TEXAS TRANSPORTATION

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Researcher

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Safety *is no* Laughing Matter

Texas Transportation Institute

A Member of The Texas A&M University System

Saving Lives, Time and Resources

ON THE COVER: When you're driving is no time to clown around.

TEXAS TRANSPORTATION
Researcher

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Envisioning a Traffic Safety Culture

Vehicles are more protective than ever before. The roadway environment is far more forgiving. Traffic laws have evolved and become more effective over time.

By almost any measure, roadway safety has advanced remarkably in a relatively short time, but engineering and enforcement will take us only part of the way. To move forward, meaningful safety improvements will rely heavily upon change — a fundamental change in how we think about driving. Imagine for just a moment what that might look like: a world in which drivers value civility over convenience, one in which driving and safe driving are synonymous and universally valued.

By almost any measure, roadway safety has advanced remarkably in a relatively short time, but engineering and enforcement will take us only part of the way.

For far too long, our society has adopted a "do as I say, not as I do" attitude behind the wheel. Altering such entrenched beliefs will be neither swift nor simple, but it is essential and achievable. The Toward Zero Deaths initiative, led by the American Association of State Highway and Transportation Officials, and related safety culture work led by the AAA Foundation for Traffic Safety are tangible examples that we are taking steps in the right direction — steps toward a true safety culture.

We took a very big step in May when I was honored to help launch the United Nations Decade of Action for Road Safety 2011–2020, which took place in 110 countries. This was the first time that traffic safety has been recognized on the scale of other killers such as TB, malaria and HIV/AIDS. In fact, in 20 years, more people will die per year on the world's roads than will die of HIV/AIDS.

Led by the World Health Organization and the FIA Foundation, the Decade of Action aims to reduce road deaths and injuries globally. The key pillars of the Decade of Action address all aspects of road safety, including infrastructure, safety management capacity, vehicles and post-crash care. In addition, one pillar focuses on enhancing road-user behavior, and our success will depend largely on a change in traffic safety culture — the collective values and beliefs that influence our behavior.

I think it's a fitting coincidence that as we begin our Decade of Action, the Texas Transportation Institute (TTI) is completing an impressive decade of its own. In 2001, the Texas Legislature created the Center for Transportation Safety at TTI, with a charge to "conduct programs of research, education and technology transfer to support the state's role in improving the safety of the roadways in this state."

In the 10 years since, TTI has done just that, building upon its remarkable record in the engineering aspects of safety and bringing a new focus and understanding to the policy and behavioral aspects of the field.

The knowledge gained through such research is essential to any further improvements in roadway safety. That's why I believe that TTI is uniquely positioned to support the advancement of a traffic safety culture in our nation and worldwide, and why I am so delighted to count the agency as a partner in the United Nations Decade of Action for Road Safety.

by Dr. T. Bella Dinh-Zarr

Dr. T. Bella Dinh-Zarr is the North American director of the Make Roads Safe Campaign for Global Road Safety and the director of Road Safety at the FIA Foundation. She was also a research associate at TTI from 1997 to 2000.

Making Safety a Cultural Priority

Safety Conference Fuels Lifesaving Passion

According to the *Texas Traffic Safety Culture Survey*, more than 80 percent of respondents say that texting while driving is a bigger problem today, while more than half perceive that aggressive driving has gotten worse.

For those attending the 2011 Traffic Safety Conference in Austin this spring — hosted by the Texas Transportation Institute's (TTI's) Center for Transportation Safety (CTS) — the substantial decline in Texas traffic deaths over the last two years, while encouraging, just isn't enough.

The facts: in 2009, there were 11 percent fewer fatalities in Texas compared to the year before, representing a 19 percent decline since 2003. (Preliminary figures for 2010 point to a further decline.) That's impressive considering the dramatic increase in both the Texas population and vehicle miles traveled.

"The Texas fatality rate is now at the lowest level since the state began calculating fatality rates in 1935," Director Terry Pence of the Texas Department of Transportation's Traffic Safety Section told attendees. "Almost 94 percent of Texans are buckling up every time they drive." He also credited safer roads and vehicles, public safety campaigns, and people driving less because of the economy and higher gas prices.

Janice Brown, the Federal Highway Administration's Texas administrator, credited the state's $1.2 billion bond program for improving safety. "These investments are paying off," she said.

Both Brown and Pence pointed out that more than 3,000 people, the second highest number of fatalities in the nation, still die each year on Texas roadways. Alcohol is a factor in almost 40 percent of these deaths.

"Every single one of our crashes where someone dies is avoidable and preventable," said Austin Police Chief Art Acevedo. "Rarely is it a mechanical failure. The majority of the time it's about behavior."

In fact, changing driving behaviors in order to improve safety seemed to be the underlying theme of the two-day conference. The breakout sessions covered topics involving pedestrians, teen and elderly drivers, work zone and motorcycle safety, freight operations, and child passenger occupant protection. Other issues included enhancing prosecution of DWI, speed management, safety belts and distracted driving.

TTI Assistant Research Scientist Joel Cooper pointed to the enormous toll that inattention has on safety. "Twenty percent of [nationwide] injury crashes in 2009 involved driver distraction, representing 5,474 deaths that same year. I believe this number is an understatement, but still the number is pretty staggering," Cooper said.

Attendees agreed that changing the culture is necessary in order to change behavior but also acknowledged it will be a time-consuming, difficult process.

> "Before, it was cool to have your cell phone in the car. It was cool to always be connected, and now we are trying to change that attitude back into 'it's dangerous… you can cause an crash.'"
>
> *Kelli Petras, TxDOT Media Relations Officer*

> "Every single one of our crashes where someone dies is avoidable and preventable. Rarely is it a mechanical failure. The majority of the time it's about behavior."
>
> *Art Acevedo, Austin Police Chief*

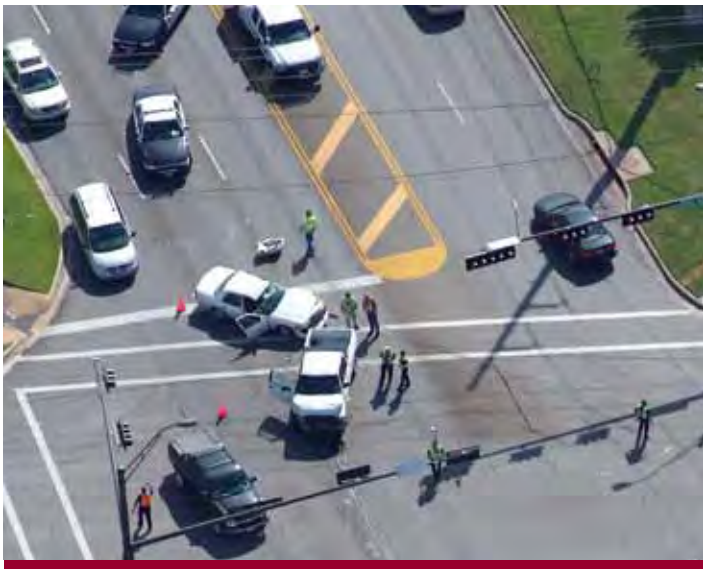
"Before, it was cool to have your cell phone in the car," TxDOT Media Relations Officer Kelli Petras said during the closing session. "It was cool to always be connected, and now we are trying to change that attitude back into 'it's dangerous…you can cause an crash.' "

Petras was part of a round-table discussion designed to get other perspectives about traffic safety. She was joined by former Texas State Representative and Senator David Cain, National President of Mothers Against Drunk Driving Laura Dean-Mooney, CEO of EnviroMedia Social Marketing Valerie Davis and Associated Press Reporter Jim Vertuno.

