TEXAS TRANSPORTATION
Researcher
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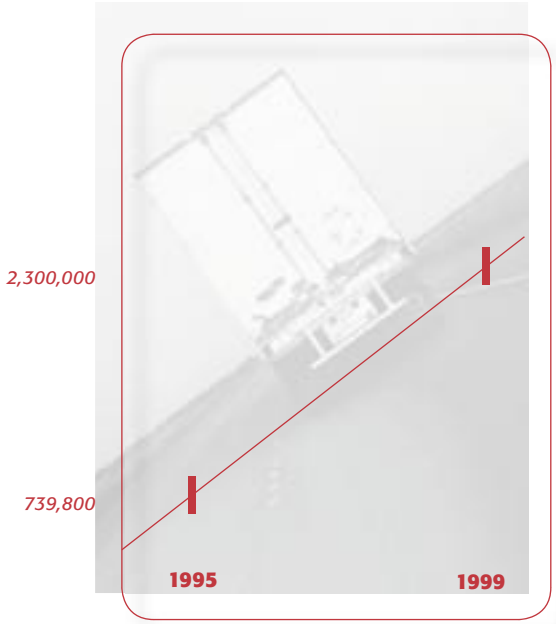
Truckin'

A look at TTI's commercial vehicle transportation research

- *Promoting Safety*
- *Examining Economic Factors*
- *Analyzing Design & Operations*

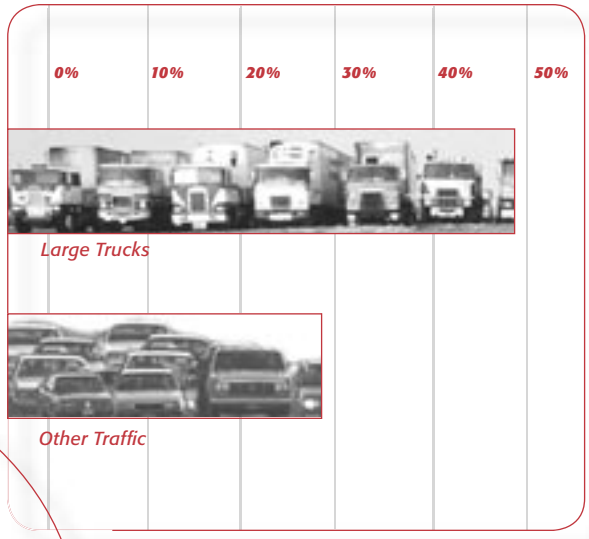
Truck traffic increases call for innovative solutions

Number of trucks entering Texas at nine border crossing locations



Texas Truck Research Issue Paper
TTI & CTR, 2000

Growth rates of truck traffic outpace all others



U.S. Urban Traffic Trends, 1990 – 1999
Calculated from FHWA data

Over the next 20 years, truck tonnage is expected to double in the United States, a rate more than five times that of population growth.

Projections from the Texas State Data Center indicate that by 2010 Texas will have three to five million more people than it does today. Between 2000 and 2040, Texas' growth rate may be as high as 140 percent. These population increases mean more cars and trucks on Texas roads. Transportation officials are busy planning ways to keep the increasing number of Texans moving safely over state roads. Texas Transportation Institute (TTI) research projects are looking at solutions from planning and design phases through implementation and maintenance needs.

One of the fastest growing transportation sectors is commercial traffic. Miles of travel for commercial vehicles are increasing at a faster rate than personal vehicle miles of travel. As the number of both commercial and passenger vehicles on state roads rises, so does concern about potential conflicts between the two modes.

A robust economy, increased international trade, changing economic trends, and other influences are affecting the freight industry, which in turn affects the Texas transportation system. Increasing numbers and size of trucks, accidents involving commercial vehicles, deteriorating pavements and bridges, and publicity about the North American Free Trade Agreement (NAFTA) have heightened awareness of community leaders and the traveling public regarding truck-related transportation concerns. The impact of trucking is felt in multiple ways:

Safety concerns The differences between cars and trucks in size, weight, speed and handling mean that cars and their passengers often incur more damage than commercial vehicles in car-truck collisions. Safety is also an issue when cargo is potentially dangerous or polluting. In addition, trucks are more frequently involved in work zone crashes than passenger cars.

Infrastructure construction and maintenance Recent regulations allow higher weights for commercial vehicles in some instances. Heavier loads may negatively impact pavements, bridges and other structures and make it difficult to maintain current infrastructure or expand capacity. Changing trends in commerce have resulted in more local stops on neighborhood roads, which may damage pavements not designed to handle frequent truck traffic.

Economic aspects Trucking constitutes a key component of the Texas economy. Over 80 percent of Texas communities receive commercial shipments exclusively by truck. In 1997, trucks carried three-fourths of all manufactured freight transported in the state, and the trucking industry employed one out of every eleven Texas workers.

Regional consequences Although commercial vehicles travel on roadways throughout the state, truck volumes are increasingly concentrated on major travel corridors. This concentrated commercial travel will amplify regional planning challenges facing fast-growing areas along these major thoroughfares.

Texas' role as gateway to the country As international traffic increases, infrastructure damage and traffic management needs may result from potentially more, and sometimes overloaded, trucks on Texas highways. Terrorist attacks and other events of recent years have increased concern over border security and inspection of vehicles crossing into the United States.

Transportation is the chain that links these differing sectors affected by truck shipments. TTI research is identifying trends, finding solutions and responding to evolving traffic-mix characteristics. Results from these projects will help optimize commercial and passenger travel across the state and prepare Texas for its rapid projected growth in coming decades.

Smarter trucks, smaller costs, safer roads

Research team makes progress toward onboard rollover warning and control system

You've seen them on the news — huge tractor-semitrailer trucks lying on their sides on the freeway like a fallen dinosaur. Chemical spills. Hazardous materials leaking. Evacuated neighborhoods.

When a truck rolls over at any speed, the results can be tragic. In 1999, 13 percent (5,362) of all fatalities involved a large truck. Rollover was a factor in 4 percent of the fatal crashes and 3 percent of the nonfatal crashes involving large trucks. Urban freeways are particularly vulnerable to this kind of crash due to their high traffic volumes and the number of curves, ramps and merges. These accidents are often preventable, and most agencies currently address the problem through signage or other traffic control measures.

