

# Researcher

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## ***DOLLARS AND SENSE***

TTI, Transportation and the Economy

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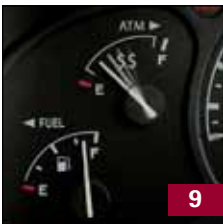
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 Stacy Schnettler

**PHOTOGRAPHER**  
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**PROOFREADERS**  
 Michelle Benoit  
 Beverly Gracia

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by Dennis Christiansen  
Agency Director

# Bringing Balance to Transportation Finance

*What It Takes Is Dollars and Sense*

**G**etting where you're going costs money. Whether that's bus fare, filling up your gas tank or keeping our transportation system operational, it all costs money. And it's getting more expensive. How much we pay at the pump might be the most visible reminder that transportation isn't free, but it's not the only reminder.

Recently, Texas Transportation Commission Chair Deirdre Delisi asked Texas' 2030 Committee to take another look at our state's transportation needs. (The original committee produced a 2008 report projecting needs through 2030.) The revised version gets more specific by examining the cost/benefit ratio of investing now in efforts to address the effects of increased population and failing infrastructure through 2035.

Essentially, the revised report concludes that the longer we wait to mitigate those problems, the more we'll pay in the end. That future cost could come through monumental maintenance expenses, increased prices for goods in stores (costs passed along by manufacturers using a substandard transportation system to get their goods to market), lower quality of life (less time spent with family, more time spent in traffic) or jobs moving out of state.

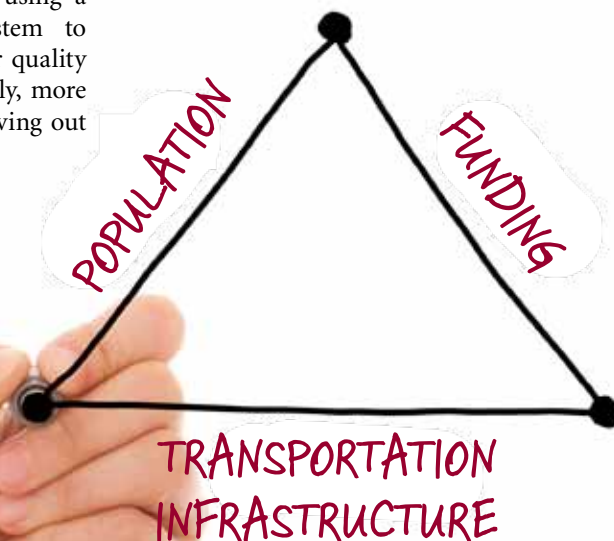
In this issue of the *Texas Transportation Researcher*, we tell you more about this latest call to action from the 2030 Committee. We also tell you how the Texas Transportation Institute (TTI) is helping our sponsors be more accountable to the citizens of Texas. For example, TTI recently helped the Texas Department of Transportation (TxDOT) create a customer satisfaction program to better assess how Texans view TxDOT's performance. And our assessment of the Loop 410 expansions in San Antonio will help TxDOT better plan improvements in other urban areas to get the best bang for the taxpayer's buck.

Essentially, the revised report concludes that the longer we wait to mitigate those problems, the more we'll pay in the end. That future cost could come through monumental maintenance expenses, increased prices for goods in stores (costs passed along by manufacturers using a substandard transportation system to get their goods to market), lower quality of life (less time spent with family, more time spent in traffic) or jobs moving out of state.

We've also been abroad teaching road design courses in Kosovo to help our global neighbors improve their own transportation systems. At home we're assisting TxDOT and other sponsors to improve how they maintain the roads with software like FPS21 and techniques like PANDA. The longer the roads stay in one piece, the less they cost over time, and we're sharing those lessons learned with other states to help them plan more sustainable transportation systems.

Finally, our feature story takes a look at that most visible sign of transportation and the economy — how much you pay at the pump. We ask TTI Research Scientist Dave Ellis why gas prices rise and fall; and Joe Zietsman, head of TTI's Environment and Air Quality Division, gives some pointers for saving gas and money by driving smarter.

So we're back where we started: the system costs money. But how and when we spend that money and how much we spend — those are factors we can control. Research helps us do that. It shows us how best to optimize the system, minimize expenses and maximize safety while ensuring a viable return on our investment. In short, research shows us how best to balance dollars and sense. ■



# Valuing Research

## TTI Assesses Loop 410 Improvements in San Antonio

**A**ccountability. Performance measures. “Bang for the buck.”

We hear these terms a lot these days about our transportation system. Knowing how to maximize the return on our transportation dollar is vital at a time when budgets are shrinking but commuter needs continue to grow.

In 1960, San Antonio’s population was 587,718. Loop 410, which opened to the public in 1966, was the first planned and constructed metropolitan loop in Texas. The loop was designed to handle 40,000 vehicles per day (twice the anticipated volume in the 1960s) and facilitate the growing trend of suburban commuting.

By 1995, however, 200,000 vehicles per day traveled the loop, and each San Antonio resident sat in traffic about 24 hours per year due to the congestion. To combat this reality, the Texas Department of Transportation (TxDOT) spent over \$900 million on infrastructure improvement projects along the loop. The improvements multiply the loop’s original vehicle capacity by a factor of 10.

“The Loop 410 projects afforded us a unique opportunity to assign a real value to the improvements TxDOT made along the corridor,” explains Texas Transportation Institute (TTI) Research Engineer Steve Venglar.

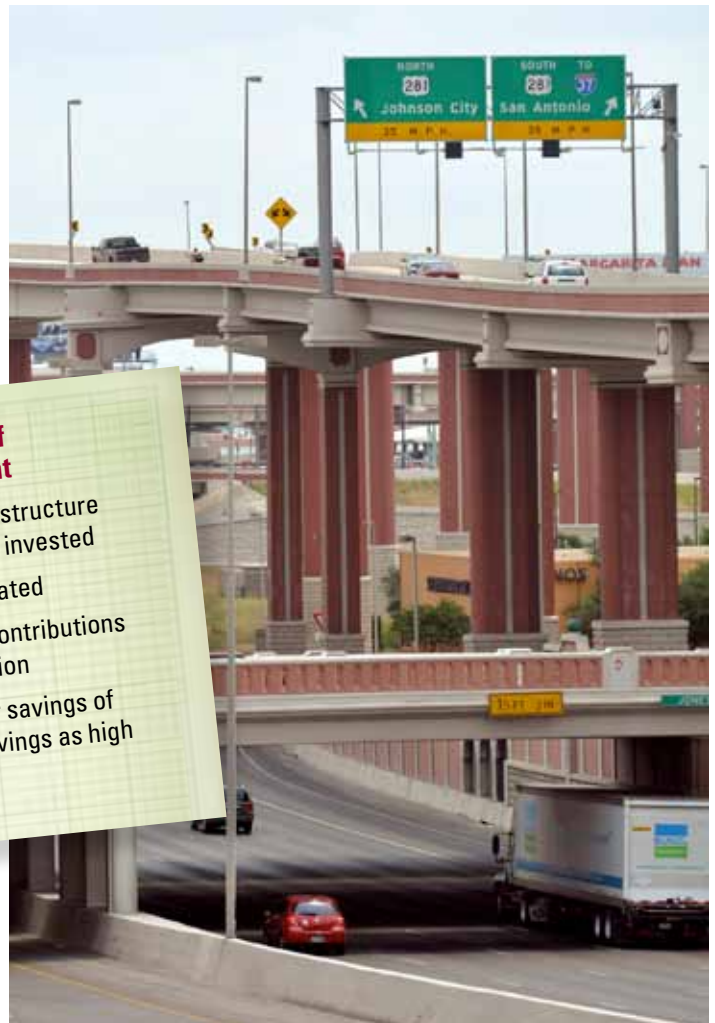
To assess the projects’ economic benefits to San Antonio, TTI researchers looked at local trackable metrics, like impact on land use and business sales, along with regional impacts, including how jobs were affected. Other factors examined included

