Some Kansas counties are experiencing significant growth due to either urban encroachment or, near Junction City, expansion of Fort Riley. Development in rural areas can lead to several problems, most based on an increased use of existing resources like sewer, water, and roadways; or problems can stem from a lack of these facilities.

Douglas County is one such county facing the challenge of rural development, and officials there have looked to rural road access management as a way to address roadway safety concerns.

Douglas County and access mgmt.

Keith Browning, Douglas County Engineer, explained what kinds of concerns led to the development of an access management policy for that county.

“The purpose is to enhance the safety along roadways. Whenever you have uncontrolled access, which is one extreme of the spectrum, it impacts both the thru-traffic on the roadways and the people pulling out onto those roadways,” Browning said. “The more people you have on the road, the greater the likelihood of a collision.”

Browning explained that safety becomes even more of a concern when dealing with rural roads because of the higher speeds involved. Subdivisions can also affect rural roads simply by causing an increase in traffic, which may exceed the built traffic capacity of those roads.

All of these reasons led to the creation of Douglas County’s access management policy.

“It has been quite a process; we actually started in the fall of 2004,” Browning said. “Since then we have sent different proposals to both the Board of County Commissioners and the Planning Commission—as of right now, they are also trying to approve new regulations for subdivisions, and are considering some of the items in those regulations. But I would say passage is imminent.”

The reason behind passing both the subdivision and access management regulations simultaneously involves the direct connection between the two; nearly any access management policy involving developments can benefit from appropriate subdivision regulations, and visa versa. Most commonly subdivision regulations include:

- A conceptual review of the site plan, which allows for problems to be identified and dealt with before actual work begins, saving both time and money.
- A policy for “reverse frontage,” referring to the design of lots so that houses along the major roadway face away from that roadway, and face towards an interior road from the driveway.

continued on page 2 ➤
Access management, continued from page 1

- Regulation of minor subdivisions and lot splits, ensuring that no potential problems arise from having two many residences on a single lot.
- Promoting a continuance and extension of the existing local street system, helping to reduce the traffic demand on major roadways.
- Limiting the size of a planned cul-de-sac, which (if too large) can increase traffic congestion because of the limited access for residents.

TRB’s Access Management Manual

“When we started, I did a lot of studying, and the Transportation Research Board (TRB) has sources that were really helpful, specifically the Access Management Manual,” Browning said. “What I noticed, though, was that this wasn’t a cookie-cutter situation...they gave lots of examples, but they were all different.


So each county or city or organization has to make it right for their community and situation, because each is going to be completely different.”

Browning said that there were several sections of the Manual that proved especially useful: Chapter 4—Local and Regional Programs, Chapter 8—Access Location, Chapter 9—Access Spacing, and Appendix B with local examples.

The chapter on local and regional programs contains general information about starting an access management program—and how to both develop a plan and then implement it through the various channels involved. Also included are an evaluation checklist and sample policies.

The integration of roadways, driveways, and the site layout is the main purpose of the section on access location. Developing certain regulations regarding sight distance, for example, can allow for greater safety in traffic flow. This chapter also explains the “access window”—meaning the correct engineering approach to finding where access to a location can best be located.

When discussing access spacing, considerations for signal spacing are mentioned. Too-close signal spacing can affect traffic by causing frequent stops, delays, an increase in fuel consumption and vehicle emissions, and higher crash rates. The chapter also includes information about street spacing and unsignalized access spacing, with real-life examples to further support the ideas.

Appendix B provides a thorough examination of the efforts of two cities (Austin, TX and Orlando, FL) and three counties (Licking County, OH, Washington County, OR, and Waushara County, WI) to develop and implement access management plans. However, Browning did not find the examples fit well with the conditions in Douglas County.

“None of the real life scenarios were extremely useful, other than to indicate that there is no “cookie cutter” solution,” Browning said. “I think, ultimately, the lesson is that an agency’s access management regulations must make sense for their roads and development patterns—and the regulations should be based on sound engineering principles.”

One aspect of access management that was stressed in the manual, according to Browning, was the handling of existing situations that will not comply with any new regulations being implemented.

“The manual makes it clear that new regulations should not be formulated to fit existing access situations,” Browning said. “It is to establish regulations for redevelopment or road reconstruction, so that over time the regulations serve to preserve road corridors. This concept was very valuable in dealing with our Board of County Commissions to establish new regulations.”

Though the Access Management Manual proved to be an important resource, Browning also used KDOT’s Corridor Management Policy, along with Johnson County’s CARNP Report and the T2025 (long range transportation planning) report by LSA Associates for Lawrence/ Douglas County, all of which allowed him to further understand the situation. He said that these sources also enabled him to think about specific ideas for achieving access management, such as minimum spacing requirements.

“The big difference between KDOT’s criteria and our proposed regulations is that KDOT has a minimum spacing requirement for entrances,” Browning said. “We’re proposing minimum frontage requirement as opposed to absolute entrance spacing requirements. We felt that in rural areas there will be many situations when it actually improves safety to have entrances closer together, to take advantage of favorable sight distance, for example. By establishing minimum property frontage requirements, we limit the total number of entrances onto roads even if some of the entrances are spaced closer than might be allowable under KDOT’s regulations.”

“I think we came up with something very suitable for our county, and it will make the roads much safer in the future,” Browning said.

Sources:


How ’bout those roundabouts?

