City of Andover Takes Proactive Approach to Reducing Crashes

By Lisa Harris

Andover’s Traffic Safety Committee gets the right people in the room to develop solutions, which include lunch, three times per year. In this article we’ll describe those meetings and how they are helping with traffic safety.

The Andover Police Department started the city’s Traffic Safety Committee meetings in January 2012. Andover’s Police Traffic Safety Coordinator of the department at the time, Sergeant Brandon “Hoss” Stewart, started them with the help of Police Chief Michael Keller. Lieutenant Lance Parker became the Traffic Safety Coordinator (and took over the meetings) in the middle of 2013.

Who is on the committee?

The committee has 10 members with representatives from traffic engineering, public works, the street department, the area school district, business owners, community members, and the police.

“Each of those are stakeholders in our community and play a role in making our...”

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Sign Retroreflectivity Quiz

By Lisa Harris

Test your knowledge of federal requirements and deadlines pertinent to your local agency.

1. What is the deadline for having a sign management or assessment method in place?
2. What’s the difference between sign management and sign assessment?
3. Do all types of signs need to be addressed in the management or assessment method?
4. What is the deadline for having signs compliant with the new retroreflectivity standards?
5. Where can I get the latest information on sign-related retroreflectivity requirements?

Answers on page 6
Andover Continued from page 1

Andover’s Traffic Safety Committee was initiated by the police department. The department organizes and hosts each meeting at their offices.

city safe,” Parker said. “The schools educate our youth, engineering/public works develops our roads and streets, and the police enforce the traffic laws of our state and city.”

What does the committee do?

The committee meets three times per year in January, May, and September to:

1) Go over traffic crash information to identify problem areas. They look at injury and non-injury crashes per four-month period and by year, and compare data with the previous year. They also break down the incidents into categories like speeding, age, gender, reckless driving, and weather conditions.

“It’s real good information for everyone,” said committee member Bill Braitsch, street superintendent. He said the police department has a relatively new crash mapping tool that helps with visualization. Traffic problems are usually at major intersections, he said.

2) Review traffic complaints and develop suggestions for improvement. Complaints are broken down into two groups: driver and road hazard.

3) Learn about police enforcement efforts such as number of citations, locations of the speed trailer and speeds recorded, location of signs, drone vehicle, etc.; and

4) Review and discuss traffic engineering studies planned and underway, road construction, and current and future improvement plans—and discuss any adjustments to consider.

The overall objective is to lower both the number of crashes and the number of traffic complaints.

What have been some notable benefits and outcomes of the traffic safety meetings?

Better communication. Parker cited this first. “I believe that communication between public works, schools, local business owners, the police, and the community has been improved. The committee members all have different perspectives on traffic safety and we all learn from each other,” he said.

Greater awareness of safety issues. Parker said that, since he has taken over the Traffic Safety Coordinator position for the police department, he has learned a lot.

“I have learned to look at computerized crash data and provide targeted enforcement sites for our agency,” he said. In addition, Parker said he has been able to provide better use of the city’s police radar trailer, radar sign, and additional traffic safety programs offered by the police department.

Parker also attends and participates in bimonthly Operation Impact meetings in the Sedgwick County/Wichita area. These meetings focus on the law enforcement side of traffic safety. Sedgwick County’s sheriff’s department, Wichita’s police department, and surrounding law enforcement agencies get together to discuss traffic law enforcement trends and issues throughout the Wichita metro area.

Braitsch said that looking at crash data and talking about the crashes gets the traffic safety committee to think about why a crash happened at a particular location and whether traffic control devices at the site are working as they should. “We might see if a traffic signal is malfunctioning. Maybe a camera needs to be adjusted because it’s not pointed just right. Maybe it wasn’t entirely the driver’s fault. We’re more aware,” he said.

Targeted engineering. Braitsch said improvement plans might be adjusted as a result of a discussion. An example is at 13th Street and Andover Road. A new junior college facility opened its doors ½ mile east of that intersection, and traffic skyrocketed. Crashes increased as well, and the traffic safety committee discussed them.

Braitsch said the public works department changed the signal timing before they had the money to reconstruct the intersection. That helped some. Later they added dedicated turn lanes. The result? In 2012 there were 19 crashes, going up to 26 in 2013, probably due to construction and confusion, said Parker. (Improvements were completed in Summer 2013.) Crashes in 2014, as of 12-18-14, number just 6. “It’s approaching 80 percent better,” Braitsch said. The crash severity has decreased as well. “We used to have T-bones at that
intersection. Now we see just fender benders. I won’t say the problem has gone away—it’s college kids and they are not always going to wait—but it’s a lot better,” Braitsch said.

Areas around district schools are particularly problematic for traffic safety, with lots of buses in the area. Braitsch said the district is always very involved in safety discussions. The committee has recently discussed the possibility of installing a pedestrian-activated beacon at crosswalk on a school route in the near future.

**Targeted enforcement at trouble spots.** The committee reviews trouble spots—places where they are seeing more crashes and/or complaints—and the police department will increase enforcement at those locations.

**Community approval.** Braitsch said Andover residents appreciate the city’s focus on traffic safety. He gave an example of the street department’s practice of installing “Keep Kids Alive—Drive 25” signs at entrances to residential areas off of arterials with a higher speed limit. The speed limit on residential streets city-wide is 25 mph, and these signs reinforce the change in speed limit.

