KS LTAP Newsletter

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A quarterly newsletter of the Kansas Local Technical Assistance Program (LTAP) at the Kansas University Transportation Center with funding from Kansas DOT and the Federal Highway Administration

Inside

REMINDER !!

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Safety Problems Using Heavy Equipment

By Larry Wilson, as told to Lisa Harris

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Working with and around heavy equipment can be dangerous business. We asked one our LTAP trainers, Larry Wilson, who is a heavy equipment operator and supervises road work projects for Douglas County, to tell us some of the more frequent kinds of safety problems he sees at road work sites, and what do to address them. His advice pertains to all types of equipment—skid loaders, pavers, loaders, backhoes, trackhoes, you name it. He said his advice is as much about efficient operations as worker safety. The two often go hand in hand, as you will see. —Editor

People stand too close to the machine. Guys could be trying to help, or trying to see what is going on. A co-worker might want to be there in case you need something shoveled out of the way. In any case, anyone near a machine should be where the operator can readily see him. An operator can't concentrate on what he's doing if he has to be watching out for people.

There really isn't a rule of thumb for how far to stay back from equipment in use. It varies by the type of equipment and varies by the operator's level of skill in using that equipment. If the operator is not experienced, or if he's experienced but just never has been very good, you need to stay back. But even if an operator is real good, having people nearby just slows him down. As for equipment, some can't be controlled as precisely as others. Not all backhoes, for example, are new with bucket arms that swing right back to place. The older ones swing around a bit and then settle down. Stay clear.

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Have You Self-Certified?

By Pat Weaver

Change in federal procedures for CDL holders requires self-certification.

A change in federal procedures last year required CDL holders to begin reporting their medical examiner's certificate status to their respective states' Drivers License Agency, which in Kansas is the Kansas Department of Revenue (KDOR). Some CDL holders are required to hold a valid medical certificate and some are exempt from that requirement. By January 30, 2014, all CDL license holders were required to "self-certify" for this, that is, to declare to KDOR that they only operate or expect to operate commercially in one of four possible categories with their CDL. Each category specifies whether the CDL holder is subject to the medical certificate requirement. This article is a reminder to anyone who

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Safety problems using heavy equipment *Continued from page 1*

People don't let the operator know when they are approaching. Sometimes a person wants to talk to the operator, or ask a question. If the operator is concentrating on a task, he might be startled by a person who suddenly appears on the ground next to the machine. Instead, stand where the operator can see you, and get his attention before you approach. Wave your arms if needed. Don't approach until he sees you.

Not digging the trench or work area big enough. This is a productivity issue as well as a safety issue. An example is putting in a pipe. You can dig straight down, just as wide as a bucket, and create just enough extra space after you place the pipe to get a guy in there to connect the pipes. But this just slows things down, because he does not have a lot of space to move around. It's more efficient and safer to dig the trench wide enough to have room to work. The trench should be angled or stepped up. OSHA has guidelines on this [see fact sheet in the sidebar on the next page]. If you need to make a judgment call, just make it safe. If it doesn't look like it's safe, dig the trench a little wider.

Another example is excavating for a box culvert. We used to make the excavated area just three ft. wider than the box would be, and someone would have to carry tools and climb up and down a ladder, all day long, in that narrow space. When it rained, it would be a big mess. Now we make a ramp and back the truck right down to site. It's way more efficient, easier, and safer.

Poor vision/dirty windows. If you can't see what you are doing, it's just bad. I see this a lot with dump trucks. Just take a little time to clean the windows. It doesn't have to been done every day, but keep an eye on it.

Uneven ground for workers and/or equipment. The site should not be "wavy wavy" or have a bunch of clods to trip over. Level out the site at the beginning of the job. Why walk over a mound or around a mound, or risk tripping? When you are carrying something, you should not have not to be thinking 100 percent about the walking part. Again it's as much about efficiency in working as it is safety.

Backing up is ALWAYS A PROBLEM. Some guys just back up, period, and don't look around. Some don't use their mirrors like they should. I tell my guys, "There are two mirrors on a truck. Try to look at both a little bit." Too many guys look in just one mirror. It's so easy to hit stuff even when you are paying attention, no matter how careful you are. Having a spotter is nice, but realistically, you won't be able to have a spotter very often for county work. You need to pay attention.

Worn hydraulic lines. When a hydraulic line breaks, it will spray hydraulic fluid. I learned this the hard way. A line broke on me one time when I was operating a trackhoe. It sprayed me inside the cab. That stuff is HOT. It will scald you. I jumped out of the cab and stripped off my clothes except my skivvies and walked down the street holding my boots. The utility guys working out there were howling at the sight, but I didn't care! Better to not be burned. Worn lines will always break when you are hurrying and trying to finish and get something done. Check your lines often. When you see a line starting to wear, plan on getting another one. Most times you can visually tell when a line is worn.

Worn chains and cables. Everybody is going to have worn chains. They get beat up when used, and they get pinched under heavy loads. A chain is only as good as weakest link. Cables will fray. Don't use a damaged chain or cable if you are going to pick up something really heavy. There is no in-between—either it will hold or not. There is no "come down easy." Don't use a worn chain or cable if you know it could really be bad if it breaks.

Lack of clear and understandable hand signals. This is one of the biggest problems I see. Imagine a guy standing in front of your machine holding out his arm and waggling his fingers… what does that mean? Back up the equipment? Raise it up? If you read that signal wrong, you could back your equipment into another piece of equipment, or worse.

If someone uses hand signals I don't understand, I get off the equipment and say to that person: "Show me what your hand signal is going to be, tell me what it means, and do it the same way every time." (And if everyone on the crew does it the same way, that's just stellar.) Some operators don't want to take the time to do this, but I guarantee you, if you're the guy who doesn't understand the directions, you'll be the one who will get blamed if there is a problem. So either do something about it or know that the blame is coming. Get off your equipment and ask for clear signals you understand.

Too many people giving directions. Same thing as above. You might have three guys telling you to do three different things. As the operator, you are going to get blamed if you follow the wrong directions and something happens. All three will blame each other at first, but in the end, they are going to point the finger at you. It's the easy way out. So, have only one person giving directions. And if more than one person is out there, stop, get out of the equipment, and say to one of them, by name (the one with the best, most understandable signals): "Joe, I am watching only you."

Lifting loads that are TOO heavy. This happens a lot. Everyone wants to be the Big Man on Campus and pick up the biggest load, the biggest bucketful. But operators know what they can lift, and the reality is: Sometimes the situation will be borderline. So it's important to realize the potential problem, and think it through. What am I going to do if this or that happens? Be ready to set the load down. For

> "You don't have to do your work like you're killing snakes."

example, a back hoe or track hoe at rest can pick up a very heavy load, but things can change when you start moving, especially on uneven ground. You might tip over or not be able to control the machine. Make sure no one is near where you are going to move. When you get to the iffy zone, if you start to tip, set the load down and go to your Plan B for getting the job done.

