

TEXAS TRANSPORTATION

Researcher

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PRESERVING
Our
Environment

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Don't Mess with

Drive Clean Across Texas
www.drivecleanacrosstexas.org

Statewide air quality education campaign turns three

A lone cowboy sits atop a grassy hill. He is silhouetted against the Texas sky and is gently strumming a guitar. “Oh, give me a home,” he sings. Then he inhales deeply from something and continues, “...where the buffaloes roam...(puff).” A camera captures the emotive scene. Then it slowly pulls back to reveal this Western figure breathing with an oxygen mask between song verses as thousands of vehicles creep by on the highway below. A traditional Texan clashes with our culture of cars. Welcome to the air quality problem in Texas.

The award-winning television spot just described was the first in a series of public service announcements (PSAs) created by the staff of the statewide air quality education and public outreach campaign, Drive Clean Across Texas (DCAT). Launched in March of 2002 with a message of endorsement from Governor Rick Perry, the campaign is an historic partnership between the Texas Department of Transportation (TxDOT) and the Texas Commission on Environmental Quality (TCEQ). The Texas Transportation Institute (TTI) headed the team developing the campaign for TxDOT and TCEQ.

It was created because a Texas-sized problem demands a Texas-sized solution.

“This is a fantastic example of state governmental agencies working together to accomplish a common goal—that goal being clean air for Texans to breathe,” says Israel Anderson, director of TCEQ’s Small Business and Environmental Assistance Division. “To the best of my knowledge it’s the first example of a major state transportation agency and a major state environmental agency pulling together to work this way.”

So, what's the problem?

Automobile exhaust is choking some of our cities right into big trouble. Ozone, which plagues larger population areas in the state, is a major component of smog and a product of heat, sunlight and automobile exhaust. Not only is ozone a major health irritant to eyes and lungs, but having too much of it at ground-level means cities fall out of compliance with federal standards and into “nonattainment” status. There are nine areas in Texas at or near nonattainment. Falling into nonattainment means risking federal penalties like losing highway funding.

And the solution?

Public education.

“TTI’s team has done a great job with creating the first statewide public education and information campaign of its kind in the nation,” says Richard Goldsmith, public information officer for TxDOT’s Environmental Affairs Division. “TxDOT is in this for the long haul to change air quality behaviors and help influence public opinion.”

Since 2002, the Federal Highway Administration and TxDOT have committed approximately \$7.5 million in an 80/20, Federal/State split. With such financing, three 30-second PSAs were developed for broadcast across Texas:

- **Singer**—a cowboy using oxygen on a hillside overlooking a busy highway.
- **Butterfly valves**—an older woman wows a parts store clerk with her knowledge of how to make hot rod engines run more efficiently.
- **Creatures**—newest of the PSAs, features critters from the animal world coughing and reacting to vehicle pollution and dreaming of clean air.

“Singer” and “Butterfly Valves” both won Telly Awards, which honor outstanding local, regional and cable television commercials and programs.

“**This is a fantastic example of state governmental agencies working together to accomplish a common goal—that goal being clean air for Texans to breathe**”

Israel Anderson, director of TCEQ’s Small Business and Environmental Assistance Division

TTI collaborated with the Sherry Matthews Advocacy Marketing group in Austin to develop the PSAs, a series of billboards, print ads and press releases.

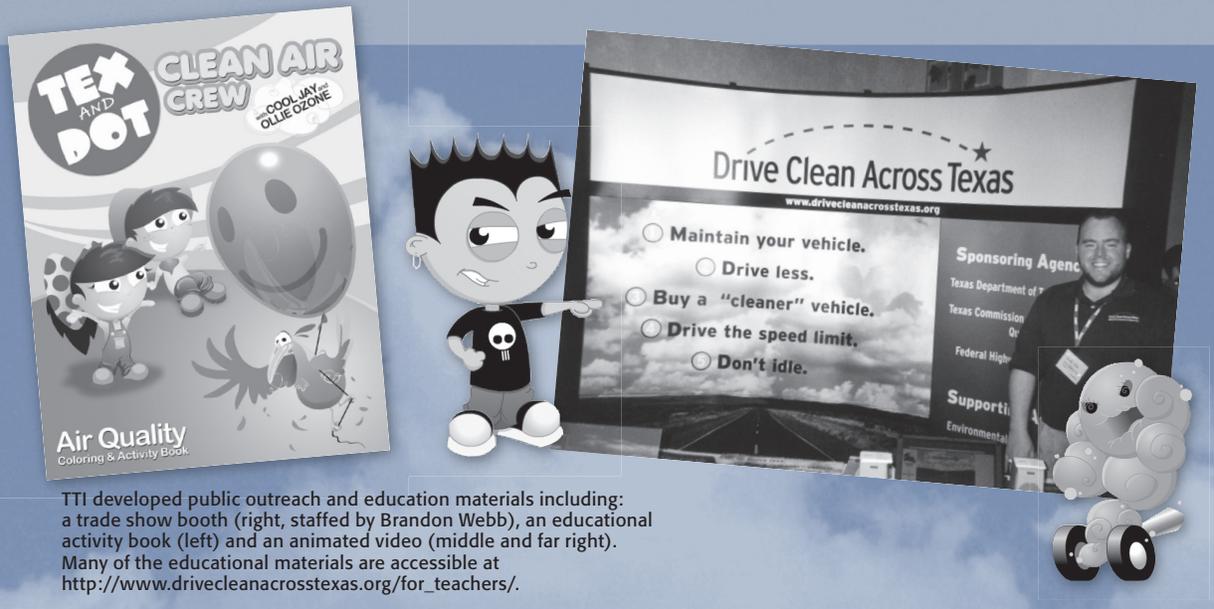
TCEQ, TxDOT’s campaign partner, funded educational outreach tools designed to share the campaign’s five messages: Maintain your vehicle, Drive less, Buy a cleaner vehicle, Drive the speed limit and Don’t (voluntarily) idle.

Measuring success

Drive Clean Across Texas is a successful public outreach and education campaign. Survey results from 2003—only a year after the launch—indicate that 25 percent of Texans, roughly 5 million people, recognize Drive Clean Across Texas and know at least some basic details about the campaign. And after only two years and a few broadcast and print messages, six percent—approximately 1.2 million Texans—said DCAT convinced them to take air-friendly actions like maintaining their vehicles per manufacturer recommendations, filling up their gas tanks after 6 pm, not topping off their tanks and keeping their tires properly inflated. The George Bush School of Government and Public Service will conduct the next survey in the summer of 2005.



A series of campaign posters were designed to highlight important “air friendly” actions, including: maintaining your vehicle, driving less, buying a cleaner vehicle, driving the speed limit and limiting the time your vehicle idles.



TTI developed public outreach and education materials including: a trade show booth (right, staffed by Brandon Webb), an educational activity book (left) and an animated video (middle and far right). Many of the educational materials are accessible at http://www.drivecleanacrosstexas.org/for_teachers/.

“Another very strong measure of success is that all of the commissioners of TxDOT and TCEQ fully support the program,” says Anderson. “The commissioners recognized that this was something they could support for the duration.”

