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Texas Transportation Forum

The first Texas Transportation Forum, sponsored by the Texas Department of Transportation (TxDOT), and co-sponsored by the Texas Transportation Institute (TTI), the Associated General Contractors of Texas, and the Texas Good Roads and Transportation Association, was held in Austin, Texas on June 8 and 9, 2006. The Forum— commemorating the 50th anniversary of the Federal-Aid Highway Act— was a huge success, attended by more than 1,300 transportation experts from nine states and the countries of Spain, Costa Rica, and Canada.

Full House in Attendance

A video produced by TTI about the history of the Interstate Highway System was introduced in the opening session. Michael Behrens, Executive Director of TxDOT, welcomed the crowd saying, "The reason we are here is obvious—Texas is facing some great transportation challenges and requires solutions that can only be achieved with collaboration and teamwork".

Those transportation challenges were discussed in the speeches and breakout sessions during the Forum. Over the two-day event, nine breakout sessions were held. Topics covered included Trans-Texas Corridor, congestion problems, funding issues and the use of public-private partnerships, , the future of road building and Regional Mobility Authorities.

Norman Y. Mineta, Former Secretary, US Department of Transportation

Among the notable speakers at the Forum were Norman Y. Mineta, former secretary of the United States Department of Transportation, Rick Perry, Governor of Texas and Roger Williams, Secretary of State. Addressing the opening luncheon, Mineta said that Texas is well ahead of the curve in encouraging more private investment in its transportation network. He called on other states to follow Texas' lead, adding that with its new, flexible approach to highway financing, "Texas can accomplish in four years what would have taken 25 years under conventional funding systems".

A highlight of the opening luncheon was the presentation of "Road Hand" awards to five Texans in recognition of their efforts to help improve transportation in their communities and throughout the state. They are: Carolyn Cerny Bilski, Austin county judge; Ruben Bonilla Jr., Port of Corpus Christi commissioner; Robert A. Bowers, former Port Arthur Chamber highway chairman; John C. Doerfler, Williamson County judge and Nelson Wolff, Bexar county judge.

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From the Editor's Desk

After the last newsletter was published, I received several congratulatory messages on successfully completing my first edition. I was also notified that the "Project News" section was not in keeping with TexITE's policies on the newsletter. Efforts are being made to address this issue in upcoming editions. I thank you all for your comments and hope that you continue to send your valuable suggestions.

This newsletter edition focuses on transportation related research activities taking place in universities and governmental agencies. I thank the authors and TxDOT project directors who gave permission to include their research articles in the newsletter.

Two years ago, in the fall edition of the newsletter, Beverly Kuhn and Ginger Goodin (both researchers at TTI) presented a preliminary report on their work regarding managed lanes. This TxDOT and FHWA funded research was completed recently and a summary report is presented in this edition on page 10.

By now all of you might be aware of the news allowing automated Red Light Enforcement on state highways. After hearing this, a thought occurred to me: was the red light running issue ever broached in the TexITE newsletter? As I flipped through the previous editions, I noticed a discussion on this topic five years ago. Two articles in the fall edition of 2001 delved into a detailed discussion about a Texas congressman's report on red-light cameras that questioned the traffic engineer's intent. The articles also highlight the efforts taken to explain the benefits of the technology to the congressman. Several research efforts were undertaken on the red light issue over the past few years. One such research effort carried out by FHWA is presented in this edition.

TexITE newsletter has undergone several changes over the years in design, content and method of distribution. The Newsletter Committee is always keen to know what you, the reader, think of the publication. To this effect, we have prepared a readership survey. I encourage all of you to participate in this important survey at http://www.texite.org/survey/.

Finally, don't forget to provide us with articles for the next edition.

Praveen Pasumarthy

What's Your E-mail?

This newsletter is distributed primarily by e-mail. If you are a TexITE member and did not receive this newsletter electronically from TexITE, please update your information. You can do this by contacting the roster manager, Susan Langdon at roster@texite.org

Committee Updates

TexITE Younger Members

We need YOU!! The younger members are helping to plan and moderate one of the sessions for the Winter TexITE in Houston. This is not an easy task because we need topics and speakers. We will plan the meeting via email and a few conference calls. To get involved send an email to: texite-younger members-subscribe@yahoogroups.com

If you have any problems with the listserv, please email Jennifer Butcher (JenniferB@streetsmarts.us). This is a GREAT opportunity to meet other engineers and become involved on your own time. We will use the listserv to plan the meeting so sign up now and don't miss your opportunity to play a role in TexITE.

Branch Younger Members

The Younger Members groups are now forming in your area! We are starting a local ITE younger members group for each branch. The groups will start with three activities per year. The activities will consist of one service project, one social, and one technical related activity. Contact your representative to become involved.

Brazos Valley
Vacant

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South Texas
Vacant

President's Message

Brian D. Van De Walle

Dear TexITE Members:

The ITE staff has been working hard on some new programs for our members. Response to the webinars is growing and several sections across the nation are using the webinars as a fundraiser. In addition to the PTOE, two new certifications are being provided. These are for non-licensed transportation professionals and include the "Traffic Operations Practitioner Specialist" (TOPS) and "Traffic Signal Operations Specialist" (TSOS). A new certification "Professional Transportation Planner" (PTP) is planned for 2007.

This has certainly been a year to celebrate our TexITE fellowship. In February, we were able to host the ITE International Technical Conference in San Antonio. Keeping things on a roll, we had a great District 9 College Station meeting in June. We all appreciate how hard the Local Arrangements Committee worked to put together a great meeting. Special thanks are due to the Highway Products Group and Consultants Council for their sponsorship.

It was in Aggieland that we first learned that Texas Attorney General Greg Abbot issued his opinion allowing automated Red Light Enforcement on state highways. After all the work that TexITE has done in educating our elected leaders, it is nice to see them working with us towards making our roadways safer. A symposium on red light running will be held in San Antonio on October 18th and 19th. More details can be found on the TexITE website. I encourage all of you to attend.

Sincerely,

Brian D. Van De Walle, P.E., P.T.O.E.

Message from International Director

Robert Wunderlich
International Director

Dear Texas District Colleagues:

That has a nice ring to it, doesn't it – Texas District. In an effort to help everyone understand the geographic location of each ITE district, we are moving to a naming system rather than a numbering system for identification. We are the Texas District and it's an honor to represent you. It's always great to see so many Texans at the annual meeting, even if we had to go to Wisconsin to see one another. My plan is to actually visit you at a section meeting during my tenure as District Director.

ITE Councils

If you're not already a member of one of ITE's specialty councils, I urge you to join. It's included in your ITE membership now – there's no additional charge. Members of each council receive regular newsletters of council activities and have the opportunity to participate in projects. You can find more information on the various councils at the ITE website, http://www.ite.org. On the left hand side of the homepage, click on ITE Councils. You will note that several Texans serve in leadership posts on Councils, including Kay Fitzpatrick, Coordinating Council Vice-Chair, Rod Kelly, Transit Council Chair, Jodi Carson, Transportation Education Council Chair and yours truly as the Public Agency Chair. Councils are a great opportunity to advance your knowledge, extend your contacts and serve your profession. You can use the "My Profile" section of the ITE website to select the council of your choice.

Board Actions

The Board has called for the formation of a task force to define issues related to the maintenance of traffic control and supporting devices. Of particular importance are new issues relating to the application of LED traffic signals, partial failures, minimum light output, individual LED burnouts and the need for considering human factors in visibility requirements. The board will also address the International aspects of the ITE and Public Information/Relations as mega topics at upcoming meetings. If you want to participate in any of these activities, please let me know.

Membership and Dues

You will by now have received information for voting on several proposed constitutional amendments. The most important one deals with the membership levels. You can visit the website for details, but if approved, membership levels will be greatly simplified. The Board worked diligently to develop a dues structure to transition into the new system. The dues are intended to cover the costs of running the Institute while not creating a burden on members transitioning to the new level.

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Vice-President's Column

"Anyone who stops learning is old, whether at 20 or 80. Anyone who keeps learning stays young."

-Henry Ford

Jason Crawford
Vice-President

As summer turns to fall, we hear the collective cheers and sighs as our alma maters battle on the gridiron. Memories of college, our professors and mentors, classes, exams, and projects may return. This is where each of us began our professional education. This is also where we began our commitment to life-long learning.

We are all learners, at many different stages and with many different needs. We are also all educators. We have each gained unique experiences – technical, project management, or administrative. Likely, much of your role as educator occurs in the day-to-day routine, either training junior staff while on-the-job or through discussions with your peers. These forms of technology transfer are very personal and highly focused. There are other opportunities, however, to share your experiences and solutions with a wider audience, improving the skills of many other peers.

Both International and TexITE offer unique outlets to transfer technology. At the International level, you can respond to calls for the two technical meetings, or submit to the peer-reviewed ITE Journal. Serving the various technical committees within its councils is another way to improve current practices, create educational material, and assist with technology transfer. Within TexITE, you can either volunteer to present at our semi-annual conferences or at the more frequent section or student chapter meetings across the state, submit articles on various topics for the newsletter you are now reading, or volunteer to collaborate on issues within our own technical committee.

Your contributions may be acknowledged and recognized among your peers. Both International and TexITE bestow many different awards for these contributions.

We each have the responsibility to educate one another, creating a more proficient and better educated profession. If we neglect or do not actively pursue this responsibility, we dilute the value and effectiveness of our educational tools, such as this newsletter. Consider how your unique experiences enable you to train others in our profession. Each of us can make a difference, and I encourage you to evaluate and take action within the next year.