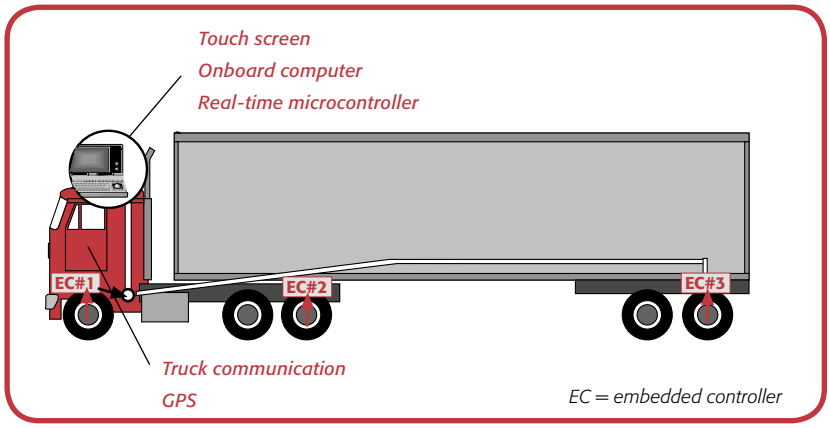
Technology developed by a team of Texas Transportation Institute (TTI) researchers, Texas A&M University mechanical engineers and students could make them even more preventable. The TTI approach would build the prevention right into the truck itself. With intelligent systems built in, the truck's onboard system could react directly to dangerous conditions, much like anti-lock brakes and airbags do now.

"The problem with external solutions like signs and other devices," explains James Ochoa, TTI's research team leader, "is that the driver has to notice and react to them correctly for them to be effective."

Originally, the system developed by TTI was strictly a warning system developed as part of a Federal Highway Administration project managed through the Intelligent Transportation Systems (ITS) research program of the Oak Ridge National Laboratory. The warning-only system was limited in its effectiveness, since, like external devices, it required the driver to react. As a result, the TTI research team, with support from the Southwest University Transportation Center (SWUTC), set out to develop an integrated rollover warning and active control system for tractor-semitrailers.

Reza Langari of Texas A&M's Mechanical Engineering Department served as the principal investigator on the SWUTC-sponsored project, which received technical support from Peterbilt Truck Company of Denton, Texas. Langari, together with Dongyoon Hyun, also a Texas A&M mechanical engineer, and Ochoa devised a sophisticated computational algorithm for an integrated rollover warning and control system.

"The onboard network of microcontrollers receives information from sensors and passes it to a central computer in the tractor cab," explains Langari. "The computer then uses an advanced computational algorithm to predict whether or not the vehicle is in danger of rollover, and sends a warning signal to the driver if rollover is imminent, or if necessary, intervenes to prevent an impending rollover."



The TTI approach would build the prevention right into the truck itself. With intelligent systems built in, the truck's onboard system could react directly to dangerous conditions, such as acceleration, strain, pressure, temperature and braking, much like anti-lock brakes and airbags do now.

Researchers believe that the construction, distribution or insurance industries might be interested in the results of this study, which still requires further field-testing. Successful completion of the research and implementation of the hardware and software promise to reduce rollovers in the future, saving money and, more importantly, saving lives for those industries that operate the trucks.

"Once tested and proven, the technology can be applied to multiple driving scenarios," says Ochoa. "Whether it's trucks driving on freeways at 70 miles an hour, or trucks moving at very low speeds in and around construction sites, the technology can help save lives, property and expensive delay times."

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or **Reza Langari** at rlangari@tamu.edu.

Report reveals danger for cargo bed passengers in pickup trucks

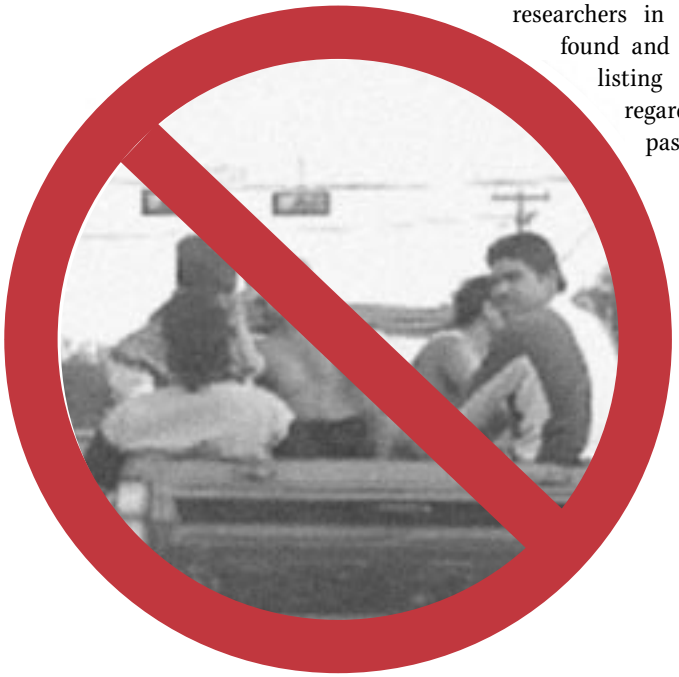
Riding in the cargo bed of a pickup truck is as Texan as rattlesnake roundups. Unfortunately, as a Texas Transportation Institute (TTI) study proved, it's also just as dangerous.

The project, sponsored by the Texas Department of Transportation (TxDOT) and part of the Federal 402 Program, analyzed crash data from the Texas accident database from 1989-1998 for the purpose of gathering statistics specifically related to cargo bed crashes. The study sought to gather the following statistics:

- *number of cargo bed crashes during the ten-year period*
- *location and time of the cargo bed crashes*
- *age group and gender involved in cargo bed crashes*
- *types of injuries sustained*

"We also worked with the Texas Department of Health and matched up crash records with trauma registry records," said Sandra De La Zerda, project supervisor with TTI. "This provided us the chance to learn more detail about the injuries sustained by the victims and the costs associated with treating them."

