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Researcher
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Double or nothing

Researchers recommend changes to work zone double-fine law

Since January 1998, Texas motorists can receive double fines for speeding in work zones. Yet Texas Transportation Institute (TTI) researchers recently discovered the new double-fine law resulted in little change in traffic speed — and they determined why.

Texas experiences the largest number of annual work zone fatalities in the country. Despite implementation of the work zone law, Texas had 125 work zone fatalities in 1998, over 40 more than in 1997. The double-fine law was designed to increase the incentive for motorists to slow down in work zones, thus increasing safety for workers who maintain and improve Texas roads. Why has this law, aimed directly at work zone violators, failed to find its target?

By studying the law, monitoring the work sites and surveying law enforcement personnel, TTI researchers uncovered the answer.

Fast Facts

Researchers conducted speed studies at 10 work zone construction projects before and after implementation of the work zone double-fine law. These sites

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Francis C. "Frank" Turner

Turner inducted into Hall of Honor

The late Francis C. "Frank" Turner, known by transportation professionals as the "Father of the Interstate Highway System," was the first person inducted into the Texas Transportation Hall of Honor on March 22. Officials of The Texas A&M University System and representatives of the American Association of State Highway and Transportation Officials (AASHTO), the Texas Department of Transportation (TxDOT), and the Federal Highway Administration (FHWA) in Washington, D.C., took part in the induction ceremony, as well as several members of Turner's family.

The Dallas/Ft. Worth native graduated from Texas A&M University in 1929 and joined the Bureau of Public Roads, which later became the FHWA. He would spend his 43-year career with those organizations.

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High-tech police car builds bridges between agencies

The most groundbreaking advance in law enforcement technology (since the two-way radio) faced its toughest test last fall. And it passed with flying colors.

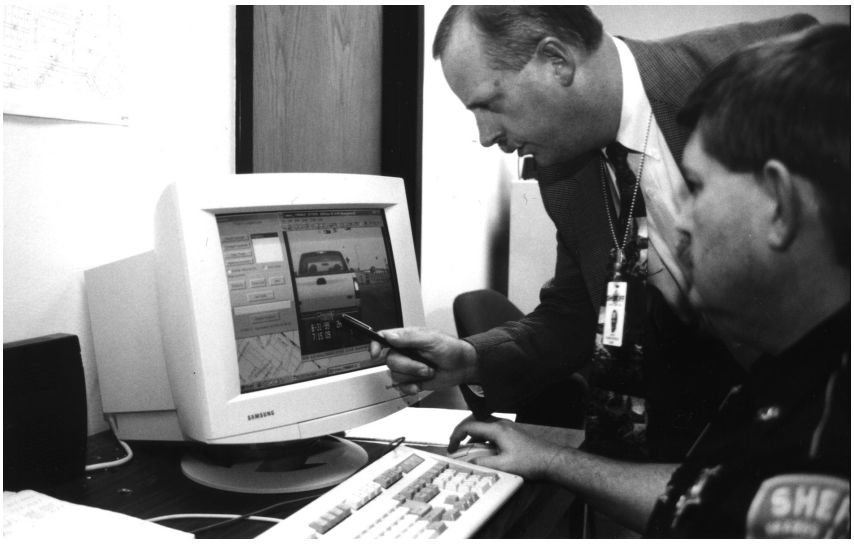
The Texas Transportation Institute's (TTI) Advanced Law Enforcement & Response Technology (ALERT) patrol car played an important role in a high-profile drama last fall. It provided enhanced surveillance and brought together multiple law enforcement agencies involved in security during the sentencing trial of Lawrence Russell Brewer at the Brazos County Courthouse in Bryan, Texas. Brewer was on trial for the 1998 dragging death of James Byrd, Jr., in Jasper, Texas.

During the trial, video cameras positioned around the courthouse provided pictures of the immediate area, but the ALERT patrol car mobile video camera substantially widened the view. As the car cruised the vicinity, real-time images were sent back to a central command post within the courthouse via STAR.net, TTI's developmental system of databases and software applications designed to enable data sharing across the agenices. The combination of these two technologies allowed nine local, state and federal agencies to communicate through a single command center for the first time. Officers in the field were directly connected with the command center.

Deputy Sheriff Mike Paulus of the Brazos County Sheriff's Department said the ALERT car ensured an almost immediate response amid concerns about radical group demonstrations at the courthouse.

"The ALERT car video camera allowed us to take and disseminate pictures of potential extremists' vehicles and download driver's license photos and criminal histories," he says. "Knowledge is power. Officers involved in the security surrounding the trial had immediate access to more information and, therefore, had tools to make better, faster decisions."

New technologies have brought many advances to law enforcement, but they haven't completely resolved complicated institutional issues among the different agencies. Technological capabilities usually advance much faster than institutional issues can be resolved. Paulus confirms that lack of cooperation between agencies is more institutional than technological. "It's been a problem for years. If the ALERT technology became widely available, it could help break down those barriers," he says.



