Vol. 31/No. 1/Spring 2017

Road TTAP Talk

EDC Spotlight on Safe Transportation for Every Pedestrian (STEP)

(Source: FHWA)

The Federal Highway Administration (FHWA) is featuring a collection of five cost-effective pedestrian safety countermeasures in its Every Day Counts (EDC) initiative. Expanded use of these countermeasures, collectively known as "Safe Transportation for Every Pedestrian" (STEP), is expected to reduce pedestrian injuries and fatalities. Twenty-five states (including Tennessee) and the Virgin Islands plan to demonstrate and assess STEP countermeasures. Another 17 states and Washington, DC, expect to institutionalize STEP countermeasures by the end of EDC-4.

State and National Pedestrian Safety Statistics

Nationally, pedestrians account for over 17.5 percent of all fatalities in motor vehicle traffic crashes. In Tennessee, pedestrians have risen from 68 of 1,014 traffic deaths (6.7 percent) in 2012, to 101 of 1,041 traffic deaths (9.7 percent) in 2016. As of May 26, pedestrian deaths account for 45 of 380 traffic fatalities (11.8 percent) so far in 2017.

The majority of these pedestrian traffic deaths occur at uncontrolled crossing locations such as mid-block or un-signalized intersections. According to the National Highway Traffic Safety Administration (NHTSA), only 18% of calendar year 2015 pedestrian traffic fatalities occurred at intersections. These are among the most common locations for pedestrian fatalities generally because of inadequate pedestrian crossing facilities and insufficient or inconvenient crossing opportunities, all of which create barriers to safe, convenient, and complete pedestrian networks.

Expecting pedestrians to travel significantly out of their way to cross a roadway to reach their destination

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Pedestrian refuge islands reduce crossing distances and allow pedestrians to deal with only one direction of traffic at a time. Credit: www.pedbikeimages.org / Lyubov Zuyeva.

In this issue...

RoadTalk is a publication of the Tennessee Transportation Assistance Program (TTAP). TTAP is part of a nationwide Local Technical Assistance Program (LTAP) financed jointly by the Federal Highway Administration (FHWA) and Tennessee Department of Transportation (TDOT).

The views, opinions, and recommendations contained within this newsletter are those of the authors and do not necessarily reflect the views of FHWA and TDOT.

865-974-5255/1-800-252-ROAD
http://ttap.utk.edu

Matt Cate, P.E., Director
865-974-4614 (mcate@utk.edu)
Dr. David B. Clarke, P.E.,
Director Emeritus
865-974-1812 (dbclarke@utk.edu).
Frank Brewer, Training Coordinator
865-974-8251 (fbrewer1@utk.edu)
Dr. Airton G. Kohls, Engineer
865-974-0298 (akohls@utk.edu)
Daniel Herman, Technician
865-974-4608 (dherman2@utk.edu)
Spence Meyers, Database,Website &
Technical Assistance
865-974-6168 (meyers@utk.edu)
Jenny Jones, RoadTalk Editor
865-974-6549 (gohjones@utk.edu)
Mollie Mitchell, Administrative Specialist
865-974-1812 (mmitche6@utk.edu)
Diana Webb, Course Registration
865-974-5255 (dwebb21@utk.edu)

From the Director

Another spring has come and almost gone. I write to you today on the verge of the Memorial Day weekend. Looking back on my Winter 2017 column, our mild winter has delivered a mixed bag of weather for the springtime. We have already seen some hot, dry weather, but we have also experienced periods of cool, wet weather. A couple of recent weekends provide a prime example of the unpredictable weather here in Tennessee. On April 29, I visited the Great Smoky Mountains National Park and the early afternoon temperature was near 90 degrees in Gatlinburg. The following weekend, US 441 was closed to through traffic due to snow and ice near Newfound Gap. Sometimes the old saying holds true. If you don't like the weather around here, just wait.

Spring also brought some welcome news on the transportation funding front. The Tennessee General Assembly passed Governor Bill Haslam's IMPROVE Act in April. This action will bring approximately $250 million annually in new state transportation funding. The IMPROVE Act also brings up to $70 million in new transportation funding for counties and $35 million for cities. These increases are made possible by increases in the state's fuel taxes (six cents per gallon for gasoline and ten cents per gallon for diesel) and vehicle registration fees. Hopefully this much-needed infusion of funds will truly improve transportation safety and accessibility for all Tennesseans.

The Center for Transportation Research partnered with Rhythm Engineering to cohost the Advanced Technologies in Transportation Symposium in Knoxville on May 9th. This event offered participants a look forward at new technologies which will bring significant change to the transportation industry. The event featured presentations on connected and autonomous vehicle technology (CAV), automated traffic signal performance measures (ATSPM), and deep learning.