As part of the study, TTI also performed an extensive literature review to study what researchers in other states had found and compiled a chart listing other state laws regarding cargo bed passengers.



"The numbers were alarming," said Bill Reichert, TxDOT program manager and project director. "You always see people in the back of a pickup truck, but you never think of them falling off or being thrown out. As TTI's study shows, it happens quite frequently."

The research results showed that 4,242 cargo bed incidents occurred over a ten-year period, the majority of the drivers involved were young males, and 231 deaths occurred. But the statistics, according to De La Zerda, are probably underrepresented because crash reports do not clearly provide an appropriate abbreviation for coding the seating position, and as a result law enforcement officials are using multiple abbreviations. For example, the project staff read about 500 crash reports, and discovered that an additional 35 persons should have been coded as passengers riding in the rear of the truck.

At the time of the project, Texas state law stated that anyone could ride in an open bed under the speed of 35 miles per hour. As of last year, that law has changed. According to Transportation Code 545.414, a person commits an offense if the person operates an open-bed pickup truck or an open flatbed truck or draws an open flatbed trailer when a child younger than 18 years of age is occupying the bed of the truck or trailer.

Both Reichert and De La Zerda concur that access to the cargo bed crash data from this project could have been important to the legislature when the law change was under consideration. "Information such as where these crashes are happening and who is being affected is good data for legislators to have when they are deciding whether to change the law or not," said De La Zerda.

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Pooled-fund study to predict effects of heavier loads

What happens to the road when trucks weighing 120,000 pounds, rather than 80,000 pounds, drive across it daily? How much quicker will the pavement fail? How much more will it cost to repair the damage?

State departments of transportation (DOTs) will need the answers to these questions over the coming years as North American Free Trade Agreement (NAFTA) rules begin to allow Mexican and Canadian trucks — often heavier than the standard U.S. loads — to travel on our highways beyond the border cities.

Many DOTs conduct expensive accelerated pavement tests in the field to help them predict how much load a road can handle over a certain period of time before it will begin to show damage. A pooled-fund study sponsored by the Federal Highway Administration (FHWA) recently completed its first year toward the goal of integrating much of this accelerated pavement test (APT) data from participating states with computer modeling capabilities developed by FHWA in its Truck Pavement Interaction Program. The Texas Department of Transportation (TxDOT), in a joint effort with Texas Transportation Institute (TTI) and FHWA, is heading the four-year effort to perfect the mechanistic model simulation techniques. Also part of the project team are the DOTs in Louisiana and New York and The University of Texas – El Paso (UTEP).

"All of these states, and many more, are and will continue to feel the impact of NAFTA loads on their highways," says Tom Scullion, the project's lead researcher at TTI. "Everyone must have a defensible methodology and prediction technique in order to make valid economic impact statements and plan for future rehabilitation and stronger pavement designs." The project will use existing data from the participating states to calibrate FHWA's VESYS 5 Mechanistic/Predictive Model.

"Once we have the model performing well with the actual data from multiple test sites, DOTs across the country can then use it to predict pavement performance under varying loads, pavement designs, climatic conditions and geographic areas — without always resorting to costly and time-intensive field tests," says FHWA's lead researcher on the project and creator of the model, Bill Kenis. "We are looking for more participants. The more representative states and pavement structures we can include, the more accurate and comprehensive the calibration will be."

DarHao Chen, TxDOT project director, provides further details on reasons for the project: TxDOT is still basing its prediction of overload damage on the "fourth-power law" based on equations, tire pressures and configurations developed in the 1960s. Forty years later, conditions have changed. Rather than 70 and 80 psi, tire pressures on trucks are 110 psi and 120 psi. Roads are constructed using different pavement structures with different materials. Trucking patterns are changing. We have new APT data. Updated conditions bring the need for new equations and testing techniques.

"The first task for TTI was to pull together all the truck configurations that are using the roads from Canada and Mexico, and we've done that," says Scullion. The information will be used later in the study to evaluate the impact of the different truck types on typical overloaded highways in Texas, Louisiana and New York. TTI researchers have also completed the first case study using Texas Mobile Load Simulator (MLS) field data taken from a TxDOT APT project on US 281 in Jacksboro, Texas. According to Scullion, using VESYS 5 modeling program, researchers have successfully matched the model performance with the Texas field data. Lab testing will further verify the match, along with repeating the procedure on a variety of sites from the participating states.

FHWA has also calibrated the VESYS performance model with the American Association of State Highway and Transportation Officials (AASHTO) Test Road Data and with Louisiana ALF data. The results showed good agreement between the predicted pavement performance and the test measurements.

UTEP has developed a website that allows participating states to observe project progress and share findings. The UTEP team is also developing finite element models that can duplicate VESYS 5 results in ABAQUS — another computer platform.

In considering benefits to TxDOT, Chen points out, "In the long term, we hope to develop and perfect the lab testing and computer simulation techniques to avoid full-scale field testing. Results from this study will also possibly help us to come up with a policy that would accurately assess the costs of different truck load weights and tire configurations and more fairly assign responsibility for covering those costs."

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or **Bill Kenis** at (202) 493-3149 or bill.kenis @fhwa.dot.gov.

Enforcement efforts gear up for increased truck traffic

Between 1991 and 1999, the number of miles traveled daily by commercial motor vehicles in Texas increased by almost 20,000 miles. As commercial vehicle use of Texas roads continues to increase, the Texas Department of Public Safety (DPS) strives to keep up its enforcement and inspection activities to meet rising demands.

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In 1999, the Texas legislature directed DPS to inventory facilities and equipment, provide an overview of enforcement activity related to commercial vehicles, and report staffing levels and operating hours. The legislature also requested recommendations of infrastructure improvements for handling projected trucking increases. DPS called on the Texas Transportation Institute (TTI) and the University of Texas Center for Transportation Research (CTR) to partner in creating a comprehensive report of DPS enforcement activities.

"With the increase in commercial traffic, we need to address overall congestion and methods of handling commercial vehicle enforcement. We knew Texas lagged behind other border states in personnel and equipment, but this project gave us the ability to quantify what we need," says Major Coy Clanton of the Texas Department of Public Safety.

