Sometimes Old Bridges Can Be Strengthened!

By Neil Cable, P.E., C.F.M., Saline County Engineer

Grand Avenue Bridge

Grand Avenue was severed when the flood-protection levee system was constructed around the City of Salina in the late 1950s. Access to the dead-ended Grand Avenue was across a bridge built in the 1930s. The bridge has a single 50-ft span and has six rolled steel beams supporting a seven-inch thick, 26 ft concrete deck with concrete post-and-beam railings. The beams are non-composite with the concrete deck as was common at the time of its construction. The bridge has been load-posted since the 1970s.

The dead-ended portion of Grand Avenue is convenient to the interstate. Saline County was faced with a repair or replace decision on the Grand Avenue Bridge. Read how and why they made the decision to repair the bridge, and the solution they came up with, given significant constraints. Pictured above, some new beams arrive.

A ll of us who have the responsibility for providing safe and reliable transportation infrastructure live in fear of a bridge failure. Property damage from such an occurrence would be bad enough, but injuries or loss of lives (say a collapse under a school bus of children) is enough to wake us up in the middle of the night. So, faced with far too many old bridges, ever larger/heavier vehicle loads, and ever shrinking budgets, what are we to do?

As public servants, we have the responsibility to optimize all the resources—monetary and otherwise—available to us. Sometimes an old bridge can actually be an asset and part of the solution to the problem. This article will provide an example of that in Saline County.

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The dead-ended portion of Grand Avenue is convenient to the interstate.

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TO OUR READERS:

Kansas LTAP Newsletter Changing to Electronic

Starting with our Fall issue, we will be phasing out hard copies to most of our readers. You can link to the newsletter online and still get all the great content, but you need to sign up online for notification. See page 9 for details and be sure to sign up before September 1.
highways and downtown Salina and thus has proved attractive to industry over the 50-plus years since the levees were constructed. These industries are served by heavy truck traffic. In fact, one business leases heavy cranes from their facilities on Grand Avenue for construction projects throughout the country. Again, all of this heavy traffic must cross an 80-plus year-old bridge, a bridge whose designers could never have foreseen the magnitude of today’s vehicle loads.

So, over the years this rather obscure bridge arguably became one of the most, if not THE most critical bridge in Saline County in terms of consistent, daily, heavy traffic loads. Failure of this bridge would cause significant disruption of commerce because there is no other access to this area.

**Declining condition signaled need for repair or replacement**

Saline County has continually inspected the bridge since the inception of the National Bridge Inspection System Program. Its declining condition has been a cause of concern for a number of years, especially in light of the nature of the traffic it receives. This kept the bridge high on Saline County’s watch list. In 2013, significant changes in the condition of the underside of the deck were observed which prompted a review and reevaluation of the bridge’s load rating. The review made it abundantly clear that action was warranted, and the sooner the better.

**Replacement not feasible**

Alternatives to rehabilitation (e.g. constructing a new bridge or access road) proved unacceptable to one or both of the bridge owners (it is jointly owned by Saline County and the City of Salina) and/or to industries that were completely dependent on uninterrupted access across the bridge. Progress in resolving the matter was stymied for a couple of months. Nonetheless, the problem—an 80-plus year-old, load-posted bridge subject to heavy industrial traffic—did not go away. The primary concern for both parties was how to replace a bridge that provides the sole access to industries without severe disruption to those industries?

With no other options, strengthening the existing bridge became the default course of action.

**Design concerns in strengthening the bridge with rolled steel beams**

The possibility of inserting new steel beams between each pair of existing steel beams, thus reducing the concrete deck span and reducing the load on each of the beams, seemed like a worthy idea to pursue.

The primary design concerns were:

#1. How could the new beams be placed? After all, the distance between the abutments is necessarily shorter than the length of the new beams, thus resulting in a geometry problem in terms of how to insert the beams.

#2. If design concern #1 is overcome, how do we ensure that the old beams still are not carrying a disproportionate share of the load?

#3. The underside of the concrete deck is not perfectly flat. So, if design concerns #1 and #2 are overcome, how do you make the new beams carry load since it would be impossible to obtain full contact between the bottom surface...
of the deck and the top surface of the
top beam flange?

#4. If design concerns #s 1, 2 and 3
are overcome, then how to ensure that
the top flange has adequate bracing to
prevent lateral torsional buckling?

#5. Finally, if all the above design
conscerns are overcome, how do we do
all this while not disrupting the heavy
truck traffic which continues into the
evening and throughout the weekends?
Night work was not acceptable due
to noise considerations for adjacent
residences and the very-much increased
safety hazards of trying to do something
this involved in the dark.

Design solutions considered

The solutions to these design
concerns were:

The pavement approaches would
need to be saw-cut and the subgrade
removed behind the abutments at each
end of each proposed new beam. Holes
through the abutment back wall would
then need to be cut out that would
allow the beams to be slid beyond the
back wall on one end while the other
end of the beam is brought up. The
beam would then be slid back to bear
on the opposite abutment.