... by Kelly Heavey. . . . . . . . . . . . . .

Roundabouts have their naysayers—especially among citizens who don’t want to slow down(!), but that’s what roundabouts are designed to do, for safety’s sake. Read on about how they work and how they compare (favorably) with the cost of installing a traffic light.

What’s a roundabout?
A modern roundabout has three main traffic-controls, each with its own benefit: yield at entry (gives traffic in the circle the right-of-way), deflection of traffic (causes low speeds), and flare (provides increased capacity). It measures 70-160 ft.

What’s NOT a roundabout?
People often confuse traffic circles with roundabouts. Unlike roundabouts, traffic circles require stops before entry, sometimes provide parking around the circle, and have a much larger diameter of 300 to 400 ft. to enable higher speeds.


Considerations
When thinking about installing a roundabout in place of a traffic light, consider these beneficial factors.

Safety. There are 32 conflict points in a single-lane intersection. If a roundabout is installed instead of a traffic light, that number drops to eight conflict points—a 75 percent drop in accident risk! (See diagram on next page.) The curvature of the roundabout reduces speeds, which provides drivers with more time to make decisions and makes impacts less forceful. Pedestrians are also better protected with reduced speeds. The space in the splitter islands between entrances allows them time to pause while crossing the street.

Low cost. Forget the poles and cables. Don’t worry about the timers. Roundabouts don’t require anything of the electrical kind, besides streetlights. This means no confusion about which drivers have the right-of-way in power outages at these intersections, and no costs for bulb replacements or other electrical problems.

The average cost of a traffic light in an intersection is $120,000 to $250,000, but hefty electric and maintenance costs will follow. Construction costs of roundabouts vary greatly, but the average cost for a single-lane roundabout is around

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Mini-Roundabout</th>
<th>Urban Compact</th>
<th>Urban Single-Lane</th>
<th>Urban Double-Lane</th>
<th>Rural Single-Lane</th>
<th>Rural Double-Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended maximum entry design speed</td>
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<td>30 mph</td>
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<tr>
<td>Maximum number of entering lanes per approach</td>
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<td>1</td>
<td>1</td>
<td>2</td>
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<td>2</td>
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<tr>
<td>Typical inscribed circle diameter</td>
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<td>80 to 100 ft</td>
<td>100 to 130 ft</td>
<td>150 to 180 ft</td>
<td>115 to 130 ft</td>
<td>180 to 200 ft</td>
</tr>
<tr>
<td>Splitter island Treatment</td>
<td>Raised if possible, crosswalk cut if raised</td>
<td>Raised, with crosswalk cut</td>
<td>Raised, with crosswalk cut</td>
<td>Raised, with extended, with crosswalk cut</td>
<td>Raised and extended, with crosswalk cut</td>
<td></td>
</tr>
<tr>
<td>Typical daily service volumes on 4-leg roundabout (veh/day)</td>
<td>10,000</td>
<td>15,000</td>
<td>20,000</td>
<td>Refer to Chapter 4* procedures</td>
<td>20,000</td>
<td>Refer to Chapter 4* procedures</td>
</tr>
</tbody>
</table>

*Adapted from Roundabouts: An Informational Guide, Chapter 1, US DOT, June 2000. Assumes 90 degree entries; 4 or fewer legs.
Roundabouts, continued from page 3

$250,000, not counting the land acquisition. The maintenance costs to follow are considerably less than traffic lights since electricity is not a factor.

Other benefits. Install a roundabout and you’re helping the environment. Because of the continuous traffic flow in roundabouts, less pollution is emitted than with the stopping and accelerating at traffic lights. It also provides for greater traffic capacity: Having a continuous flow of traffic allows more cars in the circle at once. U-turns are much easier in the curves, and the islands allow for aesthetic creativity in landscaping.

Roundabouts are a way to turn a hectic intersection into smooth sailing for drivers. By providing more safety and time, they might just be a perfect fit for your roads. For examples of Kansas roundabouts and their effects, refer to our Fall 2004 article, “Roundabouts in Kansas: Are they really safer?,” found under newsletters at www.kutc.ku.edu.

Sources:


Roundabouts, continued from page 3

Intersection motor vehicle conflict points: conventional and roundabout intersections


Liability concerns about road safety audits and reviews: Are they founded?

. . . Adapted from Baystate Roads Technotes, #41, 2006, a publication of the Massachusetts LTAP . . . .

Road safety audits (RSAs) are a proactive approach to improving transportation safety. An RSA is an examination of a future or existing roadway in which an independent, qualified audit team reports on safety issues. Conducting an RSA is a way for your agency to improve safety and communicate to the public how your agency is taking the initiative to reduce crashes.

The step-by-step procedure of an RSA can be performed during any or all stages of a new project, including planning, preliminary design, detailed design, traffic control planning, construction, pre-opening, and on existing roads.

For an existing road, the RSA is effectively a review or assessment and is referred to here as a road safety audit review (RSAR).

RSAs have been used successfully worldwide for a number of years and they are starting to catch on in the United States. Worldwide, the RSA concept has proven to be highly effective in identifying and reducing the crash potential of roadway projects.

Although concerns have been raised that the use of road safety audits would increase an agency’s liability, in fact, just the opposite is true. Implementing a plan to reduce the crash potential and improve the safety performance of a roadway is actually a proactive approach to safety and can be used to defend against tort liability claims. This is particularly true of RSAs performed in the early stages of a project.

