

TranSearch

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NEW TRAFFIC PATTERN FOR THE ITS LAB



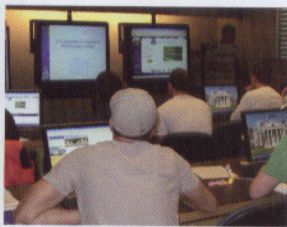
Holly Rybinski teaches the Intelligent Transportation Systems course in the Lab.

The Department's Intelligent Transportation Systems Lab has been expanded into a multi-purpose teaching and research facility. Prior to the recent renovations, the lab was used strictly for research.

Since it was initially equipped several years ago, the state-of-the-art lab has received real-time video images of traffic conditions from the Traffic Management Center of the Delaware Department of Transportation (DelDOT), enabling transportation facilities and services to be monitored, vehicle operations and facilities to be controlled, and information to be provided to the public regarding the condition of transportation services and facilities.

"The lab was already a great resource for our researchers, DelDOT, and the public," says DCT Director Arde Faghri. "But we thought it could be utilized even more for the education of transportation engineering students and for the training of traffic control professionals from DelDOT."

Repurposing the lab required the purchase of several new computers, establishment of a communication infrastructure, and the addition of desk space and seating. The conversion process was facilitated by Silvana Croope, a Ph.D. candidate in Transportation



Students utilize the newly installed, state-of-the-art computer system.

Engineering at the University of Delaware and a summer employee of DelDOT, who worked with the agency and the department to determine the needs for the new facility.

The actual renovations were carried out with the assistance of three CEE staff members: computer technician Eric Eckman, electronics technician Michael Davidson, and machinist Doug Baker. In addition, Greg Juck, a student computer specialist, contributed to the project.

Three large monitors in the front of the room now allow independent viewing of computer screens and web information, including DelDOT's traffic cameras. Computer tables that previously sat only four students were modified to accommodate ten each, bringing the total student capacity of the room to twenty.

Holly Rybinski, an engineer with Vollmer Associates, supervised the project. Rybinski is also an adjunct professor in the Department of Civil and Environmental Engineering who teaches regularly in the areas of ITS, Traffic Simulation and Modeling, and Traffic Engineering.

"We're very pleased that this project came together the way it did," Faghri says. "DelDOT's Traffic Engineering Division, through Gene Donaldson and Donald Weber, provided us with a generous grant to help fund the conversion. In addition, Bill Lee and Carolyn Mailey of DelDOT provided their expertise."

"The concept of converting the lab was raised in July," he continues, "and, through the concerted efforts of everyone involved in the department and at DelDOT, it was ready for use within just two months. Our faculty and students were able to use the new state-of-the-art teaching facility when the new semester began in September."

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MESSAGE FROM THE DIRECTOR



Ardeshir Faghri, Director

I would like to take this opportunity to wish all of our readers a healthy, happy and successful 2007. Please take a few minutes of your time to complete the questionnaire that is attached to this newsletter. Your answers will help us greatly in updating our membership information so that we can serve you (our constituents) more effectively. Also, please mark your calendars for Wednesday, November 14, 2007. This is when the Delaware Center for Transportation will hold its one-day Transportation Education, Research and Security Forum. A preliminary advertisement is printed in this newsletter. More detailed information will be mailed to you in the near future.

During the last few years, DCT has been going through major changes, including involvement in the Clean Energy for Transportation program and the TIER II Federal University Transportation Center (UTC) program as well as membership in the Mid-Atlantic Region of the University Transportation Program (MAUTC). A new organizational chart and a new strategic plan are being drafted to reflect these new changes and help the center directorship define its new vision and set new goals. The next issue of *TranSearch* will include information regarding these new developments. Regardless of the internal changes that are taking place within DCT, our main goals and objectives will always remain the serving of our constituents regarding transportation education, research and technology transfer, effectively and efficiently.

Again, a happy 2007 to all of you. For up-to-date information regarding all the programs offered within DCT, please visit our website at www.ce.udel.edu/dct.

