

TEXAS TRANSPORTATION

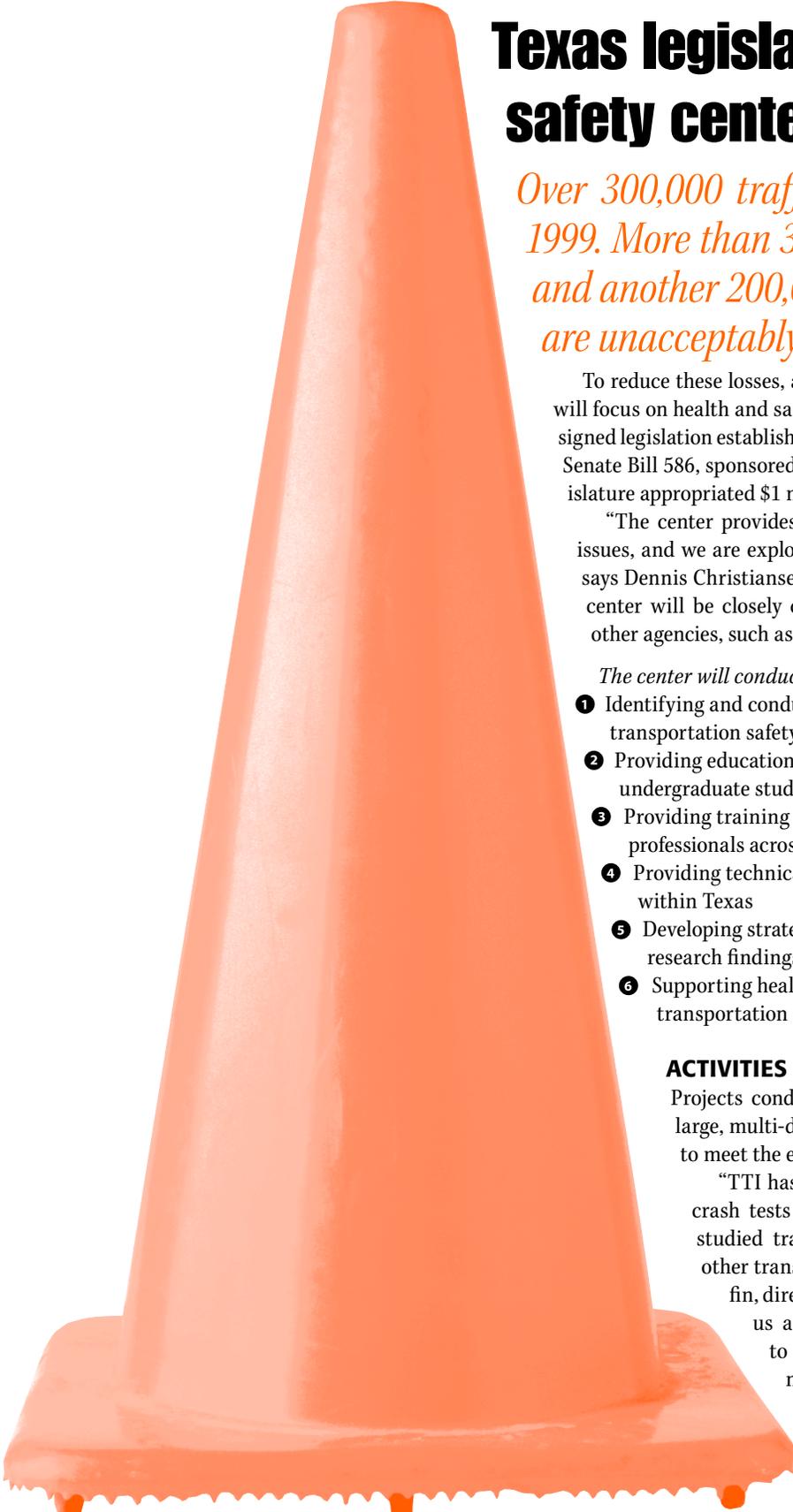
# Researcher

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**Improving Work Zone Safety**

**Enhancing Pedestrian and  
Transit Safety**

**Cutting-Edge Crash Testing**



## Texas legislature establishes safety center at TTI

*Over 300,000 traffic crashes occurred in Texas in 1999. More than 3,500 people died in those crashes and another 200,000 suffered injuries. Those losses are unacceptably large.*

To reduce these losses, a new center at the Texas Transportation Institute (TTI) will focus on health and safety issues associated with transportation. The Governor signed legislation establishing the Center for Transportation Safety on June 13, 2001. Senate Bill 586, sponsored by Senator Steve Ogden, created the center, and the legislature appropriated \$1 million to support the center in the coming biennium.

“The center provides TTI with tremendous opportunities to address safety issues, and we are exploring a number of intriguing projects and partnerships,” says Dennis Christiansen, deputy director of TTI. “Work performed through the center will be closely coordinated with safety-related work being pursued by other agencies, such as the Texas Department of Transportation.”

*The center will conduct projects targeted to six main goals:*

- 1 Identifying and conducting research that will enhance transportation safety
- 2 Providing educational opportunities for graduate-level and undergraduate students
- 3 Providing training and continuing education to transportation professionals across the country
- 4 Providing technical assistance to state, county and local agencies within Texas
- 5 Developing strategies to help implement transportation safety research findings
- 6 Supporting health-related and safety-related activities of other transportation organizations

### ACTIVITIES OF THE CENTER

Projects conducted at the center will be chosen to complement the large, multi-disciplinary program of ongoing research within TTI and to meet the expectations of the state legislature.

“TTI has a strong history of safety research. We have conducted crash tests to develop and test roadside appurtenances. We have studied traffic operations, geometrics, human factors and many other transportation topics that relate to safety,” says Lindsay Griffin, director of the center. “The transportation safety center gives us an opportunity to work more effectively and efficiently to reduce deaths and injuries in Texas and throughout the nation.”

As the center develops, it will:

- Develop and prioritize a research agenda for transportation safety

- Create a focal point for transportation safety research in Texas
- Provide coordination and increase awareness of transportation safety activities
- Serve as a dissemination point for relevant information
- Offer professional development opportunities
- Evaluate existing and proposed traffic safety programs and policies
- Coordinate and integrate key databases
- Assist in formalizing partnerships between the many organizations and agencies with an interest in transportation safety

## BUILDING PARTNERSHIPS FOR SAFETY

In addition to building on safety projects within the Institute, the center plans to bring together the many diverse players interested in transportation safety. Center personnel expect to collaborate on a national and statewide level with other agencies and safety centers to maximize joint efforts toward improving transportation safety.

“Although there is some overlap in our expertise and capability, each center has a number of complementary areas that don’t overlap. Even in the areas where we have similar expertise, we may not have staff and resources available at a particular time. By combining our centers’ strengths, we can support and supplement each other’s efforts,” says Doug Robertson, director of the Highway Safety Research Center (HSRC) located at the University of North Carolina – Chapel Hill.

TTI personnel visited HSRC in June, and University of North Carolina personnel traveled to College Station in July. The two safety centers expect to collaborate on a variety of projects, including new initiatives and

amplification of work currently underway.

TTI personnel will work closely with The University of Texas School of Public Health (UTSPH), the Texas A&M Health Science Center and other public health organizations to increase teamwork between engineering and medical aspects of transportation safety. In January, for example, TTI and UTSPH signed a memorandum of agreement formalizing their partnership. The agreement encourages research collaboration between the two institutions, fosters internship and teaching opportunities and provides for exchange of information reflecting each institution’s areas of expertise.

“There are so many areas to explore for collaboration,” says Sharon Cooper, associate professor of epidemiology at UTSPH. “For example, we have faculty members interested in alcohol and transportation safety, occupational safety, seat belt use and many related topics. Some of our students have already been involved with internships at TTI,

and some researchers there have given lectures in our classes. The safety center provides numerous opportunities to work together to enhance the transportation safety equation from both engineering and public health perspectives.”

The center will collaborate on an informal basis with numerous organizations and individuals and is already working to establish formal alliances with organizations such as the American Road & Transportation Builders

Association.

“The center will house a relatively small group of people whose primary mission will be to work in transportation safety from different perspectives. They will identify and fill gaps in research already underway, but our main function will be to coordinate and promote safety projects throughout TTI as well as with other groups already studying transportation safety issues,” says Griffin.