Identifying and documenting safety issues on an existing roadway is not an admission of guilt. Rather, it is the first step in a process designed to improve safety. Proper documentation, communication and logical prioritization of an agency’s plan to address safety issues would be difficult to fault.

Road safety audits, adaptable to local needs and conditions, are a pow-
erful tool for state and local agencies to enhance the state of safety practices. The value of the RSA process in identifying roadway safety issues makes it an important component of any agency’s safety strategy.

Most State DOTs have established traditional safety review processes through their high hazard identification and correction programs. However, an RSA and a traditional safety review are different processes. It is important to understand the difference between road safety reviews that are commonly performed and newer RSAs as described in this article. The FHWA is working with State and local jurisdictions to integrate Road Safety Audits into the project development process for new roads and intersections, and also encourage RSAs be conducted on existing roads and intersections.

**Agency concerns about RSAs**

Local agencies may have the following concerns about potential drawbacks of conducting RSAs.

- **Project development delay.** Delay for new projects is minimal. The audit process can be worked into the regular development process. From start-up to submission of the final report, a standard road safety audit requires about 1-3 weeks to complete.

- **Increased project costs.** RSA team proposals should be kept in context with the project scope and focus primarily on low-cost improvements. Any significant cost changes can be discussed with project managers prior to issuance of the final report. It is up to project managers to select or defer any changes. It is generally less costly to make needed changes in project plans than to modify a new improvement after construction is completed.

- **Potential increased liability exposure.** A properly conducted and documented RSA should not result in additional liability exposure for an agency. In fact RSAs may actually reduce potential tort claim exposure by demonstrating a proactive approach to safety. However, managers may want to discuss liability implications with agency attorneys before undertaking an RSA.

- **Identifying and documenting safety issues on a road is not an admission of guilt.** Rather, this initiative is part of a management process to improve safety within a jurisdiction. Priorities can be established and a timeline developed to implement improvements. Using accepted risk management techniques, safety concerns can be prioritized and addressed as funding becomes available.

**Road Safety Audit Reviews (or “Assessments”)**

- **A safety review uses a small (1-2 person) team with design expertise.**
- **Safety review team members are usually involved in designing solutions.**
- **Field reviews are usually not part of safety reviews.**
- **Safety reviews concentrate on evaluating designs based on compliance with standards.**
- **Safety reviews do not normally consider human factors issues, i.e. driver error, visibility issues, etc.**
- **Safety reviews focus on the needs of roadway users.**
- **Safety reviews are reactive. Hazardous locations are identified through analysis of crash statistics or observations.**

**Roadway Safety Audits**

- **A safety audit uses a larger (3-5 person) interdisciplinary team.**
- **Safety audit team members are usually independent of the project.**
- **A field review is a necessary component of the safety audit.**
- **Checklists and field reviews help to examine all design features.**
- **Safety audits are comprehensive and attempt to consider all factors that may contribute to a crash.**
- **Safety audits consider the needs of pedestrians, cyclists, and drivers of large trucks, as well as automobile drivers.**
- **Safety audits are proactive and look at locations prior to the development of crash patterns to correct hazards before they happen.**

**Resources**

For more detailed information on how to conduct an RSA, visit FHWA’s [http://www.roadsafetyaudits.org](http://www.roadsafetyaudits.org). This Road Safety Audits Web site was developed by the Institute of Transportation Engineers (ITE) in cooperation with the Federal Highway Administration (FHWA) in the interest of information exchange. The site provides an easy way to access a variety of resources including the benefits of conducting road safety audits and reviews and incorporating them into safety programs, the legal considerations and implications of RSAs, how to conduct road safety audits, and links to various RSA resources.

FHWA also offers a new, free Peer-to-Peer program for state and local agencies either considering or currently conducting RSAs. Contact the Road Safety Audit Peer-to-Peer Program at: (866) P2P-FHWA or email SafetyP2P@fhwa.dot.gov.

Kansas LTAP will be offering courses in roadway safety fundamentals this coming Spring and will offer a follow-up course reviewing some case studies later in 2007. Look for more information on those courses in the mail as details are available.

Thanks to Louisa Ward, FHWA RSA Program Manager, and Tom McDonald, PE and Safety Circuit Rider for the Iowa LTAP Center, for assisting in preparing this article.
While most people understand that the FHWA works with state organizations like KDOT, many might not know the specific responsibilities of safety-related positions within FHWA's division offices. In the case of Safety/Traffic Engineer David LaRoche, those responsibilities are closely tied with local road agencies.

LaRoche has been with FHWA-Kansas since 1989, and has held the Safety/Traffic Engineer position for the past two years. His position is similar to that of Bob Alva, ITS/Safety Engineer, though there are some significant differences. Alva is more involved with current and developing technology, and working with urban areas to implement that technology.

### Safety campaigns and safety certifications

Of course, LaRoche mainly focuses on several different aspects of safety, and this includes assisting in federally-funded safety campaigns managed by KDOT:

“Most often I serve on advisory committees,” LaRoche said, “and I’m there to put forth the federal perspective on whatever issue is being discussed. We partner with KDOT to advance our safety strategies, and at the same time assure that their needs are being met.”

LaRoche also explained his role in the safety certifications process, an area of importance in terms of funding for the state.

