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1.) Case Study of a University-Transportation Agency Partnership: Assessing Traffic Safety Culture Initiatives in Iowa - Chris Albrecht

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Summary

Vehicle crashes rank among the leading causes of death in the United States. In 2006, the AAA Foundation for Traffic Safety made a long-term commitment to address the traffic safety culture of the United States by launching a sustained research and educational outreach initiative. Since this time, efforts to improve safety culture have been undertaken in several states across the nation. In Iowa, the initiative to produce a culture of safety includes the Iowa Comprehensive Highway Safety Plan (CHSP). The Iowa CHSP "engages diverse safety stakeholders and charts the course for the state, bringing to bear sound science and the power of shared community values to change the culture and achieve a standard of safer travel for our citizens."

Despite Iowa's ongoing efforts toward highway safety, an average of 445 deaths and thousands of injuries occur on Iowa's public roads each year. As such, the Iowa Department of Transportation (DOT) and the Institute of Transportation at Iowa State of University conducted a research project that revisited the concept of safety culture from the diverse perspectives of several disciplines; including public health, education, enforcement, public policy and advocacy, social psychology, and civil engineering.

The research project included four major tasks. First, a technical advisory committee was established (Task 1). The members of the committee were identified in consultation with representatives of the Iowa DOT Office of Traffic and Safety. The next step was a literature review that summarized the best practices and effective laws of improving traffic safety culture (Task 2). These practices and laws were based on local, regional, national, and international resources. The basis for categorizing the policy areas was the traditional "Four Es" that are used to describe highway safety: Education, Engineering, Enforcement, and Emergency Medical Service (EMS).

During the next phase of the project, the research team conducted expert interviews to solicit the opinions of additional experts on improving the traffic safety culture in Iowa (Task 3). Candidate experts were knowledgeable persons in a variety of areas; including public health, education, public policy, social psychology, enforcement, and engineering. Interviews were conducted as part of a focus group session, discussions at the Iowa Traffic and Safety Alliance (ITSA) meeting in February 2010, and telephone interviews. The critical issues that the interviewees pointed out, each from different perspective according to his/hers corresponding discipline, can be easily categorized by using the "Four Es" and are discussed next.

The vast majority of the experts underlined the importance of education. Some of the issues that were discussed include the entry level age to drive in Iowa, the state's minimum driving hours to receive driver education, and the need for continuing education and safety training. The topic of continuing education was discussed for senior citizens, but experts in motorcycle and commercial vehicle advocacy pointed out the inadequate rider training and the reluctance that commercial drivers show to report any medical (or fatigue) conditions which will make them inappropriate to drive. In addition, an important issue mentioned by most of the interviewees was the overall attitude of public towards traffic safety. The lack of personal responsibility, the risk tolerance, the acceptance of a death resulting from a crash, and the distracted driving were on the top of the list. It is also notable that many experts paid special attention to the role of the parents in keeping their children safe both riding as a passenger in a vehicle and as responsible drivers.

Concerning engineering, a major issue noted was the lack of public understanding about the benefits of safety countermeasures; such as roundabouts, rumble strips, and median cable barriers. Also, gravel road experience, conspicuity of farm vehicles, and rural lighting were identified. In terms of enforcement; it was indicated that there is a need for stronger enforcement of the GDL system, distracted driving, use of safety belt, and driving under the influence; especially during the night and in rural areas. Finally, the lack of emergency medical service infrastructure was noted as a major concern in Iowa. The main cause of this problem is that EMS is not a required service in Iowa, thus the majority of EMS providers are non-compensated and cannot cover the extent of emergency calls, especially in rural areas.

Overall, it was apparent from the expert input that special attention should be given to rural driving safety, as rural driving culture and driving environment are different that those in urban areas; such as lower use of safety belts and differences in driving on gravel roads, combined with the lack of relevant education, adequate enforcement, and EMS in rural areas.

After compiling and aggregating the safety culture issues identified through the focus group meeting and the interviews, a list of 11 high-level goals was created (Task 4). With considerable input from the experts, these goals were discussed in greater detail and potential actions to meet the objectives were identified for each goal. These potential actions summarize what experts believe would be most important when addressing the higher-level goals. The goals are: improve emergency medical services (EMS) response, toughen law enforcement and prosecution, increase safety belt use, reduce speeding-related crashes, reduce alcohol-related crashes, improve commercial vehicle safety, improve motorcycle safety, improve young driver education, improve older driver safety, strengthen teenage licensing process, and reduce distracted driving.

Considering the above, this poster will summarize the findings from the interviews and will present the 11 high-level goals that were developed, each in line with Iowa's CHSP and with specific actions to support its success.

2.) Improving Rural Roadway Safety Programs through a University-Public School Collaboration - Lawson Bordley

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Summary

Over the period of two days in March of 2011, a team of five graduate student researchers from the University of Tennessee-Knoxville (UTK) hosted 71 teenagers from two rural Tennessee schools for a pilot test of a rural driver education project. The goals of the Rural Teen Driver Education Program (RTDEP) are to develop methods for making teens more conscientious and safe while driving by focusing on distracted driving and seat belt use and to teach the participants to be safer drivers using the basics of science and engineering. This program also served as a leadership development platform for the graduate student researchers and instructors who created and implemented the project in its entirety. In addition to the academic research aspect of this project, the program received widespread local news coverage. The pilot test program effectiveness showed promising results. Phase II of the program includes a strong emphasis on observational data collection in order to critically analyze short and long term program impacts on teen driver safety behaviors.

Upon arriving on the campus of UTK, the high school students participated in a classroom lecture, which examined the stopping sight distance formula and explored its relationship to distracted driving. The teens also faced an emergency driving scenario operating the University's driving simulator while talking and texting on a mobile phone. Additional classroom exercises explored Tennessee Department of Safety crash data and statistics (specific to their county of origin) to learn firsthand the numbers of crashes "close to home" and their respective causes. Several weeks later the graduate researchers returned to the partner schools to discuss the results from the simulator exercise, showing the teens the stopping distance and lane position data indicating their diminished driving capabilities. The results of a self-reporting survey given to the students during the initial visit were also discussed, focusing on the participants' low seat belt use responses. Basic math and physics were used to show the teen participants explicitly the true risks they were taking by not using occupant protection.

Teen driver safety issues are a nationwide concern. Rural teen drivers often face a different set of challenges than their urban peers. Rural roads often have higher design speeds and lower adherence to design standards. Medical response times are often significantly longer in rural areas as well. Distracted driving is a safety issue that is receiving an ever-increasing amount of coverage in the media. Not surprisingly, the RTDEP received widespread coverage in the local media. Each of the three local television stations produced feature stories, as did one partner school hometown newspaper. The

graduate researchers were interviewed by local radio and Iowa State University's online transportation magazine for teens Go! Transportation.

This project was developed and implemented entirely by graduate students at the University of Tennessee. The initial funding was secured by winning first place in a contest hosted by the URS Corporation for student engineering clubs at UTK. The Tennessee Section of the Institute of Transportation Engineers provided additional funding, and the Southeastern Transportation Center matched all private funding.

The initial results showed large decreases in the self-reported willingness to use portable electronic devices while driving. Phase II of this project is currently underway (fall 2011) whereby researchers will return to one of the partner schools and continue these educational efforts with a four day mini-course. Roadside data will be collected prior to and after the students participate in the course to determine further the impact the course may have on seat belt use and the use of portable electronic devices while driving. Additional project goals are to evaluate the short and mid term impacts of this education program on driver behavior and safety while simultaneously exposing students to transportation engineering related principles and attracting a future generation of transportation professionals.

3.) Plan4Safety - Evan Bossett

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Summary

Developed by the Transportation Safety Resource Center (TSRC) at Rutgers University's Center for Advanced Infrastructure and Technology (CAIT) and funded by the New Jersey Department of Transportation (NJDOT), Plan4Safety is a web-based, comprehensive crash analysis software application that provides decision support for New Jersey safety engineers, police officers, planners, researchers, and educators.

Partnering with the New Jersey State Police - Bureau of Safety Programs (BSP) and the New Jersey Department of Transportation (NJDOT), Plan4Safety's comprehensive database allows for the most accurate data available to be distributed to the local, county, and state levels to effect safety throughout the state's massive roadway networks. Each and every reported crash in New Jersey from 2003 onward is included in the over one million crash records in the Plan4Safety program. Working with the TSRC, a New Jersey Bureau of Safety Programs (BSP) team is assigned solely to data collection and entry work with multiple fact-checking resources and state-of-the-art comparison software.

The vitality of the software's effectiveness thrives on accuracy. Due to the reliability of the data, New Jersey organizations use Plan4Safety to display various aspects of traffic and crash data. In particular, the Brain Injury Association of New Jersey (BIA NJ) uses Plan4Safety data to visually display the many different types of teenage crashes on a GIS map to inform parents and teens in New Jersey about all the dangers and precautions that should be taken before a teenaged driver takes the wheel.

The "Red Light Running Automated Enforcement" initiative, an operational New Jersey pilot-program designed to test the effectiveness of traffic light cameras, utilizes Plan4Safety as its primary data resource in eight of the twelve pilot municipalities, including: Jersey City, Edison, New Brunswick, Linden, East Brunswick, Roselle Park, Piscataway, and Stafford.

Other Plan4Safety user organizations include the Metropolitan Planning Organizations (MPOs), the New Jersey Department of Transportation (NJ DOT) and many other state, county, and local enforcement and planning agencies. The High-Risk Rural Road (HRRR) program exists upon a federally-approved methodology and utilizes Plan4Safety's ranking feature to identify and ultimately improve high-risk rural roads, which typically experience more severe crashes.

Finally, Plan4Safety allows TSRC engineers to participate with local, county, and state engineering and law enforcement offices to provide data for field assessments, or road safety audits (RSA), which clearly identify safety issues that can be improved.

4.) Evaluating the Safety Implications of Innovative Bicycle Facilities - Jennifer Dill

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Summary

The number of cyclists in Portland has increased dramatically over the past ten years, and the City of Portland expects cyclist numbers to continue to increase dramatically over the next two decades. In order to more safely accommodate existing cyclists and to encourage future riders with safe, attractive routes, the Portland Bureau of Transportation (PBOT) has implemented a number of innovative facilities intended to improve cycling conditions, particularly in the downtown area. Since 2008, PBOT, Portland State University (PSU), and the Oregon Transportation Research and Education Consortium (OTREC) have collaborated on the evaluation of a number of these bicycle facilities to see how they are working, what the safety effect has been, and what improvements can be made. Completed assessments include: 1) an evaluation of green bike boxes installed in 2008 around the Portland downtown core; 2) a seven block cycle track separated from motor vehicle traffic by a lane of parked cars; and, 3) a couplet of wide buffered bike lanes running east-west through the Portland downtown core. A second phase bike box study is underway at PSU and PBOT, which, as with the initial phase, received matching funding from OTREC and PBOT. For each facility, PBOT collected video of the facility locations before and after treatment, which PSU analyzed for user behavior, interactions or conflicts between users, and other metrics. PSU also conducted surveys of effected user groups to assess how the facilities were being understood, used and perceived. This poster highlights the facilities that have been evaluated, including brief discussions of key evaluation methods, metrics, and findings. Through these evaluations, the City of Portland, PSU, and OTREC have developed of a strong collaborative relationship which has allowed PBOT to explore new approaches to improving cyclist safety in Portland while expanding the base of knowledge about how such facilities operate in an American city. Further, PBOT's commitment to funding bicycle safety research as PSU has allowed the university to bring hire faculty with transportation safety expertise. Finally, the City of Portland and other agencies throughout the United States are taking the findings of these evaluations into account to build the next generation of bicycle facilities designed to provide a safe and comfortable riding experience to increasing numbers of cyclists, and the methodologies developed for these evaluations are informing research examining other innovative bicycle facilities.