*TTI’s Driving Environment Simulator (DESi) incorporates four computers, three projection units, three projection screens and a specially adapted 1995 Saturn sedan to create a realistic driving environment. The simulator enables researchers to examine behaviors in crash-likely situations repeatedly, without putting the driver’s life at risk.*

## TTI ANNOUNCES SAFETY CENTER DIRECTOR

Dr. Lindsay Griffin has been appointed the first director of the **Center for Transportation Safety** established at the Texas Transportation Institute (TTI) this year. Dr. Griffin is nationally and internationally recognized for his research in transportation safety. He has served in leadership positions at TTI for over 25 years. Dennis Christiansen, TTI deputy director, noted that the Institute is fortunate to have someone with Dr. Griffin’s capabilities and reputation assume the initial leadership role of the center.

Dr. Griffin has been involved in numerous projects to evaluate the effectiveness of programs and products intended to reduce the frequency or severity of traffic crashes. Small sign supports, motorcycle headlight laws, selective traffic enforcement programs, and changes in posted speed limits are some of the topics addressed in these evaluations. He has developed and popularized methodologies to enhance traffic safety program evaluations.

In 1998, Dr. Griffin received TTI’s Charley Wootan Career Achievement Award for Research. He has also served as associate editor of *Accident Analysis and Prevention*.



## Working for safer Roadways

### *A letter from Texas State Senator Steve Ogden*

It's a sad fact that Texas leads the nation in traffic fatalities. In 1998, nearly 4,000 people died on Texas roads; the economic loss associated with traffic crashes in Texas in that year was nearly \$9 billion. Injury is the third leading cause of death overall in Texas, the leading cause of death for Texans 1-44 years of age, and the biggest killer of children. One third of all of these fatal injuries are the result of motor vehicle crashes. As the number of people traveling continues to increase at a more rapid rate than does new roadway capacity, roadway safety will become an even more serious issue in the years to come. Safety is now the top priority at the U.S. Department of Transportation. It should be the top priority in Texas as well.

However, for many years safety research has been somewhat neglected, and funding for technical studies and related work has been limited and sporadic. To help, I authored SB 586 that created the Center for Transportation Safety at the Texas Transportation Institute (TTI). Representative Clyde Alexander, chairman of the House Transportation Committee, sponsored the bill in the House, and Governor Perry signed it into law on June 13, 2001. In addition, the Legislature appropriated \$1 million to support the Center in the coming biennium. TTI is the best and most logical home for this important center because of the Institute's 50-year history of working with public and private sector partners to conduct and implement innovative research in all transportation modes. For example, TTI researchers developed such innovations as breakaway signposts, energy-absorbing guardrails and other life-saving roadside safety devices. The Institute has a well-deserved reputation for quality work, and for focusing on real-world solutions to transportation problems.

Ideally, the Center will be a focal point for transportation safety related activities in Texas. Center researchers will pursue work in such areas as safety management and data systems; driver competency; high-risk drivers; highway infrastructure and operations; vulnerable road users (e.g., bicyclists, pedestrians); truck and bus safety; post crash management; trauma related to highway accidents; and public awareness.

Partnerships will be a key to the Center's success. For example, the Center will be associated with the academic program at Texas A&M University as well as The University of Texas School of Public Health. In addition to working with the Texas Department of Transportation, the Center has sought the participation of other public and private sector partners, such as the AAA Foundation for Traffic Safety, the American Road and Transportation Builders Association, and the American Traffic Safety Services Association. I have great hope for this important research center. There is an urgent need to reduce the human and societal costs associated with traffic safety. The Center for Transportation Safety must play a key role in this effort, and I anxiously look forward to the results.

## Forum encourages multidisciplinary collaboration

The Third Annual Forum on Public Health and Transportation Safety will take place at the Hornberger Conference Center in Houston on March 12-13, 2002. The conference is being cosponsored by Texas Medical Center, the Texas Transportation Institute (TTI), The Texas Department of Transportation (TxDOT), the University of Texas School of Public Health, the Traffic Safety Center of the University of California at Berkeley, and several other organizations and agencies in Texas and around the nation. TTI conducted the first forum in partnership with The University of Texas School of Public Health in 1999.

"We started on a small scale and informal basis with virtually no funds a couple of years ago," recalls Lindsay Griffin, coordinator of the forum and director of TTI's Center for Transportation Safety. "That first year, we brought about forty people together from engineering and public health agencies in an effort to find out what was being done in different areas of transportation safety. Much to my surprise, by the end of the day people were saying to me, 'When can we do this again?'"

The second forum attracted over 100 participants from across the country. "This year we're expanding the conference to two days and we expect a much larger turnout of attendees from a broad spectrum of health and safety disciplines," says Griffin.

The conference takes a multidisciplinary approach to the issue of transportation safety, bringing together professionals from a wide range of health, safety, analytical and engineering specialties. In taking the lead in putting together the forum, TTI will emphasize the common goals of the engineering, public health and medical communities.

In her keynote address at last year's forum, Patricia Waller, senior research scientist emerita at the University of Michigan, noted, "Transportation is an integral part of the fabric of our society. As communities struggle to provide social services, education, health care and job opportunities, again and again transportation emerges as an essential component of any viable solution."

One of the main purposes of the forum is to provide an opportunity for people in divergent areas of public health and safety to interact with each other and develop ways of sharing research, resources and ideas across common areas of interest to safeguard the public health and safety of communities. The forum invites participation from the areas of medicine, rural and public health, research, emergency response, human factors, transportation engineering and a variety of other fields.

"Twenty years ago when I said to people in TTI and TxDOT that highway deaths in Texas and throughout the United States were 'a major public health problem,' people were not very receptive to that choice of words. But today, organizations recognize that highway deaths are indeed a major public health problem that can be more effectively addressed through the combined efforts of engineers and public health professionals. The forum is one of several means by which we are trying to bring these two groups together," says Griffin.

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# Improving Work Zone Safety

## Study tests devices to improve work zone safety

Maintenance crews in short-term rural work zones have a frightening job. They must perform their repair work while on constant alert for drivers who do not regard or notice the warning signs to slow down. In 1999, 372 deaths occurred in work zones in Texas, compared to 342 in 1998, and 209 in 1997. As a result, the Texas Department of Transportation (TxDOT) selected the Texas Transportation Institute (TTI) to investigate new traffic control devices that can improve worker and driver safety.

Short-term rural work zones present special challenges in providing safe conditions for work crews. “When a work zone is only in place for a day, drivers do not have a chance to develop any expectations about the presence or layout of the work zone,” says Michael Fontaine, associate transportation researcher with TTI. “This study attempted to identify devices that would better alert drivers to work zone conditions and motivate them to change the way they drive within the work zone.”

An effective traffic control device in a short-term work zone must be easy to set up and remove without compromising the safety of the workers. Because protective concrete barriers are not used, the key to successful traffic control is to gain the driver’s attention by using devices with high visibility. This study examined a total of nine devices by setting them up in short-term work zones and monitoring their effectiveness at slowing traffic. Two of these devices showed promise for improving work zone safety conditions:

- **The speed display trailer** was the most effective traffic control device tested to control speed in a work zone. Drivers slowed an average of 5 mph in the work zone after passing a speed display trailer. The key advantage of these trailers is that they are easy to set up and dependable. They also have a 130 dB siren that can be activated by vehicles traveling over a preset speed. The siren warns the maintenance crew if a vehicle is approaching at a very high rate of speed.



- **Fluorescent yellow-green vests and hard hat covers** greatly improved worker visibility. These devices are more visible against typical work zone backgrounds and have a greater luminance than the traditional orange garments.

The yellow-green safety vests were shown to greatly increase the visibility of the flaggers and maintenance crews and are currently being distributed to TxDOT personnel. Danny Brown, TxDOT project director, was pleased with the results of the research.

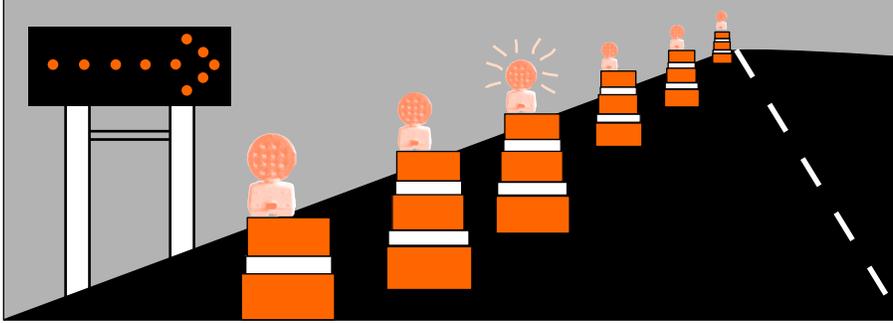
“This project was a big success in terms of identifying devices that help communicate work situations to drivers,” says Brown. “Anytime you can have effective communication between the driving public and the worker in a work zone, it is beneficial for everyone.”