The cooperative nature of the project enabled DPS to meet a tight legislative deadline. DPS offices provided site photos and historical data, CTR analyzed and inventoried equipment and activities, and TTI evaluated overall needs and coordinated the project. The Texas Department of Transportation provided requested data on traffic counts and projected traffic volumes.

The project determined that DPS is significantly underequipped and understaffed. Out of 208 designated weighing areas, only 47 have fixed, in-ground scales. Over a third can use only portable wheel-load weighers. Only one pit for inspecting vehicles exists for the entire state, requiring inspection personnel at other locations to utilize more time-consuming techniques. Despite limited equipment and the small number of people assigned to these areas, however, analysis showed DPS to be extremely active in inspections. Expanded personnel and facilities would enable the agency to keep up with projected increases in truck traffic.

During the project, researchers contacted California and New Mexico to get state-of-the-practice comparisons. Like Texas, both states have borders with Mexico. California's size and operating environment are similar to those of Texas. State surveys focused on operating environments, facilities, equipment and personnel. Comparisons helped researchers determine corresponding needs and provided cost bases for some projections.

"The interaction with DPS and the other organizations supplemented and strengthened project results," notes Randy Machemehl, project team leader at CTR. "The combination of input enabled us to develop accurate, reliable information to pinpoint needs for the future."

"We were committed by legislative mandate to respond within a tight timeframe. With all our agencies working together, we were able to meet a deadline that none of us would have been able to meet on our own," adds Clanton. Findings from the project showed:

- *There is an immediate need to increase the number of DPS personnel for roadside enforcement and truck inspection.*
- *DPS must have better facilities and equipment for inspection and enforcement throughout the state to meet projected increases in truck traffic.*
- *Intelligent transportation systems equipment and other communications technologies should be incorporated at fixed-site commercial vehicle inspection facilities.*
- *The need for border-crossing facilities identified earlier by DPS cannot be overemphasized to accomplish effective truck processing at the Texas-Mexico border.*

"The findings from this project will allow DPS officials to look ahead at their needs over the next ten years," says Dan Middleton, System Monitoring Program manager at TTI. "We found that DPS will need better facilities and significantly more manpower to meet its responsibilities and have the necessary visible presence across the state."

For more information, contact **Dan Middleton** at (979)845-7196 or d-middleton@tamu.edu

Design options target truck corridors

A new Texas Department of Transportation (TxDOT) project will focus on corridors that would benefit from truck-related design approaches and will establish guidelines for design techniques applicable to those corridors. Texas Transportation Institute (TTI) researchers are investigating what design features best meet the needs of safety, traffic flow, roadside design and other factors affected by escalating truck traffic on Texas highways.

"We have seen a tremendous increase in the number of trucks that travel our highways and, as a result, damage to our facilities is also increasing. This project will give us an opportunity to manage truck traffic in a better way and to identify the accommodation criteria we need to use," says Gus Lopez, project director and engineer in the TxDOT Pharr District.

Dan Middleton, principal investigator of the project at TTI, emphasizes that the overall picture is complex. The project will establish criteria and thresholds that indicate specific design features that are needed where numbers of trucks or adverse influences due to trucks exceed some to-be-determined threshold. At the same time, designers must keep in mind safety concerns, equipment needs, pavement interaction, roadside design and other factors important in mixed-traffic corridors.

"The topics of special treatments for trucks and even separate truck roadways keep resurfacing because trucks have such different operational characteristic than smaller vehicles. If we can determine a way for highway corridors to separate commercial vehicles from passenger traffic in a feasible, cost-effective manner, we would anticipate increased safety and improved mobility for everyone," notes Middleton.

Identifying relevant design criteria that specifically reflect truck characteristics is crucial to achieving beneficial results for all travelers. Researchers will look at the current and projected truck traffic on each corridor along with operational and safety elements that may suggest a need for geometric design or roadside hardware improvement. They will identify approaches that will guide the design to achieve benefits without creating other difficulties.

The project's final product will be a set of design guidelines helpful to planners and decisionmakers in reaching effective road use. TTI will develop and present two workshops designed to relay the guidelines about beneficial design approaches to both policymakers and technical designers.

Identifying relevant design criteria that specifically reflect truck characteristics is crucial to achieving beneficial results for all travelers.

"We're all looking forward to having some clear, written guidelines we can use to implement designs to handle our projected traffic flows," comments Lopez. "This project will impact all areas of the state with heavy truck traffic and give us clear direction in the face of changing truck-traffic trends."

For more information, contact **Dan Middleton** at (979)845-7196 or d-middleton@tamu.edu

TTI evaluates lane restrictions for Houston demonstration project

When City of Houston Councilman Carroll Robinson first took office in January of 1998, he quickly identified one of his first major challenges: what could he do to reduce the number of crashes involving 18-wheelers on Houston freeways? As it turned out, with the help of the Texas Department of Transportation (TxDOT) and a law passed by the state legislature in 1997, plenty.

"I pulled together a meeting with the police department, TxDOT officials and some folks I knew in the trucking industry and asked what I could do to help," says Councilman Carroll Robinson. "And somebody raised the fact that there was a state law that allowed local governments to have a designated 'no truck' lane statute."

The statute, previously unused in Texas, grants authority to a municipality to petition TxDOT to designate a truck restriction lane on roads with three or more lanes. After studying the results from similar truck restriction lanes in other states and meeting with local transportation authorities, TxDOT decided it was an endeavor worth pursuing in Houston.

"The bottom line is that it reduced the crash rates ... by 68 percent," said Sgt. C.J. Klausner, supervisor of the Houston Police Department's truck enforcement unit. "It's hard to have an intellectual discussion with anybody that disagrees with the lane restrictions when you have that statistic backing you up."

"The obvious advantage to a truck lane restriction is the separation of the truck traffic from the passenger vehicle traffic," says Sally Wegmann, the project director from TxDOT. "Statistics show that 50 to 70 percent of all of the 18-wheeler accidents are not caused by the 18-wheeler, but rather the passenger vehicle either changing lanes too quickly in front, or being on a blindside, or some type of human judgment reaction that an 18-wheeler cannot react to as quickly."