The Advanced Vehicle Technology (AVT) Initiative developed ALERT to streamline data collection and sharing, and improve communication within the enitre first-response community.

During a controversial trial, real-time images were sent from a patrol car outside the courthouse to a central command post, allowing nine local, state and federal agencies to share data and coordinate response.

Deputy Sheriff Clyde Collins of the Brazos County Sheriff's Department agrees there is a real need to integrate communication, transportation and public safety.

"You'd think there would be a free exchange of information between all law enforcement agencies, but there is no day-to-day communication," notes Collins. "If utilized agency wide, this technology would enhance our investigation, patrol, documentation and tactical capabilities. There are a myriad of uses that ALERT could be adapted for in the future."

This field test has benefited all of public safety by demonstrating the ability to move data and images between points, providing officers and administrators from multiple agencies with the information they need, when and where they need it most.

Although the ALERT system is still in the developmental stages, a new coalition is pursuing funding together in an effort to continue to advance the state of law enforcement information technologies. TTI, the College Station Police Department, the Bryan Police Department, Brazos County and the Department of Public Safety want to get to a point where neighboring agencies can share data.

TTI's Advanced Vehicle Technology (AVT) Initiative project administrator Joan Tatge says, "We want to help public safety understand the possibilities presented by technology. By working directly with the law enforcement user community as we did during the trial, we were able to apply their insights to make the technology more effective, and ultimately more affordable, for widespread use."

For more information, contact **Joan Tatge** at (979) 845-7546, or jtatge@tamu.edu.

Turner in Hall of Honor

—continued from cover

Ray Barnhart, former FHWA administrator, told the audience at the ceremony that Turner was "a marvelous human being and a tribute to what public service is meant to be."

Turner served as chief architect of the Interstate Highway System and as Federal Highway administrator from 1969 – 1972. He devoted his entire career in service to our nation and its highways. "Frank Turner set all standards for what the interstate system was to be, and the Texas Transportation Institute (TTI) set the bar very high in selecting Frank to be the first inductee," added Mark Goode, retired engineer-director of TxDOT.

Along with his work in the U.S., Turner also took the lead in developing the Alaskan Highway. He later was involved in engineering and diplomatic relations to repair war-torn highways and bridges and received awards from the Philippine government for his endeavors.

For almost 30 years after his retirement in 1972, Turner remained a constant fixture in the transportation industry. Herb Richardson, director of TTI, said, "Frank Turner was a person who changed all of our lives." He was involved in government legislation and became a mentor for many young engineers and professionals.

Turner received many honors during his lifetime, and was included in the "Ten People Who Changed the Way You Live" (American Heritage Magazine) and the "25 Makers of the American Century" (U.S. News and World Report, December 1999). Turner also received the 1999 Transportation Research Board Lifetime Achievement Award.

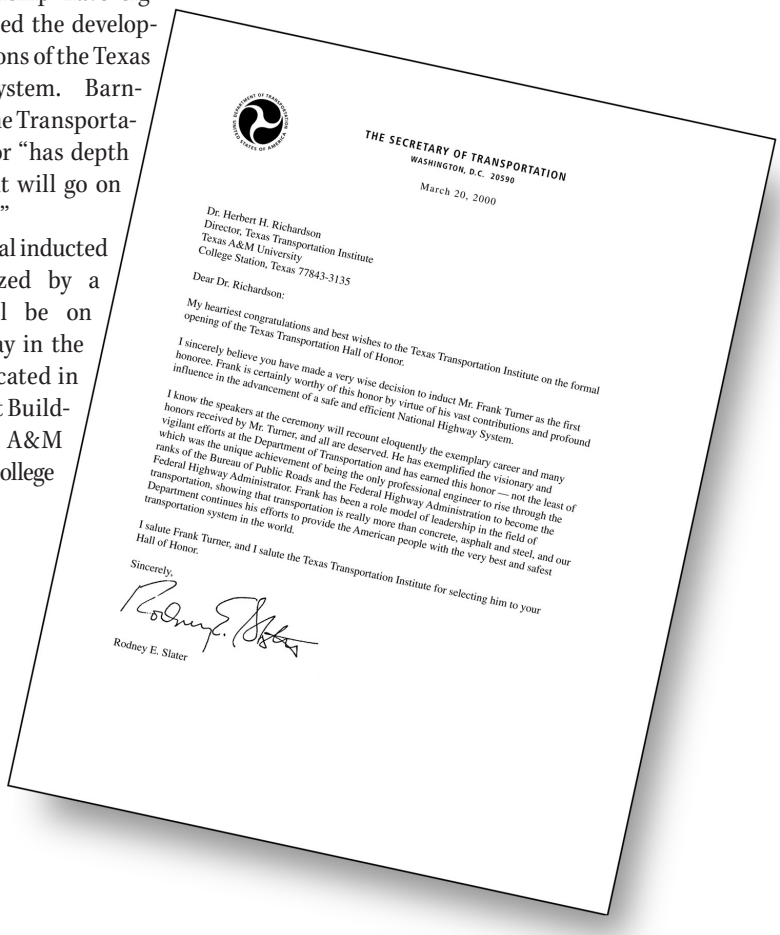
Dennis Christiansen, deputy director of TTI, commented that Turner "was a true gentleman and a real leader in the profession that had tremendous impact on the Texas transportation system."