At the conclusion of the conference, CTS Director John Mounce thanked the closing session round-table members. He borrowed a line from the luncheon speaker, Bella Dinh-Zarr, as he urged unity in the effort to change driver behavior in Texas.

"If you want to act quickly, act alone. If you want to go far, act together," Mounce told the crowd. "We've got a great distance to go, but together we are going to get there. We are going to save some lives, and that's what we are here for."

FOR MORE INFORMATION
Contact John Mounce at (979) 458-3346 or j-mounce@tamu.edu.



Crashes continue. Therefore, sharing lessons learned via events like the 2011 Traffic Safety Conference remains a priority.

> "The Texas fatality rate is now at the lowest level since the state began calculating fatality rates in 1935. Almost 94 percent of Texans are buckling up every time they drive."
>
> *Terry Pence, Director of TxDOT's Traffic Safety Section*

Safety Culture Survey

In one of the first-of-its-kind surveys conducted in an individual state, the Texas Transportation Institute's Center for Transportation Safety determined that more than a third of Texas drivers feel less safe on the roadways than they did five years ago.

More than a third of Texas drivers feel less safe on the roadways than they did five years ago, according to the *Texas Traffic Safety Culture Survey*.

The *Texas Traffic Safety Culture Survey* was conducted to gain an understanding of drivers' attitudes at a time when fatality rates have decreased. Despite the statistics, respondents feel that aggressive driving, distracted driving and speeding have gotten worse over the last five years.

More than 80 percent of respondents say that texting while driving is a bigger problem today, while more than half perceive that aggressive driving has gotten worse.

Nearly 1,200 people took part in the survey at 10 Texas Department of Public Safety driver's license offices across the state, reflecting a cross section of the adult population. Regarding views related to laws in Texas, researchers found:

- Supporters of a law to ban cell-phone use while driving outnumber opponents by a two-to-one margin.
- Supporters also outnumber opponents when it comes to the use of red-light cameras, sobriety checkpoints and requiring the use of ignition interlock devices for drivers with DWI convictions.
- Seven out of 10 favor a law that would require all motorcyclists to wear helmets.
- Respondents were generally opposed to raising the state's gasoline tax to pay for new roads.

Researchers will repeat the survey to determine if drivers' attitudes are changing over time.

FOR MORE INFORMATION
Contact Katie Womack at (979) 845-5153 or kwomack@tamu.edu.

Access the survey results online at http://tti.tamu.edu/group/cts/files/2010/11/TTI-Safety-Culture.pdf.

Center for Transportation Safety Celebrates 10 Years of Helping to Save Lives

"The work done by the Center for Transportation Safety over the past decade is saving lives — there's no question about that. It's difficult for me to think of another investment of taxpayer dollars that has paid off better than our investment in roadway safety research. My hat is off to the center's talented and dedicated staff."

Sen. Steve Ogden

Raising awareness of safety issues via outreach campaigns and educational programs has been one way TTI's Center for Transportation Safety has contributed to a safety culture in the Lone Star State.

Creating practical tools, like the Texas School Bus Driver Certification Course, helps facilitate safety statewide.

FOR MORE INFORMATION
For more information on the center's mission and projects, contact John Mounce at (979) 458-3346 or j-mounce@tamu.edu, or visit http://tti.tamu.edu/cts.

Of all the research done at the Texas Transportation Institute (TTI), perhaps none is more important than the work of the Center for Transportation Safety (CTS). September 2011 marks 10 years since the center opened its doors. In that time, CTS staff have impacted traffic safety in Texas with research, public outreach and data analysis.

"The work done by the Center for Transportation Safety over the past decade is saving lives — there's no question about that," said State Sen. Steve Ogden, who authored the legislation creating CTS. "It's difficult for me to think of another investment of taxpayer dollars that has paid off better than our investment in roadway safety research. My hat is off to the center's talented and dedicated staff."

Sen. Ogden recognized the urgent need for improved roadway safety in Texas, pointing out in the bill that "there were no days in 1998 or 1999 during which there were no deaths on Texas highways."

The mission of the center, as set out in statute, is to serve as a focal point for traffic safety research, policy analysis, education and outreach in Texas by:

- **educating** — providing students hands-on training and guidance in transportation safety and safety-related research;
- **collaborating** — promoting the collaboration of professionals from different disciplines in the cause of transportation safety;
- **analyzing** — conducting research to reduce the deaths and injuries associated with transportation in all its modes;
- **evaluating** — assessing the effectiveness of different plans, programs and policies that have been implemented to reduce transportation-related deaths and injuries;
- **sharing** — providing safety information to other professionals and the public; and
- **distributing** — serving as a resource to the Texas Legislature and various state agencies by developing new plans, programs and policies that have the potential to reduce transportation-related deaths and injuries in Texas.

In the past 10 years, CTS has used its original $500,000 in state-appropriated funds to help secure other research contracts, to bring its annual funding up to more than $5 million.

The impact of the center's reach does not stop at just research. Numerous CTS researchers have given invited testimony to House and Senate committees to help legislators improve public policy related to transportation safety.

The center has grown considerably since is inception. In 2001, CTS employed eight people; in 2011, more than 55 individuals are working on projects to improve the road safety for Texans.


Henk

"Car crashes are, by far, the leading cause of injury and death for young people in the United States, as well as every developed nation on planet Earth. Everything we do is geared toward changing that fact."

Russell Henk, Manager,
Center for Transportation Safety
Teen Driver Safety Program


Walden

"Analyzing crashes allows us to look at the when, where, how and why they occur so that we can identify ways to prevent Texans from dying or being injured on our roadways. All crashes are not the same, so we have to look at different ways to address the problem. Some solutions require engineering, while others may involve enforcement or educational strategies. The key to implementing successful countermeasures is understanding the specifics of the problem, and that is what crash analysis is really about."

Troy Walden, Manager,
Center for Transportation Safety Crash Analysis Program


Womack

"Gathering information, observing and analyzing human behavior are the foundation of assessing, understanding and then improving the traffic safety system in which humans are involved."

Katie Womack, Manager,
Center for Transportation Safety
Behavioral Research Program


Dennis

"As alcohol abuse continues to be a major traffic safety problem, research and education in this area are vital to reduce traffic crashes."