Utilities—above and underground. This is a bad deal. Nobody worries about it until you hit a line. Be sure you know where the utilities are. It doesn't matter if you are the supervisor or the new guy with a shovel. As a supervisor, it doesn't bother me at all if someone asks: "Are there any utilities here?" It's possible that the boss forgot to arrange a locate or it's been two weeks and the marks are iffy. Ask the county guy who checked it, or call the utility company for another locate.

I check sites for our county, and a lot of times I take pictures. This gives an extra measure of safety for our guys and helps with any disputes if a line is hit. If you do hit it a line, the locator will say the line was marked there, even if it wasn't. But the photo is proof.

Distraction. A lot of times operators just don't concentrate. They are thinking about something else. They don't have their head in the game. That's when things get broken and people get hurt.

Inconsistency. Consistency is one of the most important characteristics to have as an operator. Even if you are not the most skilled guy out there, you need consistency so everyone knows what to expect from your performance. You'll help the whole project be more efficient. If you do a lot of different kinds of tasks well and predictably… those are the skills a department looks for in a supervisor. I am not a great operator, but I am consistent. You don't have to do your work like you are killing snakes. Slow down a little and be consistent. You'll do it faster in the end.

Advice for supervisors of heavy equipment operators

When hiring heavy equipment operators, you are almost better off to hire guys who are a little more aggressive in their personalities—more "Type A." I would say 80 percent of good operators are relatively aggressive (and sometimes jokesters). They tend to be able to evaluate a situation quickly and react quickly. But there is a flip side: People like that can be pretty outspoken. You have to balance personality issues with good operator skills.

Sometimes you get a guy who may be a good operator but his personality just gets in the way too much. I find it's just not worth my time to constantly battle with that guy. When I reach my limit, we have a flat-out-no-holds-barred "conversation" (conversation, for lack of a better word...). Usually, they will adjust (I wouldn't say they change) or they find another job before long.

If the "conversation" doesn't work, evaluations provide an opportunity to address situations like this, in a formal way. When a guy complains when I give him a less than satisfactory evaluation, I say, "I would like nothing better than to give you a good evaluation because that would mean your work is consistent and I can count on you."

As mentioned before, distraction is a big problem, and especially at a work site where it's easy to get hurt (or hurt someone) because of the nature of the work. A lot of times it's the same guy all the time, but it can happen to anyone. Take the time to know who you are working with, and what is going on with them. If someone is going through something (relationship issues, sick kid, whatever) realize that, and don't put them somewhere where they need concentration and consistency to get the job done safely.

Most of my advice in this article is just common sense stuff. EVERYBODY says they have common sense, and some do. But for quite a few, it comes and goes.

Every day—EVERY DAY—one of these unsafe things happens. So be careful, be consistent, and good luck. ■

Larry Wilson is assistant operations manager at Douglas County Public Works.

Resources on Heavy Equipment Safety

- ***Trenching and Evacuation Safety,*** OSHA Fact Sheet. https://www.osha.gov/OshDoc/data_Hurricane_Facts/trench_excavation_fs.pdf
- ***OSHA General Heavy Equipment Operation*** (tips applicable to all heavy equipment). https://www.osha.gov/SLTC/etools/hurricane/heavy-equip.html#2
- ***OSHA Work Zone Hazards Workbook*** (See especially information on having an internal traffic control plan, page 19). https://www.osha.gov/dte/grant_materials/fy08/sh-17795-08/workzone_hazards_awareness_english.pdf

Have you self-certified? *Continued from page 1*

might have missed this notification to be sure he or she self-certifies. It's an easy process.

What are the categories?

Norm Bowers, KAC local roads engineer, sent out an email last November to all the counties about the January deadline. In that notice, he said the DOR is implementing a "Kansas Driver Issuance & Verification System," and he mentioned that part of this requirement involves verifying that all CDL holders either have a medical certificate or are exempt from the requirement to have one.

CDL holders self-certify by choosing one of the following:

Category 1. Interstate, and I am both subject to and meet 49 CFR Part 391. A copy of DOT medical card and this certification must be submitted to the state driver licensing agency.

Category 2. Interstate, but operating exclusively in transportation or operations excepted under 49 CFR 390.3(f), 391.2, 391.68, or 398.3. Only this certification must be submitted to the state driver licensing agency. [Bowers said this category applies to CDL holders who drive only for their local government.]

Category 3. Intrastate, and I am both subject to and meet state driver medical qualification requirements. This requires the driver to carry a medical card; however, only this certification must be submitted to the state driver licensing agency. Requires Intrastate only "K" restriction on CDL credential.

Category 4. Intrastate, but operating exclusively in transportation or operations excepted from all or parts of the state driver qualification requirements. Only this certification must be submitted to the state driver licensing agency. Requires Intrastate only "K" restriction on CDL credential.

All CDL holders must go online to self-certify

Those who are getting their license renewed have been notified by KDOR of the requirement, but even drivers not currently renewing a CDL license need to go online to complete this process. Again, if you only drive for your local government, you are exempt from the requirement to have a medical certificate but will still have to self-certify by going to ***https://www.kdor.org/dl/KCDLCertificate.aspx*** and selecting Category 2.

New reg helps promote safety

The new regulation is intended to better track CDL license holders and their medical fitness to drive. According to the regulation, the penalty for CDL holders who are found driving in a category other than one to which they self-certified are subject to suspension or revocation of their commercial driving privileges. It goes on to say that CDL drivers who do not update the expiration date of their ME Certificate with their State will have their commercial driving privileges downgraded, and will not be eligible to drive a commercial motor vehicle that requires a CDL.

Douglas County's experience with self-certification

We checked with Doug Stephens, operations division manager for Douglas County, to find out what their experience has been with complying with the requirement. Stephens contacted the KDOR Help Desk with some questions, and he found their staff to be very helpful. He asked the following:

Question 1. *Stephens:* I work for Douglas County Public Works. Several of our drivers have received a letter stating they need to medically certify to the type of driving they participate in. This has confused many of our operators. We drive tandem trucks, tractor trailers, and various other types of equipment. Most of our work is within the boundaries of Douglas County, although we do travel to Kansas City, Missouri, occasionally to deliver equipment for repair. If the driver checked category 2 in part (B) do they only need to submit Page 1? If so, I assume this can be done through the website. *KDOR Help Desk:* Yes that is correct. Category 2 only needs the first page of the form which can be done online, and no DOT card is required.

Question 2. *Stephens:* Is the reason they received the letter because they may have checked Category 1 or because they have not submitted the self-certification since Jan. 30, 2012? *KDOR Help Desk*: Letters were sent out in error to drivers who have completed the self-certification process. [The Help Desk staff offered to check any drivers to make sure they selected the correct category.]

