTI director of external initiatives, receives the Glass Hammer Award from Bill Cox, chairman of ARTBA.

TTI has been recognized nationally with the Glass Hammer Award for its promotion of women leaders within the Institute and the transportation industry. The award was presented Sept. 7 at a gala dinner honoring the 2011 American Road and Transportation Builders Association (ARTBA) Transportation Development Hall of Fame and the inaugural Women Leaders in Transportation Design and Construction Awards.

The Glass Hammer Award honors organizations in the transportation

industry that have innovative programs and activities directed at successfully promoting women leaders. TTI received this recognition because of innovative diversity activities that have resulted in dramatic increases in its female workforce during the last decade, as well as its active promotion of women in leadership positions in national and statewide organizations.

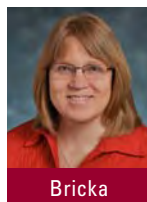
"This award illustrates that TTI's many efforts to grow and promote our female professionals are being recognized by our peers nationally," said Dennis Christiansen, agency director of TTI. "Women are influential at every level in TTI and are contributing significantly to the Institute's success and reputation. I couldn't be more proud of them and of our organization for earning this special honor." ■

Transportation Research Board Appointments

Research Scientist Stacey Bricka — named chair of the Task Force on Understanding New Directions for the Future of the National Household Travel Survey (NHTS).

Division Head Joe Zietsman — named chair of the Transportation and Sustainability Committee.

Assistant Transportation Researcher Matt Sandidge — named to the Technical Activities Council Young Members Council. ■



Bricka



Zietsman



Sandidge

Teens in the Driver Seat Honored with GHSA Award

TTI's Teens in the Driver Seat program has been honored with a 2011 highway safety award from the Governors Highway Safety Association (GHSA).

The Peter K. O'Rourke Special Achievement Award "recognizes notable achievements in the field of highway safety by individuals, coalitions, organizations, nonprofit groups, businesses, government agencies, universities or programs." The award was presented to the Texas Department of Transportation's (TxDOT's) Director of Traffic Safety Terry Pence during a ceremony in Cincinnati, Ohio, Sept. 27. TxDOT has supported the program since its creation in 2002.

In pointing out the accomplishments of the program, the GHSA news release stated, "TDS has had a strong positive impact in Texas, and its influence is beginning to be felt in other states. Since the program's inception in 2002, Texas has seen a 40 percent decrease in the frequency of teen drivers involved in fatal crashes."

Russell Henk, director of the Teens in the Driver Seat program, has also recently accepted a nomination to the GHSA/State Farm Teen Driving Expert Panel. The panel was formed to oversee a GHSA case study on teen driving. State Farm Insurance has been a sponsor of the program since 2007. ■



Henk

Poe Named TextITE Engineer of the Year, Vice Chair of ITS America's Connected Vehicle Task Force



Christopher Poe, assistant director at TTI, was awarded the 2011 Transportation Engineer of the Year Award by the Texas District of the Institute of Transportation Engineers (TextITE) Sept. 14-16. The award recognizes TextITE members for outstanding practice, teaching or research of the science and art of transportation engineering in Texas.

Poe was also named vice chair of ITS America's Connected Vehicle Task Force, which focuses on technical and institutional issues related to the deployment of short-range vehicle-to-vehicle, vehicle-to-infrastructure and vehicle-to-device (V2X) applications. V2X technology or "WiFi on wheels" is the next major step in improving highway safety and transportation mobility and convenience. Poe will support the task force and represent the needs of infrastructure operators. ■

For more information about these news items or other media inquiries regarding TTI research, please contact Rick Davenport at (979) 862-3763 or r-davenport@ttimail.tamu.edu.

Houston TranStar Wins National Award

Houston TranStar, which provides transportation management and emergency management services, and TTI have collaborated for decades to improve traffic management to the Greater Houston Region. TranStar has received the 2011 Digital Government Achievement Award from the Center for Digital Government for TranStar's cutting-edge anonymous wireless address matching travel-time information system. The Center for Digital Government is a national research and advisory institute on information technology policies and best practices in state and local government.

The new deployment, extending north more than 200 miles along the I-45 North corridor to Dallas, gives Houston TranStar the capability to monitor and manage traffic conditions on this major evacuation route.

"Houston TranStar's monitoring system on I-45 between Houston and Dallas allows us to provide travel information during both evacuations and for day-to-day use at a fraction of the cost of other technologies," said John R. Whaley, director of Houston TranStar. "Because of the incredible cost savings involved, this technology is a game changer in travel monitoring — whether for emergency management or daily commuting." ■

McLane, Lindsay Inducted into Texas Transportation Hall of Honor

Noted Texas business leader Drayton McLane Jr., a pioneer in modern transportation logistics, and Jon Lindsay, a strong political leader and advocate for transportation for over 30 years, were inducted into the Texas Transportation Hall of Honor in September and October, respectively.

During his tenure as president and CEO of the McLane Company, McLane played a key role in retailing giant Walmart's entry into the grocery business. His technology-driven focus on distribution logistics helped Walmart become the largest grocery retailer in the world in less than 10 years.

"Drayton McLane deserves recognition as one of the most visionary transportation leaders in this state and country," TTI Agency Director Dennis Christiansen said. "He wrote the book on distribution and logistics."

As both a county judge and state senator, Lindsay initiated a number of innovative transportation projects, including the Harris County Toll Road Authority and the initiative to create freight rail districts with eminent domain authority and the ability to issue bonds. "Jon was a key member of the so-called 'super group' that gave unprecedented priority and leadership to transportation in this region," said Christiansen. "He made the Harris County toll road system a reality." ■



Left to right: TTI Agency Director Dennis Christiansen; Drayton McLane; Scott McClelland of HEB; and Jeff Moseley of Greater Houston Partnership.