“Police like the signs and so do residents,” Braitsch said. “We’re looking out for their kids. They are colorful. We’re replacing our regular 25 mph signs with these.” Braitsch noted that the signs are more expensive because they are bigger than a speed limit sign and they have more than one color, but they are considered worth the investment in Andover.

**Statewide recognition.** Parker noted that the City of Andover has been awarded Kansas AAA Traffic Safety Awards since 2011, in part because of the work of their traffic safety committee. The City received the Silver award in 2011, Gold award in both 2012 and 2013, and is in line to receive the Platinum award this year.

To be eligible for the annual award, a community must conduct traffic safety promotions and educate the public on safety topics. David Hanni, AAA Kansas Region Executive Vice President, said the awards “recognize the great efforts of these law enforcement agencies, and encourage other law enforcement agencies to actively engage in similar type efforts.”

We echo the sentiments of AAA and hope this article will encourage your street or road and bridge department to develop a traffic safety committee together with your law enforcement agency and other traffic safety stakeholders. It’s certainly working well for Andover, and their whole community benefits.

For more information

For a PDF of a sample agenda from an Andover Traffic Safety Committee meeting, contact Lisa Harris at lharris@ku.edu.

Bill Braitsch, Andover Street Superintendent, can be reached at (316) 733-8290 or bbraitsch@andoverks.com

Lieutenant Lance Parker can be reached at (316) 733-5177, ext. 215 or lparker@andoverks.com

**Sources:**
- Phone interview with Bill Braitsch, 10-24-14.
- Email correspondence with Lt. Lance Parker, 11-3-14.
- Andover Police Department Facebook page: https://www.facebook.com/AndoverPoliceDepartment

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**LTAP’s Givechi Wins Safety Award**

Kansas LTAP safety trainer/engineer, Mehrdad Givechi, P.E., P.T.O.E., was recognized September 5, 2014, at a special awards ceremony celebrating the 10-year anniversary of Destination Safe, an award-winning multi-disciplinary safety coalition in the Kansas City area. Givechi won an infrastructure research award for his contribution to transportation crash analysis with a 2011 road safety audit (RSA) for Eisenhower Road. He has conducted 12 RSAs in Kansas, including Coalition counties of Johnson, Leavenworth and Miami.

Givechi was one of seven people honored at the luncheon for contributions in engineering, law enforcement, emergency management, and safety education and advocacy. Destination Safe considers partnerships a key to its strength. Congratulations, Mehrdad!

For more information on Destination Safe, visit [http://www.marc.org/transportation/safety/](http://www.marc.org/transportation/safety/).
It’s pretty amazing, actually,” said Scott Davis, county traffic engineer for Thurston County in Washington State. Davis is talking about high friction surface treatment, or HFST. His county’s crew recently installed a section of HFST as a demonstration project for the Federal Highway Administration (FHWA). This article will describe the project in greater detail, and Davis’s observations of how it went.

HFST is designed to treat short sections of road where there have been crashes due to skidding or there is a high risk for skidding. A specialized aggregate is placed over a binder, resulting in a sandpaper-like texture with more grip. Davis has known about the technology for a while, but did not consider it for previous safety programs largely because it is more expensive than other run-off-the-road countermeasures like chevrons, rumble strips, and pavement markings. Davis noted that Thurston County is running out of these lower-cost countermeasures. For example, all of the county’s curve signs are constructed of high intensity prismatic sheeting, most if not all the curves have MUTCD-required curve signing, and center and edge lines exist on all the county arterial/collector roads. He noted there are limitations on where rumble strips can be installed due to proximity to homes, lack of pavement structure, or shoulders—and there are just a few locations left where Thurston County can effectively use this proven countermeasure too.

Davis said he was “re-motivated” at the 2013 American Public Works International Congress in Chicago when he learned about the striking effectiveness of an HFST project in Wisconsin. “Crash reductions were phenomenal—something like 100 down to two at an interstate ramp,” he said. Davis learned that HFST had become a recommended technology of FHWA’s Every Day Counts (EDC) Program, which has funding for demonstration projects. “At the time I was re-introduced to HFST, I was looking for another relatively low cost and proven countermeasure that could help in some of the more interesting sites in Thurston County,” Davis said.

To become more comfortable with using the technology in his county, Davis wanted to see firsthand the product being laid down. He also wanted to get more comfortable with the maintenance aspect of HFST. He talked with the FHWA Division office and the Local Technical Assistance Program (LTAP) office in Washington State about organizing a demo. “Partnerships are important in most things we do, but having the support of those two offices is crucial to getting an EDC-funded demo project,” he said.

Mike Moravec of the FHWA Office of Transportation Performance Management and Frank Julian of the FHWA Resource Center organized the HFST demo...
that included a contractor installation at one site and a county maintenance crew installation at another site. FHWA paid for the contractor, materials for both sites, and provided training for the county crew. The county provided labor. A technical team and vendors provided direct oversight for installation.

Davis, Washington LTAP, and FHWA developed a list of candidate sites using a combination of crash history and systemic risk analysis of roadway characteristics. Other considerations included sites that could provide enough room to stage and mobilize equipment and provide space for everyone observing to be safely off the road.