- reduced travel time,
- improved travel time reliability,
- vehicle operating costs (including fuel consumption),
- driving safety,
- air quality and
- accessibility.

“We also gathered anecdotal evidence from local companies and businesses within nine zip codes along Loop 410 to assess their perceptions of improvements,” says Venglar. “In general, business owners viewed the changes as positive, and many noted improvements in commute times.”

### Long-Term Benefits of Loop 410 Improvement

- 3-to-1 return on infrastructure improvement dollars invested
- 12,000 new jobs created
- by 2020: tax-base contributions as high as \$109 million
- by 2035: commuter savings of \$1.2 billion; fuel savings as high as \$626 million



Improvements to Loop 410 are providing economic benefits to San Antonio and a template for successful expansion to the Texas Department of Transportation.

Conservatively speaking, the assessment calculated a 3-to-1 return on infrastructure improvement dollars invested, with some 12,000 new jobs created by the project. By 2035, commuter savings will likely accrue to \$1.2 billion, and fuel savings could rise to \$626 million. Tax-base contributions will reach an estimated \$109 million by 2020. To increase the accuracy of the predicted benefits of the improvements, TTI suggests continued evaluation using a more comprehensive analysis after the project has been in place for several years.

“TTI’s work has helped us clarify the long-term benefits of our work on Loop 410,” says Clay Smith, director of transportation planning and development for TxDOT’s San Antonio District. “Knowing in advance how projects like this benefit the system helps us better plan and execute other such projects in the future.”



#### FOR MORE INFORMATION

Contact Steve Venglar at (210) 979-9411 or [s-venglar@tamu.edu](mailto:s-venglar@tamu.edu).

# Assessing Customer Satisfaction

## TTI Helps TxDOT Ask Texans the Right Questions

**K**nowing how well you're doing your job can be as easy as asking someone's opinion. But when you're a public agency, it can get a bit more complicated.

In a joint effort, the Texas Transportation Institute (TTI) and the Bush School of Government and Public Service recently developed a guidebook, *Tell TxDOT: Customer Satisfaction Program*, to help the Texas Department of Transportation (TxDOT) determine how it's serving the people of Texas.

"Getting useful feedback requires more than just asking, 'How am I doing?'" explains Assistant Research Scientist Tina Geiselbrecht, TTI's lead on the project. "It also requires knowing how to ask that question — in what context, in what format and to what purpose."

*Tell TxDOT* shows agency employees how to solicit citizen opinion. It covers the basics, like when to ask for feedback on a project, and also addresses how to select a research method — from online

surveying to focus groups — and how to analyze the resulting data. Finally, the guidebook discusses how to communicate results to TxDOT staff, policy makers and others.

TxDOT recently developed a series of internal performance measures that evaluate how well the agency is meeting its strategic plan goals. Agency employees can supplement that knowledge using the guidebook to determine external perceptions of how well they are doing.

"By identifying differences between the internal and external portraits," explains Geiselbrecht, "TxDOT can improve its transparency with the public while giving citizens a voice about what they feel can be done better."

As part of this effort, TTI developed the Ride the Road with TxDOT Survey Program to study citizens' expectations about specific roadway elements and services. Researchers conducted road trips in which citizens were asked to grade various elements of the roadway infrastructure, such as the smoothness

"Getting useful feedback requires more than just asking, 'How am I doing?' It also requires knowing how to ask that question — in what context, in what format and to what purpose."

*Tina Geiselbrecht,  
TTI assistant research scientist*

of the ride or the presence of roadside trash. While TxDOT regularly conducts peer reviews with other state departments of transportation, this was the first such undertaking with the general public.

The survey studied participants' knowledge of and attitudes toward TxDOT and its services, as well as solicited their opinions while driving across eight sections of roadway maintained by TxDOT. Data analysis shows that, overall, both males and females were "somewhat satisfied" with roadway conditions and the driving experience they were asked to evaluate. When the responses are further sorted by demographics, African Americans and participants aged 40–44 and 55–59 (regardless of gender or ethnicity) represent the most satisfied groups. TTI will use the results from this pilot survey to refine questions and procedures for future road trips conducted by the department.

"The people of Texas are our customers, pure and simple," says Mary Meyland, director of strategic policy and performance management at TxDOT. "As we move to becoming a more results-based organization from a resource-based one, the Customer Satisfaction Program will provide us the necessary tools to gather and assess the public results of our performance."

**SECTION 4 : BLUE** FM 3177 from FM 969 to US 290  
Approximately 4.7 miles

**Find the Street: Lindell Lane**  
As we drive through this section, please indicate how easy or difficult it was to find this street.  
 Very Hard    Somewhat Hard    Somewhat Easy    Very Easy    Could Not Find Street

Please use the following scale to assign ratings to the various roadway features we will observe:

QUESTION	Comments	1	2	3	4	5	N/A
1. Width of lanes							
2. Width of centerline striping							
3. Condition of centerline striping (color, width, etc.)							
4. Width of lane striping							
5. Condition of lane striping (color, width, etc.)							
6. Width of OUTSIDE (right) shoulder							
7. Type of shoulder							
8. Smoothness of road surface							
9. Road noise							
10. Smoothness of railroad crossing							
11. How sharply the roadway curves left or right							
12. Distanc--							

**Importance**  
For each topic below, circle the number to the right that best fits your opinion on the importance of the issue. Use the scale below to describe your opinion.