Maury Dennis, Senior Research Scientist,
Center for Transportation Safety
Center for Alcohol and Drug Evaluation Studies


Mounce

We've come a long way in 10 years, but we still have a long way to go. Transportation safety affects everyone, whether you drive or not."

John Mounce, Director,
Center for Transportation Safety


Walden

"Drivers who are impaired by alcohol and/or drugs kill too many people on Texas roadways. Although it is a difficult problem to address, impaired driving demands our attention and resources in order to save lives. Research and program activities conducted by the Center for Transportation Safety directly address the problem of impaired driving."

Melissa Walden, Manager,
Center for Transportation Safety
Planning and Evaluation Program

Texas' Click It or Ticket Campaign Turns 10

The Click It or Ticket Stats
- 10 years
- 2,843 lives saved
- 48,000 serious injuries avoided

Safety belts save lives and help prevent serious injuries from automobile crashes. Law enforcement officers nationwide spend two weeks around Memorial Day targeting drivers and passengers not wearing their safety belts. Violators can face up to a $250 fine.

Texas' Click It or Ticket (CIOT) campaign achieved a significant milestone this year — 10 years of success. Since the campaign began, safety-belt use in Texas has reached record levels.

Based on annual, on-location surveys conducted immediately following the CIOT campaign — which this year ran from May 23 through June 5 — Texas Transportation Institute Senior Research Scientist Katie Womack and her team determined that 93.68 percent of drivers and their front-seat passengers are buckling up. Last year's results were statistically the same at 93.84 percent.

When CIOT began, only 76 percent of Texas drivers and front-seat passengers buckled up. Last year's number reached an all-time high. (Over the past 10 years, according to the National Highway Traffic Safety Administration, increased safety-belt use in Texas has saved 2,843 lives and prevented 48,000 people from suffering serious injuries.) The decade of progress can be seen in the chart in this article.

"After 10 years of Click It or Ticket, we've seen firsthand that the message is working," Womack says. "I think what has been very effective in the campaign — aside from the fact that people know that safety belts save lives — is that drivers and their passengers do not want to get a ticket. Clearly that has been a motivator in changing behavior."

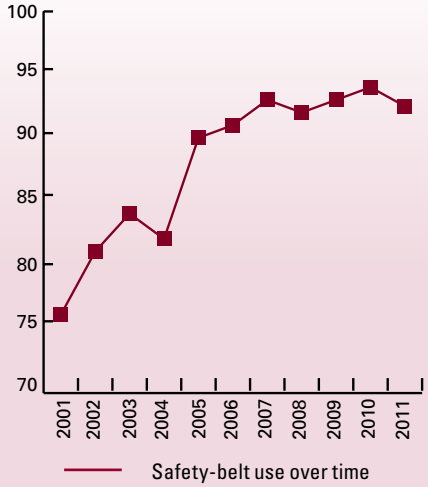
Womack was surprised when a teenager in a recent focus group (unrelated to CIOT) commented: "I remember the first time I heard 'Click It or Ticket.' I thought it was just the coolest phrase ever." Womack was impressed that the campaign reaches teenagers as well as adults.

The outreach portion of the CIOT campaign took on extra significance for the anniversary. The Texas Department of Transportation (TxDOT) developed a website, Facebook page, YouTube commercials, numerous public service announcements and even an 18-foot-by-7-foot sculpture highlighting the number of lives saved: 2,843. The sculpture traveled to 12 Texas cities for press events.

"We are pleased that the messages are reaching so many people, and that we were able to maintain our high level of safety belt use over the last year," TxDOT Traffic Safety Director Terry Pence says. "It means that lives are continually being saved. The challenge as we go forward is continuing this trend, and we are going to target those areas that we know could improve."

Based on Womack's safety-belt surveys, Pence will continue to target those who aren't using their safety belts as much as the rest of the population, specifically people in rural areas, pickup truck drivers and their passengers, and younger drivers.

Texas Safety-Belt Compliance



FOR MORE INFORMATION
Contact Katie Womack at (979) 845-5153 or kwomack@tamu.edu.

TTI Studies Increased Crash Rates Along the DFW Connector

Take a dynamic work zone that can change daily. Add distracted drivers. What do you get? That's what the Texas Department of Transportation wanted to know. Jason Crawford, manager of the Texas Transportation Institute's North Texas Region, began looking for answers.

What he and his team of researchers discovered is that more drivers are turning their attention away from driving while passing through a construction zone. The roadway in question is a $1 billion project known as the DFW Connector, which skirts the northwest side of the Dallas/Fort Worth International Airport. Over 200,000 motorists pass through it daily.

TTI researchers were asked to evaluate the work zone because of higher-than-normal crashes, especially at night and on weekends. A statistical review separated injury crashes from non-injury crashes. That analysis showed that injury crashes occurred less frequently than the national work zone average, while property damage crashes happened more often.

Researchers concluded that the higher night and weekend crash numbers were the result of driver distraction, since drivers failed to notice traffic flow changes resulting from lane and total freeway closures. Crawford notes, "There can't be any lane closures during the day. All of the work that happens above traffic lanes or impacts highway lanes occurs overnight or on the weekends."

Crawford describes the construction area as "one where you have a lot of merging traffic. You also have a lot of weaving traffic. There are temporary lane shifts the contractor has in place. If you're not really paying attention and the lane shifts, you could sideswipe someone."

Cell phones may be adding to the complexity of navigating the work zone. Average cell use while driving in the Dallas/Fort Worth area is 6 percent, according to National Highway Traffic Safety Administration estimates. TTI researchers noted 12 percent usage in the DFW Connector work zone. Researchers feel that cell phone use could be a contributing factor to increased property damage crashes, although data did not allow them to make a causal link.

"We're trying to get drivers to slow down and pay attention. The landscape for that construction project can change almost on a daily basis as you're going through. There are crashes. And, the rate of cell phone usage is twice what you'd normally see," Crawford says.

The study determined that drivers do not accurately perceive the safety risks involved with distracted driving in a complex construction zone like the DFW Connector.

The contractor has already acted on the findings. "Since we came out with the cell phone study, the contractor has implemented a number of coordinated campaigns, through banners and bumper stickers," says Crawford. "The campaigns encourage drivers to slow down and pay attention." The banners state, "Please don't text and drive. My Daddy Works Here," and "Let us work safely. Drive 50 mph!"

"They're trying to increase awareness, not only for their guys, but also for the motoring public," Crawford explains.

The study also recommends changes to lane-shift locations and markings, lighting practices and site maintenance to make the DFW Connector the safest work zone possible.

FOR MORE INFORMATION
Contact Jason Crawford at (817) 462-0534 or jcrawford@tamu.edu.

It's Confirmed: Driving's a Full-Time Job —

How Texting Impairs Driving Performance

Researchers and safety advocates have known for years that driving performance worsens when the driver is texting. Now we know just how *much* worse.