Question 3: *Stephens:* If some drivers have previously checked something other than Category 2, can they submit Page 1 of the self-certification and check Box 2 to change their category to "2"? *KDOR Help Desk:* Yes. You can change your category whenever you like. However, it must be categories that are intrastate to intrastate or interstate to interstate. If you go from intrastate to interstate, or vice versa, you will have to go back to the exam station to get a new license either adding or removing the "K" restriction.

Conclusion

If you have questions in your agency about this process for your employees, you can contact the Help Desk, as Doug did, by emailing the Commercial Motor Vehicle Office at medical.certification@kdor.ks.gov or calling (785) 296-6541. ■

Sources:

- Doug Stephens, Douglas County Operations Division Manager, email correspondence, July 31, 2014.
- Frequently Asked Questions About New Medical Certification Requirements. Kansas Department of Revenue. http://www.ksrevenue.org/faqs-dmvmedcert.html, accessed August 18, 2014.
- Norm Bowers, CDL Medical Certificates, email correspondence, November 21, 2013.

Township Employee Invents Simple, Sturdy Device to Help Move Wear-Blades

By Lisa Harris

Part of a motor grader or snowplow operator's job is getting the wear-blades on and off the equipment. Those blades can weigh anywhere from 95 to 200 lbs, and be 5 to 8 ft wide. Moving those blades around is a dangerous part of the job because they are unwieldy and they can get away from you. The types of injuries caused when things go wrong are fingers cut off, back injuries, and foot and leg injuries.

Grader operator Rodney Leach, Waco Township (near Wichita, KS) invented a special dolly that one person can use to move and install blades. This article will describe the product, how it works, and where it's being used.

Leach maintains all the township roads and is a one-person shop. He created the first "Leachrod" in 2012 to help return to work after an injury. He sustained a serious and permanent injury when he slipped on a back hoe that was loaded on a hi boy trailer, pinning his foot between the frame and step. The force of the fall separated his knee and shin. The injury has left him with very little strength in his left leg.

Grader operators typically use blocks and floor jacks to horse their blades around, Leach said. "There are all kinds of crazy ways to try to do it." The Leachrod creates a safer alternative. The dolly-like device has a rod across the front with rigid pins that insert into the blade and lock into place. Simple leverage on the device will lift the blade, and it can be wheeled to where needed. (See photo.) "Blades can't fall off and hurt someone," Leach said.

Leach patented the device last year, and Harper Trucks in Wichita is manufacturing it. "I wanted to get this tool out there," he said. "This needs to be shared. Everyone who sees it says, 'Wow, that's so easy!'"

The Leachrod is made out of steel and tires. It has a 5-year guarantee, but Leach said it should last longer, depending on the frequency of use. Tires may wear out during that time, but replacement tires are available. The unit has the option of tube tires or flat-free tires.

Two handle styles are available, one for road graders and the other for snowplows and dozers. The handle style accommodates the angle of the blade. "Some blades lay back almost flat, some sit up straight," Leach said. "The handle might hit the board if we offered only the straight handle, so we have one that is angled 60 degrees, too."

Leach's company has sold 250 Leachrods so far, in the United States and Canada, and sales are growing. He mostly sells to cities and counties and townships. He was recently contacted by a large multi-state insurance company whose rep told him that they were working on $370,000 worth of workers' comp claims in six months related to changing motor grader blades. "That is a lot of money, and a lot of hurt people," said Leach. "That is the sad thing…I am injured for life. A serious injury can be devastating to families. I was out of work for 8 months and it just about bankrupted me. I am lucky my wife works," Leach said.

The Leachrod will be exhibited at the Kansas Association of Counties annual conference this November. It comes in a $500 basic model and a $750 heavy-duty model. Check out

Continued on next page

Leachrod

A Few Words From Users of the Leachrod in Kansas

Saline County. Dennis Cooley, assistant road superintendent, said about half of their 12 grader operators use the Leachrod to move blades, saving a lot of lifting and potential back injuries. Cooley noted that their operators move blades based on personal preference, some preferring to use "brute strength" and others preferring to use a tool to assist with the process. Cooley said the Leachrod has a good place in their operations.

Ottawa County. A person who works at the maintenance shop (who preferred to not give his name) said the Leachrod works best for them on level, concrete surfaces. Otherwise it moves around a little, he said, and it can be tricky to align the pins. The County typically uses the Leachrod if an operator is lifting a blade by himself; otherwise they'll have two people lift the blade without the assistance of a tool.

Salem Township. This township, in Sedgwick County, was one of the first adopters of the tool. Clem Dickerson, trustee, said "Using the Leachrod blade lift tool makes changing our blades easier and safer. It's a really nice tool. The Leachrod has made it way easier on the back."

Device for moving blades *Continued from page 5*

this Kansas-made invention that could make moving blades in your shop a whole lot safer.

For more information, call Rodney Leach at (855) 245-3224 or visit the Leachrod website at http://www.leachrod.com/. The website also has links to Leachrod's Facebook and Youtube pages. You can watch videos of the device in action.

Note that this article is not a product endorsement by Kansas LTAP. We just want you to know it's out there! We have not seen anything else like it. Decide for yourself. ■

Sources:
- Interview with Rodney Leach on July 14, 2014.
- Leachrod website. http://www.leachrod.com/.

Flagger Training and Certification: What's Required in Kansas?

By Mehrdad Givechi and Lisa Harris

The safety of the flaggers, their fellow workers and the travelling public depends on flaggers performing their duties properly. An effective flagging operation is not something that just happens. It is the result of proper work zone design, proper training, and proper flagging procedures. Do you know the regulations or guidelines that pertain to flaggers working for cities, counties and townships in Kansas? This article provides a refresher on those, and information on where to find flagger training.

Currently there is no state law or regulation in Kansas mandating flagger training and certification. However, flaggers and their supervisors must follow the requirements (and should follow the guidelines) that apply to flaggers listed in the MUTCD—a federal publication that is recognized as the national standard governing the design and use of all types of traffic control devices. The MUTCD does not mandate training or certification, but training is certainly a good way for work crews to get the information they need to follow the MUTCD. KDOT has its own internal requirement that flaggers who work on the state system—KDOT employees or contractors—must take flagger training and earn and carry a KDOT flagger card.

KDOT's work zone training is going to become more formal soon. Kristi Ericksen, KDOT work zone engineer, said that KDOT is in the early stages of developing requirements for temporary traffic control (TTC) training at all levels of responsibility at a work zone, including flaggers. KDOT will eventually pre-qualify courses that a flagger can take, but for now flaggers must receive some form of training that uses KDOT training materials—and provides a certification. KDOT accepts any flagger course taught by anyone as long as the material covered in the *KDOT Flagger Handbook* and video are included in the instruction. KDOT posts these and other flagger training materials for free download at http://www.ksdot.org/hwycont.asp.