Sincerely,

Jason A. Crawford, P.E.

Get Involved in the Legislative Process

Walter Ragsdale
Legislative Chair

The Texas State Legislature will hold the 80th Legislative Session from January thru May 2007. During this session many decisions will be made that affect our professional and/or personal lives. The Legislature meets every other year in Texas. It is expected that over 5500 bills will be introduced at this Session. Public hearings will be held and about 25% of the bills will become new laws. These new laws will go into effect September 2007 or January 2008.

In the off season important transportation research is being conducted. There is a special nine member study commission on transportation funding. This commission is co-chaired by Senator Corona and Representative Krusee. Officials of the Governors office and Texas Highway Commission also serve on this committee. They are holding hearings around the State on the following issues:

- Evaluation of the State Highway Fund
- Evaluation of the Motor Fuels Taxes
- Rail Transportation Funding
- Motor vehicle user fees

The final report is due to be released by December 1, 2006. This report will be the basis of some of the upcoming transportation legislation that will be drafted in the upcoming session.

Keeping informed during the next session is easy with the Texas Legislature Online portal at http://www.capitol.state.tx.us/. This state sponsored site will allow you to read all the bills and modifications as they occur or watch the debates as they occur in the house or Senate. This website allows

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Announcements

5th and 6th Grade Poster Contest

In 2006, the USDOT is celebrating the 50th anniversary of the Interstate Highway System. As part of this celebration, Texas District is holding a poster competition for 5th and 6th grade students. The purpose of this contest is to introduce students to the transportation profession. Further details about the competition, a release form, suggested topics for classroom discussion, and a brief summary of the history of the Interstate Highway System are available at http://www.texite.org.

YOUR help is needed in disseminating this information to the SCHOOLS IN YOUR AREA! This competition can only be a SUCCESS if you help get the word out. Thank you in advance for your time and cooperation.

Greater Houston Area TexITE Scholarship for Studies in Traffic or Transportation Engineering

The Greater Houston Section of TexITE recently initiated a scholarship for studies in Traffic and Transportation Engineering. The scholarship includes one (non-renewable) $1,000 scholarship for one academic year starting in Spring 2007 semester.

This scholarship is open to students who are registered full-time in an undergraduate (Junior or Senior classification) or postgraduate program at a university or college in the Greater Houston Area, or have a permanent address in the Greater Houston Area. The Greater Houston Area is defined as the following Counties: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties. The degree program must include at least one Traffic or Transportation Engineering related class.

Selection criteria will be based on academic ability, stated career objectives, and supporting letters of reference. To be eligible, candidates must be U.S. residents and meet the degree program and location criteria described above. Applications should be postmarked no later than November 1, 2006 and sent to Sean Merrell, 10777 Westheimer, Suite 400, Houston, TX 77042.

For further information please contact Sean P. Merrell at smerrell@browngay.com or 713-488-8185. Visit the Greater Houston Area TexITE Website for the electronic version of the application: http://www.texite.org/houston/mainhouston.htm

Houston Section Shrimp Boil

*It's peel'em and eat'em time, so get ready for ITE Houston Section Shrimp Boil, on **October 21, 2006**.*
*This year the event will return to **Spring Creek Park** in northwest Harris County. Follow this link for information on the park: http://www.hcp4.net/Parks/springcreek/index.htm*

So what are you waiting for? Pack yourself up and prepare to enjoy an afternoon of food, fun and the company of countless others at the 2006 Houston Area Chapter TexITE Shrimp Boil!

Register On-line at http://www.texite.org/houston/registration.html by 10:00 am on Thursday, October 19

Texas Red Light Photo Enforcement Symposium

Who is invited to attend: Municipal staff that are responsible for managing a red light photo enforcement program in Texas, or municipal staff that may be involved in implementing a red light photo enforcement program in the future. This includes police departments, transportation departments, municipal courts and city attorneys.

What will be covered: Representatives from various cities in Texas will discuss the "nuts and bolts" of starting and maintaining a red light program, covering everything from the history of red light programs to assessing a program's effectiveness.

Where: The Wyndham St. Anthony in downtown San Antonio, Texas

When: Thursday, October 19 - Evening networking reception at St. Anthony
Friday, October 20 Symposium 9:00 a.m. - 4:00 p.m.
$100 per person (excluding hotel accommodations) includes 10/19 reception, and 10/20 continental breakfast and lunch.

Contact: Shelley Franklin, City of Garland
sfrankli@ci.garland.tx.us
972/487-7392

Announcements

Professional Certification

The Transportation Professional Certification Board (TPCB), an autonomous certification body affiliated with the Institute of Transportation Engineers (ITE), now offers the following certification programs: Traffic Operations Practitioner Specialist (TOPS), Traffic Signal Operations Specialist (TSOS) and Professional Traffic Operations Engineer (PTOE). The next examination dates and locations for these certifications are as follows:

October 21, 2006

- Multiple sites

December 5, 2006

- State College, PA

January 20, 2007

- Washington, D.C.

Another TPCB initiative, the Professional Transportation Planner (PTP) certification program, will be launched in 2007 & is being designed for professionals. The inaugural examination for the certification will be in 2007. For more information, visit http://www.ite.org.

Call for Abstracts

Winter 2007 Technical Conference, Houston, Texas

HEARYEA! HEARYEA! TexITE announces its first call for abstracts to the Winter 2007 Technical Conference.

The conference will be held on February 1-3, 2007 at the Crowne Plaza Hotel in Downtown Houston, Texas. Please consider submitting an abstract today! Conference information will be available on the district website (http://www.texite.org) along with contact information should you have any questions.

The conference will feature presentations chosen from abstract submittals that offer practical and innovative solutions to contemporary engineering and planning challenges. Policies, procedures, and technical analysis methods are sought. The conference organizers invite you to submit abstracts on all transportation topics, such as:

- Public Involvement and Outreach
- Transit Planning or Operations
- Transportation Safety Issues
- Traffic Operations
- ITS Design and Communications
- Mitigating Construction Impacts
- Planning
- Signs and Markings
- Low-cost Congestion Solutions
- Pedestrians and Bikes
- Managing Special Events
- Resource Planning/Scheduling

E-mail abstracts prior to **November 1, 2006** to jcrawford@tamu.edu. Please confine the abstract to 300 words and one page, including the following information: Author(s) and affiliation(s), mailing address, email, and FAX for author contact. Accepted abstracts will NOT be expected to prepare a technical paper for the conference.

If you have any questions about the abstracts please contact Jason Crawford, at jcrawford@tamu.edu or 817-462-0534.

2007 Wilbur S. Smith Distinguished Transportation Educator Award

The Wilbur S. Smith Award is given annually to a transportation educator who has made an outstanding contribution to the Transportation profession by relating academic studies to the actual practice of transportation. The Award recognizes transportation educators who help their students to advance their professional development, enhance their opportunities to come into contact with practicing transportation professionals and to become active participants in the profession.

All award nominations are **due by November 1, 2006**.

The Award includes a plaque of recognition and recognition at the ITE Annual Meeting and Exhibit and in the ITE Journal. To be eligible, the educator has to be employed or have been employed by a higher education institution to teach undergraduate and/or graduate courses in transportation. For nomination procedures, visit http://www.texite.org/News/Docs/Wilbur_Smith_Award.pdf

If you have any questions, contact Heather at ITE +1 202-289-0222 ext. 138 or htalbert@ite.org

TxDOT's Research Program

Texas Department of Transportation (TxDOT) through its Cooperative Research Program, conducts research in Texas state-sup-ported colleges & universities. Five statewide research management committees, each assigned a specific technical/operational area of responsibility, create & give direction to annual programs of research designed to reach identified goals & provide specific benefits.

TxDOT's fiscal year 2006 research program consists of 160 projects, with budgets totaling $19.5 million. Almost all of this work is contracted to fourteen Texas state-supported universities. Of the 160 projects, 60 are new projects started in 2006 while the remaining 100 projects are being continued from 2005.

Research Innovations

Each year, TxDOT selects Top Research Innovations and Findings for the past year. They are selected based on anticipated or already realized dividends to the department and the state. These dividends may be in terms of lives saved, more efficient operations, improved services and/or fiscal savings.

TxDOT's selections of top Research Innovations and Findings for 2005 are listed below. For further information on each of the projects, please visit ftp://ftp.dot.state.tx.us/pub/txdot-info/rti/innovations.pdf

1. Project - 0-4160: Tool Kit for Operating Freeways with Managed Lanes
2. Project - 0-4958: Artificial Lighting for TxDOT's Automated Pavement Crack Rating System
3. Project - 0-5157: Model for Predicting Operational and Safety Impacts When Retrofitting Bicycle Lanes
4. Project - 0-4563: Concrete Works
5. Project - 0-4046: RECIPPE: A Software Tool for Maximizing Effectiveness of Inspection during Planning and Construction of Flexible Pavements
6. Project - 0-4617: RUDI – Right of Way and Utility Adjustment Duration Information System

Note: The Editor thanks Duncan Stewart at TxDOT's Research & Technology Implementation Office for providing the information.

This day, That Age

25 Years Ago

President: Jack Hatchell
Vice-President: Gary Santerre
Secretary/Treasurer: Jim Lee

A five-year 40 million dollar Capital Improvement Bond Program was proposed by Lubbock's City Council. Included in the program were approximately $8 million for street improvements, & $4.3 million for a new traffic signal system.

Travis County Precinct Two Commissioner Bob Honts, flipped the switch to turn on the first Travis County owned and maintained traffic signal in August 1981.

