

Researcher

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TTI and the **ENVIRONMENT**

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ON THE COVER: Every spring, motorists in Texas are treated to blooming bluebonnets alongside the roadways. Highway beautification has long been a cornerstone of the Texas Transportation Institute's environmental research.



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TEXAS TRANSPORTATION
Researcher

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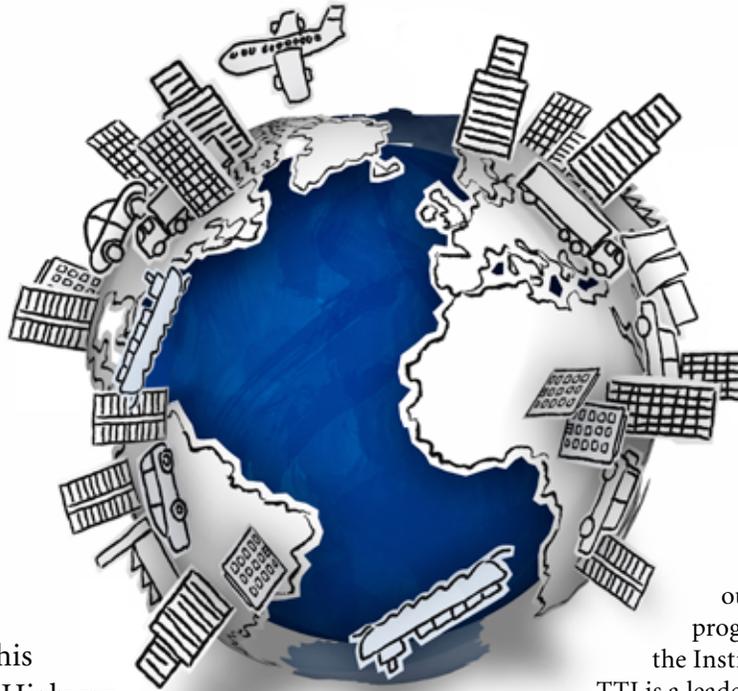
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It's Not Easy Being Green — But It's Worth the Effort



It used to be that the solution to practically every transportation problem was to build, build, build. As more drivers took to the road, testing the system's limits, we mainly added more capacity to address those needs. Some good things came out of this approach, notably the Interstate Highway System, which encouraged urbanization and spurred unprecedented economic growth throughout the country.

These days, with agency budgets shrinking and construction and right-of-way costs rising, simply building our way to greater capacity isn't always possible — or even desirable. Increasingly, concerns about the environmental impact of new construction and worsening pollution, primarily in urban areas, have begged the question: Can we meet today's transportation needs while remaining responsible stewards of the environment?

The Texas Transportation Institute (TTI) has a long tradition of recommending transportation solutions that take the environment into account. As you'll see in this issue's center spread, TTI's work in everything from vegetation management to erosion control to recycled materials pavement has advanced the field of environmentally sensitive research.

Initiated by the Texas Department of Transportation (TxDOT) in 2002, the

Drive Clean Across Texas campaign has helped raise awareness about vehicle-based pollution and influenced driver behavioral changes that benefit air quality. The Institute's work in air quality modeling is poised to lead the nation as it transitions how compliance with national air quality standards is monitored.

Our work through the National Cooperative Highway Research Program is helping formulate best practices for establishing sustainable communities. And facilities like TTI's new Drive-In Environmental Research Chamber, which opens in January, are one of a kind and will yield important emissions data that will help in setting policy and developing new products.

But beyond our research and facilities, TTI has made an institutional commitment to "going green" whenever possible. From meeting the nationally

accepted benchmark for high performance green buildings in the design, construction and operation of our new State Headquarters Research Building to our green housekeeping program, which guides how the Institute manages its facilities,

TTI is a leader in The Texas A&M University System in efforts to become more environmentally friendly.

Innovations in transportation technology have always been driven by the need to do things "a better way." Now we can add to that mantra the need to do things "a cleaner way." Innovating green technologies, building testing facilities to help preserve the environment, walking the walk with institutional policy — at TTI we're doing our part to help create a sustainable environment.

As you read this issue and discover what we're doing toward that goal, I'd like to challenge you: *What can you, one person, do to help improve the environment?* 🌱



BY DENNIS CHRISTIANSEN
TTI DIRECTOR

Drive-In Environmental Research Chamber

New TTI testing facility expected to open new doors for research



A front view of the soon-to-be-completed Drive-In Environmental Research Chamber. The testing chamber is inside the left-hand door.

CHAMBER SPECIFICATIONS

- ◆ Temperature range: -25 °C to 55 °C
- ◆ Relative humidity range: up to 70 percent at 40 °C
- ◆ Facility size: 7,500 gross square feet
- ◆ Chamber dimensions: 75 by 22 by 22-foot (capable of holding a tractor-trailer or bus)
- ◆ Infrared lights to simulate solar impact
- ◆ Variable wind speed simulator up to 20 mph

DRIVE-IN ENVIRONMENTAL RESEARCH CHAMBER

At the Texas A&M University Riverside Campus in Bryan, Texas, workers have completed the finishing touches on another in a line of world-class testing centers offered by the Texas Transportation Institute (TTI) to its sponsors.