KDOT flagger cards do not have expiration dates, but that will eventually change with the coming KDOT TTC training requirements, Ericksen said. Anyone who might be asked to flag must then carry a valid certification card. Many different KDOT employees at various levels inspect TTC areas and can ask to see the certification cards of active flaggers, Ericksen said. The time period for how long a flagger card would be valid before it expires is currently being worked out by KDOT.

Where to find flagger training

A number of organizations provide training for flaggers, with courses offered both online or taught in classrooms by certified instructors.

ATSSA. The American Traffic Safety Services Association is one of the main sources for training. Their online courses typically last for 4 hours and can be taken any time. Visit http://www.atssa.com/TrainingCertification/StateTrainingRequirements.aspx.

ATSSA also trains instructors to teach their flagger course. The instructors can then offer and schedule the course face-to-face. In Kansas, ATSSA's instructor-led training varies in frequency from month-to-month

and year-to-year, depending on the demand. Currently there are 31 ATSSA-certified instructors in Kansas offering both state- and non-state-specific flagger training courses. To see a list of flagger training courses offered in each state, go to their map at http://www.atssa.com/TrainingCertification/CourseInformation.aspx. ATSSA also lists certified flaggers and certified instructors at their website.

ARTBA. Certified flagger training with accreditation is also available from ARTBA (the American Road and Transportation Builders Association) through a partnership with the National Safety Council. http://www.artba.org/safety/work-zone-clearinghouse/.

KWORCC. Kansas Workers Risk Cooperative for Counties, in cooperation with their sister pool, KCAMP (Kansas County Association Multi-line Pool)—an insurance and risk management agency—advertises online work zone safety training to its member counties. The work zone course is offered in the spring and summer. Check out KWORCC's course list here: https://s3.amazonaws.com/ulearn/images/portal_images/kworcc/course_list.pdf.

What should be included in flagger training?

Training should cover, at minimum, the requirements and guidelines for flagger operation contained in the MUTCD. Flagging operations are listed in Part 6, Sec. 6E (2009) and cover the following topics, in general:

• ***The right flagger*** (that is, the right temperament and skill set). The flagger is in contact with the public more than anyone else on the job. The attitude and appearance directly affects the public's view of the operation. The flagger's responsibilities are critical for keeping the work zone safe.

According to the MUTCD's recommended guidance in Section 6E.01, a flagger should have the:

—Ability to receive and communicate specific instructions clearly, firmly and courteously;
—Ability to move and maneuver quickly in order to avoid danger from errand vehicles;
—Ability to control signaling devices such as paddles and flags in order to provide clear and positive guidance to drivers approaching the work zone in frequently changing situations;
—Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations; and
—Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.

• ***The right gear*** (high-visibility safety apparel).
• ***The right devices*** (hand signals and other control devices).
• ***The right practices*** (flagger procedures).
• ***The right set-up*** (flagger stations and sign spacing).

Different types of flagging set-ups serve different needs, depending on traffic volume, the space requirements for the road work, nighttime work, and more.

Are your flaggers well trained? With all the resources out there, and some of them online, it's easier than ever to get your flaggers the safety information they need for their work. ■

MUTCD Pop Quiz on Flagging

Are these required by the MUTCD? (yes or no). See answers on page 13.

1) A flagger must identify an escape route in case of an errant vehicle.
2) Nighttime illumination of flagging stations.
3) A stop-slow paddle or automated flagger devices in addition to hand signals.
4) Only a certain size and colors of flags, if flags are used.
5) High visibility apparel with specific color, coverage, and retroreflectivity.
6) An 8 ft. high staff for a stop/slow paddle.
7) Flaggers to face road users when actively flagging.
8) An approximately 44 inch long staff attached to a flag, if a flag is used.
9) Stop/slow paddle face to be 24 inches across.

Flagger Training Videos on YouTube:

— **VDOT Flagger Training.** December 2013 (19 min). Virginia DOT. www.youtube.com/watch?v=LfeOpp1bKXs
— **The Basics for Work Zone Flaggers.** Vermont Agency of Transportation. June 2012 (21 min). www.youtube.com/watch?v=K5g7ndn7ySM
— **Flagging Operation and Procedures.** May 2011 (18 min). Minnesota DOT. www.youtube.com/watch?v=6iR0AgqvZ-k
— **Flagger Safety from SafetyInstruction.com,** OSHA Safety Training, July 2009 (3 min). http://www.youtube.com/watch?v=YrwPN63n7K8

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Sources:
• Email correspondence with Norm Bowers on July 21, 2014 and August 10, 2014.
• Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, Part 6, Section 6E. http://mutcd.fhwa.dot.gov/pdfs/2009/part6.pdf.
• National Work Zone Safety Information Clearinghouse. http://www.artba.org/safety/work-zone-clearinghouse/.
• "Know Flagging" poster, American Road & Transportation Builder Association (ARTBA).
• ATSSA Flagger training web page. http://www.atssa.com/TrainingCertification/ATSSAOnlineFlaggerTraining.aspx.

KDOT Korner

Temporary Rumble Strips Help Workers Feel Safer

By Lisa Harris

KDOT is getting the attention of distracted drivers as they approach work zones.

Kansas DOT

KDOT places the rumble strips in advance of the action warning sign at a work zone. The idea is that drivers will hit the strips and look up the see the sign.

KDOT has heard from workers on its projects that distracted drivers are an issue in KDOT work zones. These drivers are not paying attention, and they sometimes approach an active work zone area at a high speed. To address this concern, KDOT crews and contractors are now using portable rumble strips at some locations to get drivers' attention. This article will describe the types of rumble strips used and spec'd by KDOT, and what to consider when purchasing temporary rumble strips for particular situations.

Types of temporary rumble strips

Types of rumble temporary rumble strips available range from raised asphalt strips applied across the roadway, which are later removed, to devices that are transported to the job site and can be used again and again. ATSSA has a guidebook that describes the common types of these removable devices. (see sidebar). Some of the devices are applied with adhesive and some stay in place on their own. KDOT uses the latter.

Kristi Ericksen, KDOT work zones engineer, said that there are a few vendors for temporary rumble strips that don't require adhesive, but KDOT chose Plastic Safety Systems Inc. (PSS) because it was the only vendor that met KDOT's specs. TxDOT also uses this vendor.

KDOT uses two PSS models: one that comes in three pieces to be assembled at the job site, and another, one-piece unit that hinges in the middle and does not need assembly. The width of the shoulder at the job site dictates which model to use. The three-piece model needs sufficient shoulder space to be able to be assembled and provide sufficient safety for the workers doing the assembly.

Are temporary rumble strips effective?

Ericksen said that the temporary rumble strips are "an extremely effective tool" to get the attention of distracted drivers. She noted that the rumble strips are especially useful for situations where you are stopping traffic unexpectedly, such as for short term-projects. She said they can help reduce the incidence of back-of-queue crashes.

The strips are placed in advance of an action warning sign at a work zone. The idea is that drivers will hit the strips and look up to see the sign, Ericksen said.