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Related Publications: Report 1879-S, *Use of Innovative Traffic Control Devices to Improve Safety at Short-Term Rural Work Zones*

## Individual Flashing Warning Light System



*The warning system is composed of a series of synchronized individual flashing lights that are attached to drums that form the lane closure taper. This causes a flash of light to “move” from the beginning to the end of the lane closure taper.*

# Work Zone Lane Closure Warning Light System slows urban drivers

Tests of a prototype work zone lane closure flashing warning light system indicate that it may improve traffic and work zone safety by encouraging drivers to exit the closed lane farther upstream. The tests were part of a project sponsored by the Texas Department of Transportation (TxDOT). This system, tested at TTI’s proving grounds at the Texas A&M University Riverside Campus and again in nighttime field studies, helps draw attention to the location of the actual lane closure and indicates the direction drivers need to move.

The warning light system is composed of a series of interconnected, synchronized individual flashing warning lights attached to drums that form the lane closure taper. This causes a flash of light to repetitively “move” from the beginning to the end of the lane closure taper.

Researchers investigated driver performance, understanding and preference for the new system compared to the nighttime lane closure setups currently used by TxDOT. “We found that 62 percent of the drivers participating in the proving grounds studies preferred the ‘moving’ flash of light,” says Jerry Ullman, research supervisor of the project.

At an urban freeway test site, the system significantly reduced the percentage of vehicles in the closed lane 1000 ft before the closure. Researchers were also encouraged by the fact that the effect was even more pronounced for trucks.

“When larger vehicles exit the closed lane farther upstream from the actual work zone, we believe that the safety of both motorists and the workers themselves is improved,” says Ullman. “We think this may be especially true at night when the visibility of a work zone is generally lower.”

Researchers have recommended that TxDOT obtain a modified version of the warning light system for further evaluation. TxDOT submitted and received approval for an official request-to-experiment with this device from the Federal Highway Administration. Currently, the Traffic Operation Division is in the process of identifying a suitable location for more testing.



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Related publications: Report 3983-S, *Work Zone Lane Closure Warning Light System*; Report 3983-1, *Work Zone Lane Closure Warning Light System*

## NATIONAL WORK ZONE SAFETY INFORMATION CLEARINGHOUSE RECEIVES THIRD AWARD

The International Road Federation (IRF) awarded the National Work Zone Safety Information Clearinghouse its prestigious 2001 Global Achievement Award during the IRF Road World Congress, held in June in Paris, France. The clearinghouse is housed at the Texas Transportation Institute (TTI) in College Station and is managed by the American Road & Transportation Builders Association (ARTBA) in Washington, D.C. This marks the third award the clearinghouse has received.

IRF’s annual competition honors organizations that demonstrate excellence and innovation in road development around the globe. The clearinghouse was recognized as the largest “cyber-library” (<http://wzsafety.tamu.edu>) of information on roadway construction safety issues. Sparked by the promotional campaigns of ARTBA and other safety organizations, usage of the clearinghouse has grown dramatically since 1998, with the facility currently handling 24,000 information requests annually from all 50 states and many countries around the world.

“We are obviously very happy with the success of the clearinghouse,” acknowledges Jerry Ullman, who directs the clearinghouse activities at TTI. “However, we recognize the importance of continuous improvement if we are to sustain this success. Under ARTBA’s guidance, we hope to make the clearinghouse even more valuable to the entire highway work zone community in the future.”

# TTI and ARTBA working to strengthen partnership and broaden work zone safety research

*"We believe that this program of targeted research can significantly enhance safety. We are confident that the partnership with TTI will result in a successful program, and we look forward to developing this new program of needed research."*

**Peter Ruane**

*president and CEO of ARTBA*

The Texas Transportation Institute (TTI) and the American Road & Transportation Builders Association (ARTBA) are moving forward with plans to strengthen their relationship in the interest of continuing to promote safety in highway construction work zones and transportation safety as a whole. The two organizations have many common interests, and the National Work Zone Safety Information Clearinghouse, an initiative they have pursued jointly, has received national and international acclaim.

As partners in this new initiative, TTI and ARTBA will pursue a program of relevant research designed to enhance construction safety. "We are discussing ways to continue to build on success of the clearinghouse," says Brad Sant, vice-president of safety and education at ARTBA. "The clearinghouse is an excellent public information source. But there are still a lot of research, consolidation of research, conference, and training opportunities." One of the goals of the TTI-ARTBA partnership will be to get industry stakeholders, ARTBA members and contractors more involved with, and knowledgeable about, work zone safety research.

The research envisioned would go beyond the traditional work zone research done for the most part by university transportation research centers for individual state agencies.

According to Sant, there are a lot of very specialized people at these centers doing excellent work on how to set up temporary traffic control, how to build work zones, how to make roads better and safer, and other areas related to traffic engineer-

ing. However, that group doesn't regularly communicate with a second group that is concerned with worker safety and OSHA-related issues. What happens when you cross over the orange barrels? What's happening to the workers? What are their exposures, and how do those relate to traffic engineering issues?

A third player is the driving public. Why doesn't the public slow down? Safety engineers assume motorists understand they are not supposed to speed in a work zone, but why do they continue to do so? How do safety efforts affect public behavior? What techniques affect behavior of individuals designing work zones, setting up traffic control and working in the zones? How do all these things interact so that everyone can move forward in mass with improved work zone safety?

The questions that need to be thoroughly addressed are endless. "What we hope to accomplish with research coming from this partnership is to step back and look at safety in all the areas from a broad perspective and from a behavioral point of view," says Sant.

Currently, TTI is pursuing additional federal funding to help support this work, and ARTBA plans to help by providing funds, making it a priority on its legislative agenda and helping develop priority work plans for the research.

According to Peter Ruane, president and CEO of ARTBA, "We believe that this program of targeted research can significantly enhance safety. We are confident that the partnership with TTI will result in a successful program, and we look forward to developing this new program of needed research."

Dennis Christiansen, TTI deputy director, noted, "This offers an excellent approach for getting all of the relevant parties involved in a critical research effort, and it also advances TTI's strategic goal of closer industry partnerships."





# Enhancing Pedestrian and Transit Safety

## Safer Crossings

### *Researchers propose pedestrian crossing guidelines and signal warrant changes*

Imagine standing on a corner of an intersection during rush hour. There is no traffic signal or crosswalk, so you must wait for a break in the traffic to hurry across the street, hoping to beat the next round of cars. This is the exact scenario that citizens in many Texas cities are concerned about, particularly when these intersections are in close proximity to busy walking areas, such as parks, public buildings and stores.

The inability to get traffic signals installed at busy intersections prompted the Texas Department of Transportation (TxDOT) to sponsor research on better means of accommodating pedestrians and cyclists in the current pedestrian warrant process. The project, conducted by TTI, also produced guidelines for providing safe and effective pedestrian crossings when a traffic signal is not warranted.

“The public had expressed some concern about the inability to get traffic signals warranted and ultimately installed where there is pedestrian traffic — particularly children, elderly, and/or disabled persons,” says Rick Collins, the TxDOT project director.

One of the criteria used by TxDOT to determine if a traffic signal is needed at a particular intersection is the pedestrian warrant, which is met if the number of pedestrians crossing the intersection is high enough. The pedestrian warrant, one of the 12 warrants used in Texas, is seldom used to require installations of a signal however. The reasons include: most intersections meet vehicle-based warrants first, the warrant requires a high number of pedestrians and the process of data collection is cumbersome. One of the goals of this project was to develop an intuitive pedestrian warrant revision while addressing the concerns of the public.

“Based on the research findings, we proposed three changes to the signal warranting process,” says Paul Carlson, project research

supervisor with TTI. “The first was to modify the vehicle-based volume warrants to include pedestrians and cyclists, the second was to include an adjustment factor that accounts for pedestrian generators in close proximity to the intersection in question, and the final was to include minor revisions to the pedestrian warrant.”

In January 2001, the recommendations for the signal warranting process were presented to the National Committee on Uniform Traffic Control Devices and are being considered for inclusion in a future revision to the *Manual on Uniform Traffic Control Devices*.

The second project goal to develop guidelines for establishing safe pedestrian crosswalks is intended to help districts accommodate needs where traffic signals are not warranted. For example, some of the strategies suggested are:

- **Visibility.** Helps the reaction time for motorists to recognize pedestrians and yield the right-of-way.

- **Controlled Vehicle Speeds.** Slower vehicle speeds increase the reaction time for the motorist and pedestrian.
- **Shortened Distance.** This can be achieved by using curb extensions and providing median islands so pedestrians can wait before crossing opposing traffic.
- **Increased Enforcement.** Periodic police enforcement can help pedestrians gain more respect from motorists.