The Drive-In Environmental Research Chamber, which opens in January 2010, is the largest of its kind in the country. The facility consists of a temperature- and humidity-controlled, 75-by-22-by-22-foot chamber housed in a building that also contains a conference room, offices, control room and vehicle preparation area. It's large enough that an 18-wheeler with trailer or a bus can easily drive into the facility.

The development of the chamber resulted from competitive grant awards to TTI from the U.S. Environmental Protection Agency (EPA) and the Houston Advanced Research Center (HARC), with additional funding provided by The Texas A&M University System and TTI.

According to TTI Director of the Center for Air Quality Studies Joe Zietsman, the idea for constructing the testing center came when TTI was awarded a project from the EPA to develop and apply a verification protocol for testing onboard idle reduction technologies for semi trucks.

“The closest environmental testing facility large enough to conduct this research was located in Reno, Nevada,” says Zietsman. “When we began to look at costs in terms of chamber rental fees, travel and housing researchers in Reno over a length of time, we realized that it would make sense over the long term to develop our own test chamber.”

RESEARCH OPPORTUNITIES

The chamber offers numerous opportunities for emissions and fuel consumption testing of various types of vehicles and engines, as well as many other products for their durability under severe temperature, humidity and weather-like conditions. A key capability will be to measure “cold starts,” which is a critical aspect of vehicle emissions testing.

Some of the other testing opportunities include:

- emissions and fuel consumption from idling cars, trucks and buses, including cold starts;
- emissions and fuel consumption from construction equipment;
- emissions and fuel consumption from a broad range of engines, including generators;
- hybrid technologies;
- clean fuels;
- vehicle components such as air conditioners, heaters and auxiliary power units;
- infiltration of pollutants into vehicles;
- emissions reduction technologies;
- lubricants and oils;
- insulation materials;
- ability of plant and other materials to absorb emissions;
- durability of equipment under severe weather conditions;

- impact of weather on the strength of construction components such as steel and concrete; and
- agricultural and food products.

FIRST PROJECT

The first project for the facility is testing auxiliary power units (APUs) for tractor-trailer trucks. APUs work as an alternate small engine of sorts that allows truck drivers to shut off their main engines, yet still run their cab necessities such as air conditioning, heating and other electrical appliances.

“With the hundreds of thousands of trucks traveling through the United States every day and the requirement for drivers to rest 10 hours for every 14 hours of driving, the amount of emissions and fuel wasted due to extended idling of these large trucks is mind boggling,” says Zietsman.

Although APUs seem like a perfect solution to idling engines, no standard exists that accurately shows the decrease in pollutants and fuel wastage when they are running.

“There are numerous manufacturers of APUs, but no standards exist,” says Zietsman. “If we can develop a standard that tells potential buyers the emissions output, fuel consumption and power usage of a particular APU, then they can compare it with the other available models and choose the one that best fits their needs. These types of tests must be performed in a humidity- and

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*Joe Zietsman,
TTI researcher*

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The size and versatility of the environmental chamber has Zietsman and other researchers excited about the future of air quality research at TTI.

“It will significantly expand our program and will put TTI on the map with regards to emissions and other environmental testing,” says Zietsman.



MORE INFORMATION

For more information, contact Joe Zietsman at (979) 458-3476 or zietsman@tamu.edu.



Workers put the finishing touches on the testing chamber.

TTI MOVES Emissions Estimates Forward



Change can be difficult . . . but it doesn't have to be. Given that we live in the Information Age, change involving software can be the most painful of all — just ask Microsoft.

The Environmental Protection Agency (EPA) uses software to enforce the Clean Air Act, which restricts certain pollutants found in urban areas with heavy traffic. Cities that exceed these standards are said to be in “nonattainment.” Using software

called MOBILE6, agencies can estimate future vehicle emissions, and individual states can use data to create these implementation plans to bring their nonattainment areas into compliance.

The Texas Transportation Institute (TTI) helps support the Texas State Implementation Plan by using MOBILE6 to estimate emissions.

“Once an area is in noncompliance, it

must demonstrate how it will conform to future air quality standards,” explains Dennis Perkinson, manager of TTI’s Transportation Modeling Program. “Our work provides these crews with the information to do so.”

Though MOBILE6 has been a good tool, the EPA is planning to change the software it uses to estimate emissions to Motor Vehicle Emissions Simulator (MOVES). While both programs estimate essentially the same pollutants, MOVES allows researchers to slice up those estimates in more sophisticated ways.

“With MOBILE6, we easily knew the difference between an 18-wheeler and a Volkswagon,” explains Perkinson. “Now, we not only know that difference, but also what those two vehicles are actually being used for — short- or long-haul trucking, for example, in the case of the semitruck.”

TTI’s Transportation Modeling Program is on the leading edge of this conversion effort. TTI researchers are currently preparing to develop application protocols and test MOVES in a Texas urban setting on behalf of the Texas Department of Transportation (TxDOT) and Texas Commission on Environmental Quality, respectively. Their research will demonstrate how MOVES compares to MOBILE6 in real-world conditions.

“The challenge is to make this conversion with no break in service,” says Perkinson. “It’s like when a city changes over its power grid from one system to another . . . if the lights go out, they did it wrong.”

The transition to MOVES needs to be seamless to avoid interrupting information flow for sponsoring agencies that depend on that data. That information is instrumental to an agency’s ability to retain federal funding, which can be put at risk if the agency is unable to demonstrate conformity with EPA standards.