TOPIC	SCALE				
	1	2	3	4	N/O
1. Removing debris such as dead animals, glass, torn tires, etc.					
2. Picking up trash and litter along roadides					
3. Removing snow and ice					
4. Moving to increase visibility					
5. Keeping guardrails and other barriers in good condition					
6. Keeping the surface of roadways in good condition (smooth and free of potholes)					
7. Keeping rest areas clean					
8. Keeping shoulders on highways in good condition (safe and free of drop-offs)					
9. Keeping bridges in good condition					
10. Providing highway striping that is visible during the DAY					
11. Providing highway striping that is visible during WEATHER					
12. Providing highway striping that is visible during WET WEATHER					
Ensuring information and warning signs are easy to see during the DAY					
Ensuring information and warning signs are easy to see at NIGHT					
Using adequate lighting in URBAN areas					
Using adequate lighting in RURAL areas					
Ensuring that water drains quickly from the surface of highways during a					
Providing information about road/work and weather-related driving conditions					
Posting clear travel time					
Posting clear congestion					
Posting clear information about road/work and weather-related driving conditions					
Posting clear information about alternative modes of transportation along highways					
Posting clear information about alternative modes of transportation along highways					
Posting clear information about public transportation services such as buses or trains					



**FOR MORE INFORMATION**  
Contact Tina Geiselbrecht  
at (512) 467-0946 or  
t-geiselbrecht@tamu.edu.

# Pavement 2.0

## TTI Updates Pavement Design Software

One of the best parts of a software upgrade is seeing the new features. Releasing next-generation software often requires a much-needed modernization of the hardware. Sometimes, though, it's the other way around. Texas' roadways — the state's biggest collection of hardware — are being modernized, and that's required the updating of the software used to design them.

FPS19, the current version of the pavement design software used by the Texas Department of Transportation (TxDOT), computes the required thickness of pavement layers to withstand the damaging effects of both traffic and the environment. It also calculates the required overlay thickness for existing highways and lets the designer estimate stress and strain within the pavement layers, as well as make predictions of pavement life.

"You build a thick asphalt pavement, and you never have to repair anything except the surface. The largest trucks will never be able to cause any structural problems. With well-constructed perpetual pavement, you never have to go more than 2 inches deep when repairing it."

*Tom Scullion,  
 TTI's Flexible Pavements  
 Program manager*

PP structure consists of several layers of HMA, a high-quality base layer over a treated subgrade material.

"You build a thick asphalt pavement, and you never have to repair anything except the surface. The largest trucks will never be able to cause any structural problems," says Tom Scullion, Texas Transportation Institute's (TTI's) Flexible Pavements Program manager. "With well-constructed perpetual pavement, you never have to go more than 2 inches deep when repairing it."

New perpetual pavement designs required software updates as well, so Wenting Liu, TTI assistant research engineer, developed FPS21. The software has a user-friendly interface and has completed beta testing. Features include

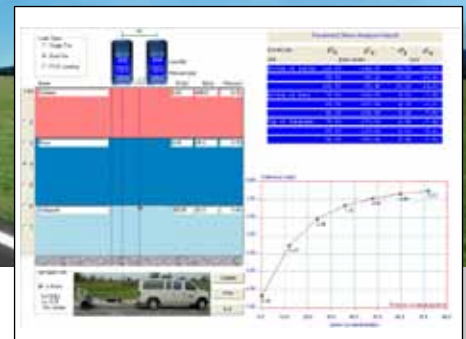
- the ability to handle more pavement layers than FPS19,

- a table look-up feature to access TxDOT's specification items and obtain design moduli values,
- a database of soil types and their respective Texas Triaxial Class for each county in Texas, and
- structural analysis capabilities to provide target pavement deflections.

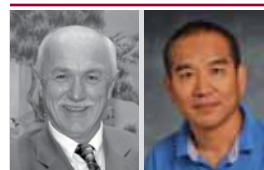
The deflection values can be used to ensure the pavement is being constructed and designed to handle anticipated loads.

"Every flexible pavement in Texas gets designed with this program in the area offices of TxDOT," says Scullion. "The engineer can mix and match TxDOT-specific asphalt layers and then run strength and cost analyses for their designs based on traffic levels and environmental factors. The program has both a mechanistic design check to account for rutting and cracking and a Texas Triaxial Class check to ensure that sufficient depth exists to prevent subgrade failures for the heaviest anticipated truck loads."

"The next step is to distribute this updated version of FPS to district users and train them through webinars on the new features. Anyone who used FPS19 should feel comfortable with FPS21," says Joe Leidy, transportation engineer in TxDOT's Construction Division. "It's another big step in the modernization of the design process in Texas." ■



FPS21 will help pavement engineers better assess how perpetual pavement structures meet ever-increasing traffic loads.



**FOR MORE INFORMATION**

Contact Tom Scullion at (979) 845-9913 or t-scullion@tamu.edu, or Wenting Liu at (979) 845-5943 or w-liu@ttimail.tamu.edu.

# PANDA Model Predicts Pavement Damage, Helps Build Better Pavements

Improving pavement performance has been a primary goal of the Texas Transportation Institute (TTI) since its founding in 1950. And we're not done yet. The latest innovation is a mechanistic method of simulating pavement behavior and predicting pavement damage that can help produce longer-lasting, distress-resistant pavements.

"There has been a continuing effort to replace empirical methods of pavement design and analysis with more mechanistic approaches," says Dallas Little, TTI senior research fellow and professor in Texas A&M University's Department of Civil Engineering. "The mechanistic method is based on fundamental aspects of pavement mechanics, as well as the properties of the material components that comprise asphalt pavements, such as asphalt binder, mastic and aggregate."

TTI has researched and developed this new method as part of the Asphalt Research Consortium (ARC). The Federal Highway Administration is funding the consortium with \$27 million over a five-year period to evaluate asphalt infrastructure performance.

This project developed the state-of-the-art, three-dimensional computational code called the Pavement Analysis Using Nonlinear Damage Approach (PANDA). PANDA has a wide range of uses to predict when and where pavement damage will occur to help build better pavements.

"PANDA offers substantial improvements in modeling capabilities," says Michael Harnsberger, principal scientist at the Western Research Institute. "It will have a great impact on the pavement design community in selecting materials and modeling performance."

PANDA can simulate the behavior of pavements and predict pavement performance, including fatigue damage, permanent deformation (better known as rutting) and overall

life span. PANDA considers the impact of moisture intrusion, aging, healing and temperature on how the asphalt composite mixture responds under traffic. Users of PANDA can see graphically (from color contours representing levels and locations of damage in the pavement) how the pavement responds under regional environmental conditions. This approach allows the user to readily compare the utility of various material constituent combinations.

"PANDA offers substantial improvements in modeling capabilities. It will have a great impact on the pavement design community in selecting materials and modeling performance."