Working with Councilman Robinson, the Houston District of TxDOT requested that the Texas Transportation Institute (TTI) explore which freeway in Houston would work best for the study, help the City of Houston draft a city ordinance, and collect data during the 36-week evaluation period. In order to be selected for the demonstration project, the freeways had to meet the following criteria:

- *be within the Houston city limits,*
- *have a minimum length of six miles,*
- *have a truck volume of at least four percent, and*
- *have sufficient existing sign structures on which to mount the required regulatory signs.*

TTI researchers recommended an eight-mile section of I-10 East Freeway for the demonstration project. TTI researchers reviewed traffic volume data gathered at three "monitoring" locations within the test section and at another location further east. The information gathered was used to determine compliance with the truck lane restriction by measuring the percentage of trucks in the left lane compared to other lanes.

"We also did a user survey, where we passed out surveys one day at selected freeway ramps to get a sample of public perception of the demonstration project, and also conducted an Internet survey," says Darrell Borchardt, the research engineer in TTI's Houston Research and Implementation Office who headed the project.

TTI researchers compiled crash data during the 36-week lane restriction demonstration project from the Houston police department and compared it to data taken on the same stretch of road prior to the restriction. The study results indicated a dramatic 68 percent reduction in crashes.

Borchardt attributes the success of the project to a high compliance rate in the restricted zone aided by active law enforcement presence provided by the Houston Police Department's truck enforcement unit. According to the TTI evaluation report, the average compliance rates in the restricted section of freeway were generally in the 70 to 80 percent range.

"The bottom line is that it reduced the crash rates on the eight-mile stretch of road by 68 percent," says Sergeant C.J. Klausner, supervisor of the Houston Police Department's truck enforcement unit. "It's hard to have an intellectual discussion with anybody that disagrees with the lane restrictions when you have that statistic backing you up."

According to Sergeant Klausner and Councilman Robinson, automobile drivers overwhelmingly support the measure, a statement backed up by the 85 percent approval rating on the survey results from the TTI questionnaire. The success of the demonstration project has resulted in TxDOT considering implementation of the restriction on additional freeways in Houston.

"When you restrict a lane to trucks and you have good law enforcement coordination, then you save lives, and that's the end all and be all of what we're trying to do in government, and that's to protect the public," says Councilman Robinson.

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Are truck lane restrictions the answer? *Opinions may vary*

Separating commercial vehicles from passenger cars may benefit both commercial and passenger traffic and solve some traffic operation dilemmas caused by mixed lane use. But it is not a simple solution.

One traffic operations approach that responds to increasing truck presence on highways is separation of passenger cars from truck traffic using truck lane restrictions.

The Houston District of the Texas Department of Transportation (TxDOT) has already implemented restricted lane use in some areas (see related story). In the Waco District, a fast-paced program is in place to relieve congestion on I-35. Engineers there think truck lane restrictions might be a cost-effective option for improving traffic operations and handling the heavy mix of cars and trucks on the near-capacity stretch of freeway in the district.

"We'd like to serve as a project test site for designated truck lanes. That way we could get a solution in place right away and also see what might work best for the long term," says Richard Skopik, district engineer in the TxDOT Waco District. "Operational differences between small and large vehicles are underscored by our significant traffic mix. The traveling public and stakeholder communities have let us know they perceive the combination of trucks and cars on the roadway as a problem. We think dividing large trucks from passenger vehicles will create a smoother flow for all vehicles, increase safety and allow more capacity out of a given set of lanes."

One way designated truck lanes could help achieve cost-effectiveness is by reducing overall facility costs. Because highways are usually designed to accommodate the most rigorous traffic requirements, pavement designs must meet heavy-duty standards on highways with high commercial vehicle levels. Designated truck lanes would allow pavement designs based on passenger cars for some lanes, reducing costs of lanes not designated for heavy loads.

Separating commercial vehicles from passenger cars may benefit both commercial and passenger traffic and solve some traffic operation dilemmas caused by mixed lane use. But it is not a simple solution. For example, restricted-lane programs need to find methods for distributing trucks and cars to use lanes at optimal efficiency. Deciding which lanes should carry what types of vehicles and designing roads for optimal access are difficult tasks. In addition, designated highway lanes do not address the problems of pavement damage and increased truck traffic on neighborhood roads resulting from changing freight delivery trends.

"When we start looking at lane restrictions or designations for trucks, there are many factors to consider," notes Bill Webb, president of the Texas Motor Transportation Association. "We have fewer long-hauls than we did just 10 to 15 years ago. Today we have many more trucks that are on and off the roads frequently delivering smaller, just-in-time loads — so safe, accessible entrances and exits are of primary concern. It's also difficult to define what kinds of trucks would need to use separate facilities."

Where designated lanes do provide the best solution, they must be designed so that both trucks and cars can use roadways efficiently and safely. Research projects and implementation sites across the state are working to determine the best way to design and operate Texas roads in the face of complicated and changing traffic patterns.

Hall of Honor Inductees

Gibb Gilchrist

In December 2001, the Texas A&M University Board of Regents and state transportation officials formally added the name of Gibb Gilchrist to the Texas Transportation Hall of Honor roll. Gilchrist was a leader in transportation throughout his professional career, heading the Texas Highway Department (now the Texas Department of Transportation) during two separate periods between 1924 and 1937.

"Mr. Gibb Gilchrist was a true pioneer in being one of the first who grasped the potential of a strong, consistent program of transportation research for the state's development. As state engineer of the Texas Highway Department, he played a major role in laying the foundations of what was to become a virtual infrastructure revolution in the state," noted Dr. Jerry Gaston, deputy chancellor of the Texas A&M University System, at the induction ceremony.

When the Texas A&M College System (now the Texas A&M University System) was established in 1948, Gilchrist was appointed its first chancellor — a post he held until his retirement. During his tenure, Gilchrist worked closely with DeWitt C. Greer (previously inducted into the Hall of Honor) to envision and create the Cooperative Research Program between the A&M College and the Texas Highway Department, which led to creation of the Texas Transportation Institute (TTI) in 1950. Gilchrist acted as the first president of TTI.

