SPOTLIGHT – CITY OF MEMPHIS Traffic Signal Maintenance and Construction

by Dr. Airton Kohls

I was in Memphis in the beginning of February to present CTR’s Traffic Signal Academy and I was impressed with the practices of the City of Memphis’s Traffic Signal Maintenance Department. The agency prioritizes the safety of pedestrians, bicycle users, motorists and the efficient movement of goods throughout the city by maintaining existing traffic signals and installing new signals with a high degree of excellence. The agency is responsible for an impressive 830 city-owned traffic signal and flasher controlled intersections, 140 city-owned school flashers, 230 jurisdiction-owned traffic signal and flasher controlled intersections, and 104 jurisdiction-owned school flashers.

Let me give you some facts regarding the City of Memphis’s traffic signal maintenance and construction operations. It is a 24 hours per day, 7 days per week, 365 days per year operation with 3 shifts: 7am-3pm (day shift), 3pm-11pm (evening shift), and 11pm-
Brrrr! It’s been a bitter winter, and it ain’t over yet! As I type, the weather prognosticators are forecasting a chance of snow for later in the week. The past few winters (a whole bunch of them, to my recollection) have been so mild in East Tennessee that we’ve had very little demand for TTAP classes on winter maintenance topics. Maybe it’s time to dust off some old courses and add them to next year’s training calendar.

We were fortunate here at UTK to have a visit and seminar last week by Dr. Marty Wachs, currently of RAND Corporation and formerly a professor at the University of California, Berkeley and UCLA. Among other things, Dr. Wachs is a recognized authority on transportation finance. In his presentation, he pointed out that under current government fuel economy standards, U.S. petroleum consumption will decline by two billion barrels of oil annually, an overall 25 percent reduction. Since highway infrastructure is presently funded by motor fuel taxes, this does not bode well. To keep pace with funding needs, we will either need a painful increase in the fuel excise tax, or some sort of alternative revenue generation system, or possibly a combination.

Increases in the fuel tax have, so far, been a modern day third rail of politics. There is little enthusiasm among the electorate—in Tennessee or nationally—for any sort of tax increase. Our elected representatives are keenly attuned to the wishes of the voters. So, the near term likelihood of a fuel tax increase, particularly of the magnitude needed to offset such large declines in fuel consumption, is small.

Another major problem with fuel taxation is that it fails to collect from the small, but increasing, percentage of the vehicle fleet that does not use petroleum fuel. Electric vehicles, for instance, get a free pass.

The holy grail of the highway revenue community is a tax based on vehicle-miles of travel (VMT). Such a tax would apply to all vehicles using the highway system. It could be graduated to reflect the impact of various vehicle classes on the infrastructure. Funds collected could, in theory, be allocated out to each infrastructure owner based on mileage traveled on their portion of the system.

While the VMT based tax has positive features, it also presents some formidable collection and enforcement issues. Advocates point out that current technology for vehicle tracking, present in every cell phone, could greatly simplify the accounting of miles traveled by roadway. However, this would mean government monitoring of vehicle travel. With the headlines of recent months about government collection and misuse of data, vehicle tracking raises serious privacy questions. Dr. Wachs believes that VMT based revenue collection systems are at least 20 years in the future. However, I think we need to be vigilant about the potential for abuse of a VMT tracking system.

That’s about it for now. As always, if we can help, please don’t hesitate to call or email. TTAP looks forward to assisting you. Be safe, and stay warm!

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From the Director

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7am (night shift). The day shift normally runs two crews responsible for planned (preventive) maintenance and inspection of school flashers and flashing intersections. The evening shift has a minimum of two crews scheduled for limited planned maintenance and special projects like LED installation. The night shift also has a minimum of two crews assigned to special projects and maintenance/inspection duties.