Federal statistics suggest that distracted driving contributes to as much as 20 percent of all fatal crashes, and that cell phones constitute the primary source of driver distraction. Researchers point to two numbers to illustrate the magnitude of the texting-while-driving problem: an estimated 5 billion text messages are sent each day in the United States, and at least 20 percent of all drivers have admitted to texting while driving.

The study consisted of three major steps. First, participants typed a story of their choice (usually a simple fairy tale) and also read and answered questions related to another story, both on their smart phone in a laboratory setting.

Each participant then navigated a test-track course involving both an open section and a section lined with construction barrels. Drivers first drove the course without texting and then repeated both lab tasks separately while driving through the course again. Throughout the test-track exercise, each participant's reaction time to a periodic flashing light was recorded.

Reaction times with no texting activity were typically between one and two seconds. Reaction times while texting, however, were at least three to four seconds.

Worse yet, drivers were more than 11 times more likely to miss the flashing light altogether when they were texting.

Texas Transportation Institute (TTI) Assistant Research Scientist Joel Cooper directed the study along with TTI colleagues Christine Yager, associate transportation researcher, and Sue Chrysler, manager of TTI's Human Factors Program. The research involved 42 participants between the ages of 16 and 54 and was funded by the Southwest Region University Transportation Center.

In addition to the reaction-time element, researchers also measured each driver's ability to maintain proper lane position and a constant speed. Major findings further documented the impairment of texting when compared to the controlled driving conditions. Drivers were less able to:

- safely maintain their position in the driving lane when they were texting, and their swerving was worse in the open sections of the course than in the barreled sections.
- maintain a constant speed while texting, tending to slow down in an effort to reduce the demand of the multiple tasks. By slowing down, a driver gains more time to correct for driving errors (such as the tendency to swerve while texting). Speed variance was also greater for texting drivers than for non-texting drivers.

This work will produce one of the first and only studies in the nation conducted in an actual driving environment. That distinction is important, researchers say, because while simulators are useful, the dynamics of an actual vehicle are different, and some driver cues can't be replicated in a simulator. By using a closed course, researchers can create an environment similar to real-world driving conditions while providing a high degree of safety for the participants.

"Most research on texting and driving has been limited to driving simulators. This study involved participants driving an actual vehicle," Yager says. "So one of the more important things we know now that we didn't know before is that response times are even slower than we previously thought."

"Most research on texting and driving has been limited to driving simulators. This study involved participants driving an actual vehicle."

Christine Yager, TTI Associate Transportation Researcher

The researchers also examined the productivity level of each driver, measuring the amount of texting activity they could perform while driving. Drivers were generally able to complete about half the exercise content behind the wheel compared to what they could do in the lab setting.

"There's a general assumption by some people who believe they're being more productive if they're exchanging messages while they drive because they're performing two tasks at once," Cooper says. "But our findings suggest that the productivity level for each of those tasks drops to less than half what it should be. That indicates to us that texting while driving is not only unsafe, it's also inefficient."

The researchers say that another finding from the study dispels a common misconception that composing a text message is a more demanding task than reading one. In post-study interviews, a majority of study participants held that belief, but study results found significant impairment from both reading and writing.

"The findings of this study extend to other distracting activities involving reading and writing, such as checking email or Facebook, while driving," notes Chrysler.

The total distance covered by each driver in the study was slightly less than 11 miles. In the interest of safety for both participants and the research staff, researchers minimized the complexity of the driving task, using a straight-line course that contained no hills, traffic or potential conflicts other than the construction-zone barrels. Consequently, the driving demands that participants encountered were considerably lower than those they would encounter under real-world conditions.

"It is frightening," the researchers wrote, "to think of how much more poorly our participants may have performed if the driving conditions were more consistent with routine driving."

FOR MORE INFORMATION
Contact Christine Yager at (979) 845-6528 or c-yager@ttimail.tamu.edu.

TTI research proves that keeping your eyes on the road really does make a difference. Texting while driving was found to double the reaction time of drivers, while myths, such as "texting while driving saves time," were challenged by the study's findings.

TTI Research Makes the Roadside Safer

Scanning Facility Opens at Riverside, Broadens Research Capabilities

TTI Student Technician Hillary-Anne Metcalfe measures a component using the FARO arm.

To further its effort under a grant from the U.S. State Department, the Texas Transportation Institute (TTI) has acquired a computer-modeling scanning system that ensures the Institute's stature as one of the premier crash-testing facilities in the world.

The three-dimensional scanning device, called a FARO® Edge, allows TTI to scan vehicle parts and components of roadside safety and perimeter security devices for use in computer modeling to predict how they might react in a crash. (For more information about the FARO scanning system, view the company's website at http://www.faro.com/edge/us.)

"Combining this new tool with our impact analysis software, TTI will be able to offer added value to our sponsors," says Research Scientist Akram Abu-Odeh of TTI's Roadside Safety and Physical Security Division.

"Full-scale crash tests are very expensive," says Abu-Odeh. Computer modeling can be used to evaluate the impact performance of a device and, if needed, to permit the device to be modified prior to performing expensive crash tests." In addition, Abu-Odeh says that computer modeling reduces the overall development cost of a product by decreasing the number of crash tests needed to arrive at a successful design.

The laser-scanning device is being used to meticulously map each component of a recently manufactured truck.

"Once we scan the entire truck with the FARO arm, we can begin doing computer-simulated crash tests on the various security devices being used at U.S. facilities overseas," says TTI Associate Transportation Researcher Michael Brackin, who is co-leading the scanning project with Abu-Odeh.

It will take a full year to scan each component and develop the detailed finite element model of the truck.

"We are extremely pleased to have this sophisticated technology available for our program," TTI Assistant Agency Director Dean Alberson says. "It greatly enhances our research capabilities and will undoubtedly open the door for other work."

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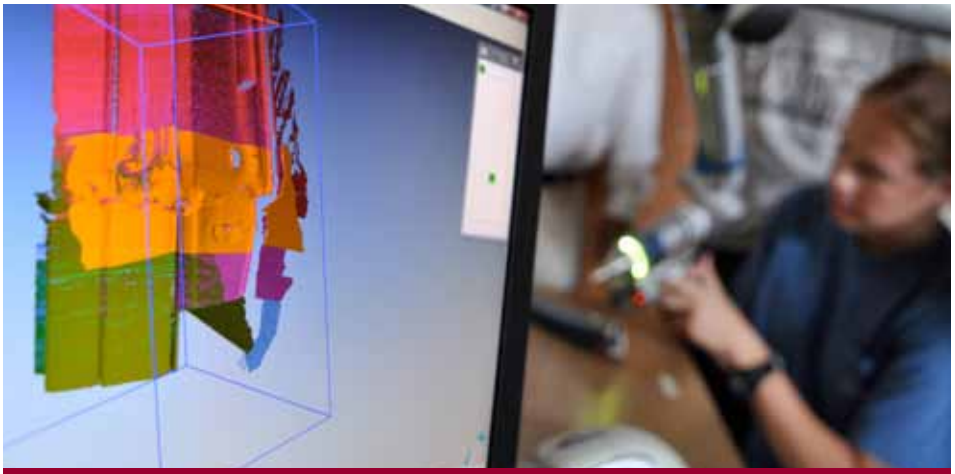
>
> *Dean Alberson, TTI assistant agency director*

FOR MORE INFORMATION
Contact Akram Abu-Odeh at (979) 862-3379 or abu-odeh@tamu.edu, or Michael Brackin at (979) 845-2019 or m-brackin@ttimail.tamu.edu.