At the induction, Turner's son, Marvin, responded, "If he were here right now, he would say that all of the credit goes to his professional family and to the team that he just happened to be a part of." The Turner family donated all of Turner's professional papers to the Texas A&M archives.

The Hall of Honor was created to recognize individuals whose vision and leadership have significantly advanced the development and operations of the Texas transportation system. Barnhart added that the Transportation Hall of Honor "has depth and meaning that will go on for years to come."

Each individual inducted will be recognized by a plaque that will be on permanent display in the Hall of Honor, located in the Gibb Gilchrist Building in the Texas A&M Research Park in College Station.

TTI Deputy Director Dennis Christiansen presents a commemorative plaque honoring Frank Turner to be displayed in the Texas Transportation Hall of Honor. Looking on are (l–r) Beverly Turner Cook, Marvin L. Turner and James M. Turner.



THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

March 20, 2000

Dr. Herbert H. Richardson
Director, Texas Transportation Institute
Texas A&M University
College Station, Texas 77843-3135

Dear Dr. Richardson:

My heartiest congratulations and best wishes to the Texas Transportation Institute on the formal opening of the Texas Transportation Hall of Honor.

I sincerely believe you have made a very wise decision to induct Mr. Frank Turner as the first honoree. Frank is certainly worthy of this honor by virtue of his vast contributions and profound influence in the advancement of a safe and efficient National Highway System.

I know the speakers at the ceremony will recount eloquently the exemplary career and many honors received by Mr. Turner, and all are deserved. He has exemplified the visionary and vigilant efforts at the Department of Transportation and has earned this honor — not the least of which was the unique achievement of being the only professional engineer to rise through the ranks of the Bureau of Public Roads and the Federal Highway Administration to become the Federal Highway Administrator. Frank has been a role model of leadership in the field of transportation, showing that transportation is really more than concrete, asphalt and steel, and our Department continues his efforts to provide the American people with the very best and safest transportation system in the world.

I salute Frank Turner, and I salute the Texas Transportation Institute for selecting him to your Hall of Honor.

Sincerely,

Rodney E. Slater

"Frank has been a role model of leadership in the field of transportation, showing that transportation is really more than concrete, asphalt and steel . . ."
– Rodney E. Slater, Secretary of Transportation

Harvesting Smoke

TTI's coal combustion by-product test roads show promise

"With the 97 million tons of the coal combustion by-products generated each year by all the coal-burning power plants in the U.S., you could fill Kyle Field football stadium and create a mountain nine miles high. Can you visualize that?"

The question comes from Don Saylak, research scientist with the By-product Utilization and Recycling Materials Program of the Texas Transportation Institute (TTI). A team of researchers headed up by Saylak and Assistant Research Engineer Cindy Estakhri is working with the Civil Engineering and Chemical Engineering Departments and the College of Architecture at Texas A&M University to find innovative and practical uses for coal combustion by-products (CCBs) created by the 18 coal-burning electric power plants in Texas. Fourteen of these plants are located in the eastern and gulf coast regions of the state, where sources for conventional road-building materials are either depleting or nonexistent.

Faculty and students from the departments have joined TTI personnel to form a program called "Harvesting Smoke." The program's cooperative projects with the Texas Department of Transportation, utility companies and independent laboratories have enabled researchers to develop a wide range of high-volume commercial applications for CCB materials.

These by-products include fly ash, bottom ash, flue gas desulfurization gypsum (FGD sulfates and sulfites) and sulfur. Fly ash and sulfur are captured from the smokestack emissions, while bottom ash is the heavier, cinder-like material that falls through the grates at the bottom of the incinerator. Each by-product has characteristics that present both peculiar difficulties and potentially unique advantages for use in commercial applications.

Primary among these applications is the construction of roadways. During 10 years of study, the group has developed cost-effective uses for CCBs in paving mixtures for all layers of a roadway, from its subgrade to base to surface course. Because chemical and physical characteristics of coal combustion by-products can vary widely based on the type of coal burned, there was initial concern over the ability to achieve consistent performance. Yet tests in a wide variety of CCB field projects show that specifications can be developed that produce strong, cost-effective by-product–enhanced paving mixtures. Even more intriguing, the new mixtures seem to work especially well with problem soils.