Their personnel consists of a manager, 18 signal technicians, 11 signal aides, a procurement specialist, a general clerk, and a day shift dispatcher. Evening, midnight and weekend dispatch is handled by the Emergency Management Agency. There is also a construction crew of 7 to 9 workers overseen by the construction crew lead technician and an inspector. The construction crew also serves as backup for maintenance activities. The electronics lab has a 3 member team during the day shift. Their responsibilities are to maintain the computerized traffic signal system/database ACTRA, maintain the school flasher database, repair fiber optic cables, repair all electronic equipment relevant to the traffic signal system (even controllers and conflict monitors), build new cabinets, perform inspections of new/modified intersections and assist other bureaus with electronic/electric problems.

The Traffic Signal Maintenance department is well equipped with nine single-man and two two-man bucket trucks, two pole trucks with trailer, one dump truck, two stake bed trucks (one with loop saw), one trenching tractor, one mini skid steer loader, support vehicles and two air compressors with jackhammer equipment. The agency also has an eight-vehicle heated garage, a pole storage lot and onsite fuel tanks.

Some of the agency’s highlights thru the years include extensive repairs to over 470 intersections that suffered wind damage in 2003, installation of LED lights at 100% of the city’s signalized intersections, and continuous repairs to equipment due to crashes. One additional comment from the agency that was interesting to me was that it is estimated to take 18 months to train a new technician before he can perform duties on his own. During the classes, I observed how the interaction between the agency’s engineers, managers, and technicians allowed them to exchange ideas and adopt a proactive approach to traffic signal management and maintenance, a constructive practice that I always preach in the Traffic Signal Academy. For additional information, please contact Mr. Jay Walko at 901-528-2844.
Remember Retroreflectivity? It’s Still a Big Deal.

by Matt Cate, P.E.

Do you fondly remember the day a couple of years ago when you heard that the Federal Highway Administration (FHWA) had relented on its mandate that signs must meet the “new” minimum retroreflectivity requirements first introduced in Revision 2 to the 2003 Edition of the Manual on Uniform Traffic Control Devices (MUTCD)? Did you gladly return to the trusty old ways of engineer grade sign sheeting and faded old signs on the roadside? If so, you may want to keep reading this article.

On May 14, 2012, FHWA simultaneously released Revisions 1 and 2 to the 2009 MUTCD. These revisions went into effect on June 13, 2012. Revision 1 addresses concerns from the traffic engineering community regarding changes to the treatment of Standards in the 2009 MUTCD and the ability to apply engineering judgment to situations where applicable standards may need to be modified to reflect roadway geometry, driver behavior, or other operational considerations. Revision 2 eliminated or delayed several compliance dates established in prior versions of the MUTCD, including three related to the traffic sign minimum retroreflectivity requirements established in Revision 2 to the 2003 MUTCD.

It is very important to note that Revision 2 primarily revised Table I-2 (Target Compliance Dates Established by the FHWA) to eliminate 46 items and to revise or extend an additional 4 items. This revision eliminated the January 2015 retroreflectivity compliance date for all applicable ground-mounted signs (excluding street name signs) and the January 2018 compliance date for overhead guide signs and street name signs. Revision 2 also modified the earliest retroreflectivity-related compliance date, delaying the date for “Implementation and continued use of an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the established minimum levels [as set in Section 2A.08].” The new target compliance date for this requirement is June 13, 2014.

So what do these changes mean for agencies that maintain traffic signs on public roads? First, these affect only the compliance dates associated with the minimum retroreflectivity standard, not the standard itself. The original retroreflectivity levels apply to all of the signs (including street name signs) addressed by Revision 2 to the 2003 MUTCD. In other words, we are still required to meet these retroreflectivity standards – only the deadline for individual signs to meet these requirements has been eliminated.

The remaining compliance date indicates that agencies must adopt and implement a retroreflectivity management or assessment system by June of this year. The MUTCD defines several acceptable options for each type of system. Retroreflectivity management techniques include expected sign life, blanket replacement, and control signs. Assessment techniques include nighttime visual inspection (comparison panels, calibrated signs, and consistent parameters) and measured sign retroreflectivity. An effective and compliant management system will apply one or more of these techniques to all signs within an agency’s jurisdiction to ensure that these signs are maintained at or above the minimum retroreflectivity levels described in Section 2A.08 of the MUTCD. This system is intended to protect agencies in the event that some individual signs fall below the values in Table 2A-3.