Workers on KDOT jobs are noticing a difference. "Our crews tell me that they notice drivers slowing down as they drive over the strips," she said. "They tell me they feel safer working out there as a result."

Joe Engle, Pittsburg Area maintenance supervisor for KDOT, said his crew likes the strips, especially when working on roads 30 ft. wide or less, because the "lead-in cones ... are constantly being hit on these narrow roadways." The strips provide an extra measure of safety.

KDOT's considerations in purchasing

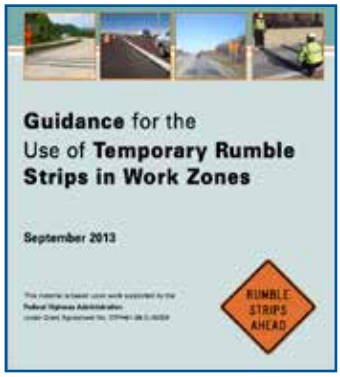
Below were the major considerations for KDOT when purchasing their rumble strips:

Adhesive or no. KDOT prefers the non-adhesive type of strip for ease of installation and removal.

Ability of the strip to stay in place under traffic. This is an important consideration with the traffic volumes KDOT sees on the state system. Engle's crew recently tested the strips at an asphalt patching work site, and noted a negligible 1.5 inches of movement after counting 38 cars/pickups, 20 semis and 3 buses passing over the strips.

Safety for assembly. As mentioned above, KDOT has been using two different styles of temporary rumble strips. One is a three-piece model, with each piece weighing about 33 lb.

The American Traffic Safety Services Association (ATSSA) has an excellent and very comprehensive guidebook on the use of temporary rumble strips in work zones. The guidebook covers benefits and limitations of several different types of temporary rumble strips; when and how to implement temporary rumble strips in work zones; and key considerations before and during implementation. Anyone considering purchasing temporary rumble strips should read this guide. You can download it for free. See the link in the Sources below.



This model must be assembled in the shoulder before being dragged onto the road. Another is a hinged model, weighing about 110 lb., that can be carried and placed by two people. There is a hand-hold at each end of the strip (see photo on previous page). KDOT's maintenance crews are switching over to the hinged model to eliminate the need for assembly in the shoulder, and the risk associated with that.

Traffic speed. Speed affects the driver's experience of the strip. At higher speeds, you need a strip with a higher profile so it can be felt and make sufficient noise. In lower speed situations, and especially near residential areas, you may want to use a lower profile device that can still be felt by drivers but will make less noise.

Traffic volume. Temporary rumble strips do wear out over time, and some devices can shift around with traffic.

Durability. The strips KDOT uses each last about five years, said Ericksen. A few have been damaged, but the manufacturer stood behind the warranty for those devices that failed early in their service lives, she said.

For more information

Ericksen would be happy to answer any questions about KDOT's use of temporary rumble strips. You can reach her at (785) 296-0355 or at Kristie@ksdot.org. ■

Kansas Research on Temporary Rumble Strips in Work Zones

The University of Kansas has some research on portable rumble strips for K-TRAN research projects published in 2006 and 2011. See Sources below for information on how to access these reports.

The first study, titled ***Guidelines for the Application of Removable Rumble Strips,*** was authored by Eric Meyer and was designed to assess the viability of two types of removable rumble strips as replacements for asphalt rumble strips, particularly in short term highway work zones. The removable strips were compared with asphalt strips in terms of the levels of in-vehicle noise, vehicle-body vibration, roadside noise, their effect on vehicle speeds, and their cost, durability, and installation and removal processes. Of the configurations tested, 6 strips with a center-to-center spacing of 2 ft. was the preferred configuration based on the sound and vibration levels produced. The results of the comparisons indicated that the removable rumble strips tested are similar to asphalt rumble strips in terms of the sound and vibration levels produced and the speed reductions observed. With certain limitations, these removable rumble strips are a viable alternative to asphalt rumble strips.

The second study, titled ***Evaluation of Innovative Traffic Safety Devices at Short-Term Work Zones,*** authored by Wang, Schrock, Bai and Rescot, included a field test for a portable plastic rumble strip. The field study was to investigate the effects of the rumble strips and drivers' response to them at three short-term maintenance work zones in Kansas. The results showed that the effect on speed reductions was more significant on cars than on trucks. The strips reduced car speeds by 4.6 to 11.4 miles per hour. They also created 5.0 to 11.7 miles per hour mean speed reduction for trucks, but the reductions were only at two test sites. It was observed that 30 to 80 percent of truck drivers activated their brakes (indicated by brake light illumination) when they approached the rumble strips. In addition, about five percent of car and truck drivers swerved around the strips. This indicates that additional signage or other supplemental traffic devices would be needed when the temporary rumble strips are implemented.

■ ■ ■

Sources:
- ATSSA. Guidance for the Use of Temporary Rumble Strips in Work Zones. 2013. http://www.workzonesafety.org/files/documents/training/fhwa_wz_grant/atssa_temporary_rumble_strips.pdf.
- Meyer, Eric. Guidelines for the Application of Removable Rumble Strips. 2006. Available from the Kansas DOT Research Reports Catalog at http://ksdot1.ksdot.org/burmatrres/kdotlib2.asp. Search for "removable rumble strips."
- Wang et al. Evaluation of Innovative Traffic Safety Devices at Short-Term Work Zones. 2011. Available from the Kansas DOT Research Reports Catalog at http://ksdot1.ksdot.org/burmatrres/kdotlib2.asp. Search for "innovative traffic safety."
- Interviews with Kelly Gaer and Kristi Ericksen on June 27, 2014.

Work Zone Layout Options When Doing Drainage Work

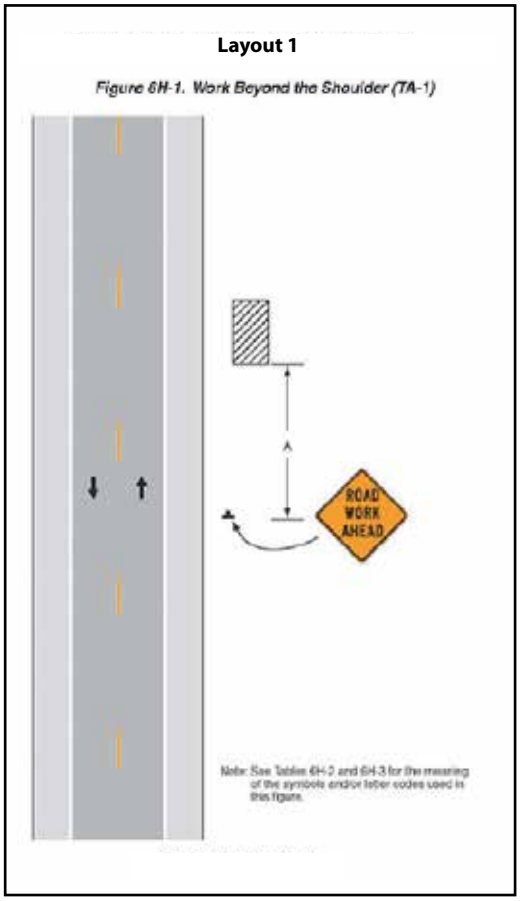
Maintenance of drainage structures is important for roadway safety and prolonging the life of the structure. Before maintenance work begins, it is important to set up proper work zone traffic control for the safety of your crew and the traveling public. An FHWA guide titled *Maintenance of Drainage Features for Safety* (2009) provides three typical traffic control plans that may be applicable depending upon the nature of the work performed.