5.) Collaborative Approaches to Implementing FHWA's Interactive Highway Safety Design Model (IHSDM) - Michael Dimaiuta

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Summary

FHWA's Interactive Highway Safety Design Model (IHSDM) is a suite of software analysis tools for evaluating safety and operational effects of highway geometric design decisions. IHSDM includes six evaluation modules (Crash Prediction, Design Consistency, Intersection Review, Policy Review, Traffic Analysis, and Driver/Vehicle) that support decision making in the highway design process. Intended users include Federal, State and local highway agencies, as well as universities. The presentation will highlight university use of IHSDM and university-agency collaboration on IHSDM-related initiatives, and identify potential future activities.

University use of IHSDM occurs on several levels, including: integration of IHSDM with highway design/safety-related courses; IHSDM as the focus of or in support of thesis and dissertation work; agency sponsored research projects; and technology facilitation (e.g., hosting IHSDM training courses).

Universities and agencies can collaborate in: evaluating and/or tailoring IHSDM for agency use; identifying the most effective and appropriate applications of IHSDM within the project development process; developing an implementation plan for agency use of IHSDM; and developing IHSDM training for universities.

The IHSDM Crash Prediction Module (CPM) is a faithful software implementation of the Highway Safety Manual (HSM) Part C crash predictive methods. The HSM strongly recommends that agencies calibrate the prediction models "to provide results that are meaningful and accurate for each jurisdiction." The 2011 release of IHSDM includes a Calibration Utility to assist agencies with data input and processing and calibration factor calculations. Some State DOTs are working collaboratively with universities on model calibration. For example, Kansas DOT provided data to the University of Kansas (KU) for calibrating the rural two-lane highway segment prediction model; KU used the IHSDM CPM to develop calibration factors, and will provide recommendations on the most appropriate level of calibration for Kansas (e.g., one State-wide factor vs. regional or county-level factors).

Although satisfactory results from the HSM Part C predictive method can be obtained by calibrating the predictive model for each facility type, some agencies may prefer to develop jurisdiction-specific SPFs using their own data. The Utah DOT and Brigham Young University partnered to develop state-specific SPFs, which can be entered into IHSDM for use in the CPM.

These and other agency-university collaboration activities will support appropriate and effective implementation of IHSDM and, therefore, improved roadway safety.

6.) Tennessee GHSO and UT Transportation Center Partnership Driving Together Towards Safer Highways - Jerry Everett

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Summary

The partnership between the Tennessee Governor's Highway Safety Office and the Center for Transportation Research at the University of Tennessee includes a number of facets. This poster describes several of the key linkages and how they fit together to promote highway safety in Tennessee.

Tennessee Traffic Safety Resource Service

The Tennessee Traffic Safety Resource Service (TTSRS) represents one of the more enduring aspects of this partnership. TTSRS provides informational, educational, and web services to enhance traffic safety in areas such as safety belt usage, child restraint promotions, drunk driving programs, teen driving issues, bicycle and pedestrian safety and many other diverse traffic safety topics. TTSRS serves as a statewide clearinghouse for traffic safety educators, law enforcement, health professionals, safety advocates, and individuals who can quickly and easily obtain current educational materials. TTSRS has evolved into a one-stop service center for Tennesseans requiring information regarding traffic safety. This program also offers technical assistance related to state highway safety laws and child passenger safety.

TTSRS also serves a very important role as a web/data clearinghouse to keep state educators and law enforcement abreast of traffic safety training, conferences, special program promotions, data collection and dissemination for statewide safety education and enforcement campaigns.

Highway Safety Program Administration

In 2000 the Tennessee Governor's Highway Safety Office awarded a grant to the University of Tennessee's Center for Transportation Research for the creation of seven full time positions onsite at the GHSO offices in Nashville. These employees were tasked with providing assistance in the areas of traffic records, impaired driving, administrative assistance, public information, law enforcement and safe communities.

Since the inception of this partnership, many of those filling the positions have excelled in their duties and evolved into leaders in the highway safety field. Through the support of the University and GHSO leadership, several have earned Bachelors and Masters Degrees to assist with their management responsibilities, as well as become certified Child Passenger Safety Technicians and certified instructors

for the Traffic Safety Institute. Currently this staff provides oversight of approximately 375 grants totaling over $15,000,000 annually. Each year this staff provides support for multiple large scale projects including the annual Tennessee Lifesavers Conference which hosts over 400 traffic safety advocates and Grant Orientation Workshops for 300 to 400 grantees.

Tennessee Law Enforcement Liaison Program

The partnership between UT and the GHSO was further enhanced in 2004 when the Tennessee Law Enforcement Liaison Program was formally established at the Center for Transportation Research. The program now includes four full-time LEL's each responsible for about a 25 county region of the state, a training coordinator and a program administrator. The program administrator and LEL's are each former law enforcement officers and are accredited law enforcement instructors. Members of the LEL team serve as the state's DRE (Drug Recognition Expert) state coordinator and the state SFST (Standardized Field Sobriety Testing) state coordinator. The LEL's organize and oversee Tennessee's law enforcement agencies' contributions to national campaigns such as Click It or Ticket and Booze It or Lose It.

The National Law Enforcement Challenge is a friendly competition between similar sizes and types of law enforcement agencies that recognizes and rewards the best overall traffic safety programs in the United States. The LEL's administer the Law Enforcement Challenge in Tennessee. Participating agencies provide documentation on their agency's efforts and effectiveness in officer training, public information, and enforcement efforts to reduce crashes and injuries. This annual contest provides agencies a chance to win a fully equipped police vehicle and other incentive items related to traffic enforcement.

Safety Campaign Awareness Survey

The Tennessee GHSO has partnered with the UT Center for Transportation Research since 2004 to evaluate Tennessean's awareness of media campaigns and gather their opinions regarding highway safety issues. To date 40,000 Tennesseans have completed these highway safety surveys. Since 2006, data collection has been scheduled to coincide with major media buys throughout the year. The surveys are designed to provide NHTSA with the data needed to document exposure to the messaging utilized in large scale media campaigns. The campaigns consistently evaluated over the years are Booze It and Lose It, which is evaluated twice in each grant year and Click It or Ticket, which is evaluated each May.

In Tennessee we find that "Click it or Ticket" has a recognition rate of 75% or higher and roughly 7 out of 10 of the respondents recognized the slogan "Booze it and Lose it". Interestingly, the much used older slogan of "Friends don't let friends drive drunk" is still recognized by more than 6 out of 10 respondents.

Safety Culture Survey

A telephone survey of 928 Tennessee residents was administered in spring of 2011 to measure attitudes and opinions about traffic safety issues and driving habits. The survey instrument was designed to

compare Tennesseans views with those in the remainder of the country by replicating questions included in the third annual Traffic Safety Culture Index conducted by the AAA Foundation.

Results suggest that Tennesseans are very similar to those across the country in their driving habits, attitudes, and beliefs about traffic safety issues. Approximately 75% report that they never drive without a seatbelt and never text while they are driving. However, the same percentage report that they talk on a cell phone while driving. Texting while driving is a growing concern to the public and is perceived to be as much of a threat to personal safety as drivers who have had too much to drink. The survey results indicate overwhelming support for requiring an interlock device on the car of someone who has received more than one DWI; screening drivers over 75; and banning texting while driving. Drivers were also asked to report on their personal attitudes and the attitudes held by their neighbors regarding the acceptability of driving behaviors such as driving after drinking or texting while driving. Respondents consistently reported they found the behaviors to be less acceptable than what they perceived their neighbors thought.

7.) Improving Transit Safety in Florida through Implementing Yield-to-Bus LED Signs - Aldo Fabregas

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Summary

The Florida Department of Transportation (FDOT) sponsored a research initiative in 2004 to explore the factors contributing to bus accidents near bus stops. The study found that 47 percent of all crashes during the five years studied (1998-2002) corresponded to vehicles having rear-end collisions with buses. Based on these findings, FDOT has identified YTB initiatives as one of the key components to increase transit safety. Yield-to-Bus (YTB) laws have been in place in many states for years. However, programs promoting YTB compliance have been difficult to fund and justify due to the lack of quantitative information regarding their effectiveness.

To increase highway safety for transit buses, the Florida Department of Transportation (FDOT) through the National Center for Transit Research (NCTR) actively pursues the best set of treatments to promote YTB awareness and compliance. FDOT, in conjunction with NCTR-CUTR, initiated a series of studies to improve transit safety at pullout bays. The study "Moving the Bus Back into Traffic Safely -Signage and Lighting Configuration Phase I" performed an initial review of the available treatments and assessment of current YTB initiatives in Florida. Also, Phase I performed a bus operator survey to obtain additional information on the effectiveness of the current YTB treatments. A decal was the most common treatment to promote YTB in Florida. Some isolated efforts by two agencies included flashing light-emitting diode (LED) signs. Phase I also produced recommendations for roadside signs and lighting configurations for YTB treatments.

Phase II of the study identified and organized the available treatments as in-bus treatments and roadside treatments. It focused on in-bus treatments, specifically YTB-LED signs. Phase II also focused on the field evaluation of in-bus treatments on two off-the-shelf YTB-LED flashing signs from three participating transit agencies in Florida. The study assessed the safety and operational benefits of installing YTB-LED flashing signs on the back of buses against those using YTB decals only. Three main performance measures were defined: number of merging maneuvers ending in yield, number of safety conflicts, and re-entry time. It was found that the YTB behavior of the motorists can be significantly improved by using flashing YTB-LED signs. The study found that the YTB-LED sign has the potential to reduce traffic conflicts.

Phase II involved active cooperation among safety, operations, and maintenance departments of transit agencies; the research institution; and sign manufacturers. The safety department cooperated with the

oversight of the study, identification of potential location for the study, and bus operator training for the tests. Operations departments assisted with the scheduling of the selected vehicles through the previously identified locations during the selected periods. In addition, only specifically trained bus operators were scheduled for the duration of the study. The maintenance departments played a key role in the study by installing the signs and taking care of compliance details regarding flashing and sign activation. In addition, the maintenance departments installed a special camera on the buses looking backwards to collect data on the traffic behind the bus.