Keeping it local

Beyond 2003’s promising survey results, the real success of DCAT is the relationship TxDOT and TCEQ have nurtured with staff at more than nine city air quality programs around Texas. The campaign is a supplement to the work that takes place in cities like Austin, San Antonio, Victoria, Corpus Christi, Tyler/Longview, Houston/Galveston, Dallas/Fort Worth, Beaumont/Port Arthur and El Paso.

“When we collaborate with a prominent statewide campaign like DCAT, it enables us to leverage local funds—to get more miles out of our local dollars,” says Joni Brown, air quality program coordinator for “Air Victoria—Keep it Clean,” with the City of Victoria. “The DCAT materials are beautiful and well-presented. And because we partner with Drive Clean Across Texas, we’re able to localize these materials with our logo and identity, which increases the visibility and reach of “Air Victoria—Keep it Clean.”

Children are the drivers of tomorrow

Who does not remember the anti-smoking or pro-seatbelt public service campaigns of our youth? Remember Smokey Bear’s message? These campaigns all share a common strategy—that children convinced by healthy messages can make lifelong healthy decisions. Air quality is no exception.

After launching the public outreach and education portion of the campaign aimed at adults, TTI began educating children and teens with a comprehensive, K-12 curriculum. These young people will soon start reaching for car keys, and the campaign aims to

influence them toward air-friendly driving habits for a lifetime of “driving clean.” The curriculum, matched to the Texas Essential Knowledge and Skills (TEKS) requirements, is available on the internet for free at: http://drivecleanacrosstexas.org/for_teachers/.

A fun, animated air quality video is part of the K-5 curriculum. Developed at TTI, the video brings to life long-established TxDOT transportation “experts” TEX and DOT, with their pals “Ollie Ozone” and “Cool Jay.” The video teams this “Clean Air Crew” against the dreaded “Smog King,” who relishes polluted skies. The video may be ordered online for free, or viewed at: http://drivecleanacrosstexas.org/for_teachers/activity_book/.

Other educational materials developed for school children include bookmarks and a K-5 Clean Air Crew coloring and activity book.

Step right up!

Public outreach appearances are a specialty characteristic of DCAT. Appearing at education events and environmental trade shows and conferences helps reinforce the campaign’s impact. Such appearances allow TTI communications staff the chance to meet and educate fellow Texans about simple steps each of us can take for better breathing.

“When Drive Clean Across Texas was launched in 2002 we tried to get decision-makers, leaders, business owners and all citizens to better understand the air quality problem,” says Brian Bochner, senior research engineer and head of TTI’s Center for Air Quality Studies. “More and more Texans now know about the problem, and they know there’s something we can do about it.” **R**



MORE INFORMATION

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TTI research seeks solutions to reduce truck idling



Due to recent regulations, long haul drivers of heavy-duty diesel trucks are required by the U.S. Department of Transportation to rest 10 hours for every 14 hours of driving. An unfortunate side effect of this new law is the possibility of higher emission levels due to increased truck idling. When truck drivers are parked at rest areas or truck stops, they idle their vehicles to operate air conditioning, heating systems and generate electricity as well as charge their vehicle's batteries and warm-up engines.

The Texas Transportation Institute (TTI) recently completed a project for the Texas Commission of Environmental Quality (TCEQ) to develop a procedure that estimates how much pollution these idling trucks pump into the atmosphere.

The research focused on a case study in Beaumont. Beaumont was selected because of its location along I-10, which has a large volume of truck traffic. The researchers studied sites where trucks were most likely to idle for more than 15 minutes, such as truck stops, rest areas, the Ports of Beaumont and Port Arthur, and industries where heavy-duty trucks delivered products.

The researchers spent three days in the summer of 2003 conducting surveys at these sites. The researchers interviewed truck drivers to obtain information and observed truck idling patterns.

The case study results showed that truck stops were typically at about 50 percent capacity. Approximately, 70 percent of the trucks at the rest stops were idling. This data was used to develop a model to estimate the truck idling emissions level for Beaumont.

The researchers developed similar equations for the other sites studied (Ports of Beaumont and Port Arthur and industries). Using the findings for all the sites, in conjunction with data from throughout the state, the researchers were able to estimate extended truck idling emissions for the nonattainment areas in Texas.

The study indicated that extended truck idling emissions is a source of mobile source emissions, resulting in more than 30 tons per day of oxides of Nitrogen (NOx) emissions and more than 0.8 tons

per day of particulate matter (PM) emissions in Texas' major metropolitan areas.

"Long duration truck idling has a negative impact on air quality, fuel consumption, engine maintenance, and driver health and safety," says Paul Bubbosh, manager of the U.S. Environmental Protection Agency's Idle Reduction Program. "TTI developed a methodology to quantify extended truck idling emissions for the entire state of Texas. This work is highly advanced, and it should serve as a model for other states attempting to quantify their extended truck idling emissions."

One of the proposed solutions to reduce extended truck idling is to make electrical hookups available at truck stops. These hookups would allow drivers to run air conditioning, heating, internet service and other amenities to the cab, thus eliminating the need for idling. The electrical hookups have recently been installed at truck stops in El Paso, Baytown, Dallas and San Antonio. 

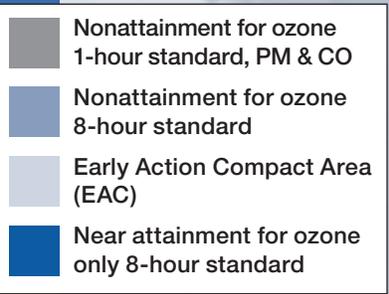
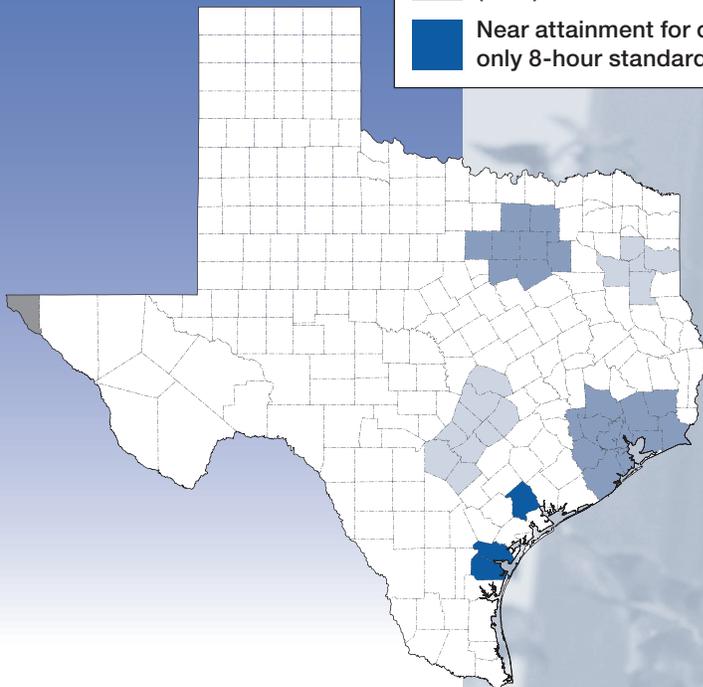


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The Air in Texas

This map contains information on state implementation planning related to air quality in Texas' nonattainment and early action compact areas. Nonattainment areas are areas that have failed to meet national ambient air quality standards as designated by the Environmental Protection Agency.