August 1981 saw the first application of a variable (changeable) message sign system along IH 35 in Austin, Texas. The system consisting of two such signs and three mini-computers had a cost of approximately $272,000.

15 Years Ago

President: Robert Jenkins
Vice-President: Carol Walters
Secretary/Treasurer: Daniel B. Fambro

Mobility 2010: The Regional Transportation Plan for North Central Texas, a 20 year plan for guiding the implementation of roadway and transit improvements was made available in 1991.

TxDOT (District 18) and DART were preparing to open the first HOV lane in Dallas. This was the first permanent application in the United States of the Movable Barrier System. It is estimated that the lane would provide users with a trvel time savings of almost 10 minutes in the morning and 5 minutes in the evening.

City of San Antonio completed its downtown "Tri-Party" project, intended to enhance pedestrian and transit modes, and beautify downtown streets.

5 Years Ago

President: Elizabeth A. Ramirez
Vice-President: Joseph T. Short
Secretary/Treasurer: Jim Williams

James Carvell was named as the TexITE 2001 Transportation Engineer of Year.

In order to promote engineering as a career choice for high school students, TexITE president Beth Ramirez called for volunteers to form a new Future Engineers committee.

After one year of extensive considerations, TexITE Board reached a cautious consensus that it was time to convert the Chapters to Sections. The Board was waiting to hear inputs from the members.

City of Plano began testing 2070 controllers in anticipation of a citywide upgrade. The project was scheduled to begin in 2002 and last for approximately two years.

Rural Truck Traffic Needs

Authors: Jolanda Prozzi, Robert Harrison, Jorge Prozzi (CTR) and Phil Nash (TTI)

Texas is in many ways a rural state:

- 80 percent of the state's land area is rural (213,297 of 267,277 square miles); 196 of Texas' 254 counties are rural;
- Texas has 227,000 farms—twice as many as any other state;
- Farm and ranch acreage comprises 78 percent of the total land area in Texas;
- Texas produces approximately 7 percent of the gross U.S. agricultural income ($13.8 billion in 2000);
- About 15.2 percent (3.16 million) of Texas' total population lived in rural areas in 2000 (Office of Rural Community Affairs, 2002); and
- Farming and farm-related jobs provide employment to about 15 percent of all Texans (Office of Rural Community Affairs, 2002).

Serving the transportation needs of the people and economy of rural Texas is not an easy matter. Policies and procedures there must be different from those applied in the much more populous and compact urban and suburban regions of the state. At the same time, the same major transportation corridors that serve rural Texas are critical to the state and national economy as a whole and provide a vital link between the metropolitan areas.

What We Did...

This study, prepared by a team of researchers from the Center for Transportation Research, The University of Texas at Austin, and Texas Tech University, had several objectives. First, the research team: assessed and described the condition of the existing rural road system; summarized the impacts of current truck traffic on the rural system; conducted a major survey to identify expected future truck traffic growth; and examined the potential for rural rail programs to absorb portions of the freight demand. The results of this initial work are contained in report 0-4169-1, "Rural Truck Traffic and Pavement Conditions in Texas." The team then: collected the major rural stakeholder views concerning rural truck impacts; developed a way to estimate equivalent damage factors for use in calculating truck-pavement impacts; and proposed a strategy for setting rural transportation priorities. Report 0-4169-2, "Defining and Measuring Rural Truck Traffic Needs in Texas," summarizes this work.

What We Found...

Rural traffic is derived from economic activities, so the researchers began by examining the major rural traffic generators in Texas. Data from the Bureau of Economic Analysis revealed that employment and economic opportunities in rural Texas are largely tied to four sectors: government, service, farming and ranching, and mining. "Government and Government Services" was the primary revenue-earning sector for 79 rural counties in 2000. That was followed by the service sector (45 counties), farming (30 counties), and finally, mining (22 counties). These four sectors were the major revenue earners in 176 of the 196 rural counties in Texas, representing almost 90 percent of the rural counties in Texas. Also, employment and economic opportunities in rural communities are localized, tied to a community's natural resources or comparative advantage. For example, farming is the primary revenue generator in northern Texas, mining and government and government services are the major revenue earners in western Texas, and government and government services are the primary economic driver in southern and eastern Texas. This work was complemented by a survey of stakeholders sent to rural Chambers of Commerce.

Figure 1 shows the major economic generators revealed by this activity. More than 90 percent of the respondents indicated that

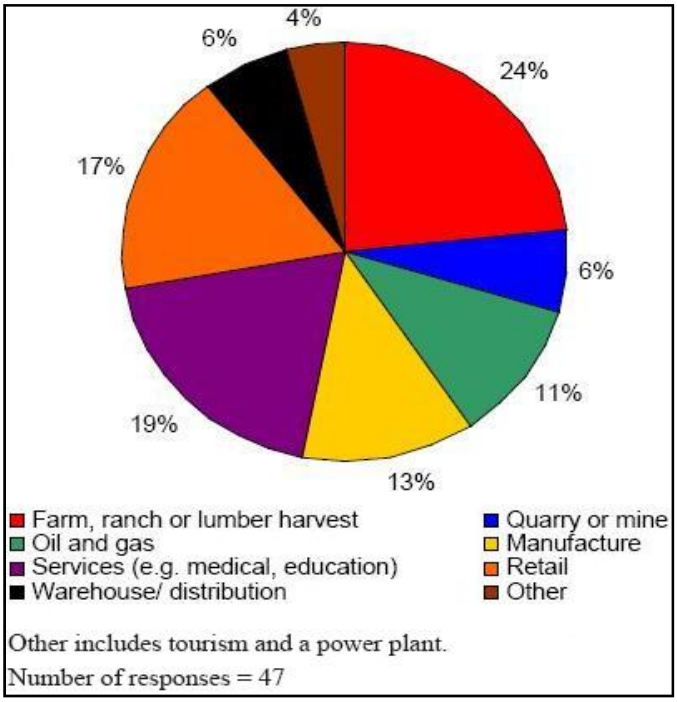

Figure 1: Major Income/Economic Generators in Rural Texas

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Rural Truck Traffic Needs

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rural transportation was a major issue or economic concern.

Many Texas Department of Transportation (TxDOT) districts have seen an increase in the volume of truck traffic on their networks and have found disequilibrium between rural demand and highway supply, often necessitating increased maintenance. In general, it was found that TxDOT districts are maintaining the state's rural roadbed section-miles well, although certain districts are more impacted by larger and heavier trucks traversing their roadways. Specifically, there is concern about the condition of the farm-to-market roads in a number of districts. Since individual TxDOT districts are responsible for balancing rural and metropolitan needs, priority is often given to higher-volume roads in urban areas. A growing number of districts are finding it increasingly challenging to maintain and repair all of their rural transportation system within current funding levels. Innovative measures therefore may be necessary to address rural maintenance and rehabilitation concerns.

Although survey results are biased towards smaller truck generators and trucking companies, the results do provide useful insights into what constitutes the major rural truck-traffic generators, commodities transported, trip patterns, and rural rail and road transportation concerns. As the users of rural infrastructure on a daily basis, rural truckers expressed a number of transportation concerns in rural communities. The concerns were about the width of rural roads, inadequate shoulders, the need for better maintenance and rehabilitation—especially with regard to county and farm-to-market roads—as well as the impact of increased truck traffic on rural roads and towns. Major factors impacting rural Texas roads include agricultural industrialization, heavy agricultural equipment, equipment from the oil and gas industry, the heavier loads permitted under House Bill 2060, the location of large distribution centers ("Big Boxes"), landfill sites, and finally, traffic linked to the North American Free Trade Agreement (NAFTA).

In the second year, researchers conducted a rural stakeholder survey to characterize rural truck generators, thus describing the demand for rural highways. This was followed by a survey describing the TxDOT district perspective—describing the supply of highways to rural users. A major part of the second year was given over to evaluating a new mechanistic-based analysis developed through models reported in NCHRP 1-37A "2002 GUIDE: Using Mechanistic Principles to Improve Pavement Performance." The four variables considered were (a) pavement structural capacity, (b) environmental conditions, (c) axle load distribution, and (d) rutting and fatigue cracking. A case study was undertaken with Waco conditions to test some of the models. There are a number of advantages to using this approach, ranging from equivalent damage factors that could be used to assess impacts of the 2060 legislation to forming inputs to economic evaluation models to prioritize district needs.

TxDOT rural districts spend substantial amounts of their maintenance budgets maintaining truck routes. However, many truck corridor users contribute little to the economic viability of the rural parts of Texas. This creates an asset management paradox that must be addressed at the state and national level.

Despite significant growth in average annual daily truck-traffic volumes across rural Texas, the research team found that the overall condition of the rural infrastructure remains adequate. Statewide, approximately 85 percent of the rural road network is rated good to very good in terms of the distress score, 88 percent is rated good to very good in terms of the overall condition score, and about 70 percent is rated good to very good in terms of the ride score. In general, it was found that TxDOT districts are keeping up with maintenance needs, although certain districts are more impacted by larger and heavier trucks traversing their roadways. Specifically, there is concern about the condition of the farm-to-market roads in a number of districts.

The Researchers Recommend...

TxDOT faces a huge challenge in maintaining the capacity and condition of Texas' rural transportation system. Given current and anticipated funding levels, the following is a list of recommendations for consideration:

1. The rural network should be carefully evaluated and reclassified to target maintenance and rehabilitation funding. First priority must go to the truck highway corridors. Second priority should go to those other parts of the system associated with significant rural employment and economic production. The remainder of the rural network may warrant only minimum levels of maintenance.