Following the recommendations of previous phases, a new project has been initiated through FDOT-NCTR to study and test the possible roadside treatments and geometric considerations of bus bays in Florida. For this project, several bus bay design configurations and their compliance with the "Accessing Transit Design Handbook for Florida Bus Passenger Facilities" are being evaluated. This ongoing project involves cooperation not only with the transit agencies but also with local traffic operations and public works departments. The traffic operations role is related to the selection design of roadside treatments, which include roadside signs, pavement markings, flashing beacons, and smart signs. Where applicable, these designs will be submitted to the Federal Highway Administration (FHWA) for approval for experimentation. The role of public works departments is related to the installation and removal of the selected roadside treatments during the study period. One of the expected outcomes of this project is the design of new roadside safety treatments for transit agencies that can be included in the Manual for Uniform Traffic Control Devices (MUTCD). In addition to the roadside treatments, a new safety study of transit-related crashes is being performed under the same project. This new safety assessment will be performed with high-quality data which will include better geographic information on incident location, roadway features, and traffic volumes.

8.) Transportation Resource Center – One Stop Safety Shopping - Mitra Fetrat-Amman

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Summary

Addressing traffic safety issues by providing vital information, educational, and technical resources from the state level to local and county agencies can be met with obstacles and setbacks. Since its inception in 2004, the Transportation Safety Resource Center (TSRC) at Rutgers' Center for Advanced Infrastructure and Transportation (CAIT) has served as a missing link—a statewide resource center for technical assistance, training, data analysis and traffic safety programs. Through a collaborative approach with stakeholders, TSRC provides support to state and local transportation and law enforcement agencies including NJ DOT, FHWA- NJ Division, state police, MPOs, county engineers, municipal administrators, and others.

Serving in a cooperative partnership with the New Jersey Department of Transportation (NJDOT), TSRC's one-stop safety stop provides safety programs and initiatives that address issues for all facets of the traffic safety industry—enforcement, education, engineering, and emergency response.

Examples include assistance to the New Jersey Division of Highway Traffic Safety (DHTS) and over 400 police officers and engineers from a sprawl of local and county agencies via the TSRC-developed Plan4Safety crash data and analysis software; participation with public agencies in the analysis of data; written update and distribution of the New Jersey Comprehensive Strategic Highway Safety Plan; improving local and county roadways for cost-efficiency and safety maximization via statewide and regional initiatives like Road Safety Audits; and providing daylong educational activities for schoolchildren to positively impact the behavioral core of future drivers. TSRC works hand-in-hand with the New Jersey Local Technical Assistance Program to develop and conduct safety related workshops to practicing professionals; conduct safety outreach programs; and provide technical assistance to public agencies.

To further consolidate traffic safety efforts and resources, TSRC hosts an annual full day safety conference—the New Jersey Safety Forum—that offers interactive workshop sessions and panels that allow educators, enforcement, engineers, to unite and discuss transportation safety issues. The Safety Forum not only advances communication between agencies and industry professions, but allows for a showcase of safety achievements around the industry to educate and inspire all toward one common goal: to move toward zero fatalities on roadways within the state, the country, and the world.

9.) The Journal of Transportation Safety & Security: leveraging research partnerships worldwide - Lissa Gay

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Summary

Across the globe, commerce, economic development, and the security of nations depend on safe and secure transportation systems. Until recently, there were limited outlets for publishing research in the areas of comprehensive transportation safety or transportation security. However, in 2009 the Southeastern Transportation Center, a regional center in the USDOT University Transportation Centers program, launched the The Journal of Transportation Safety & Security (JTSS). The journal fills that gap by publishing original research emphasizing multimodal transportation safety issues such as highway, transit, ridesharing, pedestrian and bicycle modes as well as rail, water, and aviation. JTSS is a quarterly, peer-reviewed, academic journal that is the product of an international partnership between the Southeastern Transportation Center, The University of Tennessee, Beijing Jiaotong Transportation University in China, and the London-based academic publisher, Taylor & Francis Group, LLC.

The journal is supported and directed by an international editorial board. In creating this board, the editors sought out renowned experts worldwide in all modes transportation safety. These researchers and practitioners represent China, Australia, Hong Kong, Canada, and all regions of the United States. The aims and scope of JTSS are both broad and multidisciplinary. They include the safety aspects of infrastructure design, driver behavior and human factors, traffic control and traffic operations, crash data collection and analysis, crashworthiness, safety information and communication systems, advanced and emerging vehicle and network technologies, and safety policy and planning. JTSS is also interested in security issues of transportation systems and networks, as well as emergency and incident planning and response.

The journal's mission is to disseminate research results and engineering experience to educators, researchers, practitioners, and policy makers to enhance transportation safety with comprehensive and integrated solutions. The journal succeeds in reaching an international audience: published authors are from universities in Italy, France, Spain, the Arab Emirates, China, Egypt, the United Kingdom, China, Russia while international subscriptions are growing at a healthy rate. In 2009, the journal was featured in RITA's Points of Pride publication, as an outstanding example of a successful UTC initiative.

Taylor & Francis publishes scores of engineering, science, and medical journals, including many of the world's top academic journals. According to their publication staff, JTSS is one of, if not their most successful, journal start-ups. This success in large part is a result of the vision and unique contributions of the journal partners, and the initial support and increased exposure afforded by RITA's UTC Program.

The overriding concept for this poster is that we have achieved something very important through our partnership with an international academic publisher, Taylor & Francis Group LLC, and an international university. This partnership may be a unique one because in involves a joint copyright agreement between the University of Tennessee representing the Southeastern Transportation Center, Taylor & Francis, and enjoys international editorial support from Beijing Jiaotong Transportation University. To represent this concept visually, we will answer these questions:

- What inspired the partners to create the journal? What is the need JTSS meets?
- What have we achieved?
  - Fulfilling research needs by publishing peer-reviewed transportation security research.
  - Covering diverse areas such as highway, transit, ridesharing, pedestrian and bicycle modes as well as rail, water, and aviation.
  - Supported by international editorial board filled with renowned experts.
  - Relevant to educators, researchers, practitioners, and policy makers.
- Who are the beneficiaries? This refers not only those who read the research but the contributing authors, reviewers, libraries, faculty, students, and those who use transportation worldwide.
- How do we measure our success?
- What impact do we have now and where do we envision it will reach?
- Given where we started, where are we now and what is our future?
- How could someone else achieve this sort of success?

Brief description: Journal of Transportation Safety & Security: The Model for a Successful New Publication. This journal is the product of a winning international partnership between the Southeastern Transportation Center, The University of Tennessee, Beijing Jiaotong Transportation University, and the international academic publisher, Taylor & Francis Group, LLC. It fulfills research needs by publishing peer-reviewed transportation security research that covers diverse areas such as highway, transit, ridesharing, pedestrian and bicycle modes as well as rail, water, and aviation. An international editorial board filled with renowned experts supports the journal and ensures its relevance to educators, researchers, practitioners, and policy makers.

10.) Using Peer Influence to Prevent Teen-Driver Crashes - Russell Henk

Teens in the Driver Seat -- Texas Transportation Institute
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Summary

What is Teens in the Driver Seat?

The Teens in the Driver Seat Program is America's fastest-growing peer-to-peer safety program for young drivers. Developed in 2002 by the Texas Transportation Institute to combat the leading cause of injury and death for young people in the United States, the program is distinct from other programs in three important ways. First, the program focuses on all of the major risks faced by young drivers, highlighting those that teens and their parents are least familiar with (driving at night, speeding and distractions such as cell phones / texting and other teen passengers.) Second, the program relies on teens to help shape and deliver safety messages to each other. Third, it is the only traffic safety program in the nation that activates young people starting in junior high school and continuing all the way through the college years.

Teens in the Driver Seat has brought a fresh approach to the teen driver safety problem, demonstrating through extensive data analysis that it is a proven approach to fighting the number-one killer of teenagers in America.

How widely is the program being used?

More than 500 schools in Texas now have active Teens in the Driver Seat programs in place, and it has also become active in Georgia, Connecticut, North Carolina and California. At least 500,000 young people have been directly reached through the program, with many thousands more reached via free downloadable materials from the program website, www.t-driver.com.

How successful is the program?

A national review of crash data determined that the number of teen drivers involved in fatal crashes in Texas had declined at a rate significantly higher than the national average in the years since the program has been active in the state (2003 – present). In addition, Texas has been the only state in the nation to experience a decline in its teen driver fatal crashes for eight consecutive years. Findings suggest that the trends are largely attributable to a combination of the state's Graduated Driver License (GDL) law and the program, which, by design, reinforces and augments the GDL law. The steady decline in Texas is particularly noteworthy, given the safety obstacles faced by the state, namely:

a. Texas is one of only a few states permitting teen drivers to secure a license through parent-taught driver education. Parent-taught teen drivers are nearly three times more likely to be involved in a fatal crash, according to a 2007 study performed for the National Highway Traffic Safety Administration.

b. The GDL law in Texas (until 2009) was rated as only "fair" by the Insurance Institute for Highway Safety, while 33 of the remaining states had laws rated as "good." In other words, Texas is doing better in the face of stiffer competition, because states with stronger GDL laws should expect those laws to have a more positive effect on the frequency of crashes and fatalities.

c. Until 2009, Texas did not require an on-road driving test for novice drivers seeking a license. Again in this case, Texas is doing better in the face of stiff competition, because states which require this on-road test should expect it to have a positive effect on crash frequency because the test helps to ensure that novice drivers are kept off the roads until they have learned and ably demonstrated basic driving skills.

In addition, a comprehensive case study illustrated the effectiveness of Teens in the Driver Seat in Garland, Texas, where the program was initiated in all of the community's seven high schools in 2006. In the four years prior to implementation, 12 teens died in vehicle crashes, compared to only one death in the years since the program began there. In addition, teen involvement in all crashes dropped from 28 percent before implementation, to 16 percent after the program began. Field studies showed a 30 percent decrease in teen driver wireless device use and a 14 percent increase in seat belt use at program schools.

The program has also contributed to changes in public policy in Texas. By serving as expert resources, staff members contributed directly to efforts by the State Legislature to strengthen the Texas GDL law (in 2009) along with increasing the amount of training required of new teenage drivers. Recent GDL modifications were the most significant since the law became effective in January 2002, and the actions resulted in the state's GDL law being upgraded from "fair" to "good" in ratings by the Insurance Institute for Highway Safety.

The program has also effectively positioned teen driver safety as a public health issue. This work with the Texas Legislature resulted in a partnership with the House Public Health Committee, the chairwoman of which held a press conference declaring teen driver crashes to be "one of the most serious public health crises faced by our state." TDS has also received a pledge of support and assistance from the chairwoman of the Senate Health & Human Services Committee. In addition, the Texas Transportation Institute has established a formal partnership with the Pan American Health Organization / World Health Organization, in part to apply the Teens in the Driver Seat program model to other populations within PAHO's region.

What about other young drivers (and passengers)?