Feeling we had at least a feasible
solution to design concern #1,
we moved on to address #2. The
complication was that the new beams
had to be of a lower overall height than
the existing ones in order to provide
clearance between the bottom of
the concrete deck and the top of the
abutment in order to allow the beams to
be installed. The answer to this concern
was to find shallower steel beams having
a similar section modulus and moment
of inertia to the existing beams. Such
beams were found; however, the penalty
that had to be accepted was that the
new beams had to be heavier (and thus
more expensive) to obtain the desired
section properties.

Relatively comfortable that the new
beams could be installed and that
choosing the appropriate beams would
insure that they share the imposed
loads proportionately with the existing
beams, it was time to address design
concern #3; that is, how to ensure
uniform contact between the top
flanges of the beams and the irregular
underside of the existing concrete deck.
The answer was to place non-shrink
epoxy grout between the top flange of
the new beams and the underside of
the concrete deck. The only problem
was to figure out how to place the grout
in that narrow gap such that there
would be complete filling of the space
to ensure full contact. That led us to
design concern #4.

Headed steel studs would need
to be welded to the top flange of the
beams and embedded in the concrete
slab to ensure adequate bracing of the
top or compression flange of the new
steel beams. However, there was not
sufficient clearance between the bottom
of the concrete deck and the top of the
bearing elevation on the abutments to
weld the studs on before the beams were
placed. In addition, how would headed
studs on the new beam be embedded in
an already existing concrete slab?

The answer was to install the beams
without the headed studs on them,
then core-drill through the existing slab
and weld the studs on the top flange
of the beam through the core-drilled
holes. The holes would also serve the
purpose of providing ports for placing
the non-shrink grout uniformly in the
gap between the top surface of the
beam flange and the underside of the
irregular existing concrete slab. To
do so, the gap at both flange tips had
to be blocked to contain the poured
grout which could be done by placing
strips of wood along these edges and
secured with concrete anchors into the
underside of the deck.

The final hurdle to be overcome was
design concern #5—how to safely do
all this work without disrupting the
heavy truck traffic that serves the area
industries. The answer was to repair
Continued on next page
the bridge by closing only one of the two lanes of the bridge at a time. (So, one might ask: Why not remove half the deck, install the new beams, and then replace the removed portion of deck and then do the same thing for the other half of the bridge?” This was not feasible due to the arrangement of the existing beams.)

After much study we felt confident that insertion of the two outside beams for each lane could be done. However, the obstacle of installing the new beam on the center line of the bridge remained a concern. It was felt that experience inserting the two outside beams for each lane would enable the contractor to hone his technique and a short-time closure of the entire bridge would be necessary to insert the center line beam.

**Bidding the project**

Confident that this innovative approach could actually be done, the Engineering Division of the Saline County Road and Bridge Department set about preparing drawings and specifications and then proceeded to go out for bids. Bids were opened on August 21, 2013. Three contractors bid the project. While the low bid from Reece Construction Company, Inc. was higher than the Engineer’s Estimate of Probable Cost, the price was, nonetheless, well below what a new bridge would have cost. Also, the anticipated impact on area industries of strengthening the bridge would undoubtedly be far less than would have occurred with a complete bridge replacement. The higher project cost was due, in part, to the fact that none of the contractors had ever done anything like this before. Furthermore, the cost of the non-shrink grout needed to fill the gap between the top surface of the beam flange and the underside of the bridge deck was greater than anticipated.

The possibility of substituting a high-slump concrete to fill the gap was even discussed. However, it was felt that high-slump concrete would be less ductile and more likely to break up over time thus resulting in diminished contact between the new beams and the underside of the bridge deck which would defeat the entire strengthening exercise.

The Saline County and City of Salina Commissions each independently approved proceeding with the project. A contract was awarded on August 27.

**Construction was smooth sailing**

Construction began on September 11, 2013 and proceeded smoothly with minimal disruption to industries and area residents. In fact, no full closures of the bridge were necessary, not even when the center line beam was inserted. Work was completed on October 3, a full week ahead of the required completion date set in the contract.

One of the Saline County Commissioners was asked by a concerned citizen when the work on the bridge would start. That was more than a month following completion of the project! We took that as testimony to the speed of the construction and lack of disruption it caused to area residents and businesses.

Another project will take place this summer to place a polymer overlay on the existing concrete bridge deck. With these improvements, this no-longer load-posted bridge will likely serve the community for another century!

If you have any questions about this bridge project, contact Neil Cable at neil.cable@saline.org.
**Closing a Rural Road: Does it Make Economic Sense?**

By Pat Weaver, Kansas LTAP

In this construction season when the bills are coming for road maintenance, thoughts may turn to whether there are any strategies that could possibly reduce the high cost of maintaining the network of local roads. In our Summer 2013 issue of the Kansas LTAP Newsletter, we reported on a cost-benefit study conducted at the University of Kansas for closing bridges and at what traffic volume threshold it was justifiable. That study mentioned a companion study on the cost-benefits of closing low volume roads, published in 2011 by Michael Babcock at Kansas State University.