The guide recommends using Layout 1 (6H-1) when the work is beyond the shoulder area; Layout 2 (6H-6) when the work is being done on the shoulder, and Layout 3 (6H-17), if the work is a moving operation, such as cleaning-out curb inlets. Note, these are for illustrative purposes; refer to the latest ***Manual on Uniform Traffic Control Devices*** (MUTCD) for detailed guidance. ■

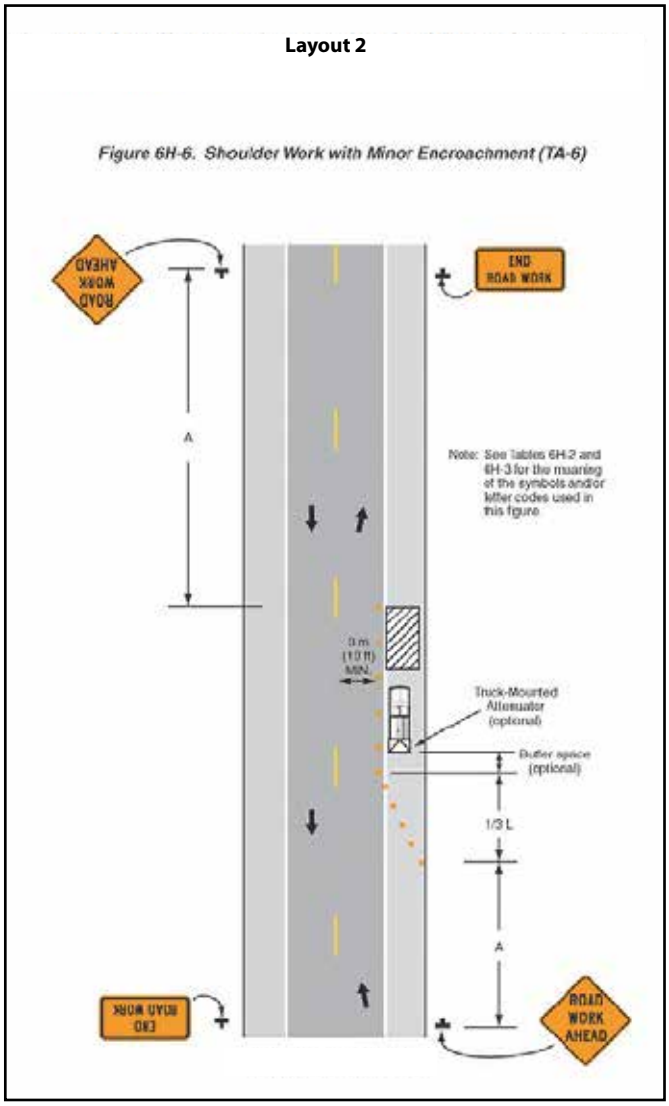
Source:

- FHWA. Maintenance of Drainage Features for Safety. 2009. http://safety.fhwa.dot.gov/local_rural/training/fhwasa09024/

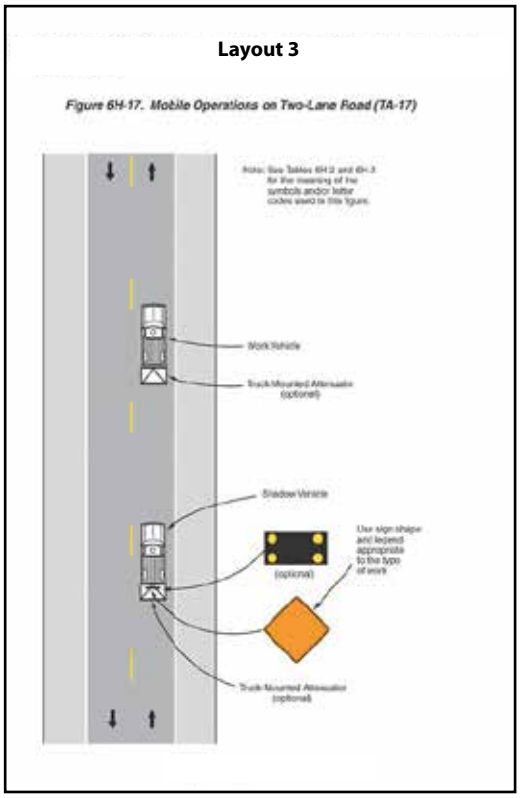
Layout 1



Layout 2



Layout 3



A Leg Up

Pedestrian Safety Issues in School Zones

By Mehrdad Givechi. P. E., P.T.O.E.

Tips for planning for school zone safety from the Association of Pedestrian and Bicycle Professionals.

When it comes to school zone safety, the greatest concern is the potential conflict between motor vehicles and school children or anyone else in the area, whether on foot or on bicycle. This article highlights some of the safety concerns common in school zones provided in a recent Webinar on the topic hosted by the Association of Pedestrian and Bicycle Professionals. It describes several safety strategies for assisting transportation planners and traffic engineers responsible for school site planning, design and school zone safety.

Common traffic-related issues around any school may include one or a combination of several of these:

- Congestion during the drop-off and pick-up times.
- Vehicles blocking thru lanes, bike lanes and crosswalks.
- Speeding.
- Lack of or undesirable locations of pedestrian crossings, or pedestrians not using the designated crosswalks.
- Illegal parking.
- Parking in a bus loading area.
- Parking across the street from school.
- Drop-off or pick-up in two or three adjacent lanes.
- Students walking between cars.
- Last minute drop-off rush.
- Parent arriving too early for pick-up.
- Not enough supervision / control.
- Lack of sidewalks.
- Neighborhood complaints.

Some other factors in addressing school safety issues are:

- Older school sites designed under old standards.
- Lack of guidance, as many jurisdictions do not have the expertise to address the safety issues.
- Undesirable school site and/or location where the school may be next to a major arterial.
- Competing interests such as funding vs. safety or time. constraints vs. selecting the right course of safety action.
- Barrier to destinations where sidewalks are not provided and/ or safe crossings are not possible, etc.

Before you develop safety strategies

With the above in mind, the first step in developing a safety plan for a school zone is to engage the stakeholders such as parents, school staff and/or board members, law enforcement personnel and neighbors in the decision-making process. One approach would be to form a multidisciplinary team to conduct a formal Road Safety Assessment (RSA) to address the safety concerns.

