MASS INTERCHANGE

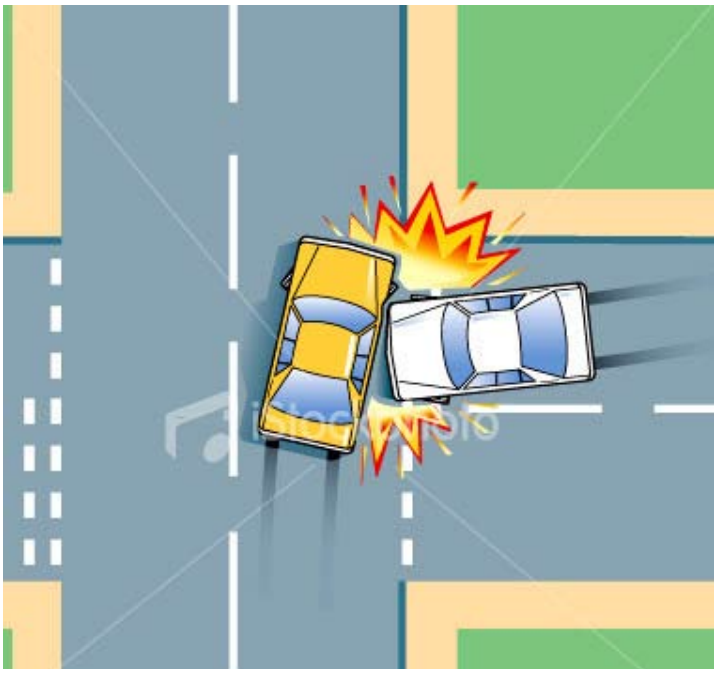
Volume 22, Number 2 Spring 2008

NEW TRAFFIC SAFETY WEB TOOL AVAILABLE

A new online educational tool that promotes safety for all roadway users is now available for Massachusetts. Critical traffic safety tips and related data such as state crash fatality facts and statistics are presented on this new site.

MassHighway's Web site at: www.mass.gov/mhd/safetytips hosts this education and outreach tool. It is also directly reachable from sites of the Executive Office of Transportation and Public Works, the Registry of Motor Vehicles, the Department of Public Health, Walk Boston, MassBike, and the Executive Office of Public Safety and Security's Highway Safety Division, all of whom contributed to this effort.

In 2006 430 people died in the Commonwealth and in 52 percent of the crash fatalities, victims were not wearing seatbelts. Forty percent were alcohol related and 34 percent speed related.



The page will be updated regularly to coincide with related statewide and national transportation events. During the recent holiday season, the site offered 10 safety tips related to the state's "Drunk Driving. . .Over the Limit. . .Under Arrest" campaign. Other tips to consider involve breakdown safety and safe driving decisions. Tip #1 for safe driving - Take in the whole scene around you. Don't just look at the road directly in front of you. Look 10-12 seconds down the road and also include sidewalks and bike lanes.

The 2006 Massachusetts Strategic Highway Safety Plan included the creation of a roadway safety Web page. This plan was the product of a year-long effort involving dozens of agencies and organizations with an interest in highway safety. The plan strives to maintain Massachusetts' ranking as the safest roadway network in the country.

MUNICIPAL SURVEILLANCE SYSTEMS

ITS

Twenty years ago, municipalities primarily employed surveillance cameras to safeguard materials. A common application involved installing a CCTV camera near an overhead light to guard a maintenance yard. The camera was typically connected to a monitor in a maintenance office. A call to the police would result "if someone was walking off with something." While this use of surveillance technology is still commonplace today, municipalities have been utilizing increasingly sophisticated surveillance systems due to increased needs and advancements in technology.

Today's surveillance applications generally fall within three categories:

1. Asset protection
2. Personnel protection
3. Critical infrastructure protection

Asset protection surveillance systems are still used primarily to guard against theft. Recent advancements in these systems include the use of infrared cameras and "illuminators" to address the concerns of homeowners about bright lights in municipal facilities. The "monitor in someone's office" is augmented by digital video recorders which usually store a week's worth of video to aid in post incident processing. Perimeter or proximity sensors and machine vision techniques have been added to these surveillance systems to detect when someone has entered a secure zone. Machine vision evaluates individual video pixels within the camera video stream to detect a presence or gauge movement.