Teens in the Driver Seat – Junior High, was developed to help pre-drivers learn information and develop skills to be responsible passengers, and in many cases, positively influence older siblings who are behind the wheel. Building upon the dramatic success of Teens in the Driver Seat, the developers of the

program have produced a component for the college-age audience named “U in the Driver Seat.” Although the mix and frequency of risk factors for college-age individuals is slightly different, the challenges and dangers they face are virtually the same as their younger counterparts. Like Teens in the Driver Seat, this newest form of the program depends upon peer influence to reduce the number of crash injuries and fatalities for young people.

11.) Establishing a Connecticut Crash Data Repository - Eric Jackson

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Summary

Analysis of highway safety is probably the most data-intensive activity carried out by highway and transportation agencies. It requires more than just archiving police accident reports. To be effective, information recorded on the accident reports must be captured into a searchable database. Furthermore, roadway inventory, traffic volumes and even land use information are all critical for evaluating the safety of any road segment or intersection, and other safety analysis exercises such as demographic or behavioral studies require driver licensure, motor vehicle registration and other institutional databases.

Currently, Connecticut has two disparate crash repositories: one at the Department of Public Safety (DPS); and one at the Connecticut Department of Transportation (ConnDOT). In addition to two large scaled repositories, there are numerous small scale repositories retained at local police departments throughout the state. However, these crash data repositories are not easily linked to roadway information, traffic volumes or land use data. These other databases are maintained by other state agencies and require significant manual reformatting to combine the crash data and roadway information. The non-highway information is maintained by other State agencies such as the Department of Motor Vehicles or the Department of Public Health. Compiling and linking these data requires additional steps, especially contacting multiple offices. Having the information from all of these databases assembled into a single data repository would reduce duplicative effort on the part of State agency employees and researchers on projects funded by the State.

Historically, a Centralized Accident Records System (CARS) served as the states records repository. However, Connecticut's crash data had to be hand-entered from crash forms submitted by law enforcement agencies. The move to electronic crash report generation provides the opportunity to create a centralized single data repository for Connecticut.

The first phase of Connecticut Crash Data Repository CTCDR development was focus on designing and building a CDR for PR-1 files. The repository developed in phase 1 will serve as the foundation for future, more advanced versions of the data repository. The development of the base CDR established a repository that can allow law enforcement agencies across the state to submit collected crash information via XML specification standards. In return their crash data will be available for analysis using web tools developed in later phases of this research. This first phase of the CTCDR development:

1) Designed the structure and foundation for the CTCDR database; 2) Developed the data entry, query, and analysis tool set program; 3) Developed a secure web portal that will allow users to display and analyze, export, and print crash records. The current repository can be accessed at www.ctcrash.uconn.edu

The purpose of Phase 2 of this project is to enhance the CTCDR, data query and analysis toolset created in the first phase of this study. The overall project goal is to provide members of the traffic-safety community with timely, accurate, complete and uniform crash data. The Crash Repository designed at the University of Connecticut compiles data from agencies in Connecticut that capture PR-1 accident data and provides users access to these data. The system is currently designed to allow users access to two individual data repositories. The first repository is collected from the Connecticut Department of Public Safety (DPS) and the second is repository is generated from accident data processed by the Connecticut Department of Transportation. Phase 2 of this project would work to: 1) add additional functionality to the web portal of the repository, 2) incorporate more local police department crash reports (electronic XML) into the repository and 3) integrate other roadway and traffic information databases into the repository.

A potential phase three of this research could be to link or merge the Patient Care Reporting (PCR) software to the crash data repository. This would allow users access to not only crash data but medical reports detailing the care provided to and the severity of the injuries to crash victims. However, the addition of patient care information increases the level of security and complexity needed to meet Health Insurance Portability and Accountability Act (HIPAA) requirements. This phase would also require the current CTCDR to be updated to include personal identifiers for those involved in each crash.

Overall the development of the CTCDR will allow for unprecedented public access to individual crash data without disclosing personal information. This will allow the public, researchers, public safety officials across the state and anyone around the world to quickly view and analyze Connecticut crash data.

12.) A Statistical Analysis of Motorcycle Crashes in Maryland - Mansoureh Jeihani

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Summary

Commuting and recreational motorcycle use in the United States has been on the rise since the mid-1990s, with motorcycle registrations increasing 61 percent between 1996 and 2005 (NHTSA, 2006). As the number of motorcyclists increases, it is important that the safety issues associated with this mode of travel be addressed. Motorcycle riders and passengers are much more vulnerable to injury in crash situations. While crash fatalities decreased from 1990 to 1997, fatalities in the United States have increased every year for the past 10 years (NCHRP, 2008).

Motorcycle crashes are becoming more and more frequent in Maryland. Although some studies have examined different aspects of motorcycles crashes in Maryland, there has never been a comprehensive data set and analysis of the road-related factors of motorcycle crashes. This study identifies recurring or common road characteristics of motorcycle crashes in Maryland from 1998 to 2007.

The objectives of this research project were threefold:

- to perform a comprehensive statistical analysis of motorcycle crashes in Maryland;
- to identify crash and injury patterns (including areas with the highest crash rates, common issues of crash locations, the relationship between crash rate and volume, the relationship between rural and urban areas and crashes, difficulties in reporting and collecting crash data, and the types of roadways where most crashes have occurred); and
- to determine any increase or trend in motorcycle registrations and volumes, and their relationship to crashes and injuries.

Motorcycle crash data was obtained from the National Highway Traffic Safety Administration's Crash Outcome Data Evaluation System, and road inventory data was obtained from the Maryland State Highway Administration. A geo-spatial joint was performed on the two data sets in order to have a comprehensive database of crashes and characteristics of the roads where the crashes occurred.

The preliminary data analysis indicated that most motorcycle crashes happened on state roads with no access control and speed limits of 40-55 mph. These roads—urban-other-principal arterials, urban minor arterials, and urban collectors—were mostly undivided, two-way roads with two through marked lanes

and no auxiliary lanes. The crashes typically occurred during the day when weather conditions were sunny or cloudy and the road surface was dry. The majority of crashes were single-vehicle collisions in which the motorcycle was moving straight in a constant speed far from an intersection. The drivers, who were mostly 20-to-45-year-old men, were in normal condition and wore helmets. Prince George's County, Baltimore County, Baltimore City, Anne Arundel County, and Montgomery County had the highest percentage of the motorcycle crashes.

Fault tree analysis was implemented to find the variable combination responsible for most motorcycle crashes. Categorical principal component analysis (CATPCA), which is factor analysis for categorical data, quantifies categorical variables while reducing the dimensionality of the data. CATPCA was used to group the variables and reduce the number of variables in the regression model. Most of the data variables were ordinal and categorical. Because the probability distribution of the dependent variable within each road class fit the gamma function, generalized linear model was utilized to estimate the crash rate (number of crashes per mile) for all roads in Maryland and each road type (freeway, arterial, and collector/local).

The important factors in motorcycle crashes were government control, shoulder type, road type, area type, and median width.

Government Control: County- and agency-controlled roads had a lower probability of motorcycle crashes than state-controlled roads.

Shoulder Type: There was a higher probability of motorcycle crashes on roads without any shoulder or curbs than on roads with concrete or bitumen shoulders. The crash probability was also higher on roads with curbed shoulders than on roads with concrete or bitumen shoulders. However, there was a lower probability of motorcycle crashes on roads with gravel-stabilized shoulders than on roads with concrete or bitumen shoulders.

Road Type: Collector/local roads and arterials had a higher probability of motorcycle crashes than freeways.

Area Type: More motorcycle crashes occurred on urban roads than on rural roads.

Median Width: The wider the median, the lower the probability of motorcycle crashes.

Engineers and safety officials can use this study's results to develop solutions to reduce the probability of motorcycle crashes.

13.) Road Safety Audits -- Assisting Local Communities in New Jersey Through Cooperation - Andrew Kaplan

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Summary

The Transportation Safety Resource Center (TSRC) part of the Center for Advanced Infrastructure and Transportation (CAIT) at Rutgers University has implemented a Road Safety Audit (RSA) program for local agencies. TSRC employs a diverse staff of engineers, data analysts, and education specialists to provide safety resources and services to agencies statewide. A cornerstone of TSRC, the Road Safety Audit program provides towns and counties with no-cost, data-driven engineering support which identifies long- and short-term countermeasures that fit within each unique budget.

A Road Safety Audit (RSA) is an FHWA-supported safety performance evaluation conducted by an independent, multidisciplinary team on existing or future roads and intersections. In a traditional road or intersection safety review, situational factors and issues are not part of the safety assessment, but the TSRC team - led by staffed engineers - conduct an RSA that examines and identifies potential issues that could be hazardous to not only motorized traffic, but to all potential road users, including pedestrians and bicyclists.

TSRC has been instrumental in implementing a statewide RSA program aligned with the FHWA goals and objectives of enhancing local road safety through a data-driven process, and at the same time providing a benefit to the local stakeholders. Site visits are a vital part of the RSA process that relies on keen safety observation and data analyzed prior to evaluation. These elements allow TSRC to provide recommended short- and long-term countermeasures to be implemented by the towns and counties that receive them.

Recommendations, site visits, and data do not solve traffic issues alone. When a local public agency implements countermeasures recommended by the RSA, post-evaluation data from national statistics from FHWA suggest that crashes can be reduced up to 40 percent in urban areas and up to 60 percent on rural roads, where crashes tend to be more severe.

Successful RSAs conducted by CAIT's TSRC involve the bringing together of local officials such as police officers, municipal and county engineers, planners, publics works employees, safety-oriented community organizations, school transportation companies, hospitals, and fire departments with experts such as FHWA, NJ Transit, NJDOT Traffic Engineers, NJDOT Safety Engineers, NJDOT Bicycle and Pedestrian Experts, Rutgers' Voorhees Transportation Center, NJ Local Technical Assistance Program, TSRC Safety Engineers, Rutgers Pavement Resource Program pavement experts, Transportation Management Associations, and Metropolitan Planning Organizations.

14.) Pedestrian Access Management at Modern Roundabouts - George Lu

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Summary

Since the 1990s, there has been a burgeoning growth of modern roundabouts in many states and municipalities of the United States. The keen interest in modern roundabouts can be mostly attributable to their vast success in some European and Oceanian countries. In geometrics, a modern roundabout is an unsignalized intersection which includes a central island encircled by a single-/multiple-lane roadway. Vehicles entering the roundabout must yield cautiously to ones already navigating on the circulatory lane(s). Its far-reaching appeals can be specifically ascribed to substantiated safety benefits, strengthened circulation efficiency, lessened maintenance cost, and beautified aesthetical impact. Currently, a large number of roundabouts are under construction or in the planning phase in North America. Simultaneously, the flourishing emergence of modern roundabouts has kindled a widespread debate, as a response to relevant roundabout studies, over the pedestrian access issue. The Access Management Manual prescribes major transportation actions which include multimodal streets with sidewalks and adequate pedestrian refuges, without addressing pedestrian access issue at roundabouts.