PRINCIPAL INVESTIGATOR/ DELDOT PROJECT MANAGER MEETING

On Friday, October 20, 2004, the DCT-affiliated faculty members working on DelDOT research projects and their DelDOT Project Managers held a meeting to discuss the work plan and progress made to date. One-on-one meetings followed general presentations by the researchers and discussions by the attendees. This productive meeting helps the investigators fine-tune their work plans to better respond to the research needs of DelDOT. The following lists the research projects, Principal Investigators, and DelDOT Project Managers:

- Potential of Retention Ponds to Produce Nuisance Mosquitoes and West Nile Virus Vectors II: Field Trials for Non-Pesticidal, Self-Sustaining Control of Mosquitoes
Principal Investigator: Jack Gingrich
Project Manager: Marianne Walch
- Asset Management as a Strategic Decision Making Tool in DelDOT
Principal Investigator: Sue McNeil
Project Manager: Ralph Reeb
- Comparative Analysis of Best Management Practices in Transportation Design, Construction, and Management Planning to Accommodate Growing Elderly Needs in Delaware
Principal Investigators: Bernie Dworsky, Robert Warren, Doug Tuttle, Julie O'Hanlon
Project Manager: Mark Luszcz
- Scour Monitoring of the Indian River Inlet Bridge
Principal Investigators: Jennifer Righman, Michael Chajes, Jamie MacMahon, Jack Puleo
Project Manager: Doug Robb
- 2006-2007 GPS Travel Time and Delay Data Collection and Analysis
Principal Investigator: Ardeshir Faghri
Project Manager: Mark Eastburn
- Enhancing Delaware's Highways: A Natural Vegetation Project
Principal Investigator: Sue Barton
Project Manager: Chip Rosan

DCT DISTINGUISHED SPEAKER SERIES FEATURES TALK ON THE "BIG DIG"



Chris T. Hendrickson, Duquesne Light Professor of Engineering at Carnegie Mellon University, was a DCT Distinguished Speaker on September 7, 2006. He spoke on "Management Practices on the Boston Central Artery

(Big Dig) Project" to University students and faculty, as well as guests from the DelDOT and local transportation agencies.

Professor Hendrickson presented an overview of this \$16 billion project, which is open but not fully complete. The Big Dig includes a tunnel replacement of the formerly elevated I-93 through downtown Boston, an extension of I-90 under Boston Harbor to Logan International Airport, reconstruction of the rail approaches to South Station, and numerous improvements to the local street system.

The Big Dig is one of the largest and most costly transportation projects ever undertaken in the United States. Professor Hendrickson was frank about the numerous problems associated with the project such as tremendous cost overruns, design and construction errors, and faulty project management. He believes that the number one obstacle was the lack of a management oversight process that should have included greater coordination among federal and state officials and their consultants.

The Big Dig was and continues to be an extremely complex engineering project. Professor Hendrickson's audience may never participate in a venture of this magnitude, but he gave them a valuable guide to avoiding the same mistakes made in Boston on their future projects.

PLEASE MARK YOUR CALENDARS

Transportation Education, Research
and Security Forum

Wednesday, November 14, 2007

8 am to 3 pm

Clayton Hall, University of Delaware

Government Agencies • Private Sector • Academia
Civic Groups • Individuals

We hope you can join us in this event to define the
transportation-related problems and issues facing
Delaware and the Mid-Atlantic Region.

TRANSPORTATION PLANNING MODEL UPDATE



Professor Emeritus David Boyce of the University of Illinois at Chicago delivered a lecture on "Convergence of Road Traffic Assignment, Feedback, and More!" on November 10, 2006. Professor Boyce came to the

University at the invitation of his former colleague, Dr. Sue McNeil, who is now at UD.

Traffic assignment is a component of traffic forecasting models. In this component, traffic volumes are assigned to the specific links of a potential highway network based on many variables such as surrounding land use, number of lanes, origins and destinations, etc. Transportation planners may continually adjust these variables and test many networks until the optimum network is built.

Professor Boyce's remarks focused on a new traffic assignment algorithm that finds consistent route flows, which are the most likely route choices given user-equilibrium link flows. His remarks were very timely, since the University has recently acquired Cube, the latest transportation forecasting model that DelDOT uses. DelDOT and the University are cooperating to ensure that graduating civil engineers have good knowledge of DelDOT's modeling practices.

ITE STUDENT CHAPTER UPDATE

The Student Chapter of the Institute of Transportation Engineers (ITE) is having another active year. Chapter president, Kevin Connor, CE '07, leads a group of about a dozen members. Kathryn Peacock of McCormick, Taylor consulting (and a UD graduate) and Larry Klepner of the DCT advise the group.

The chapter had three meetings during the fall 2006 semester. At the first meeting, President Connor led a discussion of the year's planned activities. Ms. Peacock gave tips on job seeking and interviewing techniques to the members. At its second meeting, the members participated in the regional meeting of the Middle Atlantic Section of the ITE that took place on the University campus. The highlight of the meeting was a lecture by Professor Sue McNeil, who spoke on developing asset management programs in the transportation industry.