TTI Research Scientist Akram Abu-Odeh (right) and TTI Student Technician Michael Brock prepare a component for measurement.



The impact analysis software used by TTI has the potential to save sponsors thousands of dollars when conducting full-scale crash tests.

"The only damage was that the sign was bent a little. The system worked like it was designed to. Great product..."

email from KDOT

This SLIP SAFE™ sign performed as designed in a crash in Kansas.

SLIP SAFE Breakaway System Goes Big in Kansas

Joe Frazzetta of Nucor Steel-Marion Inc. is a believer. He decided to approach state departments of transportation (DOTs) with a Texas Transportation Institute (TTI)-designed and crash-tested product that has, for the most part, "needed a jump start regarding promotion and marketing."

It's called a SLIP SAFE™ breakaway system, designed for locations where signs are frequently hit. When a vehicle impacts a sign post, Nucor's slip base allows the post to release from the base, causing minimal damage to the vehicle and the sign, depending on vehicle speed. The base remains in place, and with a new retainer plate, the existing sign and post are easily replaced, saving DOTs maintenance costs.

"The Kansas Department of Transportation [KDOT] told me they had a problem location where warning signs were always being knocked down by traffic," Frazzetta said. "Working with KDOT, we put up SLIP SAFE units with our channel posts as part of a trial effort."

Sure enough, a sign was hit, and someone with KDOT went out to take a look. The employee took pictures and sent an email to his boss. Those pictures and the email found their way to Frazetta's inbox: "The only damage was that the sign was bent a little. The system worked like it was designed to. Great product. The Nucor system has less parts and less damage when hit, very easy to repair."

Tried and True — ET-2000 Guardrail Still Saving Lives

Most drivers throughout Texas and the country have seen the black-and-yellow-striped guardrail impact device known as the ET-2000 and not given it a second thought. Donny Ohana, undoubtedly, will never see them the same.

Recently, Ohana, his brother and two friends were traveling in a small car down a feeder road in Houston off I-610. As he sped up to enter the ramp, he lost control of his vehicle and impacted the guardrail head-on, eventually coming to a stop on a hill on the roadside.

"I looked around and saw that I was OK, and that my brothers and friends were OK," says Ohana. "I couldn't believe what had just happened. I was just sitting there scared.

"I'll never forget this. One of the cops came up to me and said, 'You know, you are very lucky because if the old guardrail was still there or a different system was in place, it would have gone right through your windshield.'"

The Texas Transportation Institute (TTI)-developed guardrail worked as designed, curling up upon impact and dissipating the forward motion of the car.

"That is one of the most notable inventions and safety devices that has ever been developed at TTI," says retired TTI Research Engineer Hayes Ross, who was the principal investigator for the ET-2000. "You don't have to go along far on any highway in the United States or other countries to recognize some of the hardware and safety features that were developed at TTI."

Familiar sight: the ET-2000 guardrail end treatment.

"I'll never forget this. One of the cops came up to me and said, 'You know, you are very lucky because if the old guardrail was still there or a different system was in place, it would have gone right through your windshield.'"

Donny Ohana

To see a video featuring Donny Ohana and other TTI videos, please visit our YouTube channel at http://www.youtube.com/user/ttitamu.

TTI Study Underscores Safety Benefits of Red-Light Cameras

> "As a former police officer, I've seen the aftermath of some really devastating crashes. Through research, we're driven to better understand why red-light running crashes occur, and how we can suggest countermeasures that reduce the social harm that these tragic events generate."
>
> *Troy Walden, TTI Associate Research Scientist*

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Public policy and public opinion don't necessarily go hand in hand, but when it comes to red-light cameras, two new studies suggest they do. According to the Insurance Institute for Highway Safety (IIHS), most drivers like the cameras. And according to the Texas Transportation Institute (TTI), they work.

The TTI study, although limited to Texas, is one of the most extensive in the nation and focused on the safety aspects of red-light camera use. The primary objective of the study, sponsored by the Texas Department of Transportation, was to evaluate the effectiveness of automated traffic enforcement systems in reducing right-angle, rear-end and other crash types at signal-controlled intersections across the state, and to report the findings surrounding crash incidence at those intersections.

Researchers examined more than 11,000 records of crashes occurring at the 275 intersections statewide where cameras were in place, and compared crash frequencies one, two and three years before and after installation of the cameras.

An overall reduction of 633 crashes recorded at those intersections represents an 11 percent decline. Red-light-related crashes dropped by 25 percent, and right-angle crashes (the most severe type) dropped by 32 percent. The reductions were seen across the board on all types of roadways, including business/primary roads, farm-to-market roads, interstate access roads, state highways and U.S. highways.

Researchers also compared crash frequencies at different intervals before and after cameras were installed. The examination showed a 23 percent drop from one year before to one year after cameras were put into use. The two- and three-year comparisons reflected reductions of 27 percent and 21 percent, respectively.

"These findings show clearly that red-light cameras offer significant safety benefits," says Troy Walden, the lead researcher on the TTI study. "Most importantly, they help prevent the most severe and deadly type of intersection crashes."

Publication of Walden's research comes soon after another study showing that a majority of drivers support the use of the cameras. Focusing on 14 cities in nine states that had red-light camera programs in place, the IIHS found that two-thirds of drivers favored the cameras, and 59 percent believed that the cameras had made intersections safer.

"Most drivers don't buy the argument that it's somehow wrong to enforce the law just because you're using a camera to do it," says Anne McCartt, senior vice president for research at IIHS. "They understand that this technology is preventing crashes in their cities."

According to the National Highway Traffic Safety Administration, red-light running causes more than 100,000 crashes and nearly 1,000 fatalities every year, and right-angle crashes account for 46 percent of all intersection-related collisions.

"As a former police officer, I've seen the aftermath of some really devastating crashes," Walden said. "Through research, we're driven to better understand why red-light running crashes occur, and how we can suggest countermeasures that reduce the social harm that these tragic events generate."

Getting It Write — New Crash-Reporting Form for Texas Law Enforcement

If you want safer roads, you have to have accurate and effective crash reporting. The forms used to gather information about crashes are an essential first step in the process.