Texas meets federal air quality standards with the following exceptions: (1) carbon monoxide and particulate matter in El Paso; (2) ozone in Houston/Galveston/Brazoria, Dallas/Fort Worth, El Paso (for 1-hour standard) and Beaumont/Port Arthur. In addition to these four nonattainment areas, there are three early action compact areas: San Antonio, Austin and Northeast Texas. These three areas have pledged to meet the 8-hour ozone standard earlier than required by the Clean Air Act. Two areas in Texas remain near nonattainment, meeting the air quality standards (specifically ozone standards) by a slim margin. The Texas near nonattainment areas are Corpus Christi and Victoria.



Five Years Later:
TTI Center Still
a Breath of

*Fresh
Air*

*The quest for cleaner
air continues*

**CFAQS Case Study:
A Funding Lapse in
Beaumont/Port Arthur**

The Texas Transportation Institute (TTI) launched the Center for Air Quality Studies (CFAQS) in 2000, and the Center has conducted many projects in the last five years. “The Center’s research has been quite responsive to TxDOT’s issues and needs concerning mobile source emissions,” says Jim Randall, director of the Texas Department of Transportation’s (TxDOT) Transportation Planning and Programming Division.

Some of the projects underway the past five years include:

- evaluating the cost effectiveness of mobile source emissions reduction programs;
- assisting TxDOT in reviewing the project selection processes to optimize use of the federal Congestion Mitigation and Air Quality (CMAQ) program funds;
- evaluating forecasting model usage for estimating travel, emissions and tolling; and
- developing a comprehensive list of innovative mobile source emission reduction measures that can improve air quality.

Researchers at the Center continuously look for other ways to assist in air quality improvement efforts around the state. These effects include providing ideas for reducing polluting emissions, and providing TxDOT and other agencies with information for outreach efforts.

“Most of the work we’ve done so far has been Texas-oriented,” says Bochner. “But looking ahead; we’re now pursuing more national research through the Environmental Protection Agency and Federal Highway Administration.” 



MORE INFORMATION
For more information contact Brian Bochner at (979) 458-3516 or b-bochner@tamu.edu.

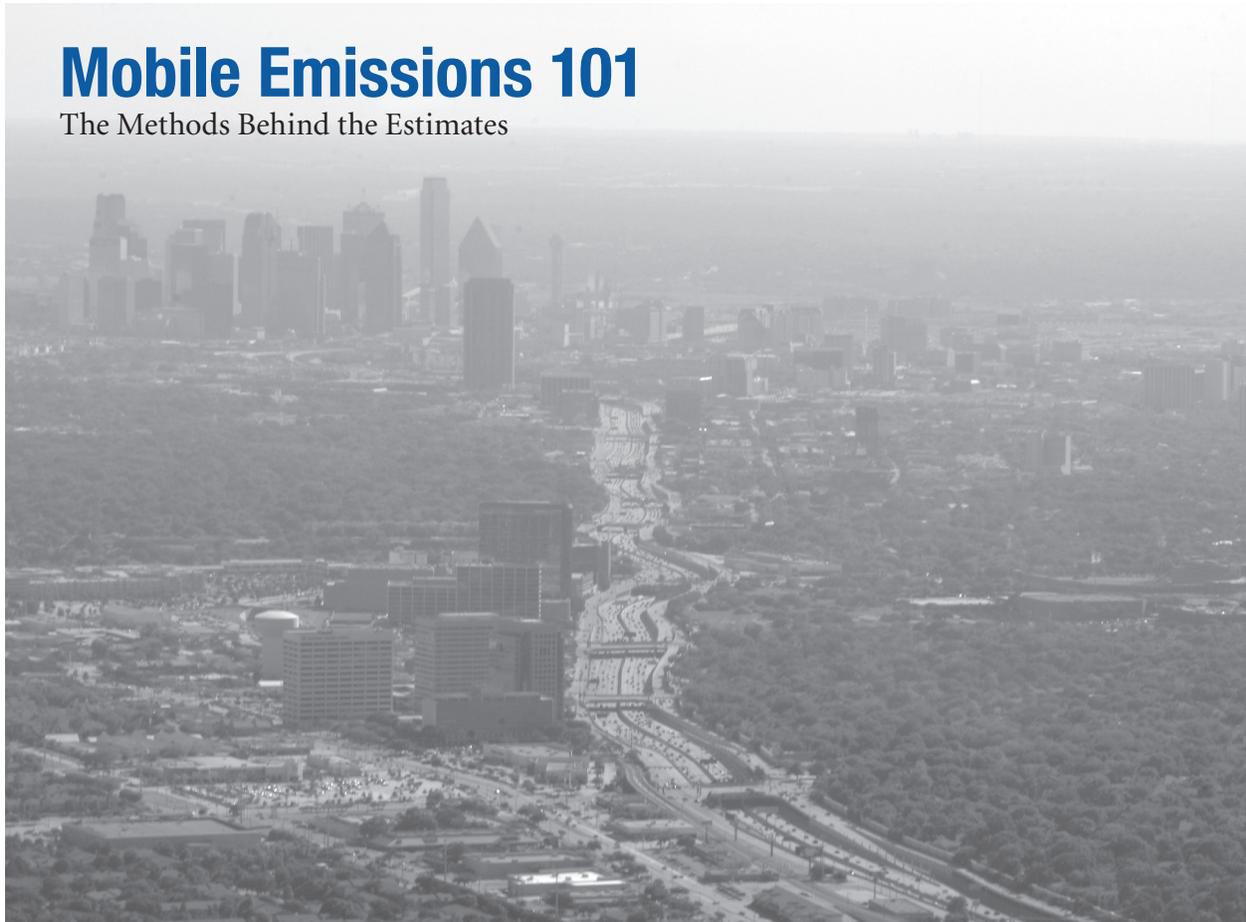
In 2004 the Southeast Texas Regional Planning Commission (SETRPC) in the Beaumont/Port Arthur area faced a significant potential loss of transportation funding for lapsing into non-conformity (i.e., not meeting federal air quality requirements) without a measurable plan for how to correct the problem. “They faced the first level of sanctions, meaning they would lose federal funds for any projects that expand transportation capacity like widening or new roads,” says Laura Higgins, associate research scientist with TTI.

TTI assisted the SETRPC by developing an implementation plan to lower emissions in the area, which in turn would restore funding. The plan included implementing truck stop electrification, which means during down time at truck stops truckers can plug their rigs into a box that provides them electricity and, in some cases, internet access. This eliminates the need to idle the diesel engines for hours on end in order to provide the truck electricity—greatly cutting diesel exhaust emissions. The other major recommendation was to enforce existing freeway speed limits, which helps control emissions that spiral higher at increased speeds.

Thanks in part to assistance from TTI’s Center for Air Quality Studies, the Beaumont/Port Arthur area was able to regain its conformity, become eligible once again for the full range of federal transportation funding and improve air quality standards for local citizens.

Mobile Emissions 101

The Methods Behind the Estimates



The Dallas skyline is in the backdrop of this picture that shows the problem of air pollution in Texas. Dallas is one of the four nonattainment areas in Texas.

The Texas Transportation Institute (TTI) is at the forefront in developing methods and procedures to apply the Environmental Protection Agency's (EPA's) MOBILE emissions rate program to estimate on-road mobile source emissions in Texas.