In 2002, the United States Access Board published “Draft Guideline for Accessible Public Rights of Way, Roundabout” which proposes pedestrian signals at all roundabout crosswalks. In 2005, the Access Board released a revised draft to call for the provision of “A pedestrian activated traffic signal… for each segment of the crosswalk…” at multilane roundabouts to ensure safe access for vision-impaired pedestrians. Operationally, this provision induces an interruption to the vehicular flow continuity which is originally intended in roundabout design. Another critical issue is the enhanced likelihood that the yielding queue spills back into the circulatory lane(s). Currently, only a few roundabouts were ever signalized for pedestrians in North America, and only very little literature documented the theme of signalizing roundabouts to improve pedestrian access. Although roundabouts are rarely signalized for pedestrian access in the United States, the call from the Access Board and the absence of roundabouts in the Access Management Manual make it imperative for access management community to have more practice-oriented research endeavors regarding the roundabout accessibility for pedestrians.

This study was aimed to quantitatively evaluate the performance of four pedestrian signals (PA, HAWK, PELICAN, and PUFFIN) experimentally installed at typical single-/double-lane modern roundabouts where three crosswalk geometric layouts (Conventional, Offset, and Distant) and two signal installation schemes (One-Stage, and Two-Stage) varied under a range of traffic conditions. The objective was to

provide access management community with an objective basis for identifying potential crosswalk treatments to improve the roundabout accessibility especially for children, seniors, and the visually impaired or disabled, while maintaining adequate multimodal traffic mobility. From an operational perspective, this study investigated how specific crosswalk treatments, which result from variations in three dimensions (signalization options, geometric layouts, and installation schemes), affect multimodal performance measures under varied traffic conditions at typical roundabouts. It is nearly infeasible to scrutinize the performance of these treatments in a real-world context due to potential disruptions and hazards posed to smooth and safe circulations if traffic control strategies change on site. Instead, a simulation platform rendered a valid surrogate means by which treatments can be implemented and evaluated in a quantifiable fashion.

The study results suggest a non-monotonic relationship between the signalization effects and all levels of vehicle volumes. Vehicle delays appeared to be the largest as traffic volumes approach the roundabout capacities. It could also be concluded that: (i) “Two-Stage” installation scheme is much more operationally efficient than the “One-Stage” counterpart; (ii) There are no significant differences among three geometric layouts if they are used in conjunction with the “Two-Stage” scheme. When the “One-Stage” scheme is employed, the “Distant” layout, compared with the “Conventional” layout, can reduce vehicle delays and queue lengths due to the enlarged vehicle storage space at the exit lane(s); (iii) HAWK poses the least delays to vehicles for most study scenarios; while PUFFIN generates minimum pedestrian delays for all scenarios. These two signals are promising for roundabout signalization, while PUFFIN is believed to provide a better balance between pedestrian crossing safety and traffic movement efficiency; (iv) An interesting finding is the addition of pedestrian signals to double-lane roundabouts is operationally beneficial for the roundabout-wide vehicle circulation when vehicular inflows are in saturated state.

The study findings should be informative to transportation policy-makers, planners, and practitioners in access management community who face the challenge of bettering the roundabout accessibility to pedestrians especially those with impaired vision or mobility.

15.) Traffic Assistance Services for Kansas (TASK): Providing Quality Training in Highway Safety Since 1980. - Robert Stokes

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Summary

The Traffic Assistance Services for Kansas (TASK) program is a cooperative highway safety training program funded by the National Highway Traffic Safety Administration (NHTSA) and administered by the Kansas Department of Transportation (KDOT). The primary objective of the TASK program is to provide training to Kansas public employees who have traffic safety responsibilities. The program has been in existence since 1980. The program's training courses (workshops) are developed and delivered by senior faculty from Kansas State University (KSU) and the University of Kansas (KU). Guidance on the program of courses is provided by the TASK Advisory Committee, consisting of representatives from KDOT, the Federal Highway Administration (FHWA) and local (city and county) transportation agency personnel. In 2006, the TASK program was incorporated into the K-State University Transportation Center's (K-State UTC) technology transfer and education programs. The program typically offers 4-5 one-day workshops per year on topics such as the Manual on Uniform Traffic Control Devices (MUTCD), Traffic Engineering for Technicians, Use of Traffic Control Devices to Improve Highway Safety, and Bicycles, Pedestrians and Traffic Calming (a Safety Perspective). In addition to the scheduled offering of courses, local (city and county) agencies may request "On-Demand" courses to be delivered at a date and location that best meets their needs. In recent years, the program has delivered on-site training to approximately 150 local transportation agency personnel per year across the State of Kansas. Participants in the program receive Continuing Education Units (CEUs) or Professional Development Hours (PDHs) from the KSU Division of Continuing Education. In addition, selected TASK Courses can be used to meet the requirements of the Kansas (KU) LTAP Center's "Roads Scholar" Program. In 2009, the TASK Program received the KSU Division of Continuing Education award for "Excellence in the Provision of Non-Credit Programming". The TASK Program is a highly successful, on-going highway safety training program involving KDOT, the state's two major universities and local transportation agencies. The poster presents a brief history of the program, the roles of the various agencies involved in the program, workshop development and delivery methods, and a summary of the program's effectiveness in providing quality training to Kansas public employees who have traffic safety responsibilities.

16.) Accelerated Safety Improvement Using University–Agency–Industry Collaboration - Cody Stolle

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Summary

Crossover crashes, in which a vehicle crosses a divided median and strikes a vehicle traveling in opposing travel lanes in a nearly head-on collision, constitute less than 2% of all crashes on divided highways, but account for more than 30% of highway-related fatalities. Cable median barrier is used to reduce the frequency of crossover crashes, and has reportedly reduced crossover crash risk and fatality rate by as much as 90% on divided roadways. However, cable median barriers also constitute a risk to occupants of errant vehicles, since approximately 3% of all cable median barrier crashes result in a severe injury or fatality. Based on industry and DOT speculation on barrier installation it is expected that the current base of cable median barrier will double within the next five to ten years. If the current rate of severe cable median barrier crashes is sustained as cable median barrier mileage increases, as many as 500 fatalities and more than 2,500 severe injuries may occur every year due to cable median barrier crashes in only one decade.

A cable median barrier improvements study was funded through a cooperative grant provided by the Mid-America Transportation Center, Region VII UTC, to evaluate the causes of cable median barrier failures. For this study, a failure was defined as an occupant sustaining serious or fatal injuries. Knowledge about the cause of serious injury and fatal crashes was used to identify barrier design modifications, median construction recommendations, and barrier placement guidelines to improve the state-of-the-art with respect to cable median barrier technology and implementation. This study examined the results of more than 15,000 cable median barrier crashes in 10 states to determine impact conditions leading to increased propensity for barrier failure. Design changes to barriers and installation practice are currently being pursued. This study is ongoing.

The cable median barrier safety improvements study is being conducted at the Midwest Roadside Safety Facility (MwRSF), located at the University of Nebraska-Lincoln (UNL). The MwRSF is recognized as a global leader in roadside design for safety and has collaborated extensively with both government agencies and private companies. Much of the MwRSF's experience in collaboration with government is based upon the Midwest States Pooled fund program. This program includes 10 state DOT's who pool their research funding for transportation safety. A total of 16 state DOT's were contacted to obtain cable median barrier accident records in the form of police level accident reports, including sketches of

scene diagrams and crash narratives, when available. All relevant crash information was then compiled into a large database and a statistical description of crashes involving serious injury or fatality was developed. This information and database were then used to develop recommendations regarding optimum cable barrier configuration and placement conditions.

In addition, potential contributors to unsafe vehicle//barrier interaction were identified for further investigation. As transportation research and operations budgets are reduced at the state, national, and local levels, the cooperative pooling of resources and information together with university collaboration enables DOTs to obtain a broader understanding of the inherent risks and benefits associated with roadside treatment options, including cable median barriers. Furthermore, based on the results of this study, changes have been recommended at the federal testing level to evaluate cable median barrier in impact conditions commonly associated with the crashes involving barrier penetration, vehicle rollover, or serious injury or fatality to occur. Recommended changes to federal testing standards would be impossible without the collaboration of state DOT"s together with experience and expertise of the university researchers familiar with these testing standards.

In addition to collaboration between researchers at UNL and state DOTs, a cable barrier manufacturer supported this project. Safence, Inc, a cable barrier manufacturer and subdivision of Blue Systems, Inc, provided funding for full-scale crash testing that helped to isolate causes of unsafe barrier performance. This testing and findings from the accident data analysis have been used to provide recommendations for specific design changes to improve proprietary barrier designs. It is important to note that private agencies are generally unable to obtain confidential crash data such as that obtained in this study. Thus, the study described herein was impossible for a private company to undertake without collaborating with a university. Safence representatives hope to improve product performance and address potential problems in barrier design to make safer and more competitive products. Further the company has committed to evaluating the performance of its barrier systems under the new crash test conditions identified as commonly associated with serious injury and fatal cable barrier crashes. Hence, by incorporating design modifications developed during this study and revising test conditions to more accurately reflect impacts associated with barrier failure, Safence should be able to develop the safest products available anywhere on the globe. Further, an additional cable median barrier manufacturer, Brifen, has also requested the results of the study and has indicated an intention to evaluate its barrier systems under the new recommended impact conditions.

University collaboration with state DOTs and cable median barrier manufacturers has provided state highway agencies with barrier placement guidelines that should provide significant improvements in safety performance. Further, barrier design modifications and identification of revised impact conditions that are more representative of crash conditions associated with barrier failures will help barrier manufacturers significantly reduce the number of serious and fatal injury classes. Further, participation in this university/government/industry collaboration has helped all parties understand the magnitude of the safety problems associated with existing barrier design and placement guidelines. This appreciation for the high number of serious and fatal injuries associated with cable barrier crashes will assure that the states and barrier manufacturers rapidly implement design and testing modifications identified from this study.

It is important to note that the study described herein represents the first major effort to compile a large accident data base of crashes involving a single barrier type. This approach provides the best possible method for isolating crash conditions and barrier configuration and placement geometries that frequently lead to barrier failure. This information is being used by industry to improve their products and state DOT's to identify the best available barriers and erect them in the regions of the median that can maximize motorist safety. These benefits would not be attainable without the industry/university/government collaboration.

17.) Analysis of Bus Collision and Non-Collision Incidents Using Transit ITS and Other Archived Operations Data - James Strathman

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Summary

This study examines collision and non-collision incidents associated with bus operations at TriMet. The analysis encompasses over 4,600 incidents that occurred between 2006 and 2009. Regression analysis is employed to estimate the effects of a variety of factors influencing the frequency of collision and non-collision incidents, including operator demographics, employment status, characteristics of assigned work, service delivery performance, and information provided by customers about their riding experiences. The principal findings and implications are summarized below.

First, beyond the initial probationary period of employment, the regression results indicate that there are diminishing marginal safety returns associated with both operator age and length of service, where the collision frequency elasticities become positive at age 30 and when length of service reaches 33 years. Regarding the age effect, traffic safety researchers have long recognized that drivers' motor and cognitive performance diminish with age, although the transition point estimated in this study occurs when bus operators are still relatively young. This finding may not surprise those who have studied the health and wellness of transit operators. However, health and wellness research in the transit industry has tended to focus on such outcomes as health expenses, workers' compensation costs, absenteeism costs, and operator turnover costs. As this study's findings indicate, safety outcomes and costs should also be a relevant concern associated with the aging of operators. The diminishing marginal safety returns to operator length of service point to a need for more emphasis on regular refresher training, a practice that an industry survey by Moffat et al. (2001) found is utilized by only 36% of transit properties.