Early this year, the Texas Transportation Commission approved a new form giving law enforcement officers an option when it comes to reporting crashes. Designed to make crash scene reporting easier and more accurate, the form is the result of teamwork between the Texas Department of Transportation (TxDOT) and the Texas Transportation Institute (TTI).

"Because traffic statistics determine so many things related to safer roads — how safety dollars are spent and what transportation research is conducted — accurate crash reporting is critical," explains Troy Walden, associate research scientist in TTI's Center for Transportation Safety. "We think the new form could have an important impact on safety…and we're especially pleased that it meets the needs of TxDOT."

Walden says that some law enforcement officers across the state were experiencing frustration with the crash-reporting form that went into effect in January 2010. "In July of last year, TxDOT challenged us to come up with a new, user-friendly version that would satisfy the needs for data collection by law enforcement in the field, but also conform to the data entry requirements needed for proper coding into the Crash Records Information System," Walden says.

Walden and Senior Research Specialist Bob Gilbert, both former law enforcement officers, conducted numerous forums and surveys with agencies across the state to assess the usability of the previous version of the form. Gilbert and Walden say the result was a new form that some feel is simpler to use, takes less time to complete and was tested to be more accurate than the form currently in place. In addition, it conforms to the reporting requirements that TxDOT outlined as priorities.

"Because traffic statistics determine so many things related to safer roads — how safety dollars are spent and what transportation research is conducted — accurate crash reporting is critical. We think the new form could have an important impact on safety…and we're especially pleased that it meets the needs of TxDOT."

Troy Walden, TTI Associate Research Scientist

Officers who wanted a change said they liked numerous aspects of the new form, including:

- crash codes added directly to the form that allow officers to write a description of a crash without having to refer back to confusing code sheets,
- larger font sizes and data fields, and
- a simplified and logical format.

The new form has been available for use across the state since July 1, 2011. Agencies have the option of using either the new or older form.

"We have not heard any complaints about the new version from law enforcement agencies," TxDOT Traffic Operations Director Carol Rawson says. "And in this case, I really think no news is good news. It's good that law enforcement officers have a choice, especially if it makes their job easier."

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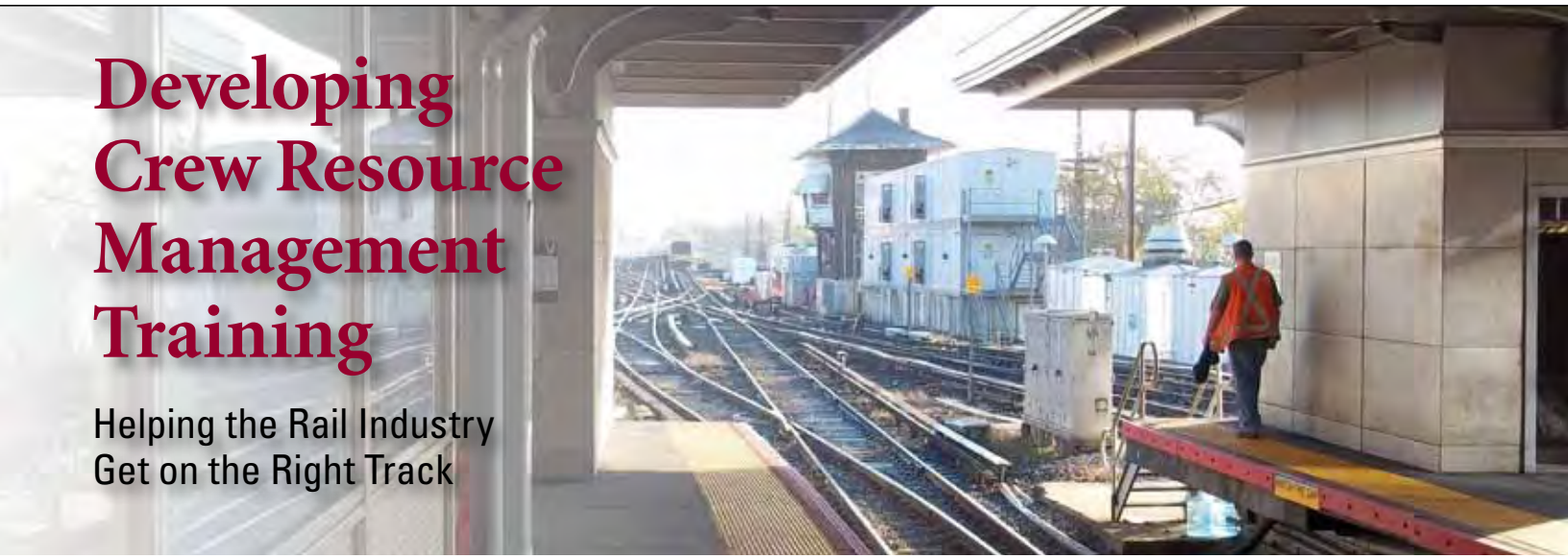
Developing Crew Resource Management Training

Helping the Rail Industry Get on the Right Track



To lessen the number and severity of train incidents, the Texas Transportation Institute's (TTI's) Rail Research Program is developing course materials for the Long Island Rail Road (LIRR), the oldest and busiest passenger railroad still operating under its original name and charter in the United States.

"LIRR management is taking a very proactive approach to changing its culture and improving safety," says Curtis Morgan, TTI Multimodal Freight Transportation Program manager. "This is the beginning of the process . . . but will be spread to the various groups within the company."

To create the course materials, TTI is building upon the team safety concept of crew resource management (CRM), first developed by NASA and the commercial airline industry. CRM's original purpose was to help avoid crashes resulting from pilot error by identifying and preventing potential problems before they occur or by mitigating the effects of minor errors before they result in a major incident. Research showed that many crashes resulted not from operator error, but from poor communication and resource coordination among flight crew members. CRM addresses these fundamental problems by emphasizing a teamwork approach to improving safety. Time has proven the value of CRM to the airline industry via improvements in crew member proficiency, communication and teamwork, conflict resolution, and the maintaining of situational awareness.

TTI's work with the Long Island Rail Road aims to increase rail safety by improving intra-team communication among rail-industry personnel.

Rail industry leaders began adapting CRM to their own needs, though until recently those efforts were largely limited to training engineers and conductors. TTI's approach will widen the training to the larger teams supporting passenger movement, specifically in the area served by LIRR.

"Sometimes, rail crews become so bogged down with their own individual assignments, they lose sight of the big picture," says TTI Associate Research Scientist Les Olson, head of the LIRR project. "This team-based concept will help railroad personnel anticipate, prevent and minimize incidents."

The current project builds on research conducted by TTI from 2002 to 2007. At that time, the Federal Railroad Administration sponsored TTI to conduct an assessment of rail industry needs regarding CRM. The Institute studied railroads, including Class I railroads, a shortline/regional railroad, a commuter railroad and the national intercity passenger railroad (Amtrak). This survey yielded quantifiable characteristics of how teams work together across the industry.

