



ADDRESS UPDATE

The T² Center is continuously updating its mailing list. Please check your address above and fax new information and/or changes to [301] 403-4591.

CENTER STAFF

PHILIP TARNOFF

Director
[301] 403 - 4619
tarnoff@eng.umd.edu

ED STELLFOX

Program Manager
[301] 403 - 4696
stellfox@umd.edu

JANETTE PRINCE

Assistant Program Manager
[301] 403 - 4623
janette@umd.edu
ttc@eng.umd.edu

HOLLY WENGER

Administrative Assisant (New Staff Member)
[301] 403 - 4239
hwenger1@umd.edu

Name: _____
Agency: _____
Department: _____
Title: _____
Address: _____
City: _____ State: _____ Zip+4: _____
Phone: _____
Fax: _____
Email: _____

Your interests:

- | | |
|---|--|
| <input type="checkbox"/> Technotes Newsletter | <input type="checkbox"/> Other |
| <input type="checkbox"/> Assisting T ² as a resource | <input type="checkbox"/> Training Announcements |
| <input type="checkbox"/> Roadway Design | <input type="checkbox"/> Traffic Engineering |
| <input type="checkbox"/> Temporary Traffic Control | <input type="checkbox"/> Lighting |
| <input type="checkbox"/> ITS | <input type="checkbox"/> Road Safety |
| <input type="checkbox"/> Soils | <input type="checkbox"/> Traffic Control Devices |
| <input type="checkbox"/> Structures | <input type="checkbox"/> Water |
| <input type="checkbox"/> Roadside Maintenance | <input type="checkbox"/> Pavement |



Maryland Transportation Technology Transfer (T²) Center

University of Maryland, College Park
Building 806, Suite 3102
College Park, Maryland 20742-6602

Nonprofit Org.
U.S. Postage
PAID
Permit No. 10
College Park, MD



technotes



MARYLAND
TRANSPORTATION
TECHNOLOGY
TRANSFER CENTER

Local Technical
Assistance Program
(LTAP)
University of Maryland
at College Park

INSIDE

Page 2

ETHICS

LTPP PRODUCTS 2006

Page 4

AUDITS HELP STATES EXAMINE ROAD SAFETY

Page 5

HYDRAULIC SYSTEM HAZARDS

Page 6

A SIMPLE WAY TO PREVENT BLINDZONE ACCIDENTS

Page 8

CURRENTLY SCHEDULED COURSES FOR 2007

Page 11

CONSIDER ADDING BREAKAWAY SUPPORTS WHEN YOU REPLACE SIGNS

GEOTECHNOLOGY INCREASES ROADWAY SAFETY IN GREAT SMOKY MOUNTAINS NATIONAL PARK

The use of geotechnology to build stabilized grass roadway pulloff areas along the Gatlinburg Spur of the Foothills Parkway in Tennessee's Great Smoky Mountains National Park has increased safety along the roadway, while minimizing the impact on the surrounding environment. Owned and maintained by the National Park Service, the Gatlinburg Spur of the Foothills Parkway is a section of US 441 and US 321 that runs between Gatlinburg and Pigeon Forge, Tennessee. The roadway has grass rather than paved shoulders, following standard design for Park Service roads and parkways. However, unlike typical park roads, the Spur has a large volume of high-speed traffic generated by tourist attractions in Gatlinburg and Pigeon Forge.



Above: Geoblocks are installed and cut to fit a roadway pulloff area in Tennessee's Great Smoky Mountains National Park.

"Because of the combination of high volumes of traffic, excessive speeds, changes in geometric configuration, and tourists unfamiliar with the roadway, the number of accidents in the area is high," notes Martin Hatcher of the Federal Highway Administration's (FHWA) Eastern Federal Lands Highway Division office. There were very few areas along the roadway where motorists involved in accidents could safely pull off and wait for help to arrive, and where park rangers could pull off to assist them. To solve the problem, the Park Service asked the Eastern Federal Lands Division to design and construct safe and stable pulloff areas to be used by motorists and park rangers.

FHWA constructed eight soil stabilized pulloff areas in 2004. The pulloffs were built at sites designated by the Park Service that are prone to reoccurring traffic accidents. They were

continued on the following page

ETHICS

Public officials from the White House to city and county offices are in the news for ethics violations and worse. A number of them are protesting their innocence. It's obvious that ethics can make or break a career in public service, so it's important to know what's involved. What are the rules? Who is governed by them? What can happen to someone accused of an ethics violation? Ethics can be confusing and intimidating. Quite often, we hear stories about people getting into ethical problems without realizing it. There are a few simple logical rules to follow in order to stay out of trouble.

The first is, CASH YOUR CHECK.

CASH YOUR CHECK. What you are paid and your other compensations, such as vacation and sick leave, are all you are entitled to for doing the job you signed on to do. Some people feel that they don't get paid enough for what they do. If you feel this way, talk to your boss, apply for a raise or promotion, or look elsewhere. You cannot accept anything of value as a gift just for doing your job. You also cannot accept favors from anyone who has pursued or is pursuing a contract with your agency.

It is okay to be friendly with contractor or consultant personnel. More work gets done in a cooperative relationship than in an adversarial one. But be careful! If you go to a sporting event or any entertainment or party, PAY YOUR OWN WAY. **PAY YOUR OWN WAY.** It is usually alright to socialize with people who have contracts with your agency, as long as you don't accept gifts or favors from them. For instance, you can play golf

or go fishing with someone who has a contract with your agency, but pay your own greens fees and your share of the cost of the fishing trip. There are times when you could be put into an ethical bind because of a job offer for when you retire or for your relatives.