Second, operator absenteeism has been a long-standing focus of an industry concerned with containing health expenses and labor costs, as well as reducing labor turnover. Beyond these concerns, this study's findings indicate that absenteeism also contributes both directly and indirectly to safety outcomes and costs: directly in the positive association found between an operator's absence hours and his expected collision frequency; and indirectly through the absence-driven demand for extraboard replacement operators, whose more varied daily work spans are estimated to contribute to greater collision frequency.

Third, the transit safety literature has identified operator fatigue as a serious concern, and this study's findings provide support for this concern in several respects. Generally, collision and non-collision risk is

greater during overtime work hours. Also, when controlling for hours worked, increasing the daily span of hours - as is the case for split shift operators – is estimated to increase the expected frequency of collisions. Fatigue-related concerns associated with the disruptive effects of variable work assignments are also supported by the positive association estimated between work span variability and expected collision frequency. Thus, expected labor cost savings that motivate the use of such work assignments are at least partially offset by higher safety costs.

Fourth, operator surveys reveal that pressures to maintain a schedule are a key source of occupational stress. This study has found that running late is a significant contributor to the expected frequency of both collision and non-collision incidents. With the advent of AVL systems, schedule writers now have access to abundant running time information, reducing the likelihood that running late is a consequence of a poorly written schedule. However, schedules are generally written to be compatible with the abilities of a "typical" operator. The "variance" of abilities in relation to the typical operator means that some operators will face greater difficulty maintaining a schedule on a given route. Hypothetically, it would be beneficial to assign work so that such variance is minimized. However, it has been a time-honored (and bargained) right of operators to select work on the basis of seniority, which may or may not be compatible with a "minimum variance" work assignment approach.

Fifth, related to operators' schedule maintenance pressures, the additional dwell time associated with lift operations can be directly factored into schedules when the frequency of lift operations is regular and predictable. When lift usage is sporadic, it is commonly treated as another source of random delay, and is addressed indirectly in the recovery time that is built into a schedule. While the positive association between lift usage and expected collision frequency estimated in this study can be interpreted as a scheduling problem, more detailed analysis of lift activity at the route and trip levels would be needed to determine how the problem should be addressed in the schedule writing process.

In addition, this study has found a positive association between lift usage and the expected frequency of non-collision incidents, suggesting that customers with disabilities face a relatively greater safety risk. This finding underscores a need for continuing research on the design of lift and securement devices, as well as a need for ongoing assessment of practices intended to ensure safe travel among disabled customers.

Sixth, customer commendations and complaints serve as a valuable source of information that can be used to improve safety. While operators are often rightfully skeptical of the validity of individual pieces of customer information, this study has found that patterns of such information offer important insights into the safety-related performance of operators, as perceived by customers.

18.) Driving Without Distraction: Measuring the Impact of Additional Driver Tasking and Information Delivery and its Mitigation by Design - Gregory Thomas

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Summary

The DWD (Driving Without Distraction) Team is taking an analytical approach to evaluating the impacts of automakers and their attempt to “personalize” the vehicle to make driving more of an entertainment oriented experience. In doing so, the automakers have layered the complexities and increased the multitasking of the operator. With the comprehensive study of the numerous media impacts on driving, the additional aspect of designing a “smarter” dashboard console was undertaken by a collaboration of KU faculty and students. The purpose of the collaboration between experts in engineering, design and cognitive science was to develop a new class of “Adaptive Information Displays (AID)” that can intelligently assess road and driver conditions and adjust the driver’s in-car experience to anticipate their needs and demands for safety. The emphasis is directed to maximizing the amount of “eye-to-road” contact by the heuristic [and tailored] design of instrument clusters and their usage. The project is a study & analysis on the amount of media distractions (inclusive of cell, text, music, navigation) and their impairment on the driving function by instrument ergonomics and increasing interactive tasking. The design problem focused on the concept of new console configurations that enable multi-tiered information delivery, consolidation of instrument/information clusters, simplification of information delivered.

"Keep your eyes on the road" has been the mantra of every driver's education teacher and nervous parent. But the fact of the matter is, we really don't keep our eyes on the road at all times. And that's not to say that we're engaging in dangerous behavior like texting or changing radio stations while driving -- we're actually briefly averting our eyes to aid the driving experience. We refer of course, to the dashboard display.

The term "dashboard" originated with the horse and buggy days and came out of a piece of wood that protected the buggy's passengers from all the mud and slush. By the 1930s, though, cars started coming with gauges, and by the mid-30's, all cars included what has been graciously termed the "idiot light," or a warning light indicating that something is wrong with the vehicle. Even in the present day, manufacturers are tinkering with the instrument panel, moving it to the center of the dashboard or packing it full of technology that may make keeping your eyes on the road harder than ever.

In 2008, 5,870 people lost their lives and an estimated 515,000 people were injured in motor vehicle crashes that involved at least one form of driver distraction, according to the National Highway Traffic Safety Administration. "Driver distraction" is a catchall term that includes cell phone use, texting while driving, eating, drinking and talking with passengers, as well as using

in-vehicle technologies and portable electronic devices.

In 2009, more than 135 billion text messages were sent or received in a one-month period nationwide, an 80 percent increase over the rate in 2008, according to the traffic safety administration. A driver will glance away from the road for about 2.6 seconds when texting, compared to 1.1 seconds when the driver is not.

If texting and cellphone distractions weren't enough, Transportation Secretary Raymond LaHood recently said, "In recent days and weeks we've seen news stories about carmakers adding technology in vehicles that lets the drivers update Facebook, surf the Web or do any number of other things instead of driving safely."

A coalition of University of Kansas professors representing various areas of research has been formed to address what we perceive as technology in search of a safer application environment. To date the auto industry continues to develop standard instrument clusters that have had little modification with the exception of some personal customization. Other than provide the ability to create personal preference color consoles, important information regarding the car's performance, operating diagnostics, climate control, GPS navigation and music management continue to be independent modules. By failing to integrate all components into an easier to read, more ergonomically centric console, the industry is continuing to add to the safety issues relating to distractions.

The purpose of the current collaboration between experts on the DWD (Driving Without Distraction) Team consisting of: engineering, design and cognitive science is to develop a new class of "Adaptive Information Displays (AID)" that can intelligently assess road and driver conditions and adjust the driver's in-car experience to anticipate their needs and demands for safety. The emphasis would be on maximizing the amount of "eye-to-road" contact by the heuristic [and tailored] design of instrument clusters and their usage. The project is a study & analysis on the amount of media distractions (inclusive of cell, text, music, navigation) and their impairment on the driving function by instrument ergonomics and increasing interactive tasking. The design problem will focus on the concept of new console configurations that enable multi-tiered information delivery, consolidation of instrument/information clusters, simplification of information delivered.

Not only do individual drivers have different levels of skill and cognitive/attention capacity because of differences in training and ability, but also roadway conditions change, placing different demands upon the attention of the driver from moment to moment. The purpose of the current collaboration between experts in engineering, design and cognitive science is to develop a new class of "adaptive smart systems" that can intelligently assess road and driver conditions and adjust the driver's in-car experience to anticipate their needs and demands for safety.

Students in Mechanical Engineering together with students in Industrial and Interaction Design worked together in teams to study vehicular information and develop a new prototype for its delivery. This would involve the inclusion of Information Design… where the data is complex or unstructured, a visual representation can express its meaning more clearly to the viewer. The emphasis was on maximizing the amount of "eye-to-road" contact by the heuristic [and tailored] design of instrument clusters and their usage. The instrument information could change size and shape and even disappear or become prominent depending on input by GPS, sensors and

other tracking/monitoring devices.

Project deliverables were to conduct a study & analysis on the amount of media distractions (inclusive of cell, text, music, navigation) and their impairment on the driving function by instrument ergonomics and increasing interactive tasking. The design problem focus on the concept of a new console configurations that enable multi-tiered information delivery in both an animated presentation and full-scale console prototypes.

The KU Team's goal was to investigate the competing information sources, account for varied driver and vehicle abilities, and examine potential future innovations; then determine how best to meet driver needs while maximizing safety for the driver and surrounding vehicles. Drivers are continuously bombarded with information, and the Team is investigating how best to manage this information and keep the driver focused on the main task - driving.

Based on the unique area of expertise of each KU Team member, the complementary backgrounds of the Team members would foster innovative solutions for the problems associated with today's driving environment.

19.) Application of Advanced Tools to Achieve Cost-Effective Traffic Safety Management - Zong Tian

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Summary

The poster presentation will illustrate the projects that UNR has conducted in partnership with the Nevada Department of Transportation. Particularly, we will present projects in which advanced tools have been developed and applied for better management of safety data. One major project is related to beta testing the SafetyAnalyst software. We used GIS tools to merge data from various sources in order to create a dataset for the SafetyAnalyst software based on the Reno-Sparks area transportation network. Another project is related to studying pedestrian crashes at unsignalized intersections. A web-based tool was developed to graphically display pedestrian crashes so that pedestrian concerntrations can be visually inspected.

20.) Implementing Traffic Safety Evaluations to Improve Local Road Safety - Kimberly Vachal

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Summary

Improving roadway safety is an ongoing priority for transportation agencies. However, addressing safety issues in rural areas is difficult for local governments due to the limited resources available for maintenance and improvement projects. North Dakota Department of Transportation (NDDOT) reports that 88% of fatal and injury crashes occurred on rural roads between 2005 and 2009. Among non-interstate rural roads the High Risk Rural Roads Program (HRRRP) group, which includes the lowest population/traffic density roads, accounted for a 56% of the fatal and injury crashes over the past five years (Figure 2). The majority of the HRRRP group crashes, 91%, are attributed to the local road system with the other 9% to the major collector system.

Traffic Safety Evaluations (TSE's) have emerged as a proven and proactive tool for identifying and addressing roadway safety issues. TSE are founded on the same principles as the FHWA proved strategy of Road Safety Audits with a format and process that is designed to fit the rural roads community. According to the Federal Highway Administration (FHWA), Road Safety Audits noticeably improve the safety performance of roadway facilities. Several benefits can be achieved through the implementation of Road Safety Audits such as low-cost/high-value improvement opportunities, promoting the awareness of safe design and maintenance practices, and providing a means to tailor the resources of an agency to meet specific problems.

This project used the case-study research approach. Researcher developed supporting materials and resources and documented experiences in two Traffic Safety Evaluations to demonstrate the methodology and application to agencies in North Dakota. The demonstration has lead to additional TSEs in the state and an expanding partnership in promoting this proven safety countermeasure.