TTI also found that combining cognitive training methods (e.g., traditional and multimedia-based instruction, computer-based training, and written exercises) with behavioral training methods (e.g., roleplaying, group exercises and simulation) yields the most effective instruction. Subsequent studies included a pilot test of the TTI-developed CRM curriculum at BNSF Railway and a business-case study to show the potential value of implementing CRM in the railroad industry.

Olson explains that once the LIRR management personnel have received the new training, LIRR will provide CRM training to their remaining employees. The project is expected to last one to two years as the CRM materials are developed and adopted into LIRR's existing training programs.

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ITE Recognizes Teens in the Driver Seat

TTI's Teens in the Driver Seat® (TDS) is the recipient of the Institute of Transportation Engineers' 2011 Transportation Achievement Award in Safety. TDS Program Director Russell Henk was presented with the award at the ITE Annual Meeting in St. Louis Aug. 15. This is the second time TDS has received the award, the first time being in 2007.

TDS is the nation's first peer-to-peer program focusing solely on teen-driver safety. Its goal is to prevent crashes by raising awareness of the top driving dangers for young drivers and supporting teens' efforts to develop and deliver safety messages to their peers. Student teams at more than 500 Texas schools have started TDS programs, reaching more than half a million of their peers with safe-driving messages. Other states, including Connecticut, Georgia, North Carolina and California, are now implementing TDS programs.

"Most young drivers don't know that they're many times more likely to die in a crash than people in other age groups," Henk says. "This award signifies the importance of what TDS is all about — saving lives. It's working, and we are all extremely proud and honored by the recognition the program is receiving." ■

Russell Henk receives his ITE award from International President Robert C. Wunderlich.

Freight Pioneer Inducted into Texas Transportation Hall of Honor

Callan

The founder of Central Freight Lines, Inc., William Woody Callan, was inducted into the Texas Transportation Hall of Honor July 27. Callan becomes the 33rd member of the Hall of Honor, established in 2000 by the Texas Transportation Institute as a way to recognize select individuals who played pivotal roles in the advancement of transportation in Texas and the nation.

Gary Thomas, vice president for safety, compliance and training (retired) of Central Freight Lines, provided comments about Callan's career. Robert Braswell, Callan's grandson, accepted the recognition for his grandfather on behalf of the Callan family. Callan was the first individual inducted into the Transportation Hall of Honor who devoted his career to the trucking industry.

"If I were to describe Mr. Callan in one word, it would be 'visionary,' " said Thomas. "Over the course of its 86 years of operation, third and fourth generations of families have made their careers at Central because of the vision of Mr. Callan." Braswell spoke of his grandfather's ingenuity, integrity and dedication to his employees, most of whom he knew by name.

Callan founded the company in 1925 with a Model-T truck and built Central into the largest intrastate, regular-route common carrier in the nation, employing over 4,500 people and serving 1,200 Texas cities and towns. He retired as president of the company in 1952, served as chairman of the board, and was active in transportation and community affairs until his death in 1987. ■

Little Becomes ASCE Distinguished Member

Little

Dallas Little, TTI senior fellow and associate director of the International Center for Aggregates Research, has been selected as a distinguished member of the American Society of Civil Engineers (ASCE). Little is also a regent's professor and the E.B. Snead Chair of Transportation and Civil Engineering in Texas A&M University's Zachry Department of Civil Engineering.

Second only to ASCE president, distinguished membership is ASCE's highest recognition. Little will be formally inducted during the 141st Annual Civil Engineering Conference in Memphis, Tenn., in October. Since 1852, only 615 individuals have been elected to distinguished membership. During his career, Little has been the recipient of numerous awards and recognitions and has served on many boards and review panels. ■

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.

TexITE Outstanding Chapter

The Texas A&M Institute of Transportation Engineers (ITE) Student Chapter was named the Texas District of ITE (TexITE) outstanding student chapter for the 2010–2011 school year. The members are now entered into the ITE international competition. Also, Texas A&M University student Kai Yin was the recipient of the TexITE outstanding student paper award. Yin's paper, "Control Delay for Signalized Intersections with Left-Turn Bay Blockage," will now compete in the ITE Daniel Fambro Outstanding Student Paper competition. ■

Kay Fitzpatrick receives her ITE award from International President Robert C. Wunderlich.

TTI Researchers Receive Awards at Annual ITE Meeting

The Traffic Engineering Council Technical Committee on *Pavement Marking Patterns Used at Uncontrolled Pedestrian Crossings: An Informational Report* was selected to receive the Institute of Transportation Engineers' (ITE's) 2011 Coordinating Council Best Project Award. Kay Fitzpatrick, research engineer at the Texas Transportation Institute (TTI), chaired the committee, and TTI Assistant Research Engineer Marcus Brewer was also a committee member.

The report can be used by decision makers and practitioners to assist in developing or refining policies and practices for applying pavement markings at uncontrolled pedestrian crossings. It also identifies opportunities to educate or support these users regarding the application of pavement markings at uncontrolled pedestrian crossings.

"The technical committee included 14 members who, among other tasks, provided insights into U.S. and Canada regional differences in how crosswalk markings are selected," says Fitzpatrick. "ITE and ITE technical committees provide a wonderful opportunity for interactions on a national level, and this technical committee benefited from the discussions we had during the committee's activities. We are pleased that ITE recognized our efforts with this award."

The ITE Coordinating Council Best Project Award may be given annually for technical committee excellence. The award recognizes an outstanding contribution to the ITE Coordinating Council through excellence in an ITE Coordinating Council project committee report. ■

Norboge, Welkener Honored by Texas Senate

Norboge

Welkener

Two students working for TTI are among seven Texas A&M University students who have been honored by the Texas Senate. Nicholas Norboge was a legislative liaison for TTI, and Craig Welkener was a legislative analyst for the Institute.

The students were enrolled in the Master of Public Service and Administration Program at the Bush School of Government and Public Policy and took part in the Bush Legislative Capstone Program. The new program allows students to work closely with legislators, committees and agencies. The Texas Senate approved a resolution honoring the students for their service during the 82nd legislative session. ■

Epps Inducted into NCAT Wall of Honor

Epps

TTI Executive Associate Agency Director Jon Epps was selected for the National Center for Asphalt Technology's (NCAT's) inaugural Wall of Honor during an award ceremony at Auburn University Aug. 8. Epps has served on NCAT's board of directors since its inception in 1986.

In honoring Epps, a plaque that bears his likeness reads: "His strong knowledge of NCAT operations allowed him to provide guidance to the board and to the NCAT director. He also served as a professor training course instructors. Jon deserves credit for helping develop the national road map for asphalt research."

Including Epps, NCAT inducted 18 members to its newly initiated Wall of Honor to signify the organization's 25th anniversary and plans to add two additional members each year.