The *Pedestrian Crossing Guidelines for Texas* is currently available to TxDOT engineers in the districts and is being considered for inclusion in the *TxDOT Roadway Design Manual*. “There are numerous guidelines in existence, but they were spread out among several different reports from other states and were generally not accessible to TxDOT project engineers,” says Shawn Turner, the TTI researcher in charge of the pedestrian guidelines. “TTI summarized and compiled the best recommendations from several reports in the TxDOT guidelines.”



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Related Publications: Report 2136-1, *Revising the Traffic Signal Warrants to Better Accommodate Pedestrians and Cyclists*; Report 2136-P1, *Pedestrian Crossing Guidelines for Texas*.



*TxDOT and TTI are working to better accommodate pedestrians and cyclists – not only at signal crossings, but also where a signal may not be warranted.*

# TRANSIT SAFETY

*TTI researchers and TxDOT work with industry representatives to improve Texas transit system safety programs*

Texas Transportation Institute (TTI) researchers and the Texas Department of Transportation (TxDOT) share the common goal of making travel in the state safer for all, regardless of travel mode. The two agencies are collaborating with transit safety professionals from across the state to advance safety principles at small urban and rural public transit systems.

In a TxDOT-sponsored project, TTI researchers led by Cinde Weatherby Gilliland are developing a guidebook for public transit systems to use to promote safety in their operations. Researchers are working closely with a newly formed organization of public transit safety professionals to develop the guidebook. The Texas Transit Safety Professionals Association (TTSPA) was founded last year by Mark Ostertag, safety coordinator for Austin's Capital Metropolitan Transportation Authority. He serves the organization as its first president.

TTSPA membership includes individuals who spend the majority of their time working in safety or risk management positions in metropolitan transit authorities in the state. The



*(l - r): Robert Davaila, VIA Metropolitan Transit Authority (San Antonio) speaking to Mark Ostertag, Capital Metropolitan Transportation Authority, Janine Sanders, Lubbock CitiBus, and Marie Nichols, First Transit, Inc., Corpus Christi at a meeting of the Texas Transportation Safety Professionals Association.*

organization's mission and the objective of the TxDOT project are nearly identical — to promote the advancement of public transit safety in the state and provide a forum for the exchange of experiences, comparative study and innovative solutions in the transit safety field.

According to Ostertag, "If there is a better way out there to increase passenger safety, reduce accidents or lower costs, members of the TTSPA want to find it. Each member brings a unique set of qualifications and skills to the discussions and allows us to develop better answers than any of us could devise on our own."

In addition to the involvement of the TTSPA, industry representatives from small urban and rural transit providers are involved in the guidebook development: Janine Sanders, safety specialist for CitiBus in Lubbock; and Rene Guajardo, safety and training professional for the Capital Area Rural Transportation System (CARTS) headquartered in Austin.

TxDOT's Public Transportation Division places an emphasis on safety programs. Susan Hausmann, the division's transit system safety manager, is the TxDOT liaison for this project. The division is responsible for the federally mandated safety oversight of the urban passenger rail service in the state and also provides support to transit systems for safety-related issues such as development of drug and alcohol prevention programs.

"We look forward to making the guidebook available to transit systems throughout the state," said Hausmann. "This project illustrates the importance of the TxDOT research program and its ability to address practical problems and issues."



*Rene Guajardo, the director of safety and service quality for Capital Area Rural Transportation System (CARTS), shows Linda Mainor how to perform a pre-trip inspection before she begins her bus route. CARTS drivers perform a daily inspection of their buses, including a check of various items in the engine compartment, the driver's area, operational lights, brakes and suspension, passenger area, wheel chair lift and then a general walkaround.*

The guidebook is scheduled for fall completion. It will include sections on accidents and incidents; alternative fuel safety; customer relations; performance and audits; facility safety; emergency response; employee safety; hazardous materials; and human resource safety and training issues. A feature of the guidebook that will also be of utility to metropolitan transit agencies, as well as the small urban and rural systems, is the availability of examples of existing policies and programs and information on safety training programs and other resources.

The guidebook is being designed for dissemination in both hard copy and electronic format (via CD-ROM and a web site). Forms will be included that can be tailored to agencies for their own use, such as pre-trip inspection forms or accident report forms.



For additional information, contact **Cinde Weatherby Gilliland** at (817) 462-0518 or [cinde-gilliland@tamu.edu](mailto:cinde-gilliland@tamu.edu)

# TTI project assists driver educators

*Freeways, freeway entrance/exit ramps and freeway frontage roads — these are the most difficult roadways for teenagers to drive according to a recent Texas Transportation Institute (TTI) survey. In the same project, sponsored by the Texas Department of Transportation (TxDOT), researchers surveyed older drivers, who responded that driving at night, backing up and passing on two-lane highways were their most difficult driving operations.*

The Insurance Institute for Highway Safety shows that the rate of fatal crash involvements drops to its lowest point for drivers in the 40 to 49 age bracket. Numbers increase for both older and younger drivers. TTI addressed younger and older age categories in a recent project exploring driver knowledge and behaviors that need to be addressed in traffic safety education courses.

The surveys were part of a three-year effort focused on improving driver understanding of traffic control devices. Similarities and differences in responses among age groups can help educators develop materials to address specific groups and problem topics.

“The Texas Education Agency is updating its driver education curriculum,” says TTI researcher Angelia Parham. “The timing of this project was just right to be able to use our results to offer suggestions. Many of the changes we suggested have been incorporated in the curriculum.” Garry Ford, assistant researcher in TTI’s San Antonio office, served on the Texas Education Agency (TEA) driver education curriculum committee and served as liaison between TTI and TEA.

“A lot has been learned about teaching driver education recently,” says Lauralea Bauer, program administrator of Safety and Driver Education at TEA. “For this revision process, we brought in an expert to guide the committee through the project. We were able to bring in specialists, like those from TTI, who could supply new research.”

Bauer notes that the approach to teaching driver education courses is changing. Most schools now offer the course outside normal school hours, giving teachers little time to

prepare lesson plans and materials. The new curriculum provides plans and materials to help teachers conduct both classroom and in-car instruction.

“This research was very valuable to us and we appreciate the input,” says Baker Bauer. “The committee wanted to put road knowledge items like road signs and road rules up front, so we pulled in this research and incorporated it into our first course module.”

During this project, TTI has approached driver education from several angles. In addition to changes proposed to the TEA curriculum, the project team suggested revisions to a chapter of the *Texas Drivers Handbook*, the reference used as the basis for license testing in the state. “During the final year of the project, we developed pages for TxDOT’s web site so that this information could be accessed via the Internet. We also developed a spiral notebook with dividers illustrating traffic control devices that are often misunderstood along with their correct meaning,” says Parham.

TxDOT has distributed the “What’s Your Sign” notebooks to student council representatives, driver’s education instructors, TxDOT district traffic safety specialists (TSS) and other TxDOT employees. Additionally, the notebook recently won an Award of Excellence from the International Association of Business Communicators (IABC).



*The project team developed a notebook with educational dividers and a brochure illustrating the most often misunderstood devices.*



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**Garry Ford** at (210) 731-9938 or [g-ford@tamu.edu](mailto:g-ford@tamu.edu)

Related publications:

Report 1794-1: *Recommendations to Improve Driver Education on Traffic Control Devices*

Report 1794-2: *Driver Behavior Characteristics of Teenage Drivers and Older Drivers*

Report 1794-3: *Updating Educational Materials on Traffic Control Devices*

Report 1794-5: *Driver Education Needs and Materials Concerning Traffic Control Devices*

# Safety matters

## Precious Cargo brings communities and TxDOT together

The response to the Texas Department of Transportation's (TxDOT) Precious Cargo program continues to grow, and the results have improved safety at numerous schools statewide. The program strengthens communication and trust between local school districts, local communities and TxDOT.

Since its 1998 inception in Dallas, the program has gained involvement from 16 TxDOT districts: Abilene, Atlanta, Austin, Beaumont, Bryan, Corpus Christi, Fort Worth, Houston, Laredo, Lubbock, Paris, San Antonio, Tyler, Waco, Wichita Falls and Yoakum. As a result, statewide more than 160 schools in over 50 school districts have seen traffic safety improvements around their schools or future school sites. Legislative recognition and support have been received from 16 Texas senators and representatives, as well as other national government officials. The Precious Cargo program has won numerous national, regional and local awards.

TxDOT-Dallas Public Information Officer Mark Ball, who initiated the program, points to its benefits. "The cooperative effort between TxDOT communities and elected officials has been a key to the success of this program. When TxDOT can help school districts with early planning at the lowest level (communities and engineers working together) we can solve problems faster." Ball also comments, "TxDOT is happy to assist communities in finding these problem-solving tools. By closing a driveway, changing a road to one-way or simply changing paint color, we can increase the safety near schools."