“The state provides information on compliance with federal regulations, and we review it,” LaRoche said, “so, for example, with the .08 law, that was a basic ‘yes they have it’ or ‘no they don’t.’ ”

However, that process has changed because of a different strategy being used by federal lawmakers. In past years, the consequence of not having a certain law in place would most likely be a loss in funding, meaning states had to abide by the rules or lose money. The current strategy being used is based on incentives, providing an opportunity for states to “ earn” the money if laws are put into place. LaRoche said that the switch was designed to make for a positive result, rather than a negative one.

“A great example of this ‘incentive’ policy is the primary seat belt law,” LaRoche said. “Kansas could earn about $11 million if a law were put in place. However, the state legislature has not enacted a law and maintains their support for individual’s rights, a relevant concern to Kansans. We have the information that the societal costs are just too great (to not pass the law), and that it could save about 50 lives a year simply because people will follow the law.

“Currently, because there isn’t a law in Kansas, there isn’t that money coming in. It’s a big incentive for a state to get that kind of money to use to meet the comprehensive safety program. The $11 million sure would help.”

According to LaRoche, other incentives focus on intoxicated drivers, and are based on fatalities per vehicle miles traveled. If a state can get the rate below a certain threshold, then the state will qualify for funding and their “share of the pot.” LaRoche said that Kansas has been progressive and qualified for this incentive last year.

### Roadside design & hardware

LaRoche’s other basic safety responsibilities include monitoring the development and use of roadside safety design and hardware. For example, when there is an obstacle near a roadway and it is not possible to remove the obstacle, sometimes that obstacle can be effectively shielded behind a guardrail—and those guardrails need to measure up to certain crash test standards; they must be FHWA NCHRP 350 compliant. LaRoche has similar responsibilities regarding work zone safety.

“When a road is under construction, there are additional safety criteria that have to be followed,” LaRoche said. “In fact, there is a whole additional compliance list for any equipment involved in the road work process, from safety signs to the actual tools used.”

### MUTCD wording & compliance

LaRoche’s safety focus extends to all roads, under construction or not, when he works with the Manual on Uniform Traffic Control Devices (MUTCD), which he describes as “essentially the Bible for all striping, signing, etc.”

“The FHWA maintains and approves the MUTCD as the National Standard, so I’m involved in the rule-making process that provides public notice to changes in the MUTCD,” LaRoche said. “We work with KDOT to interpret the rules, noting that .08 law is the enforcement of a drunk-driving charge when the driver’s blood alcohol level is at .08 or above.
and how to implement them. KDOT has appropriate internal procedures to implement the rules, and we partner with them to provide any clarification on the issues.”

The rules contained within the MUTCD concern topics like appropriate levels of sign retroreflectivity, which makes the signs visible at night, as well as promoting new sign lettering designs like “clearview” fonts and bigger signs where necessary. LaRoche said that a particular area of focus is in making sure that the roads are safer for older drivers, which is even more important in an area with an aging population. He pointed to the recent implementation of six-inch edge lines throughout the state as a good example of how safety can and should be improved for older drivers. LaRoche’s job, then, is to disseminate best practices.

“While most of our work is with KDOT, we also interact with various technical groups, like the Kansas Association of Uniform Traffic Control,” LaRoche said. “I’ll give the federal update at their meetings providing the latest information at the national level—basically just reach out and inform any interested party.”

SAFETEA-LU and Kansas
LaRoche has also been heavily involved in explaining the effects that the new federal SAFETEA-LU transportation bill will have on nearly every transportation organization throughout the country.

“SAFETEA-LU elevated the safety program to a core program instead of just specific funding. Now it’s a whole new program,” LaRoche said. “States now need to meet certain requirements by October 1, 2007 or face loss of funds; funding will be held to the 2007 level if the requirements aren’t met.”

Specifically, SAFETEA-LU changed the Highway Safety Improvement Program (HSIP), previously just one part of the larger, core Surface Transportation Program, into a stand-alone program. The HSIP focuses on roads and intersections with poor safety and on the options to make improvements, including roundabouts, improving the geometrics of the intersection, and any other solutions available. SAFETEA-LU also created two new programs: the Safe Routes to School (SRTS) program, and the Interstate Maintenance Program.

“What Do You Mean, “Core Program”?"

The HSIP being referred to as a new “core program” means that the HSIP will have separate funding, unlike the old HSIP, which was funded indirectly through several specific safety programs (Hazard Elimination Program, Highway-Rail Grade Crossings Program). Now the HSIP will include hazard elimination, as well as other types of highway safety improvement. Other “core” programs include the National Highway System, Surface Transportation Program (STP), and the Interstate Maintenance Program.

“Now the HSIP has its own funding, which though it may not be as much as the STP gets, is still significantly more than before,” LaRoche said. In fact, the funding now available nationally for HSIP will be double what was made available to the program under TEA-21, from $662 million per year to an average of $1.265 billion per year over the next four years.

Each state is apportioned a part of the HSIP funding based on a formula using lane miles, vehicle miles on Federal-aid highways, and fatalities on Federal-aid roadways within that state. Each state is also required to develop a Strategic Highway Safety Plan (SHSP) based on accident data, and aimed at identifying and improving on the most immediate safety needs. This also means the new HSIP will not provide “dedicated” Obligation Authority, but can be used at each state’s discretion for any program with sufficient unobligated contract authority.