NCAT was created through an agreement between the Research and Education Foundation and Auburn University. NCAT is considered a world leader and authority in hot-mix asphalt research, development, technology and education. ■

2011 Buchanan Lecture

Cold War Legacy — Design, Construction and Performance of a Land-Based Radioactive Waste Disposal Facility

Nov. 11, 2011, at 2 p.m.
Brazos Amphitheater at the College Station Hilton

The lecture will be followed by a reception at the home of Janet and Jean-Louis Briaud.

Zachry Department of CIVIL ENGINEERING TEXAS A&M UNIVERSITY

Speaker Dr. Rudolph Bonaparte, CEO of Geosyntec

TTI Leads Mileage-Based User Fee Conference

Some 115 federal, state and local government representatives, transportation system users, private-sector representatives, and transportation researchers attended the Symposium on Mileage-Based User Fees (MBUFs) in Breckenridge, Colo., June 13–14. TTI's University Transportation Center for Mobility co-sponsored the event along with the University of Minnesota's Humphrey School of Public Affairs, Move Colorado and the Transportation Research Board.

MBUFs, also known as vehicle-miles-traveled fees, would raise funds based on how many miles a motorist drives. Revenue generated would replace or supplement the fuel tax.

"Interest [in this topic] is really growing at the state and national levels," says symposium co-chair Ginger Goodin. Goodin is currently serving as principal investigator for a U.S. Department of Transportation study on road-user fee collection technologies and is TTI's resident expert on the topic. The three most popular questions on attendees' minds involved how to implement MBUFs, coordinating research efforts on the topic and increasing public acceptance of the concept.

The four state departments of transportation — Oregon, Minnesota, Texas and Nevada — actively involved in MBUF research and testing were all represented at the conference. Alex Hergott, from Sen. James Inhofe's office, discussed federal policy issues related to MBUFs via Skype. Private entities, such as the American Trucking Association, AAA and GMAC Insurance, also presented their views. ■

AWAM Named Most Innovative Use of Technology

TTI's patent-pending Anonymous Wireless Address Matching (AWAM) system took center stage May 19 when Houston's TranStar was given the Most Innovative Use of Technology Award by the Center for Digital Government. The center is a national research and advisory institute on information technology policies and best practices in state and local government.

Developed by TTI Senior System Analyst Mike Vickich, Research Scientist Darryl Puckett and Research Engineer Tony Voigt, AWAM is a traffic-monitoring system consisting of Bluetooth®-enabled sensors placed along I-45 from Houston to Dallas. It allows TranStar to monitor the 200-mile stretch of highway, which is a major evacuation route. The interstate was turned into a parking lot in 2005 as Houston residents attempted to flee Hurricane Rita.

"The AWAM system that TTI developed leverages the use of applied research with widely available technology for the benefit of traffic management and traveler information," Vickich says.

Soon after the hurricane, TTI, the City of Houston and the Texas Department of Transportation worked together to come up with a solution to the chaos caused by the evacuation. "Knowing in real time what the traffic conditions are allows TranStar to open up contra-flow lanes as northbound lanes become congested during an evacuation," says Voigt. ■

A travel-time monitoring station using TTI-developed software called AWAM is mounted on a light pole along I-45.

Finley Elected President-Elect of TexITE

Finley

Texas Transportation Institute Associate Research Engineer Melisa Finley was recently elected to serve as vice president/president-elect of the Texas District of the Institute of Transportation Engineers (TexITE). Finley will begin her term as vice president on Jan. 1, 2012, and then serve as president in 2013.

Finley's duties include chairing the program committee and developing the technical programs for the biannual meetings.

"It's a big honor to be elected by my peers to this position," says Finley, who currently serves as secretary/treasurer. "I've been active in TexITE since I was an undergraduate student, and it's always been one of my professional goals to be elected president."

Finley also helped to establish the Brazos Valley Section of TexITE.

TexITE is a professional organization for individuals in transportation who reside in Texas. Through this organization, transportation professionals strive to help Texans provide a safer, cleaner, and more convenient and efficient transportation system. ■

2011 Buchanan Lecturer Selected

The 2011 Buchanan Lecture will be held at the College Station Hilton Nov. 11. Created in 1992 to honor a world leader in soil mechanics and foundation engineering (as well as a distinguished Texas A&M University professor), the Buchanan professorship supports a wide range of enriched educational activities in civil and geotechnical engineering. In 2002, this professorship became the Spencer J. Buchanan '26 Chair in Civil Engineering.

Dr. Rudolph Bonaparte, the CEO of Geosyntec, has been selected as the 2011 Buchanan lecturer. Bonaparte's lecture will be "Cold War Legacy — Design, Construction and Performance of a Land-Based Radioactive Waste Disposal Facility." ■

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Publications

TECHNICAL REPORTS

Benefits of Public Roadside Safety Rest Areas in Texas: Technical Report, by Jodi Carson, **0-6267-2**, July 6, 2011.

Development of Guidelines for Triple Left- and Dual Right-Turn Lanes: Technical Report, by Scott Cooner, **0-6112-1**, July 28, 2011.

Development of a MASH TL-3 Median Barrier Gate, by Roger Bligh, **9-1002-2**, June 23, 2011.

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

Development of the Texas Revenue Estimator and Needs Determination System (T.R.E.N.D.S.) Model: FY 2010 Activities, by David Ellis, **0-6395-TI-2**, July 18, 2011.

Evaluation and Development of Pavement Scores, Performance Models and Needs Estimates: Phase I Activities, by Nasir Gharaibeh, **0-6386-2**, July 18, 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.

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

Landside Freight Access to Airports: Findings and Case Studies, by Bill Frawley, **0-6265-1**, June 16, 2011.

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

Peer Grouping and Performance Measurement to Improve Rural and Urban Transit in Texas, by Jeff Arndt, **0-6205-1**, July 1, 2011.

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

Rapid Field Detection of Sulfate and Organic Content in Soils: Technical Report, by Pat Harris, **0-6362-1**, June 27, 2011.

Rural Planning Organizations — Their Role in Transportation Planning and Project Development in Texas: Technical Report, by John Overman, **0-6483-1**, July 6, 2011.

Synthesis and Study of the Roadside Vegetation Establishment Process, by Beverly Storey, **0-5731-1**, June 14, 2011.

Treatments to Reduce the Frequency of Freeway Exit Sign Hits, by Geza Pesti, **0-6120-1**, June 23, 2011.

Work Zone Positive Protection Guidelines, by Jerry Ullman, **0-6163-1**, June 15, 2011.

PROJECT SUMMARY REPORTS AND PRODUCTS

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

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

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

Prototype Design for a Predictive Model to Improve Evacuation Operations, by Russell Henk, **0-6121-S**, May 18, 2011.

Roadside Vegetation Establishment Quick Reference Field Guide, by Beverly Storey, **0-5731-P1**, June 14, 2011.

Rural and Urban Transit District Benchmarking — Effectiveness and Efficiency Guidance Document, by Jeff Arndt, **0-6205-P1**, June 30, 2011.

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

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

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

TTI PUBLICATIONS

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