*Michael Harnsberger,  
principal scientist,  
Western Research Institute*

One unique feature of PANDA is that, rather than considering the pavement as a continuum, it can focus on the microstructure of the asphalt mixture. This helps the pavement engineer to assess specific mechanisms that can cause failure or to define the weak link in the design.

"Our vision is for wide use of PANDA, both within the United States and around the world," says Rashid Abu Al-Rub, TTI assistant research engineer. "The results are easy to evaluate even if the user isn't knowledgeable about mechanics."

The research team, which also includes Research Engineer Eyad Masad at Texas A&M University-Qatar, is completing software development and performing validation in both field experiments and laboratory tests. Work continues to make the model more user friendly for widespread use.

Little is quick to praise TTI Research Engineer Bob Lytton for his tireless leadership and guidance in advancing the understanding of mechanics and fundamental properties. These are the

bases for PANDA and help fuel ARC research in many other important areas. ■

- ARC Members**
- Texas A&M University
  - The University of Wisconsin-Madison
  - The University of Nevada, Reno
  - Western Research Institute
  - Advanced Asphalt Technologies

"There has been a continuing effort to replace empirical methods of pavement design and analysis with more mechanistic approaches. The mechanistic method is based on fundamental aspects of pavement mechanics, as well as the properties of the material components that comprise asphalt pavements, such as asphalt binder, mastic and aggregate."

*Dallas Little,  
TTI senior research fellow and  
professor in Texas A&M University's  
Department of Civil Engineering*



**FOR MORE INFORMATION**  
Contact Dallas Little at (979) 845-9847 or d-little@tamu.edu.

# Drive Smarter, Pay Less

*Answers from the Expert:  
Understanding Fuel Prices  
from the Inside Out*

**D**ave Ellis is the Texas Transportation Institute's resident expert on economic trends associated with fuel prices and driving behavior. Recently we asked him some questions about why gas prices rise and fall so dramatically from time to time. Here's what he had to say.

## **Why are gas prices really going up? Is it a supply issue?**

Some say it's price speculation, not a shortage, and so there's no supply/demand reason for the price of oil to increase. I don't believe we can blame it all on speculation. There are two parties to every futures contract. For every buyer who thinks the price will go up, there's a seller who thinks it won't.

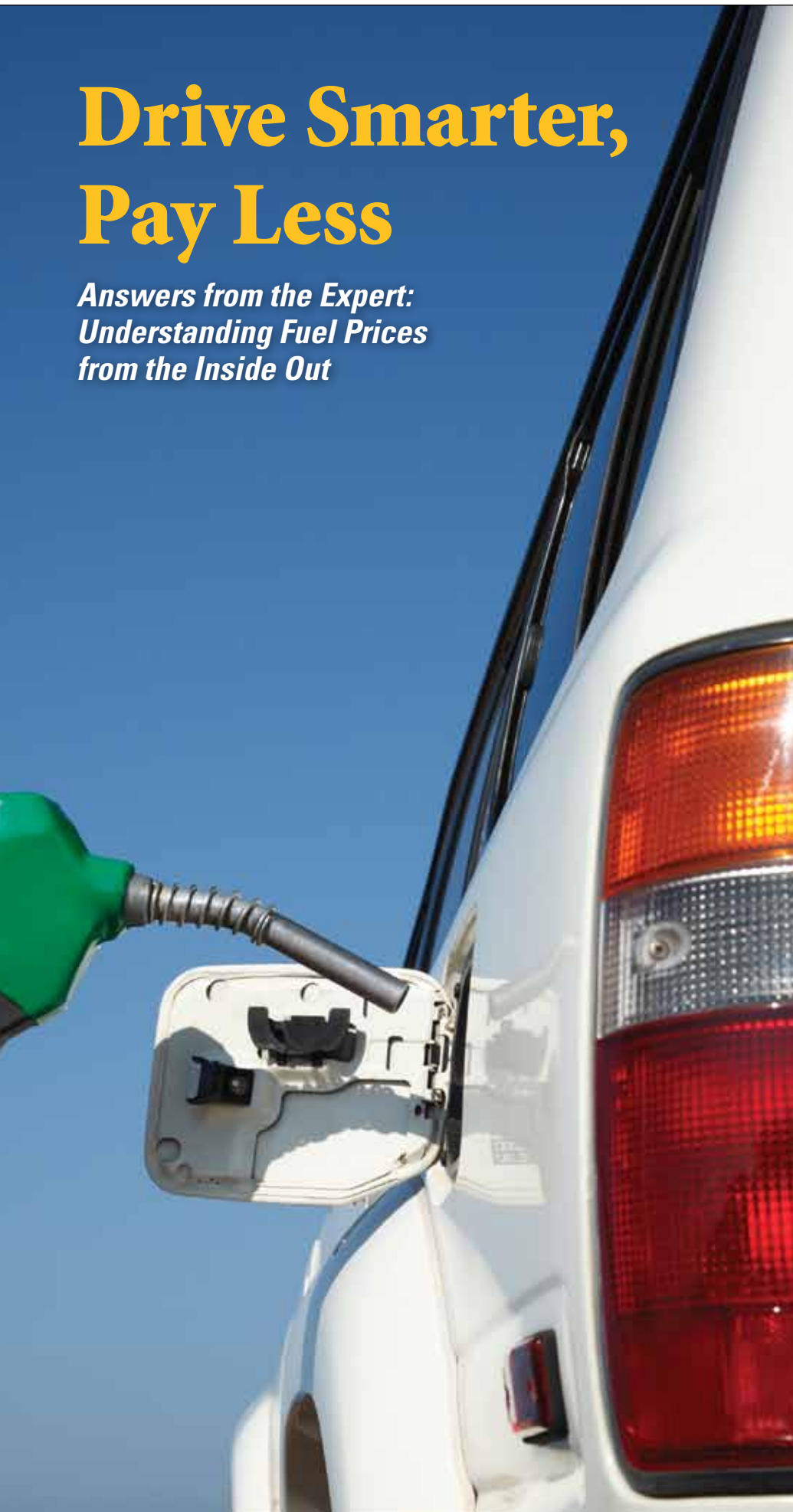
I think the price increase results from a combination of several things, including the instability in North Africa and the Middle East. Also, the weakness of the dollar tends to boost the price of dollar-denominated commodities, and oil is one of those.

## **Will higher gasoline prices lead to increased domestic production of oil?**

Domestic production reached its peak in 1985 and then declined until it bottomed out in 2008. Production actually increased slightly in 2009–2010. Whether that's the beginning of a new trend is debatable. Part of that production increase is due to price. Higher crude prices make potentially marginal wells more profitable. How long and to what extent exploration and drilling in the Gulf of Mexico are affected by the moratorium is also another factor.