Before Precious Cargo began, TxDOT was often unaware when new schools were being built along state highways. Often, after a traffic incident, schools would contact TxDOT and request traffic control assistance. TxDOT-Dallas wanted to change this pattern by letting schools know that assistance is available from the very beginning stages of new school planning.

*Through Precious Cargo, TxDOT has the ability to:*

- provide comprehensive and thorough initial site plan reviews
- identify potential traffic control devices
- discuss future planning for roadway

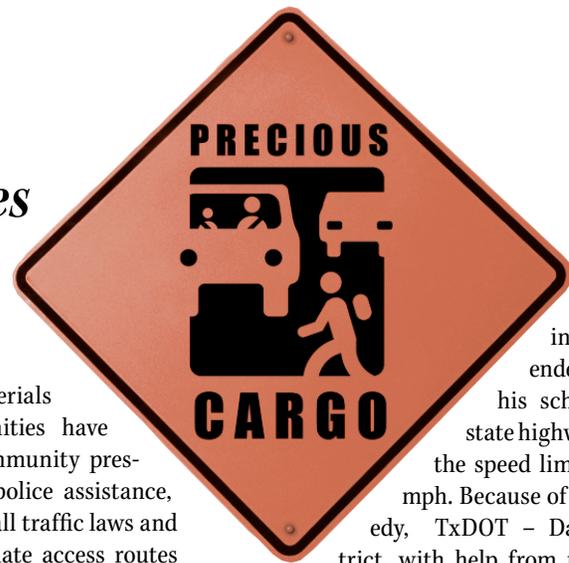
improvements

- share existing traffic safety education materials

Additionally, communities have the ability to make a community presence known, provide for police assistance, promote compliance with all traffic laws and warnings and build alternate access routes to school sites. Working together and being aware of what each has to offer, TxDOT and communities can share construction materials, labor and equipment, develop an understanding of each organization's abilities and limitations and establish safe and efficient management of traffic.

Dramatic growth in the Dallas area has led to the construction of more schools along what once were remote, high-speed, two-lane highways not originally designed to accommodate the traffic typically associated with a school. When such highways are combined with school traffic, tragedy can result.

In 1998, one such tragedy struck a rural area of Collin County. A 7-year old boy was fatally injured when the car he was riding



in was rear-ended near his school on a state highway where the speed limit was 65 mph. Because of this tragedy, TxDOT – Dallas District, with help from the Texas Transportation Institute (TTI), created the Precious Cargo Program.

"Our goal was to establish and maintain effective, ongoing communication between TxDOT, Dallas-area school districts and communities," says Bernie Fette, TTI's public relations manager, who coordinated the Institute's role in Precious Cargo's development, "The program's success is a result of this ideal combination of traffic engineering and community relations."



For more information, contact **Bernie Fette** at (979) 845-2623 or [b-fette@tamu.edu](mailto:b-fette@tamu.edu)

*awards*

### PRECIOUS CARGO AWARDS

- National Quality Initiative - Silver Award**  
National Quality Initiative
- Transportation for Livable Communities Award - Best in State**  
Trans Texas Alliance
- Texas Quality Initiative Award - Partnering**  
Texas Quality Initiative
- Brazos Bravo - Community Relations Award**  
Brazos Valley International Association of Business Communicators (IABC)
- 2000 Communication Award**  
Texas Department of Transportation
- AASHTO President's Award**  
American Association of State Highway and Transportation Officials (AASHTO)
- Journey Toward Excellence - 2000 Work Group/Team Award**  
Texas Department of Transportation
- Certificate of Quality Service**  
Western Association of State Highway and Transportation Officials (WASHTO)
- Pathfinder for Innovation and Quality - Team Award**  
American Association of State Highway and Transportation Officials

# Cutting-Edge Crash Testing

## Project shows predictive use of computer simulation

### Design it. Build it. Test it.

A time-honored and logical process for producing roadside safety devices. Now computer simulation enables engineers to integrate design and testing phases, saving money and providing greater flexibility.

“We will see more and more projects that have an integrated simulation component to help guide the crash testing program and limit the cost of the project,” predicts Roger Bligh, director of the Center for Transportation Computational Mechanics at Texas Transportation Institute (TTI).

### Using simulation during design

A recent TTI project conducted for the Washington State Department of Transportation (WSDOT) prompted Bligh’s comments. The state uses a portable concrete barrier design that needed to pass federal crash tests. Engineers in Washington wanted to verify that the barrier design would hold up to testing and subsequent roadside use, so they asked researchers at the center to conduct virtual crash tests. Researchers used the LS-DYNA computer simulation program to model vehicle impacts.

“Our simulation indicated that there was a high probability that the current design would not pass, and Washington officials elected to evaluate some design modifica-

tions and improvements through computer simulation. We were able to develop models and compare simulated crash tests of these alternatives for them. They then used the results to select what they felt was the best option,” explains Bligh.

In recent years, computer simulation has frequently been incorporated into the design process to evaluate changes to improve a device following an unsuccessful crash test. The TTI project used simulation in a predictive manner prior to testing, as a part of the design and evaluation process, before time and money were spent on constructing and testing the actual physical device.

“We conducted several simulations on situations for which we didn’t perform a physical crash test. Those extra simulations give us supplemental information on impacts and other considerations when we look at future design options,” says Dick Albin, design policy standards and safety research engineer with WSDOT.

### Predicting test results

The Federal Highway Administration requires all longitudinal roadside barriers to meet safety performance evaluation guidelines. For WSDOT to continue to use its portable Type 2 concrete barrier with pin-and-loop connection, the barrier needed to be evaluated in accordance with the guidelines set forth in National Cooperative Highway Research Program (NCHRP) Report 350.

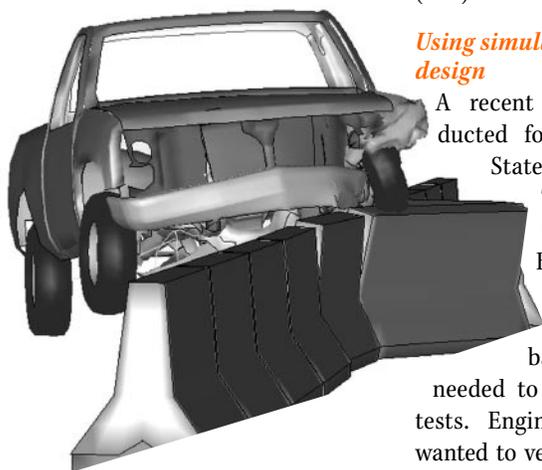
Based on simulation results, engineers knew what to expect when the crash tests were run.

While both the existing and modified designs passed, the barrier with the design improvements performed better. In the test of the original design, the barrier connection partially failed and the barrier sustained considerable damage. The improved pin-and-loop connection design maintained its integrity and the barrier sustained less damage with reduced barrier deflection.

“We were certainly pleased with the results. We had two goals for the simulations — to see if our current design had any flaws that would cause failure and to select an improved design before spending money to implement it,” says Albin. “Because our current design passed the crash test, we now have time to refine any new designs before implementing them. The simulations give us feedback to use in the process of making a final design decision.”

This project provides an example of simulation used as an additional evaluation and design tool to help guide the crash testing phase of a roadside safety product.

“The correlation we got between simulation and crash testing was very reasonable. It was all done in a predictive manner, rather than having previous crash tests to use as a validation of the models,” notes Bligh. “This is an illustration of the type of work that will be done in roadside safety from now on.”



The TTI project used simulation in a predictive manner prior to testing. As shown here, simulation was extremely accurate.



For more information, contact **Roger Bligh** at (979) 845-4377 or [rbligh@tamu.edu](mailto:rbligh@tamu.edu)

Related report: *NCHRP Report 350 Test 3-11 of the Washington Type 2 Concrete Barrier, May 2001*

# Tracking crashes on our highways

Given the choice, most people would agree that statistics are easier to understand and more persuasive when presented visually, rather than in tabular form. Unfortunately, the state of Texas does not have a system in place that can easily translate tremendous amounts of crash data information in a visual format.

Crash data in most Texas counties are difficult to access and understand. To further complicate the issue, crash data are usually manually entered in multiple databases, increasing the possibility of human error. Without the means to efficiently gather accurate crash data, highway safety engineers can arrive at contradictory and erroneous conclusions. Locations that are in need of remedial treatment can be overlooked or misdiagnosed with regard to the problem or problems that are resulting in excess crashes.

That is just the challenge facing the joint research effort of Shaw-Pin Miao of the Texas Transportation Institute (TTI) and Bani Mallik and Joon Jin Sung of the Department of Statistics, Texas A&M University. In a project sponsored by the Bureau of Transportation Statistics, U.S. Department of Transportation, the team is developing a model that will visually track crashes on state highway systems for purposes of keeping highway safety engineers and other state agencies fully informed of where, when and how crashes occur throughout the state highway system.