One phrase that grabbed my attention at the symposium was "cyber security." Most of our current safety efforts focus on unintentional driver error or poor judgment, but what happens if an individual or group intentionally interferes with the systems that ensure safety in a world of connected autonomous vehicles which depend on a constant stream of accurate information from onboard sensors and cameras, other vehicles, GPS, and the roadway itself? Other potential effects of new technologies were less ominous but equally interesting. If autonomous vehicles lead to a shift away from personal vehicle ownership and towards ridesharing or use-on-demand models, what happens to parking lots? In this version of the future, vehicles would pass from one user to another with little downtime. In times of reduced demand, unneeded vehicles could be moved away from city centers to satellite service or

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storage facilities. It will probably take decades for this transition to occur, but it would certainly change the way we approach residential and commercial development (and the roads which serve these areas).

That's all for now. Please let me know if there is anything that TTAP can do to help you meet your community's transportation needs.

EDC Spotlight on Safe Transportation for Every Pedestrian (STEP), *continued from page 1*

is unrealistic and counterproductive to encouraging healthier transportation options. By focusing on uncontrolled locations, agencies can address a significant national safety problem and improve quality of life for pedestrians of all ages and abilities.

STEP Pedestrian Safety Countermeasures

FHWA is promoting the following pedestrian safety countermeasures through the fourth round of Every Day Counts (EDC-4):

- Road Diets can reduce vehicle speeds and the number of lanes pedestrians cross, and they can create space to add new pedestrian facilities.
- Pedestrian hybrid beacons (PHBs) are a beneficial intermediate option between RRFBs and a full pedestrian signal. They provide positive stop control in areas without the high pedestrian traffic volumes that typically warrant signal installation.
- Pedestrian refuge islands allow pedestrians a safe place to stop at the midpoint of the roadway before crossing the remaining distance. This is particularly helpful for older pedestrians or others with limited mobility.
- Raised crosswalks can reduce vehicle speeds.
- Crosswalk visibility enhancements, such as crosswalk lighting and enhanced signing and marking, help drivers detect pedestrians—particularly at night.

Benefits of STEP Countermeasures

- Improved Safety. Countermeasures are available that offer proven solutions for reducing pedestrian fatalities at uncontrolled crossing locations.
- Targeted Investment. By focusing on uncontrolled locations, agencies can address a significant national pedestrian safety problem.
- Enhanced Quality of Life. Improving crossing opportunities boosts quality of life for pedestrians of all ages and abilities.

Pedestrian hybrid beacons (PHBs, also known as HAWK signals) stop vehicular traffic when pedestrians are present. PHBs rest in a dark state when not in use. Credit: www.pedbikeimages.org / Mike Cynecki.

State of the Practice

Road Diets, pedestrian refuge islands, and PHBs are all considered Proven Safety Countermeasures by FHWA. FHWA is also promoting Road Diets through EDC-3.

The Tennessee Department of Transportation (TDOT) is developing a program that identifies high crash pedestrian corridors and intersections. Road safety audits will be conducted at these locations and countermeasures will be implemented.

Other communities benefitting from the use of STEP countermeasures include Austin, Texas, where at least 39 PHBs are already installed and residents can request additional sites for them. In Michigan, the Department of Transportation (DOT) developed a Road Diets checklist to ensure smooth administrative procedures.

Countermeasures such as rectangular rapid flashing beacons (RRFBs), crosswalk lighting, and raised crosswalks are being promoted through

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FHWA's PEDSAFE, a tool that helps transportation agencies diagnose and treat pedestrian safety issues. PEDSAFE includes numerous case studies that describe how communities across the country have implemented these safety improvements. The RRFB has been demonstrated to greatly increase driver yielding rates in several communities, including St. Petersburg, Florida.

This EDC-4 effort will help more communities deploy these pedestrian safety improvements based on their specific roadway contexts and needs. It also aligns with U.S. DOT's Safer People, Safer Streets initiative and with other U.S. DOT efforts such as Ladders of Opportunity, which aims to provide people with safe, reliable and affordable connections to employment, education, healthcare and other essential services.

STEP is also an important action in FHWA's Strategic Agenda for Pedestrian and Bicycle Transportation, which is a collaborative framework for pedestrian and bicycle planning, design, and research efforts being developed over the next five years.

To learn more about the pedestrian safety innovations described in this article, please visit the FHWA website at https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm.