Bob Alva, FHWA ITS/Safety Engineer, said that the Kansas SHSP was received and approved by FHWA-Kansas on October 18, 2006. Alva said the SHSP will serve as a “guiding force” for the stand-alone HSIP, meaning that to qualify for HSIP funding, a potential project must be described in the Kansas SHSP and correct or improve a hazardous road location or feature, or address a highway safety problem. Any public road or public pathway or trail is eligible.

Another change in the new HSIP will be the sub-allocation of funds for the High Risk Rural Roads program. Funds for construction and operational improvements involving high-risk rural roads and rail-highway crossings will now be subject to a “set-aside” from a state’s HSIP funding, meaning that those funds cannot be used in other HSIP projects.

After states are apportioned funds, they have that fiscal year plus three fiscal years to obligate those funds before they lapse. Funds being apportioned in FY 2006 would lapse in September of 2009, from FY 2007 to September 2010, and so on.

Sources:


and the High Risk Rural Roads Program (HRRRP).

“We are working to implement state procedures of the Safe Routes to School program regarding grant applications, draft guidelines and the required hiring of an SRTS coordinator,” LaRoche said. “Basically this program is for local school districts, primarily K-8, to promote walking and biking to school safely.”

“The High Risk Rural Roads is a set-aside of the HSIP targeting rural roads,” he added. “The program is for roads with crash rates higher than the statewide average, and we want to target the most severe needs first.”

The HRRRP has tremendous potential to assist local governments with safety problems, especially in a state with as many rural roads as Kansas. LaRoche said that it may take time before the program is completely functioning.

“Being a new program, we need new procedures, and right now we’re in the process of drafting those procedures,” LaRoche said. “With this program, it’s not a situation of entitlement where all of the everyone get their piece of the pie. Instead, this is meant to target certain areas of safety concern, specifically fatalities and injuries. So how we select the projects, and what priority is given to them, is where those procedures come into play.”

**Bicyclist and pedestrian safety**

LaRoche, who describes himself as an avid bicyclist, also has his hand in several projects being developed for cyclists and pedestrians. This includes the MetroGreen project under development by the Kansas City MARC Metro, a proposal for over 1,100 miles of interconnected trails and open space that will link seven counties in the Kansas City metro area.

“The MetroGreen is probably the most comprehensive plan that we are working on right now, so I work with the Bike/Pedestrian committee and others and serve in an advisory capacity, informing them about federal perspective, funding issues, and safety concerns,” LaRoche said. “Safety always becomes an issue when dealing with facilities that promote health and mobility, because you want those using it to feel safe.”

LaRoche is also concerned with any project where pedestrian/vehicle interaction is a factor.

“In urban areas, obviously accessibility should be part of any development,” LaRoche said. “If it’s a federal project, then we can make sure that those types of concerns are addressed for the entire development—buildings, sidewalks, walkways. With private developers, we can’t force anything, but we can certainly encourage it.”

He explained that because most developments are usually planned without any direct involvement from FHWA, issues can arise that could otherwise be avoided.

Overall, however, LaRoche said that pedestrian safety and accessibility were important concerns, simply because of what it means for the future. “Promoting alternative forms of transportation like walking and biking means that we develop a harmonious transportation system that incorporates all modes,” LaRoche said.

**Data and local agencies**

One of the primary responsibilities for LaRoche involves collecting and analyzing data from different sources around the state, including emergency services, law enforcement, and local organizations. This data can then be used for future and even immediate planning by different organizations.

“The data is what makes it all go around,” LaRoche said. “Crash and roadway data can be very useful in identifying areas of concern on the state and local roadways. Driver, citation/adjudication, injury surveillance and vehicle data can be very effective in helping us direct resources to appropriate safety programs. In this data, then, we can look for areas of concern and develop countermeasures...[for example] we might use citation data to help law enforcement, and they can use it to focus resources. Also, there is money available in the form of grants for states that have developed traffic records strategic plans to better utilize data, and KDOT has a plan like this in place so they can apply for those grants.”

LaRoche wants to make sure agencies and citizens know the purpose of both his position and FHWA-Kansas. “We want local agencies to know that we partner with KDOT and are a resource to local agencies as well,” he said. “We want to promote low-cost safety. Anything we can do to help improve safety and reduce crashes is our highest priority.”

LaRoche can be reached at David.LaRoche@fhwa.dot.gov or (785) 271-2448 ext. 210.

**NCHRP report focuses on local roads and safety**

.... by Kelly Heavey. ..........

In 2005, 71.9 percent of accident fatalities occurred in rural areas. The National Cooperative Highway Research Program’s (NCHRP) Synthesis 321, Roadway Safety Tools for Local Agencies, gives suggestions to city, county and township road departments to help them choose and develop safety programs fit for urban or rural areas. The study describes two main types of tools to consider using when evaluating roadways: reactive and proactive.
The reactive approach involves the evaluation of crash data on local networks to establish if and where safety improvements are needed. By displaying data from crash forms using a geographic information system or on a simple map with pins, you can determine if there are patterns of similar crashes in a specific location, which is a cue to put a safety tool in place. Crash evaluations are based on several factors including number of crashes, crash density, crash rate, and number rate.