Finally this semester, the chapter met to hear from Mr. Todd Lang, a Baltimore area consultant, who compared careers in the private and public sectors. His talk sparked numerous questions from seniors who are hunting for their first full-time jobs.

During the second semester, the chapter is planning tours to DelDOT and a major transportation facility in either Philadelphia or northern Delaware.

BRIDGE CENTER TEAM DEVELOPS PLAN FOR FHWA

by Diane S. Kukich

Research Administrator, Center for Innovative Bridge Engineering

A team of faculty from the UD Center for Innovative Bridge Engineering recently completed a draft workplan for the Federal Highway Administration's Long-Term Bridge Performance (LTBP) Program. The project team included five faculty members: Michael J. Chajes, Sue McNeil, Harry W. Shenton III, Dennis R. Mertz, and Nii Attoh-Okine.

The objective of the LTBP program is to collect, document, and make available high-quality quantitative performance data on a representative sample of bridges nationwide. A similar program focusing on pavement performance was initiated in 1987 and is now managed by FHWA in partnership with the states and provinces.

"One of our goals in developing the workplan for the bridge program was to learn from other experiences such as the Long-Term Pavement Performance Program," says Attoh-Okine, "in terms of what works and what does not in carrying out such an initiative."

Mertz points out that a significant percentage of the nation's bridge inventory is classified as either structurally deficient or functionally obsolete. While a number of bridge management tools and databases are available, there is still much to be learned about the performance and degradation of structures and materials over time, as well as about the effectiveness of maintenance, repair, and rehabilitation strategies for a given bridge component or system.

"New life-cycle cost and performance models are required, but high-quality quantitative data is needed to serve as the foundation for the development of these new models and decision-making algorithms," says McNeil.

Advised by Chajes, graduate student Melissa R. Williams focused her master's thesis on documenting the motivation for assessing the long-term performance of bridges and explaining the need for the LTBP program. Her work highlighted some limitations of the current National Bridge Inventory (NBI) database, established the need for the next-generation NBI, and discussed how the LTBP program will be utilized to develop it.

To collect data, the LTBP program will comprise three bridge monitoring and evaluation components: (1) periodic inspection of a representative sampling of bridges, (2) continuous monitoring of a set of instrumented bridges, and (3) forensic autopsying of a small group of decommissioned bridges.

"These three types of monitoring and evaluation strategies will provide complementary information about the various issues involved in effective bridge management," says Shenton.

The draft framework, which defines both short- and long-term program activities and goals, will be presented to key members and representatives of the highway bridge community for comment and recommendations in a series of workshops. The first of these, the "FHWA/NSF Workshop on Future Directions for Long-Term Bridge Performance (LTBP) Monitoring, Assessment, and Management," was held in Las Vegas, Nevada, on January 9 and 10, 2007. Chajes represented the UD team at the meeting.

"The LTBP program will require considerable synergy and cooperation among and between FHWA, bridge owners, the bridge industry, and academia," says Hamid Ghasemi, LTBP program manager at FHWA. "If successful, the program will drive efforts that result in bridges that last longer, require less maintenance, and can be modified to accommodate changes in traffic or function much more quickly and far less intrusively than current technology allows."

MEEHAN JOINS CEE FACULTY



Dr. Christopher L. Meehan joined the University of Delaware's Department of Civil and Environmental Engineering as an Assistant Professor in September 2006. He earned his Ph.D. at Virginia Polytechnic Institute & State University and then served as a Visiting Researcher at the University of California, Davis. Meehan is a geotechnical engineer whose research focuses on shear behavior of soils under static and dynamic

loading conditions, including the development of soil and strength characterization methods that are practical, economical, and theoretically robust. As a graduate student, he was the recipient of a United States Society on Dams Scholarship and a Via Master's Fellowship Award Winner. He is a member of Chi Epsilon, the Civil Engineering Honor Society. Chris is an affiliated faculty member in the Department's Center for Innovative Bridge Engineering.

RESEARCH FELLOW PRAKASH RANJITKAR JOINS DCT

Dr. Ranjitkar joined the Department of Civil and



Environmental Engineering in September 2006 as a Research Fellow. Previous to joining University of Delaware, he was Postdoctoral Research Fellow at Hokkaido University, where he completed his Ph.D. in 2004. His research interests focus on operation and management of traffic facilities with emphasis on the applica-

tions of innovative technologies in transportation. Dr. Ranjitkar has some industrial experience in the area of construction management of roads, buildings, hydropower stations and waste water management projects.