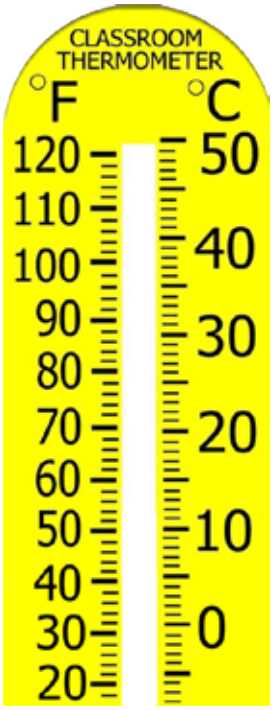
Personal protection surveillance systems are prevalent in parks, park and ride lots, and other public spaces. These systems can be augmented by panic buttons and links to public safety responders. In a typical application, the surveillance system in a park and ride lot will include multiple cameras that pan to various locations and continuously record video. These systems slew the cameras to a particular location when someone presses a panic alarm. The alarm and video feed is transmitted to the local police, who can make an immediate determination of the severity of the incident and required response before they arrive on the scene.

Critical infrastructure protection systems typically combine security systems to detect and evaluate incidents and intrusions with building control systems to produce comprehensive, situational awareness systems that mitigate the risk and impacts of security breaches. A recent technology innovation is video analytics. Video analytics represent the next generation of machine vision. In addition to the detection of presence and movement, video analytics can sound an alarm if someone leaves a package in a train station as well as allow responders to search a video database to "show everyone wearing a yellow jacket that day."

In summary, the security needs of municipalities have evolved over the past two decades. The security technology that is available for deployment has also significantly advanced. Municipalities today need to understand the threats they face and the current technology available for protection of residents, assets, and critical infrastructure.

This article was provided by John Colangelo, Chairman of the Board of ITS Massachusetts and a Senior Project Manager at Jacobs Edwards and Kelcey. He can be reached at (617) 242-9222 or John.Colangelo@jacobs.com

WARM MIX ASPHALT REDUCES PRODUCTION TEMPERATURES



New warm mix asphalt (WMA) technologies allow asphalt mixtures to be produced and placed at significantly lower temperatures. The temperatures can be reduced by as much as 30 percent while still allowing the asphalt binder to adequately coat the aggregate during mixing at the plant and achieve the desired workability at the paving site. This is accomplished by reducing the viscosity and increasing the workability of a given asphalt binder at a given temperature.

POTENTIAL BENEFITS

Warm mix asphalt's most often mentioned benefits during mix production are:

1. Decreasing the energy and fuel consumed to make hot mix asphalt.
2. Reducing possible emissions and odors from plants.
3. Improving the working conditions at the plant and paving site.

Reducing emissions is especially critical around large cities that have tight air quality restrictions.

Some road agencies are exploring the use of WMA to extend the paving season. With WMA, mixes can remain workable at cooler temperatures, increasing the time available for compaction. This may make WMA a feasible option for those end-of-season projects that must be completed before winter.

Another potential benefit relates to the mix not being exposed to the elevated production and placement temperatures typical of HMA. Less oxidative hardening of the binder takes place with WMA, possibly reducing a mixture's susceptibility to aging and cracking.

Of course, with less hardening comes the potential for greater susceptibility to early rutting until the pavement has oxidized somewhat in service. Strategies need to be developed for determining when it is appropriate to select a higher performance grade to address the issue.

MASSHIGHWAY RESEARCH

MassHighway was the first state in the nation to use Sasobit® to produce a WMA. A portion of I-95 between Danvers and Rowley was resurfaced about three years ago using Sasobit® which contains a wax additive. MassHighway will be using WMA in the HOV lane on I-93 in the Quincy/Milton/Boston area. WMA was chosen for this high traffic area because more pavement could be put down in a shorter period of time.

Under consideration are a variety of WMA additives including synthetic zeolite (a crystalized sodium aluminum silicate), Sasobit® (a Fischer-Tropsch paraffin wax), and Evotherm® which uses a chemical additive technology and a "dispersed asphalt technology" delivery system.. These new technologies appear to allow the production of WMA by reducing the viscosity of the asphalt binder at a given temperature. This reduced viscosity allows the aggregate to be fully coated at a lower temperature than what is traditionally required in HMA production.

MassHighway is also sponsoring research conducted by Dr. Walaa S. Mogawer at UMass/Dartmouth on the labortory and field evaluation of WMA technology to determine its applicability for Massachusetts. This study will document construction data of production and placement of WMA, construct stone matrix asphalt and WMA specimens at the contractor's plant, and monitor performance in the field.