The first site, for the vendor demo, was a curve on the county’s HFST candidate list. The second site was further down on the county’s list, but it made the cut because it was close to the first site and there was an adjacent school that provided space for staging equipment, hosting a peer exchange, and observing the work.

Because there was extra material left over from the first two sites, the team decided to add a third site. This site was first on the county’s HFST candidate list—a downhill grade to a stop-controlled T-intersection. County staff did the installation at this site. Davis said it involved 11 people for the labor, plus some supervisors.

Thurston County hosted a peer exchange that coincided with the scheduled HFST installation by county maintenance staff. The intent was to allow attendees not only to learn about HFST in a classroom environment but also see an actual installation by local forces. Davis said 35 or so individuals attended, 21 of whom were from local governments. Davis said the weather cooperated—no small feat in Washington State. He also said, in his opinion, “Our folks did it an amazing job—the work was done fast, and it was high quality. I believe these thoughts were shared by all those that attended the peer exchange.”

Davis said the installation of HFST “goes pretty quick.” For example the county’s maintenance crew laid about 440 ft of HFST in one lane in two hours, with an hour of prep before. After installation, the treatment needs to sit a little while to cure out. Based on Thurston County’s experience, Davis said a county could easily do a one-lane segment in half a day with mobilization and demobilization. If doing two lanes, Davis recommended scheduling two days, although the crew would not be working full days at the site.

When asked if he had any tips for other agencies in using the materials, Davis said both of the materials used for the binder (acrylic resin or epoxy) are considered hazardous for various reasons, so you need to have folks who have hazmat certification to haul the materials. “Read and follow the MSDS sheets,” he said. Thurston County provided the appropriate safety gear and discussed the materials and precautions with staff prior to installation.

Davis also mentioned the aggregate is like marbles if Continued on next page
High friction surface treatment  
Continued from page 5

“Everyone on the crew was pleased when they got back to the shop. They were happy with the end-product and proud of their work.”

not embedded in the binder. So he suggested making sure to sweep the entire road when done and post loose gravel signs as an added precaution until the site can be swept again.

Frank Julian from FHWA said he enjoyed working with Davis and the county maintenance crew. “This county is fantastic. I had so much fun working with the guys. Local folks are great, and innovative. They did the job for half the cost of a contractor,” he said.

Davis estimated the cost of a 450 ft one-lane section to be $13-15,000 for materials, with 2/3 of that cost for the binder and 1/3 for the aggregate. “Although this sounds like a lot, it really is not if you have already exhausted other low-cost measures and you have no other options or are considering reconstruction,” he said. Davis is looking at doing more HFST projects with the roadway maintenance crew next year.

When asked if he felt a difference in the driving surface after the installation of HFST, Davis said “I don’t drive fast, so it is hard to say. However the HFST itself feels like sandpaper and I can feel a difference just walking on it. Plus a local law enforcement officer told one of the county workers he was going to try and drive faster around the curve. That’s not exactly what we had in mind, though...” Davis said.

“Too bad HFST did not make it to the next round of Every Day Counts.” Davis said. “I believe this demonstration and peer exchange with the locals in action was a great way to showcase a proven safety countermeasure and get others interested to try it out. I think other states and local agencies could benefit from similar events,” he said.

Davis did say that two counties that attended the peer exchange have already decided to pursue HFST. One is planning to install a mile total of segments of HFST, and the other county requested $2 million in federal safety funding (HSIP) for HFST projects.

Davis appreciated having the county maintenance crews install HFST—and watching the process. “It’s interesting to see a hands-on approach. It’s a lot different than seeing a contractor do it,” he said. Plus his county got a safety improvement in the process, for the cost of the labor. Hosting the demo was a win-win.

The installation went very well. Davis said everyone on the crew was pleased when they got back to the shop. “They were happy with the end-product and proud of their work,” he said. “Now crew members are thinking of some other uses for HFST,” he said.

Davis noted that “this effort would not have been possible without a strong partnership with our local FHWA and WSDOT offices. Both are very supportive of local road safety and helped champion our HFST demo request.”

This article was excerpted from a 6-page fact sheet by Kansas LTAP titled “High Friction Surface Treatment Starting to Take Hold on the Local System.” See page 15 for a copy.

Sources for this excerpt:
• Phone interviews with Frank Julian on 10-19-14 and Scott Davis on 11-20-14.

Sign retroreflectivity quiz  
Continued from page 1

1– The deadline for having a sign management or assessment method in place to maintain minimum levels of retroreflectivity has passed. It was June 14, 2014. Various methods for sign management and assessment are outlined in a 4-page guide titled Maintaining Traffic Sign Retroreflectivity. See page 15. Agencies can use one method or a combination.

2– An “assessment” method involves evaluating individual signs. A “management” method provides an agency the ability to maintain sign retroreflectivity without having to physically inspect each sign.

3– This is a trick question! There is no set deadline for having signs upgraded to the new retroreflectivity standards. Federal guidance says “when signs are found to be below the minimum retroreflectivity levels, they should be replaced, but it is up to each agency to decide when the replacement occurs.” Your assessment or management method should document your approach to sign replacement. The retroreflectivity standards are found in Section 2A.08 of the federal Manual on Uniform Traffic Control Devices, or MUTCD.

