Build a Better Mousetrap

by Dr. Airton G. Kohls & Matt Cate, P.E.

Since 2009, the Federal Highway Administration’s Local Technical Assistance Program and Tribal Technical Assistance Program centers have gathered innovative, cost-saving ideas from local agencies around the nation through the Build a Better Mousetrap competition. The purpose of this annual contest is to collect and document real world examples of best practices, tips from the field, and creative solutions to common problems. More importantly, the Build a Better Mousetrap competition is a fantastic way to share these ideas with others that may benefit from different concepts and perspectives. Finally, the competition provides well-earned recognition for the hard work and creativity of these city, county, and tribal transportation workers.

We want the Volunteer State to share in this recognition. TTAP is looking for projects that you, your employees or crew designed and built. Potential Build a Better Mousetrap projects include the development of tools, equipment modification, and/or processes that increase safety, reduce cost, improve efficiency, and improve the quality of transportation.

If you have developed a unique solution to a common problem or have found a faster/better/cheaper way to serve your community’s transportation needs, we want to hear from you! Additional details of the Tennessee Build a Better Mousetrap competition will follow on the TTAP website and in the Fall issue of RoadTalk. In the meantime, please contact Matt Cate (865-974-4614, mcate@utk.edu) or Airton Kohls (865-974-0298, akohls@utk.edu) for more information.

To get you started, here are some examples of the great ideas collected in previous Build a Better Mousetrap competitions. You may benefit from one of their ideas!

Object Marker Spring-Loaded Post Holder - Nebraska

Problem: Inability to keep object markers (OM-3) up at bridge sites.
Solution: Use of an object marker spring-loaded post holder (see picture) has basically eliminated the problem.
Labor/Material/Cost: 45 min. of labor per unit; welder, drill press and band saw; 2” sign post anchor; 1 3/4” slide in sign post; (1) adjustable spring; (1) 1 1/2” flat bar for pivot; misc. bolts. $32.00 per unit.

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As I write this column, we’re in the full throes of a Tennessee summer. Unlike last year, with its scorching temperatures and near desert dryness, this summer has been unusually cool and rainy. The press is full of concern about global climate change these days. We Tennesseans know that climate change is a regular thing. As the saying goes, if you don’t like our weather, wait a few hours—it’ll change!

OK, so now that I’ve made my obligatory comments about the weather, what can I say about the world of transportation? Mr. Anthony Foxx was sworn in July 2 as the 17th U.S. Secretary of Transportation. A North Carolina native and former mayor of the city of Charlotte, Mr. Foxx should bring to the job an understanding of the needs of and issues faced by local governments. He has stated that safety will remain the Department’s top priority, but also appears to strongly support workforce development activities.

I was fortunate in July to be invited to Beijing, China to do some lecturing on U.S. freight transportation, including the role of motor carriers on our highways and streets. This is my fourth trip to China, and I have found each trip to be enlightening. This time, I was also able to observe some public works activities in Beijing, including street and utility maintenance. I also toured some transportation facilities. Most everything I saw would have been familiar to you, right down to the traffic control deployed and the personal protective equipment worn by the workers. I will say that driving on some of the local streets in Beijing is a tad exciting, given a mix of cars, bicycles, and three-wheeled cargo trikes and very narrow lanes (a generous term). Like New Yorkers, Beijing drivers tend to use their horns liberally. It’s all very good natured, though, and I never saw any evidence of “road rage” despite often heavy traffic conditions.

We’re continuing to work hard for you here at TTAP. One new innovation you might check out is the online version of RoadTalk. You can find this via the TTAP website. The online version contains additional content that space limitations preclude from the printed version. We’ve also got a new online course registration site, too, which we hope will simplify the process of registering for our classes. We’re still working on online payment by credit card, so in the meanwhile you’ll have to call or fax your card info to us.

Speaking of RoadTalk, we’d like to feature examples of innovation and best practices from you, our readers, in upcoming issues. If you’d like to tout your agency, please drop us a line and we’ll help get the message out. Since LTAP programs nationwide often share newsletter articles, you could even get national publicity! Please don’t be bashful. Let us know what you’re most proud of.

