



A Leg Up

Hybrid Beacons Help Pedestrians Feel Safer When Crossing the Street

By Mehrdad Givechi and Lisa Harris



Kansas LTAP

When activated by a pedestrian, this Pedestrian Hybrid Beacon at 18th and Kentucky Streets in Lawrence stops traffic to allow school children to cross the street near Cordley Elementary School.



A Pedestrian Hybrid Beacon (PHB) is a traffic control device similar to the PELICAN pedestrian signal from Europe. It was first adopted in the United States by City of Tucson, Arizona in 1990s. The system is designed to increase motorists' awareness of pedestrians crossing the street. A PHB differs from pre-timed traffic signals and constant flash warning beacons because it is only activated by pedestrians when needed. This article will describe how they work and where they are especially effective.

Two traffic control devices in one

Being a "hybrid" beacon, a PHB functions like two types of traffic control devices into one: a traditional traffic signal and a stop sign. A "steady red" indication acts like a red traffic signal and means motorists are prohibited from crossing the crosswalk. After 5-7 seconds, the steady red changes

to alternating flashing red, and acts like a stop sign, meaning motorists can proceed (after a complete stop at stop bar) if the pedestrian has safely completed that portion of the crossing.

Where are they best used?

PHBs are most effective at locations where traditional crosswalk signs and markings do not provide adequate safety measures and/or where installation of a conventional traffic signal is unwarranted and/or cost prohibitive. FHWA guidance says that good candidates are multi-lane, high-volume, high-speed roadways that pose a major challenge for pedestrians to cross. However, they can also be installed successfully on two-lane streets.

PHBs can be installed mid-block and or at an intersection. Where used, a PHB should be located outside the functional area of any nearby signalized intersection and outside of any turn lanes or acceleration lanes.

Benefits: Increased safety, less delay

A number of studies have been conducted to assess safety and operational efficiency of PHBs. The results indicate that the beacons can reduce pedestrian crashes by 69 percent, total crashes by 29 percent, and severe crashes by 15 percent. Compared to traditional signalized crossings, PHB crossings show fewer rear-end collisions. From operational standpoint, motorists also benefit from PHBs by experiencing up to 50 percent less delay.

Guidance for installation

Chapter 4F of the MUTCD contains provisions on how PHBs can be installed and used in conjunction with signs and pavement markings. It also identifies factors for agencies to consider in determining the use of PHBs, including pedestrian and traffic volumes, roadway speeds, and sight distance.

Experience with PHBs in Lawrence

Lawrence, KS, has installed 10 PHBs in various locations, and more are on the way. The first one was a test installation when the technology was fairly new. It is on a school route that crosses a busy two-lane street. The project was done in conjunction with Kansas State University faculty, who reported to FHWA on the beacon's effectiveness.

Lawrence's PHBs have been installed at locations requested by citizens where traffic volume and speed are such that the citizens feel uncomfortable crossing the street themselves or having their children or elderly neighbors cross unattended. None of the locations had a crash history. Some are at intersections, some are installed mid-block.

The streets on which the PHBs have been installed in Lawrence to date have been two-lane collectors or minor



arterials. A few of them are one-way streets with two lanes.

The City is considering installing PHBs at a few locations on four-lane major arterials. In two cases, the beacons would be near facilities that serve or employ individuals with disabilities who need to cross the four-lane street to get to a bus stop.

David Woosley, Lawrence's transportation/traffic engineer, said the City has received hardly any complaints about the beacons, and a lot of thank-you's, especially from parents of elementary school children.

He has noticed that some drivers treat the alternately flashing red beacon like a red light and do not proceed through the intersection when it

is safe to do so. "Sometimes you'll hear a horn honk," he said. Woosley understands the confusion. "I doubt there is anything about [PHBs] in the *Kansas Driving Handbook*," he said, "so it's understandable people don't always know what to do."