If an agency does not have this retroreflectivity management system in place by June 13, there is no immediate penalty. However, the agency’s liability is potentially increased for any nighttime crash that occurs near a non-compliant sign. Without the information and documentation required by Section 2A.08 an agency may be unable to prove that it has taken adequate steps to ensure that signs meet these minimum retroreflectivity requirements. Ideally this system will document a number of relevant characteristics for each sign on the roadway network. Examples of these data include, but are not limited to:

- Sign description
- Location
- Direction faced by sign
- Sign Size
- Date of installation
- Date of last inspection (as required by selected management technique)
- Condition/retroreflectivity at last inspection

Without a deadline to guide the process of replacing individual signs, how should agencies proceed? This answer is provided in the introduction of the MUTCD. Any new or reconstructed device installed after the final effective date of the most recent version of the MUTCD (or adoption of this version by the state) shall be in compliance with the new edition or revision. This means that all new or replacement signs must comply with applicable minimum retroreflectivity standards. Existing devices
Remember Retroreflectivity? It’s Still a Big Deal

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may generally remain in use through the end of their useful service lives. Keep in mind that a sign may reach the end of its useful life long before it is stolen or damaged beyond repair – the MUTCD instructs agencies to consider many sign characteristics as part of their routine maintenance activities, including “proper position, cleanliness, legibility, and daytime and nighttime visibility.” Furthermore, “Damaged or deteriorated signs, gates, or object markers should be replaced.” Marginal daytime legibility is not enough to justify continued use of an existing sign. Excessive fading or loss of retroreflectivity indicates that a sign has reached the end of its service life. Any sign installed after retroreflectivity standards were in effect must be maintained at or above the minimum levels detailed in Table 2A-3 of the MUTCD.

Regardless of their retroreflectivity levels, signs that are badly faded or damaged should be replaced to ensure that their message is effectively conveyed to all drivers. This stop sign had likely been in poor condition for several years at the time this photo was captured.

When replacing signs to meet retroreflectivity standards, be sure to address other potential MUTCD compliance issues (including minimum sign height).

TTAP Can Help

TTAP still has sign retroreflectometers available for loan to local agencies across Tennessee. We can also provide additional information and guidance to help your agency attain compliance with retroreflectivity standards. To borrow equipment or seek other assistance, contact TTAP at 1-800-252-7623 or TTAP@utk.edu.

Build a Better Mousetrap Update

by Matt Cate, P.E.

TTAP’s announcements of the “Build a Better Mousetrap” competition appeared in the Summer 2013 and Fall 2013 issues of RoadTalk (http://ctr.utk.edu/ttap/newsletter/index.php). However, most of you are apparently quite shy about your innovations, as evidenced by the fact that we received only one submission prior to the original January 31 deadline. We would like to thank Bo Mills and his maintenance crew at the Germantown Public Services Department for their excellent submission. At the same time, we would also like for their submission to be part of an inaugural group rather than a lone innovation.

To give everyone one last chance to submit an idea or innovation for consideration, we are extending the competition deadline to Friday, March 28. Our panel of impartial judges will select a winner and a runner-up from the pool of submissions, both of which will receive a prize package (including a certificate for a free seat in any of our one-day classes) and recognition in a future issue of RoadTalk. All submissions will be included in a 2014 TTAP Build a Better Mousetrap Entry Booklet to be posted on the TTAP website.

Please share your innovations, refinements, and solutions to help someone else address the same issues that led you to develop your own “better mousetrap”! Remember that we just need a few pieces of information from you, including: a problem statement; discussion of your solution; labor, equipment, and materials used; estimated cost; and a description of the resulting savings and benefits to your agency and community. Entries will be judged on five criteria: cost, savings/benefits to the community, ingenuity, transferability to others, and effectiveness.