Before his appointment as chancellor, Gilchrist served as dean of engineering and president of Texas A&M University. He established the Department of Aeronautical Engineering, and his leadership in the field of aeronautics launched College Station's Easterwood Airport.

"Texans today enjoy a strong transportation system due in part to the contributions of Gibb Gilchrist," said Mike Behrens, executive director for the Texas Department of Transportation. It is fitting that TTI has chosen to induct Gibb Gilchrist into the Texas Transportation Hall of Honor."

Alton McDonald

Alton McDonald was formally introduced as the fifth member of the Texas Transportation Hall of Honor in a ceremony in February 2002. The induction was performed during the annual meeting of the McDonald Transit Associates, Inc. in Irving, Texas. The ceremony featured speakers from McDonald Transit Associates, the Texas Transportation Institute (TTI), the Texas Department of Transportation (TxDOT), and the Fort Worth Transportation Authority (FWTA).

Mr. McDonald began his career in public transportation in 1929 at the Jacksonville, Florida, Traction Company. After a brief stint as treasurer of National Air Lines, he returned to his specialty, surface transportation.

Between 1945 and 1972, Mr. McDonald gained national recognition for directing successful public restoration of failing bus companies throughout the United States. In 1972, he founded McDonald Transit Associates in Fort Worth to assist the city with the purchase and public management of the failing private bus company.

"Mr. McDonald founded McDonald Transit Associates, Inc. for the specific purpose of applying consumer-oriented private enterprise management techniques to the operation of public transportation," said Larry Heil, chairman of McDonald Transit. "Following this principle, the company grew into the oldest and largest independently owned transit management firm in the United States."

Fort Worth's first public transportation system, CITRAN, was a success and paved the way for voter approval of FWTA. The FWTA, known as "the T," offers Tarrant County residents public transportation such as bus services, shuttles and trolleys. "Mr. McDonald is the reason for the growth of the "T," our state of the art transit system," said John Bartosiewicz, president/executive director of FWTA. "All our growth is directly attributable to the patterns he set in the early 70s."

Before retiring in 1979, Mr. McDonald chaired many committees for the American Public Transit Association, and served two terms as its vice president and a member of its Board of Directors.

"Texas was blessed with some extraordinary transit leaders in the 60s and 70s that were not only great Texas leaders, but were recognized nationally as pioneers in the field," said Margot Massey, director of the Public Transportation Division at TxDOT. "McDonald was certainly one of those that was significant not only to transit in Texas, but to transit in the United States."

Previous Inductees:

Frank Turner
March 2000

DeWitt Greer
May 2001

Herb Kelleher
June 2001

For more information on the Texas Transportation Hall of Honor contact **Dennis Christiansen** at (979) 845-1713 or dennis-c@tamu.edu.

TTI acquires Rakeman "History of Transportation" art collection

(l – r) Dennis Chrisitansen, deputy director, TTI, Herbert Richardson, director, TTI, Dennis Judycki, acting deputy executive director, FHWA, Steve Simmons, deputy executive director, TxDOT, Steve Gayle, international president, ITE.

In 1921, Carl Rakeman (pronounced rock-man) joined the Bureau of Public Roads, the predecessor to the Federal Highway Administration, as a commissioned artist with the task of creating paintings depicting the history of North American transportation. The results of his 30 years of work are now on display throughout the hallways of the Texas Transportation Institute's (TTI) Gibb Gilchrist building in College Station.

Rakeman created models for use in his painings.

TTI celebrated the official opening of Rakeman's painting exhibit, named "The Past, the Present, and the Future of Transportation," on November 28 in a ribbon cutting ceremony. Speakers from the Institute of Transportation Engineers (ITE) and the Federal Highway Administration (FHWA) presented the collection.

Rakeman's collection commemorates the evolution of North American transportation beginning in 1539 with travel by horse and ends with a painting depicting the national highway system in 1945. Other highlights of the collection include colonial bridges and trails, the Pony Express, the Lewis and Clark expedition, and the Chisolm Trail.

"My favorite [of the collection of paintings] must be the ones that show the beginning of highway research," says Dr. Dennis Christiansen, TTI's deputy director. "That's what we do here, and seeing these pictures remind me of how it all began."

The Rakeman collection is on loan from FHWA and will be on display in the Gilchrist building for five years. Before arriving in College Station, the paintings were displayed at the Rutherford B. Hayes presidential museum in Fremont, Ohio. The museum is undergoing renovations, and the paintings needed a new location with plenty of wall space. The 80 oil paintings are arranged on the first and third floors of the Gilchrist building and accompany the Gilchrist lobby display of historical traffic control devices, on loan from ITE.

Carl Rakeman, a native of Washington D.C., was educated at several art academies throughout Europe. In addition to oil paintings, the multi-talented Rakeman etched, painted watercolors and frescoes, and worked in the field of mural decoration. One of his more notable works was painting the mural that adjoins the Senate Committee Room on Appropriations in the Capitol building in Washington D.C.

"We are pleased to feature the Rakeman collection in our Gilchrist Building," says Dr. Herbert Richardson, TTI's director. "This collection of American transportation art illustrates the history of how our transportation systems have improved over time, through research. As a research institute, TTI is proud to be part of the past, present, and future of transportation."

1903 – First transcontinental automobile trip. The 20-horse power Winton touring car encountered problems in Wyoming.

1934 – Railroad crossings bridged. In June 1934, the federal government authorized funds to aid in separating grades at 70 intersections.

Historical traffic control devices on display at TTI

Accompanying the Rakeman collection in the Gilchrist building lobby is a display of historical traffic devices on loan from the International Institute of Transportation Engineers (ITE).

The display features an interesting ensemble of traffic signals used in the early 1900s, and a national highway sign used at the turn of the century.

"Some of these pieces represent attempts to create traffic signals before there was any consistency in how traffic signals were presented to the driving public," said Gene Hawkins, division head of the Operations and Design Division at the Texas Transportation Institute (TTI). "In the 1920s and probably even into the early 30s to some extent, traffic control devices had a lot of different appearances."