The proactive approach involves a Road Safety Audit Review (RSAR), which consists of a small team independent from the local agency performing an assessment of a specific roadway’s safety. The team writes a report prioritizing concerns, to share with the jurisdiction, and if needed, to use for applying for safety funding. (See page 4 for more information on RSARs.)

### What is the NCHRP?

The National Cooperative Highway Research Program was founded in 1952 to conduct studies in problem areas affecting nationwide highway planning, design, construction, operation, and maintenance. It is administered by the Transportation Research Board (TRB) and is in cooperation with the Federal Highway Administration (FHWA).

NCHRP is solely funded from states’ voluntary donations, which are taken from Federal-Aid highway distributions. Studies are chosen through a seven-month application and ranking process. NCHRP has publications in the form of reports, legal research digests, and Web documents on projects including snow and ice control, finance, roadside development, and safety. Go to [http://www.national-academies.org](http://www.national-academies.org).

### Safety countermeasures

Several countermeasures to improve safety are outlined in the report. Here are a few:

- **Speed humps.** Not to be confused with speed bumps, speed humps are raised areas in roadways that spread across the street. (The closely related speed bump is used only in private drives and parking lots.) The study explains that speed humps can be installed in residential areas to slow traffic, decrease traffic volume, and reduce accidents. A New York DOT study recently found that speed humps significantly reduce noise in residential areas, and an Oakland, California research team discovered that neighborhoods with speed humps cut the chance of child fatalities by 40-47 percent. If pairs are used, they should be installed no more than 100 ft. apart to ensure a driver doesn’t accelerate between them, creating noise and a potential safety hazard.

- **4-way stops.** Add stop signs, add safety. When properly located, 4-way stops increase safety for drivers by slowing the flow in heavy traffic areas. Installation must meet the requirements of the Manual on Uniform Traffic Control Devices (MUTCD).

- Any of the following warrants a 4-way stop sign installation:
  - Where a traffic signal is warranted, a four-way stop can be installed quickly to control traffic until the proper signal is installed.
  - The occurrence within a 12-month period of five or more reported accidents, such as turn collisions or right-angle collisions.
  - Total vehicular volume entering the intersection from all approaches must average 500 vehicles per hour for any eight hours of an average day, and the combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same eight hours.

  **Work zone mgmt.** Organizing construction areas into distinct zones takes into account different safety and communication considerations in those areas. The NCHRP recommends organizing construction zones into three areas as follows:

  - **Transition Area**—begins to move traffic from its normal area
  - **Buffer Space**—provides protection for traffic and workers
  - **Work Area Termination Area**—directs drivers to resume normal driving.

NCHRP’s Roadway Safety Tools for Local Agencies offers many ways to prevent accidents, but the decision ultimately rests in a local department’s hands. And while the study suggests many ways for a road department to prevent roadway accidents, it also encourages departments to raise citizen awareness of a driver’s role in safety. [The Kansas Department of Transportation reports that in the top contributing circumstances to an accident were rushed driving habits and inadequate attention to the road.]

The overriding message of this NCHRP report is that safety practices should be tailored to the problems and resources of an agency and that there is no one-size-fits-all safety solution.

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Making your mark: Which pavement marking material suits your needs?

by Laura Snyder

Pavement marking can dramatically increase safety on local roads. But with almost a dozen different marking materials on the market, figuring out which one will work best for a particular project and be cost-effective can be a chore. So we talked to Bob Hanson of Ennis Paint and Richard Schwartz, chief chemist for KDOT, and compiled some information about the most common marking materials and their functions and cost.

Oil-based paints
There has been some controversy surrounding oil-based paints, and while the Environmental Protection Agency (EPA) recommends against them, some agencies still use them. However, one type of oil paint, Acetone-based paint, is environmentally friendly and now more commonly used than the older oil-based paint. Acetone-based paint is a low VOC-compliant paint, which means the level of volatile organic compound is 150 grams or less per liter. While some Acetone-based paints contain lead, Hanson said there are no longer any environmental concerns because the lead is now encapsulated, which means it can’t leak into the environment.

Hanson said oil-based paints can last up to six months, depending on the volume of traffic. One benefit of oil-based paints is that you can paint in cooler weather, as low as 35 degrees Fahrenheit. However, oil-based paints are difficult to clean out of the machines that do the striping and marking. Hanson said high solvents work best for this, but they aren’t favored by the EPA. Low solvents are more environmentally friendly, but don’t do as good of a job. Oil-based paint costs around $10 per gallon, but that increases with the price of oil, says Hanson, so you could end up paying $0.12 to $0.30 per foot.

Water-born paints
Water-born paint is becoming a favorite marking material because of its durability, reasonable cost, and easy clean-up. Although oil-based paint used to be preferred over water-born, Hanson said a type of resin is now used in the paint to thicken it, which makes it last two to three years. A gallon costs about $7.50 and yields about 240 to 300 feet of a four-inch line, or about 17 gallons per mile, according to Hanson. High build paint, a type of water-born paint, uses a different kind of resin and costs about $9.25 per gallon. Because it goes on thicker, it takes about 22 to 25 gallons per mile, says Hanson. High build paint is also used by KDOT to stripe highways.

Cold plastic tape
Cold plastic tape is rarely used anymore except for areas like crosswalks, says Schwartz. While it’s very durable—it lasts five to seven years—it’s also expensive. A four-inch-wide line costs $3 per foot.