DO YOUR JOB. Competence is another area of concern for public employees. You must do work you are qualified for or supervise the people doing the work. Don't do work outside your area of expertise unless it is a learning process, and you are supervised by someone who is teaching you a trade or area of competence. Possibly the most ethical thing you can do if you are a supervisor is to let the people who should be doing the work do the work. Don't micromanage, second guess or take authority away from your subordinates.



DON'T HIRE FAMILY. Most public works agencies restrict family members from working closely with each other. Sometimes this may be difficult if you get a promotion to an area in which you supervise a relative. Check with your Human Resources Section or your State Ethics Board to be sure you can accept the promotion. If you don't ask, it may look like you are trying to hide something. You may wonder why there is a problem with supervising your relatives. If you are in business and hire family, it may be a great idea. If you are dealing with public funds, the rules are not so liberal.

Unfortunately, people are all too willing to believe that public employees are incompetent, crooked or both. Don't let your name be associated with any unethical behavior. Your reputation is precious and very difficult to recover once it has been damaged.

LTPP PRODUCTS 2006

Since 1987, the Federal Highway Administration's (FHWA) Long-Term Pavement Performance (LTPP) program has collected and analyzed data across North America to better understand how and why pavements perform the way they do. This data analysis has resulted in a range of products and tools to meet today's pavement technology needs. The new LTPP Product List (Publication No. FHWA-HRT-06-119) outlines the many products available in such categories as Maintenance and Rehabilitation, Pavement Management Systems, and New and Reconstructed Pavements. LTPPBind 3.1, for example, is a Microsoft Windows®-based program that can help highway agencies select the most suitable and cost-effective Superpave™ asphalt binder performance grade (PG) for a particular site. The

software features a database of high and low air temperatures for nearly 8,000 North American weather stations, enabling users to select the binder PG based on temperature conditions at the site, desired level of risk, and different levels of traffic loading and speed. The Distress Identification Manual for the Long-Term Pavement Performance Program (Publication No. FHWA-RD-03-031), meanwhile, provides a consistent, uniform basis for collecting distress data. The manual contains a common language for describing cracks, potholes, rutting, spalling, and pavement distresses monitored by the LTPP program. It features photographs and text that clearly label, describe, and illustrate each type of distress. Many States have adopted the procedures established in the manual. Users around the world can access the LTPP data through the LTPP Standard Data Release, which makes the world's largest pavement performance database

available annually in Microsoft Access® format as a five-CD set or on a single DVD. Data can also be obtained through DataPave Online (<http://www.wcf.fhwa.dot.gov/exit.cfm?link=http://www.datapave.com>), a user-friendly application that includes inventory, materials testing, pavement performance monitoring, climate, traffic, maintenance, rehabilitation, and seasonal testing data from the more than 2,500 LTPP pavement test sections throughout North America. For more information on LTPP products or a copy of the 2006 Product List, visit www.fhwa.dot.gov/pavement/ltpp/index.cfm (look under "Publications" for the Product List). The Distress Identification Manual is available at www.fhwa.dot.gov/pavement/ltpp/resource.cfm. To learn more or for information on obtaining LTPPBind 3.1, contact the LTPP Customer Support Service Center, 202-493-3035 (email: ltpinfo@fhwa.dot.gov).

continued from page 1



Above: The completed pulloff areas blend in well with the surrounding environment.

“Aesthetically pleasing, environmentally sensitive solutions are critical when constructing features for the National Park Service.”

— Martin Hatcher (FHWA)

typically located at the beginning or end of a horizontal curve or near some feature restricting the shy zone (the space from the edge of the travel lane to the nearest impactable object). The pulloffs were spaced along the length of the Spur, with four located on the northbound side and four on the southbound side. All of the pulloffs are approximately 21-m (70-ft) long, with a 9-m (30-ft) taper on the approach, a 6-m (20-ft) full width area, and a 6-m (20-ft) taper on the exit end. The pulloffs are capable of holding two cars. “The intent was to create a safe pulloff for emergency use and not to create a permanent parking area to be utilized by tourists and fishermen,” says Hatcher.

To determine the best practice for future projects, FHWA used a different stabilization method for each pulloff area. All eight areas were built with a woven geotextile fabric on the subgrade for separation. The backfill consisted of a mixture of aggregate and topsoil. The first area was constructed as a control lot, using only geotextile and the aggregate-topsoil mixture typically used on parkway shoulders. A combination of geosynthetic systems, such as a geoweb made out of polyethylene and sewn together to produce a honeycomb structure; cellular block panels or geoblocks made out of recycled polyethylene; a porous ring and grid system constructed from high-density polyethylene; and a fiberglass grating system, were installed on top of the geotextile fabric and used for soil stabilization in the other seven areas. The pulloffs were then seeded for turf so that they would blend into the environment.

Since construction, “the pulloffs have stabilized the area and are holding up well,” says Ken Thornton of FHWA. “All of the systems appear to be viable,” adds Hatcher. “Each has its place depending on the desired application.” For example, the ring and grid system offers faster and easier construction, while the fiberglass system provides more durability for high-traffic areas. Costs ranged from \$33 per square m (\$27.60 per square yd) for the control area to \$114 per square m (\$95.40 per square yd) for one type of porous synthetic ring and grid system. Each of the turf-covered pulloffs blends in well with its environment. “Aesthetically pleasing, environmentally sensitive solutions are critical when constructing features for the National Park Service,” notes Hatcher. “It is recommended that one or more of these systems be tried when soil stabilization in an environmentally sensitive situation is required.”



For more information on the stabilized grass pulloff areas along the Gatlinburg Spur, contact Martin Hatcher at FHWA, 865-453-7123 (email: marty.hatcher@fhwa.dot.gov).