The first step in developing visual crash data charts is to consolidate crash data from the existing database sources for particular counties. For example, the research team recently merged four data sets from the National Highway Planning Network, the Texas Department of Public Safety (TxDPS), the Texas Department of Transportation (TxDOT) and the Bureau of Census for three Texas counties: Brazos, Dallas, and Tarrant. Some of the challenges the research team encountered while compiling the data included: missing location data for some of the crash records and inconsistent milepoint numbering systems that could result in inaccurate crash locations.

In spite of these impediments, the research team has created visualization charts that use GIS-based technology to plot figures representing the location of crashes in each of those counties. The charts are designed to be interactive and user-friendly. When a plotted crash is clicked, statistics such as date of crash, number of occupants in the vehicle and whether or not speeding or drunk driving was involved are displayed.

“The state of Texas has many miles of highways and limited funds, so it is important for safety engineers to have an efficient means of selecting sections of roadway to study and possibly modify,” says Miao.

In addition to helping safety engineers identify “hot spots” on the highway system that may need to be addressed, visual mapping can also assist police departments in the deployment of officers. “A police department can use the charts to look for patterns of crashes that resulted from speeding or drunk driving,” says Miao. “Then they can assign patrol vehicles to patrol these areas.”

Miao presented his research to the Traffic Records Coordinating Committee on August 14 in Austin. Representatives from the Texas Department of Transportation, Department of Public Safety,

Texas Health Department, Austin Police Department, Federal Highway Administration, Federal Motor Carrier Safety Administration and the National Highway Traffic Safety Administration were in attendance to hear the project’s progress.

Susan Bryant, TxDOT’s traffic safety director, commented “Shaw-Pin has taken on an impressive and daunting task, but one that can have a very positive ripple effect across all highway-related functions, from planning through operations. Creating a process and methodology by which anyone can ‘see’ where the problems are, and then move to prevent or fix them, would be a major breakthrough. We applaud Shaw-Pin’s efforts and look forward to seeing the results of this work.”



For more information, contact **Shaw-Pin Miao** at (979) 862-8753 or [s-miao@tamu.edu](mailto:s-miao@tamu.edu)



# Compliant equipment improves road safety

A multi-year project sponsored by the Texas Department of Transportation (TxDOT) at the Texas Transportation Institute (TTI) is analyzing and testing a variety of roadside equipment including flashing beacon assemblies, mailboxes, barricades, sign supports, work zone control devices and other items. The comprehensive project documents findings and recommendations in six reports focusing on categories of safety devices.

“Every roadside device has its own use and its own place,” says Roger Bligh, manager of the Roadside Safety Program at TTI. “They have different features and different functions, but the bottom line is that their crash worthiness must be demonstrated to make sure they are safe for the public when they are installed on the highway.”

Items that successfully pass crash tests are added to approved equipment lists for use by state contractors, local agencies and state maintenance and work crews. Approved work zone safety devices, for example,

appear on TxDOT’s Compliant Work Zone Traffic Control Device List. Other devices are implemented through revision to standard specifications sheets, technical memorandums or other means of notification.

## BEACON ASSEMBLIES

Flashing beacon assemblies designate traffic areas that need special warnings, such as school zones or sharp curves. In the past, when solar panels were used to supply energy to the beacon assembly, the panels and associated equipment were mounted on separate supports from the flashing beacon itself. This project tested a combined, single-support configuration that incorporates the warning sign, flashing beacons, solar panels, and battery cabinet (Report 1792-4, January 2001).

Analysis showed the all-in-one assembly needed design modifications for crash safety. Crash tests verified that the new assembly, which saves time and money during installation, meets federal safety guidelines.

## BARRICADES

One report published as a result of the current project (Report 1792-2, December 2000) describes testing of work zone barricades. Because of restricted site conditions, it is difficult to maintain a level of safety in a work zone comparable to that of a normal highway not under construction. Proper delineation and traffic control using crash worthy devices is critical to the safety of both vehicles and workers in work zones.

Despite this situation, little was known about the impact performance of many work zone devices until TxDOT took national leadership in the evaluation and design of work zone barricades a decade ago. In response to deficiencies identified

during tests, TTI researchers developed and recommended several generic, low-cost, alternate barricade designs that later passed crash test requirements.

“The designs we’re using now are definitely safer. As soon as we discovered that older equipment was not sufficient, we began testing new designs,” says Dan Maupin, research engineer at TxDOT. “As a result, our compliance list has served as a model for other state departments of transportation.”

## SIGN SUPPORTS

Researchers performed tests on a variety of sign support types and anchoring systems to verify performance and safety (Report 1792-3, January 2001 and draft Report 1792-5, June 2001). Pedestal-base systems, slip-base small sign supports and other types of sign supports were evaluated for performance and safety. Tests showed that a new cost-effective screw-in anchoring system that uses a single-step installation procedure meets safety standards for use with frangible pedestal-base systems. An increased bolt torque for small slip-base sign supports has passed crash testing and should reduce maintenance associated with signs blowing down.



Vehicle in contact with molded plastic mailbox.

## MAILBOXES

New all-in-one molded plastic mailboxes made by several commercial manufacturers are becoming popular with rural Texans. These mailbox assemblies must meet the same standards as all mailboxes used on the state highway system, but had not been tested or approved prior to this project. TTI researchers studied three types of support systems for use with the new mailbox, tested the assemblies, and recommended approval with use of the most effective type of support (draft Report 1792-6, August 2001).

Studies on the safety of roadside equipment will continue as new designs and devices are developed.

“One advantage of this type of cooperative project is that we’re able to trade suggestions and build on each other’s ideas,” comments Greg Brinkmeyer, policy and standards engineer at TxDOT. “The subsequent testing helps us confirm the safety of new designs and get them in use quickly.”



Test of traditional wood barricade showing penetration through windshield (top). Above, photo of a vehicle after test of a generic, low-cost barricade design. Note contrast in windshield damage.



For more information, contact **Roger Bligh** at (979) 845-4377 or [rbligh@tamu.edu](mailto:rbligh@tamu.edu)

### Related reports:

1792-2: *Impact Performance Evaluation of Work Zone Traffic Control Devices*, December 2000

1792-3: *Testing and Evaluation of a Pedestal Base Sign Support*, January 2001

1792-4: *Testing and Evaluation of the Solar Panel Sign Support System*, January 2001

# TTI assists in establishing new utility safety program

Model Niki Taylor recently spent almost three months in the hospital recovering from near-fatal internal injuries and is now undergoing rehabilitation. She was a passenger in a car that ran off the road and struck an Atlanta utility pole on April 29. Unfortunately, this was not an isolated incident. In 1999, nationwide 50,000 people were injured and 1,070 killed in collisions with utility poles. It is a real problem — one that the Texas Transportation Institute (TTI) is helping to address.

For 35 years, TTI researchers have been inventing, developing, testing and implementing safety structures that create a more “forgiving” roadside. Steel-reinforced safety poles (breakaway devices), crash cushions, concrete barriers and guardrails are some of the alternatives that have been proven effective in full-scale crash tests at TTI’s Riverside crash test facility.

“Proving these treatments work is only half the battle,” says TTI safety engineer Don Ivey who currently co-chairs (with Paul Scott of the Federal Highway Administration) the Transportation Research Board (TRB) Utility Safety Task Group. “The challenge now is to implement the safety solutions on a prioritized basis throughout the country.”

TTI’s utility industry project is designed to help do just that. The project was set up to support activities of the Utility Safety Task Group, part of TRB Committee A2A07, and to support individual utility companies as they begin safety programs.

Currently, ten states and three utility companies have begun utility safety programs with the expectation of reducing the frequency of automobile-utility pole collisions. Ironically, Georgia is one of the most progressive states in working to prevent such collisions and has received national awards for its pioneering work. Recently, through their work on this project, TTI researchers helped add another to the list of progressive new utility safety programs — that of the Lafayette Utilities System (LUS) in Lafayette, Louisiana.

A key element of the program is the three-step identification, evaluation and monitoring process of possibly hazardous sites. By investigating collisions with utility structures, categorizing crash locations as either

random or part of a repeated pattern, and applying predictive analysis techniques, TTI and LUS staff selected 12 sites for improvement. Of those, the two highest priority sites were scheduled for immediate improvement. Work was completed on these first sites in July 2001. The poles located within highway clear zones can often be economically retrofitted with crash cushions or other types of treatments.

“We assisted LUS in installing crash cushions composed of 11 sand barrels adjacent to large steel poles at these sites,” says Dean Alberson. “Our goal is to continue promoting the prevention of fatalities and injuries by assisting utility companies with these types of safety programs. Where these programs are in place, they are a proven success.”