To help simplify the process, we have posted a Build a Better Mousetrap entry form on the TTAP website (http://ctr.utk.edu/ttap/index.php). If you have any questions about the competition, please contact Matt Cate (mcate@utk.edu) or Airton Kohls (akohls@utk.edu) by email or call us at 1-800-252-7623.
Maintaining Pedestrian Facilities for Enhanced Safety

by Dr. Airton Kohls  (Source: US Department of Transportation – Federal Highway Administration)

With the primary goal of increasing safety and mobility, in October 2013 the Federal Highway Administration (FHWA) released A Guide for Maintaining Pedestrian Facilities for Enhanced Safety as one of several means of reducing the approximately 4,000 pedestrian fatalities and tens of thousands of pedestrian injuries occurring in the United States annually.

One way pedestrian safety can be improved is by encouraging state, local and municipal governments to provide and maintain accessible sidewalks along streets and highways where there is pedestrian activity such as near school zones, transit locations and other locations with frequent pedestrian activity. Although there are guidelines and standards to aid in the design of pedestrian facilities, it can be difficult to adequately maintain facilities once they are in place so they remain safe and accessible. Federal funding is not available for maintenance activities, and many state and local government agencies have severely constrained resources for monitoring, inspecting, and maintaining sidewalks and other pedestrian facilities. Not only does this problem relate to walkability and accessibility, there are also liability consequences related to poor, inadequate, or infrequent inspection and maintenance of pedestrian facilities.

Sidewalks or walkways (a slightly broader term that also includes walks that do not parallel a street) received the greatest attention in this Guide as they comprise the vast majority of the pedestrian system in the United States. Shared use paths will often have the same maintenance needs as sidewalks, and where a discussion can cover sidewalks and paths, the guide does so. The guide includes discussions on Americans with Disabilities Act (ADA) including curb ramps, detectable warning fields and sidewalk surface materials. Pedestrian facilities used to cross streets, such as crosswalks and signals, and their associated maintenance issues are also discussed. Other sections of the report include funding and techniques to elongate the maintenance life of pedestrian facilities. All of the sections include a discussion of exemplary maintenance practices from around the United States and recommendations for maintenance.

Who is responsible for facility maintenance?

Many jurisdictions have laws or ordinances addressing pedestrian facility maintenance, which often require the adjacent property owner to repair deteriorated sidewalks adjacent to their property. More often ordinances require property owners to remove snow and ice and vegetation encroaching onto sidewalks. However, property owner requirements and enforcement of these regulations may vary widely from jurisdiction to jurisdiction. Maintenance of shared use paths is more complicated still, because the agencies that are responsible for them do not always make a practice of monitoring them and making sure they are in safe and passable condition.

A Guide for Maintaining Pedestrian Facilities for Enhanced Safety is a comprehensive reference that addresses the needs for pedestrian facility maintenance; common maintenance issues; inspection, accessibility, and compliance; maintenance measurers; funding; and construction techniques to reduce future maintenance. A free document download is available at: http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/fhwasa13037.pdf

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The following are examples of maintenance repair methods for sidewalks and paths:

### Patching

*Missing areas of concrete have been marked for repair*

*The areas have been temporarily repaired with asphalt patches. Note the patching material overlaid on the concrete extending beyond the hole.*

### Cracking Repairs

*A small wedge may still create a hazard or be difficult to navigate in a wheelchair. This wedge had deteriorated over time.*

### Wedging

*Wedge has been placed to mitigate the hazard caused by a raised sidewalk slab. Note the extensive and appropriate ramping of the wedge.*

Looking to add another great reference to your toolbox?


It is intended to provide practitioners with the latest information available for improving the safety and mobility of those who walk. The online tools provide the user with a list of possible engineering, education, or enforcement treatments to improve pedestrian safety and/or mobility based on user input about a specific location.
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.

1. Please send me more information on the following articles mentioned in this newsletter.

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

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3. Please list topics for videos you would like TTAP to obtain.

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4. Please list any other ideas or suggestions on how TTAP could assist you.

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