The Clean Air Act (CAA) requires the EPA to set limits on the amount of certain pollutants allowed in the air. These "criteria pollutants" are ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide and sulfur dioxide. For transportation in Texas, the primary pollutants of concern are oxides of nitrogen (NO_x), carbon monoxide (CO) and volatile organic compounds (VOC). In addition, particulate matter, or PM, is a concern for some areas. (see the Primary Pollutants sidebar for additional information)

When the level of any of these pollutants exceeds the standard in

an area, EPA designates that area in nonattainment (of the standard) for that particular pollutant. Once an area has exceeded the standard, the state is required to develop a state implementation plan (SIP) for those areas to implement, maintain and enforce these standards.

There are four areas in Texas, which are currently designated in nonattainment for one or more criteria pollutants. Another five are "near" nonattainment, meaning that they are close to having a problem, even though they have not been officially designated as violating a standard.

These nonattainment areas are subject to certain requirements. They must demonstrate that the emissions resulting from future actions (as documented in their official transportation plan) will not exceed the area's emissions budget, a process known as "demonstrating conformity." If conformity cannot be demonstrated by a specified deadline, or if the plan expires before a new one is adopted, the area enters into a "conformity lapse." For areas in a conformity lapse, federal transportation funds cannot be spent on capacity enhancing projects (though certain safety, transit and air quality projects may go forward). There is, therefore, a critical need to accurately estimate on-road mobile emissions.

TTI researchers in the Transportation Modeling Program have developed procedures that estimate emissions for vehicles that travel on public roads based on EPA's emissions rate program called MOBILE. MOBILE produces emission rates for 28 vehicle types, operating on four roadway types, under a range of conditions (temperature, humidity, emissions control programs, etc.). TTI's approach allows the application of EPA's MOBILE routines at an extremely detailed level. (see the Key Activity Measures sidebar for additional information)

"We apply an activity measure like vehicle mile traveled and speed for every hour of the day, for every link of the roadway network, by road type, by each of the 28 vehicle types," says Dennis Perkinson, program manager of the Transportation Modeling Program at TTI. "This very disaggregate process is extremely sensitive to changes in the transportation system, whether these changes are due to area growth, changes in travel patterns, improvements in vehicle technology, or emissions reduction measures." **R**



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PRIMARY AIR POLLUTANTS

NO_x

is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. These compounds are involved in the creation of ozone. NO_x forms when fuels are burned at high temperatures.

CO

is a colorless, odorless, poisonous gas. A product of incomplete burning of hydrocarbon-based fuels, carbon monoxide consists of a carbon atom and an oxygen atom linked together.

VOCs

are precursors of ground-level ozone. Since all organic compounds contain carbon, volatile organic compounds are often called hydrocarbons (HC).

PM

includes dust, dirt, soot and smoke. It is identified by size with a different standard for each. PM₁₀ (particles less than 10 microns) and PM_{2.5} (particles less than 2.5 microns) are the sizes of interest for transportation emission purposes.

KEY ACTIVITY MEASURES



Vehicle miles traveled (VMT) is a key activity measure for emissions estimation. All else being equal (which it rarely is), the more VMT you have, the more emissions you have. For a given area, VMT is estimated by year, seasonal day type (e.g., summer weekday), hour of the day and direction (peak or off-peak), for each roadway type (e.g., freeway, arterial, collector, etc.).

Emissions can vary dramatically by speed. In general, speed is a function of the ratio of roadway volume to capacity. Speed is estimated for each link (roadway segment) in the transportation system of an area.

Emissions also vary by vehicle type. The MOBILE program produces emissions rates for 28 different types of vehicles categorized by fuel type and gross vehicle weight rating. The mix of these 28 vehicle types is estimated by roadway type and time of day for each area.



Airport Development Research: Environmental and Economic Challenges

Despite the economic hardships facing the airline industry, the number of passengers flying is returning to pre-9/11 levels.

Expansion or improvement projects are underway at many of the 26 commercial and 253 general aviation airports in Texas. Long before construction begins however, the possible effects on the environment must be considered. Local communities and state and federal government officials find themselves balancing the economic needs and environmental impacts on each project.

The Texas Department of Transportation (TxDOT), through Federal Aviation Administration State Block Grant Programs, administers several programs affecting general aviation and reliever airports. General aviation airports serve smaller, slow-flying aircraft, while reliever airports serve corporate jets, air taxi services and some charter services.

At any given time, there are over 300 improvement projects underway at general aviation and reliever airports in Texas. These projects include planning

and environmental studies, engineering and design, property acquisition and construction. These projects keep the TxDOT aviation division busy.

“The Department’s environmental stewardship responsibilities include considering any impacts that may be caused by a proposed project, considering alternatives to minimize those impacts and identifying ways to mitigate for significant losses due to unavoidable impacts,” says Sandra Gaither of TxDOT’s Aviation Division. “This is especially critical if the airport is in or near a flood plain or protected habitats requiring mitigation efforts. The challenges increase as residential and commercial developments expand toward airport facilities.”

Researchers at the Texas Transportation Institute (TTI) provide assistance to TxDOT’s Aviation Division in examining airport development issues.



Land Use and Encroachment

“Land use and encroachment are key issues and relate to noise, air and water quality, wildlife, and archeological and hazardous materials,” says Jeff Borowiec, associate research scientist at TTI. “Communities all across Texas traditionally built airports away from population centers. But over time residential and commercial developments often expand toward those airports.”

The large commercial airports, under the jurisdiction of the Federal Aviation Administration (FAA), face the same environmental challenges as regional ones, but on a larger scale. “In addition to noise levels and air quality, we must also deal with historical sites, wetlands and endangered species,” says Mike Nicely, manager of the FAA’s Texas Airport Development Office. “If we determine adverse environmental impacts caused by construction, alternative plans are considered to mitigate the effects,” he said.

Airport Cooperative Research Program

In the coming months, the new federal Airport Cooperative Research Program (ACRP) is expected to sponsor research opportunities addressing many critical issues facing the nation’s airports. The need for ACRP was identified in a Transportation Research Board (TRB) special report 272, *Airport Research Needs: Cooperative Solutions*. The research will include security and safety, the environment, policy and planning, design, construction and maintenance.

At the larger commercial airports, more than a dozen environmental topics will be addressed by the ACRP problem statements. Some of the targets include: noise and air quality tradeoffs, airport related toxic emissions, guidelines for conducting streamlined environmental analyses, lowering aquatic toxicity of aircraft de-icing and anti-icing compounds as well as the effect of changes in aircraft noise on children’s learning.

Land use impacts near airports, development of light detection and ranging (LIDAR) deployment standard for airport obstruction analysis, planning for sport aviation, alternative models for improved strategic planning and the effects of airport expansion on residential property values are some of the research opportunities facing larger airports and general aviation locations. **R**



MORE INFORMATION

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For additional information contact Sandra Gaither, TxDOT, sgaither@dot.state.tx.us or 1-800-68-PILOT

Chris Rozansky, Collin County Airport, crozansky@mckinneytexas.org or (972) 562-4096

Bringing it together:

THE COLLIN COUNTY REGIONAL AIRPORT MEETS TRANSPORTATION NEEDS



The Collin County Regional Airport in McKinney, a general aviation reliever airport owned and operated by the City of McKinney, has become an important economic engine for the surrounding communities. It's located about 30 miles northeast of Dallas and is a key factor in McKinney's booming economy. National corporations planning to relocate or expand operations seek the convenience of nearby general aviation airports. The Collin County Airport offers that convenience.