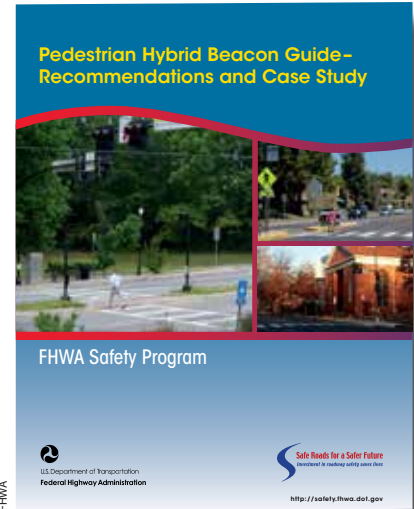
In Lawrence, the City purchases all the equipment for the crossings and then hires-out the installation, costing about \$50,000 per location on a two-lane facility.

Lawrence has had a good experience with PHBs in helping citizens feel more safe when they are crossing the street. For more information on Lawrence's experience with PHBs, contact David Woosley at (785) 832-3034 or at dwoosley@lawrenceks.org. ■



Sources:

- Pedestrian Hybrid Beacon Guide: Recommendations and Case Study. FHWA-SA-14-014. http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa14014/fhwasa14014.pdf
- Interview with David Woosley, June 19, 2014.



This new, 12-page free guide on PHBs can be found at the link in the Sources at left. It contains detailed information on how and where to install the beacons, along with case studies where they have been installed in various cities. Photographs and illustrations help make the guide easy-to-read.

Kansas LTAP Newsletter Bidding Good-bye to Paper

By Pat Weaver



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Take a few minutes to SIGN UP to continue receiving the newsletter.



Beginning with the Fall issue of the *Kansas LTAP Newsletter*, we will be migrating the distribution of your newsletter to electronic editions for most recipients. As the cost of printing and mailing continues to increase, it has become more and more difficult to continue with hard copy distribution. We are cutting back our hard-copy distribution to one copy per local agency in Kansas, plus a few key stakeholders.

The full version of the newsletter will still be available on our website, and an electronic alert with article highlights will be sent to your email inbox to inform you about the availability of the latest edition—and link you directly to it.

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Good-bye paper, hello e-version! Same look, same great content, just in a different form. **Sign up by September 1** to ensure you receive notice of the Fall issue (and future ones). ■



Supervisory Level Focus on Road Construction BMPs By Richard Basore

Editors note: We asked Richard Basore, Watershed Field Coordinator for the Kansas Department of Health and Environment (KDHE), to provide stormwater management tips for supervisors of crews on road work sites. He provided some great feedback, below. Be sure to read the sidebar below, too, about the requirement for a Stormwater Pollution Prevention Plan and tasks in the Plan that must be carried out at the job site.

It takes a “village”

Good BMP installation and maintenance is really dependent on everyone in the chain of command, from project managers to the individual work crew members at a project... not only the crews (or BMP contractors) that might have a BMP-connected responsibility, but everyone who has a role to play on the site. This includes subcontractors or utility companies installing in rights-of-way, and from the land-clearing and grading crews down to the last crews to leave the finished site.

Someone who may run over a sediment fence, or “temporarily” remove a ditch check (that doesn’t get reinstalled) may be an ancillary function contractor, such as fuel delivery, heavy equipment



A damaged BMP like this one—a sediment fence wash-under failure in a right-of-way ditch—should be reported to the job site supervisor, and quickly repaired.

repair, pipeline, cable or electric pole relocation, etc.—not directly connected to the main project work.

So in short, it becomes the responsibility of everyone on the site, but particularly for the main contractors’ work crews who are there every day, to be aware of the BMPs—why they are there, why they are important, and to report any activity-related damage.