PUBLICATIONS

During the 2005-2006 fiscal year, the Delaware Center for Transportation published project reports that have been completed by the Principal Investigators who have been doing research for the specific needs of DelDOT. For a complete list of our publications, please visit our website, www.ce.udel.edu/dct. If you would like to obtain a copy of any DCT publications, contact sandy@ce.udel.edu.

Active Adult (55+) Community Trip Generation Rates

by David P. Racca, Center for Applied Demography and Survey Research, in cooperation with Project Manager Bill Brockenbrough, DelDOT

Application of Advanced Composites To Steel Bridges: A Case Study on the Ashland Bridge

by Michael Chajes, Department of Civil and Environmental Engineering

Application of Global Positioning Systems (GPS) to Travel Time and Delay Measurements 2003 Phase

by Ardeshir Faghri, Department of Civil and Environmental Engineering, in cooperation with Project Manager Daniel LaCombe, DelDOT

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Cost and Benefits of Advanced Public Transportation Systems at DART First State

by David P. Racca, Center for Applied Demography and Survey Research, in cooperation with Project Manager Bill

Hickox, DelDOT

Cracking of Overhead Signs Structures and Their Repair Using Composite Fabric as a Wrap

by Baidurya Bhattacharya, Department of Civil and Environmental Engineering, in cooperation with Project Manager Jason Arndt, DelDOT

DART First State: Transit Accident Study: A Review of Operators' Time on Duty, Rest Between

by Douglass F. Tuttle, Institute for Public Administration, in cooperation with Project Manager M. Hacket, DelDOT

Environmental Evaluation of Roundabouts vs. Unsignalized and Signalized intersections in Delaware

by Ardeshir Faghri, Department of Civil and Environmental Engineering, in cooperation with Daniel LaCombe, DelDOT

Inspection Guidelines for Construction and Post-Construction of Mechanically Stabilized Earth Walls

by Dov Leshchinsky, Department of Civil and Environmental Engineering, in cooperation with Project Manager, Dennis O'Shea, DelDOT

Interconnectivity: A Review of the Current Status and Steps Necessary to Increase the Level of Interconnectivity of Future Development in Delaware

by Edward O'Donnell, School of Urban Affairs, Institute for Public Administration, in cooperation with Project Manager Ralph Reeb, DelDOT

Load Rating of Concrete-Encased Steel Girder Bridges

by Michael J. Chajes, Department of Civil and Environmental Engineering, in cooperation with Project Manager Jiten Soneji, DelDOT

Load Rating of Arch Bridges

by Michael Chajes, Department of Civil and Environmental Engineering, in cooperation with Project Manager Dennis O'Shea, DelDOT

MMFX Rebar Evaluation for I-95 Service Road Bridge 1-712B

by Michael Chajes, Department of Civil and Environmental Engineering, in cooperation with Project Manager Jason Hastings, DelDOT

Quality Control and Quality Assurance of Hot Mix Asphalt Construction in Delaware

by Nii Attoh-Okine, Department of Civil and Environmental Engineering, in cooperation with Project Manager Wayne Kling, DelDOT

Resilient Modulus Construction Materials

by Nii Attoh-Okine in cooperation with Project Manager Wayne Kling, DelDOT

Sealing Material Research

by Nii Attoh-Okine, Department of Civil and Environmental Engineering, in cooperation with Project Manager G. Pusey, Former DelDOT

Transforming Data Into Information: The Development and Demonstration of a Model to Support Planning

by David P. Racca, Center for Applied Demography and Survey Research, in cooperation with Project Manager Mike DuRoss, DelDOT

Trip Attraction Rates of Shopping Centers in Northern New Castle County, Delaware

by Shinya Kikuchi, Department of Civil and Environmental Engineering, in cooperation with Project Manager Bill Brokenbrough, DelDOT

Research

A Principal Investigator/Project Manager (PI/PM) meeting was held at the end of October. The PIs gave brief reports on their projects and then met one-on-one with the PMs. DCT is meeting with the DelDOT Research Committee in January to prioritize DelDOT concerns and identify projects for funding in FY2008.

The current active research projects are listed and described briefly below. As each project is completed, an abstract will be available on the DCT website (<http://www.ce.udel.edu/dct>).

Characterization of SR-1 Concrete Test

This project focuses on characterization of the concrete used for State Route 1 (SR-1), including shrinkage and modulus evaluations.