2. Much more information needs to be collected in support of planning and decision making on future transportation needs in rural Texas. The research team suggests that this should be done through a panel system.

3. Designate key state supply chains. This research recognizes that users develop their highway routes based on the needs of their shippers and the commodities being moved. The designation of supply chains for key commodities should therefore as-

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Findings from Texas: Five Years of Research on Managed Lanes

Authors: Beverly Kuhn and Ginger Goodin

This article is reprinted by permission from TTI

The increasing population growth in Texas has placed enormous demands on the transportation infrastructure, particularly the freeway systems. There is a growing realization that the construction of sufficient freeway lane capacity to provide free-flow conditions during peak travel periods cannot be accomplished in developed urban areas due to cost, land consumption, neighborhood impacts, environmental concerns, and other factors. Like other transportation agencies nationwide, the Texas Department of Transportation (TxDOT) is searching for methods to better manage traffic flow and thus improve the efficiency of existing and proposed networks.

A viable method for meeting mobility needs is the concept of "managed" lanes, which is growing in popularity among users and agencies alike. TxDOT anticipates that the managed lanes operational approach can offer peak-period free-flow travel to certain user groups by using strategies that manage demand in the lanes. These user groups might be high-occupancy vehicles (HOVs), trucks, toll-paying vehicles, transit, low-emission vehicles, or some combination of these and other groups. Moreover, the eligible user groups can vary by time of day or other factors depending on available capacity and the mobility needs of the community. Strategies that vary toll rate according to congestion levels and that control access to the lanes can also have a role in managing demand in the facility.

Thus, TxDOT initiated this multi-year project to research the complexities of designing a practical, flexible, safe, and efficient facility that may have multiple operating strategies throughout the course of a day, week, year, or beyond to help ensure the successful implementation of managed lanes in Texas.

What We Did…

The Texas Transportation Institute (TTI), in partnership with Texas Southern University (TSU), embarked on a five year effort to answer numerous critical questions regarding managed lanes facilities (see **Figure 1**). Through a well-defined and coordinated project management strategy, key researchers who possess expertise in specific areas of interest led the various project tasks with guidance from the research supervisors; the TxDOT program coordinator, project director, and project monitoring

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Table 1: Research Questions

Project Phase	Critical Question Answered by Research
Planning Managed Lanes Facilities	• What are the operational options available for a managed lanes facility? • How does an intended user group(s) affect a managed lanes facility's design and operations? • What defines a successful managed lanes project? • How can I fund and finance a managed lanes project? • How do I market a managed lanes project to help make it a success? • How do I integrate other key agencies (transit, toll, law enforcement, etc.) into a managed lanes project to help overcome institutional issues and barriers? • Are there any interim or temporary uses for a managed lanes facility?
Designing Managed Lanes Facilities	• How do I design a managed lanes facility to handle a selected user group? • How can I design a managed lanes facility to be flexible for future needs? • What safety issues do I need to be aware of when designing a managed lanes facility? • What interoperability issues do I need to be aware of when designing a managed lanes facility? • What information do users need to make decisions about using a managed lanes facility? • What approaches to delivering user information can be used to provide information appropriately?
Operating Managed Lanes Facilities	• What is the best way to enforce a managed lanes facility? • How do I handle incidents on a managed lanes facility? • What staff do I need to manage a managed lanes facility, and what training do they need? • How do I evaluate and monitor a managed lanes facility to determine success?

Findings from Texas: Five Years of Research on Managed Lanes

(continued from page 10)

committee; an external stakeholder committee; and ad hoc task-related technical advisory committees. **Table 1** shows the major questions addressed by the project.

What We Found…

The research project developed more than 150 products over the course of its five years. Material is available on the Internet at http://managed-lanes.tamu.edu. The products include technical papers, abstracts, journal and magazine articles, reports, bulletins, brochures, newsletters, technical memoranda, presentations, and a handbook and screening tool for managed lanes strategy selection. **Table 2** lists reports that document project activities, findings, and recommendations.

Table 2: Principal Research Reports

Report Number	Title
4160-1	Managed Lanes Symposium—Conference Proceedings
4160-2	Year 1 Annual Report of Progress: Operating Freeways with Managed Lanes
4160-4	Managed Lanes—Traffic Modeling
4160-5	Developing a Managed Lanes Position Paper for a Policy-Maker Audience
4160-6	Developing a Managed Lanes Position Paper for a Media Audience
4160-7	Marketing the Managed Lanes Concept
4160-8	State & Federal Legislative Issues for Managed Lanes
4160-9	The Funding and Financing of Managed Lanes Projects
4160-10	Managed Lane Ramp and Roadway Design Issues
4160-11	Enforcement Issues on Managed Lanes
4160-12	Year 2 Annual Report of Progress: Operating Freeways with Managed Lanes
4160-13	Identification of Traveler Information and Decision-Making Needs for Managed Lane Users
4160-15	Year 3 Annual Report of Progress: Operating Freeways with Managed Lanes
4160-16	Traffic Control Devices for Managed Lanes
4160-17	Incident Management for Managed Lanes
4160-18	Interoperability Issues on Managed Lanes Facilities
4160-19	Year 4 Annual Report of Progress: Operating Freeways with Managed Lanes
4160-20	Staffing and Training Needs for Managed Lanes Facilities
4160-21	Decision Framework for Selection of Managed Lanes Strategies
4160-22	Strategies for Interim Use of Managed Lanes
4160-23	Monitoring and Evaluating Managed Lane Facility Performance
4160-24	Managed Lanes Handbook
4160-25	Findings from Texas: Five Years of Research on Managed Lanes

The broad scope and long length of this project allowed the research team to investigate the complex issues of managed lanes in a comprehensive manner. The researchers provided results to TxDOT as tasks were completed to help ensure the timely implementation of findings into current projects, and they shared those results with the transportation community through an Internet site and electronic newsletter.

Four key products of note that this project produced were two position papers, a preliminary screening tool, and a handbook. One position paper, entitled Managed Lanes: More Efficient Use of the Freeway System (Product 4160-P1), provides policy makers with information about managed lanes, how they may be operated, the benefits of managed lanes, where successful projects have been implemented, and what TxDOT is planning for Texas. The second paper, entitled Managed Lanes: A New Concept for Freeway Travel (Product 4160-P2), is tailored to editorial staff, transportation reporters, and others in the media. By educating the media on this concept, this paper will place media representatives in a better position to accurately portray the concept to the general public. Both documents provide an effective means of communicating information about managed lanes to the target audiences.

A user-friendly preliminary screening tool was developed to assist TxDOT in identifying managed lane strategy options very early in the conceptual planning process. The framework for the decision support methodology is the backbone for the Managed Lanes Handbook (Report 0-4160-24). The handbook includes all of the project research in a usable format, providing a clear, concise, and step-wise approach to planning, designing, operating, and enforcing a managed lanes facility. It also refers the user to other pertinent documents that provide additional detailed information on various aspects of managed lanes, offer the resources and guidance to develop a managed lanes project, and address characteristics unique to individual facilities.

The Researchers Recommend…

The research team recommends that TxDOT encourage its personnel to use the Managed Lanes Handbook and other research

(Continued on page 12)

Rural Truck Traffic Needs

(continued from page 9)

sist statewide planning and the targeting of funding for those sections of highways passing through rural areas. Moreover, it will link into those generators within different parts of the state and ensure that the supply chains are not simply portions of the interstate but cover the movement of goods from origin to destination within a district network.

4. Install or expand Intelligent Transportation System (ITS) services (weather, accidents, incidents) along all truck corridors. Almost all medium to large trucking companies now have information technologies (IT) which allow the tracking of tractors and therefore more precise determination of fleet utilization and commercial opportunities for new business. The vehicles are capable of providing valuable information for highway management, and this is something that deserves further examination. As an example, the federal government has been evaluating the use of Freight Performance Measures (FPMs) to provide time/location information, which can then be translated to corridor speeds. In addition, FPMs are capable of transmitting other changes in the environment such as bad weather. FPMs offer the potential for transmitting useful information over the rural systems of ITS information, which will strengthen safety and efficiency for other truck users. If FPMs can be shared with truck dispatchers, there is a possibility of significantly improving not only the management of the rural system from a TxDOT perspective but also the operations systems of its users.

For More Details...

The research is documented in the following reports:

0-4169-1 Rural Truck Traffic and Pavement Conditions in Texas

0-4169-2 Defining and Measuring Rural Truck Needs in Texas

Research Supervisor: Robert Harrison, Center for Transportation Research, harrison@mail.utexas.edu, (512) 232-3113

TxDOT Project Director: William M. (Mike) Battles, P.E., Tyler District, mbattle@dot.state.tx.us, (903) 510-9241

TxDOT Research Engineer: Duncan Stewart, Ph.D., P.E., Research and Technology Implementation Office, dstewart@dot.state.tx.us, (512) 465-7648

To obtain copies of a report, contact CTR Library, Center for Transportation Research, ctrlib@uts.cc.utexas.edu, (512) 232-3126

Five Years of Research on Managed Lanes

(continued from page 11)

products from this project to develop managed lanes facilities that meet the mobility needs of Texans across the state. They also recommend that TxDOT consider opportunities in the future to sponsor additional research in the area of managed lanes to help answer both the questions that this project generated and those that will arise as more of these complex facilities become operational. Such an effort will help to continue to advance the state-of-the-art and state-of-the-practice in operations management and help secure TxDOT's leadership role in this endeavor.

Figure 1: Project Team Members

For More Details...