Planning for the future, a replacement runway is being considered to enhance the airport's safety and capacity, as well as serve more corporate customers. But, some nearby communities objected, fearing more activity would impact noise and safety. Construction of the replacement runway could be complete by the year 2012.

Noise and Safety

"Noise is certainly an issue," says Chris Rozansky, the Collin County Regional Airport Operations Manager. "Recognizing a responsibility to our citizens and neighboring jurisdictions, the city took the initiative to conduct a federal noise study, which revealed that the majority of the significant noise exposure occurs on airport property." The study, a two-year process conducted in conjunction with the airport's master plan update, showed that 94 percent of the noise levels considered significant by the FAA are concentrated on airport property.

One of several recommendations of the noise study encourages land use and compatibility planning. "Future considerations could include an airport overlay district," Says Rozansky. "It's been very useful at a number of airports and would be very helpful to us because our airport is in the southeast corner of the city limits. The overlay district would allow for more compatible

development around the airport and include neighboring jurisdictions outside the city limits. The challenge is convincing adjacent jurisdictions to enact responsible zoning to protect future residents who may be sensitive to aircraft overflight and noise."

Water Management

Storm water runoff and drainage are also important environmental issues continuously being addressed by the Collin County Regional Airport. The airport was developed in the middle of a field near the East Fork of the Trinity River and a flood plain in 1979. An enormous amount of storm water flows onto the property from nearby industrial and residential areas.

Because of the airport's drainage challenges, a consultant was hired to complete a master drainage study. Information from that study helped engineers modify the initial design and address the drainage issues before construction began on the new 50-foot wide, \$2.1 million taxiway. The taxiway should be ready for use by June 2005 and will open approximately 60 acres for aeronautical development.

Wildlife Management

Nearby wildlife can become a serious safety issue for aircraft taking off and landing. "We're one of only a few general aviation airports that maintains a wildlife management program because of a landfill less than two miles away," says Rozansky.

The program includes the review of all landscaping plans, such as not planting trees with dense canopies attracting birds, maintaining drainage structures because they can become overgrown and form a habitat and active wildlife harassment.

Uncontrolled growth around general aviation airports is a big issue facing TxDOT and communities hoping to take advantage of their growing economic opportunities. **R**

Natural Landscapes

TTI Research Introduces Native Plant Life to Roadsides



TRAVELING DOWN THE HIGHWAY CAN BE TEDIOUS—miles and miles of road, tens of thousands of lane markers and traffic signs. Sometimes the scenery is the only thing that keeps you awake. But there's more to it than meets the eye.

The Texas Department of Transportation (TxDOT) sponsored a study conducted by the Texas Transportation Institute (TTI) to use native plants to recreate the visual character of the regional native landscape. Prior to this time, the typical approach to interchange landscape design was to create a park-like setting dominated by canopy trees. Maintenance required mowing the area at the same frequency as other sections of corridor.

“This project explored the use of local plants in landscaping the roadside rather than using a one-size-fits-all approach,” says Jim Schutt, assistant research scientist with TTI. “This would not only give the roadside a ‘local look,’ but would also facilitate the growth and maintenance of the landscaped area by using plant life native to the area.”

An interchange in Austin was used as the test case. A context-sensitive design was used to enhance both the local community and the

natural environment. Located in an urban area amid office buildings and shopping centers, the interchange presented some design challenges. TxDOT wanted to reduce maintenance while developing a publicly acceptable landscape aesthetic. The first three goals of the design plan were established as eliminating the need for hand maintenance wherever possible, especially near travel lanes, preventing erosion on slopes and improving the appearance and maintainability of the detention ponds.

Researchers worked with various stakeholders—City of Austin Parks representatives, representatives of the Lady Bird Johnson Wildflower Research Center, the Texas Parks and Wildlife Department, and representatives of local, grass-roots environmental programs—to finalize the site design.

Water quality was identified as the key environmental issue since so much water flowed through the site.

The plan called for enhancing the siltation function of the ponds by installing a rock filter dam and reducing mowing. The aesthetic goal was to re-create the visual character and, as much as possible, the ecological character of the Texas Hill Country live oak savanna.

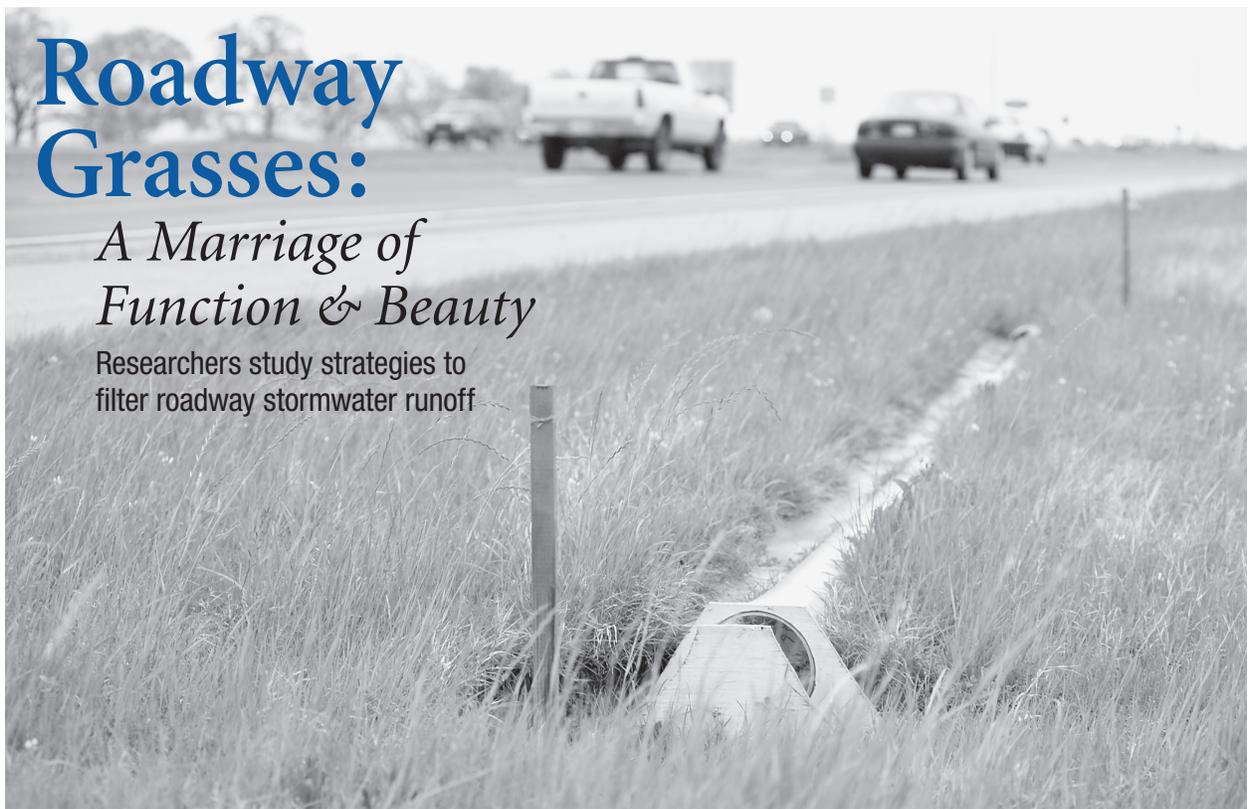
Aesthetically, the site today resembles some commonly seen rural landscapes of native plant communities. The new maintenance schedule reduces the frequency of mowing, which in turn reduces management costs to TxDOT and taxpayers.