LUS Director Terry Huval has become a prominent advocate of the safety program. “LUS has always made safety a high priority for its employees and the public it serves. Taking these proven steps to further protect the public was simply the right thing to do,” he says. “We were pleased to partner with TTI researchers in evaluating high-risk sites. The



*Crash cushions composed of eleven sand barrels adjacent to large steel poles were installed at two sites selected by LUS and TTI.*

initial preventive steps we have taken are on the path to providing a safer and more reliable system for our customers.”



For more information, contact **Dean Alberson** at (979)458-3874 or [d-alberson@tamu.edu](mailto:d-alberson@tamu.edu)

## RELATED SOURCES

1. *Transportation Research E-Circular*, Number E-C030 Online Publication, April 2001. <http://www4.trb.org/trb/onlinepubs.nsf/web/newpubs>
2. *The Influence of Utilities on Roadside Safety*. Draft Proposed State of the Art Report. Prepared by the Utility Safety Task Group of the Utilities Committee, A2A07, Transportation Research Board, Washington D.C. July 2001.
3. *Roadside Design Guide*. American Association of State Highways and Transportation Officials, Washington D.C., January 1996.
4. *Utility Poles and Roadside Safety, The Road to Responsibility*. Presentation. Transportation Research Board, Committee on Utilities, Washington D.C. January 2001.

**“Our goal is to continue promoting the prevention of fatalities and injuries by assisting utility companies with these types of safety programs. Where these programs are in place, they are a proven success.”**

**– Dean Alberson, TTI**

# Expanding the safety performance of guardrail end treatments

## Side-hit crash tests show positive results

A team of researchers with the Texas Transportation Institute's Safety and Structural Systems Division recently completed a set of side-impact crash tests designed to improve guardrail end treatments. The research was done in support of suggested changes in National Cooperative Highway Research Program (NCHRP) Report 350. "We expect the next set of crash guidelines, coming out in the next few years, to contain a side-impact requirement. We are showing that side-hit protection is practical. We will be ready," says Dean Alberson, a key member of the research team working on the effort.

Traditionally, crash testing is done on a straight track with the test car impacting the end treatment head-on. Recent studies and statistics show that in real-world crashes, the driver often loses control of the vehicle in such a way that the impact occurs with the car traveling sideways into the object. This "off-track" side-impact factor is something that must be considered as safety engineers continue to improve guardrail design.

In the last ten years, the safety of guardrail end treatments has been vastly improved with the advent of ET-2000, SRT and similar designs. Now a growing contingent in the safety field is suggesting these new designs may also be significantly improved. Malcolm Ray and John Carney, et al., estimate a loss of \$3 billion a year because a significant percentage of cars strike fixed roadside objects

going sideways, a condition for which engineers have never designed (1).

The original recommendations for an optional side-impact test in NCHRP Report 350 were to test at a speed of 30 mph. "This was considered then the highest speed we could hope to accommodate without significant injury to passengers," says Alberson. Based on statistical evidence that supports the likelihood that cars traveling sideways are quite often moving at speeds faster than that suggested speed of 30 mph, TTI researchers were successful in designing for and conducted crash tests using an impact speed of 35 mph.

"Nine percent more collisions can be accommodated if design speed is raised from 30 mph to 35," says Don Ivey, TTI safety engineer and inventor of one of the side-hit adaptations called CPSI. "Tests of four combinations of guardrail end treatments with side-hit modifications show conclusively we can economically improve side-hit safety," says Ivey

*Researchers used the following estimates in computing the cost-effectiveness of implementing the modifications:*

- There are now about 750,000 guardrail end treatments in place in the U.S.
- There are over 15,000 collisions with end treatments each year.
- There are over 100 deaths and 5,000 injuries each year.
- Current end treatments can be modified for side hits to reduce deaths and injuries by 50 percent.
- Societal cost is over \$500 million per year.
- The cost of those modifications will average \$100 or less per end treatment.
- Those modified end treatments could be placed in the field at the rate of 30,000 per year for the next ten years.

"With an investment of \$30 million over ten years, we calculate a savings of \$50 million," says Ivey. "That's a benefit/cost ratio of 1.7." The key findings of this research were presented at the 80th Annual Transportation Research Board Meeting (Paper No. 01-2791).



For more information, contact **Don Ivey** at (337) 824-59865 or [d-ivey@tamu.edu](mailto:d-ivey@tamu.edu).

### REFERENCES

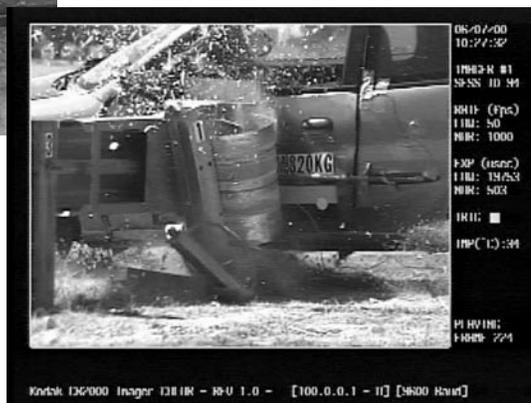
1. a. Ray, M.H. Hargrave, M.W., Carney III, J.F., and K. Hiranmayee.

"Side Impact Crash Test and Evaluation Criteria for Roadside Safety Hardware." Paper No. 980797, Transportation Research Board Annual Meeting, Washington, D.C., January 1998.

b. Ray, M.H., and J.F. Carney III. "Side Impact Crash Testing of Roadside Structures." Report FHWA-RD-92-079. Vanderbilt University, May 1993.



The modified ET-2000 guardrail end treatment performed well under a 35 mph side impact crash test.



**KELLEHER INDUCTED INTO HALL OF HONOR**

Herb Kelleher, one of the founding partners of the Dallas-based Southwest Airlines, became the third inductee into the Texas Transportation Hall of Honor. Kelleher was inducted at Southwest Airlines 30th anniversary celebration in Dallas in June. TTI Deputy Director Dennis Christiansen noted that "this recognition is indicative of Herb Kelleher's stature in the profession and the high regard in which he is held by his peers."

Kelleher joins Frank Turner and Dewitt Greer in the Hall, located permanently on the campus of Texas A&M University in College Station. The Hall of Honor was created to recognize that small group of individuals whose vision and leadership have significantly advanced the development and operation of the Texas transportation system.

Kelleher was a San Antonio attorney in 1968 when he drew up Southwest's original flight plan – a triangle among Dallas, Houston and San Antonio – on a cocktail napkin. He served as its chief attorney during the 60s and 70s, battling for the airline against the major carriers in both state and federal courts. After winning the legal right to fly in Texas, the first Southwest plane left the ground in 1971. Over the ensuing decades, this airline changed the way Texans travel and do business.

Kelleher became chairman in 1978 and president and chief executive officer in 1982. Under his leadership, Southwest has posted profits for 26 consecutive years. With over 330 jets, in terms of domestic passengers, it is the fourth largest airline in America, flying 57 million passengers a year to 58 airports in 57 cities.

There is no question that the consistent success enjoyed by Southwest Airlines is directly linked with the style and leadership provided by Kelleher. A key to this success is the fun-loving, team-oriented, creative corporate culture.

In 1998, *Fortune Magazine* named Southwest the best company to work for in America. In 1999, Kelleher was named "CEO of the Year" by *Chief Executive Magazine* and "CEO of the Century" by *Texas Monthly*.



*TTI Deputy Director Dennis Christiansen (left) with Herb Kelleher at his induction into the Texas Transportation Hall of Honor.*

**CARVELL NAMED TexITE ENGINEER OF THE YEAR**



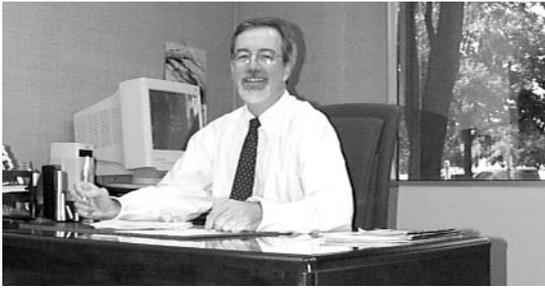
The Texas Section of the Institute of Transportation Engineers (TexITE) has named Jim Carvell the TexITE Transportation Engineer of the Year for 2001. Carvell has over 35 years of traffic and transportation engineering experience, 20 of which have been with the Texas Transportation Institute (TTI). He is a senior research engineer and manages TTI's Dallas Research and Implementation Office.