4– Regulatory and warning signs were required to be included your management or assessment method by the June 14, 2014 deadline; guide signs are also required to be included, but with no deadline set for their inclusion.

5– The latest information on federal retroreflectivity requirements for both signs (and pavement markings) can be found at a “one-stop” FHWA webpage on the topic: http://safety.fhwa.dot.gov/roadway_dept/night_visib/. The page has links to the relevant sections of the MUTCD.
From Reactive to Systemic: KDOT Continues its Shift in Local Road Safety

By Lisa Harris

Road safety improvement projects are designed to improve safety by minimizing or eliminating risk to roadway users. Rather than managing risk at certain locations where crashes have already taken place, a systemic approach takes a broader view and looks at risk across an entire roadway system. Crashes alone are not always sufficient to determine what countermeasures to implement, particularly on low-volume local and rural roadways where crash numbers are lower. The systemic approach is a proactive approach that attempts to take care of those features that are most likely to be involved in a crash or contribute to the severity of a crash—before a crash actually occurs.

Systemic approach in Kansas going strong

In our Spring 2011 issue, we reported about KDOT’s Bureau of Local Projects’ (BLP) shift in focus away from higher-cost “hot spot” improvements to funding low-cost safety improvements at a larger number of high-risk locations. The main emphasis has been on reducing the number and severity of road departure crashes. This has resulted in a dramatic increase in applications for HRRR funding by locals.

Salt Lake City peer exchange

In September 2014, Ron Seitz, bureau chief of BLP, Nelda Buckley, local road engineer with BLP; Norm Bowers, local road engineer for the Kansas Association of Counties, and Clark Rusco, county engineer for Barton County, Ks., attended a peer exchange in Salt Lake City on systemic improvements. At the end of the exchange, each participating state reported on how they intended to go forward with the systemic approach.

County safety plans to be strong focus going forward

Kansas participants in the peer exchange were in strong agreement that county safety plans—a strategy in the Kansas Strategic Highway Safety plan—need to be a priority for HRRR funding, until there is a plan for every county in Kansas.

The safety plans will focus on the county rural major collectors and will assist the county in prioritizing the safety improvements. The plans will be set up so that projects from the plans could be easily submitted directly for HRRR funding.

“This approach will make the best use of our safety dollars across the local system,” said Seitz. “We will be funding improvements that counties themselves have prioritized, with improvements to consider from all across the state, and counties will be participating in a consistent way.” BLP anticipates hiring a consultant to prepare the plans, and is in the process of developing a request for proposal for this effort.

The safety planning process will kick off with three counties: McPherson, Barton, and Butler. Plans for those counties are anticipated to be completed in 2015.

For more information

To learn more about the county safety plan process in Kansas or to inquire about how to get your county on the list for developing one, contact Ron Seitz at (785) 296-3861 or Seitz@ksdot.org.
Nine Proven Safety Countermeasures

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

Research has proven these countermeasures work. Here’s how they are being implemented in Kansas.

A general definition of “countermeasure” is an action or device that is intended to stop or prevent something bad or dangerous. A traffic safety countermeasure helps prevent road departures and crashes. In January 2012, The Federal Highway Administration (FHWA) issued a Guidance Memorandum on Promoting the Implementation of Proven Safety Countermeasures, and update to the 2008 memo, to advance a group of countermeasures that have shown great effectiveness in improving safety in three specific focus areas:

- roadway departure
- corridor/intersection, and
- pedestrian safety

FHWA has been strongly encouraging public agencies to consider implementing these countermeasures. Many of these are low-cost safety improvements, with a few being on the higher end (e.g. roundabouts, pedestrian hybrid beacon). All nine are being implemented in Kansas at the state and local levels. This article highlights a few examples of each.

Examples of the nine proven countermeasures in Kansas

We contacted FHWA-Kansas Division, the Kansas Department of Transportation (KDOT), the Mid-America Regional Council (MARC) and several local agencies, and learned there are a number of communities in Kansas that have implemented and/or plan to implement one or more of these countermeasures.

1 Roundabouts: Approximately 150 roundabouts are currently completed, under construction, under design, or planned in Kansas. Most of these are in larger urban areas or on some state routes and interchange ramp terminals, but a number of medium-sized cities such as Emporia, Hutchinson and McPherson have also implemented this countermeasure. Paola also has a roundabout under design (303rd Street and Hedge Lane) and another one planned (303rd Street and Hospital Drive).


2 Road Diet: Several communities are coming onboard to use the road diet (road reconfiguration). The diet creates “complete” streets that are friendly and safe for all road-users including pedestrians and bicyclists.

Two examples are the Cities of Merriam and Lawrence. Phase 1 of a road diet on the eastern segment of the Merriam Lane and Southwest Boulevard corridor was completed in 2013 with Phase 2 currently under construction. More at http://bikewalkkc.org. The City of Lawrence implemented road diets at a few locations recently; on 9th Street near downtown and on Princeton Boulevard in a suburban area.