Visit the managed lanes website at http://managed-lanes.tamu.edu for a detailed listing of products developed throughout this project. Many of the products listed are available on-line in portable document file (PDF) format.

A complete product listing is available in Report 0-4160-25, Findings from Texas: Five Years of Research on Managed Lanes.

Research Supervisors: Beverly T. Kuhn, Ph.D., P.E., (979) 862-3558, b-kuhn@tamu.edu;

Ginger Daniels Goodin, P.E., (512) 467-0946, g-goodin@tamu.edu

TxDOT Project Director: Carlos Lopez, P.E., (512) 416-3200 clopez@dot.state.tx.us

TxDOT Research Engineer: Wade Odell, TxDOT, (512) 465-7403, wodell@dot.state.tx.us

To obtain copies of reports, contact Nancy Pippin, Texas Transportation Institute, TTI Communications, at (979) 458-0481 or n-pippin@ttimail.tamu.edu.

2006 TexITE Summer Meeting, College Station, Texas

Serious Board Meeting Action

The student presentation session was well attended

Hawaiian luau was a big success

The 2006 TexITE Summer Meeting was held in College Station, Texas between June 22 and 24, 2006.

TexITE Board held long discussions on June 22nd and 23rd discussing various topics. Dr. Ben Welch, Director of the Center for Executive Development, Mays Business School, delivered his speech on "The Proven Keys to Success" during the kickoff luncheon on Friday June 23rd. In addition to the technical programs, the tours, golf tournament and Hawaiian luau were a big success.

Finally, at the Business Luncheon on Saturday June 24th, District 9 awards as well as the election results were announced. Brian Jahn was elected to secretary-treasurer of TexITE. His term, as well as that of Jason Crawford (president) and Rick Charlton (vice-president), will begin on January 1, 2007. the following is a summary of the awards presented at the meeting:

- TexITE Transportation Engineer of Year award – William Jack Hatchell
- TexITE Young Member of the Year award – Brooke Ullman
- Section Activities Award – Greater Forth Worth Section
- Special Recognition Certificates –

  Outgoing Dallas Section Representative – Paul Luedtke

  Past Student Chapter Liaison – Robert Wunderlich
  Past Membership Committee Chair – Bill Thorpe
  Past Newsletter Editor – Emily Braswell
  Past Webmaster – Marc Jacobson

- Outstanding Students – Erin Eurek (TAMU), Jeff LaMondia (UT), Sasanka Pulapati (UTA), Bikash Gautam (UTEP) and Warren Curtis (TSU)
- Outstanding Student Chapter – Texas A&M University

Additional meeting photos can be accessed online at http://www.texite.org/Meetings/meetingphotos.php

City of Bryan Councilman Marc Conlee welcomes the crowd at Kickoff Luncheon

The TTI-Riverside campus tour was widely attended

John Denholm (seated), winner of poker tournament

Improving Safety and Operations of Traffic Signals near Railroad Grade Crossings with Active Warning Devices

Authors: Kevin N. Balke, Roelof J. Engelbrecht, Srinivasa R. Sunkari, and Steven P. Venglar

While the number of collisions at railroad crossings declined between 2000 and 2004, the proportion of these collisions occurring at crossings protected by automatic gates has remained relatively constant. During 2000 alone, 93 incidents occurred at grade crossings protected by gates, resulting in 4 fatalities and 37 injuries. In 2004, these numbers had increased to 120 accidents, 9 fatalities, and 51 injuries. A significant portion of the collisions and fatalities occurred where a highway intersection was located within 150 feet of the crossing. **Figure 1** shows a common example of railroad-highway grade crossings adjacent to signalized intersections in Texas.

Figure 1: Typical Highway-Rail Grade Crossing in Texas

The objective of this research project was to increase safety and reduce disruption in coordinated operations along arterials with railroad preemption by improving the operation of traffic signal controllers near highway-railroad grade crossings. Significant safety concerns and operational problems exist at railroad highway grade crossings adjacent to signalized intersections. Current TxDOT procedures, in particular the *Guide for Determining Time Requirements for Traffic Signal Preemption at Highway-Rail Grade Crossings* worksheet, do not specifically address all these problems. This research project:

- determined safety, human factors, and operational problems at traffic signals near grade crossings;
- identified and evaluated potential solutions to these problems with regard to their effectiveness and applicability in Texas; and
- combined applicable solutions into a guideline document that will help TxDOT staff recognize and address the special circumstances associated with signals near grade crossings.

What We Did…

As part of this project, Texas Transportation Institute (TTI) researchers conducted a survey of operations engineers and practitioners in Texas and in key locations across the United States to determine the paramount safety and operational issues relating to highway railroad grading crossings. TTI researchers then identified and evaluated potential operational and human factor solutions to the safety problems identified through the survey. TTI completely revised the Texas Department of Transportation's (TxDOT's) *Guide for Determining Time Requirements for Traffic Signal Preemption at Highway-Rail Grade Crossings* to more accurately assess the required advanced warning time needed to address many of the safety issues at grade crossings. Guidelines were also developed for operating traffic signals near highway railroad grade crossings.

What We Found…

The results of the survey as well as past research identified a number of safety concerns at traffic signals near highway-rail grade crossings with active grade crossing warning systems. As shown in **Figure 2**, these included the following:

- abbreviating normal pedestrian clearance and minimum vehicle green times,
- gates descending on stationary vehicles or trapping those vehicles in queues on the tracks that could not go elsewhere,
- failure to consider the longer length and slower acceleration of heavy vehicles,
- not providing sufficient time between the last vehicle leaving the crossing and the train arriving at the crossing,
- non-supervised interconnect circuits and fail-unsafe traffic signal controller preempt inputs, and
- preemption over long distances.

Using hardware-in-the-loop simulation and other evaluation

(Continued on page 15)

Improving Safety and Operations of Traffic Signals near Railroad Grade Crossings with Active Warning Devices

(continued from page 14)

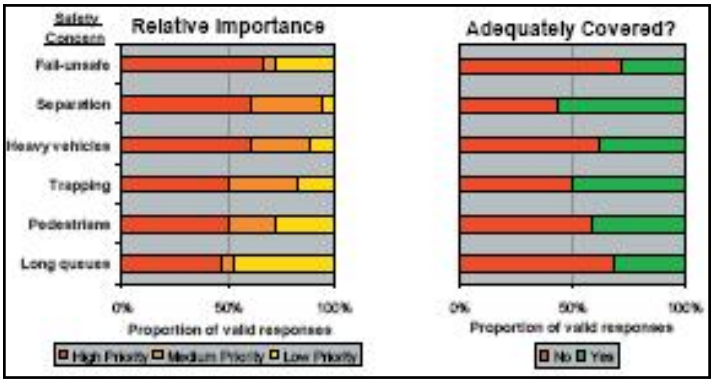

Figure 2: Summary of Critical Issues Associated with Traffic Signal Operations near Highway-Railroad Grade Crossings

tools, researchers developed and evaluated numerous operational strategies to address these issues. In conducting these evaluations, TTI researchers found that TxDOT's current procedures of computing train warning time requirements needed to be upgraded to address many of these concerns. The updated guide contains a number of improvements over the guide currently in use. The updated guide:

- provides a more detailed calculation of the right-of-way transfer time,
- bases queue clearance time calculation on the design vehicle concept,
- places greater focus on the effects of heavy-vehicle characteristics (length, acceleration, effect of grade),
- categorizes minimum separation time as a design input,
- includes a method for track clearance green time calculation, and
- includes a method to calculate the advance preemption time required to avoid gates descending on heavy vehicles.

The updated guide is available both as a regular, printable document and as a fillable form. The fillable form can be completed on the computer screen and printed, with calculations done automatically.

The Researchers Recommend…

The following recommendations were developed by TTI researchers to address the safety concerns at traffic near highway-rail grade crossings with active grade crossing warning systems.

Abbreviating normal pedestrian clearance and minimum green times

The Texas Manual on Uniform Traffic Control Devices for Streets and Highways (TxMUTCD) allows for the shortening of minimum durations of the green and pedestrian clearance intervals at traffic signals that are interconnected with railroad grade crossing equipment (i.e., signals operating under preemption). Very little guidance is provided, however, as to when and how much these intervals can be shortened. TTI researchers recommend using 2 seconds of minimum green time during the transition into preemption. To quantify the need for full pedestrian clearance times, TTI researchers developed a Truncation Exposure (TE) index that determines the impact of pedestrian clearance time truncations. The TE defines the time, in pedestrian-seconds per day, that normal pedestrian clearance is truncated due to preemption, and provides an indication of the number of seconds during the day in which pedestrians have to clear the intersection unprotected due to clearance time truncations.

Gates descending on stationary vehicles or trapping vehicle in a queue on the tracks with nowhere to go

One cause of gates descending on stationary vehicles or trapping a vehicle in a queue on the tracks is a maximum normal preemption time that is more than the total warning time available from the railroad. The other cause of gates descending on stationary or trapped vehicles is the ending of the track clearance phase before the active grade crossing warning lights start to flash or the gates start to descend, blocking access to the crossing. At a minimum, TTI researchers recommend that duration of the track clearance green phase be no less than 15 seconds. A more accurate approach is to consider the observed or expected variation in advance preemption time together with the actual gate descent characteristics. Other strategies to ensure that vehicles are not trapped or the gates do not descend on stationary vehicles include minimizing the variation in the right-of-way transfer time, minimizing the variation in the advance preemption time, using a gate-down signal, and avoiding using the advance preemption.