Working across Time

"We started out back in 1991 with a 300-by-18-foot wide experimental road constructed at Texas A&M University's Riverside Campus using flue gas desulfurization gypsum [FGD calcium sulfate] in the subgrade and base courses," says Saylak. "That road was immensely successful, and it prompted additional research activity with other coal combustion by-products. Using different blends of fly ash, FGD and bottom ash, we constructed another experimental road in 1992, and three more in 1993, all of which are still performing very well. In light of the successes we've seen since 1991, we put all the technologies together in the construction of two more experimental test sections during May 1999."

Promising Performance

A test road placed in May 1999 at Riverside Campus used a blend of 2 percent lime and 5 percent fly ash to stabilize a troublesome, highly expansive clay subgrade. Typically, the same result without fly ash would have required from 5 to 7 percent lime in the mixture.

In the same test road, researchers combined a stabilizer made of 60 percent fly ash and a Type I cement with an FGD base course mixture. Tests demonstrated the successful use in both subgrade and base without gross sulfate-induced expansion or heaving. Further tests are extending this benefit for stabilizing soils containing troublesome soluble sulfates.

Attention was next directed toward the utilization of bottom ash as an aggregate in asphalt concrete mixtures. In the past, the porous nature and low crush resistance of bottom ash limited its use as a low-cost filler in mixing and placing asphalt surface courses.

To resolve these problems, TTI researchers developed the concept of filling the pores of the ash with elemental sulfur. They discovered the resulting product significantly reduces the mixture's demand for asphalt, while it enhances strength and skid resistance. This concept was field-demonstrated in 1999 in Waco, Texas, where an 18-by-100-foot surface course was placed using a mixture consisting of 7 percent asphalt, 46.5 percent crushed stone and 46.5 percent sulfur-modified bottom ash.

Because of the presence of lightweight bottom ash, "sulfur-modified bottom ash [SMBA] asphalt concrete mixtures are about 25 to 30 percent lighter than traditional mixtures," explains Estakhri. "Since you buy asphalt concrete by the ton, that translates to about 25 percent more road for the money."

Texas ranks first in the nation as a user of coal and lignite, and the state's 18 coal-burning power plants assure a continuing supply of CCBs. The state's extensive transportation system has a continuing need for new materials for construction and maintenance of its roads. Results like those produced by these novel roadway concepts show that CCBs can play a major role in satisfying this need.

This article was written by **Don Saylak**. For more information, contact him at (979) 845-9962, or d-saylak@tamu.edu.

HYDRATED FLY ASH BASE PERFORMING WELL

Six unassuming test sections of pavement on several roadways in northeast Texas may signal the need for eventual changes in pavement performance analysis when recycled materials are used in construction.

"Some of the deflection test data on these sections are quite variable, indicating that some parts of the pavement should be losing strength. Yet the test sections are performing well and show no significant signs of deterioration," says Cindy Estakhri, assistant research engineer at the Texas Transportation Institute. "For example, ground-penetrating radar readings show a high concentration of water in the base, which would normally indicate a potential for the base material to fail. That hasn't happened. I think some of the indicators we've used to measure performance in the past and characteristics we associate with a good base have not applied here because the material is so different from conventional crushed stone bases."

What makes this material different is the use of hydrated fly ash as a stabilized base. Hydrated fly ash is produced by allowing powder fly ash from coal power plants to cure with moisture. The hydrated fly ash becomes a stiff material that can be crushed to form a synthetic aggregate. This aggregate can then be placed and compacted to an optimum moisture content and density to form a roadway base.

"This material has an optimum moisture content of about 35 percent, whereas a typical base might have somewhere about 10 percent," notes Estakhri. "You just can't compare the two."

Under Texas Department of Transportation sponsorship, the research team has monitored the pavement for three years although some of the sections have been in place for several years longer. Two more evaluations are planned in April 2000 and April 2001. Researchers expect results to show continued consistent performance of the recycled hydrated fly ash material.

"This project has provided valuable information on effective use of a specific waste material. It's also shown that the ground-penetrating radar and deflection testing values we've used to evaluate pavement performance in the past may need to be examined in view of the increasing use of recycled materials," says Estakhri.

For more information, contact **Cindy Estakhri** at (979) 845-9551, or c-estakhri@tamu.edu.

Related publication: *Field Performance Evaluation of Hydrated, Fly Ash Bases in the Atlanta District — Year 3.* TTI Report 2966-3. Cindy Estakhri. October 1999.

Let us try

Robert Lytton on Pavement Performance

Essayons. The Army Corps of Engineer's motto is French for "Let us try." This petition highlighted the theme of Robert Lytton's Distinguished Lectureship at the 79th annual Transportation Research Board (TRB) meeting in Washington, D.C.

The lecture, titled "Characterizing Asphalt Pavements for Performance," drew a large and very interested audience. Graduate students and veteran transportation engineers gathered to hear research results that, according to Lytton, "didn't see the light of day in the U.S. until Jan. 10."

Over the years, Lytton, a research engineer at the Texas Transportation Institute (TTI), has endured the turmoil of leading-edge research. His work in computer-aided pavement design has received praise for its innovation and skepticism for what some have regarded as impossible to do. But Lytton contends his research results prove that it can be done.