Principal Investigator: Danny Richardson, Department of Civil and Environmental Engineering

Project Manager: Wayne Kling, Division of Materials and Research

Succession Planning

This project focuses on developing a strategy for the transfer of institutional knowledge to the next generation of DelDOT professionals, including evaluating the pros and cons of consultants vs. in-house expertise and work force assessment.

Principal Investigator: Doug Tuttle, School of Urban Affairs

Project Manager: AnnaMay Decker, Division of Planning

Evaluation of the Potential of Retention Ponds and Sand Filters to Produce Nuisance Mosquitoes and West Nile Virus Vectors

The purpose of this project is to identify a non-pesticidal, sustainable treatment method to reduce the number of mosquito larvae in stormwater retention ponds.

Principal Investigator: Jack Gingrich, Department of Entomology and Wildlife Ecology

Project Manager: Maryanne Walsh, Division of Field Services

2006-2007 GPS Travel Time and Delay Data Collection and Analysis

This ongoing project uses state-of-the-art satellite position equipment to collect real-time statewide traffic data, which is then analyzed and displayed using Geographic Information Systems software.

Principal Investigator: Arde Faghri, Department of Civil and Environmental Engineering

Project Manager: Dan LaCombe, Division of Planning; Dan Blevins, WILMAPCO

Letting Scenic and Historic Roads in Delaware Tell Their Story

This effort is focused on developing a web-based manual to facilitate the identification, designation, and management of scenic and historic highways in Delaware.

Principal Investigator: David Ames, Center for Historical Architecture and Design

Project Manager: Maria Andaya, Division of Planning

Enhancing Delaware's Highways: A Natural Vegetation Project

This project is investigating vegetation models conceived to restore Delaware's roadside landscapes to a more natural state reflecting regional flora.

Principal Investigator: Sue Barton, Department of Plant and Soil Sciences

Project Manager: Chip Rosan, Roadside Environment

Defining and Protecting Delaware's Historic Bridges

This project focuses on a number of issues associated with reevaluating the State's historic bridge list, including determining what constitutes a historic bridge, differentiating between old and historic bridges, developing life-cycle cost strategies for historic bridges, and investigating mobility and congestion problems associated with keeping older structures in service.

Principal Investigator: David Ames, Center for Historical Architecture and Design

Project Manager: Glen Lovelace, Bridge Design

Scrap Tire Research

This project focuses on determining the environmental and engineering properties that should be monitored during the construction of shredded tire embankments; the work includes instrumentation, installation, monitoring and an analysis plan.

Principal Investigator: Nii Attoh-Okine, Department of Civil and Environmental Engineering

Project Manager: Wayne Kling, Division of Materials and Research

Hot-Mix Asphalt Specification Research

This project is a continuing analysis of DelDOT's Hot Mix Asphalt Quality Assurance Specifications, including an updated comparison to other states, particularly Pennsylvania and Maryland.

Principal Investigator: Nii Attoh-Okine, Department of Civil and Environmental Engineering

Project Manager: Wayne Kling, Division of Materials and Research

Laboratory Determination of Resilient Modulus of Unbound Materials and Hot Mix Asphalt

This project focuses on reviewing the work done in the "Resilient Modulus" project and identifying gaps between

products from that project and the recently released pavement design procedure.

Principal Investigator: Nii Attoh-Okine, Department of Civil and Environmental Engineering

Project Manager: Wayne Kling, Division of Materials and Research

Comparative Analysis of Best Practices in Transportation Planning, Design, Construction and Management to Accommodate Growing Elderly Needs

This project focuses on investigating services and programs to accommodate the increasing number of elderly drivers in Delaware, provide alternatives to driving, and improve overall elderly-friendly mobility standards.

Principal Investigator: Bernie Dworsky, Institute of Public Administration

Project Manager: Mark Luszczyk, Division of Transportation Solutions

Asset Management as a Strategic Decision-Making Tool in DeDOT

This project focuses on the use of asset management as a data-driven decision-making tool; the need for such a tool is motivated by escalating public demand for accountability, aging infrastructure, increasingly constrained resources, new funding challenges, and increasing emphasis on the private provision of public service and public-private partnership.

Principal Investigator: Sue McNeil, Department of Civil and Environmental Engineering

Project Manager: Ralph Reeb, Division of Planning

Examination of GIS and Current Information System Plans and Responsibilities

This project focuses on appraising the strengths and weaknesses of existing and proposed GIS and information system efforts within DeDOT's Division of Planning.