For more information on road diets, visit http://safety.fhwa.dot.gov/road_diets/info_guide/

3 Safety Edge: Our Kansas LTAP fact sheet, Safety Edge: Reports from the Field, reports on the use of the safety edge in four counties: Miami, Riley, Coffey, and Johnson. http://www2.ku.edu/~kutc/pdf/LTAPFS12-SafetyEdgeField.pdf

4 Pedestrian Hybrid Beacon (PHB): This is a pedestrian-activated beacon at a cross walk. An article on this countermeasure was published in the Spring 2014 issue of our newsletter, describing installations in Lawrence. A PHB is also being considered for Andover, near a school.

5 Longitudinal Rumble Strips and Stripes on Two Lane Roads: KDOT installs rumble strips systematically on the state highway system, per policy. In 2013 Sedgwick County installed rumble strips (mostly centerline) using HRRR funds at 19 locations at curves or alignment kinks that were considered by the county to be at risk for crashes. Johnson County has rumble strips on Old US-56 between the cities of Olathe and Gardner.
Which Countermeasure to Use?

To get the best use of available funds, agencies are encouraged to use site-specific analytical approaches and systemic planning approaches to make safety investment decisions. Some of the available analytical tools to help with the countermeasure selection process include:

- **Highway Safety Manual (HSM)**—http://www.highwaysafetymanual.org/
- **Crash Modification Factor (CMF) Clearinghouse**—http://www.cmfclearinghouse.org/
- **Intersection safety issue briefs**—http://safety.fhwa.dot.gov/intersection/resources/fhwsa10005/brief_8.cfm
- **Traffic signal safety issue brief**—http://safety.fhwa.dot.gov/intersection/resources/fhwsa10005/brief_5.cfm
- **Intersection safety issue briefs**—http://safety.fhwa.dot.gov/intersection/resources/fhwsa10005/brief_8.cfm
- **Traffic signal safety issue brief**—http://safety.fhwa.dot.gov/intersection/resources/fhwsa10005/brief_5.cfm

6 **Corridor Access Management:** Although a number of Kansas local agencies have some sort of access management policy in place to guide a driveway permitting process and assist with traffic congestion and safety management, many agencies still have no written policy and/or guidance when it comes to access issues and concerns.

Some of the Kansas public agencies that have an access management policy in place include:

- **KDOT.** Their Access Management Policy 2013 is very well put together and can be used by local agencies in need of a guide for access management. http://www.ksdot.org/assets/wwksdotorg/bureaus/burTransplan/AccessMgt/Access_Management_policy_Jan2013.pdf.
- **City of Hays.** Hays adopted KDOT’s guidelines for access management.
- **Douglas County.** The county has public road access management standards established in code. http://www.lawrenceks.org/assets/pds/planning/documents/article5.pdf
- **City of Olathe.** See the city’s access management plan at http://www.olatheks.org/files/publicworks/traffic/AdoptedAccessManagementPlan.pdf

7 **Retroreflective Borders on Signal Back Plates:** As part of a Kansas State University recent research project by Ishani Dias and Sunanda Dissanayake (completed August 2014), two sites in Manhattan were selected for installation of retroreflective tape on signal back plates: one at Anderson Avenue and Sunset Avenue, and the other at Denison Avenue and Clifton Road. A 2012 installation in Topeka was also evaluated in the study for effectiveness of this countermeasure. The researchers found that the countermeasure is effective in reducing red-light violations in through- and left-turn traffic but is not effective in reducing red-light violations for right turns.

Side note: The Topeka project was at the intersection of 21st and Washburn Avenue. According to the city traffic engineer at the time, Linda Voss, the installation of the tapes was not as quick as expected. She said you need to allow time for your maintenance crew to clean up grime from the back plates, follow that with an application of an alcohol-based solution, then apply the 2-inch wide tape around the back plate leaving a 1-inch border on the front and back edges, working from a bucket truck.

8 **Enhanced Delineation and Friction for Horizontal Curves:** KDOT is experimenting with enhanced friction treatment on horizontal curves and has installed several projects on the state system. The Unified Government of Kansas City/Wyandotte County will also be installing a friction treatment on a curve, with federal funds. See page 15 to download or order a new Kansas LTAP fact sheet with more information on these projects and others around the U.S.

9 **Medians and Pedestrian Crossing Islands:** According to MARC, there are several refuge islands in Prairie Village, along Somerset between 83rd Street and Mission Road. There are also three along 15th Street east of Iowa Street in Lawrence, on the University of Kansas campus. Lawrence is planning to install a pedestrian crossing island on 9th Street at Schwarz Road in front of an elementary school.

FHWA has identified proven countermeasures to improve safety, many of them low cost. It’s good to see them being used by KDOT and local agencies in Kansas.

Sources:

- Email and phone correspondence with Nelda Buckley, KDOT Local Projects; David LaRoche, FHWA Kansas Division; Aaron Bartlett, Mid-America Regional Council; and Linda Voss, formerly with the City of Topeka; September and October 2104.
Wayfinding for Bicycle Routes

Guidance from city transportation officials on how to help guide bicyclists through your community.

If you're looking for design standards for wayfinding for bicycle routes in your community, the Urban Bikeway Design Guide published by the National Association of City Transportation Officials, may be your answer. The second edition of this guide, published in 2012, created a standardized set of signing and pavement marking treatments for bicycling in U.S. cities. The Guide was developed with input from 21 cities as well as a nationwide team of experts. In each section of the publication, three levels of guidance are provided: required, recommended, and optional. This article will review these recommendations associated with bike route wayfinding and suggest where to go for additional information.