"We're trying to design pavements using laboratory tests and computer programs — that we know before we ever construct them — are going to last well beyond what other such pavements have done," says Lytton. "We know we can predict pavement performance because we've tested the system with core samples and observed performance all over the country."

What makes Lytton's research so far reaching is his extensive use of computers in every aspect of the pavement design and implementation process. No one in the past has been able to predict with such accuracy how specific pavements will react under load, weather and other long-term stresses. No one before has devised a way to analyze radar signals to determine the composition of pavement layers. And perhaps most important: Lytton's system is the first that allows engineers to predict performance with such accuracy while still in the laboratory, before any roads are built, thereby ensuring substantial savings in time and money. From laboratory testing and design to innovative field-testing techniques, Lytton has developed a complex and comprehensive system. But the complexity of it, according to Lytton, is the only way the individual steps can be made simple and the whole process can be trusted. Lytton used Alfred North Whitehead's words in his lecture: "The only simplicity that can be trusted," wrote the British mathematician turned philosopher, "is that which lies beyond complexity."

To clarify this point in his presentation, Lytton looked to his father, Robert O. Lytton, who was chief of surveys and assistant engineer for a major Texas Highway Department bridge project in the 1930s. "This bridge had to be built tall enough to allow the passage of ocean-going vessels up the Neches River to visit the port of Beaumont," says Lytton. "It had to be built strong enough to withstand hurricane-force winds, and it had to be built across a salt marsh, in absolutely the worst kind of soil conditions." Lytton pointed out in his lecture that many people at that time said the bridge couldn't be built, but the men of the highway department built it anyway. Says Lytton, "In 1957, Hurricane Audrey came ashore, ran right up that bridge site and gave it the acid test. It is still standing."

To further illustrate his argument to try the "impossible," Lytton presented slides detailing the conditions under which the Neches River bridge was constructed: A photo of his father holding a Cottonmouth Moccasin snake. A picture of an alligator staring hungrily at construction workers. "I just laid it out there," says Lytton. "These old 1930s

To further illustrate his argument to try the "impossible," Lytton presented slides detailing the conditions under which the Neches River bridge was constructed: "A photo of [my] father holding a Cottonmouth Moccasin snake; pictures with guys up to their chests in muck; leaning against the wind with the American flag standing straight out on its staff, just smiling."

pictures with guys up to their chests in muck and down under pressure in the caissons supporting that bridge, and 250 feet up in the bridge steel-driving rivets, leaning against the wind with the American flag standing straight out on its staff, just smiling."

Although the opening and closing of his presentation largely focused on the tremendous spirit and dedication displayed during his father's successful bridge project, Lytton pulled together facts from his own research to solidify his argument. He says, "Our research actually showed that it is possible to predict, very simply, the future performance of pavements. We took cores of pavements all over the U.S. and Canada and matched the distress observed over time under the traffic on all those pavements. And we used computer testing from start to finish. This system works; we just need a chance to put it to work."

The bridge so many called an impossibility in 1930 still stands strong today. Pavements that can be designed by methods many consider impossible remain to be built in the future. "So, essayons," says Lytton. "And furthermore, let us prevail."

For more information, contact **Robert Lytton** at (979) 845-9964.

DECISIONS MADE EASY

New software and manuals individualize TxDOT maintenance strategy selection procedures

So many factors are involved in keeping a road maintained and repaired that even the most seasoned engineers can have trouble keeping them straight. And younger, less experienced engineers sometimes have not been around long enough to know how certain pavements should react to traffic loading and environmental factors over time.

TTI researchers found a simple solution to making these maintenance decisions easier. They interviewed Texas Department of Transportation (TxDOT) engineers, collected extensive information on various repair and maintenance techniques, and produced a software program and two manuals — one for airports and one for roads — containing maintenance strategy selection procedures.

"The problems we had to address were for pavements with chemically stabilized layers," says Tom Freeman, engineering research associate at TTI. "These pavements tend to crack and form joints. You see these transverse cracks and think the road needs to be rebuilt, when in fact that is normal performance for the pavement."

Knowing some pavement cracking is normal is only part of the issue, however. TxDOT engineers have a wide array of maintenance strategies available to care for the roads in their districts, but choosing the right strategy for each situation is not always easy.

That's why Freeman and his colleagues included easy-to-use charts in their manuals, allowing engineers to select a maintenance solution based on the type of damage, extent of damage, level or importance of traffic, and timeframe requirements. The software program is simply an online manual, with the added advantages of an automated questionnaire-style interface and the ability to download updated data. Both the manuals and the software include individualized strategies for each TxDOT district.

"If there are pavement cracks in Odessa, you might not even seal them, but if they're in Houston, you certainly do because they get so much rain," says Freeman. "It's important to consider everything about the road and its environment in making a repair decision. The key question is 'what is the proper maintenance strategy, and under what conditions should it be performed?' These products provide the answer."