AUDITS HELP STATES EXAMINE ROAD SAFETY

More than 42,000 people are killed every year on our Nation's road network. State and local transportation agencies are identifying different approaches to improving safety in their jurisdictions. One proactive approach is for transportation agencies to anticipate the crash potential and safety performance of the road network and identify potential safety issues before a crash pattern develops. To implement this approach, transportation agencies can undertake road safety audits (RSAs). Road safety audits are formal safety performance examinations of existing or future roads or intersections by independent audit teams. At the Federal Highway Administration (FHWA), officials are working to develop basic knowledge and tools for agencies interested in conducting RSAs.

Transportation agencies at the State, county, and city levels have been performing road safety audits since 1997. To carry out an audit, an agency starts by identifying the existing or future road or intersection to be assessed and then selecting a team qualified to perform the audit at that location. The team then evaluates the safety of the road or intersection and prepares a brief report identifying potential safety issues. The agency or owner of the road or intersection responds to the issues identified and lists the actions that will be taken or documents the reasons for not implementing a suggestion. Issues identified by RSAs can range from the very simple, such as the need to trim vegetation, to the more complex, such as the planning of the layout of roadway networks.

In addition to saving lives, RSAs may offer potential cost savings. Officials in Grand Rapids and Detroit, MI, have performed economic analyses of suggestions resulting from RSAs and consistently have found positive benefit-to-cost ratios. In South Carolina, the State department of

transportation saved thousands of dollars after its first audit by correcting a design problem at the audit site.

The cost of performing an audit can vary and depends on the complexity and scope of the project. Agencies can save money by designating RSA teams that include experts from nearby jurisdictions, in exchange for providing their own experts to perform RSAs on neighboring roads. Alternatively, agencies can hire a consultant, which can cost anywhere from \$2,000 to \$5,000 or more, depending on

continued on next page



Prior to the RSA of this intersection in Grand Rapids, MI, two traffic signal heads were suspended on a diagonal span of wire with only one head hung over the travel lanes. The intersection also had two approaching lanes, which were separated by a dashed white pavement marking.



After the RSA, three traffic signal heads were suspended on a box span of wire directly over the travel lanes, with two signals for the through lane and one for the left turn lane. Traffic signal timing also was adjusted to add a protected left turn phase. In addition, pavement markings now show a separate left-turn lane at the intersection.

HYDRAULIC SYSTEM HAZARDS

The main hazards to consider when working with hydraulic systems include crushing, burns, being hit by flying objects, and high pressure injections.

CRUSHING - Items that are raised by hydraulics can come crashing down if the system loses pressure, fails, or if the controls are bumped. To prevent crushing whatever is under the equipment, lock equipment in the raised position and discourage riders who could bump equipment controls. Remember: hydraulics need a running engine to raise equipment, but equipment can descend without the power being activated.

BURNS - Equipment using hydraulic fluid operates at high temperatures. If a hose breaks, the result can be severe burns.

FLYING OBJECTS - Fluid sprays due to a large hole or high pressure can cause equipment parts to tear off and become airborne. Watch out for flying shrapnel.

HIGH PRESSURE INJECTIONS - Household water comes out of the faucet at around 40 pounds per square inch (psi). Hydraulic systems operate at 2,000 psi or higher. A pin-hole-sized leak at that pressure can cause hydraulic fluid to penetrate a person's skin and even some safety gloves as well. Hydraulic fluid injuries can cause gangrene if not immediately treated by a physician. (To view a photo of a finger that



HYDRAULIC FLUID INJURIES CAN CAUSE GANGRENE IF NOT IMMEDIATELY TREATED BY A PHYSICIAN.

was injected with hydraulic fluid, visit <http://www.flagsafe.ufl.edu/snn/injury01.html> The finger was lanced in an attempt to save it and the hand.)

CHECKING FOR LEAKS: Hold a piece of cardboard or paper above a hydraulic hose to identify a leak location; never rub your hand along a hose. The general

rule for leak testing is to shut down the machine and drain the pressure from hoses before inspection. Eye protection should always be used.

IN A DAILY EQUIPMENT CHECK, LOOK FOR:

- Proper fluid levels, according to manufacturers' specifications
- Leaks, damage, or wear and tear on lines, hoses, and fittings
- Twists or abnormal contortions on hoses
- Equipment positioned to rub against hoses and fittings
- Hydraulic oil spills under or on the machine

SOME HYDRAULICS SAFETY RESOURCES: A Lesson Plan on Hydraulic System Safety (Kansas State Extension) www.cdc.gov/nasd/docs/

d000701-d000800/d000789/d000789.html Hydraulic Systems Safety facts and proper procedures (NASD) www.cdc.gov/nasd/docs/d000801-d000900/d000891/d000891.pdf

This article was adapted from Safety News and Notes, Vol 7, No 2, Feb 2006.

continued from adjacent page

the scope of the RSA. To fund the RSA and implement the audit results, agencies also can seek Section 402 Highway Safety Funds, which support State highway safety programs designed to reduce traffic crashes and resulting deaths, injuries, and property damage. At least 40 percent of these

funds are earmarked for addressing local traffic safety problems.

A report by the National Cooperative Highway Research Program, Roadway Safety Tools for Local Agencies, contains an RSA toolkit for local agencies that includes

forms to use on field visits and a sample checklist of items to consider when conducting an audit. To download the report, visit http://trb.org/publications/nchrp/nchrp_syn_321.pdf. FHWA also is developing guidelines and a checklist for use by agencies conducting RSAs. In addition, the National Highway Institute offers a 2-day course on road safety audits.