“Thanks to TTI, Texas will hit the ground running as MOVES is implemented nationwide,” says Paul Tiley, technical working group coordinator of TxDOT’s Transportation Planning and Programming Division. “More accurate estimates provided by this software will help our cities demonstrate compliance with the EPA . . . and that will help us all breathe a little easier.”

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*Paul Tiley,
technical working group
coordinator of TxDOT’s
Transportation Planning and
Programming Division*



MORE INFORMATION

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Enhancing Transportation in National Parks and Gateway Communities

Since they preserve the country's natural beauty and heritage, many people would agree with Director Ken Burns that the National Parks are "America's Best Idea."

The parks and their nearby communities — called gateway communities — have a symbiotic relationship. The communities rely heavily on tourist dollars generated by the parks, while the parks depend on local communities to provide visitors with food, lodging and other services.

Though transportation has always been an integral part of park visits, in recent years, congested roadways, overcrowded parking lots and vehicle pollution have all begun to detract from the visitor experience. Gateway communities share many of these same problems, which negatively impact local economies.

Researchers at the Texas Transportation Institute (TTI), in partnership with Cambridge Systematics, Inc., recently completed a National Cooperative Highway Research Program

(NCHRP) project to address these issues.

"The project examines 10 case studies highlighting innovative partnerships among local, state and federal agencies, as well as private groups," notes Katie Turnbull, TTI executive associate director and the project's principal investigator. "The results illustrate examples of innovative approaches to transit in a variety of parks — from a multi-route bus service in Maine to a proposed one-bus system in Vermont."

The following highlights some of the common themes from the case studies:

- The issues, opportunities, geography, proximity of gateway communities and unique characteristics of each area should be matched with appropriate transit services, advanced technologies and other techniques.

- Building on existing relationships among various agencies and groups is important, as is forging new partnerships.
- Recognizing and respecting the different missions, goals and objectives of the various agencies and organizations involved is very important.
- Staff, financial resources and expertise should be optimized among the various groups.
- Communication among partners and with the public and stakeholders is vitally important.
- Many of the parks developed service in an incremental manner, building on the success of an initial route or routes. Service should also be flexible and responsive based on visitor demands and other conditions.
- Opportunities exist to engage businesses, corporations and other private-sector groups in supporting park and gateway community transit services and other transportation projects.
- Foundations can undertake and facilitate many activities that parks, federal lands and government agencies cannot.
- Documenting successes and failures is important. Providing information on ridership, costs and benefits is important for continued support from policy makers, funding agencies and the public.

"National parks and other federal lands agencies, gateway communities, state departments of transportation, and transit providers will find the reports and PowerPoint developed by TTI extremely valuable in developing partnerships, plans and agreements to advance transportation projects that benefit all types of users groups, while still protecting the natural resources of the areas," notes Ben Orbson of the South Dakota Department of Transportation and chair of the NCHRP project panel.



Visitors at Rocky Mountain National Park listen to a park ranger while waiting for a shuttle bus.



MORE INFORMATION

For more information, contact Katie Turnbull at (979) 845-6005 or k-turnbull@tamu.edu.

TTI Brings the **GREEN** INDOORS

The Texas Transportation Institute (TTI) is known for leading the charge in solving all types of transportation problems. Over the last few years, TTI has developed a reputation as an environmentally conscious organization — and not just through its “green” research.

In 2005, the agency implemented its Energy Management and Conservation Plan, which guides the Institute toward making environmentally sound decisions as it grows.

“While we have always considered environmental management and sustainability when faced with decisions, the plan provided a platform to maximize our environmental efforts,” explains TTI Director of Facilities, Safety and Support Services Holly Crenshaw. “TTI is committed to good stewardship in all areas, and that certainly includes environmental management and sustainability.”

This commitment has led to a few more key efforts that highlight TTI’s dedication to being an environmentally aware organization.

STATE HEADQUARTERS RESEARCH BUILDING

The construction of TTI’s new building has brought much excitement and anticipation. It represents many accomplishments but also exemplifies TTI’s commitment to the environment. TTI will pursue a Leadership in Energy and Environmental Design (LEED) Silver certification for the building. If certification is granted, TTI will be one of the first in The Texas A&M University System to receive the certification.

An enhanced energy management system, building design, construction materials and practices (such as landfill avoidance), and recycled materials are key components in the design/construction phases. A covered bike rack, showers and strategic use of windows are all building features with environmental motivations.

“Some of our employees ride bikes to work, so offering a covered bike rack, showers and locker rooms supports and encourages their using alternate forms of transportation,” says Crenshaw. “These features just make sense; they provide environmental benefits and offer our employees the necessary facilities to support those transportation modes, or, simply, to take a run after work.”

Regarding design, the only windows on the west side provide natural light for a stairwell and corridors. Approval was granted from the university’s Architectural Design Review Board for the windows on the south side to have a slight grey tint that will help reduce heat transfer. There is also less glass exposure on the south side.

In addition to the window layout, all walls in the building are insulated. Besides improving noise reduction, insulating interior walls helps reduce heat transfer and makes buildings more energy efficient. Ultimately, every aspect of this building was designed with energy management and sustainability in mind.



The northeast side of TTI’s new headquarters building features floor-to-ceiling windows.