What is a bicycle wayfinding system?

The authors of the NACTO Guide define bicycle wayfinding system as “a set of comprehensive signing and/or pavement markings used to guide bicyclists to their designations along preferred routes.” The signs or markings are placed at decision points along the route and may include placement at an intersection of bikeways as well as at other locations leading to or along the route.

The signing/marking system includes three types:

confirmation to indicate to the traveling public that they are on a bicycle route; turn, when the bikeway turns from one street to another; and decision signs to mark a junction and to provide information about the route to key destinations.

Why implement a wayfinding system?

An easy-to-understand wayfinding system helps users understand the bicycle network, and may be particularly helpful to new or infrequent bicyclists. It provides information on the best routes to specific destinations and, with mileage or travel time information, may help encourage users to travel by bicycle. Clearly-identified wayfinding also gives information to motorists that they are driving on a bicycle route to encourage additional caution.

What’s required? What’s recommended?

First, the requirements: Standards outlined in the Manual of Uniform Traffic Control Devices (in Section 9B.01—Application and Placement of Signs and Section 9B.20—Bicycle Guide Signs) are required. These standards detail mounting height and lateral placement as well as examples of signs used for confirmation, turn, and decisions.

There is no standard color for bicycle wayfinding signage, although the MUTCD establishes the general meaning for signage colors. Green is the most common color of bicycle wayfinding signage in the US.

In addition to MUTCD requirements, NACTO also provides a number of recommended features to improve wayfinding. For example, placement of confirmation signs are recommended every two to three blocks on on-street routes and at the far side of major street intersections. If travel time is included on decision signs, it is recommended that 10 mph bicycle speed be used for calculations.

Additional considerations

A few other optional recommendations are provided in the Guide to enhance wayfinding. For example, there is a suggestion that signs be placed on “feeder” streets between the bicycle route and nearby destinations. The Guide also states that wayfinding signs “may be limited specifically to the designated bicycle network, as other streets may be difficult or dangerous for bicyclists.” Other features outlined as optional include placement of route map signs, pavement markings placed to reinforce routes and directional signage and, for extensive route networks, route number systems.

The authors of the Guide point out that Google and other online mapping programs offer bicycle route mapping that...
may differ from your city or county. You might want to consider these technologies and how your community is using them as you identify (or make changes to) your bicycle route system and associated wayfinding.

The NACTO Guide provides extensive resources on wayfinding and many other topics of bicycle facility design. However, as the authors of the Guide state, “...treatments must be tailored to the individual situation. Good engineering judgment based on deep knowledge of bicycle transportation should be a part of bikeway design...and decisions should be thoroughly documented.”


Other Resources on Wayfinding


The following two resources each address coordination of wayfinding across jurisdictions:


Which Type of Traffic Control is Needed at This Intersection, if Any? By Mehrdad Givechi, P.E., P.T.O.E.

A guide for local agencies in knowing how to tell.

When it comes to controlling traffic at intersections, one size does not fit all. Whether to place a stop or yield sign or traffic signal, add a roundabout, or just leave the intersection without any traffic control, depends on a few important factors, including approach speed, sight distance, and traffic volumes. This article will outline the considerations for installing different types of traffic control on local roads for optimal traffic safety.

Function of traffic control at intersections

Traffic control devices alter the “rules of the road” for driver behavior to improve safety. Where there are no traffic control devices, the right-of-way rules of the road apply. These rules are established by the state and local laws in accordance with the state Motor Vehicle Code. The rules say:

1. The driver of a vehicle approaching an intersection must yield the right-of-way to any vehicle or pedestrian already in the intersection; and
2. The vehicle on the left must yield to the vehicle on the right if they arrive at approximately the same time.

Traffic control devices, such as YIELD or STOP signs or traffic signals, can be used to assign the right-of-way at

Do you need to be an engineer to determine where traffic control devices will be placed? According to the MUTCD, Section 1A-09, the decision to use a particular traffic control device at a particular location should be made on the basis of an engineering study or the application of an engineering judgment, both of which shall be performed by an engineer or by an individual working under the supervision of an engineer (See MUTCD, Section 1A-13, items 64 and 65).

What is an engineering study? According to the MUTCD, an engineering study is the comprehensive analysis and evaluation of available pertinent information, and the application of appropriate principles, provisions, and practices as contained in the MUTCD and other sources, for the purpose of deciding the applicability, design, operation, or installation of a traffic control device. The MUTCD requires that an engineering study be documented.
What type of traffic control? Continued from page 11

Intersections on one or more approaches. Roundabouts or mini traffic circles provide another way to assign right of way; we’ll mention those on page 13.

Guidelines on selection of intersection control type

The Manual on Uniform Traffic Control Devices (MUTCD), which is the national standard for traffic control, outlines the specific types of information needed to make the decision about installing a traffic control device. The MUTCD states that engineering judgment should be used to establish intersection control type with the following factors as guidance:

- Vehicular, bicycle, and pedestrian traffic volumes on all approaches;
- Number and angle of approaches;
- Approach speed;
- Available sight distance on each approach; and
- Reported crash experience.

No traffic control. Where there is no history of crashes, sight distance is good, and total entering traffic volumes are very low (less than 400 vehicles per day), uncontrolled intersections may be a good choice.