Be on the lookout

People at the site also need to check for the need for maintenance following a weather event that may have damaged or compromised the ability of the BMP to function properly. An example is a sediment fence 1/3 to 1/2 full of dirt following a heavy rain. That is not a BMP failure, but actually evidence that the fence functioned as it was supposed to

R. Basore

As a job supervisor, you are likely responsible for the on-site tasks identified in the project’s SWPPP. A SWPPP, or Stormwater Pollution Prevention Plan, is the plan submitted to KDHE by the project owner. KDHE bases its permit for land disturbance on the SWPPP, which includes:

- A site description identifying sources of pollution, including a site and BMP maps;
- A description of how you will prevent erosion, sediment, and other pollutants from contaminating stormwater (including fuel storage and solid wastes);
- A description of how you will control storm water flow from your site;
- Documentation supporting permit eligibility with regard to the Endangered Species Act; Possible Historic Sites, and the Kansas Surface Water Register;
- Documentation supporting permit eligibility with regard to local Total Maximum Daily Load (TMDL) requirements;
- Clearly outlined roles and responsibilities of different operators; and
- The protocol you will use to inspect your site.

Records must be maintained for the mandated 14-day self-inspections performed and the times and locations of major land disturbance and stabilization activities. Since you are required to inspect within 24 hours following 1/2 inch or more of rain, have a rain gauge on site—then you know. Make sure these records are legible. Be prepared to show the SWPPP and records to government inspectors who may visit your site. The SWPPP should be kept on site and revised if needed. For more detail on SWPPP contents, read the Construction General Permit packet referenced immediately below.

Source: Permit Packet, Kansas Department of Health and Environment, Kansas Water Pollution Control and National Pollutant Discharge Elimination System Stormwater Runoff from Construction Activities General Permit Packet, 2012. Accessed at <http://www.kansascountyhighway.org/DocumentCenter/View/130>.



do. The fence captured the sediment that might have otherwise left the site, so now it just needs to be cleaned out, have a stake or two added if needed, etc., to be ready to function again to trap sediment during the next rain event. Or maybe it is evidence that some additional measure needs to be taken to control runoff.

Common BMP problems in Kansas

The main issues we see at construction sites in Kansas are:

- Lack of maintenance for BMPs,
- Sediment fences down, or washed under, or with broken stakes,
- Ditch checks overwhelmed or washed around,
- Curb inlet controls out of place, and
- Track-out of dirt or mud from the site.

Avoid and combat track-out

The #1 complaint from the public that we get is track-out of dirt, and particularly mud, onto the roads adjoining a construction site. Besides being a nuisance, tracked-out mud can be a traffic hazard, especially for bicyclists and pedestrians.

Track-out is usually addressed in two ways, hopefully in combination:

- 1) by creating controlled/limited access to a site and making all vehicles exit over a proper (rough) construction exit to knock off as much dirt and mud possible from transiting vehicles, and
- 2) The permit requires track-out clean-up at the end of each work day.

Create an erosion control culture at the job site

Again, everyone on the site is another pair of eyes that can make note of how things are working (or not).

Crew supervisors in particular should be aware of and understand the importance of BMPs and not only relay that to their crews, but develop a culture whereby the crew members will readily report real or suspected issues to their supervisors.

One way to do that would be for the supervisors in their morning huddle to remind their crews if they are going to be working with or around BMPs that day and to be aware, to try not to damage the BMPs, and to report any BMP issues they

After it Rains, Don't Wait to Inspect. Get Out There!

By Richard Basore

Early last Spring I went by a KDOT project on US54 where they were doing a major road project. It was a divided highway section with a wide median for drainage purposes. It had rained heavily about dawn, and as I crested a hill I saw a well-done set of 10 or so stair-stepped sediment fences serving as ditch checks. They were impressively nice and wide and well-staged to handle the slope down to a creek at the bottom. Following the heavy rain most of the sed fences were full and bulging with water, some even spilling water over the top at the center (and that's OK). But what struck me was that two or three were holding no water because they had evidently washed out under the base of the netting.