Well, that’s about it for this issue. As always, if we can help, please don’t hesitate to call or email. TTAP looks forward to assisting you. Be safe!
Under Vehicle Washer - Connecticut

Problem: The use of winter de-icing chemicals was having a tremendous corrosive effect on the trucks. The salt material gets caught in a lot of hidden areas under vehicles and cannot be reached by rinsing with a regular hose and nozzle.

Solution: The unit (see picture) is connected to a hose - preferably with good water pressure. The unit is then moved under the vehicle and water is turned on. The operator (employee) then moves it around under the vehicle rinsing the underside from all different angles. The holes were placed at varying angles along the copper pipe to maximize reach and coverage.

Labor/Material/Cost: Depending on in-house supplies or parts that can be recycled from other things, the cost estimate would be around $100 (if all parts needed to be purchased).

Sign Repair Stand - Colorado

Problem: Two of the Street Departments many tasks include maintaining all of the City’s information and regulatory signage (name signs, speed limits, stops, etc.) and low to the ground right of way tree trimming around signage and other structures. Unfortunately the City is not resourced with a vehicle (bucket truck) specifically designed for these duties. As a result we would end up with somebody standing in the back of a pickup or climbing a ladder to do these low to the ground maintenance repairs. We feel climbing a ladder always represents a risk factor, especially on uneven rights of way, during all forms of weather conditions. We further felt that climbing in and out of a pickup bed, reaching out over the edge of the bed, and just standing in a wet or snow covered pickup bed while doing repairs was too great a risk for staff members to continue doing. A new truck, mounted with the appropriate attachments and safety protection, was not a feasible option. We needed a low budget solution that was both practical and safe.

Solution: The Street Department is fortunate to have a Crew Leader that is very knowledgeable in the area of steel fabrication. When faced with the task of building some kind of a sign repair stand, it was desired to find a low cost solution that would fit in the bed of a pickup, be easily installed or removed by two men, and provide the safety measures needed for personnel doing repairs. The design in the picture was developed.


Hose Reel for Rubber Patching Rig - Pennsylvania

Problem: Before we made this mount for the air hose it was difficult to control the hose used to blow out cracks before rubber sealing. When the hose was run over by the truck it would scratch the hood and get in the way of the driver; then, when you wanted to move to the next job, you had to wrap up the hose and disconnect the wand and put it in the bed of the truck.
Solution: We made a removable mount to attach a retractable hose reel, so that the hose and wand would always be in front of the truck and ready at any time. We then fished an air hose along the frame of the truck, and attached quick connects on either end for easy disconnect and hook up. By creating this mount, we can move to the next job in minutes, and by using only one vehicle, it results in less fuel usage and smaller work zones.

Labor/Material/Cost: About $400

TTAP is looking for projects that you, your employees or crew designed and built. Projects can be anything from the development of tools, equipment modification, and/or processes that increase safety, reduce cost, improve efficiency, and improve the quality of transportation. If you are interested in participating, please contact Airton Kohls/Matt Cate for information.

MUTCD Update: No News Is The News

by Matt Cate, P.E.

You may remember that we shared news of a Request for Comments regarding potential options for splitting the Manual on Uniform Traffic Control Devices (MUTCD) into two separate documents. In this request for comments, FHWA described two options under consideration. Option A would have retained Standard statements and important Guidance statements, along with associated Option statements in the MUTCD. Support statements and stand-alone Option statements (those that are not exceptions to the Standard and Guidance statements that were retained in the MUTCD) would be moved from the MUTCD to the Applications Supplement. Option B would have moved a greater amount of information from the MUTCD to the Applications Supplement, retaining in the MUTCD only Standard statements and any related Option statements that contain exceptions to the Standard statements. These options were intended to reduce the complexity and length of the MUTCD and simplify the rulemaking process by removing supplemental information from the regulatory document.