Failure to consider longer lengths and slower acceleration of heavy vehicles

The queue clearance time has to be determined on the worst-case vehicle mix, which may include one or more design vehicles. As shown in **Figure 3**, trucks should be considered as the design vehicle at many grade crossings. The previous version of the guide used only a single design vehicle (usually a passenger car) for calculating warning time requirements. However, at many crossings, heavy vehicles or vehicles that are required by law to

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Improving Safety and Operations of Traffic Signals near Railroad Grade Crossings with Active Warning Devices

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Figure 3: Heavy Vehicles at Grade Crossings Have a Significant Impact on Operations

stop at the crossing (e.g., a school bus) should be the design vehicle. The updated guide provides a methodology for calculating the minimum queue clearance times based on the operating characteristics of different design vehicles.

Not providing sufficient time between the last vehicle leaving the crossing and the train arriving at the crossing

The time difference between when the last vehicle clears the crossing and the arrival of the train at the crossing is referred to as separation time. Separation time is generally considered part of the preemption sequence. It typically represents the time at the end of the preemption sequence after the signal has transferred the right-of-way to the approaching train and queued vehicles have cleared the tracks. Previously, separation time was considered a variable in the calculation of the required advance warning times. As a result, in the worst-case situation, separation time between vehicular traffic and the train arrival could be as low as zero seconds. Under the revised guide, a minimum separation time (fixed interval) is entered to increase the likelihood that at least a few seconds separate the last vehicle leaving the crossing and the train's arrival under all circumstances.

Non-supervised interconnect circuits and fail-unsafe traffic signal controller preempt inputs

Under the current state-of-the practice design of traffic signal and railroad interconnects, if the interconnect circuit is disrupted or disconnected, the traffic signal will not be alerted to the train continuing to approach the crossing once an initial preemption has occurred. This creates a "fail-unsafe" condition. What needs to occur is that when the interconnect circuit between the railroad warning equipment and traffic signal equipment breaks, the controller should automatically transition into preemption and remain in preemption even when a train is not present. This represents a "fail-safe" condition because the system fails in its most restrictive state (i.e., preemption).

Preemption over long distances

Preemption over long distances is especially difficult because of the need for long minimum preemption warning times and the time required to clear traffic off the tracks. The best strategy providing preemption over long distances is the use of a traffic signal timing plan at the intersection to ensure that queues at the traffic signal never back up far enough to block the grade crossing. In those situations where this cannot occur, the use of pre-signals (i.e., installing a separate traffic signal upstream of the railroad tracks) and the use of queue cutter signals (e.g., flashing beacons installed upstream of the grade crossing to alert vehicles that a train is approaching and to not stop on the tracks) are two strategies recommended for helping keep the track area free of queued traffic. TTI researchers recommend that the operations of both pre-signals and queue cutter signals be closely coordinated with the operations of the intersection traffic signal to ensure that the queue does not build over the crossing.

For More Details...

The research is documented in the report 0-4265-1, *Engineering Solutions to Improving Operations and Safety at Signalized Intersections near Railroad Grade Crossings with Active Devices*

Research Supervisor: Roelof J. Engelbrecht, TTI

TxDOT Project Director: David Valdez, TxDOT, (512) 416-2642, dvaldez@dot.state.tx.us

TxDOT Research Engineer: Wade Odell, TxDOT, (512) 465-7403, wodell@dot.state.tx.us

To obtain copies of reports, contact Nancy Pippin, Texas Transportation Institute, TTI Communications, at (979) 458-0481 or n-pippin@ttimail.tamu.edu.

Newsletter Articles

To submit an article or a news item
for future newsletter publications, please send information to
Praveen Pasumarthy at
vpasumarthy@wilbursmith.com
or contact him at 713-785-0080 ext. 56

Safety Evaluation of Red-Light Cameras

Researchers: Forrest M. Council & Kimberly Eccles, BMI-SG; Bhagwant Persaud & Craig Lyon, Ryerson University; Michael S. Griffith, FHWA

Editor's Note: Due to size restriction of the Newsletter, only a brief summary of the research work is presented here. Extreme care has been taken to present the results/conclusions of the authors without modifying the original intent. For further information on the research work, please refer to the report Safety Evaluation of Red-Light Cameras, FHWA-HRT-05-048, published by the Federal Highway Administration in April 2005.

The editor thanks Ned Levine, Transportation Safety Coordinator, H-GAC for informing him about various research articles on the red light issue.

Introduction

The fundamental objective of this research was to determine the effectiveness of red-light-camera (RLC) systems in reducing crashes. This study included collecting background information from literature and other sources, establishing study goals, interviewing and choosing potential study jurisdictions, and designing and carrying out the study of both crash and economic effects. The study involved a before-after research using data from seven jurisdictions across the United States to estimate the crash and associated economic effects of RLC systems.

Methodological Basics

The general crash effects analysis methodology used in this research is different from those used in past RLC studies. This study benefits from significant advances made in the methodology for observational before-after studies, described in a landmark book by Hauer. The book documented the EB procedure used in this study. The EB approach sought to overcome the limitations of previous evaluations of red-light cameras, especially by properly accounting for regression to the mean, and by overcoming the difficulties of using crash rates in normalizing for volume differences between the before and after periods.

Figure 1: A photo taken from a camera of a crash involving red-light running

The analysis of economic effects fundamentally involved the development of per-crash cost estimates for different crash types and police-reported crash severities. In essence, the application of these unit costs to the EB crash frequency effect estimates. The EB analysis was first conducted for each crash type and severity and site before applying the unit costs and aggregating the economic effect estimates across crash types and severity and then across jurisdictions. The estimates of economic effects for each site allowed for exploratory analysis and regression modeling of cross-jurisdiction aggregate economic costs to identify the intersection and RLC program characteristics associated with the greatest economic benefits of RLC systems.

Data Collection

The choice of jurisdictions to include in the study was based on an analysis of sample size needs and the data available in potential jurisdictions. It was vital to ensure that enough data were included to detect that the expected change in safety has appropriate statistical significance. The final selection of seven jurisdictions was made after an assessment of each jurisdiction's ability to provide the required data. The jurisdictions chosen were El Cajon, San Diego, and San Francisco, CA; Howard County, Montgomery County, and Baltimore, MD; and Charlotte, NC. The study included 132 treatment sites, and specially derived rear end and right-angle unit crash costs for various severity levels.

Conclusions

This statistically defendable study found crash effects that were consistent in direction with those found in many previous studies, although the positive effects were somewhat lower that those reported in many sources. The conflicting direction effects for rear end and right-angle crashes justified the conduct of the economic effects analysis to assess the extent to which the increase in rear end crashes negates the benefits for right-angle crashes. This analysis, which was based on an aggregation of rear end and right-angle crash costs for various severity levels, showed that RLC systems do indeed provide a modest aggregate crash-cost benefit.

The opposing effects for the two crash types also implied that RLC systems would be most beneficial at intersections where

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Safety Evaluation of Red-Light Cameras

(continued from page 17)

there are relatively few rear end crashes and many right-angle ones. This was verified in a disaggregate analysis of the economic effect to try to isolate the factors that would favor (or discourage) the installation of RLC systems. That analysis revealed that RLC systems should be considered for intersections with a high ratio of right-angle crashes to rear end crashes, higher proportion of entering AADT on the major road, shorter cycle lengths and inter-green periods, one or more left turn protected phases, and higher entering AADTs. It also revealed the presence of warning signs at both RLC intersections and city limits and the application of high publicity levels will enhance the benefits of RLC systems.

The indications of a spillover effect point to a need for a more definitive study of this issue. That more confidence could not be placed in this aspect of the analysis reflects that this is an observational retrospective study in which RLC installations took place over many years and where other programs and treatments may have affected crash frequencies at the spillover study sites. A prospective study with an explicit purpose of addressing this issue seems to be required.

In closing, this economic analysis represents the first attempt in the known literature to combine the positive effects of right-angle crash reductions with the negative effects of rear end crash increases and identify factors that might further enhance the effects of RLC systems. Larger crash sample sizes would have added even more information. The following primary conclusions are based on these current analyses:

Even though the positive effects on angle crashes of RLC systems is partially offset by negative effects related to increases in rear end crashes, there is still a modest to moderate economic benefit of between $39,000 and $50,000 per treated site year, depending on consideration of only injury crashes or including PDO crashes, and whether the statistically non-significant shift to slightly more severe angle crashes remaining after treatment is, in fact, real.

Even if modest, this economic benefit is important. In many instances today, the RLC systems pay for themselves through red-light-running fines generated. However, in many jurisdictions, this differs from most safety treatments where there are installation, maintenance, and other costs that must be weighed against the treatment benefits.

The modest benefit per site is an average over all sites. As the analysis of factors showed, this benefit can be increased through careful selection of the sites to be treated (e.g., sites with a high ratio of right-angle to rear end crashes as compared to other potential treatment sites) and program design (e.g., high publicity, signing at both intersections and jurisdiction limits).

Notice

Availability

The report may be obtained from the FHWA Report Center by e-mail to report.center@fhwa.dot.gov, by fax to 301–577–1421, or by phone to 301–577–0818.

Get Involved in the Legislative Process

(continued from page 4)

research on any part of the legislative process and also facilitates an email alert to you when bills come up for hearings.

I challenge each of you to undertake these three steps to improve our profession:

1. Vote for the candidate that most matches your views in November.

2. Keep informed on what is happening in Austin for the 80th Legislative Session.

3. Call, visit, write or email your representative your views on the proposed bills.

By

Walter Ragsdale

Message from International President

(continued from page 3)

As always, I ask that you let me know if I can do anything to make sure ITE is helping to make you a better professional. In return, I ask that you look for ways to participate in ITE to make your profession stronger.