For more information on RSAs, visit www.roadwaysafetyaudits.org or contact:
Louisa Ward
202-366-2218
louisa.ward@fhwa.dot.gov

A SIMPLE WAY TO PREVENT BLINDZONE ACCIDENTS

This article was written by George Platzer, a specialist in rear-view mirror design, and produced by the Society of Automotive Engineers. Give this a try. You won't believe what a difference changing the adjustment of your mirrors can make in eliminating blind spots. (From: The Road Ahead, June 2006).

THE BLINDNESS HAZARD

Most of us learned about blindzones in a driver education class, and to look over our shoulders before changing lanes. Your first real encounter with a blindzone was probably when you tried to change lanes and got a horn blast in your ear. The adrenaline instantly kicked in as you reversed your maneuver. Your heart jumped to your throat, and you suddenly felt hot as you realized you had just made a dangerous mistake. You asked yourself, "What happened? Why didn't I see that car? Did I forget to look?"

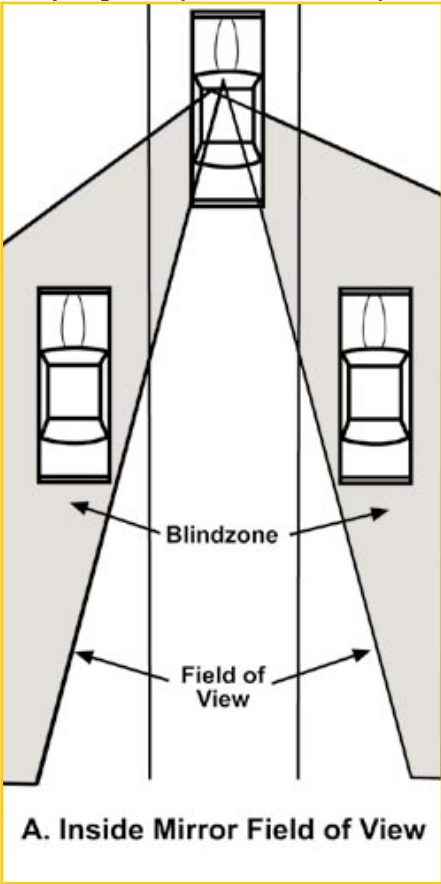
Lots of people make that mistake every year, and sometimes it results in more than just a horn blast. The National Highway Traffic Safety Administration (NHTSA) has studied a category of accidents they call Lane Change/Merge (LCM) crashes. They estimate there are 630,000 LCM crashes with 225 fatalities annually. A NHTSA study found that about 60% of drivers involved in LCM crashes did not see the other vehicle, and about 30% of drivers misjudged the position or speed of the other vehicle.

All LCM crashes cannot be blamed on the blindzones, but blindzones are extremely important. They are not well

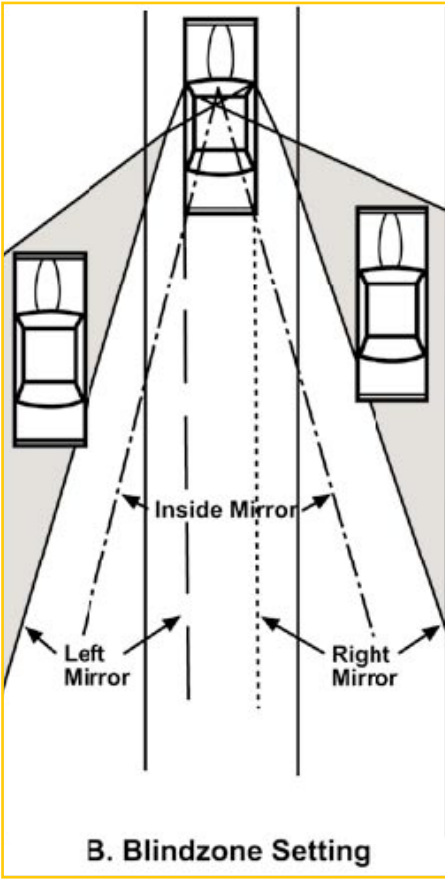
understood by the average driver, yet they are involved in every LCM maneuver.

HOW BLIND ZONES ARE CREATED

To understand why the blindzones are important, let's see how they are created. Most passenger cars are equipped with one inside mirror and two outside mirrors. The inside mirror provides the driver with the widest field of view and by far the most information about traffic to the rear. For this reason, drivers should consider the inside mirror their primary mirror.



A. Inside Mirror Field of View



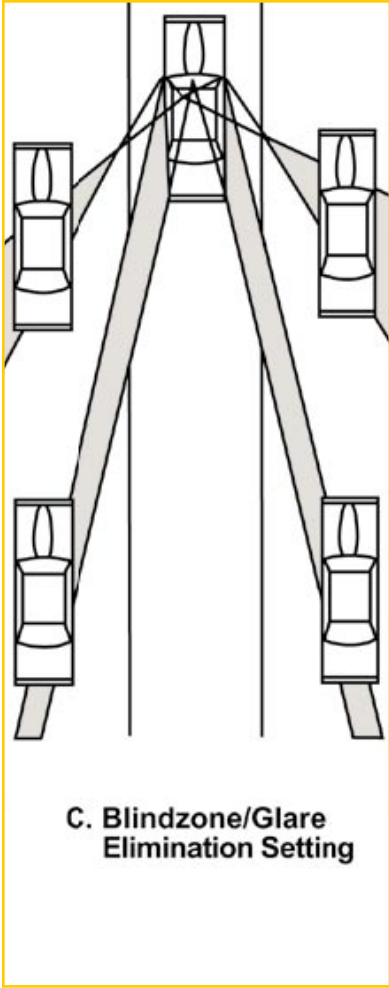
B. Blindzone Setting

two outside mirrors. These outside mirrors have been set so that the sides of the car are just visible. The field of view of an outside mirror is about half that of the inside mirror. Note that the outside mirrors have reduced the size of the blindzones, but have added relatively little to the field of view seen in the inside mirror. Blindzones capable of hiding a vehicle still exist. With this setting of the outside mirrors, it is still necessary to turn and look into the blindzones when changing lanes. This setting is called the "Blindzone Setting."