“The building architects, BRW Architects, and their LEED professional staff designed an outstanding facility that encompasses LEED requirements and occupant comfort,” states Crenshaw. “The general contractor, Vaughn Construction, carefully followed the LEED requirements and ensured compliance through all of their processes.”

GREEN HOUSEKEEPING PLAN

Another aspect of the headquarters building is the green housekeeping plan. Executing this plan required deliberate attention to detail in the earliest planning stages of design because all materials, furnishings and cleaning products used in the building had to be certified Green Seal products.

Crenshaw asked Texas A&M’s Custodial Services to collaborate on a committee and revamp products, processes and training to support implementing a green housekeeping plan. If this is successful, the building should be the first in the A&M System to have a LEED green housekeeping plan.

HYBRID VEHICLES

A Toyota Camry Hybrid has been introduced to the TTI vehicle fleet. The response has been positive as users enjoy the car, and the 41 mpg during in-town use has been rewarding as well.

“While this hybrid represents TTI’s environmental concern, we monitor the

fuel efficiency of every vehicle in our fleet,” says Crenshaw. “Fuel efficiency is always considered along with functionality requirements when we make purchasing decisions.”

EFFORTS WILL CONTINUE

TTI’s efforts toward sustainability and environmental practices will continue. Currently, Crenshaw, who has been appointed to Texas A&M’s Sustainability and Environmental Management Council, is serving as chair for the university’s recycling task force and is looking into an enhanced recycling program that would go above and beyond what is now in place. “While the TTI Facilities, Safety and Support Services Program will facilitate the recycling plans, participation by all employees will ensure success,” notes Crenshaw.

“It is the responsibility of everyone to be good stewards of what they have, and we are proud to be an organization that cares for the environment. We aim to do things better, and cleaner, too,” explains TTI Director Dennis Christiansen. “TTI continues to pursue excellence and innovation in every aspect of our work.”



TTI’s new Toyota Camry Hybrid.



MORE INFORMATION
For more information, contact Holly Crenshaw at h-crenshaw@tamu.edu or (979) 845-6595.

VEGETATION MANAGEMENT

The Texas Transportation Institute (TTI) conducts research into various roadside applications to provide sponsors with a more diverse set of tools and options to ensure a more sustainable roadside environment. Areas researched include water harvesting applications, grass communities and their successional processes, improved vegetation through soil restoration using compost and other organic materials, and minimizing the effect of construction on existing trees and other sensitive landforms.



EROSION AND SEDIMENT CONTROL

TTI's Hydraulics, Sedimentation and Erosion Control Laboratory (HSECL) is a state-of-the-art facility used by Texas and other states to improve our nation's water quality. Products, materials, devices and methods used for storm water quality improvement, erosion and sediment control and the design and management of sustainable roadsides are all researched at the facility. Those results are then shared with other state transportation agencies. TTI's facility is recognized as one of the premiere facilities of its type in the world.



SUSTAINABILITY IN TRANSPORTATION PLANNING

TTI recently completed a project to develop sustainability objectives for Texas Department of Transportation to consider in its strategic planning process. Researchers created 13 sustainable transportation performance measures and a methodology for benchmarking them, as well as derived a method for combining those measures into one index for comparative purposes. TTI was recently awarded a National Cooperative Highway Research Program project to examine similar issues at the national level.



IMPROVED TRANSPORTATION OPERATIONS

TTI works with local, state and federal agencies to improve traffic operations through better management of the transportation system. Software programs developed by TTI, like PASSERV, help optimize traffic flow and reduce congestion, thereby mitigating traffic's impact on the environment. TTI is currently pursuing new initiatives such as integrated corridor management and active traffic management, green transportation corridors where design and operation of transportation corridors maximize the ability to move people and vehicles, everything from mobility measures to reduce congestion to integrated corridor management — in short, where all aspects of transportation are coordinated to minimize the environmental impact of operating the system.



WARM MIX ASPHALT

Researchers at TTI have applied lessons from Europe to lower the temperature of asphalt by 35 to 100°F prior to application. Warm (as opposed to hot) mix asphalt reduces on-site emissions, lowers energy costs for the contractor and expedites construction time. This process can significantly impact transportation construction projects in and around air quality nonattainment areas. With warm mix technology, asphalt production plants can manufacture more tonnage without increasing plant emissions, a serious concern in an age of climate change.



RECYCLING OF ROADWAYS

Full-depth reclamation (FDR) is a rehabilitation technique that involves pulverizing the existing roadway materials, mixing it with a stabilizing agent and using it to form a foundation layer for the new roadway. FDR provides structural benefit to the new roadway, conserves raw materials and quickly returns the facility to service. Not only does FDR benefit the environment by recycling 100 percent of the materials used in a roadway, it's also an efficient, cost-effective re-use of roadway materials.



ROADSIDE DESIGNS FOR AESTHETICS AND ACCESSIBILITY

TTI projects have assisted in the revitalization of older, established communities and small towns by redesigning the roadside for accessibility compliance and incorporating streetscape components such as public spaces, pedestrian and bicycle circulation, aesthetic lighting, street trees, landscape planters, and public art.



LAND USE AND PLANNING PARTNERSHIPS

Regional planning aimed at better coordinating local transportation systems, rerouting hazardous materials away from urban population centers and better coordinating hurricane evacuations is only a few of the land use and planning areas in which TTI researchers support sponsor goals. One recent project involved TTI working in India to trap methane gas produced by landfills for conversion into liquefied natural gas for use as fuel.