TECHNICAL WORKING GROUP

The FHWA and NAPA formed a national WMA Technical Working Group in 2006. Members of the group include representatives from several highway agen-

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DETERMINING THE SAFE SPEED FOR CURVES

As a vehicle approaches a curve, the driver will hopefully slow down and negotiate the curve safely. This is possible because signs have been placed by the highway department informing the traveling public of the character of the curve. In order to do this successfully, one needs to know which signs should be used, and how to properly place them.

Before discussing how to determine which sign to use, one needs to remember what the curve and turn signs are telling the traveling public. Black-on-yellow signs are ***warning signs***. These particular ones provide information to the motorists about the nature of the curve they are approaching. They let the driver know if it is a sharp turn or just a gradual curve. Supplemental plates provide an advisory speed for traveling around the curve.

What Does the Advisory Speed Mean?

The advisory speed for a curve is **NOT** the safe speed for every vehicle and pavement condition. The advisory speed is a relative value that, for most vehicles, under **WET** pavement conditions, provides an adequate margin of safety and is reasonably comfortable for most drivers. On a snowy day, for example, one may need to drive even slower than the advisory speed.

It is important to have a consistent, uniform method of placing curve signs. If every curve is posted consistently, the traveling public will have a better understanding of how to drive when they see a particular sign. On the other hand, if some curves are posted differently, the driver may not know what the sign means. Uniformity may be the most important aspect of all signage, not just curve signs, i.e. the Manual on *Uniform* Traffic Control Devices.

Determining Which Signs to Place

The choice of which specific sign to place on a curve depends upon several different factors. The number of curves in a series, the advisory speed of the sharpest corner, and the alignment of the first curve all help to determine which sign to place. When deciding whether to group curves as part of a series, determine if they have the same alignment (for example, two curves to the left or two to the right). If two curves have the same alignment and are separated by more than 200 feet of straightaway, sign them separately. If two curves have opposite alignments (for example, one to the left and then one to the right) and the distance between them is less than 600 feet, group them together. Sequential curves can always be signed separately if needed, just be sure that the sign placement is not confusing to motorists.

If the advisory speed is less than or equal to 20 mph, place turn signs (W1-1 and W1-3). At 35 mph or more, use curve signs (W1-2 and W1-4). At speeds of 25 and 30 mph, either type of sign may be used. The determination of which sign to use should be based upon a study of the geometry and general appearance of the curve(s). A W1-5 is used whenever there are three or more curves in a series. If there are more than four curves in a row, additional signs are warranted in the middle of the series. An L (left) and R (right) designation is used to define the direction/orientation of the first turn.

The goal is to provide a consistent message to alert drivers to the nature of the roadway they are about to travel.

This article was adapted from one prepared by David P. Orr, P.E., Cornell Local Roads Program Senior Engineer, and Jim Mearkle, P.E., Engineer, Albany County DPW, which appeared in the Fall 2007 issue of Nuggets & Nibbles, Cornell Local Roads Program, Ithaca, NY.

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Warm Mix Asphalt application

cies, state asphalt paving associatons, HMA contractors and other industry groups such as the Asphalt Institute, National Center for Asphalt Technologies, American Associaton of State Highway and Transportation Officials, etc. The mission of the technical working group is to implement proactive WMA guidance, policies and procedures to evaluate and implement WMA technologies that contribute to high quality and cost-effective pavements. Specific guidelines include:

- ☐ Technology transfer and implementation
- ☐ Research needs
- ☐ Procedures for project and material approval
- ☐ Testing and performance management protocols
- ☐ Guidelines for mix design and construction

NCHRP PROJECT 9-43

The National Cooperative Highway Research Program (NCHRP) has just recently awarded Project 9-43, Mix Design Practices for Warm Mix Asphalt Technologies. The objective of this $500,000, 36-month research project is to develop a performance-based, mix design procedure for WMA in the form of a manual of practice. The method will be based on Superpave, include a suite of performance tests and be applicable to any of the WMA technologies.

AWAITING ANSWERS

Although various WMA technologies seem to offer promising benefits, many questions need to be answered regarding mix design, performance and cost before their use becomes more concentrated in the field. Because of the variety of products and processes involved, this is no small challenge but national initiatives such as the working group and Project 9-43 as well as statewide research should provide many of the answers.

For more information on the use of WMA in Massachusetts, please contact Matt Turo, MassHighway.
Source for this article: The Asphalt Handbook, Manual Series No. 4, 7th Edition, Asphalt Institute, 2007.

BAYSTATE ROADS SCHOLARS

Congratulations to the newest Baystate Roads Scholars on their fine achievement. Keep saving those certificates and you could also be listed here.