## **How much is gasoline in other countries? Why is it so high in some places?**

As of April 1, gasoline cost about \$9.63 per gallon in Turkey, and a little over \$8 in the Netherlands and the U.K. If you want a good deal on gasoline, you





can try Caracas, Venezuela, where it's 6 cents per gallon.

So, why the difference? First, fuel tax rates can vary significantly. In Texas, we pay about 38 cents per gallon in fuel taxes; 20 cents is a state tax, and the rest is federal. In France and the U.K., the fuel tax is about \$3.50 per gallon. Also, some governments choose to subsidize the price of gasoline to avoid potential political unrest and mitigate inflationary pressures that fuel-price increases can have on the general economy.

### How expensive must gasoline get before we start changing our behaviors?

We don't know with any precision. What I tend to think, though, is that we do change, but we do so gradually and to varying degrees depending on things like lifestyle, age, income and availability of alternatives. Higher fuel prices tend to cause us to think more before we drive. But if we want to decrease our commute distance because of high fuel prices, there are basically two things we can do: change where we work or change where we live. Both changes take time to implement.

### Did our driving behavior change when gasoline got so expensive in 2007–2008?

Only for a while. But then, the number of miles we drove started to increase again at about the same rate it's always increased.

### Do people drive less when gas prices go up?

It depends. If the price goes up a lot and quickly, there tends to be an immediate response. Over time, though, people adjust. Also, a significant summer price increase tends to impact driving more because more of our discretionary driving, like vacation driving, tends to occur during those months. ■



**FOR MORE INFORMATION**  
Contact Dave Ellis at  
(979) 845-6165 or  
d-ellis@tamu.edu.



## Eco-driving Means Driving Smarter

For motorists across the country, it feels like history is repeating itself. Recently, average gasoline prices hovered around \$4.00 per gallon, just like they did in 2008. And some predictions have prices at the pump heading to \$5.00 in 2012.

As a result, commuters are once again contemplating changes in what, or how, they drive. A more economical vehicle is always one option. Other choices for urban dwellers include an increased use of transit or joining a carpool and taking advantage of smarter commuting options like high-occupancy vehicle lanes.

"I suspect that many people are thinking about how they drive," says Joe Zietsman, head of the Texas Transportation Institute's (TTI's) Environment and Air Quality Division. "Is this trip really necessary? Can I combine this trip with another? Can I use an alternative mode or share a ride?"

One thing that Zietsman says most people don't realize is that they can save money by changing the way they drive. "If you want to save on fuel costs, you can avoid sudden stops and quick accelerations, which burn up a lot of gas," he says. "Anticipating changes in traffic lights and coasting to stops are great habits to have."

Zietsman says that studies at TTI and other places show that up to 10 percent of your gas bill can be eliminated just by practicing what he calls eco-driving. Eco-driving

involves adopting driving behaviors that can result in reduced emissions and fuel consumption, which saves money and is also good for the environment. Some eco-driving behaviors include:

- Use a "feather foot" on the gas pedal instead of a "lead foot."
- Avoid tailgating — maintain reasonable following distances.
- Avoid rapid starts and stops, also known as "jack rabbit" driving.
- Drive the prevailing speed between intersections.
- Use cruise control on freeways (except hilly areas).
- Use the air conditioner sparingly for speeds up to 40 mph.
- Avoid idling when possible.
- Get an EZ or TxTag pass if you use toll roads often.

Several other tips to help squeeze more miles to the gallon: check tire pressure on a regular basis, make sure your vehicle is tuned up and don't carry unnecessary items in your trunk.

Zietsman says that by becoming a more eco-friendly driver, you will use less fuel, save money and also reduce emissions. ■



**FOR MORE INFORMATION**  
Contact Joe Zietsman at  
(979) 458-3476 or  
zietsman@tamu.edu.

# Providing a Viable Financing Option

## TTI Helps Implement TRZs in Texas

A nation's progress depends in part on transporting goods and services over a safe, reliable road network. With the current state of the national economy, however, public funding for road construction and infrastructure maintenance is rapidly shrinking. This makes finding innovative financing methods even more critical.

One such solution for Texas is presented in the recently passed Senate Bill (SB) 1266, which provides the legal basis for setting up transportation reinvestment zones (TRZs). TRZs facilitate *value capture* of the tax increment from a future transportation project. An innovative financing tool, value capture leverages real estate potential due to urban asset investments, sort of like “counting your chickens before they hatch” and getting all you can for them ahead of time.

To help make TRZ implementation more acceptable, the Texas Transportation Institute (TTI) conducted a co-sponsored Texas Department of Transportation (TxDOT)/Federal Highway Administration project that promotes ways to understand and implement SB 1266 among Texas agencies. The project team, led by TTI Associate Research Scientist Sharada Vadali and Research Scientist Rafael Aldrete, conducted surveys in Texas cities to document the extent of understanding and knowledge (or lack thereof) regarding the bill's provisions. This involved compiling actual implementation case examples.

Researchers found a lack of standardized procedures and guidance for TRZ development, so they explored data quality and standards across the state and developed procedures and tools for TRZ stakeholders. Aldrete notes, “We also propose standardized methods of screening TRZ projects to actually develop and implement TRZs, as well as evaluate their revenue potential.”

A second critical finding was a general lack of awareness of TRZs and the provisions of SB 1266. The research team conducted an extensive outreach effort across various organizations in Texas through web-based surveys and telephone calls. “We developed a structural guide for



municipalities to implement TRZs so they can assess that potential revenue,” Vadali adds.

The researchers crafted several recommendations to amend SB 1266 for implementing agencies. They then conducted workshops with various agencies to share the research and compiled feedback crucial to finalizing recommendations.

The legislation was finalized in the most recent legislative session, resulting in House Bill 563. Updates include simplifying requirements to establish a TRZ and significantly expanding the types of transportation improvements eligible for funding, from roads only to any other transportation project. According to Aldrete, “Given these updates, those who were unable to participate in the previous workshops may now wish to attend.”

TRZ is a positive and viable option that provides communities with an additional tool for their highway infrastructure projects — without necessarily adding another tax. Currently, three areas in Texas — El Paso, Forney and Hidalgo Counties — are implementing TRZs.

According to Gerry Leos, project engineer in TxDOT's El Paso District, “TTI has a lot of staff with much experience and education, so definitely having that sort of team always helps TxDOT. For the TRZ project, TTI has helped us educate people, informing them about this potential funding source and helping them understand and use it.” ■



### FOR MORE INFORMATION

Contact Rafael Aldrete at (915) 532-3759 or [r-aldrete@tam.u.edu](mailto:r-aldrete@tam.u.edu), or Sharada R. Vadali at (979) 845-3325 or [s-vadali@ttimail.tamu.edu](mailto:s-vadali@ttimail.tamu.edu).