21.) Identifying Factors that Predict Teen Driver Crashes - Kimberly Vachal

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Summary

Reducing crashes, in particular those that result in injury or fatality, is an ongoing struggle for agencies tasked with reducing crashes and making our roads safer. Any ability to predict these crashes would allow the agencies to develop an intervention targeting these drivers to change their behavior and ultimately reduce the number of these crashes. Teen drivers are ideally suited for this type of intervention for several reasons. They are disproportionately over-represented in crashes - teens account for only 4% of the driver population but account for 10% of crashes. Also, a large share of teen crashes occurs within the first year after licensure due to a lack of driving experience. Lastly, the learning curve is still steep at this point in their driving history which makes them more susceptible to interventions.

In an attempt to predict these crashes, North Dakota driver licensing data and crash data were used to develop a sample of 20,392 teen drivers ages 14 to 17. Within the first year after licensure, these drivers sustained 317 crashes that resulted in an injury or death. The resulting logistic regression model identifies gender, traffic convictions, rural/urban, geography, and involvement in previous property damage only (PDO) crashes as markers that are significant in predicting injury and fatal crashes. According to the model, living in an urban area increases risk of being in an injury or fatal crash within the first year after attaining a license by 2.5 times compared to drivers who live in rural areas. Drivers involved in a previous PDO crash are 25 times more likely to be involved in an injury or fatal crash than those not involved in a previous PDO crash. These results can be used in a driver improvement program. One application may be an advisory or warning letter targeted to teen drivers suggesting additional training or guidance for those who exhibit the above markers. Hopefully, altering their behavior and reducing their likelihood of being involved in an injury or fatal crash.

The NDDOT, AAA-North Dakota, ND Highway Patrol, and FHWA-ND District supported this project during the competitive process used for MPC research project selection. In addition, these partners worked with the American Association of Motor Vehicle Administrators to try to secure funding for a pilot project. The NDDOT was instrumental in providing data needed to complete the research.

22.) Collaborating To Improve Road Safety in Louisiana: The Louisiana Transportation Research Center and the Louisiana Highway Safety Research Group - Marie Walsh

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Summary

Collaborating to Improve Road Safety in Louisiana

The Louisiana Transportation Research Center and the Louisiana Highway Safety Research Group

The process of developing the initial Louisiana Strategic Highway Safety Plan (SHSP) in 2005 identified the need to engage a more extensive and active core group of stakeholders dedicated to reducing traffic related deaths in the state. While many challenges still exist in the efforts to meet the SHSP Vision of "Destination Zero Deaths," Louisiana has achieved significant reduction in fatalities in the past years and work continues to identify and eliminate the primary causes of serious crashes. Central to the success of many of Louisiana's efforts are the products of the collaboration between the Louisiana State University with the Louisiana Department of Transportation and Development (DOTD) and other key stakeholders. The two primary university based organizations of this university/safety stakeholder collaboration are the Louisiana Highway Safety Research Group (LHSRG) and to a growing extent the Louisiana Transportation Research Center (LTRC). The activities conducted by these groups include research; training and outreach; project and program management; data collection and analysis; and program evaluation. These tasks are conducted in support of both state and local level safety efforts in Louisiana and also contribute to national safety efforts.

The Louisiana Highway Safety Research Group (HSRG) is funded by the Louisiana Department of Transportation and Development (DOTD) to collect, store and analyze crash data reported by Louisiana's law enforcement agencies. The HSRG is a division of the Information Systems and Decision Sciences (ISDS) Department within the E. J. Ourso School of Business on LSU's Baton Rouge campus. Central to the LHSRG's operations is implementation of the LACrash, Louisiana's electronic crash reporting system for law enforcement. Training, technical assistance and continuous improvement have resulted in LACrash being widely implemented by Louisiana's law enforcement community. Data timeliness, consistency and quality continue to improve as well as data accessibility. The HSRG also leads the Louisiana Traffic Records Coordinating Committee which is working strategically to improve the timeliness, quality and connectivity of all crash and related traffic data from the different sources.

The data generated by the HSRG provides the foundation for the SHSP and for the data driven safety improvement efforts in the state. The HSRG continues to provide innovative solutions and services to the law enforcement community and other safety stakeholders. Recent products include Digital Dashboards and Geographical Information Systems projects to make data more meaningful to practitioners and decision makers. Further improvements utilizing "business intelligence" strategies have resulted in prototypes designed to provide sophisticated data analysis techniques and results presented in understandable formats for practitioners.

The Louisiana Transportation Research Center (LTRC) is a research, technology transfer, and training center administered jointly by the Louisiana DOTD and LSU. LTRC provides a setting in which the thresholds of technology can by explored and applied in practical ways. By merging the resources of DOTD and LSU, a versatile core of facilities and expertise address the rapidly evolving challenges in the transportation field. LTRC's contributions to the implementation of Louisiana's SHSP include the Local Road Safety Program (LRSP) , traffic and roadway safety training, implementation of the Highway Safety Manual, safety research, communication and outreach and direct assistance to DOTD's Highway Safety Office and to the Governor's Highway Safety Office.

The Louisiana Local Technical Assistance Program (LTAP) located within LTRC plays a major role in the DOTD's safety efforts including development and implementation of the LRSP and management of the local road safety improvement projects funded by the High Risk Rural and the Highway Safety Improvement Programs. LTAP represents LTRC on the Highway Safety Manual Lead State Implementation Team; SHSP Implementation Team; Traffic Records Coordinating Executive Committee; Operation Lifesaver Board of Directors and regional safety coalitions. Under a contract with the Governor's Highway Office, LTAP has coordinated and presented a highly successful annual series of Impaired Driving Workshops for law enforcement officers. The LTAP connection with the local transportation community; elected officials; and other potential safety stakeholders enhances ongoing safety outreach and SHSP implementation activities.

Workforce development for existing and future highway safety professionals is a familiar topic of discussion at the professional safety meetings around the country. The AASHTO Standing Committee on Highway Safety has issued a resolution supporting an aggressive effort to educate and train a multi-disciplinary workforce of transportation professionals in road safety principles and techniques. LTRC has collaborated with the LADOTD for years to host a series of training programs for the DOTD and other safety stakeholders on a variety of topics including Road Safety Audits, Highway Safety Manual implementation, Safety Analyst, speed management, roundabout design and implementation, Work Zone Safety, Low Cost Safety Improvements, Fundamentals of Road Safety and others. LTRC and DOTD have also co-sponsored a pilots of the NCHRP product Road Safety 101 and the NCHRP/ FHWA Highway Safety Manual training. LTRC supports DOTD and the other stakeholders in professional development efforts such as the biannual Louisiana Safety Summit; other regional and national conference implementation and peer exchanges. A recent local road safety peer exchange among the Southern States was a collaborative effort between the Louisiana LTAP; LADOTD: LTRC and the Louisiana FHWA Division.

LTRC implements an extensive research program each year. In 2011, three of the top rated research projects were safety related: Development of a Strategic Research Program for Louisiana; Implementation and Calibration of the HSM; and Development of a Tool to More Effectively Implement and Track Intersection Improvements. A specific team has been identified to manage implementation of these research projects including the LTAP Director and a new road safety engineer staff member.

The partnership between DOTD, the HSRG and LTRC highlights the benefits of collaboration to all stakeholders. The safety stakeholders benefit directly from the products and outreach provided by the university groups and the University uses the opportunity to fund students and research. The HSRG routinely recruits students from different university departments to meet the needs of the project work. This expands the available technical and knowledge base available to the HSRG and exposes students to the highway safety field who otherwise would not have the experience. LTRC works with the other Louisiana University systems to implement research and is investigating how to recruit more students into the area of traffic safety by expanding by research and educational opportunities.

23.) Implementing Pedestrian Safety Countermeasures through University and Government Partnerships: A Case Study from Las Vegas, Nevada- Shashi Nambisan

Shashi Nambisan, Iowa State University
Srinivas S. Pulugurtha, The University of North Carolina at Charlotte
Vinod Vasudevan, Indian Institute of Technology Kanpur, India

This poster summarizes efforts in and outcomes of a program aimed to enhance pedestrian safety and improve pedestrian mobility concerns in the Las Vegas metropolitan area (in Nevada, USA). This research, implementation, and evaluation program had the Federal Highway Administration (FHWA) as the lead sponsor who provided about 75 percent of the funding, and five state and local government agencies as co-sponsors who collectively provided about 25 percent of the funding. The five state and local agencies were: Clark County Department of Public Works (CC), City of Las Vegas Department of Public Works (CLV), Nevada Department of Transportation (NDOT), Nevada Office of Traffic Safety (OTS), and the Regional Transportation Commission of Southern Nevada (RTC). The efforts were led by researchers at the University of Nevada, Las Vegas transportation Research Center. This program was conducted in conjunction with similar efforts in the Miami-Dade County area in Florida, and the City of San Francisco in California.

The program included identifying appropriate pedestrian safety countermeasures for deployment in Las Vegas, Nevada and potentially transferable to other areas in the USA, deploying the countermeasures, and evaluating their effectiveness. As a part of a program, high pedestrian risk locations were identified based on spatial and temporal characteristics of pedestrian crash data and crash rates, demographic characteristics, land use characteristics and traffic characteristics. The countermeasures installed were signs, markings, signals, and other devices, and they were categorized broadly as follows: engineering based, ITS, and others. Appropriate measures of effectiveness (MOEs) were used to evaluate the effectiveness of the countermeasures. Field observations were used to quantify the MOEs. Over 18,000 pedestrians were observed in the field. The analyses include before-and-after studies as well as a comparative evaluation of MOEs across deployment sites and control sites. Parametric and non-parametric statistical tests were used to support the analyses.

Results of the analyses can be summarized broadly based on the relative effectiveness (High, Medium, and Low) and the relative costs (low- L, medium- M, and high – H) of the countermeasures. The following were highly effective countermeasures: Advanced yield markings (L), In-roadway knockdown signs (L), Pedestrian Countdown Signals with Animated Eyes (M), Danish Offset (H), Median Refuge (H), Portable Speed Trailer (H), and Pedestrian Activated Flashing Yellow (H). The following were moderately effective countermeasures: Pedestrian Call buttons that Confirm Press - Visible/Audible confirmation (L), Turning Vehicles Yield to Pedestrians (L), ITS No-Turn on Red Signs (M), and Automatic Pedestrian Detection Devices (H). The following countermeasures had relatively low effectiveness: Warning Signs for Motorists (L), High Visibility Crosswalk Treatment (M), Pedestrian Channelization (H), and Smart Lighting (H).

The lessons learned from this program include critical issues related to coordination, scheduling, and procurement especially when involving multiple administrative jurisdictions and vendors are involved, and issue associated with changes in key personnel at each of these organizations. Other considerations include the significant time and effort required for permitting, procurement, construction processes. Yet other concerns include legal aspects and effectively addressing liability related concerns posed by public agencies. Effective communications with various stakeholders and the user community is critically important. There are significant benefits of involving from the inception a

broad group of partners and stakeholders. Their perspectives, insights, and ingenuity were invaluable in various phases of the program.