Please provide T-shirt size, your address and your supervisor's name, title, and address when notifying Baystate Roads Program of your status. Our workshop database will confirm your attendance. Notify BRP by FAX: 413-545-6471 or email: baystateroads@hotmail.com

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Robert Burgmann - Barnstable Engrg.
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Debra Davis - Worcester DPW
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Michele Stein - Tewksbury Engineering
William L. Stratford - Leverett DPW

DWI or DWY ?

Research shows that driving while using a cell phone can pose a serious cognitive distraction and degrade driver performance. The data are insufficient to quantify crashes caused by cell phone use specifically, but the National Highway Traffic Safety Administration (NHTSA) estimates that driver distraction from all sources contributes to 25 percent of all police-reported traffic crashes.

Cell phone use (Driving While Yakking) has doubled for almost all age groups between 2000 and 2005 according to NHTSA and the National Center for Statistics and Analysis. However, it has remained constant at one percent for drivers 70 and above. Based on studies by NHTSA, as many as 10 percent of motorists of all ages may be using some type of phone, either hands-free or hand-held.

A study published in a 2006 issue of *Human Factors: The Journal of Human Factors and Ergonomics Society* showed that cell phone users were even more dangerous than intoxicated drivers. Forty volunteers drove a simulated 24-mile course four different times: while undistracted, while using a handheld cell phone, while using a hands-free phone, and while intoxicated. Participants were given a juice mixture to induce a blood-alcohol content of 0.8, the average level of impairment across the United States. When intoxicated, volunteers followed other cars more closely and braked 23 percent more forcefully. However, all drunk drivers were accident-free while three sober cellular phone users rear-ended the simulated car in front of them while talking. Driving while talking on a cell phone could be as bad or maybe worse than driving drunk.

The available research indicates that whether it is a hands-free or hand-held cell phone, the cognitive distraction is significant enough to degrade a driver's performance. This can cause a driver to miss key visual and audio cues needed to avoid a crash. Highly emotional conversations seem to elevate risk. It is the conversation, not the device that distracts the driver. So, hands-free or not there's an increased risk of DWY.

Any activity that the driver engages in while driving has the potential to distract him/her from the primary task of driving. Some research findings comparing cell phone use to passenger conversations while driving show each to be equally risky, while others show cell phone use to be more risky. A significant difference between the two is the fact that a passenger can help monitor the driving situation along with the driver and pause for, or alert the driver to, potential hazards, whereas a person on the other end of the phone line is unaware of the roadway situation.

Current research does not provide a definitive answer as to whether cell phone use or eating and drinking is riskier. In a controlled study, comparing eating and operating a voice-activated cell phone to continuously operating a CD player, it was found that the CD use was more distracting than the other activities. In a test track study conducted by NHTSA, the results showed that manual dialing was about as distracting as grooming or eating, but less distracting than reading or changing CDs.

It is best to avoid using a cell phone while driving but if you must:

- Learn the features of the phone beforehand
- Use it only when absolutely necessary
- Keep the conversation short
- Do not engage in emotional conversations

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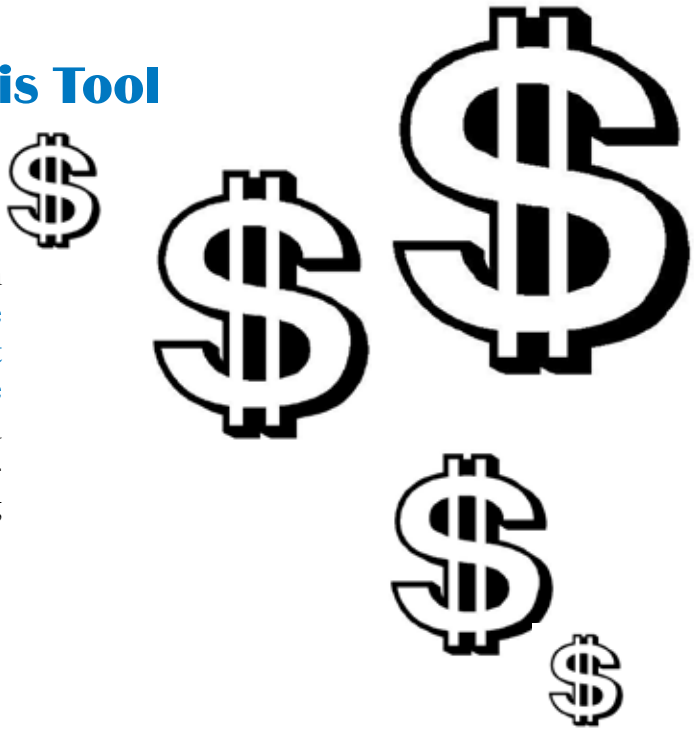
FHWA's New Online Benefit-Cost Analysis Tool