Rectangular rapid flashing beacons (RRFB) combine bright, rapidly-flashing lights with standard crosswalk warning signs and pavement markings to provide drivers with active warning of pedestrians crossing the street. Credit: Evaluation of Pedestrian Hybrid Beacons and Rapid Flashing Beacons, FHWA-HRT-16-040.

News in Brief

Frank Brewer Named to NCUTCD Technical Committee

Congratulations are in order for our own Frank Brewer! Frank has been named as a technical member of the National Committee on Uniform Traffic Control Devices, or NCUTCD. He serves as a member of NCUTCD's Temporary Traffic Controls technical committee. This move recognizes Frank's many years of excellence as a work zone traffic control instructor for both TTAP and the National Highway Institute and places him in a position to help shape future revisions to Part 6 of the Manual on Uniform Traffic Control Devices (MUTCD).

Deadline for MUTCD Traffic Signal Timing Changes Has Passed

The 2009 Edition of the MUTCD included revisions which may require changes to signal timing at some intersections. Section 4D.26 states that the durations of yellow change and red clearance intervals shall be determined using engineering practices. Section 4E.06 contains a new requirement in the 2009 MUTCD that the pedestrian change interval shall not extend into the red clearance interval and shall be followed by a buffer interval of at least 3 seconds.

The compliance date associated with these revisions is June 13, 2017 (5 years after Tennessee's official adoption of the 2009 MUTCD). To learn more about these changes and to see additional compliance dates, please visit the MUTCD website at https://mutcd.fhwa.dot.gov/kno_2009r1r2.htm.

FHWA Issues New MUTCD Interim Approvals for Tennessee Agencies

TDOT has requested and received approval to implement new or revised traffic control devices under existing FHWA interim approvals. This approval allows TDOT and all local agencies in Tennessee to use green pavement in bicycle lanes (IA-14.100) and to apply an alternate version of signal warrant 7 for crash experience (IA-19.1). The use of green pavement or the alternate signal warrant is optional. All applications must comply with the terms of the interim approvals as shown on the MUTCD website (https://mutcd.fhwa.dot.gov/res-interim_approvals.htm). Local agencies wishing to utilize these interim measures should coordinate with TDOT State Traffic Engineer Jason Oldham (615-741-0995 or Jason.oldham@tn.gov). Please remember that any traffic control device deployed under an interim approval must be brought into compliance with the provisions of the MUTCD within 3 months following the issuance of a final rule on this traffic control device; and it must be removed if at any time FHWA determines significant safety concerns are directly or indirectly attributable to the device or application.

Managing Speed

by Airton Kohls (Source: World Health Organization)

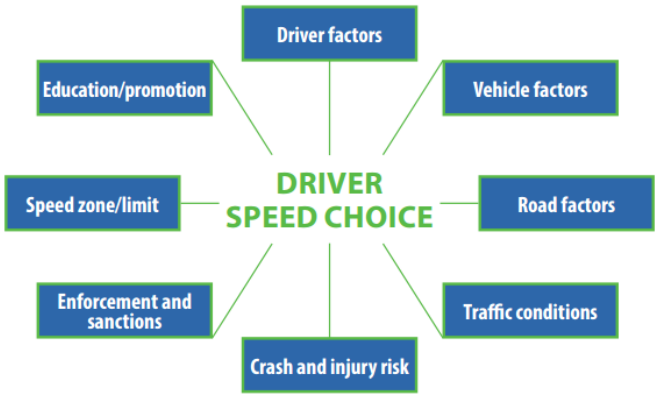
While reading the latest TRB news, I came across an article from the World Health Organization on managing speed. It has been a topic of interest to me since 1996, when I started as a traffic engineer in southern Brazil. With the arrival of connected and automated vehicle technology, it is going to be interesting to see the interaction of speed limit obeying vehicles with our typical human inclination to drive faster than allowed by law. Is it me or are more and more drivers disrespecting the speed limits nowadays and, more importantly, imperiling lives on our roadways? Let me share with you some excerpts from this article including simple actions taken around the world to manage speed. To read it in full go to http://www.who.int/violence_injury_prevention/publications/road_traffic/managing-speed/en/

Speed has a positive effect on mobility in terms of reducing transportation times, but it impacts negatively on road safety, affecting both the likelihood of a road traffic crash and the severity of its consequences. Speed also has adverse effects on levels of environmental and noise pollution, and the "liveability" of urban areas. Over the last decade, along with greater global attention to reducing speed as part of efforts to reduce road traffic deaths and injuries, there has been a growing movement - often instigated at local level - concerned with strategies to manage speed in communities, and the potential benefits in terms of safer and more liveable streets.