Drawing A is a scale drawing showing the inside mirror's field of view when it is centered on the road. The shaded regions are blindzones in which a vehicle cannot be seen in either the inside mirror or the driver's peripheral vision. To change lanes, you must turn and look into the blindzones to see if a vehicle is there.

Drawing B adds to Drawing A the fields of view of the

continued from adjacent page



First, turning to look into the blindzones, which can be uncomfortable and annoying, is no longer necessary.

Second, only a brief glance at the mirror is required to view the blindzone, as opposed to the longer time required when turning your head. At highway speeds, turning takes your eyes off the road for about 100 feet.

Third, glancing at the mirror leaves the forward scene in your peripheral view, while turning your head completely eliminates the forward view.

Fourth, the blindzones can be easily included in your visual scanning.

Fifth, at night, glare from the outside mirrors is virtually eliminated. The reason for this is that a following car's headlamps are not visible until the car moves into the blindzone, and at that point, the high intensity portion of the headlamp's beam does not hit the mirror. This setting of the mirrors is called the "Blindzone/Glare Elimination Setting," or "BGE Setting."

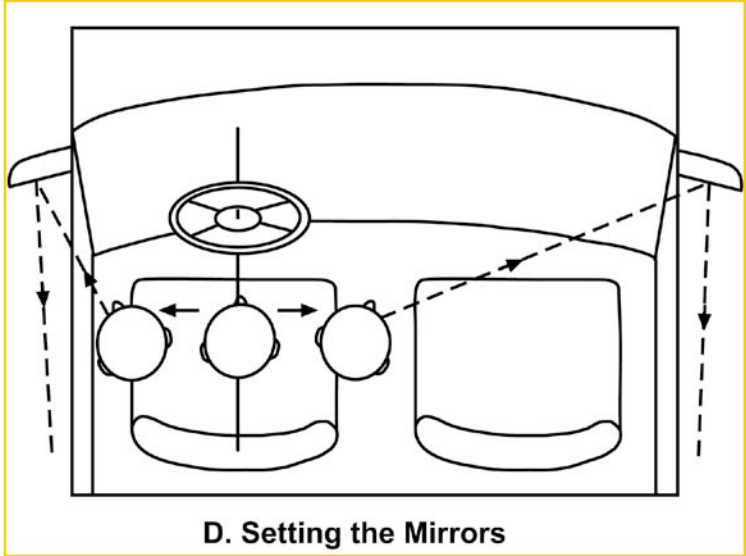
ELIMINATING THE BLINDZONES

Drawing C shows how easily the blindzones can be eliminated. The two outside mirrors are simply rotated outward to look into the Drawing B blindzones instead of looking along the sides of the car. There are now four mini blindzones, but none is large enough to hide a vehicle. With this new setting, it is no longer necessary to turn and look into the blindzones. All that is required is a glance at the outside mirror to see if a car is there.

The new mirror setting has five major advantages.

USING THE NEW BGE SETTING

The BGE Setting requires turning the field of view of each outside mirror outward by about 15 degrees from the Blindzone Setting. For the driver's side mirror, this can be done by placing your head against the side window as shown in Drawing D and then setting the mirror to just see the side of the car. Do the same with the passenger's side mirror, but position your head at the middle of the car. You should next check to see that the blindzones are truly eliminated. From the normal driving position, watch a car as it passes you. It should appear in the outside mirror



These two simple steps will eliminate blind zones:
1. Place your head on the driver's side window and adjust the mirror to see the side of the vehicle.
2. For the passenger's side mirror, sit in middle of the car and adjust the mirror to see the side of the car.

before it leaves the inside mirror, and it should appear in your peripheral vision before leaving the outside mirror. This is your proof that the blindzones have been eliminated and that your mirrors are correctly set.

When changing lanes with the BGE Setting, you must first look in the inside mirror for vehicles approaching from the rear, then glance at the outside mirror to see if a vehicle is in the blindzone. A good rule to follow when changing lanes is that if you can see the entire front of a vehicle in the inside mirror, and that vehicle is not gaining on you, it is safe to change lanes provided there is no vehicle in the blindzone. This is similar to the rule used when passing, which says, wait until you see the front of the car you just passed before changing lanes.

The Blindzone Setting and BGE Setting are both useful. For most driving situations the BGE Setting is best. Occasionally, the Blindzone Setting is required. This

continued on page 10

The following courses have already been scheduled for 2007. More classes are also being added on a regular basis. Act now to make sure that you or your constituents get a seat before they fill up! For more information or to schedule a class call Janette Prince at (301) 403-4623 or visit our website at <http://www.ence.umd.edu/mdt2center>.

BASIC DRAINAGE

Edwin Stellfox

February 15, 2007, 8:30 am – 3:00 pm
College Park, MD
\$75 All Registrants
CEU's: 0.0

This course emphasizes the importance of good drainage with discussions of water and its effects on roads, problems caused by improper drainage, and ways to handle these problems. It covers types of drainage facilities, ranging from ditches, culverts and subdrains inlets and end structures, their uses, materials, installation and maintenance. It also introduces geosynthetic drainage applications.