24.) Collaboration with UDOT & Local Governments to Improve Sign Management, Kevin Heaslip

Kevin Heaslip, Utah State University

The Manual on Uniform Traffic Control Devices (MUTCD) specifies minimum retroreflectivity requirements that include an obligation for agencies to develop a strategy for maintaining compliance. With a deadline on January 1, 2012 for the implementation of a management plan there has been an increased emphasis on sign asset management. With budget considerations it is important that a transportation agency implement an assessment and management plan that is efficient and provides compliance with the standards required by the Manual on Uniform Traffic Control Devices (MUTCD). The development of an efficient plan requires knowledge of the overall condition of an agency's assets as well as unique considerations regarding their performance.

Through a review of previous data collection efforts, this paper details the development of a data collection strategy for assessing the performance of traffic signs maintained by the Utah Department of Transportation (UDOT). Agency operations, site selection, and attribute collection were all considered while developing a collection plan for an agency where limited inventory and installation data was available. Retroreflectivity measurements were taken for 1,433 UDOT signs. This sample provided a snapshot of current compliance and assisted in the selection of an asset management plan for maintaining sign retroreflectivity. Results from the study showed that UDOT's signs were well over 90% compliant to the MUTCD standards and preliminary management strategies were presented to address vandalism and other damage

25.) Scoping Study For Implementation for The Highway Safety Manual in Alabama, Steven Jones

Steven Jones, Dan Turner, Yingyan Lou, Randy Smith, Dave Brown and Tim Barnett
University of Alabama

The University Transportation Center for Alabama (UTCA) and the Center for Advanced Public Safety (CAPS) at the University of Alabama (UA) initiated a project in 2010 to develop a plan for the Alabama Department of Transportation (ALDOT) to implement the new *Highway Safety Manual* (HSM) methodologies into its day-to-day activities. The project is currently underway and is based on ten primary work tasks, each addressing a major aspect of the implementation planning. Many of the tasks will be conducted in parallel, saving time and allowing better coordination. The final task will be the development of a proposed work plan and schedule for implementation. Each of the tasks is described in the following portions of this proposal.

Task 1, *Learn from Implementation Efforts by Other States*, is intended to foster interaction among the UTCA and CAPS researchers with safety professionals in other states working to integrate the HSM into their practices (e.g., attending Lead State workshops, NCHRP-sponsored training, and related events). The second task maps HSM-related needs and outcomes to various transportation safety providers throughout the state including ALDOT, city and county officials, planning commissions and consultants. The results of this project task will be a technical memorandum detailing when, why and how the various end users can expect to use the HSM and related tools. The document will also identify data-related and training needs for each group to be able to maximize the potential benefits of implementing the HSM. The preparation and circulation of this document to obtain concurrence early in the project will assure that the project team is on track moving forward. The third and fourth tasks are intended to assess the data and other user needs required to use SafetyAnalyst (SA) and the Interactive Highway Safety Design Model (IHSDM), respectively, for safety-related studies in Alabama. Both tasks comprise efforts to identify data needs for the software packages and map these to data sources within ALDOT and other organization involved in traffic safety work in Alabama. The capabilities and demands of the software packages will be examined in light of end user needs and capabilities by way of traditional Strengths/Weaknesses/Opportunities/Threats analysis. The result of this analysis will be a recommendation regarding the feasibility and evaluation of the SA and IHSDM and whether or how the systems provide benefits or logical coordination with the HSM in Alabama. Task 5, *Data Needs*

Assessment, Inventory and Gap Analysis, is an effort to identify any gaps in the data available from ALDOT and related agencies and to develop a plan to collect (where not currently available), maintain and manage the necessary data for successful HSM implementation in Alabama. At the conclusion of this Task, ALDOT will have a plan and process for collecting data needed for optimim operation of the HSM. This plan can serve as a guide for collecting data in other Bureaus, or ALDOT may elect to include the HSM data generation in a larger project that addresses all of ALDOT's data needs. The sixth task represents an effort to integrate the existing traffic safety analysis tools currently used in Alabama, CARE/CORRECT into a new HSM-based approach. The CAPS-developed Critical Analysis Reporting Environment (CARE) has an embedded component that can find hotspots for any type of crash according to specified criteria (high crash, high rates, statistical outliers, etc.). It would be fairly easy to expand CARE and add additional criteria such as Empirical Bayesian (EB) approaches. Cost/benefit Optimization for the Reduction of Roadway Caused Tragedies (CORRECT) has been employed by ALDOT since the early 1980s. CORRECT encompasses the entire process of field investigation of hot spots using data generated during the hot spot determination procedure; it includes the data generated by crash location investigations from which costs and benefits of recommended improvements are determined, and it includes methods for assuring that the maximum benefits are obtained given the funds allocated to an overall program. It has been continuously innovated, and now takes the critical locations obtained by CARE along with the standardized reports of specific crash information for each location and synthesizes the results into an optimal set of roadway improvements. It does this by maximizing the number of lives saved and injuries reduced within the specific total budget that is available for a given program. The seventh task is an attempt to determine whether or not default Safety Performance Function (SPFs) in the HSM are applicable to local conditions in Alabama and, if not, how new Alabama-specific SPFs can be developed. Task 8 will synthesize the results of previous tasks aimed at assessing the feasibility of using SA and IHSDM to perform traffic safety analyses in Alabama and whether or not the existing CARE/CORRECT (or some extension/derivative thereof) and associated data availability. At the conclusion of Task 9, ALDOT will receive the draft implementation plan, which will include work plans for each of the major implementation efforts (research, software development, integration of components, training, data collection, SPF development, calibration, etc.). A time frame and estimated costs will be included in the plan. Finally, Task 10 will allow for additional scoping exercises between ALDOT, UTCA and CAPS to identify future efforts to further the partnership and continue the successful implementation of HSM into safety practices in Alabama.

This poster will present the planned activities associated with each task, progress to date and other issues related to the execution of the partnership between UTCA and ALDOT.

26.) Development of Transportation Safety–Technical Assistance in Massachusetts, Robin Riessman

Robin Riessman, Michael Knodler, and John Collura
University of Massachusetts

The societal costs of traffic safety have been well documented throughout the existing literature; yet this issue remains a critical area of attention. In Massachusetts, the toll of crashes on roadways can be quantified not only in terms of injuries and fatalities but also in terms of cost. Although the various safety stakeholders have both independently and collectively established programs and countermeasures aimed at improving safety, there remains a need for an analytical support mechanism for transportation safety. The primary objective of this research was to establish a Traffic Safety – Technical Assistance Center (TS/TAC) with the intent of providing an analytical support system to enhance current approaches to traffic safety analyses in the Commonwealth of Massachusetts. The established goal of the TS/TAC was to provide a dynamic source for general data analysis and support, program evaluation for initiatives, access to unique transportation datasets (i.e. linked data), and as appropriate, the collection of additional data. There is a direct and specific need for research tools like these. To that point, SAFETEA-LU, the current Federal transportation legislation, requires transportation agencies to be more data-driven in their approach to programming and to expand accountability and reporting. By all accounts, the forthcoming transportation bill will likely increase the demand for funding to be tied directly to quantifiable performance measures. This emphasis translates into an increased demand for high quality, accurate safety data and analyses in order to justify expenditures in the area of safety, a high priority area of the forthcoming legislation.

The University of Massachusetts Traffic Safety Research Program (UMassSafe) is a multidisciplinary traffic safety research group housed in the University of Massachusetts Transportation Center in the College of Engineering at the University of Massachusetts Amherst. At UMassSafe, we seek to reduce the frequency and severity of crashes through the rigorous examination and analysis of safety-related data to better understand crashes, driver behavior, and related factors. The developed TS/TAC serves to meet the immediate data analysis needs of safety shareholders; with the information provided being useful for problem identification, program evaluation, accountability reporting (including benefit/cost analysis), and analytical comparisons across the United States.

The safety analysis is completed using safety data available in the UMassSafe Traffic Safety Data Warehouse. The data warehouse includes “administrative” datasets collected by state agencies and other organizations; including crash, citation, roadway inventory, hospital, etc. Currently, 14 such datasets are housed in the UMassSafe traffic Safety Data Warehouse. Additionally, the analysis includes linked datasets created using the aforementioned administrative databases. Crash, citation, hospital, death certificate, and roadway inventory data have been linked using advanced statistical methodologies to create a single dataset that allows analysts to consider the comprehensive crash experience; including driver behavior, crash characteristics, roadway environment, and crash outcomes such as injuries and costs. This data and associated analysis is used to assist state agencies via the TS/TAC.

26.) A Collaborative Effort to Promote Use of the Safety Edge in Iowa, Shauna Hallmark

Shauna Hallmark (ISU), Midwest Transportation Consortium (MTC), Tom McDonald, Center for Transportation Research and Education at ISU, Bob Sperry, Center for Transportation Research and Education at ISU, Jerry Roche, Iowa Division, FHWA, Keith Knapp, Iowa LTAP

FHWA estimates that 160 fatalities and over 11,000 injuries annually are related to pavement edge drop-off. When a vehicle leaves the paved roadway surface onto an unpaved shoulder, scrubbing may occur between the exposed vertical pavement edge and tire resulting in loss of control. Edge drop-off can also reduce vehicle stability and affect a driver's ability to control their vehicle when inadvertently leaving the paved driving area. The Safety Edge$_{SM}$, developed by FHWA, places a 30° fillet during paving using a device that shapes and consolidates the asphalt material at the pavement edge. The Safety Edge$_{SM}$ is part of FHWA's Every Day Counts based on research indicating that a sloped pavement edge surface can more easily be traversed by vehicles attempting to remount the pavement edge after leaving the paved roadway surface.

Although it is a relatively simple countermeasure and provides significant safety benefits, the Safety Edge$_{SM}$ had not caught on as quickly as desired in Iowa, consequently the Center for Transportation Research and Education (CTRE) at Iowa State University worked with an advisory team of 24 individuals from the Iowa DOT, FHWA, Iowa counties, a local contractor, the Iowa Concrete Paving Association, and the Asphalt Paving Association of Iowa to develop educational materials, market the Safety Edge$_{SM}$ to Iowa Counties, and conduct early analyses of the Safety Edge$_{SM}$. The project resulted in application of the Safety Edge$_{SM}$ for 20 county projects during the 2010 construction season. The project resulted in four deliverables which can be used nationally by state, county and local roadway agencies. The material supplements FHWA's Every Day Counts Program and includes:

1) A final report describing outreach activities (which included hosting open houses, loaning Safety Edge$_{SM}$ equipment, providing technical assistance, and trouble-shooting), evaluation of the Safety Edge$_{SM}$, and lessons learned;
2) Training material that can be used by Local Technical Assistance Programs (LTAP) to implement and troubleshoot the Safety Edge;
3) Development of PCC Design Standard for the Safety Edge and first national demonstration of the Safety Edge with PCC on E-34 in Jones/Linn County, Iowa;
4) A chapter in the Iowa Lane Departure Strategic Plan.

The poster will consist of:

- Introduction to summarize the safety impacts of pavement edge drop-off and a brief description of the Safety Edge$_{SM}$;
- Description of the collaborative project activities to encourage use of the Safety Edge$_{SM}$;
- Description of project deliverables;
- Lessons learned in the university-agency partnership