# TTI Helps Texas Legislators See into the Future

## Investment Today, Return Tomorrow

Funding transportation infrastructure is a lot like investing in education — expenditures today will yield substantial returns over time.

With a gloomy economy and ever-increasing transportation needs in mind, Texas Transportation Commission Chair Deirdre Delisi reconvened the 2030 Committee to develop an updated analysis of the state’s transportation system.

Released in March 2011, the updated report *It’s About Time: Investing in Transportation to Keep Texas Economically Competitive* examines pavement and bridge conditions, urban congestion and rural connectivity between cities and towns for 2015, 2019 and 2035.

“The Texas transportation system will change dramatically in the next few

decades,” explains Texas Transportation Institute (TTI) Research Engineer Tim Lomax, the Institute’s lead on the updated study. “More drivers, tougher global competition and an aging infrastructure — all are coming together over the next 25 years to present significant challenges to Texans.”

*It’s About Time* studies the pros and cons of acting (or failing to act) to maintain and improve the state’s infrastructure.

“Without significant new dollars, the existing system continues to deteriorate, resulting in lost commercial opportunities, reduced safety, increased congestion and exponentially higher transportation costs,” explains 2030 Committee Member Judy Hawley.

The report presents four scenarios, each of which was assigned a grade.

**Grade F (unacceptable conditions):** maintain the current policies, planning processes and funding schemes;

**Grade D (worst acceptable conditions):** increase funding for road and bridge maintenance to reduce the amount of expensive rebuilding;

**Grade C (minimum competitive conditions):** increase funding to maintain Texas’ infrastructure and congestion levels to remain on par or better than its peer states or metropolitan regions; and

**Grade B (continue 2010 conditions):** increase funding to maintain Texas’ 2010 conditions through 2035.

There was no Grade A Scenario since the committee deemed this level of improvement beyond any funding expectations.

## 2030 COMMITTEE

**Ken Allen**  
*HEB*

**Drew Crutcher**  
*Landgraf, Crutcher and Associates*

**The Honorable Ed Emmett**  
*Harris County Judge*

**Judy Hawley**  
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**Gary Thomas**  
*Dallas Area Rapid Transit*

**C. Michael Walton**  
*The University of Texas at Austin*

The annual funding for these scenarios ranges from \$4 billion (Grade F) to \$10.8 billion (Grade B). In the Grade B Scenario, for instance, while households would need to pay \$402 more per year to achieve those conditions, they’d also save \$2,440 per year per household in improvement benefits.

The report clearly demonstrates that the more citizens pay up front in the form of fees, for example, the less they pay in vehicle maintenance, time spent in traffic or costs passed along to them by businesses that have to deal with a sub-par system to get their goods to market.

“The transportation infrastructure of Texas is a critical catalyst to the quality of our future,” says C. Michael Walton, chair of the 2030 Committee. “The state’s investment in transportation has not kept pace with the significant growth we have experienced or expect to experience. Our state leaders must recognize and address this problem before it is too late.”



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

Visit <http://texas2030committee.tamu.edu>.



Properly funding Texas’ transportation infrastructure will help keep the Lone Star State economically competitive and help Texans maintain their desired quality of life.

# Road Design Training in Kosovo

## TTI Contributes to a Unique Public-Private Partnership

**G**ood roads are vital to progress, especially in newly established and developing countries. After more than a decade of war and political unrest, Kosovo emerged as the world's newest independent state in early 2008. But the country's roadway infrastructure was severely deteriorated and in need of reconstruction.

To help with this, the Texas Transportation Institute (TTI) recently conducted a five-week intensive Road Design Training at the University of Prishtina in Kosovo. The U.S. Agency for International Development (USAID) sponsored the training, from February to April 2011 through the Kosovo Private Enterprise Program (KPEP), which is being implemented by Booz Allen Hamilton, a global strategy and technology consulting firm. Thirty-three participants from private road construction firms and the Kosovo Ministry of Transport, as well as graduate students and faculty from the university, attended.

The need for the training came from an assessment TTI conducted back in July 2010. "We worked with KPEP to look at engineering and construction company needs," says TTI Research Scientist Rafael Aldrete, who serves as the USAID KPEP transportation advisor. The needs assessment identified the lack of official or widely used design standards and construction specifications for road infrastructure in Kosovo.

Engineers in Kosovo graduate with limited road design and supervisory experience, and this presents a critical shortcoming. According to Mark Wood of Booz Allen Hamilton, "The TTI course has been instrumental in bridging that gap — both technically, through the provision of an excellent series of courses designed to meet the needs of graduate engineers working in the field, as well as academically by stimulating the demand for the course among practitioners and the faculty."

Course participants were engaged and positive. On request, the TTI instructors also discussed transportation project

planning, use of intelligent transportation systems (ITS), design of hot-mix asphalt, design of reinforced concrete pavements and use of textured pavement materials for skid-resistance improvement.

The Institute of Transportation Engineers (ITE) certified the course, and participants successfully completing modules received an ITE completion certificate. This ITE certification has helped standardize the training and further stressed the importance and usefulness of following standard design and construction procedures for all projects.

To date, TTI and the University of Prishtina are in the process of signing a memorandum of agreement setting up a transportation graduate degree program. According to Dr. Naser Kabashi, dean of the faculty of Civil Engineering and Architecture at the University of Prishtina, the training course brought together participants with different levels of expertise who exchanged individual knowledge and best practices on common concerns.

"We hope to continue this sharing on a higher level through the graduate degree program, and some of our best students could continue their Ph.D. studies at Texas A&M University and work as graduate research assistants at TTI. Of course, we greatly appreciate TTI's help in

organizing the courses and helping the university develop new staffers," says Kabashi.

Another training course with additional topics such as transportation planning and ITS is also planned for December 2011. ■



Course participants and TTI instructors identify safety concerns related to roadside structures in the access to European route 65 in Prishtina.



### FOR MORE INFORMATION

Contact Rafael Aldrete at (915) 532-3759 or [r-aldrete@tamu.edu](mailto:r-aldrete@tamu.edu).

## Freight Shuttle, New Guardrail Highlighted at Awards Luncheon

Eight TTI employees were recognized at the Patent and Innovation Awards Luncheon May 6, which was held at the Annenberg Presidential Conference Center at the George Bush Presidential Library.

Steve Roop, Leslie Olson and Curtis Morgan were honored for their patent, described simply as a freight transportation system and method. The Freight Shuttle is a revolutionary cargo-movement concept consisting of a series of specially designed transport vehicles that carry freight containers and truck trailers. The containers travel on an elevated guideway, propelled by electric linear induction motors.

Patent number 7,656,203 was issued to the trio and former TTI employee Craig Roco in February of last year.

Akram Abu-Odeh, Dean Alberson, Roger Bligh, Lance Bullard and Gene Buth were issued patent number 7,694,941 in April. It's described as a guardrail safety system for dissipating energy to decelerate the impacting vehicle.