EMISSIONS TESTING AND MONITORING

TTI's Transportation Modeling Program uses applied mathematics to help urban areas model their mobile source emissions to determine how to demonstrate conformity with Environmental Protection Agency (EPA) emissions standards. Researchers in this program are currently leading the way in transitioning how EPA tests emissions (see story on page 6).



DRIVE-IN ENVIRONMENTAL RESEARCH CHAMBER

Opening in January 2010, TTI's new facility is the largest of its kind in the United States. Temperature and humidity are controlled in the 75 by 22 by 22 foot chamber, which will help test, among other things, onboard idle-reduction technologies for semi trucks. Other areas for testing include fuel consumption, hybrid technologies, pollutants entering vehicles and various applications related to emissions (see story on page 4).



10 Ways TTI Initiatives Support the Environment

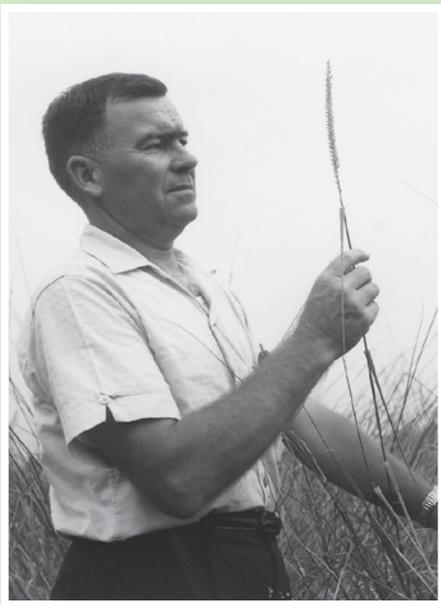
Best Practices for Growing Grasses on Right of Way Are Determined

(Excerpt from Texas Transportation Researcher, October 1967)



Photo courtesy TxDOT Library

The Texas Transportation Institute's (TTI's) research on vegetation and erosion control in the 1960s saved Texans millions of tax dollars in highway maintenance costs through the discovery of effective ways to control Bermuda grass and the development of planting guides for the 10 geographical regions of the state.



Wayne McCully, one of the pioneers of environmental research at TTI.

Best cultural methods to give an ideal stand of grass for erosion control along the highway have been determined by Dr. Wayne McCully and Mr. William J. Bowmer in research of the Texas Transportation Institute sponsored by the Texas Highway Department with the Bureau of Public Roads. Establishing a vegetative cover on roadsides for erosion control requires a balancing of plant growth requirements with engineering specifications. The plant requirements are: (1) planting materials adapted to existing soil conditions in a particular area and (2) an environment favorable for seed germination and for seedling growth. Plant materials for an area as large as Texas may vary considerably across the state. Generally, Bermuda grass is seeded in the eastern one-third of Texas, and perennial native bunchgrasses are used in the drier western areas. Seeding usually is not recommended in the portion of Texas receiving less than 12 inches of rainfall annually. Specific grass varieties may be designated for specific areas, and these should be used where the premium on seed cost is not great. The researchers suggest a number of field practices which are important in establishing a protective vegetative cover. ▮

Testing 21st Century Sediment Control Devices



Top and middle photos: The sediment retention device test flume, part of TTI's testing equipment at the Hydraulics, Sedimentation and Erosion Control Laboratory (HSECL).



Bottom photo: Greenhouse at the HSECL.



In 2010, Texas Transportation Institute (TTI) researchers will enter the second phase of a project for the Texas Department of Transportation (TxDOT) Maintenance Division to develop an Approved Products List (APL) for sediment control devices. Sediment runoff from construction sites is now the number one pollutant of our waterways, according to the Environmental Protection Agency. By 2013, contractors will be required to monitor and measure storm water runoff, which then must meet standards (Effluent Limitation Guidelines) before it can be discharged into a storm water conveyance system. For over 20 years, research conducted at TTI's Riverside Campus facility has produced methods, products, materials and devices in the area of vegetation and storm water management. Since 1990, the TxDOT-funded program at the TTI Hydraulics, Sedimentation and Erosion Control Laboratory has regularly updated an APL for erosion control materials, with many manufacturers having their materials tested at the facility. ▮