For more information, contact **Tom Freeman** at (979) 845-9923, or t-freeman@tamu.edu.

Work Zone

—continued from cover

ranged from two-lane, two-way highways to multilane freeways.

The studies indicated that the double-fine law had little effect on traffic speed characteristics in the work zones examined. Average speeds after law implementation, relative to before-law conditions, were statistically unchanged at six of the 10 sites. Changes in average speeds ranged from a 4 mph decrease at two sites to a 6 mph increase at another. At seven of the 10 sites examined, more than two-thirds of the motorists exceeded the posted speed limit.

"Our results weren't terribly surprising," says Jerry Ullman, program manager of the Traffic Operations Program at TTI. "We'd had conversations with enforcement personnel and others that indicated work zone enforcement of the new law was not heavily emphasized. Without enforcement, a law just isn't going to have much of an impact."

It's the Law

All but four states have passed laws which increase fines for traffic violations in work zones. TTI researchers reviewed and studied work zone laws passed in other states as well as in Texas.

"If we're serious about what we're saying in these work zone laws, then we need to establish higher levels of enforcement to achieve compliance. There are a number of difficulties in enforcing the law as it currently stands," notes Ullman.

The Texas work zone law implemented January 1, 1998, doubles the minimum and maximum fines applicable to traffic violations that occur in work zones where workers are present. Because of the dynamics associated with work activities, law enforcement personnel have difficulty establishing whether workers are actually present at the exact time and location of the speeding violation. Unless an officer has recently passed through a work zone, he or she cannot be sure workers are on site. Discussions with transportation and law enforcement officials outside Texas highlighted similar difficulties associated with double-fine laws that require workers to be present.

Another difficulty is that justices of the peace, who determine fines for citations issued in their jurisdictions, have wide latitude in setting issued fines for individual violations. The law raises only the range of fines available to officials — it does not specify a mandatory increase for specific instances of work zone violations. A comparison of citation frequency, disposition methods, and fines levied before and after implementation of the law found few changes.

Speeding toward a Safe Future

Despite the recent findings, TTI researchers emphasize the merit of work zone legislation. Based on the results of the study, they believe the state's current law can be improved through four changes:

- eliminate the worker-presence requirement,
- increase the minimum fines for a violation cited within a work zone,
- modify the law to still require a fine or greater court costs for those attempting to have the ticket dismissed through a defensive driving course, and
- establish legislation to allow a reduced regulatory speed limit to be posted in certain maintenance zones.

"We believe our recommendations will help the work zone law achieve the benefit initially intended," Ullman comments. "With changes to the law and an implementation plan that makes the best use of enforcement resources in work zone areas, the law will ultimately improve driver behavior and reduce speeds in maintenance and construction areas. Those slower speeds will increase safety for both workers and motorists."

For more information, contact **Gerald L. Ullman** at (979) 845-9908, or g-ullman@tamu.edu.
Related publication: *Work Zone Traffic Legislation in Texas*. TTI Report 1720-3. Gerald Ullman et al. December 1999. Work Zone Safety Clearinghouse web site: http://wzsafety.tamu.edu.

"We believe our recommendations will help the work zone law achieve the benefit initially intended."
— Gerald Ullman

Economy and ecology — toward a sustainable transportation system

Sustainability. A seemingly simple term — until you're asked to apply it in areas like economics, the environment and transportation — and all at once. Sustainability deals with environmental protection and economic development complementing each other, rather than competing for importance. Much research has focused on general principles of this concept and its feasibility on a national or worldwide level, but theories are only useful when applied. To truly achieve sustainability in our transportation system as a whole, we must first bring it down to a local level and focus on one area of development.

Associate Research Scientist Eric Lindquist recently completed a Southwest Region University Transportation Center study on how to do just that. The result is a "primer" of innovative methods to design, finance and implement sustainable transportation development projects in a local community.

"The greatest challenges of this study were interpreting sustainability from a transportation perspective and bringing it down to the local level," Lindquist says. "Many significant barriers to sustainable growth were discovered that confront planners and advocates, including professional norms and traditional planning practices." Using case studies, the study shows how countries, regions and communities deal with and overcome problems relating to these barriers.

The study suggests ways to change the traditional land use planning process by including sustainability goals all the way from goal setting through finance and implementation.

"I also looked at the challenges of actually integrating the concept of sustainability into professional practices," says Lindquist. "It's a worthwhile goal that will benefit everyone."

Community developers now have an educational, informative resource as they work to bring economic growth and ecological considerations together.

For more information, contact **Eric Lindquist** at (979) 845-9945, or e-lindquist@tamu.edu.
Related Publication: *Financing and Implementing Sustainable Development: A Local Planning Approach.* SWUTC/99/472840-00011-1. Eric Lindquist. October 1999.