Approximately 1.25 million people die every year on the world's roads as a result of road traffic crashes. They are the number one cause of death among young people aged 15–29 years. As well as the public health impact of road traffic injuries, the disproportionate impact of road traffic crashes on the younger age groups makes them an important development problem: road traffic crashes are estimated to cost countries approximately 3% of their GDP, with the economic losses in low- and middle-income countries equivalent to 5% of GDP.

What are the factors which influence speed?

In addition to the speed limit posted on a road, a driver's speed is influenced by a number of other factors such as the driver's age and sex: in most countries male drivers and young drivers are more likely to speed and are therefore over represented in speed-related crashes. Other factors that may influence speed are the driver's blood alcohol concentration, and those related to the road layout and surface quality, as well as the power and maximum speed of the vehicle (see Figure below).



Source: *Speed management: a road safety manual for decision-makers and practitioners.* Geneva, Switzerland, GRSP, 2008.

Saving pedestrian lives in New York City

New York City's ambitious target of reducing annual road traffic fatalities by 50% by 2030 aims to save 1600 lives between 2007 and 2030. To achieve this the city has installed pedestrian countdown signals at 1500 intersections citywide; implemented 75 additional 20 mph school speed zones; developed a pilot program for neighborhoods of 20 mph zones; enforced speeding laws along major traffic corridors; and used mass media campaigns to engage and inform the public. Depending upon the specific intervention being assessed, these measures have been credited with reducing pedestrian collisions and total road traffic crashes by 25–51%.

Ensuring in-vehicle technologies

Accelerating the penetration of proven life-saving vehicle safety technologies into the global fleet helps to reduce the number of people killed and seriously injured on the world's roads. This can be achieved through regulatory action by government or by voluntary commitment from manufacturers to make these technologies a standard feature of all vehicles. In the United States, twenty vehicle manufacturers representing 99% of the country's auto market have committed to make autonomous emergency braking (AEB) a standard feature in all new cars by no later

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than 2022. Their action was initiated ahead of any regulatory change by the Government. In addition to governments and manufacturers, consumers can also play a part by purchasing a vehicle fitted with these technologies.

Community support drives action on speed management

"Driving a mile through our streets at 20 mph instead of 30 mph adds just 60 seconds" was suggested by Myra James who was an environmental and sustainable transportation campaigner in Hebden Bridge, a market town in the Calderdale area of the North of England. In 2013 she formed a local "20's Plenty for Calderdale" campaign to specifically ask for a community-wide 20 mph limit on roads. After a successful meeting with the politician responsible for transportation, it was recognized that showing community support would be an important part of any speed limit change policy. She widened the campaign and activated other community groups by promoting the benefits for walkers and cyclists and the young and elderly as well as for the environment in terms of reductions in emission and noise that come with lower speeds. It became clear to politicians and Calderdale Council officials that there was strong community support for 20 mph limits. In May 2014 the decision was made by the Council to adopt a 20 mph limit for most urban and village roads across Calderdale and started a phased change of the legal speed limit for most roads from 30 mph to 20 mph through Traffic Regulation Orders. At the 2017 national "20's Plenty for Us" conference, Calderdale Council's Director of Public Health presented the results of the campaign: a reduction in casualties of 22% since the introduction of the new speed limits and sustained support from the community for the scheme with surveys showing 80% approval. Throughout the campaign, Myra had support and advice from the national "20's Plenty for Us" nongovernmental organization and in 2015 Myra was given their Campaigner of the Year award. Calderdale is just one of the many places adopting 20 mph speed limits for residential and urban streets in the United Kingdom.

AASHTO's Online Tool for TSM&O

by Airton Kohls (Source: AASHTO)

Transportation Systems Management and Operations or TSM&O is a set of strategies to anticipate and manage traffic congestion, and to minimize the other unpredictable causes of service disruption and delay, thereby maintaining roadway capacity while improving reliability and safety.

However, implementing the required strategies at the best practice level presents a unique set of new challenges to transportation agency management. The American Association of State Highway and Transportation Officials (AASHTO) has developed a website (http://aashtotsmoguidance.org/) as an online tool that uses self-evaluation and best practice experience to identify key program, process and institutional preconditions to achieve more effective TSM&O, and to develop action plans for incremental improvement of the required capabilities.

Congestion and Degradation of the Level of Service

Roadway congestion has continued to increase over the last 20 years in intensity and in geographic and temporal extent as demand has outgrown capacity, especially during peak periods.

The continuing increase in population and vehicle use has—and will—continue to substantially outstrip the ability of new capacity to keep pace.