Sincerely,

Robert Wunderlich

Improved Quantification of High Occupancy Vehicle (HOV) Lane Delay Savings

Authors: David W. Fenno, Robert J. Benz, Michael J. Vickich, LuAnn Theiss, and Stephen E. Ranft

High occupancy vehicle (HOV) lanes are commonly evaluated using travel time studies. These studies are typically conducted infrequently and under non-incident conditions due to the cost and manpower required to conduct manual studies. A literature review did not identify any evaluations of HOV lanes under incident conditions.

Due to the high occurrence of incidents in large urban areas where HOV lanes are more likely to be implemented, travel time studies conducted under non-incident conditions underestimate the true benefit of the HOV lanes. The prevalence of incidents is seen in Houston, where in 2003, an average of only 17 percent of morning peak periods and 10 percent of afternoon peak periods were found to be incident free on a given day on any of the four HOV corridors studied.

What We Did…

The primary focus of this research was to examine HOV lane travel time savings for barrier-separated HOV lanes in Houston and HOV lane travel time savings for buffer separated HOV lanes in Dallas during incident conditions. The goal of the project was to determine the additional benefit provided by HOV lanes during incident conditions. An additional task also looked at the feasibility of opening the HOV lane to mainlane traffic during certain mainlane incidents.

For the Houston barrier-separated analysis, researchers:

- categorized 9506 incidents in the 2003 Regional Incident Management System (RIMS) database by characteristics such as corridor and direction, cross-section location, severity, number of vehicles, time of day, day of week, etc.;
- created an incident matrix based on extent of lane blockage and duration of incident;
- developed a Travel Time Generator Software program to analyze historical automatic vehicle identification (AVI) data to compute corridor travel times;
- developed selection criteria to identify incidents for further analysis;
- analyzed a total of 341 individual incidents in four HOV lane corridors covering a range of incidents in the incident matrix; and
- quantified the dollar value of HOV lane travel time savings using an entire year of AVI data (minus holidays and two flooding events), which include both incident and non-incident conditions for 2003.

For the Dallas buffer-separated analysis, researchers:

- videotaped 569 peak period incidents on one buffer-separated HOV corridor using Dallas Traffic Management Center cameras;
- categorized these incidents by characteristics such as incident location, direction, time period, cross-section location, longitudinal direction, type of incident, duration, etc.;
- created an incident matrix based on extent of lane blockage and duration of incident;
- acquired corresponding Autoscope speed data and calculated travel times between camera locations; and
- evaluated a limited number of incidents due to unanticipated speed and travel time data limitations.

For the task that studied opening HOV lanes to all traffic during certain mainlane incidents, researchers:

- performed a literature review and identified current diversion policies of various HOV operators;
- developed a matrix of 16 scenarios with four variables and analyzed the feasibility of opening HOV lanes to mainlane traffic during mainlane incidents for each scenario; and
- developed a decision-making tool for in-field agents on whether or not to open the HOV lanes to mainlane traffic during certain mainlane incidents.

What We Found…

For the Houston barrier-separated analysis, each of the 341 incidents was analyzed to compare HOV and mainlane travel times throughout the peak period, and a series of graphs were produced depicting the travel time savings. **Figure 1** shows an example of the HOV and mainlane travel times, while **Figure 2** shows the HOV travel time savings corresponding to a single incident from the incident matrix.

Averaging data from all 341 incident evaluations showed that

(Continued on page 20)

Improved Quantification of High Occupancy Vehicle (HOV) Lane Delay Savings

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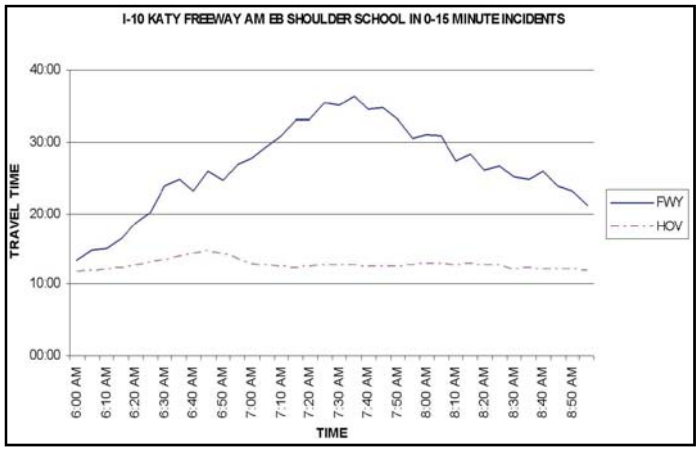

Figure 1: Mainlane versus HOV Lane Travel Times

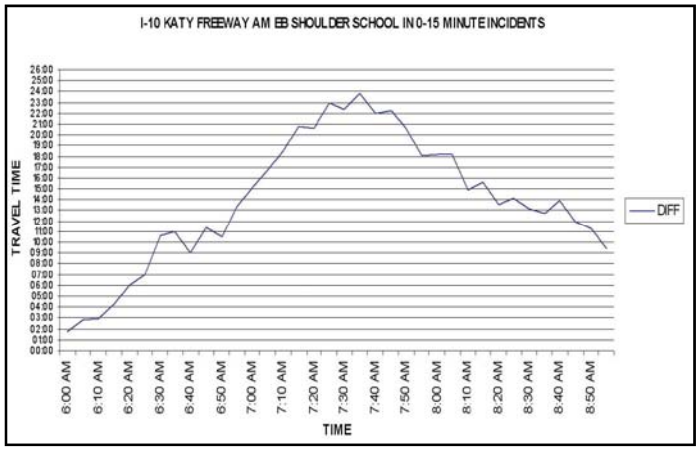

Figure 2: HOV Lane Travel Time Savings

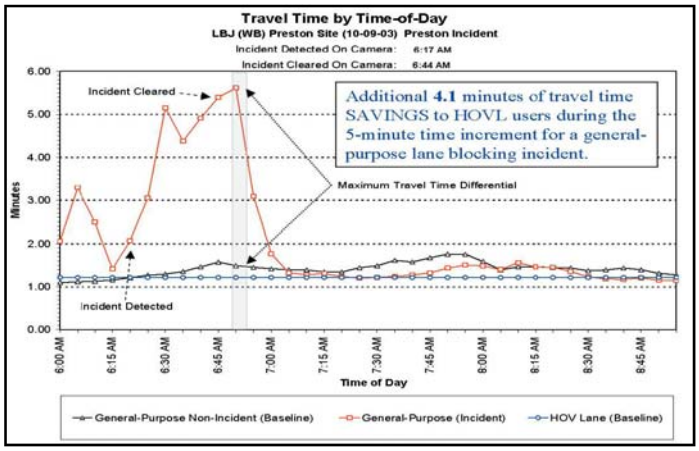

Figure 3: Additional HOV Lane Travel Time Savings

HOV lanes provide an additional 74 percent travel time savings during incident conditions over non-incident conditions. The maximum travel time savings during incident conditions ranged up to 64 minutes in the morning peak period and 49.5 minutes during the afternoon peak period. An analysis of the entire year of 2003 AVI data, which include incident and non-incident conditions, estimated the benefit of Houston HOV lanes in the four corridors analyzed at approximately $38 million per year. The Katy Freeway HOV lane showed the greatest incident and non-incident delay savings at nearly $80,000 per day or $20.5 million per year.

For the Dallas buffer-separated analysis, each incident was analyzed to compare the HOV and mainlane travel times. However, only a few incidents could be analyzed from each matrix cell, a total of 64 incidents. Graphs were produced showing the travel time savings for each general-purpose lane incident. **Figure 3** shows an example of the HOV and mainlane travel times during a typical incident.

Incidents blocking one or more of the general-purpose lanes showed a maximum additional travel time savings to HOV lane users of 10 minutes per vehicle for incidents with a lane blockage of nearly one hour. Shorter duration incidents produced less additional travel time savings. Incidents causing the HOV lane to be blocked, due to the incident itself or to responding emergency vehicles, resulted in HOV lane users experiencing at least as much if not more delay than that experienced by general-purpose lane users. An unanticipated result of this research was the observation that during certain mainlane incidents the HOV lane operated effectively until emergency vehicles arrived on the scene.

Of the 16 scenarios explored for opening HOV lanes to mainlane traffic during certain mainlane incidents, only four scenarios showed a positive benefit. All four of these scenarios involved a low level of HOV utilization. Without low HOV volumes, no significant capacity is available for diversion, and the corridor becomes a poor choice for carrying incident based traffic from the general purpose lanes. Three of these four scenarios also involve high incident severity in the mainlanes, implying that the incident will be in place for an extended period of time. A diversion decision in the case of a low-severity incident should be made only when general purpose lane blockage is likely to be high. In this situation, even if the incident can be cleared relatively quickly, multiple lane blockages may cause residual upstream traffic congestion for an extended period of time.