Thermo plastic
Thermo plastic is made by melting a solid material that hardens when it hits the pavement. Thermo plastic also lasts five to seven years, but it is so thick that sometimes snowplows accidentally remove it. It costs about $0.48 per foot, and is intended primarily to go on new asphalt, says Hanson. “That’s about the best product to install on new asphalt,” he says. “There’s nothing better than that.”

Epoxy
Hanson says epoxy is basically a glue, made by mixing a resin with a hardener that solidifies as it hits the pavement. It bonds well to concrete and is often used on highways. KDOT sometimes uses it on asphalt because it’s cheaper than thermo plastic. Per gallon, the cost is about $25, but Hanson says agencies generally get a price break when they buy more. It takes about 17 gallons per mile when striping a four-inch-wide line, costing about $0.25 to $0.35 per foot. Epoxy can last two to four years depending on the volume of traffic.

Poly urea and modified urethane
These two marking materials are considered a step above the standard epoxy. Like epoxies, they are made by mixing two parts resin with one part catalyst, but they are UV-stable, meaning the sun won’t bleach them. Poly urea and modified urethane are both more expensive than other epoxies, with poly urea costing about $0.80 to $1.25 per foot and modified urethane costing $0.50 to $0.65 per foot. However, they last longer, usually between four and five years.

Note: Local governments can get KDOT prices on some pavement marking materials through the Kansas Division of Purchases Procurement Contract List. Visit http://da.state.ks.us/purch/contracts/contract.asp.

For more information on different types of marking materials, contact Bob Hanson, Ennis Paint, at (913) 209-4051 or bob@ennispaint.net.
New Web portal to improve bridge inspection process and information

... by Jacob Bustad ...

Technology has proved to be a valuable resource in efforts to make the transfer of information easier and more efficient. KDOT’s Bureau of Local Projects is currently developing a high tech strategy for how it receives bridge inspection data from local road agencies. A new Web portal, developed by KDOT staff including BLP Bridge Inspection Engineer John Gough, is nearing completion that will improve both the process and quality of the inspection reports. The portal will be accessed through the KDOT Web site (www.ksdot.org).

“The development of the portal was a team effort,” said Gough. “I have very much appreciated the efforts of all of the contributing parties, because I needed lots of help.”

Why A Web portal?

“The cities and counties report inspections to the state for reporting to the federal government, so this portal will be a vehicle to get that information to the federal government,” Gough said. “The federal government charges us with improving the quality of both the process and the information, so this is our way to do that. Obviously, they felt like problems were occurring in the process so this is how we hope to solve those problems.”

Gough said that the problems stemmed from inconsistencies in the data and how the data was reported. Such problems are present in bridge data throughout the country. For example, a county might report a bridge as being located over a railroad track and also having scour problems. “It’s hard to tell what the situation really is with that bridge,” said Gough. “Is it over a railroad or over water?” Inconsistent data results in incorrect reporting on the condition of the state’s bridges.

Gough said that such mistakes are easy to make because some of the codes look similar and the reporting tool is complicated. The Web portal will address this problem with the use of a built-in software algorithm that will automatically detect inconsistencies as they are entered, and alert the user so the problem can be fixed. “A dialog box will appear that will say something like ‘this item and that item are not compatible’,“ said Gough.

The new portal will allow local road agencies to submit their inspection reports electronically—a significant change in the current process—and will also allow for that information to be automatically compiled and more accessible to local governments.

“Primarily, it will make the knowledge available to county commissioners and city councils to give to their staff and let them get the most bang for their buck,” Gough explained. “Right now, the data is in a little black box in a computer so this will open that information up for them so they know what it all means.”

According to Gough, at least one other state has planned development of a similar portal, and he expects other states interested in the software algorithm to discuss their plans with KDOT.

Help needed to test the site

Gough is looking for a few more local road agencies interested in helping test the portal. Those interested can contact Gough at (785) 296-0416 or Gough@ksdot.org.

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A Leg Up

How to improve pedestrian safety?

Let PEDSAFE count the ways (almost 50 of them).

... by Jake Bustad...

From the biggest cities to the smallest towns, every community's citizens have a basic desire for a comfortable place to live. Yet while developing these communities, the aspect of walking as a form of transportation can be given short shrift because of a strong focus on motor vehicles on roadways. But a new project sponsored by the FHWA is aimed directly at this situation: the PEDSAFE program, or Pedestrian Safety Guide and Countermeasure Selection System. The PEDSAFE Web site, (www.walkinginfo.org/pedsafe/), is intended to be a source for comprehensive information about improving the safety and mobility of pedestrians in any community, large or small.

Focus on streetscapes and walking

In the United States, walking and biking have commonly been overlooked in favor of faster methods of transportation, but many people are realizing that the pedestrian accessibility of a neighborhood can mean more than just getting around easier. In fact, PEDSAFE lists five reasons why a community's streets are vital to its strength and prosperity:

- Linkage—They connect parts of cities to each other, one town to another, and activities and places.
- Transportation—They provide the surface and structure for a variety of modes. All modes and users should be provided for: pedestrians, bicyclists, transit, motor vehicles, emergency services, maintenance services, etc.
- Access—They provide public access to destinations.
- Public right-of-way—Space for utilities and other underground infrastructure is usually a hidden function of the street.
- Sense of place—The street is a definable place, a place for people to interact, the heart of a community. A street can serve this role by being a venue for parties, fairs, parades, and community celebrations, or by simply being a place where neighbors stop to chat.