In fact, according to FHWA-SA-05-11 “Road Safety Fundamentals,” uncontrolled intersections may be safer than stop-controlled intersections at low volumes because a driver may be more likely to run a STOP sign if he or she knows there is little chance of a vehicle coming the other way. The publication states that drivers typically are more cautious when crossing an intersection when they believe other drivers do not have to stop.

Yield and stop control.

Yield control. Uncontrolled intersections may not work well when daily volumes exceed 400 vehicles. Use a YIELD sign if there is no crash history and sight distance is adequate. Often, a YIELD sign causes less delay than a STOP sign, because it requires drivers to adjust speed to yield to another vehicle and not necessarily to come to a complete stop.

Stop control. Stop control may be necessary because of sight distance restrictions, high traffic volumes, or unusual conditions such as high crash locations. Local agencies use two-way stop control on minor roads that intersect roads with heavier traffic volumes, higher operating speed, or those that appear to be major roads. All-way stop control works best when traffic volumes are roughly the same on each approach to the intersection.

The MUTCD states that YIELD and STOP signs should be used at an intersection if one or more of the following conditions exist:

- An intersection of a minor roadway with a main roadway where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;
- A roadway entering a designated major roadway (e.g. state route, arterial, thoroughfare, parkway); and/or
- An unsignalized intersection in a signalized area.

The MUTCD also says the use of YIELD or STOP signs should also be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:

- The combined vehicular, bicycle, and pedestrian volumes entering the intersection from all approaches average more than 2,000 units per day;
- Restricted sight distance; and/or
- Five or more crashes within a 3-year period, or three or more crashes within a 2-year period, all caused by

Sight Distance Considerations

Sight distance is a factor when considering installing a traffic control device. Poor sight distance can lead to rear-end crashes on the approaches to intersections and to angle crashes within the intersections because drivers may be unable to see and react to traffic control devices or approaching vehicles. As a driver approaches an intersection, two different types of sight distances come into play:

- Stopping sight distance to the intersection—Drivers on the main road need to see far enough ahead so they can stop safely if a vehicle on the side road makes an unsafe move caused by lack of traffic control on minor road or lack of their visibility.
- Intersection sight distance—This is typically defined as the distance a motorist can see approaching vehicles before their line of sight is blocked by an obstruction near the intersection. The driver of a vehicle approaching a yield condition or departing from a stopped position at an intersection should have an unobstructed view of the intersection and enough time to anticipate and avoid potential collisions. Examples of obstructions include farm crops, hedges, trees, fences, berms, bridge railing, culvert headwall, utility poles, traffic control devices such as signs and signal equipment, buildings, parked vehicles, street furniture, etc. The horizontal and vertical alignment (i.e., curves and dips or rises) of the roadways approaching the intersection can also reduce the sight distance.

The area needed for provision of the unobstructed view is called the clear sight triangle. There are two types of sight triangles:

- Approach sight triangle, which covers a larger area and is applied to uncontrolled or yield-controlled intersections; and
- Departure sight triangle, which is smaller than its counterpart and is applied to stop-controlled (two-way or all-way) or signalized intersections.

failure to yield the right-of-way under the normal right-of-way rules.

**Signal control.** When traffic volumes are too high for any type of stop control, consider installing a traffic signal (only if it is warranted in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) or a modern roundabout, which works well when traffic volumes are nearly even on each approach leg, when left-turn movements are heavy, when severity of crashes are of primary concern, or when speeding is an issue.

Drivers are typically more cautious at an intersection when they believe others drivers do not have to stop.

According to MUTCD, an engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic signal is justified at a particular location. The study shall include analysis of factors related to the existing operation and safety at the study location, the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants.
- Eight-hour vehicular volume
- Four-hour vehicular volume
- Peak-hour vehicular volume
- Pedestrian volume
- School crossing
- Coordinated signal system
- Crash experience
- Roadway network
- Intersection near a grade crossing

The MUTCD states that satisfaction of one or more traffic signal warrants shall not in itself require the installation of a traffic signal. The need should be based on an engineering study.

**Conclusion**

If you are considering adding traffic control to an uncontrolled intersection, be sure you are following the guidance in the MUTCD; the Manual is designed to create safer conditions, and following it will help reduce liability for your agency in the event of a crash. More (and more expensive) traffic control is not always the best way to address a safety concern. Sometimes the best approach is a simple one, especially in low-volume situations.

For more information, consult the sources listed below.

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**Install a YIELD or STOP sign? Helpful hints from the MUTCD**

- YIELD or STOP signs should not be used for speed control.
- YIELD or STOP signs should not be installed on a higher volume roadway unless justified by an engineering study.
- When two roadways with the relatively equal volumes and/or characteristics intersect, consider installing YIELD or STOP sign to control the direction that:
  -Conflicts the most with established pedestrian crossing activity or school walking routes;
  -Has obscured vision, dips, or bumps that already slow down the drivers; and
  -Has the best sight distance from a controlled position to observe conflicting traffic.
- YIELD or STOP signs shall not be used in conjunction with any traffic signal control except:
  -If the signal indication for an approach is a flashing red at all times; or
  -If minor roadway is located within or adjacent to the area controlled by a traffic signal, but does not require separate traffic signal; or
  -If a channelized turn lane is separated from the adjacent travel lanes by an island and the channelized turn lane is not controlled by a traffic signal.