Principal Investigator: David Racca, Center for Applied Demography and Survey Research

Project Manager: Joseph Cantalupo, Division of Planning

Rating of 4-Way Stop Intersections for Conversion to Roundabouts

This project is the second phase of work aimed at assessing the use of roundabouts as a safer, cleaner alternative to four-way stops, with Phase II addressing the rating of four-way stop sign intersections for conversion to roundabouts to improve traffic flow and safety.

Principal Investigators: Avi Polus and Arde Faghri, Department of Civil and Environmental Engineering

Project Manager: Dan LaCombe, Division of Planning

Fuel Cell Bus

The project focuses on developing a fuel-cell-powered technology demonstration vehicle, establishing a refueling infrastructure, and conducting reliability, safety, and durability studies.

Principal Investigator: Ajay Prasad, Department of Mechanical Engineering

Project Manager: Sean Rickerson, FTA

DOT TIER II University Transportation Center

The new Tier II UTC at the University of Delaware will focus on resiliency of transportation corridors; the overall goal of the center is to support research, education, and technology transfer that will improve our ability to plan, design, construct, manage, and maintain an advanced transportation infrastructure.

Principal Investigator: Sue McNeil, Department of Civil and Environmental Engineering

Project Manager: Amy Stearns, RITA

Investigating the Cost, Liability, and Reliability of Anti-Idling Equipment for Trucks

This project focuses on investigating the cost, liability, and reliability of anti-idling equipments for trucks, including evaluation of environmental, energy, and economic impacts as well as on developing policy recommendations to curb idling and facilitate the entry of anti-idling equipment in the marketplace in Delaware.

Principal Investigators: Young-Doo Wang and John Byrne, Center for Energy and Environmental Policy

Project Manager: Mark Glaze, Division of Planning

Scour Monitoring of the Indian River Inlet Bridge

This project focuses on evaluating existing scour detection technologies, developing a scour detection system for the existing Indian River Inlet Bridge, and assessing the structural integrity and safety of the bridge during its remaining service life while replacement options are explored and developed.

Principal Investigator: Jennifer McConnell, Department of Civil and Environmental Engineering

Project Manager: Doug Robb, Division of Transportation Solutions

Moment Redistribution and the Service II Limit State

The objective of this work is to evaluate the current stress limits for steel I-girders at the Service II limit state, with the long-term goal being to increase economy in steel bridge designs.

Principal Investigator: Jennifer McConnell, Department of Civil and Environmental Engineering

Project Manager: Doug Robb, Division of Transportation Solutions

2006 Bridge Data Management Using In-Service Data

This project is aimed at using peak strains produced by ambient traffic to determine accurate bridge ratings.

Principal Investigator: Michael Chajes, Department of Civil and Environmental Engineering

Project Manager: Doug Finney, Division of Maintenance and Operations

Instrumentation and Monitoring of the Indian River Inlet Bridge: Phase I

The objective of this project is to develop and install a long-term structural monitoring system for both the substructure (the MSE walls used to support the bridge approaches) and the superstructure of the new Indian River Inlet Bridge.

Principal Investigator: Michael Chajes, Department of Civil and Environmental Engineering

Project Manager: Jiten Soneji, Bridge Design

Assessing the Fatigue Life of Delaware's Steel Bridges

This project is aimed at assessing the fatigue life of Delaware's steel bridges to enable identification and implementation of appropriate repair and retrofit techniques, thereby preventing fatigue cracks, which require costly road closures and repairs.

Principal Investigator: Dennis Mertz, Department of Civil and Environmental Engineering

Development of State-Specific Truck Weights

The goal of this work is to develop state-specific data in terms of design load for strength design and rating, which will aid DelDOT in more cost-effective design and operation of bridges.

UPCOMING T² CENTER EVENTS

January 22-25, 2007

Transportation Research Board Annual Meeting
Washington, D.C.

February 14, 2007

Annual DelDOT Maintenance/
Operations Conference
Kent Poly-Tech High School, Woodside

March 13, 2007

Right-of-Way Appraisers Workshop
Clayton Hall, Newark

April 2-4, 2007

Annual Roadway Management Conference
Double Tree Inn, Charlottesville, VA

April 17-18, 2006

Pedestrian Facility Design
Kent Poly-Tech High School, Woodside

COMING SOON:

Geotech Workshops • Intersection Design
Work Zone Flagger Certification
Effective Communications
Asset Management

For up-to-date information on T² Center events, please visit our web page at www.ce.udel.edu/dct/t2/t2.htm or call 302-831-6241

FHWA DELAWARE WELCOMES NEW DIVISION ADMINISTRATOR

Hassan Raza recently joined the Delaware Federal Highway Administration (FHWA) office as the new Division Administrator. Hassan is responsible for overall Federal-aid highway program delivery in Delaware. He is committed to excellent customer service to partners in the Delaware Department of Transportation, the Metropolitan Planning

Organizations, local agencies, industry, and academia.