Because of the continuing rain and the over-saturated conditions nobody was working at the site, so unless someone went to the site (and they may have... I just didn't see anyone), KDOT or the contractor may have missed an opportunity to view the site and to make note of the two or three failures needing maintenance/repair when the rain ended. By the time anyone showed up the next morning for the mandated 24 hour inspection following the rain, the full sediment fences may have drained out and to the untrained eye they might all look alike with the presumption that they had all worked, missing the problems.

So inspection during wet weather events to monitor BMP effectiveness, even if work is not being performed at the moment, can be valuable in monitoring BMP performance and possible maintenance needs.

You should check for a leaky roof when it rains; same for BMPs !!!

might see, whether related to their own activities or not.

Learn from the private sector

Walmart has developed an effective stormwater controls program for their new store construction sites. They have a pre-construction meeting for all dirt-related contractors prior to work commencing. They all meet and have a presentation on general construction stormwater rules, regulations and reasons. They then discuss, with the aid of copies of the SWPPP, the entire plan for the site, location and function of BMPs and timeline for construction phases. Walmart makes the contractors and subcontractors not only aware of the BMP needs, but puts responsibility on them to respect the BMPs in place and to report any damage that they may cause. (\$\$\$\$!)

As grading work is done, Walmart has a second meeting with all of the structure contractors and subcontractors, cement, frame, electrical, plumbing, paving, etc., etc., and they take them through the BMPs and SWPPP issues the same way.

When the original **Keystone Pipeline** came through here few years back, they

held an all-day pre-construction meeting where all the work crew supervisors—from the multiple contractors and sub contractors to be involved in the project from start to finish—were all together in one room at the same time; close to 100 people. They discussed all aspects of the construction project, the layout of the route, special issues (wetlands, creeks or rivers, etc.), and how they would be approached. They discussed individual BMP types and purposes, and had a heavy emphasis on their rule that at the end of every work day, individual crews were responsible for making sure that all BMPs in their work area were left in fully functional and correct condition before they could leave.

Where to get more information

The KDHE website has links to information & guidance regarding all aspects of the permitting process for a Construction Stormwater Notice of Intent (NOI) and the Stormwater Pollution Prevention Plan (SWPPP). Go to <http://www.kdheks.gov/stormwater/index.html#construct>



KDOT Korner

New Manual on Chip Seal Has Useful Tips

By Lisa Harris

A new report released by KDOT in 2014 provides guidelines, background and general information for the design, construction, and inspection of chip seals. It is aimed at KDOT and its chip seal contractors, but much of the information is useful to local agencies as well.

The 175-page *Kansas Department of Transportation (KDOT) 2014 Chip Seal Manual* contains information, recommendations and best practices for: 1) learning the overall chip seal operation; 2) learning how to properly use equipment in chip sealing; and 3) learning chip seal design procedures.

The Manual notes that KDOT lets all chip seal work to contract, and the chip seal design, equipment, materials and labor to perform the work is the contract responsibility of the contractor. The contractor is responsible for the initial chip seal design with adjustments made during construction in conjunction with a KDOT engineer. Checking various aspects of the process may fall to either the contractor employees or the KDOT engineer or inspectors, or both. The contractor is ultimately responsible for delivering a final product in conformance with the terms of the contract.

Prepared by Dean Testa of DMT Enterprises and Dr. Mustaque Hossain of Kansas State University, the manual covers:

- Where to use chip seal as a preservation treatment
- Materials for chip seal
- The design process
- Surface preparation prior to chip sealing
- Equipment inspection and calibration
- The application process
- Areas of concern during the construction process.

The chapter on “areas of concern” is especially helpful in helping to avoid costly mistakes. The average effective life of a chip seal varies from four to eight years, but can be much shorter with poor design. The longer the life, the more cost-effective the treatment.