Causes of Congestion

There is a range of problems that cause congestion:

- The increase in demand on existing roadway capacity causes congestion, which results in increased travel time and higher collision rates;
- Unanticipated traffic disruptions create longer and unreliable trip times, as well as increased collision rates;
- Road construction and maintenance create traffic congestion that may vary from day-to-day;
- Weather-related events (ice, snow, fog) create unstable, unpredictable, and potentially unsafe driving conditions;
- Complex travel conditions and patterns lead to desire for actively managing the transportation network.

Delay and disruption is not confined to the recurring congestion of peak period travel. Even in the off-peak period and outside of urban areas, level of service is increasingly unpredictable, owing to crashes, construction, and weather.

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Urban and Rural Congestion

While recurring (peak period) congestion is largely an urban phenomenon, non-recurring congestion occurs in all geographic contexts. Crashes, work zones, and weather are the major causes of congestion in smaller urban and rural areas, reflecting their network redundancy limitations and sparse incident response resources. The table below shows these comparisons by indicating the percentage contribution of causes of delay by geographic context.

CAUSE OF DELAY		CONTEXT		
		Large Urban Areas > 1m	Small Urban Areas 0.1-1.0m	Rural
RECURRING CAUSES	Demand greater than capacity	29-37%	20-26%	0%
	Poor signal timing	4-5%>	7-13%	2%
TOTAL RECURRING		33-42%	32-33%	2%
NON-RECURRING CAUSES	Crashes	35-36%	19-26%	26%
	Breakdowns	6-7%	6-10%	25%
	Work zones	8-19%	26-27%	39%
	Weather	5-6%	7-10%	7%
	Special events, other	1%	<1%	0%
TOTAL NON-RECURRING		58-67%	67%	98%

Source: Summarized in The 21st Century Operations-Oriented State DOT, NCHRP 20-24(21), 2006 from FHWA table combining recurring congestion date (TTI) and non-recurring congestion data (ORNL).

Congestion Self-evaluation Processes

The AASHTO guidance is designed for transportation agency managers whose span of control relates to the operations and management of the roadway system, including policy makers and program managers related to ITS and TSM&O at both the state and regional level, as well as managers of related activities such as traffic engineering, maintenance and public safety.

The AASHTO guidance is also designed to provide direction to a given agency via a custom-tailored action plan for improving the performance-related effectiveness of TSM&O activities on a continuous basis. It is based on the understanding that capitalizing on the full potential of TSM&O strategies requires special technical and business processes, organizational structure, and relationships all tailored to the unique features of the high-tech, real-time, collaborative characteristics of TSM&O. As these capabilities are often inconsistent with existing legacy processes and arrangements, a deliberate management approach to improving these processes and arrangements is essential.

The stepwise guidance can be custom-tailored to the agency and user through a self-evaluation based on a combination of the user's span of control and interest, the state of play of the agency's TSM&O activities, and the current agency capabilities regarding technical and business processes and institutional arrangements.

The evaluation identifies the current level of agency capabilities in key process and institutional dimensions. This evaluation is automatically linked to a set of custom-tailored, "next steps" action plans to improve the levels of agency capability to develop and implement increasingly effective TSM&O.

The Guidance can be custom-tailored to the agency through two self-evaluation processes:

One-Minute Guidance Evaluation – Based on a snapshot of the agency's current program

Detailed guidance is provided for a user with limited time or wishing to "get a feel" for how the full self-evaluation and custom-tailored detailed guidance works. Guidance is provided based on user selection of brief statements describing the agency's TSM&O capabilities regarding technical and business processes and institutional arrangements.

Customized Guidance Evaluation – Based on a comprehensive review of the agency's current program

Custom-tailored detailed guidance is provided in response to a 15-20 minute self-evaluation that queries a user's span of control and interest, the state of play of the agency's TSM&O activities, and the current agency capabilities regarding technical and business processes and institutional arrangements.

These self-evaluation processes can be found at:

http://aashtotsmoguidance.org/one_minute_evaluation/
http://aashtotsmoguidance.org/self_evaluation/

Tennessee Transportation Assistance Program
Center for Transportation Research
The University of Tennessee
309 Conference Center Building
Knoxville, TN 37996-4133
Ph. (865) 974-5255/(800) 252-ROAD
Fax. (865) 974-3889
Email. TTAP@utk.edu
Web. http://ttap.utk.edu

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TALK TO TTAP

We are always looking for your comments, ideas and suggestions to help make the TTAP Program more useful to you. Please fill out and fax the form below to TTAP at (865) 974-3889 or mail to TTAP; Suite 309 Conference Center Building, Knoxville, TN 37996-4133 or email TTAP@utk.edu if you have any questions.

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2. Please list any additional training workshops you would be interested in attending.

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