The Federal Highway Administration (FHWA) issued its response to comments received from 40 State DOTs, 26 local agencies, 17 associations, 34 consultants, 3 vendors, and 49 private citizens. Out of 169 unique responses received, 155 (92%) were either against splitting the MUTCD into 2 separate documents, or recommended postponing any action to split the manual pending results from the ongoing National Cooperative Highway Research Program (NCHRP) strategic planning effort, which are expected to be available in January 2014. The strategic planning effort will address many issues that would impact future MUTCD content and structure, including consideration of an MUTCD that would consist of more than one volume.

Commenters also identified several relevant concerns, including: the MUTCD’s complexity as a result of its organization rather than the amount of information presented; the potential for the total volume of information presented in the newly separate documents to exceed that of the MUTCD in its current format; the potential for confusion and inconsistency as users attempt to combine information from the MUTCD and a separate applications supplement; and the resulting complexity that would be faced by more than 30 state DOTs that adopt state-specific versions of the MUTCD or publish state supplements to the national manual.

In its response to these comments, FHWA indicates that it will not move forward at this time with its plan to split the MUTCD into multiple documents due to a lack of support from commenters. Instead, the agency will focus its efforts on other alternatives to make the MUTCD more user-friendly. To see the complete response to comments, please visit the MUTCD website at http://mutcd.fhwa.dot.gov/.
Traditionally, safety improvements on roads are based on making upgrades to specific locations with higher than expected number of crashes. According to the National Highway Traffic Safety Administration (NHTSA) in 2010, rural areas accounted for 54 percent of the fatal crashes as compared to urban areas, which accounted for 45 percent. Crashes on rural and local roads are typically spread over hundreds or thousands of miles and are not as densely clustered as crashes in urban areas. It is often difficult for agencies to isolate high-crash locations for safety improvements on rural and local roads. The systemic approach to safety provides state, regional, and local agencies an alternative method to address these crash types and fulfill a previously unmet need.

Systemic improvements can address rural crashes because the focus is high-risk roadway features not specific locations. As an exercise, examine the fatal crash locations in your state from year to year. What do you see? You will likely see fatal crashes occurring at different locations across the system, rather than isolated high crash locations, especially in rural areas. Now look at fatal crashes by crash type in your state. What do you see? You will likely see that the same type of fatal crashes occur from year to year. While it is not possible to predict where fatal crashes will occur from year to year, it is possible to use the roadway characteristics associated with particular severe crash types to predict the locations that are most likely to experience a fatal crash in the future using the systemic approach to safety. The approach is also beneficial for urban areas particularly in addressing crashes involving pedestrians, bicyclists, and motorcyclists.

The systemic approach is iterative and intended to be flexible and easy to apply to a variety of systems, locations, and crash types. Similar to the site analysis approach and most common safety management processes, the systemic planning approach involves problem identification, countermeasure identification, and project prioritization:

**Step 1: Identify Target Crash Types/Risk Factors**
Review systemwide data and location characteristics to focus on specific crash types and associated risk factors. A lengthier list of potential risk factors is listed in the next column.
Asphalt Paving Longevity

by Frank Brewer (Excerpted, in part with permission, from http://mpw.nashville.gov/ims/Paving/ProjectTypes.aspx#5)

Asphalt Paving is not cheap. The longer the life we get from any paving application, the less expensive it becomes so let us look at a few of the various means to extend pavement life.

Asphalt resurfacing is a method that has a couple of alternatives. One is a direct overlay; another is a milling and resurfacing process.

- The direct overlay is effective but raises the height of the pavement which can cause drainage problems as well as access problems, as you continually bring the street level up by the thickness of the asphalt mat laid down. Maintaining bridge approach clearance is also a problem.

- The milling and resurfacing process allows for the removal of the existing surface, to a specific height. When the resurface mat is placed, it will meet the existing height of the previous roadway. The material milled, known as reclaimed asphalt pavement (RAP) may be recycled as base material or reground and mixed with new hot-mix asphalt (HMA). Deformities such as rutting and potholes are easily corrected in the process.

- Both operations will have to involve readjustment of utilities so these costs are the same regardless of the operation chosen.