His accomplishments include serving as project manager for development of a freeway management handbook for the Federal Highway Administration (FHWA), publishing more than 60 research and other technical documents and, in 1972, serving as the project engineer during the implementation of the Dallas Corridor Freeway Surveillance, Communication, and Control System—one of the first integrated freeway and surface street control and management systems in the country. He is a licensed professional engineer in Texas, North Carolina and Arizona and, while in private engineering consulting practice, he supervised the design of several traffic control systems.

Carvell is past-president of TexITE, and he currently serves as TexITE's liaison for five student ITE chapters in Texas.

**TTI COMMUNICATORS WIN LOCAL AWARDS**

Eighteen communications products developed by the Information & Technology Exchange Center at the Texas Transportation Institute won writing, editing, design and production awards from the Brazos Valley chapter of the International Association of Business Communicators (IABC) in June. The products entered were reports, technical articles, a newsletter, videos, brochures, a poster and interactive CD-ROMs. Sponsors ranged from the Texas Department of Transportation and the Federal Highway Administration to the International Right-of-Way Association and various components of the Texas A&M University System.



**SEYMOUR TO HEAD TRANSPORTATION OPERATIONS GROUP**

Dr. Ed Seymour became assistant director and head of the TTI Transportation Operations Group (TOG) in July. Seymour is a TTI researcher who has worked extensively on Intelligent Transportation Systems (ITS).

He brings nearly a decade of experience at TTI to his new position and over 25 years in the transportation field. He has served in national leadership positions in the ITS standards area including chairing the National Transportation Communications for ITS Protocols (NTCIP) Committee.

"The Transportation Operations Group enjoys the work we do. We value the quality of our organizational family and our relationships with our partners," says Seymour.

**FITZPATRICK ACCEPTS ITE AWARD**



Kay Fitzpatrick received the Institute of Transportation Engineers (ITE) Coordinating Council Outstanding Council Chair Recognition award. It was "... in recognition for unselfish dedication and extended service as the Chair of the Traffic Engineering Council during 2001." ITE is an international individual member association that includes traffic engineers, transportation planners and other professionals who are responsible for meeting society's needs for safe and efficient surface transportation. ITE's technical activities are housed within 11 councils with the largest council being the Traffic Engineering Council. Fitzpatrick's duties as chair included overseeing the efforts of 15 programs and more than 30 committees producing technical products. She also served during the past year as the chair of an ITE Task Force on Volunteer Resources.

**SCHULTZ AWARDED APTA's JACK R. GILSTRAP AWARD**



Grant Schultz, a Texas A&M University graduate student was awarded the American Public Transportation Association's (APTA) Gilstrap Award for the 2001-2002 academic year. Schultz, a Ph.D. student in civil engineering and graduate research assistant at the Texas Transportation Institute (TTI), received the highest overall score in the award application process and was granted a scholarship of \$2,500.

Schultz said his experience as a practicing professional transit and transportation engineer helped him win the award.

The Gilstrap award will be presented at a scholarship ceremony during the APTA annual meeting, October 2, 2001, in Philadelphia.

APTA was founded in 1988. Its charitable foundation exists to increase and retain the number of young professionals entering the transit field by offering scholarships to deserving students. The APTA foundation has awarded more than 50 scholarships. Schultz's selection marks the fifth year in a row that a TAMU/TTI student has been selected with three of those years having multiple award winners from the Institute.

**ZIMMERMAN AWARDED AMERICAN AUTOMOBILE ASSOCIATION (AAA) FOUNDATION FELLOWSHIP**

Texas A&M Civil Engineering student Karl H. Zimmerman has been awarded the AAA Foundation Traffic Safety Fellowship. Zimmerman, a Ph.D. candidate, has worked on narrow bridge projects and is interested in railroad research, roadside safety, hardware testing and neighborhood safety.

He has not focused entirely on one area of research, but Zimmerman says his fellowship will help him throughout his graduate career.

"About 45,000 people a year are dying on American streets and highways," Zimmerman said. "Why? How can this be prevented, or at least reduced? This is the problem I want to work on."

**DEPUTY DIRECTOR ELECTED TO POSITIONS AT ARTBA, CUTC**



TTI's Deputy Director Dennis Christiansen has been elected president of the research and education division of the American Road & Transportation Builders Association (ARTBA). Christiansen, a 30-year employee of the Texas Transportation Institute (TTI), has also been elected vice president of the Council of University Transportation Centers (CUTC).

Christiansen's research career spans traffic operations, transportation planning, transit planning and identifying cost-effective approaches for addressing urban

mobility concerns. He currently has overall responsibility for research in transportation safety, materials and structures.

Christiansen will guide ARTBA into 2002, when the association will celebrate its 100th anniversary. The association is the U.S. transportation construction industry's representative in Washington, D.C., and it advocates strong federal investment in the nation's transportation infrastructure.

Christiansen will serve as vice president of CUTC, an organization established in 1979. With more than 50 university members, CUTC's goal is to strengthen the role of transportation research and education at the university level and beyond.

## TTI BIDS FAREWELL TO URBANIK AND KOPPA

The Institute said goodbye this summer to two researchers with a combined total of more than 50 years of service. After nearly 25 years with the Texas Transportation Institute (TTI), Dr. Tom Urbanik retired in June 2001. Dr. Rodger Koppa, a TTI researcher for more 28 years, retired in August.

### Tom Urbanik

Urbanik, who served as the associate agency director for TTI, moved to the University of Tennessee, where he will serve as a chaired professor. While at TTI, Urbanik taught undergraduate transportation and traffic engineering courses at Texas A&M University and short courses for the Texas Engineering Extension Service. He was TTI's coordinator of intelligent transportation systems (ITS) research and the head of TTI's Transportation Operations Group (TOG).

Speakers at the June reception included Institute Director Herb Richardson and colleagues Ed Seymour and Gene Hawkins. A humorous video created by Urbanik's work group helped say goodbye.

"Tom Urbanik has done an exceptional job of providing leadership and vision to the TTI research program for nearly 25 years," said TTI Deputy Director Dennis Christiansen. "His contributions to both TOG and the leadership of TTI are greatly appreciated and will be missed."



*Tom Urbanik enjoying a "video roast" at his farewell gathering.*



*Rodger Koppa ready for "retirement."*

### Rodger Koppa

Koppa began his career with the Institute in 1973 and devoted his research to human factors in transportation. Koppa specialized in aspects related to the design of adaptive equipment for disabled drivers. Hundreds of severely disabled clients of the Texas Rehabilitation Commission have benefited from his research.

Institute employees celebrated Koppa's retirement at a reception held on August 22. Speakers included Safety and Structural Systems Division Head Gene Buth and co-workers Val Pezoldt, Katie Womack, Michael Manser, and Make McDermott. TTI Director Herb Richardson presented a plaque to Koppa recognizing his years of service. Buth summed up the feelings of all of Koppa's colleagues, "We're proud you came here, Rodger, and sad to see you go."

When asked about retirement, Koppa says he plans to serve on student advisory committees, to write and to do some consulting. He says he'll be working on "a backlog of three years worth of reading and growing."

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## THE BACK ROAD



The beginning of another academic year brings new opportunities and challenges for the Texas Transportation Institute (TTI). It's the time of year when we welcome new employees, new graduate and undergraduate students, and start new research projects. This fall brings special opportunities for TTI to continue its leadership in safety research.

Roadway safety is one of the most critical issues facing the transportation industry. In 1999, more than 3,500 people died on Texas roads; the economic loss associated with Texas' traffic crashes in 1998 was nearly \$9 billion. Vehicle miles of travel continue to increase at a much more rapid rate than does new roadway capacity, and all of us—elected officials and policy makers at all levels of government, as well as the transportation community—are devoting more attention to reducing mortality and morbidity on the roadway system.

This issue of the *Researcher* highlights a number of safety-related issues and projects at TTI, including the new Texas Transportation Safety Center, created by Senate Bill 586 during the 77th Legislative Session. Senator Steve Ogden was the driving force behind this important new research center, and he explains his keen interest in making the roadways safer for all Texans.

Related stories of interest include the latest in crash simulation technology from the Dyna 3D Center, and work that is ongoing related to side-impact crash-worthiness testing, likely to appear in the new testing criteria from the Federal Highway Administration. And because identifying and displaying accident data effectively is key to any safety research program, you'll be interested in the latest developments in this area.

You'll also find information on the latest improvements in traffic control devices, as well as some interesting changes that will help improve safety for those who work along the highways. TTI's Work Zone Safety Clearinghouse (a partnership with the American Road & Transportation Builders Association) has been up and running for three years, and was recently recognized for its efforts.

All of us at TTI are committed to doing what we can to improve roadway safety, and I hope that you will see the results of our research put into practice before long. The Institute has a long and proud history of making significant contributions to the field, and we look forward to continuing that tradition.

# Researcher

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