“This project demonstrates that we can improve maintenance, make the roadside look better, reduce erosion, and improve the environment for native plants and wildlife, even in urban areas,” explains TxDOT’s Pat Haigh. “We’ve asked TTI to revise a draft for a set of guidelines that standardizes the procedures for the design and installation of these types of projects at large interchanges. We are also working on adapting the approach to narrower sites on large, linear interchanges.” **R**



MORE INFORMATION

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Roadway Grasses:

A Marriage of Function & Beauty

Researchers study strategies to filter roadway stormwater runoff

Grass.

It isn't just for mowing anymore.

In fact, the sometimes lush and pretty patches along roadways are an important frontline defense in the battle to improve water quality. But which varieties work best? Which seed mix of grasses will stand up to brutal Texas weather and regimented mowing heights? And just how much grass is needed to effectively filter roadway stormwater runoff?

The Texas Department of Transportation (TxDOT) sponsored a study conducted by the Texas Transportation Institute (TTI) studying these very questions.

The native alternative

“The concept of using native seed sounds great,” says Jett McFalls, an associate transportation researcher in TTI’s Environmental Management Program. “Two things need to be considered in its use, however. Number one, when a contractor goes in and strips off the soil, gets it down to subgrade, pours concrete and does everything else you have to do to build a road—you no longer have a native environment. Number two, in their natural environment, native seeds are left

alone and allowed to grow. But highway rights-of-way are mowed 3 or 4 times per year. This changes the development of the native vegetation.”

In ongoing research at TTI, McFalls is studying native seed species along with the standard, TxDOT-approved seed mix. Using soil samples taken from Austin, Abilene, Lufkin and Corpus Christi, TTI researchers are testing the different seed mixes at greenhouse facilities and outdoor laboratories.

Knowing the lingo

Best Management Practice (BMP) devices, methods, or practices for preventing stormwater pollutants from reaching receiving waters

Construction Sequencing scheduling construction in stages to minimize erosion

Receiving Waters a river, lake, or other body of water into which water is discharged

Sediment any eroded material suspended in wind or water

By the numbers...

1 soil is the number one pollutant of receiving waters

2 acres—the size of a stormwater runoff oil slick created by a quart of motor oil

3 million dollars—the largest stormwater fine ever assessed by EPA was levied on Wal-Mart for runoff violations at construction sites across the country

4 metals—lead, mercury, iron, manganese can be found in runoff

5 pollution prevention benefits of vegetation—includes protecting soil from the impact of raindrops, slowing down stormwater runoff, anchoring soil in place, intercepting soil before it runs off, increasing filtration rate of soil

In addition, test plots were planted in Georgetown, north of Austin, using both commercially available native seed mixes and the standard TxDOT seed mix. Researchers are also monitoring a second set of test plots at TTI's Erosion Control Laboratory on the Riverside campus.

"The laboratory at TTI is a unique testing facility that helps us cut down on research costs and yet still receive accurate testing," says Steve Prather, vegetation specialist for TxDOT.

One section of the test plots is mowed according to TxDOT specifications and the typical mowing schedule. This ensures that the performance of the seed mixes is evaluated under the normal conditions grasses would encounter along roadways.

Vegetation along roadways plays an essential role in stabilizing soil banks, stemming erosion and protecting habitats and waterways from too much sediment. Beyond beauty, this is ultimately grass' most important function. The project concludes in August of 2005.

Grass filters

Most environmental researchers agree that sediment is the number one pollutant of receiving waters. While some techniques, like construction sequencing, can help minimize sediment runoff during construction, establishing vegetation is the single most important step toward protecting waterways from harmful runoff.

Water streaming off the hard-packed surface of roads can grab sediment and pick up heavy metals and organic compounds (like motor oil), and would eventually deposit such sediment in pipes, drainage systems and water bodies were it not for one potent defense mechanism along roads—grassy filters.

"The premise of our work is to study how vegetative buffer strips affect runoff from highways," says Ming-Han Li, an assistant research engineer at TTI. "Our pre-

liminary findings show that the more grass water runs through, the cleaner it gets. Leaving vegetation buffer strips near roads is a good management practice."

To study how effective grassy strips are at filtering runoff, researchers buried 30-foot lengths of 8-inch PVC pipe at 2, 4, and 8 meters from roadway pavement edges along Hwy 6 in College Station, Texas, and Hwy 360 in Austin. Rainwater is collected during test periods and is then sent to the Lower Colorado River Authority in Austin for chemical analysis.

"Research into how vegetated roadside swales (shallow depressions that carry water mainly during rainstorms) can function to filter storm water runoff, reduce the need for end-of-channel water quality structures, and improve the overall quality of runoff from the highway system is important," says Amy Foster, environmental specialist for TxDOT's Environmental Affairs Division. "Understanding the properties of and having good documentation of roadside water quality performance can potentially reduce the cost and size of end-of-channel water quality structures on the highway system."

According to Li, early results seem to indicate that up to a certain distance, grass can be quite effective at trapping and filtering sediment. The project ends in August of 2005. **R**



MORE INFORMATION

For more information about Project 0-5212 "Comparison of Alternative Seed Mixes to Standard TxDOT Specification" contact Jett McFalls at: (979) 847-8709 or j-mcfalls1@tamu.edu.



For more information about Project 0-4605 "Stormwater Quality Documentation of Roadside Shoulders Borrow Ditches" contact Ming-Han Li at: (979) 845-6211 or minghan@tamu.edu.

TEXAS TRANSPORTATION INSTITUTE

COUNCIL

The Texas Transportation Institute (TTI) wishes to recognize members of the TTI Council by featuring profiles in each issue of the *Texas Transportation Researcher*. The TTI Council meets once a year to hear updates on research projects and program initiatives, discuss critical transportation issues facing Texas and provide guidance on potential future research efforts.



JERRY N. HIEBERT joined the North Texas Tollway Authority (NTTA) as executive director in August 1998. The NTTA is a statutory regional tollroad authority serving Dallas, Tarrant, Collin and Denton counties. The NTTA maintains the Mountain Creek Lake Bridge and the 21.8 mile Dallas North Tollway. The NTTA has recently completed construction of the 3,600 foot Addison Airport Tunnel and is actively pursuing completion of the 30 mile President George Bush Turnpike. Several other potential toll projects in the region are in various stages of evaluation.

Prior to joining NTTA, Hiebert was the Deputy City Manager for the City of Richardson. He served in a variety of positions with the city of Richardson, Texas over a 19 year period.