An RSA, as defined by FHWA, is a formal safety performance examination of roadway(s) or intersection(s) by an independent multidisciplinary team with safety as the primary focus. The team considers the safety of all road users —not just the motor vehicles—and reports on road safety issues and opportunities for safety improvements ranging from short-range, low-cost treatments to long-range, high-cost mitigation measures. As part of the RSA process:

Continued on next page

www.pedbikeimages.org / Dan Burden

Resources on School Zone Safety

MUTCD 2009 Edition, Part 7: Traffic Control for School Areas. http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part7.pdf

Back to School: Safety tips for motorists. National Safety Council. http://www.nsc.org/safety_home/SafetyObservances/Documents/Back%20to%20School%202014/Back-to-School-Tips-for-Motorists.pdf

National Safe Routes to Schools Clearinghouse. University of North Carolina. http://www.saferoutesinfo.org

Traffic Operations and Safety at Schools: Recommended Guidelines. Texas A&M University. http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/4286-2.pdf

Tips for Driving Safely Through School Zones. Mississippi Walk to School Program. http://msdh.ms.gov/msdhsite/_static/resources/3873.pdf

School zone pedestrian safety *Continued from page 11*

• *Talk to those with safety concerns (i.e. school officials, parents, neighbors, police officers, etc.) and listen to complaints.*
• *Think cause and effect.* A problem at one location may be just a symptom of much bigger problem, and addressing the symptom might not be the best approach. Get out there and observe the condition in the field and look at the problem from big picture perspective. Treat every site individually and do not use a generic solution for each site with the same symptom.
• *Identify problems before developing solutions.*
• *Gather relevant information on school arrival and dismissal times, enrollment numbers, busing, open enrollments, special event schedules, crash data and traffic volumes on the adjacent street network.*
• *Perform field observations to review traffic patterns on- and off-site, focusing on student drop-off and pick-up, on-street parking, pedestrian and bicycle conflicts with motor vehicles, location of crosswalks, and signage.* A great way to log this information is to take photos or videotape the observations.

Tips for crafting strategies

With the stakeholders engaged and relevant data collected for the school zone, it's time to develop safety strategies. In doing so, focus on these tips:
• *Work with the school not to reinvent the wheel for school safety.* Share the experiences and lessons learned from other school sites, but keep in mind that one solution does not fit all situations.
• *Make sure that safety is the main focus and does not fall through the cracks, competing with other constraints such as budget, deadlines, etc.* Work with school to set up a mechanism for funding the mitigation measures.
• *Listen to complaints and be slow to speak.* Build relationships with those with safety concerns and have open communication with them.
• *Determine the source of safety concerns for all school-related traffic.* Experience has shown that the primary cause of vehicle-related issues is the drop-off and pick-up.
• *Look for opportunities to reduce conflicts between motor vehicles and pedestrians and bicycles.* Less congestion means a more pedestrian and bicycle friendly environment. One strategy is to conduct a walkability study to ensure that there are sidewalks and marked crosswalks to/from school, and that they are continuous and connected with an acceptable level of service.
• *Provide clear and reasonable traffic control.* Do not over-sign as it leads to non-compliance.
• *Design so that traffic and parking rules can be reasonably followed.* In many instances, on-street parking is prohibited adjacent to schools. Field observations have shown that many parents disobey the "no parking" signs and park in these areas to pick up and drop off their children—a behavior that has been proven to be unavoidable in many instances, regardless of the restriction. Evaluate the need for these parking restrictions and work with local agencies to eliminate them, if feasible, and allow on-street parking. Another example of this issue—having to do with pedestrian activity—is in the sidebar on the next page about Peoria, Arizona.
• *Separate the bus loading areas from street traffic.* Make sure the bus loading area is long enough to accommodate all buses serving the site during the drop-off and pick-up times.
• *Install traffic calming devices on street(s) adjacent to school site if speeding is an issue.* Examples of such devices are refuge islands (staggered or straight), radar feedback speed limit signs, narrower lanes, pedestrian hybrid beacons, curb bulb-outs, and mini roundabouts.
• *Provide "out of the box" options to invalidate any excuses for taking unsafe actions.* Some strategies here include staggered start and dismissal times, early start and after school activities, on-site drop-off and pick-up areas, remote off-site locations for drop-off and pick-up, and engaging parents, teachers, and perhaps responsible students in assisting children during drop-off and pick-up times.
• *Develop outreach programs through public service announcements, police departments and driver's licensing to educate the public on safety-related issues in school zones.*

Conclusion

In addressing school zone safety, it is important to involve all stakeholders (school district, parents, neighbors and city) in the process from the beginning, and listen to their concerns, using every opportunity to educate them on mitigation possibilities. Remember, every case is different and one solution does not fit all. Try to balance traffic control remedies with human behavior. Consider all road users and make safety the priority. Keep in mind that some low-cost innovative safety treatments (e.g. marking, signing) can be very effective in improving safety. Solutions aren't always costly. ■

■ ■ ■

Sources:
• Best Planning and Engineering Practices for School Zones. Association of Pedestrian and Bicycle Professionals (APBP) Webinar, May 2014. http://www.apbp.org/?page=Webinars.
• School Site Planning, Design, and Transportation. ITE Informational Report, June 2013. Available at http://www.ite.org.

Case Study: Peoria High School, Arizona

This school is at the intersection of an arterial street (4-lane, divided with a center two-way left-turn lane) and collector street. The primary safety concern was that a large number of students (80 to 100 daily) cross the arterial at midblock to get to the food establishments across the street from high school during their breaks. Other concerns included narrow and poor sidewalks on both sides of the arterial, unsafe behaviors by both pedestrians and motorists, and American Disability Act (ADA) noncompliance issues.

Midblock crossing concerns persisted regardless of efforts by the city to install signs to prohibit midblock crossing and direct pedestrians to the nearby traffic signal with designated crosswalks (600 ft. away). Police education efforts also failed to change the students' behaviors; the students preferred the most direct path to the food establishments.

Finally, there was a "moment of clarity" and the city decided that they needed to evaluate the situation yet again and, this time, instead of telling students to not cross at midblock, to accommodate them by providing a midblock crossing with a staggered raised refuge island. The sidewalks on both sides of the arterial were also widened and retrofitted to comply with ADA requirements. In response to a request from the city manager, the original design of the refuge island was enhanced aesthetically by adding landscape features on both ends of the island. The result was well received by all stakeholders and improved safety significantly.

Some of the lessons learned by the public agency included:

- Observe and document reported concerns.
- Balance traffic control with human behavior.
- Accommodate all modes of transportation appropriately.
- Use opportunities to address multiple concerns.
- Don't neglect aesthetics.

Source: School Site Planning, Design, and Transportation. ITE Informational Report, June 2013.