Best practices using aggregate in chip seals

Below is a checklist from the Guide (pg. 106) to help identify areas of concern with using and applying aggregate:

- **Gradation.** Graded aggregate tends to segregate when stockpiled. Finer particles tend to sift between the coarse particles, causing the stockpile to show an increase of coarse particles near the top and outside. Note: this may not be a major problem as many of the gradations being used today utilize a “single size” aggregate. Take a representative sample of aggregate from the bucket load. The loader bucket should penetrate the stockpile near the bottom and deep enough into the stockpile so that when raised, it will have a full range of the aggregate gradation. The representative sample



KDOT / Ron Matteson

Chip seals can lose aggregate for a number of reasons. Read below for tips for keeping the aggregate on the road.

Loss of Aggregate

KDOT's *2014 Chip Seal Manual* lists the following major causes for loss of aggregate from chip seals:

- A long delay between applying the binder and applying the aggregate (after applying the binder it begins to cool and harden, reducing the binding properties).
- Performing the chip seal late in the sealing season. By the Contract Documents the seasonal limits and weather conditions for chip seals are specified. Chip seals are intended to be performed during the warmer months.
- Low amount of binder was applied. A fog seal may be applied after the fact that may help hold the chips in place.
- Selecting the wrong type of binder for prevailing conditions. As soon as the problem is discovered, change to the preferred binder. An example the electronic charge of the binder and the aggregate are the same.
- Excessive amounts of dust or a film of moisture on the aggregate particles affecting adhesion. If dust is the problem, perform extra pre-binder brooming. If moisture is the cause, delay starting the chip seal until the moisture has evaporated.
- Opening the chip seal to high speed traffic before adhesion is fully developed. Keep the roadway closed until the binder has set.
- A rainstorm occurring after applying the chip seal, but prior to the development of adhesion or curing. This may require resealing the area affected, or applying a fog seal, depending on the amount of lost aggregate.
- Applying excessive cover material causing embedded aggregate to be dislodged under traffic. Once discovered, decrease the amount of aggregate being applied.



may come from more than one loader bucket. (Follow KDOT's Construction Manual for stockpile sampling requirements.)

- **Contamination.** The loader operator usually tries to use the entire aggregate stockpile. In doing so, the bucket often scrapes too close to the bottom of the stockpile, allowing clay balls, soil or grass to be picked up along with the aggregate. Do not use aggregate containing contaminants. If there is grass, clay, or soil detected in the spreader box, correct the loader operation immediately.

- **Degradation.** Avoid degradation of the aggregate. Do not operate any equipment in such a manner that causes the wheels to roll over any of the stockpile. These wheel loads will cause larger pieces to be crushed into smaller particles changing the aggregate gradation.

- **Full Trucks.** Fill every haul truck to its predetermined calibrated level. Over or under filling affects the amount the Contractor delivers and is paid for. Any irregular filling affects

the application rate. Uniformity is the key to success for a quality chip sealing application.

- **Excessive Dust.** Excessive dust will affect the project, and is detrimental to the performance of the seal coat. If dust in the stockpile is a problem, it may be reduced by lightly sprinkling the stockpile with water. This procedure is only recommended when emulsions are being used.

See the sidebar on the page 12 for information from the Guide on major causes for loss of aggregate from chip seals.

In sum

The tips in this article are just a taste of what you'll find in KDOT's *2014 Chip Seal Manual*. Go online and check it out. It is available for free download at: http://www.ksdot.org/PDF_Files/KSU-09-8_Final.pdf. 175 pages. ■



Source:

- Testa, Dean and Hossain, Mustaque. Kansas Department of Transportation 2014 Chip Seal Manual. K-TRAN KSU-09-8. March 2014. http://www.ksdot.org/PDF_Files/KSU-09-8_Final.pdf

KDOT's Haul Road Provision Updated

By Lisa Harris



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The Kansas County Highway Association (KCHA)'s KDOT Liaison Committee has spearheaded a one-word tweak to KDOT's haul road provision for contractors to respond to concerns raised by counties about road damage by KDOT contractors as travel on local roads.