SIGNAL WARRANT & INTERSECTION CONTROL ANALYSIS

Dane Ismart

February 28, 2007, 9:00 am – 4:30 pm
College Park, MD
\$95 Maryland Local Government Only
\$125 State, Federal,
\$150 Private, and Out-of-State
CEU's: 0.0

This course will cover the eight MUTCD signal warrants:
Warrant 1: Eight-Hour Vehicle Volume
Warrant 2: Four-Hour Vehicular Volume
Warrant 3: Peak Hour
Warrant 4: Pedestrian Volume
Warrant 5: School Crossing
Warrant 6: Coordinated Signal System
Warrant 7: Crash Experience
Warrant 8: Roadway Network

The course will also cover warrants for four-way stops as well as alternatives to traffic control signals. A detailed discussion of the advantages and disadvantages both in the terms of capacity and safety of various types of traffic controls will be presented. The basis for both the installation and the removal of traffic control devices will be covered.

As part of the course, workshop problems will be given to the class participants. The class will be provided intersection field data

and will determine if signals are warranted for the sample intersections. After completing the workshops, MUTCD signal warrant analysis software will be demonstrated and the workshop problems will be evaluated based on microcomputer analysis.

PAVEMENT MANAGEMENT SYSTEMS FOR LOCAL GOVERNMENTS

Alan Kercher

March 1, 2007, 8:30 am – 3:00 pm
College Park, MD
\$95 Maryland Local Government Only
\$125 Maryland State Government
\$150 Federal, Private and Out-of-State
CEU's: 0.0

Pavement Management Systems (PMS) provide a systematic way for local officials to answer basic questions about their road system to guide future improvement and investment. With commitment to a PMS, officials can gain a clear insight into the condition of their roadway system, how it is changing, and what road improvements ought to be a priority, as well as a general estimate of the cost of priority improvements, based on the specific goals and priorities of local leaders.

The Roadway Surface Management System (RSMS) is a network PMS, intended to provide an overview and rough estimate of a roadway system's condition and the approximate costs of future improvements. Participants will learn how to use RSMS software to define a road network, assign the condition of the road sections, program repair and maintenance alternatives, develop cost estimates, prioritize rehabilitation and maintenance needs, and get the most out of the RSMS reporting capabilities.

We will teach you new tips and will show you how to load the software, input data, conduct a condition survey, modify the software to meet local conditions and practices, and to generate analyses and reports.

TRAFFIC CALMING

Dane Ismart

March 27, 2007, 8:15 am – 4:00 pm
College Park, MD
\$100 Maryland Local Government Only
\$175 Maryland State Government
\$195 Federal, Private, and Out-of-State
CEU's: 0.8

The Maryland Transportation Technology (T₂) Center is offering this 1-day training seminar on the principles and practices of Traffic Calming. This Traffic Calming seminar is designed to present a broad-based understanding of traffic calming philosophy and measures while recognizing and preserving the function of roadways. This course is adapted toward state and local government officials and employees who are charged with enhancing roadway safety.

The seminar will focus on the appropriateness and effectiveness of various traffic calming measures as well as the specifics of designing such measures to achieve their desired effect. Audio-visual presentation materials will be used, and attendees will also participate in interactive workshops where case studies are evaluated and appropriate traffic calming solutions are developed. Upon completion of the workshop sessions, the participants will present their solutions to the class. The goal of the course is that participants will leave with a basic understanding of what traffic calming is, and what issues are typically encountered when using traffic calming techniques.

PREVENTIVE MAINTENANCE

Ed Stellfox

April 11, 2007, 8:30 am – 12:30 pm
College Park, MD
\$50 All Registrants
CEU's: 0.0

This course covers preventive maintenance treatments such as chip seals, slurry seals, and microsurfacing and discusses when and where each technique could be effective.

It presents application methods, including preparation, materials, equipment, operations and safety, along with practical tips on how to avoid trouble.

ACCESS MANAGEMENT

Dane Ismart

April 17-18, 2007, 8:00 am – 4:00 pm
College Park, MD
\$195 Maryland Local Government
\$275 Maryland State Government
\$295 Federal/Private/Out-of-State
CEU's: 1.2

Traffic engineers have long recognized that eliminating unexpected events and separating decision points simplifies the driving task. Since access control reduces the number, complexity, and spacing of events to which the driver must respond, it results in improved traffic operation and reduces accidents. Other benefits include reduced delay, improved traffic flow, increased capacity, and improved fuel economy. This course covers not only why, but also how to manage access, from a policy, legal, and design perspective.

ASPHALT ROADS COMMON MAINTENANCE PROBLEM

Ed Stellfox

April 24, 2007, 8:30 am – 12:30 pm
College Park, MD
\$50 All Registrants
CEU's: 0.0

Municipal road crews should understand the causes of common maintenance problems on asphalt roads and be familiar with proper repair materials and methods. This course discusses causes and repair procedures for common problems such as cracking, potholes, rutting, corrugations, etc. The procedures cover materials, equipment, and techniques for lasting repairs.

HIGHWAY CAPACITY ANALYSIS

Dane Ismart

May 15-17, 2007, 8:15 am – 4:30 pm
Linthicum, MD
\$250 Maryland Local Governments Only
\$395 Maryland State Government
\$430 Federal, Private, and Out-of-State
CEU's: 2.2

This course provides a working knowledge on the basics of capacity analysis and the use of the Highway Capacity Manual (HCM) and Highway Capacity Software. The course includes lectures, sample problems. Topics addressed will cover the analysis of a wide range of facilities from freeway systems to signalized and unsignalized intersections. Design issues and their effect on capacity will be covered as well as the major changes in the latest version of the Highway Capacity Software. In this course you will hear how the methodologies were developed.

ASPHALT RESURFACING

Ed Stellfox

May 22, 2007, 8:30 am – 12:30 pm
College Park, MD
\$50 All Registrants
CEU's: 0.0

This course reviews the various asphalt mixes, their components and their uses. Asphalt resurfacing procedures are covered, including preparation, material, equipment, operation and safety. Special emphasis is placed on proper rolling and compaction of the asphalt overlay. Superpave mix design is discussed.