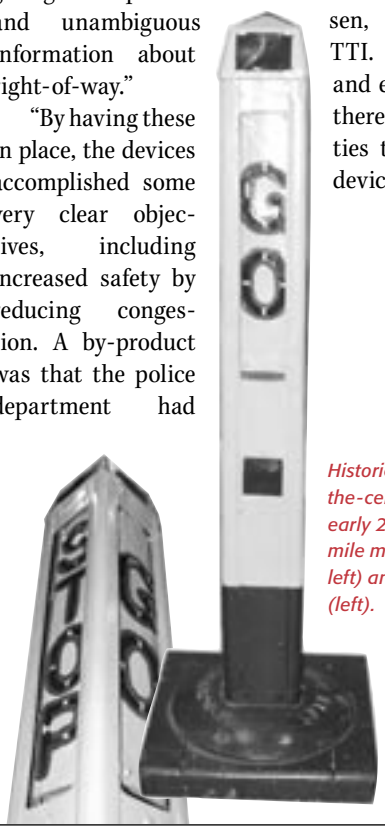
At the Rakeman ribbon cutting, Steve Gayle, the International President of ITE, spoke about the importance of the devices during the early years of public transportation.

"As this country became motorized and our cities more congested and less safe, traffic engineers invented these traffic control devices for the sole purpose of giving the public clear and unambiguous information about right-of-way."

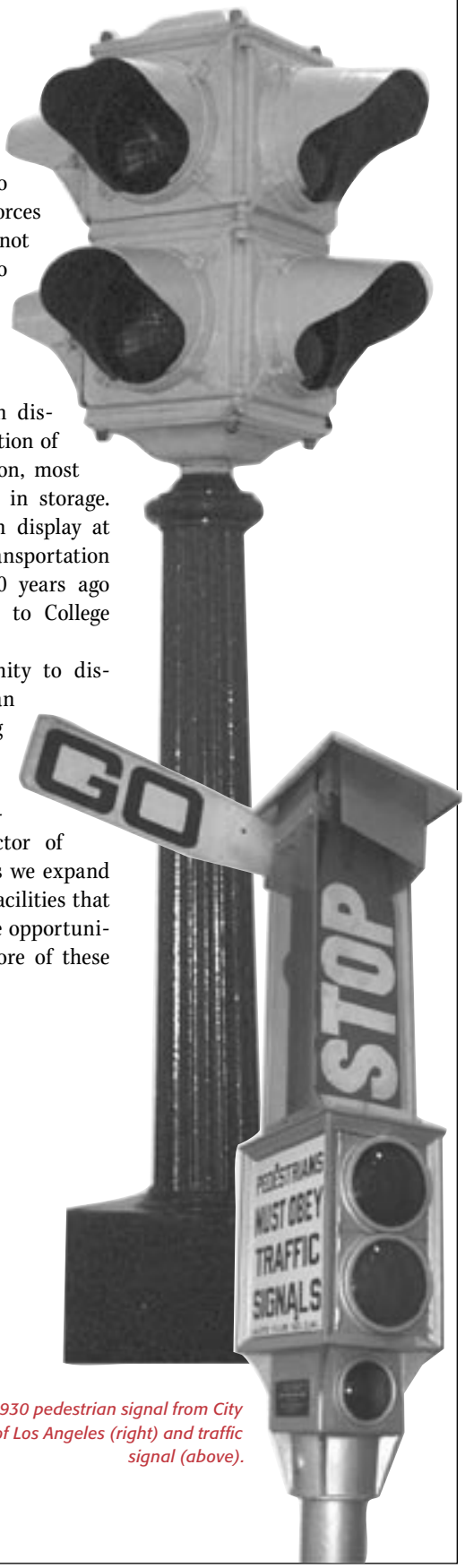
"By having these in place, the devices accomplished some very clear objectives, including increased safety by reducing congestion. A by-product was that the police department had the opportunity to re-deploy their forces because they did not need policemen to perform traffic control at busy intersections," said Gayle

The signals on display are just a portion of the entire collection, most of which are still in storage. They were last on display at the Boston Transportation Museum about 20 years ago before being sent to College Station last year.

"The opportunity to display them in an education setting was very attractive to ITE," said Dennis Christiansen, deputy director of TTI. "We hope as we expand and enlarge TTI facilities that there will be more opportunities to display more of these devices."



Historical turn-of-the-century and early 20th century mile marker (far left) and signal (left).



1930 pedestrian signal from City of Los Angeles (right) and traffic signal (above).

NAOMI LEDÈ HONORED AS FIRST RECIPIENT OF SHARON D. BANKS AWARD FOR INNOVATIVE LEADERSHIP IN TRANSPORTATION

Naomi Ledé, senior research scientist at the Texas Transportation Institute (TTI) in College Station, Texas was honored as the recipient of the inaugural Sharon D. Banks Award for Innovative Leadership in Transportation on January 16, 2002, at the Transportation Research Board's (TRB) 81st Annual Meeting.

"Dr. Ledé's expertise, strategic thinking, planning and ability to create and implement innovative transportation programs fully represents why she is a highly deserving recipient of this award," says Dr. Herb Richardson, director of TTI.

Sharon D. Banks was the general manager of AC Transit, Oakland, Calif., from 1991-1999. She also served as the Chairwoman of the TRB Executive Committee in 1998. Banks died unexpectedly in 1999.

Established by TRB with the support of the U.S. Department of Transportation, the Sharon D. Banks Award for Innovative Leadership in Transportation recognizes sustained leadership accomplishments and innovations over an extended period of time that exemplify Banks' caring nature and depth of character. The award criteria include a documented record of successful and innovative leadership by improving transportation services, operations, management practices, mentoring and training programs, community relations or labor relations.

Ledé assumed her position with TTI in 1998 after retiring from Texas Southern University with a 25-year distinguished career in transportation research and education. There she served as director of the Center for Transportation Training and Research (CTTR), developing one of the strongest and most well respected transportation research and education programs in any historically black university in the nation.

Additionally, she developed a National Summer Transportation Institute (NSTI) aimed at introducing junior high and high school students from the minority community to the many opportunities of a career in transportation. The program has been recognized with a number of national Federal Highway Administration (FHWA) awards. With others at TTI, Ledé is continuing to develop innovative programs, for students from elementary school through college, to increase the number and the quality of those entering transportation careers.