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**Modern roundabouts** have also proven to be safe and efficient types of intersection traffic control devices. They work well when traffic volumes are nearly even on each approach. Single-lane roundabout is often a good alternative to all-way stop control. Multi-lane roundabout can replace traffic signals, but they are very complicated in design.

**Traffic circles**, on the other hand, are traffic calming devices (often used on local residential streets) with much smaller inscribed diameters and do not have the characteristics of modern roundabouts.


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Sources:
MORE

By Lisa Harris

See download / ordering information on next page.

Alternative Intersections Videos on YouTube
FHWA has produced a series of informational videos on some alternative intersection types including the Diverging Diamond Interchange, Median U-Turn, Displaced Left Turn, and Restricted Crossing U-Turn. 16 videos, 3-8 minutes each.

Traffic Safety Facts: Rural/Urban Comparison
Contains statistics on motor vehicle fatal crashes based on data from the national Fatality Analysis Reporting System (FARS). NHSTA. 6 pages.

Maintaining Traffic Sign Retroreflectivity
A 2013 update of a brochure published in 2007 that describes federal sign retroreflectivity requirements and the basis for them. It also describes assessment and management methods to maintain retroreflectivity for signs. FHWA. 4 pages.

High Friction Surface Treatment Starting to Take Hold on the Local System
Provides a 2014 update on the use of HFST in Kansas and describes examples of using this anti-skid treatment in other parts of the country, especially by local agencies. 6 pages.

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:
2015....
MUTCD for Technicians ▲L1
1/6 in Hutchinson
Low Cost Safety Improvements ▲L3-e
1/20 Webinar Part 1
1/27 Webinar Part 2
Acquiring ROW on KS Local Roads – Lessons Learned
2/5 Webinar
Asphalt Road Maintenance ▲L1
2/10 in Garden City
2/11 in Russell
2/12 in El Dorado
2/17 in Manhattan
2/18 in Leavenworth
Workplace, Job Site & Equipment Safety ▲L1
2/24 in Garden City
2/25 in Hays
2/26 in Wichita
2/27 in Topeka
Culverts and Drainage ▲L1
3/3 in Oakley
3/4 in Great Bend
3/5 in El Dorado
3/6 in Lawrence
Traffic Impact Studies ▲L3-e
3/10 in Manhattan
MUTCD for Technicians ▲L1
3/17 in Olathe
Gravel Road Maintenance ▲L1
Would you like to host a workshop?
For details contact Kristin - kbkelly@ku.edu
Road Safety Assessment ▲L3-e
4/6 Webinar Part 1
4/13 Webinar Part 2
4/21 Webinar Part 3
4/28 Webinar Part 4
MUTCD for Technicians ▲L1
5/26/15 in Topeka

UPCOMING MEETINGS:
National Association of County Engineers (NACE) Annual Conference and Expo
April 19-23, 2015 in Daytona Beach, FL.
http://www.countyengineers.org/events/2015/Pages/default.aspx
Joint Meeting -- KCHA and APWA-KS
May 13-15, 2015 in Manhattan, Ks.
Contact Michael Spickelmeier at (913) 684-0470

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 Roads Scholar Program Level 1 — Technical skills required course.
▲L2 = KS Roads 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 Roads Scholar Program Level 3 — Master Roads Scholar required course.
▲L3-e = KS Roads Scholar Program Level 3 — Master Roads Scholar elective course.

Kansas LTAP Now Producing Webinars
To help more local agencies obtain training, Kansas LTAP is now producing free webinars on administrative topics, accessible from a computer anytime, anywhere.
Go to http://www.ksltap.org under “What’s New.” Just click on the webinar’s name to access the content. Posted webinars, to date, include KDOT Local/State Project Coordination Part 1; KDOT Local/State Project Coordination Part 2 (with three separate modules on project development, bridge inspection, and bridge design); and Introduction to Acquiring Right of Way in Kansas. All feature presenters from Kansas.
FREE ROAD & BRIDGE RESOURCES

Check off your selections, fill in the bottom portion, and return this form to:
Kansas LTAP Materials Request, 1536 W. 15th St., M2SEC Building, Room G520, Lawrence, Kansas 66045 or fax to 785/864-3199

GUIDES & VIDEOS
You are free to keep hard copies. Or you can download at the links provided.

Alternative Intersections Videos
Description on page 14. View at https://www.youtube.com/playlist?list=PL5_sm9g9d4T0VisDAyJpyQDTM1BuqUUjA

Traffic Safety Facts: Rural/Urbain Comparison

Maintaining Traffic Sign Retroreflectivity

High Friction Surface Treatment Starting to Take Hold on the Local System

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

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 in a case.

REQUEST FORM

Name ____________________________________________ Phone number ________________________________

Position ________________________________ E-mail address ____________________________________________

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*For requests outside the United States: After receiving your request, we will notify you of the postage cost and will send materials after receiving payment for postage.
Let us help you find the answers to your transportation-related questions.

The Kansas Local Technical Assistance Program (LTAP) is an educational, technology transfer and service program of the Kansas University Transportation Center (KUTC). 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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