Hiebert is a Member of the International City Management Association (ICMA), and a Charter Member of the American Institute of Certified Planners (AICP) and the American Planning Association (APA). He served as President of the Texas Chapter of APA 1991-93. He is Past President of the North Central Texas Section of the American Planning Association, and of the City Planner's Association of Texas (CPAT). He is also a past member of the Board of Directors of the Texas Municipal League, and at the present time is serving his second term as Chairman of the Demographic Methodology Task Force of the North Central Texas Council of Government's Regional Data Center.

Jerry Hiebert holds a master's Degree in Regional and City Planning from the University of Oklahoma, and a bachelor's Degree in Social Science from Southwestern Oklahoma State University. ■



H. THOMAS KORNEGAY was appointed executive director of the Port of Houston Authority (PHA) in April 1992. Before his appointment by the Port Commission, Kornegay served as the Port Authority's managing director for five years.

Kornegay has held numerous PHA positions since he first joined the Port Authority staff in April 1972. He worked his way through the Port Authority ranks, serving in the engineering department for 15 years before being appointed as managing director.

Kornegay is a registered engineer in the state of Texas. He holds a master's degree in Architectural Engineering from Oklahoma State University and a bachelor's degree in Architectural Engineering from the University of Texas.

In May 2003, Kornegay was elected first vice president of the International Association of Ports and Harbors (IAPH). His involvement in the organization over the years has also included election as the second vice president and membership on the executive committee.

He has served as chairman of the board of the American Association of Port Authorities and chairman of the U.S. Delegation of AAPA.

Kornegay was appointed to serve on the executive committee of the Transportation Research Board, which is responsible for recommending transportation policy and programs to the National Research Council.

He was appointed by the governor of Texas to serve as the state's representative on the Western Gulf of Mexico Regional Dredge Team and was also appointed to serve on the Rail Advisory Committee. Additionally, Kornegay has been elected as chairman of the advisory board for Ex-Im Bank in Washington, D.C. ■



MARK STILES is Senior Vice President of Trinity Industries, Inc. He is also the Group President of the Construction, Energy and Marine Products Group which is comprised of the following divisions: Highway Safety, Structural Bridge, Fittings, Marine, LPG and Concrete and Aggregates, which includes Transit Mix Concrete and Materials Company and Trinity Materials, Inc. In September 2004, Stiles assumed executive responsibility for Trinity's Rail Components division.

In 1991, Trinity Industries, Inc. acquired Transit Mix Concrete, a family-owned concrete and materials company in Southeast Texas where Stiles began as a salesman in 1971. Stiles was named President of Transit Mix in 1993. In 1993, he was named Corporate Vice President for Trinity Industries and his role has since elevated to the current positions.

Stiles served as Chairman of the House Committee on County Affairs, the House Committee on Ways and Means and he served an unprecedented three terms as Chairman of the powerful House Committee on Calendars.

Recognized as a leader in many areas of state government, Mr. Stiles championed reform issues in Texas including insurance, property tax, education and criminal justice. Some of his legislative highlights include: Texas Chamber of Commerce Legislator of the Year; Texas County Agricultural Agents Association Man of the Year; Texas Municipal League Legislator of the Year; Legislative Study Group Most Valuable Player; Texas Public Employees Association "Made It Happen Award," and the Press Club of Southeast Texas' Excellence in Media Award.

He remains interested and active in community affairs and Texas politics by serving as a board member of the Texas Civil Justice League, a state tort reform association. ■



GARY K. TRIETSCH is the district engineer for the Houston District of the Texas Department of Transportation (TxDOT). He was named district engineer of the Houston District in September 1995.

Trietsch joined TxDOT's Fort Worth District Tarrant County construction section in 1967. After earning his bachelor's degree in civil engineering in 1970, he moved to the design section. From 1972 to 1978, Trietsch worked in the district traffic engineering section, earning his master's degree in civil engineering from the University of Texas at Arlington in 1974.

Moving to Austin in 1987, Trietsch became director of the safety and traffic operations section in the Safety and Maintenance Operations Division. As assistant division director for traffic operations in 1988, he was responsible for the central permit operations, traffic safety, traffic engineering and traffic management systems sections in the Maintenance and Operations Division. In 1992, Trietsch was selected as director of the division.

Honored for his contributions in the field of engineering and to the state of Texas, Trietsch received the 1991 Dewitt C. Greer award from TxDOT, the 1996 Transportation Engineer of the Year award from the Texas Section of the Institute of Transportation Engineers, 1997 Dr. L. I. Hewes Award from the Western Association of State Highway and Transportation Officials (WASHTO) and the Houston Area Engineer of the Year for 2005.

Founding president of Intelligent Transportation Systems (ITS) of Texas from 1993 to 1994, Trietsch is also a member of the Institute of Transportation Engineers and the National Society of Professional Engineers. A native of Fort Worth, Trietsch and his wife, Bonnie, have two daughters. ■

TTI sets forum for policy makers, media representatives

Texas Transportation Institute (TTI) officials broke new ground recently by creating an open forum for news media representatives and some of the most prominent transportation policy makers in Texas.

The February event brought together transportation writers from the Dallas Morning News, Houston Chronicle, Austin American-Statesman and the New York Times. Policy executives included: Mike Behrens, TxDOT Executive Director; Gary Trietsch, TxDOT Houston District Engineer; Roger Hord, President and CEO of the West Houston Association; Alan Clark, MPO Director of the Houston-Galveston Area Council; James McCarley, Executive Director of the Dallas Regional Mobility Coalition; and Gary Slagel, Mayor of the City of Richardson.

The robust, on-the-record discussion clearly illustrated the range of complex and pressing transportation issues facing Texas and its major cities, as topics included the Trans-Texas Corridor, tolling, the motor fuels tax, and bond financing for new highway construction.

The luncheon followed a morning workshop, organized by Bernie Fette, TTI's public affairs officer, in which TTI

researchers met in a media relations workshop designed to help researchers best highlight research during an interview, get a central message or idea reported, prepare for an interview, and understand how the news media works.

The workshop opened with TTI staff sharing some of their experiences with the media. Dave Willis, a TTI senior research scientist who has appeared on "The Today Show" said, "If you're on your toes, the media will appreciate it and will reward you with more exposure." Penny Beaumont, associate agency director, said, "When reporters call you've got to respond. You can't just not call them back, and if you don't know the answer, just say you don't know."

Tim Lomax, TTI research engineer, encouraged workshop participants to be open and friendly during interviews but he urged caution, saying "Be careful



TTI's Bernie Fette addresses news media representatives and some of the most prominent transportation policy makers in Texas. The forum held in February was an open discussion of complex and pressing transportation issues, followed by a luncheon.

trying to be too comprehensive in your explanations. Make sure you answer the reporter's question first, and then add more detail."

Gaby Garcia, TxDOT Turnpike Division, and Janelle Gbur, TxDOT Houston District, gave the assembled researchers and reporters some insight into how they do their media relations jobs for TxDOT, and the energetic and informative meeting closed with a Q&A Session between TTI researchers and visiting reporters. ■

Inaugural Wootan Award Presented at TRB

Theodore H. Poister of Georgia State University and Douglas E. Zimmerman and David L. Margolis, both of the Pennsylvania Department of Transportation (PennDOT), are the recipients of the inaugural Transportation Research Board (TRB) Charley V. Wootan Award for the outstanding paper in the field of policy and organization. This new TRB award was established in memory of Wootan, the former Director of the Texas Transportation Institute from 1976 until his retirement in 1993. He continued to be active in the university system until his death in 2001. A 1984 W. N. Carey Award recipient, Wootan also served as Chairman of the Technical Activities Council and was the Chair of the TRB Executive Committee in 1980.