Another countermeasure is Crack Sealing. As pavement weathers and settles surface cracks form. Cracks should be treated promptly because they create openings for moisture to penetrate the pavement layers. Moisture or water can cause severe damage when trapped in the crack. Neglecting pavement cracking usually leads to accelerated deterioration of the pavement, resulting in significant problems such as potholes or base failures, which cause the serviceability of the pavement to decline. By using a hot polymer sealant, you are able to fill the crack to prevent the water intrusion and the service life of the roadway is extended.

Rejuvenation is also available. Rejuvenation is a surface treatment that replaces the lighter or volatile oils in the asphalt mix. These oils essentially evaporate over time. This process can be used on road surfaces that are in good condition but have been in place for a period of several years. It is less expensive than most processes; however, it will not correct surface deformities. A thorough sweeping prepares the roadway, the Surface Treatment is applied, and that is followed with a Curing treatment. The application of the volatile oils will add years of service life to the roadway.

Once the pavement is renewed there will be re-stripping and other activities involved. There are also additional methods to extend the service life to your roadways. Although there are expenses with these processes, the extended life of the roadway justifies the expenditures.

For more information on these and the additional methods, please contact TTAP (865-974-5255, 800-252-7623, ttap@utk.edu)
For example:
Crash Type – Roadway departure crashes on rural two-lane highways with various roadway features.
Risk Factors – Average daily traffic volumes, curve density, access density.

Step 2: Screen and Prioritize Candidate Locations
Use the risk factors to screen the network and prioritize candidate locations for safety investments that will reduce the potential for future severe crashes.

Step 3: Select Countermeasures
Evaluate countermeasures to select those that address roadway departures on roads with the identified risk factors.
For example:
Rumble strips, cable median barriers, or advanced curve delineation.

Step 4: Prioritize Projects
Prioritize safety projects for implementation based on the risk-based assessment, available funding, other programmed projects, time to develop projects, and other considerations.

Highway safety improvement projects are designed to improve safety by minimizing or eliminating risk to roadway users. Rather than managing risk at certain locations, a systemic approach takes a broader view and looks at risk across an entire roadway system.

For additional information, including examples of systemic approaches in states including Minnesota and Missouri, please visit the FHWA Office of Safety website at http://safety.fhwa.dot.gov/systemic/index.htm.

### New and Recent Videos in the TTAP Library

These video titles are available from TTAP for loan or purchase. For more information, please contact TTAP at 1-800-252-7623 or TTAP@utk.edu.

- **Best Practices: Crack Filling/Sealing**
  (19m, Ohio DOT, 2011). Capturing best practices for maintenance operations has just gotten easier with a series of best practice training videos starring maintenance crews from around the state of Ohio. With its first release Ohio DOT Best Practices: Crack Filling/Sealing, viewers will join Caught in The Act Carl on a trip to Fayette County to learn how ODOT performs its crack filling maintenance procedure.

- **Best Practices: Culvert Replacement**
  (20m, Ohio DOT, 2012). Viewers join a maintenance crew in southern Ohio as they replace a large corrugated metal pipe with a plastic pipe. The video begins with a description of the necessary planning and preparation including the coordination with other sections of the department. The viewer is then taken to the site where video describes the pavement cutting, excavation and removal of the old culvert and the grade setting, installation, compaction and paving elements that are all part of a successful culvert replacement.

- **Median Barriers: A Solution to Cross-Median Crashes**
  (18m, FHWA, 2008). This informational DVD is intended to introduce you to the various options that are available to help mitigate cross-median collisions.

- **Rumble Strips: A Sound Investment**
  (14m, FHWA, 2007). This informational DVD on shoulder and centerline rumble strips is intended to introduce you to a cost effective treatment that has been proven to provide results by saving lives.

- **Successful Roadside Revegetation Using Native Plants**
  (23m, FHWA, 2011). This DVD showcases the various native plant revegetation techniques that were successfully used in several roadway projects including projects in Glacier National Park (Montana), Cascade Lakes (New York), and the Molly Stark Scenic Byway (Vermont).
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.

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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