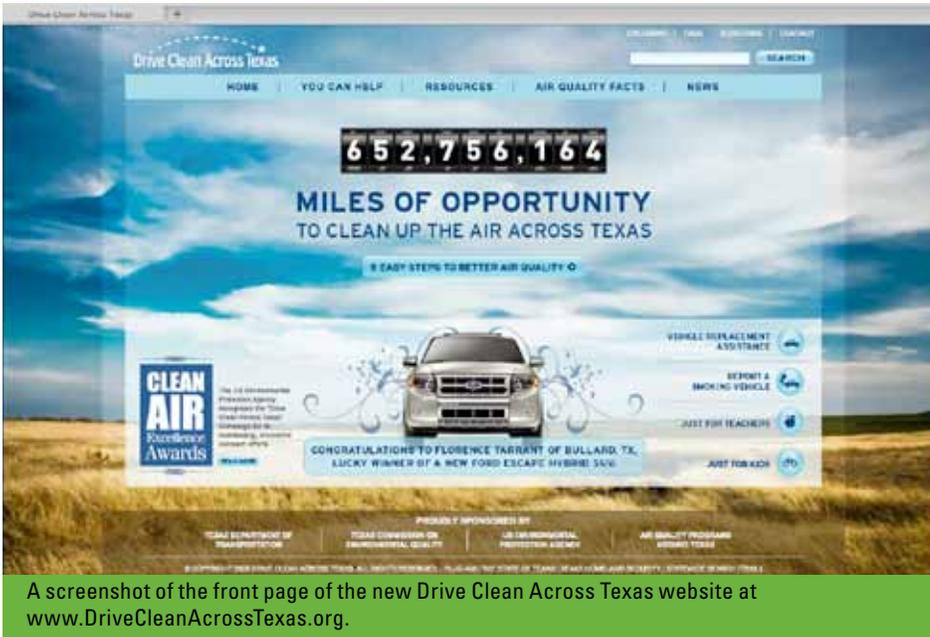


MORE INFORMATION

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Drive Clean Across Texas

A Success Story



A screenshot of the front page of the new Drive Clean Across Texas website at www.DriveCleanAcrossTexas.org.

Think back roughly eight years ago — where were you? Some that were graduating high school are now out of college and in the work force, and fifth graders at that time are now in college. The Drive Clean Across Texas (DCAT) campaign was in its infancy then but now stands as an award-winning education and outreach campaign.

Officially launched in May 2002, DCAT was the nation’s first statewide air quality public outreach and education campaign. Co-sponsored by the Texas Department of Transportation (TxDOT) and the Texas Commission on Environmental Quality (TCEQ), the campaign was designed to raise awareness and change attitudes about air pollution. Researchers from the Texas Transportation Institute (TTI), as well as staff from TTI Communications, have worked in a productive partnership with Sherry Matthews

Advocacy Marketing to do just that.

“Eight years ago air quality was not a concern for most Texans,” explains TTI Associate Research Scientist and project supervisor for DCAT Laura Higgins. “The process of raising the public’s awareness and then educating them on how they can help make a difference in air quality has been a challenging but successful venture.”



The DCAT booth at the Poteet Strawberry Festival.

This success is seen in the campaign’s performance. In a 2003 survey conducted by the Bush School of Government and Public Service at Texas A&M University, 23.7 percent of those surveyed had heard of an air quality campaign. By 2007, 40.6 percent of those surveyed were aware of the DCAT campaign specifically. Similarly, in 2003 only 25 percent of survey respondents reported that they had made one or more changes in their behavior (car pooling, using public transportation, properly maintaining their vehicle, checking tire pressure or reducing idling, for example), but by 2008 that number grew to 62.8 percent.

TTI Associate Research Editor Chris Sasser has seen the changes firsthand.

“When I first began working DCAT outreach events, some people were defensive about the topic of air quality, but now the public is much more aware and educated about air quality concerns,” he says.

Further evidence of the campaign’s success came in 2007, when the U.S. Environmental Protection Agency (EPA) awarded DCAT its annual Clean Air Excellence Award for Outreach/Education.

The challenge now is to carry this success forward. New EPA regulations for air quality standards are on the horizon, and several regions of Texas will struggle to meet these requirements. Fortunately, help should be on the way in the form of those fifth graders mentioned earlier. In addition to educating the general public, DCAT has been helping educate Texas children of all grade levels about how vehicles contribute to air pollution.

“DCAT’s curriculum educates, informs and inspires young Texans to adopt air-friendly habits as they become the drivers of tomorrow,” says Richard Goldsmith, public information officer with TxDOT’s Environmental Affairs Division, which manages the campaign. “The success of DCAT over the last eight years has been fantastic, and the campaign’s efforts with Texas children will undoubtedly help carry that success forward for years to come.”



MORE INFORMATION

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Using Dirt to Clean Water:

Bioretention improves runoff quality

It's every kid's dream — that playing in dirt could make you cleaner than the dreaded bath time. But one Texas Transportation Institute (TTI) project is using soil and plants together to clean storm water runoff before it returns to the main water supply. As storm water washes down an embankment, it carries with it an assortment of pollutants and pathogens.

Water contamination is a concern for every urban area, especially areas with an aquifer. Bioretention is one low-impact development technique advocated by the U.S. Environmental Protection Agency to clean storm water runoff — a water quantity and quality control system that consists of a water storage space, vegetation, mulch, soil and gravel.

“Bioretention removes pollutants from runoff via physical, chemical and biological processes,” explains Ming-Han Li, an assistant research engineer for TTI, who is leading the bioretention research. “The various layers of vegetation, soil and gravel act as a filter for dirty water.”

In bioretention facilities, runoff from parking lots or pavements is detained on top and filters through the soil, undergoing constant cleaning until it reaches the discharge point. Plant roots take out pollutants such as nitrogen and phosphorus, while soil absorbs metals such as zinc and lead and pathogens such as E. coli. Determining the ideal configuration is complex, however.

While plants' roots are necessary for pollutant removal, they also decrease the detention time. Li's current task is to determine how to optimize performance between roots and detention time — as well as combating fire ants, whose elaborate tunnels become an expressway for water. The research



Researchers used controlled runoff with known levels of pollutants.

team plans to monitor two field demonstration sites to better understand bioretention's real-world performance.