SITE IMPACT ANALYSIS

Dane Ismart

June 6-7, 2007, 8:00 am – 4:00 pm
Linthicum, MD
\$200 Maryland Local Government
\$275 Maryland State Government
\$325 Federal, Private, and Out-of-State
CEU's: 1.2

Participants will learn the standard techniques for estimating the traffic impacts of both small and large site developments. Content includes procedures for land use forecasting, trip generation, trip distribution and assignment, site impact layout design, and level of service designation. The workshop will be conducted with manual procedures, but computer software packages suitable for site impact will also be demonstrated.

UNPAVED GRAVEL ROAD MAINTENANCE

Ed Stellfox

June 14, 2007, 8:30 am – 12:30 pm
College Park, MD

\$50 All Registrants
CEU's: 0.0

This course addresses basic maintenance techniques for unpaved and gravel roads. Topics include road materials, blading or dragging, reshaping or regrading for proper crown, regravelling, stabilization or full-depth reclamation, and dust control, with an introduction to road management techniques.

ASPHALT RECYCLING

Ed Stellfox

July 11, 2007, 8:30 am – 12:30 pm
College Park, MD
\$50 All Registrants
CEU's: 0.0

This course discusses the advantages of asphalt recycling as part of your road maintenance program. It covers techniques for recycling asphalt pavement, including surface recycling, hot mix recycling, and cold mix recycling. The course emphasizes cold mix recycling, full depth reclamation, reviewing materials, equipment and operations. It also presents recent examples of asphalt recycling projects in several states.

TRAFFIC ENGINEERING SHORT COURSE

Mr. Joseph Cutro

Mr. Tom Hicks

Mr. Woody Hood

Mr. Dane Ismart

Mr. Gerry Alexander

Mr. Wamahdri Williams

Mr. Rick Hawthorne

July 16-20, 2007

Linthicum, MD

\$300 MD Local Government

\$650 MD State Government

\$700 Federal/Private/Out-of-State

CEU's: 3.5

This five-day short course covers many aspects of traffic engineering, including design, data analysis, operation and management. Also, related factors, such as road use characteristics, public influence and traffic calming are addressed in the class. The course is designed for persons with an engineering background and/or traffic engineering responsibilities in a related field. Junior level traffic engineers, transportation planners, highway designers, city/

continued on page 11

will be true when the rear window is blocked by cargo, or if you are in heavy stop and go traffic and a car on your bumper blocks your rear view to adjacent lanes.

When driving with the BGE Setting, most drivers initially feel a sense of confusion with the outside mirrors. You are not sure where they are pointed; you miss not seeing the sides of the car; and you do not know how to interpret what you see. Don't give up. The confusion will go away, especially if you do a few simple things.

First, understand that the inside mirror is truly your primary mirror. THE INSIDE MIRROR SHOWS YOU EVERYTHING EXCEPT THE BLINDZONES. Study Drawing C, and accept this fact.

Second, do not look at the outside mirrors except to see if

a vehicle is in the blindzone. THE OUTSIDE MIRRORS SHOW YOU ONLY THE BLINDZONES.

Third, if you are in doubt about the position of the driver's side mirror, move your head to the side window and check to see that the side of the car is just visible. For the passenger's side mirror, move your head to the middle.

It will take time to overcome your previous habits and accept the new way, but it will happen. Perseverance will reward you with a new dimension in driving which will enhance your safety and comfort.

Thanks to Michigan's Local Technical Assistance Program for providing the artwork for this article, which is reprinted with permission from their newsletter, *The Bridge*, Volume 18, No.1, October/December 2003. Reprinted by permission from SAE 950601 © 1995 SAE International.

Consider Adding Breakaway Supports When You Replace Signs

In December, we received word from Nicholas Artimovich, a Highway Engineer in the Federal Highway Administration's Office of Safety Design, suggesting we advise you who deal with retroreflectivity improvement programs to consider upgrading non-breakaway sign supports at the same time. We asked if we could use his email as an article in *The Road Ahead*. He begins with some background:

Breakaway supports have been required on the National Highway System since 1998 - that is not news.

However, the 2000 MUTCD, which, of course, applies to all roads in the United States, revised the wording from "should" to "shall" regarding the use of breakaway supports for signs located within the clear zone.

This is spelled out in Section 2A.19:

SECTION 2A.19 LATERAL OFFSET STANDARD "For overhead sign supports, the minimum lateral offset from the edge of the shoulder (or if no shoulder exists, from the edge of the pavement) to the near edge of overhead sign supports (cantilever or sign bridges) shall be 1.8 m (6 ft). Overhead sign supports shall have

a barrier or crash cushion to shield them if they are within the clear zone.

"Ground-mounted sign supports shall be breakaway, yielding, or shielded with a longitudinal barrier or crash cushion if within the clear zone."

Then, in the 2003 MUTCD, we see the establishment of a target date for implementation on certain roads:

"SECTION 2A.19 LATERAL OFFSET- crashworthiness of sign supports for roads with posted speed limit of 80 km/h (50 mph) or higher-January 17, 2013."

On roads posted less than 50 mph there is no target date, but a program to replace non-breakaway supports within the clear zone needs to be in the highway agency's long term plans for complying with MUTCD changes. As I noted above, **highway agencies ought to consider installing breakaway supports at the same time that the sign faces are replaced to comply with retroreflectivity requirements.**

We do not want cities and counties going through all the effort to upgrade their sign faces only to be told to take them all down and put them back up on breakaway supports.

In order for the breakaway or yielding supports to be acceptable for use they must conform to the breakaway requirements of **NCHRP Report 350 or the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals** (1985 or 2001 editions.)