Hassan served as Assistant Division Administrator in the Maryland and New Jersey Divisions prior to this assignment. He joined the Federal Highway Administration in 1980 as a Highway Engineer Trainee. Other FHWA assignments include Transportation Planning Engineer in the New York Division, Area Engineer (Pavements and Environment) in Massachusetts, Project Development Manager in the Kuwait Division, Program Manager for Pavement Preservation in FHWA Headquarters in Washington, DC, and Programs and

Technology Team Leader in the Maryland Division. In 1999, Hassan traveled to Saudi Arabia and Kuwait at the invitation of host governments to assist in infrastructure preservation and employee development programs.

He is a graduate of the Polytechnic Institute of New York, where he received both Bachelor of Science and Master of Science degrees in Civil Engineering and Transportation Planning & Engineering. He has a BS degree in Physics from the University of Punjab in Pakistan, and he is a licensed Professional Engineer in the State of California.

Hassan was recently awarded the U.S. DOT Secretary's Award and the Federal Highway Administrator's Award for his contributions to Woodrow Wilson and Inter-County mega projects in Maryland. Hassan brings a wealth of experience to his new position and he looks forward to enhancing economic growth opportunities and the quality of life for Delawareans.

(This article was contributed by Rosemary Samick, Transportation Specialist, at the FHWA division office in Dover, DE)

RESEARCH PAYS OFF



Reducing the Illegal Passing of School Buses

Video Footage Assists in Documentation, Training, and Raising Public Awareness

JEFFREY C. TSAI AND DEREK GRAHAM

Tsai is Program Director, Pupil Transportation Group, Institute for Transportation Research and Education, North Carolina State University, Raleigh. Graham is Section Chief, Transportation Services, North Carolina Department of Public Instruction, Raleigh.

According to TRB Special Report 269, *The Relative Risks of School Travel: A National Perspective and Guidance for Local Community Risk Assessment*,¹ the school bus is the safest mode of school transportation in the United States. Nonetheless, the nation experiences an average of 20 school bus-related fatalities per year. One-third of these fatalities occur when motorists illegally pass a stopped school bus, ignoring the flashing red warning lights and the deployed stop-arm.

Problem

North Carolina school districts operate more than 13,000 school buses daily, and illegal passing of school buses takes place an average of 1,900 times each day. In North Carolina, the stop arm violation—passing a stopped school bus while the side-mounted stop sign is deployed—is the only type of traffic violation for which law enforcement relies on citizen reports. The violation also carries the second highest penalty for a moving violation, next to the penalty for driving while intoxicated.

Law enforcement officers, however, have questioned the validity of some violation reports. Occasional stepped-up enforcement efforts often produce few or no observed violations.

The North Carolina Department of Public Instruction and the Institute for Transportation Research and Education at North Carolina State University set out to find ways to reduce the illegal passing of stopped school buses. The study focused on three coastal school districts: Onslow, Pender, and New Hanover counties. In Onslow County, a high level of collaboration among agencies—plus the use of external, bus-mounted video cameras—led to notable success.

¹ www.TRB.org/publications/sr/sr269.pdf

Solution

Gathering Stakeholders

At the initial project meeting with stakeholders, law enforcement officers were skeptical about the magnitude of the problem and about the validity of the reported violations. Officers also expressed concerns about the deployment procedures for stop arms, particularly the way that some drivers sometimes activate the stop arm before coming to a stop, in an attempt to control traffic. Because of this, some violation reports filed by bus drivers had been dismissed and were not pursued through the judicial system.

The first step of the project, therefore, was to conduct a question-and-answer session for all stakeholders. The goal was to ensure that the law enforcement officers who issue the citations, the district attorneys who seek the convictions, the bus drivers who file the violation reports, and the bus driver trainers all agree on what constitutes illegal passing of stopped school buses.

Video Cameras

To address questions about the school bus stop arm deployment procedures, the project team conducted a study using video cameras. The Onslow County project team mounted weatherproof video cameras outside the bus near the stop arm of selected school buses operated by drivers who had reported frequent illegal passing. The video cameras recorded the date, the time, the speed of the bus, the activation of the amber warning lights, and the deployment of the stop arm.