(Continued on page 21)

Improved Quantification of High Occupancy Vehicle (HOV) Lane Delay Savings

(continued from page 20)

The Researchers Recommend…

Based on the results of this research, researchers make the following recommendations:

- This research showed the additional travel time savings HOV lanes provide under incident conditions. Evaluations of HOV lanes should consider the impact of incidents in the analysis, which provides additional travel time savings to HOV lane users over typical non-incident travel time savings.
- The combined incident matrix results from the barrier-separated analysis in Houston can be utilized as a starting point for estimating the additional travel time savings provided by barrier-separated facilities during incident conditions with given corridor characteristics.
- In Houston, where continuous AVI data are available, HOV benefits based on travel time savings should take advantage of these data as they contain both incident and non-incident speed conditions and more accurately reflect the true benefits of the HOV lanes.
- Several suggestions for incident response techniques on buffer-separated HOV lanes are offered for maintaining HOV lane operation during incident conditions including preferred placement of emergency vehicles in Report 0-4740-2, Additional High-Occupancy Vehicle Lane Delay Savings Calculated for Incidents on IH-635 (LBJ Freeway) in Dallas, Texas.
- Agencies that operate HOV lanes need to have procedures in place based on defensible engineering practices for opening HOV lane facilities during certain mainlane incidents.
- The qualitative tool developed by researchers may be used to assist in the evaluation of the appropriateness of diverting general-purpose lane traffic to HOV lanes during certain mainlane incidents.

For More Details…

The research is documented in the following reports:

Report 0-4740-1, Quantification of Incident and Non-Incident Travel Time Savings for Barrier-Separated High-Occupancy Vehicle (HOV) Lanes in Houston, Texas

Report 0-4740-2, The Effects of Incidents on Concurrent Flow High Occupancy Vehicle Lane Delay on IH-635 (LBJ Freeway) in Dallas, Texas

Report 0-4740-3, Improved Quantification of High Occupancy Vehicle (HOV) Lane Delay Savings: Year Two Results

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To obtain copies of reports, contact Nancy Pippin, Texas Transportation Institute, TTI Communications, at (979) 458-0481 or n-pippin@ttimail.tamu.edu.

Texas Fun Facts

- The world's first rodeo was held in Pecos on July 4, 1883.
- In 1893 Amarillo's population was listed as "between 500-600 humans and 50,000 head of cattle."
- Texas comes from the Hasinai Indian word tejas meaning friends or allies.
- The Amarillo airport has the 3rd largest runway in the world and is designated as an alternate landing site for the space shuttle.
- Texas has a total of 6,300 square miles of inland lakes and streams, second only to Alaska.

News You Can Use

- ITE's new design manual, *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*, demonstrates how major urban streets can support walkable and bikeable communities, compact development and mixed land uses. An electronic copy of this document, along with additional information, is available online at http://www.ite.org/css
- Texas Board of Professional Engineers posted proposed board rules on its website at http://www.tbpe.state.tx.us/. The Board welcomes your comments on the rule changes until October 15, 2006. Some of the topics include taking the PE exam early, listing areas of competency, exam collusion and firm registration.

Section News & Activities

Participation in local TexITE Sections is a great opportunity to interact with fellow transportation professionals. Each Section has a website with contact information, if you are interested in becoming a member of your local Section.

Brazos Valley Section

The Section successfully organized the 2006 TexITE Summer Meeting in Bryan-College Station. The members usually meet once a month. For further details, please visit http://texite.org/bv/index.html

Capital Area Section

The Section's last meeting on August 4, 2006 was held at the 3M Austin Innovation Center, 6801 River Place Blvd in Austin. Our speaker was Alex Barrientes from 3M's Traffic Safety Systems Division. Mr. Barrientes provided information on the past and current automobile headlight properties and designs which affect sign sheeting.

Also at the August meeting, the revised bylaws were approved by the members of the Capital Area Section. These bylaws were then submitted to the TexITE Board for adoption at their October meeting.

The Section is looking for different locations to hold future meetings. If you would like to volunteer your office, please contact James Kratz at James.Kratz@cb.com. Suggestions regarding meeting topics and speakers are also welcome.

Greater Dallas Section

The Dallas Section recently adopted a 2-mile section of SH66 in Garland for their Adopt a Highway Program. They had a successful clean up event on Saturday, September 9th with nine participants who braved the heat.

This Section holds meetings on the second Thursday of each month. Previous monthly meetings were held on July 14th and August 31st, 2006.

Greater Fort Worth Section

The Fort Worth Section meets each month at Joe T. Garcia's in Fort Worth for a noon-hour meeting. Next meeting is scheduled for October 19th, 2006. Jerry Hodge from City of Grapevine will speak on Funnel Project at this meeting.

Greater Houston Section

The board recently approved money for a scholarship for studies in Traffic and Transportation Engineering. Please turn to page 5 for further details.

The section has been holding ITE webinars at TranStar. So far two webinars were conducted and more are being planned.

Volunteers are still needed for the 2007 TexITE Winter Meeting in Houston. If you would like to volunteer , please e-mail Stuart Corder at scorder@dot.state.tx.us

The annual Houston Section Shrimp Boil will be held on October 21, 2006 at Spring Creek Park. Please turn to page 5 for further details.

Ned Levine from H-GAC spoke about "The Houston-Galveston Traffic Safety Planning Program" at the September Section meeting.

South Texas Section

You can find more information about South Texas Section and their monthly meetings at www.texite.org/southtexas/

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Student Chapter/University News

Congratulations to all the students who graduated recently. Students, as you graduate and begin your careers, please remember to update your contact information with TexITE. This can be done online in the "Members Only" section of the TexITE website, http://www.texite.org. To the future employers, student resumes are available on CDs and are distributed at the TexITE Meetings.

Texas A&M University

Dr. Luca Quadrifoglio joined the Transportation Engineering Division as an assistant professor. His research interests focus on public transportation, logistics operations research, scheduling algorithms, stochastic processes, optimization and decision analysis.

Texas Transportation Institute (TTI) has been named lead agency for the Southwest Region University Transportation Center (SWUTC), overseeing an annual $2 million dollar grant for the next four years.

The Board of Regents of the Texas A&M University System has unanimously selected Dr. Dennis L. Christiansen as the sole finalist for the position of director of the Texas Transportation Institute (TTI). When appointed, Christiansen, the current deputy director of TTI, will succeed Dr. Herbert H. Richardson, who is retiring after 22 years of service to the A&M System.

On Friday October 27, SWUTC will sponsor a field trip to the TxDOT Bryan District for interested undergraduate and graduate students. In this trip, students will get a chance to attend presentations made by key district staff explaining various sections of the district . The students will also tour the district complex.

Some of the past and future speakers at the Student Chapter's monthly meetings include:

- September 25, 2006: John Breeding, President of Uptown Houston Business District Association spoke on the role of business community in planning, designing, funding and implementing public and private sector improvements in Uptown Houston, the 14th largest business center in the U.S.
- October 11, 2006: Mike Aulick, Executive Director, Capital Area Metropolitan Planning Organization, Austin, TX will speak on Transportation Challenges in a Rapidly Growing Region
- November 7, 2006: Joe Ternus, P.E., Bastrop County Traffic Engineer will speak on Traffic in urban and rural areas and the role of county governments

Texas Southern University

The Department of Transportation Studies at Texas Southern University (TSU) selected DriveSafety's DS-600c with QMotion (tm) as a research tool to help improve urban traffic and air quality issues. The DriveSafety DS-600c simulator is a simulation system which research studies have shown to effectively approximate driving in the real world.

University of Texas at Austin

A research team led by Kevin Folliard has been awarded one of TxDOT's Top Research Innovations and Findings for 2005. The research project, TxDOT Project 0-4563 "Prediction Model for Concrete Behavior," has led to the development of ConcreteWorks, a suite of Windows®-based concrete technology programs.

Dr. C. Michael Walton has received a national award from the Council of University Transportation Centers in recognition of Dr. Walton's "significant and outstanding contributions to university transportation education and research resulting in a lasting contribution to transportation."

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People News

Brazos Valley Section

Congratulations to Brazos Valley Section Representative **Srinivasa Sunkari**. At the ITE Annual Meeting in Milwaukee, Srini received the Traffic Engineering Council Award for Outstanding Council Project. The project report was entitled *Benefits of Retiming Traffic Signals: An ITE Informational Report*.

Kimley-Horn and Associates, Inc. will be opening up an office in College Station, Texas in August of 2006. **Mike Moore** will be moving to College Station to lead this effort.

Greater Dallas Section

Lloyd Denman, Program Manager for Transportation Engineering, City of Dallas, recently celebrated the birth of a son, Colson Scott. Colson was born on August 8th and weighed in at 7 lbs. 15 oz. and was 21 ½ inches long.

Baby Jack Robert Kroll was born to **Julie Kroll, P.E.** of DeShazo Tang & Associates on July 8, 2006. Jack was 6lb 10oz. at birth.

G. David Nevárez, E.I.T. of DeShazo Tang & Associates married Priscilla Medina from his home town in El Paso, Texas on Saturday July 22, 2006.

Civil Associates, Inc. (CAI) is pleased to announce the addition of **Larry W. Cervenka, P.E.** as Director of Traffic Engineering Services. Larry, a 35-year veteran of the transportation engineering industry, is a licensed professional engineer in the State of Texas.

Mark Titus was promoted to the position of Program Manager for the Transportation Management Systems (TMS) Program at the City of Dallas. Mark is a licensed professional engineer and has worked for City of Dallas for 21 years.

Greater Houston Section

Congratulations to **Rosely Marmentini, PE**, of Brown and Gay Engineers, Inc. who obtained her professional engineer's license this past spring.

Rebecca Spaeth, EIT, from Texas A&M, recently joined Brown & Gay's Traffic Department, which now has a staff of 18.

Nathan New, EIT, Barry Vanderwalt, PE, Don Durgin, PE (Nevada), **Sejla Bakalovic, PE** and **Mike Moore, PE** joined the Houston office of Kimley-Horn and Associates, Inc.

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