TRAINS, PLANES, AUTOMOBILES — AND MUCH, MUCH MORE

Bringing transportation to our schools

It's not just about building a road anymore. Recent advances in technology have increased the knowledge and skills that transportation professionals need to work effectively. And our children will have to know even more. The success of transportation depends on earlier and more advanced training for future professionals so they can design, plan, manage, operate, build and maintain the 21st century transportation system.

In a Southwest Region University Transportation Center effort, Beverly Kuhn, director of the Texas Transportation Institute's (TTI) Center for Professional Development, and her project team have developed a transportation outreach pilot program for students in grades K–12, as well as educational and outreach materials for students in higher education.

"Our goal is to better equip educators to teach children and young adults about transportation." Says Kuhn. "We need to get kids excited and interested in all the educational and career opportunities that are out there."

The team targeted grades K–12, developing an education/outreach folder and CD-ROM that introduces students to transportation and Internet references and resources. Two teaching modules were then tested in various middle school and high school outreach programs and workshops. Kuhn said the direct feedback from students and teachers was very positive.

The research team has also developed two educational modules and other materials for students in higher education. Researchers worked with other universities and colleges to present the modules.

The team targeted grades K–12, with two teaching modules tested in various middle and high school outreach programs.

"The greatest accomplishment of this study was developing the educational resources we've posted on the Web [http://cpd.tamu.edu] and making them available to educators, students and anyone else interested in transportation education," says Kuhn. "It was a great learning and unifying opportunity for all of us."

Contact **Beverly Kuhn** at (979) 862-3558, or b-kuhn@tamu.edu.
Related Publications: 1) *Transportation Engineering Education and Outreach Program Designed for Collegiate Level*. SWUTC/99/472840-00029-1. Beverly T. Kuhn. September 1999. 2) *Transportation Engineering Education and Outreach Pilot Program Targeting Students in Grades K–12*. SWUTC/99/472840-00031-1. Beverly T. Kuhn. September 1999.

IN MEMORIAM

Charles J. "Jack" Keese, Texas Transportation Institute (TTI) director from 1962 to 1976 died in April in College Station, Texas. The next issue of the *Texas Transportation Researcher* will include a tribute to Mr. Keese and his impact on transportation. He will be missed by all of us at TTI.

LEDÉ HONORED BY HOUSTON COMTO

Naomi Ledé, TTI senior research scientist and former head of the Center for Transportation, Training and Research at Texas Southern University, was honored by the Houston chapter of the Conference of Minority Transportation Officials (COMTO) at a reception held Dec. 13. The event recognized outstanding accomplishments in the transportation field. Ledé was named Transit Researcher of the Century and was cited for her accomplishments in academics, research and service to the community.

TURNBULL AND FITZPATRICK CHAIR ITE COUNCILS

Assistant Agency Director **Katie Turnbull** and Associate Research Engineer **Kay Fitzpatrick** are serving as Chairs of two Institute of Transportation Engineers (ITE) councils in 2000.

Turnbull is the new chair of the ITE Transit Council. Major Transit Council projects for this year will include updating the public transportation textbook, developing a "Transit Toolbox," providing best-practice case studies on "Transit and Smart Growth," and organizing sessions at the international and annual meetings.

Fitzpatrick is serving her third year of a three-year term as chair of the ITE Traffic Engineering Council. The Traffic Engineering Council oversees activities such as organizing sessions and seminars at international and annual meetings, and maintaining the council's list serve. New projects started this year include a rewrite of *The Traffic Control Devices Handbook* and additional testing of LEDs. An emphasis of Fitzpatrick's term as chair is to expand the size and frequency of the newsletter to improve communication within the council.

HULETT RECEIVES McCASLAND FELLOWSHIP

Renee Hulett, a Texas A&M University graduate student, is the first recipient of the William R. "Dick" McCasland Fellowship in Traffic Engineering — established by Jim and Nell Carvell of Dallas in 1998 to benefit master's degree students with an interest in freeway management in Texas A&M University's civil engineering department.

Dick McCasland and Renee Hulett

Hulett, who is from Houston, is currently employed in TTI's traffic design program and working on her master's degree in civil engineering, with a specialization in transportation. McCasland has served on the civil engineering faculty at Texas A&M and as a TTI researcher for over 40 years. He received TTI's Lifetime Achievement Award in 1996.

Jim Carvell, a research engineer and manager of TTI's Dallas office, established the fellowship to "honor Dick McCasland for his lifelong contribution to the field of traffic engineering and for his friendship over the past 30 years."

1999 SWUTC STUDENT AWARDS

The Southwest Region University Transportation Center (SWUTC), through the Advanced Institute and TTI, annually recognizes a master's and doctoral candidate for outstanding performance in transportation engineering. Students are evaluated by a faculty and staff committee on academic performance, technical and research merit, the quality of research papers and reports, and professionalism and leadership.