A midblock crosswalk was designed to accommodate students crossing an arterial to get to food establishments. Students were not using the pedestrian crossing 600 ft. away.

Before and after: Landscaping was added to crossing refuge.

Before and after: Sidewalk obstructed by pole was re-aligned.

Answers to the MUTCD flagging quiz on page 7:

1) No. An escape route is recommended, but not required.
2) Yes. Nighttime illumination is required — except when responding to an emergency situation.
3) Yes. Using hand signals alone is prohibited.
4) Yes. Flags must be red or florescent orange-red and be 24 inches square.
5) Yes. There are specific requirements for color and level of retroreflectivity of high visibility apparel.
6) No. The height of the stop/slow paddle is not specified. It is recommended that the staff be tall enough, when the end of the staff is resting on the ground,that the message is high enough to be seen by approaching or stopped traffic.
7) Yes. Flaggers must face traffic when on duty.
8) No. The length of the staff for a flag is specified at 36 inches, not 44.
9) Yes. The stop/slow paddle must be 24 inches wide.

MORE

By Lisa Harris

See download / ordering information on next page.

Field Guide on Installation and Removal of Temporary Traffic Control for Safe Maintenance and Work Zone Operations

This 4x6 inch pocket guide illustrates the proper set-up and take-down procedures for temporary traffic control devices and is designed to highlight common sense steps for maintaining a safe environment through a "safety first" attitude. Contractors, field personnel, traffic control services firms, construction supervisors, inspectors, and law enforcement will find this product particularly useful. 19 pages. ATSSA. August 2008.

A Guide For Maintaining Pedestrian Facilities for Enhanced Safety

This guide identifies noteworthy practices and barriers for sidewalk/shared use path maintenance: what works and what does not work based on experience from State and local agencies. The guide also provides examples and experiences from jurisdictions that have developed effective policies for selecting and maintaining pedestrian facilities in terms of responsibilities, allocation of costs, and related issues. FHWA. October 2013. ■

CALENDAR

Visit our website for even more training calendar listings and to register for workshops. Go to http://www.ksltap.org and click on "View the LTAP Calendar."

■ **TRAINING:**

2014....

Low Cost Safety Improvements
September 16 in Dodge City

Road Safety Assessment – ▲L3e
September 30 in Pittsburg

Road Engineering for Non-Engineers
(new course)
September 30 in Erie
October 1 in McPherson
October 2 in Leavenworth

Introduction to Acquiring Right of Way Following the Uniform Act
Webinar – October 9

Concrete Road Maintenance – ▲L1
October 14 in Wichita
October 15 in Lawrence

Snow and Ice Control – ▲L1
October 20 in Colby
October 21 in Dodge City
October 22 in McPerson
October 23 in Chanute
October 24 in Atchison

HSM LIte
November 4 in Wichita

Public Works I and II – ▲L2
November 6-7 in Emporia

Making Safer Roads
November 18 in Salina

Bridge Maintenance
November 19 in Hutchinson
November 20 in Manhattan

Local/State Project Coordination – ▲L3r
Webinar 1 of 2 – December 2
Webinar 2 of 2 – December 4

Engineering Functions in Public Works –▲L3r
December 9 in Topeka

■ **UPCOMING MEETINGS:**

MINK Local Roads Regional Meeting
September 24-25 in St. Joseph, MO
Call Lisa Harris, (785) 864-2590

APWA-KS Fall Meeting
October 14 in Wichita
Call Ray Ibarra, (785) 238-7142

Kansas Association of Counties Annual Conference 2014
November 12-14 in Wichita
http://www.kansascounties.org/10/Annual-Conference

For information on calendar items or to suggest a topic for an LTAP workshop, contact: Kristin Kelly, LTAP Training Coordinator, 785/864-2594, kbkelly@ku.edu.

▲L1 = KS Road Scholar Program Level 1 — Technical skills required course.

▲L2 = KS Road Scholar Program Level 2 — Supervisory skills courses are provided by the Kansas Association of Counties. Go to http://www.kansascounties.org and click on "Education Program."

▲L3-r = KS Road Scholar Program Level 3 — Master Road Scholar required course.

▲L3-e = KS Road Scholar Program Level 3 — Master Road Scholar elective course.

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This new workshop will raise the knowledge of local public agencies on what crash data on local roads is available to them, increase knowledge on how to access that data, teach how to use crash data and available research on roadway characteristics to identify appropriate low cost countermeasures as part of a local roads safety plan, and cover how to develop applications for funding the identified countermeasures. It will be very practical training in how to reduce crashes in your jurisdiction. See "Making Safer Roads" above, for details. Coordinated by Kansas LTAP and Norm Bowers.

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Check off your selections, fill in the bottom portion, and return this form to:
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GUIDES & DVDs

You are free to keep these unless otherwise noted.
Or you can download at the links provided.

Field Guide on Installation and Removal of Temporary Traffic Control for Safe Mainenance and Work Zone Operations
See description on page 14. Download at:
http://www.workzonesafety.org/fhwa_wz_grant/atssa/atssa_pocket_guide_traffic_control

A Guide for Maintaining Pedestrian Facilities for Enhanced Safety
See description on page 14. Download at http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/fhwasa13037.pdf or ❑ Send a copy. Use the order form below.

EQUIPMENT LOANS

We offer the following items for loan to local highway agencies. Contact mgivechi@ku.edu for counter boards and weaver@ku.edu for the Safety Edge shoe. There could be a waiting list for these items.

Safety Edge Paving Shoe. This Advant-Edge shoe attaches to a paver with a universal bracket, provided with the shoe. Several counties have borrowed this attachment and have reported good results.

Turning Movement Counter Board DB-400, Jamar Technologies, Inc. A basic model for recording turning movements at intersections. The board is lightweight and comes with its own case.

Turning Movement Counter Board TDC-8, Jamar Technologies, Inc. Can be used to do turning movement counts, classification counts, gap studies, stop-delay studies, speed studies, and travel time studies. The board is lightweight and comes with its own case.

Our library of free reports and training videos is searchable online. Visit http://www.ksltap.org. Click on the "Lending Library" to search the catalog and place your order.

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❑ add to KS LTAP email discussion list

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KANSAS LTAP

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Fax 785.864.3199 http://www.ksltap.org

The Kansas Local Technical Assistance Program (LTAP) is an educational, technology transfer and service program of the Kansas University Transportation Center (KUTC), under the umbrella of the KU Transportation Research Institute. Its purpose is to provide information to local government highway departments and their personnel and contractors by translating into understandable terms the latest technologies in the areas of roads, highways and bridges.

The *Kansas LTAP Newsletter* is published quarterly and is free to counties, cities, townships, tribal governments, road districts and others with transportation responsibilities. Editorial decisions are made by Kansas LTAP. Engineering practices and procedures set forth in this newsletter shall be implemented by or under the supervision of a licensed professional engineer in accordance with Kansas state statutes dealing with the technical professions.

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