KDOT addresses local road damage through haul road agreements with their contractors, who must repair

road damage they cause on designated haul roads. However, the route from a commercial asphalt plant or quarry to the state highway is not eligible to be designated as a haul road. Any damage on that route must be repaired at the local government's expense.

The wording change pertains to when the plant happens to have local access to two state highways and the haulers choose to go to the farthest one instead of the nearest. Probably the farther state highway is closer to the job site to which they are hauling their materials, but counties would like haulers to do one of two things: 1) Preferably, take the most direct route to the *nearest* state highway, and travel the rest of the way to the job site on the state system which is better designed to accommodate heavy loads. A shorter route means fewer miles of potential damage the local government must pay for; or 2) take the longer route

but designate that route as a haul road so the contractor will be responsible for any road damage.

The (draft) wording before tweaking was: "*The most direct route to the state highway that is normally used for hauling commercial material into and from established plant sites and quarries is not designated as part of the haul road.*"

The revised (and adopted) wording is: "*The most direct route to the nearest state highway that is normally used for hauling commercial material into and from established plant sites and quarries is not designated as part of the haul road.*"

Take note of this change when observing KDOT haulers on your roads, and call your KDOT Area Engineer if a hauler is not taking the appropriate route.

For more information, contact Sue Darling, assistant bureau chief at KDOT's Construction and Materials Bureau, (785) 296-7138. ■



Sources:

- Harris, Lisa. "Haul Road or Quarry Road?," Kansas LTAP Newsletter, Fall 2011.
- November 2013 minutes of the KCHA-KDOT Liaison Committee.



MORE

By Lisa Harris

See download / ordering information on next page.

2014 Roadway Safety Guide: Primer for Community Leaders

This guide is designed to provide community leaders and elected officials with basic information to improve roadway safety in their communities. Originally published in 2000, this new/updated version includes information on numerous new technologies and engineering treatments like modern roundabouts and median barriers that have been revised with years of safety research and data now supporting their implementation. Roadway Safety Foundation. 83 pages.

Recognize, React, Recover

This 17-minute DVD focuses on using rumble strips to prevent run-off-the-road (ROR) crashes. Through six modules, audiences are introduced to the causes and consequences of ROR crashes, hear real-life stories of ROR crash victims, and learn about the lifesaving, and cost-effective, benefits of implementing rumble strips as a crash countermeasure. In addition, professional drivers offer valuable tips on how to react appropriately in the event of a roadway departure, making this a valuable resource for novice and experienced drivers alike. Roadway Safety Foundation.

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■ TRAINING:

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Concrete Road Maintenance – ▲L1
October 14 in Wichita
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Snow and Ice Control – ▲L1
October 20 in Colby
October 21 in Dodge City
October 22 in McPherson
October 23 in Chanute
October 24 in Atchison

Highway Safety Manual (HSM) Lite
November 4 in Wichita

Public Works I and II – ▲L2
November 5-6 in Emporia

Bridge Maintenance
November 18 in Hutchinson
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■ WEBINARS: COMING FALL 2014:

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Kansas Association of Counties Annual Conference 2014
November 12-14 in Wichita
<http://www.kansascounties.org/10/>
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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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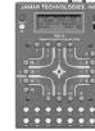
2014 Roadway Safety Guide: Primer for Community Leaders

See description on page 14. Download at:
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Recognize, React, Recover (DVD)

See description on page 14.

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We offer the following items for loan to local highway agencies.
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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.

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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.

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KUTC Executive Director / LTAP DirectorPat Weaver
 Editor / Manager, Communications & Outreach...Lisa Harris
 ContributorsNeil Cable, Richard Basore,
 Mehrdad Givechi, Pat Weaver

KUTC Resource and Education Staff

- Traffic and Hwy. Engineering.....Steve Schrock & Mehrdad Givechi
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