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“We are working toward a method that utilizes the properties of plants and soil microbial action to remove pollutants, requires only periodic maintenance and is aesthetically pleasing to the public.”

*Steve Ligon,
environmental specialist,
Texas Department of Transportation
Environmental Affairs Division*

pleasing to the public,” says Steve Ligon, an environmental specialist in the Texas Department of Transportation (TxDOT) Environmental Affairs Division. Ligon is working with Li and TTI's Environmental

Management Program on the project.

Initial studies in other parts of the country produced promising results with bioretention, but can the same methods be successful given Texas' unique and varied climate? Li, who is both an engineer and a landscape architect, knew that the right plants for this substantial job would not only need to be native to the specific Texas region but also be able to survive periods of drought. TTI's team tested vegetation in small-scale experiments with controlled soil and water content. They discovered that the longer the water was detained in the soil, the cleaner it came out in the discharge.



Researchers tested various vegetation and soil mixes for bioretention in recycled dumpsters.

“This research bridges disciplinary gaps. We're connecting several concepts together in the beginning stages, combining engineering disciplines to create aesthetically pleasing, environmentally conscious and functional designs to maintain TxDOT's rights-of-way,” says Li. “TxDOT's effort in researching new designs of storm water from Texas highways is over and beyond the call of duty.”



MORE INFORMATION

For more information, contact Ming-Han Li at minghan@tamu.edu or (979) 845-6211.

Right: (left to right): Lawrence Olsen, executive vice president, Texas Good Roads and Transportation Association; Ed Serna, TxDOT assistant director for support services; Janice Brown, Federal Highway Administration Texas Division administrator; Ned Holmes, Texas transportation commissioner; Ted Houghton, Texas transportation commissioner.



83rd ANNUAL TRANSPORTATION SHORT COURSE



Above: TxDOT Executive Director Amadeo Saenz during his opening session remarks.

Left: Texas A&M University System Regent Bill Jones addresses the crowd about the impact that TxDOT has on Texas.



"The quality of life, air quality. . . everything is dependent on the work that you do. Change is simply part of life. We just need to make change work for us. We need to be engaged."

*Ned Holmes,
Texas Transportation Commissioner*

Amadeo Saenz told the crowd that "Texans are counting on us, and we will continue to make changes." Saenz also mentioned the internal review that's under way designed to make the department more efficient.

Members of the Texas Transportation Commission also addressed TxDOT employees, emphasizing their dedication and the impact that they have on transportation in the state. "The quality of life, air quality. . . everything is dependent on the work that you do," Commissioner Ned Holmes said. "Change is simply part of life. We just need to make change work for us. We need to be engaged."

Included in the opening session was the annual presentation of the Extra Mile Awards. This year, seven TxDOT employees were recognized for saving the lives of their fellow Texans.

Planning for this year's Short Course presented a big challenge for TTI's Director of Administration Mary Cearley and her staff. Usually, the numerous break-out sessions are held at Texas A&M University's Memorial Student Center (MSC). However, the MSC is closed for renovations.

"Thanks to our team of 80 TTI volunteers, we were able to get all the attendees to the various on- and off-campus session locations," Cearley said.

In addition to the logistics volunteers, more than 20 TTI staff co-chaired, moderated or conducted presentations for the break-out sessions. In case attendees were unable to see some of the presentations, TTI's Visual Media Group taped each of the sessions, which will be posted to the Institute's website. ■



MORE INFORMATION

For more information, contact Terri Parker at (979) 862-8348 or t-parker@tamu.edu.

Spiegelman Named Distinguished Professor



Spiegelman

Texas Transportation Institute (TTI) Senior Research Scientist Clifford Spiegelman has been appointed Distinguished Professor of Statistics at Texas A&M University's College

of Science. The title of Distinguished Professor is reserved for faculty who are recognized by their peers as being among the top 5 percent in their fields worldwide. Currently, there are about 70 Distinguished Professors among the 2,900 faculty members of Texas A&M University.

"This appointment is a career highlight, to say the least," Spiegelman said. "It's a huge honor for me to work alongside my colleagues at TTI and the university to try and solve problems through statistics."

Spiegelman, who joined the Texas A&M faculty in 1987, made international news in 2007 when his work on bullet fragments from the JFK assassination case determined that the FBI analysis was flawed.

Spiegelman is a founder of chemometrics and a leader in statistical forensics. His appointment as Distinguished Professor became effective September 1. ■

Engineering Advisory Council Spouses Tour TTI

The spouses of the Texas A&M Engineering Advisory Council (EAC) members toured the Texas Transportation Institute (TTI) in October as part of their fall meeting. The spouses learned about the Institute with the help of various presentations including a TTI overview, the Universal Freight Shuttle and the Teens in the Driver Seat program. The mayor of College Station, Texas — Ben White — welcomed the spouses.

"TTI was a great host for our group," says Jill Bennett, the wife of G. Kemble Bennett, the vice chancellor and dean of engineering. "We really appreciate all the time and effort that went into the tour and making us feel at home." The EAC spouses take "field trips" to various engineering-related facilities and organizations each year.

The EAC is made up of dozens of industry leaders who help guide the Dwight Look College of Engineering with strategic planning, external relations and resource development. ■



Jill Bennett (center) speaks with (left to right) Dean Alberson and Dennis Christiansen as TTI hosts the spouses of the Texas A&M EAC members.