The award was presented on January 10 at the Thomas B. Deen Distinguished Lecture and Outstanding Paper Awards Ceremony during the TRB 84th Annual Meeting in Washington, D.C. The award-winning paper, "Strategic Management at PennDOT: A Results-Driven Approach" was published in the Transportation Research Record: Journal of the Transportation Research Board, No. 1885. ■



TTI Hosts District Engineers

The Texas Transportation Institute (TTI) hosted a meeting with the Texas Department of Transportation (TxDOT) District Engineers from West Texas on February 1-2 in College Station, Texas. The purpose of the meetings was to highlight major problems being faced in their districts and identify ways in which TTI might be helpful in addressing the problems. In addition to the meetings, the district engineers watched presentations from TTI personnel on the Institute's testing facilities and recent research.

"TTI really enjoys the opportunities to spend time with the TxDOT district engineers. It is a way we come to better understand the problems they are facing, and we can work to structure a research program to meet those needs," says Dennis Christiansen, deputy agency director. ■

TxDOT RTI Director Visits TTI



Collins

Rick Collins, Director of Research and Technology Implementation (RTI) at the Texas Department of Transportation (TxDOT), visited the Texas Transportation Institute on March 3. Collins began his tenure as RTI director a year ago, and shared his thoughts on the division's goals and accomplishments during his first year.

"It has been a year of learning," said Collins. "I am amazed at what is involved in the project process. It takes a tremendous coordination in effort to get a project to the completion stage."

Among the points that Collins discussed were the introduction of several resources to aid researchers seeking information about RTI: the RTI Program Handbook, internet site (<http://www.dot.state.tx.us/RTI/default.htm>) and the "Eye on Research" newsletter.

Collins also spoke about developing research partnerships with underutilized universities as a way to get them better involved with potential research efforts.

Collins wrapped up his comments by explaining some of his goals for RTI. Among his goals for the program are putting products developed in the research program into practice and doing a better job of producing deliverables. ■

Symposium Honors Lytton's Contributions



Lytton

The Pavement Committee of the Geo-Institute and the Inelastic Properties Committee of the American Society of Civil Engineers (ASCE) Mechanics Division are sponsoring a symposium entitled "R. L. Lytton Symposium on Mechanics of Flexible Pavements." This symposium is organized in honor of the contributions of Dr. Robert L. Lytton to the area of pavement mechanics.

Lytton is a research engineer with the Texas Transportation Institute (TTI) and holds the Fred J. Benson Chair in Civil Engineering at Texas A&M University. He has conducted pavement research for the Institute for nearly 30 years and holds a patent for "System Identification and Analysis of Subsurface Radar Signals." He also teaches a graduate course at Texas A&M University on foundations in expansive soils.

The symposium will be part of the 2005 joint ASME/ASCE/SES Conference on Mechanics and Materials that will be held in Baton Rouge, Louisiana in the period between June 1-3, 2005. ■

Ruane Receives Inaugural TTI Award

American Road and Transportation Builder's Association (ARTBA) President and Chief Executive Officer Pete Ruane was the first recipient of the Texas Transportation Institute's (TTI) inaugural Director's Research Champion Award for leading the association's efforts in advancing and promoting transportation research at the federal level.

The award was presented January 9 at the TTI reception during the Transportation Research Board (TRB) annual meetings. During the presentation, TTI cited the association's strong relationship with the transportation research community, including the establishment of a formal partnership with the Council of University Transportation Centers (CUTC).

TTI will begin to recognize an individual at the national level each year as part of its new Research Champions Program. The Institute will also recognize individuals at the state level who have made significant contributions to transportation, research, technology transfer and implementation. ■



Ruane

TTI Welcomes New Director of Communications

Rob Robideau has joined the Texas Transportation Institute (TTI) as the director of communications and will be leading the communications efforts at the Institute.



Robideau

Robideau formerly served as director of communications for the Texas Engineering Experiment Station (TEES) and the Dwight Look College of Engineering. He served six years in the Air Force and has held management, marketing and communications positions in private sector companies and also with the U.S. Department of Energy and the U.S. Environmental Protection Agency.

Robideau was formally welcomed as director of communications at TTI on Monday, February 7, 2005, at a reception hosted by Bill Stockton, associate agency director, and Penny Beaumont, interim director of communications. ■

TTI Award Winners

The following employee awards were presented at the 2004 TTI Day:

Administrative Professional Staff Award: **Yu-Ying Diana Lin**

Administrative Support Staff Award: **Elizabeth Tworek**

Administrative Technical Support Award: **Rhonda Brinkman, Hong Yu**

Division Administrative Support Award: **Michelle Hoelscher, Bonnie Duke**

Division Technical Support Award: **Richard Canatella**

Trinity New Researcher Award: **Montasir Abbas**

Trinity Researcher Award: **Dean Alberson, Kay Fitzpatrick**

Trinity Senior Researcher Award: **Tom Scullion**

Charles J. "Jack" Keese Career Achievement for Agency Support Award: **Marie Ethridge**

Trinity Charley V. Wootan Career Achievement for Research Award: **Sadler Bridges** ■

THE BACK ROAD



All of us have a stake in preserving our environment. How we keep our air, water and land fit for future generations is an issue which challenges transportation engineers and planners as well as elected officials at all levels.

In this issue, you'll learn how research is helping to preserve our fragile Texas environment in the face of a growing population and a parallel need for more transportation infrastructure. TTI's Center for Air Quality

Studies is actively involved in a unique project sponsored jointly by TxDOT, The Texas Commission on Environmental Quality and the Federal Highway Administration. "Drive Clean Across Texas," is designed to increase awareness and change attitudes about air pollution. The goal is to convince drivers that their actions—reducing travel, driving the speed limit, maintaining vehicles, reducing idling, and buying fuel-efficient "clean" vehicles—really can make a difference in the quality of the air we breathe. With several of Texas' largest metropolitan areas not now meeting EPA air quality standards, the campaign is meeting a major need, and more importantly, it is having a positive effect. The Transportation Modeling Program is helping to reduce highway mobile source emissions by developing efficient and accurate procedures for assessing an area's progress in meeting air quality standards. Other related stories provide information on how research is helping to find a way for truckers to run their cab air conditioners while they sleep, thus eliminating the need to run engines all night.

But TTI researchers don't just focus on the highways. We're working on environmental issues related to urban and rural airports, including the problems of water runoff and the noise pollution generated by aircraft. Other researchers are studying ways native vegetation can help combat sediment erosion, the number one pollutant in the country and also are looking at the feasibility of using native plants at interchanges rather than the traditional planting of canopy trees and grass which require regular mowing. This new approach not only recreates the regional native landscape, it also holds the promise of creating self-sustaining areas that recycle nutrients, conserve soil moisture and even provide habitats for nesting birds.

I hope you'll enjoy learning about the work TTI and its sponsors are doing to preserve our environment, and join us and other Texans in keeping Texas's skies blue and our water and land usable for all.

Researcher

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