"This system is the first guardrail terminal to meet the new national standard, 'Manual for Assessing Safety Hardware,' also known as MASH," Bullard explains. "It is a tension terminal that has the potential to withstand a second impact, which is different than current guardrail systems." TTI is currently in discussion with Trinity Industries regarding a licensing agreement, which is the first step before production.

The Texas A&M University System Office of Technology Commercialization handed out a total of 24 Patent Awards to 40 A&M System employees this year. ■

## Christiansen Elected to ITS America Board



Christiansen

TTI Agency Director Dennis Christiansen was elected to a three-year term on the Intelligent Transportation Society of America (ITS America) board and joined the board at the organization's June board meeting. He will also serve on the ITS America Policy and Business Council, which focuses on transportation policy, business leadership, and government and international affairs.

"I am honored to be selected as a board member of ITS America, one of the nation's primary thought leaders in emerging intelligent transportation system [ITS] technologies," Christiansen says. "I am looking forward to being involved in moving these new technologies forward to improve our nation's transportation system."

ITS America was established in 1991 as a not-for-profit organization to foster the use of advanced technologies in surface transportation systems. The organization's members include private corporations, public agencies and academic institutions involved in the research, development and design of ITS technologies to enhance safety, increase mobility and sustain the environment. ■



Steve Roop (above right) receives a Patent and Innovation Award from Darrell Kuhn of the Office of Technology Commercialization.

## Transportation and Livable Communities Conference Planned

A conference devoted to making communities as livable as possible — including the role transportation plays in that community — will be held Sept. 7-8 in Austin, Texas.

"Transportation is a key element of livable communities," notes Katie Turnbull, TTI executive associate director and chair of the conference planning committee. "This conference focuses on developing and applying appropriate performance measures to ensure transportation supports livable communities and federal, state and local goals."

The Conference on Performance Measures for Transportation and Livable Communities will address the current state of the practice by presenting performance measures for transportation and livable communities in urban, suburban, exurban and rural areas.

Speakers in general and breakout sessions will examine the performance measures related to transit, bicycles and pedestrian travel, health issues, access to destinations, the environment, and sustainability. Areas for further study will be identified and discussed.

The conference is sponsored by the TTI (and its University Transportation Center for Mobility and Transportation Economics Center), the Center for Transportation Studies at the University of Minnesota and the Transportation Research Board.

Online registration for the conference will end Aug. 26. ■



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.



### TTI Graduate Assistant Named Eno Fellow



Norboge

Nicolas Norboge, graduate research assistant in TTI's Mobility Analysis Program, has been named an Eno Fellow by the Eno Transportation

Foundation. Norboge is among only 20 Fellows named by the foundation. The Eno Fellows program is designed for graduate students in transportation-related disciplines.

Eno Fellows are invited to the Leadership Development Conference, which is Eno's flagship program for emerging transportation professionals. All expenses for the conference are paid by the foundation. The conference was held in Washington, D.C., June 6-10. ■

### Traffic Safety Conference Tackles Driving Behaviors



Austin Police Chief Art Acevedo was an opening-session speaker for the 2011 Statewide Traffic Safety Conference.

Distracted driving, drunk driving and speeding were among the topics discussed at the 2011 Statewide Traffic Safety Conference in Austin March 21-23. Two-hundred people attended the event, which is organized each year by TTI's Center for Transportation Safety.

"Let's face it...some [drivers] still think you can safely talk on your cell phone or send a text," Administrator Janice Brown with the Federal Highway Administration Texas Section said during the opening session of the conference. "The truth is you simply can't."

Brown and many of the other speakers highlighted the improving fatality rate in Texas. In 2009, nearly 400 fewer people were killed than the year before, an 11 percent drop. Preliminary figures for 2010 indicate a further decline.

"These are really positive trends; however, we need to do more to reduce fatalities," said Terry Pence, director of the Texas Department of Transportation's Traffic Safety Section. "Texas is taking on the vision statement of Toward Zero Deaths, which you will hear more about in the months to come." ■

### Texas A&M's TexITEs Win 2011 Collegiate Traffic Bowl

Texas A&M University's student chapter of the Texas District of the Institute of Transportation Engineers (TexITE) has won the 2011 TexITE Collegiate Traffic Bowl, a *Jeopardy!*-style competition that tests student knowledge of traffic-related subjects.

The competition was held at the spring meeting in Fort Worth. The Traffic Bowl allows students to demonstrate their abilities and expertise gained through their transportation education. The team will now represent the Texas District in the International Collegiate Traffic Bowl in St. Louis in August. ■



2011 Texas A&M Traffic Bowl team from left to right: Adam Kaliszewski, Mark Kranz and Scott Nelson.



Ed Seymour (center right) was named a Regents Fellow by the Texas A&M University Board of Regents. (Also pictured, from left to right, are Regent Morris Foster, Ed's wife Anna Petersen and Regent Jim Wilson.)

### Seymour Receives Regents Fellow Designation

Ed Seymour, TTI associate agency director, was presented March 24 with a Regents Fellow Service Award, among the most prestigious honors bestowed by The Texas A&M University System Board of Regents. The award recognizes employees who have made exemplary contributions to their university or agency and to the people of Texas.

"To be recognized by the Board of Regents and the chancellor in this way is very humbling," Seymour said of the Regents Fellow award ceremony. "However, I think any accolades I receive, especially one of this caliber, are a true reflection of the group of people I've had the pleasure of working with."

Seymour is head of TTI's Transportation Operations Group, which has offices statewide. He coordinates various initiatives involving everything from intelligent transportation systems and work zone safety to geometric design and professional development. He also oversees TTI's growing international research effort. ■



Honoring the teenagers killed in traffic crashes, a balloon launch was conducted as part of TDS Fest at Creekview High School.

## TDS Organizes Festival for Teen Traffic Safety

Less teens are dying on Texas roadways. The number of Texas teen traffic deaths has dropped from 549 in 2002, when the Teens in the Driver Seat (TDS) program began, to 343 in 2009, according to the National Highway Traffic Safety Administration. To celebrate this decline and spread awareness that car crashes are the leading cause of injury and death for teens, TDS organized a festival at Creekview High School in Carrollton, Texas, March 5.

Safety advocates and student leaders from around the state attended the rally sponsored by TTI, State Farm Insurance, the Texas A&M University 12th Man Kickoff Team Foundation, Omni Hotels and Resorts, and PBSJ (an Atkins company). About 300 people participated in the event.

Ray LaHood, U.S. Department of Transportation secretary, welcomed the participants in a video message made specifically for the festival. LaHood pointed out the importance of avoiding distracted driving and congratulated TDS for having the event.