Connecting with Future Transportation Professionals

TTI researchers from various programs were able to "connect" with middle school students who attended a Chamber of Commerce-sponsored Youth to Career Fair event at the Brazos County Exposition Complex Nov. 4.

"There's nothing more rewarding than to witness students' eyes light up when they hear and see what we do and they realize they want to be a part of it," says Debbie Jasek, a research specialist in the Center for Professional Development. "It doesn't happen with all the kids, but when it does — it makes our efforts seem worthwhile."

More than 3,000 eighth graders from the Brazos Valley region attended the event. ■

Overman Helps India Tackle Transportation Problems

Texas Transportation Institute Associate Research Scientist John Overman was part of a team of transportation experts that went to Mumbai, India, in September to help the State of Maharashtra develop its own Transportation Training Institute — which is designed to improve the country's transportation problems.

"As you may have seen in some online videos, transportation is a major issue in India," Overman said. "I was asked to teach a course in transportation planning as the newly formed institute begins to design a course curriculum." Other members of the United States delegation taught other transit-related short courses including security, environmental sustainability and integrated fare collection.

Overman was part of a delegation arranged by the Federal Transit Administration and the Mumbai Metropolitan Region Development Authority.

"We were well received by the people of India," Overman said. "It is clear that they are eager to improve all aspects of their transportation system. I was very pleased to be asked to be a part of that effort." ■



John Overman (center) poses with transportation planners of the Mumbai Metropolitan Region Development Authority.

Fulbright Scholar Makes TTI Temporary Home

A Fulbright Fellow selected the Texas Transportation Institute (TTI) for her environmental research work, arriving in College Station on Sept. 1. Anuradha Shukla worked for the Center for Air Quality Studies under the direction of Director Joe Zietsman. She has been employed at India's Central Road Research Institute (CRRI) for 22 years, where she is a division head responsible for transportation planning and environment. Her specific expertise is in air quality.

In addition to her research at TTI, Shukla also conducted several lectures out of state, including at Virginia Tech and Georgia Tech. She also attended an emissions testing conference in Ann Arbor, Michigan.

"The only other place in the United States I had been before coming to TTI was California," Shukla said. "My experience at TTI was an excellent learning experience, and I was able to travel to other parts of Texas and the country."

Shukla plans to form several collaborative projects with the Center and hopes that the work leads to a CRRI/TTI memorandum of understanding, which could open the door for future projects.

Zietsman met Shukla during a visit to India in 2008 where he gave a presentation on emissions testing at a conference in Nagpur, India.

"The Fulbright Fellowship is a very competitive and prestigious award," says Zietsman. "We are extremely honored that she selected TTI and the Center for Air Quality Studies as a home for four months. It was an excellent opportunity for us to learn more about the work her institute does, and it really opens the door for collaborative opportunities." ■



Joe Zietsman poses with Fulbright Fellow Anuradha Shukla after she arrived in College Station for a four-month stay.

Railroad Crossing Safety Professionals Gather for Conference

About 200 participants from across the country took part in the 2009 National Highway-Rail Grade Crossing Safety Training Conference in New Orleans, Louisiana, in November. The Texas Transportation Institute-sponsored conference is held every two years and is designed to share the latest and best practices in highway-rail grade crossing safety and trespass prevention.

A highlight of the conference was the Hoy Richards Career Achievement Award, which was presented to Bill Browder, the director of operations with the Association of American Railroads.

The founder of the Railroad Chaplains of America, Gil Stricklin, was a speaker at the conference. Stricklin described how his organization sends out a team of caregivers when a railroad death or serious injury occurs.

Nearly 1,000 people are killed at railroad crossings each year. ■



Retiring Bochner Urges Colleagues to Ask "So What?"

Known for his mild manner, patience and insightful curiosity, Senior Research Engineer Brian Bochner had words of advice for his Texas Transportation Institute (TTI) colleagues during his retirement party Sept. 18. "Don't stop learning" and "look ahead, not back."

After 43 years of professional employment concentrating on transportation planning and air quality, Bochner worked for the Institute for 10 years. "TTI is the classiest of the three employers I've had."

And judging from the comments of his colleagues, it was Bochner who added class to TTI.

"Brian was my mentor," said Joe Zietsman, who took over Bochner's role of director of the Center for Air Quality Studies. "Brian is like a walking encyclopedia. Ego is not something Brian struggles with."

"To our good fortune, Brian chose to join our staff 10 years ago," TTI Agency Director Dennis Christiansen told the crowded conference room of well wishers. "He's done a great job for us — but in the TTI tradition — this is really just a fake retirement."



TTI Director Dennis Christiansen (right) jokes with Brian Bochner at his retirement party.

Bochner officially retired August 31 but will continue working part time as he finishes various projects.

In a last bit of advice, Bochner urged his co-workers to find meaning in what they do. "Don't be afraid to try new things and always ask 'so what?'" ■

**»» TEXAS TRANSPORTATION INSTITUTE
Publications****TECHNICAL REPORTS**

"Analysis and Integration of Spatial Data for Transportation Planning," by Stephen Sebesta, **0-6071-1**, September 15, 2009.

"Assessment of a Traffic Monitoring System for a Major Traffic Generator to Improve Regional Planning: Technical Report," by Todd Carlson, **0-5531-2**, November 4, 2009.

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