LORD AWARDED D. GRANT MICKLE AWARD

Dominique Lord, associate research scientist with the Texas Transportation Institute (TTI), was presented the D. Grant Mickle Award for his paper entitled "Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Methods." Lord received the award at the 81st Transportation Research Board (TRB) annual meeting on January 16 in Washington D.C.

The D. Grant Mickle Award was established in 1976 and is presented annually for the outstanding paper published in the field of operation, safety and maintenance of transportation facilities.

Lord has been with TTI since October of 2001 and specializes in traffic safety. Over the last eight years, Lord has participated in numerous traffic safety studies as researcher and consultant in Canada, the United States and western Africa.

OVERMAN SELECTED AS NATIONAL TRANSIT INSTITUTE FELLOW

John Overman, associate research scientist with the Texas Transportation Institute (TTI), has been selected as a National Transit Institute (NTI) Fellow for the class of 2003. The NTI Fellows Program is a program that was created in 1994 to recognize and promote the sharing of innovative practices in the transit industry.

During his two-year tenure, which began January 1, Overman is responsible for delivering a minimum of four of his "environmental compliance for transit operations" workshops. The audience for the workshops are North American transit agencies, state or provincial departments of transportation, regional or local agencies, private firms involved in transit work, or colleges, universities or other not-for-profit transportation organizations.

Overman joined the Institutional Policies Program in TTI's Arlington Office in 1999. He brings 12 years of experience in environmental planning, management and assessment to the Fellows program.

"This is a great opportunity to interact with transit agencies and transit operators throughout the country and also offers great networking opportunities," says Overman.

JOHN BASILOTTO RETIREMENT

The Texas Transportation Institute (TTI) hosted a retirement party on January 10 for **Colonel John Basilotto**, director of the Center for Ports and Waterways (CPW), which is headquartered at Texas A&M at Galveston (TAMUG). Basilotto also served as the division head of TTI's regional division at TAMUG, where he was a faculty member in the Department of Maritime Administration.

When Basilotto joined TTI seven years ago, he brought a vast knowledge of the Texas maritime industry and a wealth of expertise he developed as the district engineer for the Galveston district of the U.S. Army Corps of Engineers. When the CPW was established, Basilotto quickly developed the relationships necessary to implement the CPW's research and outreach programs.

Basilotto became widely respected in many national maritime organizations, serving in various executive and committee capacities. Among Basilotto's more notable achievements is the establishment of the award winning informational website known as MERMAID (http://maritime.tamu.edu), which is the world's leading website on maritime transportation. Basilotto is also responsible for TTI's designation by the U.S. Maritime Administration as a National Maritime Enhancement Institute.

Basilotto's retirement plans include immediate enrollment in an educational curriculum of electronic and radio technology communications. Also, he is already engaged in some broadcasting and broadcast engineering for a radio station in Austin, where he resides with his wife, Pat.

"John was a very dynamic colleague who was extremely innovative, committed to excellence, and eager to achieve each and every goal he attempted," says Dock Burke, director of external programs at TTI. "He was a superb advocate for TTI, and those of us who worked closely will miss his energetic enthusiasm and his willingness to share his encyclopedic understanding of maritime transportation systems."

TURNBULL APPOINTED TRB GROUP 5 COUNCIL CHAIR

Katherine Turnbull, associate agency director of TTI, has been appointed Chair of the Transportation Research Board (TRB) Group 5 Council and a member of Division A Council. Division A, the Technical Activities Division of TRB, is responsible for committees and task forces, the annual meeting and specialty conferences and workshops, publications and the state visit program.

Approximately 140 committees and task forces in Division A are organized into five groups, with Group 5 consisting of 22 committees and task forces focusing on intergroup resources and issues. Examples of committees in Group 5 are Conduct of Research, Intelligent Transportation Systems, Transportation Issues in Major Cities, and Critical Infrastructure Protection.

As Chair of Group 5 Council, Turnbull will help coordinate activities among committees and groups and act as a liaison between committees and the TRB Executive Committee and TRB staff. Priorities for 2002 include incorporating the critical issues identified in the TRB Strategic Plan into committee activities, promoting diversity in committee membership, encouraging greater interaction among committees and councils, and enhancing the annual meeting and specialty conferences.

Colleagues presented Col. Basilloto with the limited edition print of "Moment of Glory" by the noted Texas artist G. Harvey. The print depicts a U.S. Army regiment (engineering) returning home at the end of the Civil War.

THE BACK ROAD

Anyone who drives on Texas highways knows about trucks- and probably worries about their effect on highway safety. Recent data indicate that truck traffic in Texas has grown dramatically and will continue to increase. In fact, truck tonnage is expected to double in the United States over the next 20 years, and Texas will see much of that increase. A strong economy, increasing international trade, and other economic influences affect the freight industry, as well as the overall transportation system in Texas.

Because the increase in truck traffic calls for innovative solutions, Texas Transportation Institute (TTI) researchers have been working on a range of commercial vehicle concerns, several of which are highlighted in this issue. They include truck safety-including 'built in' rollover prevention, the effects of heavy loads on pavements and possible highway design options that could ease the effect trucks have on our highways. There is also a story about the dangers of riding in the cargo beds of pickup trucks, and the importance of combining crash data with trauma registry to give a more complete picture of this unsafe behavior. All of our research is aimed at finding ways to keep trucks and other vehicles moving safely and easily on Texas highways.

Other highlights in this issue include the latest distinguished inductees into the Texas Transportation Hall of Honor — Gibb Gilchrist and Alton McDonald. They join Frank Turner, DeWitt Greer and Herb Kelleher, all of whom are recognized for their outstanding leadership and contributions to transportation in Texas. Finally, I want to encourage you to read about, and perhaps come and see, a series of transportation paintings by Carl Rakeman and some historic traffic control devices now on display in the Gibb Gilchrist Building. I hope they will entice you to pay a visit to TTI and the A&M campus.

We're grateful for your interest and support of TTI's research program. I hope you continue to find this publication useful and interesting, and that you'll check our website or contact us if you'd like more information.

Herb Richardson

TEXAS TRANSPORTATION Researcher

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