A balloon launch and memorial walk to honor the lives of teens that have died in crashes were part of the activities, which also included food, prizes, music and a dance. Including Creekview High School, TDS is now active in more than 400 schools across Texas. ■

## Leading the Distracted Driving Research Effort



Cooper

TTI's Center for Transportation Safety (CTS) recently hired Joel Cooper, assistant research scientist, to champion research into distracted driving, a growing safety concern

around the country. He has already testified twice before legislative committees as Texas contemplated five driver-distraction bills.

"CTS recognized the need to improve our ability to respond to legislative and media inquiries in this important area," says Sue Chrysler, manager of the CTS Human Factors Group. "Joel will be able to make good use of our driving simulator, instrumented vehicle and eye tracker."

Cooper is co-leading efforts at TTI to assess the distraction potential of the federally proposed program called Connected Vehicles. He will also lead the research on one of the first test track studies conducted on texting while driving, funded by the Southwest Region University Transportation Center.

"Driver distraction is a hot issue right now, and it will only get hotter because the complexity of what drivers have to deal with is skyrocketing," Cooper says. ■

## RITA's Peter Appel Connects with Students

Peter Appel, who was appointed administrator of the Research and Innovative Technology Administration of the U.S. Department of Transportation (USDOT) in 2009, coordinates USDOT's research, education and technology transfer programs. On Feb. 18, Appel toured TTI and spoke to Texas A&M University students involved in research sponsored by the Southwest Region University Transportation Center (SWUTC) and the University Transportation Center for Mobility (UTCM).

"One of my passions is to get people in different aspects of transportation talking to each other and realizing shared areas of interest," said Appel at a luncheon with graduate students. His tour included overviews of TTI, SWUTC and UTCM; a crash test at TTI's Riverside Campus; and a ride in the Institute's instrumented vehicle designed for human factors research. "It's an exciting time to be in transportation, to address the issues of safety, global communities and mobility and deal with environmental issues," he told students. "I want to personally thank you for being in the transportation field."

As he was leaving TTI, Appel said he was impressed with what he'd seen and heard. "TTI is a national leader in transportation with a tremendous variety of cutting-edge research. I really like the interdisciplinary aspects of its research." Noting the linkages among the engineering, policy and finance issues of transportation, Appel said, "It's great to have each of these groups talking to each other." ■



Appel (center) poses with (from left to right) Director Emeritus Herb Richardson, SWUTC Director Dock Burke, UTCM Director Melissa Tooley and Agency Director Dennis Christiansen.

## »» TEXAS TRANSPORTATION INSTITUTE Publications

### TECHNICAL REPORTS

*Development of Performance-Based Evaluation Methods and Specifications for Roadside Maintenance*, by Nasir Gharaibeh, **0-6387-1**, February 11, 2011.

*Evaluating the Impact of Overweight Load Routing on Buried Utility Facilities*, by Edgar Kraus, **0-6394-1**, February 18, 2011.

*Realtime Monitoring of Bridge Scour Using Remote Monitoring Technology*, by Jean-Louis Briaud, **0-6060-1**, February 18, 2011.

*Development of a Precast Bridge Deck Overhang System*, by David Trejo, **0-6100-1**, February 22, 2011.

*Collision Loads on Bridge Piers: Phase 2. Report of Guidelines for Designing Bridge Piers and Abutments for Vehicle Collisions*, by Gene Buth, **9-4973-2**, March 15, 2011.

*Development of Field Performance Evaluation Tools and Program for Pavement Marking Materials: Technical Report*, by Yunlong Zhang, **0-5548-1**, March 16, 2011.

*Operational Performance Management of Priced Facilities*, by Ginger Goodin, **0-6396-1**, March 30, 2011.

*Field and Laboratory Investigations for Full Depth Reclamation Projects*, by Stephen Sebesta, **0-6271-1**, March 31, 2011.

*Operations and Safety of Super 2 Corridors with Higher Volumes*, by Marcus Brewer, **0-6135-1**, May 27, 2011.

### PROJECT SUMMARY REPORTS AND PRODUCTS

*Incorporating Sustainability into TxDOT's Transportation Decision Making — Summary of Work Performed, Methods Used and Results Achieved*, by Tara Ramani, **5-5541-01-1**, February 3, 2011.

*Is Texas Ready for Mileage Fees? A Briefing Paper*, by Trey Baker, **0-6660-P1**, February 14, 2011.

*The SAFE Freight Shuttle: A Proposal to Design, Build, and Test an Alternative Container Transport System*, by Steve Roop, **9-1528-S**, February 21, 2011.

*Use of Existing Information Systems and Data to Support Bridge Management at TxDOT*, by Cesar Quiroga, **0-6389-P1**, March 4, 2011.

*Guidebook on Landside Freight Access to Airports*, by Bill Frawley, **0-6265-P1**, March 8, 2011.

*Vehicle Miles Traveled (VMT) Fees Study*, by Ginger Goodin, **0-6660-S**, March 11, 2011.

*Signing Guidelines for Flooding Conditions and Warrants for Flooded Conditions Detection Systems*, by Kevin Balke, **0-6262-S**, March 11, 2011.

*Standards for Mounting Traffic Control Signs and Devices on Concrete Traffic Barrier (CTB) in Construction Work Zones: Project Summary Report*, by William Williams, **0-6143-S**, March 14, 2011.

*Development of Field Performance Evaluation Tools and Program for Pavement Marking Materials*, by Yunlong Zhang, **0-5548-S**, March 15, 2011.

*An Evaluation of the Performance of High-Impact Signs*, by Geza Pesti, **0-6120-S**, March 15, 2011.

*Benefits of Public Roadside Safety Rest Areas in Texas*, by Jodi Carson, **0-6267-S**, March 15, 2011.

*Framework for Comprehensive Bridge Management and Information System (BMIS)*, by Andrew Wimsatt, **0-6389-S**, March 22, 2011.

*Super 2 Design for Higher Traffic Volumes*, by Marcus Brewer, **0-6135-S**, April 13, 2011.

*Guidelines for Designing Bridge Piers and Abutments for Vehicle Collisions*, by Gene Buth, **9-4973-P2**, May 5, 2011.

*Triple Left-Turn Lanes: Keys to Successful Public Outreach*, by Scott Cooner, **0-6112-P1**, May 6, 2011.

*Implementation of TAMSIM and EROW Right-of-Way Acquisition Decision-Support Tools*, by Paul Krugler, **5-5534-01-1**, May 11, 2011.

*Implementation of the UV-VIS Method to Measure Organic Content in Clay Soils: Technical Report*, by Pat Harris, **5-5540-01-1**, May 13, 2011.

*Prototype Design for a Predictive Model to Improve Evacuation Operations*, by Russell Henk, **0-6121-S**, May 18, 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.