Left to right: Steve Lindsay (son); Tony Lindsay (wife); Chairman and CEO of Williams Brothers Construction Co., Inc., Doug Pitcock; Jon Lindsay; Dennis Christiansen; L. Jon Lindsay (son); and President and CEO of Jones and Carter, Inc., Bob Jones.

Harris Receives ITS America Award

Bill Harris, former Texas Transportation Institute associate director and holder of the E.B. Snead Endowed Chair in Transportation Engineering in the Texas A&M University Zachry Department of Civil Engineering, is the recipient of an ITS America Hall of Fame Award. Harris, a pioneer in the area of rail research, was instrumental in advancing intelligent transportation systems.

The Hall of Fame award recognizes individuals who are considered champions of technology in transportation. TTI Executive Associate Director Katie Turnbull accepted the award on behalf of Harris and TTI at the ITS World Congress in Orlando, Fla., Oct. 17, 2011. ■



Photo courtesy of ITS America.

TTI Executive Associate Director Katie Turnbull accepts the ITS America Hall of Fame Award on behalf of former TTI Associate Director Bill Harris.

**»» TEXAS TRANSPORTATION INSTITUTE
Publications****TECHNICAL REPORTS**

Development of Precast Bridge Deck Overhang System: Technical Report, by David Trejo, **0-6100-3**, August 9, 2011.

Field Evaluation of Asphalt Mixture Skid Resistance and Its Relationship to Aggregate Characteristics, by Eyad Masad, **0-5627-3**, September 14, 2011.

Framework for a Comprehensive Bridge Management and Information System, by Cesar Quiroga, **0-6389-1**, November 11, 2011.

It's About Time: Investing in Transportation to Keep Texas Economically Competitive, by David Ellis, **0-6666-TTI-1**, August 11, 2011.

Lane Assignment Traffic Control Devices on Frontage Roads and Conventional Roads at Interchanges: Technical Report, by Alicia Nelson, **0-6106-1**, November 22, 2011.

A Portable Toolbox to Monitor and Evaluate Signal Operations, by Srinivasa Sunkari, **0-6177-1**, October 17, 2011.

Prototype Design for a Predictive Model to Improve Evacuation Operations: Technical Report, by Russell Henk, **0-6121-1**, August 29, 2011.

Signing Strategies for Low-Water and Flood-Prone Highway Crossings, by Kevin Balke, **0-6262-1**, November 14, 2011.

Traffic Signal Operations Handbook Workshop Series: Final Report, by Mike Pratt, **5-5629-01-1**, October 25, 2011.

White Paper: State of ITS Industry and Assessment of Project Types, Ed Seymour, **0-6672-1**, November 22, 2011.

**PROJECT SUMMARY REPORTS
AND PRODUCTS**

Analysis of Roadway Departure Crashes on Two-Lane Rural Roads in Texas, by Dominique Lord, **0-6031-S**, October 4, 2011.

Characterization of Exhaust Emissions from Heavy Duty Diesel Vehicles in the HGB Area, by Joe Zietsman, **0-6237-S**, October 17, 2011.

Development of Pedestrian Safety Based Warrants for Protected or Protected-Permissive Left Turn (PPLT) Control, by Jim Bonneson, **0-6402-S**, August 24, 2011.

Evaluation of Modern Traffic Control Devices to Improve Safety at Rural Intersections, by Kay Fitzpatrick, **0-6462-S**, October 5, 2011.

Evaluation of Overweight Load Routing on Buried Utility Plant, by Edgar Kraus, **0-6394-S**, November 14, 2011.

FDR (Full-Depth-Reclamation) Performance-Based Design, Construction and Quality Control, by Tom Scullion, **0-6271-S**, August 11, 2011.

It's About Time: Investing in Transportation to Keep Texas Economically Competitive: Executive Summary, by David Ellis, **0-6666-TTI-2**, August 11, 2011.

Pedestrian Safety Treatments for Signalized Intersections, by Jim Bonneson, **0-6402-P3**, November 9, 2011.

Positive Feedback: An Examination of Current Approaches in Iterative Travel Demand Model Implementation, by Phillip Reeder, **0-6632-S**, November 14, 2011.

Prototype Decision-Making Software (Web-Based), by Russell Henk, **0-6121-P1**, November 28, 2011.

RAS Workshop: State of Practice in Texas, by Fujie Zhou, **0-6614-P1**, November 7, 2011.

Roadside Safety Device Crash Testing Program, by Roger Bligh, **9-1002-S**, November 29, 2011.

Skid Analysis of Asphalt Pavement, by Eyad Masad, **0-5627-P1**, September 14, 2011.

Synthesis of TxDOT Uses of Real-Time Commercial Traffic Routing Data, by Dan Middleton, **0-6659-S**, November 3, 2011.

System Operation and Preservation Optimization, by Tim Lomax, **0-6655-TI-S**, August 16, 2011.

Traffic Signal Operations Handbook — Second Edition, by Jim Bonneson, **0-6402-P1**, November 10, 2011.

Traffic Signal Operations Handbook: Workshop Training and Instructor Guide, by Jim Bonneson, **5-5629-01-P1** and **5-5629-01-P2**, November 15, 2011.

Transportation Reinvestment Zone Training Materials, by Sharada Vadali, **0-6538-P1**, October 20, 2011.

Unknown Foundation Determination for Scour, by Jean-Louis Briaud, **0-6604-S**, November 14, 2011.

TTI PUBLICATIONS

A full catalog of TTI publications and other products is online at <http://tti.tamu.edu/> publications. You can find the publications by searching for either the title or publication number listed here. Most of these publications are available as free downloads in portable document format (PDF).

Printed, bound versions of these reports are also available through the URL above.