The initial use of the video cameras was to perform a time and motion study of how bus drivers were operating the traffic control devices—the amber warning lights, the red warning lights, and the stop arm. The videos showed that bus drivers sometimes failed to come to a complete stop before activating the red warning lights and stop arm.

The daily recordings for each bus also captured at

EDITOR'S NOTE:

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Video footage snapshot documents a passing violation while the school bus was stopped (vehicle speed is 0) and the stop arm was deployed (red warning lights were activated).

least one or two vehicles illegally passing while the stopped bus was loading and unloading school children. Because the footage documented that the school bus was stopped and that the stop arm was deployed, the violations were easily verified.

The transportation director for Onslow County Schools shared the findings from the daily footage with local highway troopers. The footage convinced the law enforcement officers of the magnitude of a problem observed only rarely by patrols.

Training Drivers

The focus on stop arm violations and the implementation of the video technology brought the school system transportation staff and law enforcement agencies together to work toward a common goal. The time and motion study revealed that drivers may not have followed consistently the procedures for making passenger stops.

In North Carolina, school bus drivers are trained to activate the vehicle's amber warning lights 300 feet before the stop, stop the bus 15 feet short of the closest waiting passenger, come to a complete stop, check the traffic, and then open the door. Opening the door activates the red warning lights and the stop arm. The time and motion study revealed that drivers did not keep to the 300-foot warning stage and sometimes deployed the stop arm before the bus came to a complete stop.

The video footage pointed out the need for continued education of school bus drivers. A brochure and 6-minute video, "Your School Bus Passenger Stop: Consistency Makes the Difference," were developed

and distributed throughout the state.

The training videotape emphasizes that the school bus drivers' only ways to communicate with motorists are through the vehicle's amber warning lights and red flashing lights. The bus driver must use these warning devices consistently, so that motorists can anticipate when and where the bus will make a stop.

After the reinforcement training in Onslow County, the average daily number of reported violations of the no-passing law filed by the 203 bus drivers dropped. The one-week tally declined from 22.6 to 15 violations per day.

Raising Awareness

Onslow County added more video cameras to the fleet. Working with the district attorney's office, law enforcement agencies issued citations to owners of the vehicles involved in the recorded violations. The locations of the violations also were mapped on a geographic information system, along with the times of the violations, allowing officers to identify high-incident locations for increased enforcement.

Motorists who realize the dangers inherent in the violation will be less likely to pass the stop arm. A key goal of the project, therefore, was to heighten public awareness. Radio advertising, television advertising, press conferences, and educational materials spread the message, along with promotions during School Bus Safety Week and at the North Carolina State Fair.

Television stations in Onslow County incorporated the video footage from the school buses into evening news reports. The result was a further decrease in stop violations.

Frame from school bus driver reinforcement training videotape, produced by the North Carolina Department of Public Instruction and the Institute for Transportation Research and Education, North Carolina State University, with funding from the National Highway Traffic Safety Administration.



Application

The success of Onslow County Schools' experience with video cameras recording school bus stop arm violations spurred great interest from other school districts. Manufacturers of cameras for the school bus industry competed to create more sophisticated units for videotaping inside and outside of school buses.

Laws governing the use of video footage for prosecution may vary from state to state. At the least, however, videos can supply critical evidence to law enforcement agencies that the illegal passing of school buses is a problem.

Benefits

During the 18-month project—which combined cooperation from law enforcement agencies, the reinforced training of school bus drivers, and a public awareness campaign—stop arm violations in Onslow County declined from 22.6 to 7.6 per day, a 67 percent reduction. Other school districts have had similar success using video cameras to document school bus stop arm violations.

Media coverage continues to bring the issue to public attention. The video footage also highlighted the need for continued training of school bus drivers on the proper procedures for making passenger stops.

Since 1997, the North Carolina Department of Public Instruction has maintained a statewide survey of school stop arm violations of all 13,000-plus school buses on a single day—usually a Wednesday—in March. The statewide record indicates that 1,500 to 2,000 times a day a motorist illegally passes a stopped school bus, endangering the lives of students. The

data also show that 3 to 4 percent of the violations occur on the right side of the bus, where students are boarding or off-loading.

School bus drivers, school district transportation staff, law enforcement officers, and motorists have key roles in preventing this risky act. Technology can be a valuable tool, but compliance requires hard work and determination. Onslow County's concerted efforts demonstrate that it is possible to reduce the number of violations and to improve the protection of schoolchildren.

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