For information on breakaway supports you may go to the FHWA Office of Safety web site at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/breakaway.htm and to the AASHTO Bookstore where you may purchase a copy of *A Guide to Small Sign Support Hardware* - 1998 edition at https://bookstore.transportation.org/item_details.aspx?ID=164.

Finally, from our brochure on breakaway sign supports:

What does breakaway mean? "Breakaway" refers to a sign support that, when struck by a vehicle, separates from its base and is knocked ahead of or up and over the errant vehicle. "Yielding" refers to a sign support that bends, allowing a vehicle to run over it. Many sign supports are yielding at low speeds and breakaway at high speeds.

To get copies of the brochure, *Safe Sign Supports, Are Yours Breakaway Yet?* (FHWA-SA-06-14), you may send an email to report.center@fhwa.dot.gov or fax a request to (301) 577-1421.

For additional information, you may email Mr. Artimovich at nick.artimovich@fhwa.dot.gov.

By Nicholas Artimovich, Office of Safety Design, Federal Highway Administration. (From: *The Road Ahead* June 2006)

county engineers without traffic engineering background, and possibly some experienced traffic technicians will benefit from the class. Materials include a student workbook and "Fundamentals of Traffic Engineering," a publication by ITS, Berkley.

INTERSECTION DESIGN & ANALYSIS

Dane Ismart

August 6-7, 2007, 8:30 AM – 4:30 PM
College Park, MD
\$100 Maryland Local Government Only
\$150 Maryland State Government
\$175 Federal, Private, and Out-of-State
CEU's: 1.2

This course will have broad general coverage of at-grade intersection analysis and design features. The analysis will include signalized, unsignalized and roundabout intersections. Specific coverage will include capacity analysis, signal warrants, queue analysis and safety selected design features. Software packages such as HCS, CIDRA and RODEL will be demonstrated.

CONSTRUCTION MATHEMATICS

Ed Stellfox

August 9, 2007, 8:30 AM – 3:00 PM
College Park, MD
\$50 All Registrants
CEU's: 0.5

Construction Inspectors may need to brush up on math skills specifically related to construction inspection, especially basic geometry, fractions, area, volume and conversions. The class is a good refresher, and excellent preparation for the Construction Inspection class.

WINTER MAINTENANCE

Ed Stellfox

September 13, 2007, 8:30 AM – 3:00 PM
College Park, MD
\$50 All Registrants
CEU's: 0.0

This course covers all aspects of winter operations - planning and organizing, methods of snow and ice control, salt usage, and winter equipment maintenance. Lesson will include usage of snow maps and formal snow plans.

PEDESTRIAN AND BICYCLE ACCOMMODATION

Dane Ismart

September 18, 2007, 8:30AM – 4:00 PM
Linthicum, MD
\$75 All Registrants
CEU's: 0.0

Many communities in the United States were not designed for pedestrian and bicycle travel. However, today walk-ability and bike-ability are viewed as signs of a livable community and encourage physical activity. The goal is to create an environment that encourages people to walk and bike for transportation, recreation and exercise. This workshop provides current information on the design, operation and maintenance of successful pedestrian and bicycle facilities. Emphasis is placed on making participants aware of the characteristics and needs of pedestrians and bicyclists and on the importance of an interdisciplinary approach to planning and implementing pedestrian and bicycle programs.

ROUNDAABOUT PLANNING AND DESIGN

Dane Ismart

September 19, 2007, 8:15 AM – 4:00 PM
Linthicum, MD
\$75 Maryland State Government
\$95 Federal, Private, and Out-of-State
CEU's: 0.0

This one-day workshop will provide participants with an introduction to the planning and design of the modern roundabout. Topics covered in the roundabout course will include geometric design, signing, striping, safety, and accommodation of pedestrians and bicyclists. An important component of the course will be a discussion of the advantages and disadvantages of roundabouts. SIDRA and Rodel software packages will be demonstrated to the class participants and used for capacity and operational analysis of roundabouts. The basic structure of the course will be built around the FHWA Report, "Roundabouts: An Informational Guide." Maryland's Roundabout Guide will also be discussed and included as part of the course.

INTRODUCTION TO GEOSYNTHETICS

Ed Stellfox

October 9, 2007 8:30 – 12:00 PM
College Park, MD
\$25 All Registrants
CEU's: 0.0

This course is an introduction to geosynthetics, beginning with a discussion of geosynthetics, what they are, how they are made and how they can be used in a road maintenance program. The course then looks at other geosynthetics and their road system uses, including geogrids, geocells and geowebbs, presenting new materials with new applications.

SIGNAL WARRANT & INTERSECTION CONTROL ANALYSIS

Dane Ismart

October 16, 2007, 9:00 AM – 4:30 PM
College Park, MD
\$95 Maryland Local Government Only
\$125 Maryland State Government
\$150 Federal, Private, and Out-of-State
CEU's: 0.0

This course will cover the eight MUTCD signal warrants:
Warrant 1: Eight-Hour Vehicle Volume
Warrant 2: Four-Hour Vehicular Volume
Warrant 3: Peak Hour
Warrant 4: Pedestrian Volume
Warrant 5: School Crossing
Warrant 6: Coordinated Signal System
Warrant 7: Crash Experience
Warrant 8: Roadway Network

The course will also cover warrants for four-way stops as well as alternatives to traffic control signals. A detailed discussion of the advantages and disadvantages both in the terms of capacity and safety of various types of traffic controls will be presented. The basis for both the installation and the removal of traffic control devices will be covered.

As part of the course, workshop problems will be given to the class participants. The class will be provided intersection field data and will determine if signals are warranted for the sample intersections. After completing the workshops, MUTCD signal warrant analysis software will be demonstrated and the workshop problems will be evaluated based on microcomputer analysis.