The 1999 Outstanding Master's Student Award winner was Matthew Estes. The two runners-up in the master's category were Debra Burdette and Renee Hulett. The recipient of the 1999 Outstanding Ph.D. Student Award was Kimberly Mastako, who was also selected as the winner of the SWUTC Regional Award. Recipients are given a cash award.

1999 TRANSPORTATION ENGINEERING STUDENT AWARD WINNERS

Eno Fellowship
Josias Zietsman

Kimley-Horn Graduate Scholarship
Marcus Brewer
Debra Burdette
Matthew Estes

TexITE Outstanding Student (Texas A&M)
Josias Zietsman

TexITE Outstanding Paper
Melissa Finley

American Public Transit Foundation (APTF) Transit Hall of Fame Scholarship
Josias Zietsman
Bill Eisele
Debra Burdette

American Automobile Association (AAA) Foundation for Highway Safety Fellowship
Karl Zimmerman
Jacqueline Jenkins

PUBLICATIONS ORDER FORM

_____ 1720-3, *Work Zone Traffic Legislation in Texas*, G. Ullman, P. Carlson, N. Trout, 68 pp., $12.00.

_____ 1469-1, *Enhanced Traffic Control Devices and Railroad Operations for Highway-Railroad Grade Crossings: First-Year Activities*, D. Fambro, S. Cooner, J. Messick, R. Bartoskewitz, 124 pp., $20.00.

_____ 1722-4, *Maintenance Selection Manual for: Maintenance of Pavements with Chemically Stabilized Layers — Highway Pavements 1998*, T. Freeman, D. Little, 126 pp., $12.00.

_____ 1722-5, *Maintenance Selection Manual for: Maintenance of Pavements with Chemically Stabilized Layers — Airport Pavements 1998*, T. Freeman, D. Little, 27 pp., $5.00.

_____ 1353-6, *An Evaluation of High-Occupancy Vehicle Lanes in Texas, 1997*, W. Stockton, V. Daniels, D. Skowronek, D. Fenno, 292 pp., $43.00.

_____ 1274-3, *Evaluation of Alternative Traffic Signs for Use in Texas Border Areas*, H. Hawkins, D. Kreis, M. Knodler, 84 pp., $12.00.

_____ 1274-S, *Traffic Control Devices in Texas Border Areas: Summary of Research and Recommendations*, H. Hawkins, 90 pp., $12.00.

_____ 2966-3, *Field Performance Evaluation of Hydrated, Fly Ash Bases in the Atlanta District — Year 3*, C. Estakhri, 38 pp., $5.00.

_____ 3944-S, *Traffic Demand Analysis in Major Investment Studies*, J. Brunk, M. Middleton, 66 pp., $12.00.

_____ 3926-S, *Feasibility of Portable Traffic Signals to Replace Flaggers in Maintenance Operations*, V. Daniels, S. Venglar, D. Picha, 40 pp., $5.00.

_____ 3926-2, *Guidelines for the Use of Portable Traffic Signals in Rural Two-Lane Maintenance Operations*, V. Daniels, S. Venglar, D. Picha, 36 pp., $5.00.

_____ 3926-1, *Feasibility of Portable Traffic Signals to Replace Flaggers in Maintenance Operations*, V. Daniels, S. Venglar, D. Picha, 68 pp., $12.00.

_____ 1353-I, *The ABC's of HOV: The Texas Experience*, W. Stockton, V. Daniels, D. Skowronek, D. Fenno, 28 pp., $25.00.

_____ 1709-1, *Multi-Box Beam Bridges with Composite Deck*, H. Jones, 136 pp., $20.00.

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THE BACK ROAD

The Texas Transportation Institute (TTI) began the new millennium by recognizing the accomplishments of one of the great transportation leaders of the 20th century. The late Francis C. "Frank" Turner was honored as the first inductee into the Texas Transportation Hall of Honor, which is housed in TTI's new Gibb Gilchrist Building. You'll learn more about Frank Turner and the Hall of Honor in this issue, along with stories covering a wide range of institute activities. Read about TTI's own Bob Lytton, who gave this year's Transportation Research Board (TRB) Distinguished Lecture at the annual meeting. Bob's theme of "Let Us Try" could certainly apply to the innovations developed at TTI. For example, this issue reports on several projects dealing with new pavement uses for coal combustion by-products and hydrated fly ash, both of which are turning out to be good performers in test roads.

As a member of The Texas A&M University System, and with close ties to many Texas universities, TTI has long been engaged in supporting and enhancing transportation education programs. TTI leads a consortium of Texas A&M University, the University of Texas at Austin and Texas Southern in the Southwest Region University Transportation Center (SWUTC), which was recently re-awarded to TTI by the Federal Highway Administration (FHWA). Two SWUTC projects are covered in this issue. One focuses on a transportation outreach pilot program for public schools as well as colleges and universities. The other looks at innovative methods of designing, financing and implementing sustainable transportation development projects in a local community.

I hope you'll find these and other stories to be of interest and use.

Herb Richardson

TEXAS TRANSPORTATION Researcher

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