The Web site discusses how citizens factor in safety when considering whether to walk to a destination: “No matter how convenient the trip is otherwise, if pedestrians don’t feel safe for even a short distance, they will choose not to go, or to go by another mode (usually driving—and the more people who drive, the less pedestrian-friendly a place becomes).”

Another reason that accessibility is critical to a community is in the relationship to citizens with special transportation needs because of disabilities. The PEDSAFE site discusses how the safety of these pedestrians is especially important, because lack of safety can limit their mobility, which in turn can affect their participation in the community. The Americans with Disabilities Act (1990) ensured that citizens with disabilities have the same access to public spaces as all citizens, and the U.S. Access Board is currently developing further guidelines for improvements in this area. These improvements are included in the Public Rights-of-Way Guidelines, which will extend the ADA Accessibility Guidelines already in place. A draft version of these guidelines can be found at www.access-board.gov/rowdraft.htm.

How PEDSAFE Works

Aside from being a source of information, the PEDSAFE site also features a set of “tools” that can be used interactively. A PEDSAFE report issued in 2002 identified and evaluated nearly 50 options engineers can use to improve pedestrian safety and mobility. The PEDSAFE Web site makes this research interactive and therefore more accessible for both engineering professionals and interested citizens. This includes a group of case studies providing details about the problems and solutions used by states and municipalities from 20 states, as well as Canada and Switzerland. These case studies are grouped both by location and by “countermeasure group,” allowing the user to quickly narrow down a search. There are 49 documented countermeasures grouped into seven sections (roadway design, intersection design, signals and signs, and more).

An experienced traffic professional might use PEDSAFE to make sure no alternative has been left off a list of solutions to consider.
PEDSAFE’s selection tool outlines options

PEDSAFE was very easy to use and understand. You almost wouldn’t need to really understand much about pedestrian issues to use the tool. The information provided was simple—in other words, high level (macro) recommendations without the detail that many technical users would be looking for. Input of your problem is simple—you answer simple questions and click on choices provided. The software then provides possible solutions without detail.

A novice to pedestrian issues would benefit most from using PEDSAFE, as the solutions provided would serve as a springboard to more in-depth review of the possibilities. More experienced users would probably have most of the identified solutions already on their list to investigate.

Small governments would benefit the most from this tool as they typically would not have the expertise on staff to effectively list all possibilities to consider for specific issues or problems. However, I don’t know if they would get enough information to effect a solution without the aid of a consultant or other technical advisor.

This tool is not meant to provide the user with the best solution. It instead gives a number of solutions that the user can investigate to find which is the most practical for the specific situation. An experienced traffic professional might use PedSafe to make sure no alternative has been left off a list of solutions to consider.

As long as PEDSAFE is just a Web site away, it is something that anyone could put in their “tool box” for pedestrian projects/problems, although it does not go in to detailed solutions.

—Mark Borst, P.E., Traffic Engineer, Sedgwick County Public Works

Report on local road safety tools, continued from page 9

Emphasis is placed on safety tools that will give local agencies a practical and affordable toolbox, with a stronger safety program as the result.

NCHRP’s Synthesis 321, Roadway Safety Tools for Local Agencies is available from the Transportation Research Board for $20 in hard copy or you can download the PDF. Go to http://www.national-academies.org and type the report’s title into the Web site’s search engine to find the publication.

Sources:

- Accident Statistics 2005, Kansas Department of Transportation.
KDOT bridge portal, continued from page 11

Gough said that depending on the number of bridges that a Local Public Authority (LPA) has, any testing would likely take 16-20 hours spread over a month. Also, while real data will serve as the basis for testing, some unusual data might be used occasionally in order to try and find any potential problems. While this means that the testers will need to enter their actual data again at a later time, Gough said he appreciates the willingness to put in the extra time.

After testing, some refinements will be made.

“It will probably be another year before we have a functional operation. We could be up and running in 3 months, but there are bugs to get out and enhancements we want to build in that will take longer,” Gough said. Each LPA has a staggered schedule of when their reports are due, all coming in over a two-year period, which means that the portal may be ready for some LPAs and not for others.

Using the bridge data

“The reports we are building-in are above and beyond what is expected by the federal government. It will provide data that will help both KDOT and the local agencies make decisions,” Gough said.

However, this does not necessarily mean that the reports will have extra data. Instead, the benefit will be that this data will now be aggregated, which means that it can be sorted much easier.

“For example, you could sort the data to see how many bridges you have that were built between 1950-60, or 1960-70,” Gough said. “That will help you determine how many dollars are needed to take care of your bridges.”

Additional Portal features

Some of the enhancements, Gough said, include adding educational information and training schedules to the site. Inspection personnel qualifications will also be added and tracked, as that is another requirement of the federal government.

For more information on KDOT’s Bridge Inspection Web Portal, contact John Gough at (785) 296-0416.

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☒ Road Safety Audits
  FHWA and AASHTO, 2005. Provides basic information on Road Safety Audits (RSAs). Publication.

☒ Road Safety Audits Train the Trainer Course
  FHWA, 2005. Describes the Road Safety Audit Process and shows an audit conducted for a Native American tribal road system. On CD.

☒ Trenching and Tunneling Near Trees
  James Fazio. Publication intended for utility workers, written by an arborist.

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