As a municipal employee you have probably been asked these questions. Will a project's performance warrant the resources needed to build it? Which project alternative will result in the greatest net benefit and the most return on taxpayer dollars? A new browser-based benefit-cost analysis tool, **BCA.Net**, is designed to provide valuable support to the highway decisionmaking process. Transportation agencies can now:

- ☐ Manage economic analysis data
- ☐ Select from an array of sample data
- ☐ Develop alternative strategies for improving and managing highway facilities
- ☐ Evaluate and compare benefits and costs of alternative strategies.

BCA.Net evaluates projects based on capital and maintenance costs data, the projects' physical and performance characteristics, forecast travel demand, and the economic value of benefits to users. Required data inputs include such items as the project facility type (urban freeway, urban arterial, etc.); type of improvement being considered; project length; number of lanes; pavement condition and deterioration rate; crash rates; current and project traffic levels; vehicle mix data; vehicle type and occupancy data; and right-of-way, construction, operation and maintenance costs. Most of the data should be available to the model user based on existing planning, design, and engineering studies. The model provides default data for economic factors such as the value of travel time and vehicle operating costs and also calculates travel time savings based on facility characteristics and projected traffic levels. The user can override any of the default data in the model with location-specific data.

The user specifies a base strategy and alternative strategies for improvement and maintenance of the facility. BCA.Net calculates the traffic impacts and agency and highway user costs and benefits for each strategy and compares them, generating measures such as the net present value, benefit-cost ratio, and rate of return for the alternative strategies relative to the base strategy.

BCA.Net has report writing capabilities for all analysis results and their associated statistics. The tool also accommodates a risk-analysis feature that allows the analyst to develop probabilistic inputs and results, thus accounting for the uncertainty associated with analysis inputs.

The program is available online at no cost and does not require the special installation of software on a user's computer. Users can store up to 10 data sets on the BCA.Net server. Data may also be archived on the user's computer and restored to the BCA.Net system for use in subsequent sessions.

To begin using BCA.Net, visit https://fhwaapps.fhwa.dot.gov/bcap/. Three walk-through training exercises are available under the "Help" section of the online tool. The first exercise guides users through the basic features of the tool as it performs a sample project evaluation. Two additional walk-through exercises highlight more advanced features. The exercises not only demonstrate how to use the model, but also how to set up a project for economic analysis. FHWA strongly recommends that users go through the exercises before getting started.

For more information contact Eric Gabler at FHWA, (202)-366-4036 or email: eric.gabler@fhwa.dot.gov.

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- Use voice mail functions
- Return calls when stopped at a safe location
- Ask passengers to place calls
- Secure your phone while driving
- Switch to a hands-free version

For a copy of "Cell Phones and Driving: A Review of Research" by A. McCartt et al., email: publications@iihs.org

For results of NHTSA's survey: www.nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/RNotes/2005/809967.pdf

Sources

National Highway Safety Transportation Assn.
www.nhtsa.dot.gov
National Safety Council
www.nsc.org
Insurance Institute for Highway Safety ***www.iihs.org***

in this issue

BAYSTATE ROADS - WORKSHOPS

CHAIN SAW SKILLS I--SAFETY & BASICS

May 21-22 Quabbin Reservoir, Belchertown, MA
Tim Ard, Instructor Limited to 12

BASIC CONSTRUCTION INSPECTION

April 29 Chocksett Inn, Sterling, MA
April 30 Coonamessett Inn, Falmouth, MA
May 1 Hotel Northampton, MA
John Hopkins, Instructor

The Baystate Roads Program, which publishes Mass Interchange each quarter, is a Technology Transfer (T2) Center created under the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP). This newsletter is prepared in cooperation with The Excecutive Office of Transportation (EOT) and the United States Department of Transportation Federal Highway Administration. FHWA is joined by EOT, UMass Transportation Center at the University of Massachusetts/Amherst, and local public works departments in an effort to share and apply the best in transportation technologies. In addition to publishing Mass Interchange, the Baystate Roads Program facilitates information exchange by conducting workshops, providing reports and publications and videotapes on request, and offering one-to-one technical assistance on specific roadway issues. Because the program relies on input from many sources, inquiries, articles and ideas are encouraged.

LTAP Local Technical Assistance Program

To contact the Baystate Roads Program call (413) 545-2604 or FAX 413-545-6471

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