Does reducing the size of the road network for which the county is responsible make sense? We’re revisiting the Babcock study and his recommendations. This article will describe the main points and takeaways from that study to see if it can be applied to your circumstances.

**What’s the problem?**

There are several reasons thoughts turn to reducing the size of the road network in Kansas as a way to reduce construction and maintenance costs. First, the number of miles of locally-owned rural roads in Kansas that fall under the jurisdiction of the cities, counties and townships totals 130,000 miles. Kansas ranks fourth among states in road miles, but 34th in population. That small tax base bears a huge burden in maintaining the road network. In fact, one example cited in the Kansas Long-Range Transportation Plan was of a county with 1,000 miles of road serving 1,400 residents. The State’s declining population, often concentrated in some of the most rural counties with a high per capita roadway network, is a related factor in the ability to pay for the road network.

Kansas holds the distinction of being first in the nation in percentage of local ownership of public roads at 81 percent of the total, and 50 percent of the funding for the local road system is generated from local budgets. In addition, 25 percent of the counties in Kansas own 90 percent or more of the public roads located within their borders (NACo, 2014). Kansas counties are looking for ways to contain the maintenance costs (nearly $79 million in 2012) of that massive network. Closing a road, or designating a road as “a minimum maintenance road,” may be a consideration in some circumstances.

**Is closing a road a political or an engineering decision? What does the law say?**

In Kansas, the county commission has specific duties according to statute and tradition. One of those specific duties is the opening or vacating of a road. Staff may conduct the analysis and make the recommendation to the commission but, ultimately, it is the county commission’s responsibility (Kansas Local Road Management Handbook, 2011).

In addition, State statute authorizes the Board of County Commissioners to fix a rate of a levy annually for construction, reconstruction, improvements, repair, maintenance and acquisitions of rights-of-way for county roads and bridges (K.S.A. 79-1947). State statute also designates procedures for classifying a road as a “minimum maintenance road,” spelled out in K.S.A 68-5102. It provides that, if in the opinion of the Board of County Commissioners of any county “that a road is used only occasionally or is used only by a few individuals, the board may commence proceedings to declare the road a ‘minimum maintenance road.’ ” The statute requires a hearing process for public comment and that any designated road be signed as such within 10 days. This reduces the liability associated with failure to maintain a roadway to normal standards.

A minimum maintenance road is not the same as closing a road, but does allow it to be maintained below normal road standards. A minimum maintenance road “...needs some maintenance and should be passable during dry weather. The road should not have hidden defects that could cause an accident, such as a washed-out culvert” (Kansas Local Road Management Handbook, 2011).

It’s vital that everyone does their homework; it is the county engineer or road supervisor’s responsibility to prioritize projects, prepare project requests, and develop cost estimates. As staff, if you’re considering a recommendation to your county commissioners for closing a road, you must know what the annual cost of maintenance is, what the

[Continued on next page]
Closing a rural road  Continued from page 5

traffic counts are for the affected segment, and what potential alternative routes exist. A good roadway asset management plan will go a long way in determining a best course of action.

Are other states designating “minimum maintenance” roads?
In Nebraska, the process for designating a minimum maintenance road is spelled out using the following criteria: the road is not (1) a mail route, (2) a school bus route, or (3) the only access to an occupied dwelling. The county must also affirm that a public hearing was held before adopting the proposed reclassification. These requirements are consistent with the criteria used in the Babcock study, as well as with Kansas State Statute.

Reducing your maintenance budget: Is reducing the number of miles the solution?
The primary objective of the 2011 study conducted by Babcock (2011) was to estimate the economic impact on selected county road systems from reducing the size of the road system. He considered ten road segments in each of three counties: Thomas, Pratt and Brown. Selection was based on many factors, but the most important criterion was the traffic volume on the segments. Thomas and Pratt County had an average ADT of 15 on the ten segments in Thomas County at 15, half of the segments in Thomas County had 2 or less ADT per segment. Brown County No single-access roads should be considered for analysis, nor did he recommend closing single-access roads.

Babcock looked at benefits and costs of keeping the road system as it currently exists, and of several scenarios that simulated county road closure. The cost was measured by the additional travel cost of rural residents due to more circuitous routing to their destination. The benefit was measured by the avoided maintenance costs of roads removed from the network. The study assumed an annual maintenance costs of both $3,000 (considered very conservative) and $4,000 per mile. Norm Bowers, Local Roads Engineer for the Kansas Association of Counties, believes this range to still be a good estimate of local roads maintenance costs.

A major conclusion of the study was that rural counties will be able to save money by closing some relatively low-volume roads and redirecting those savings toward increasing the quality of the other county roads. He found that counties with relatively extensive road systems (miles of road per square mile) and relatively high population are less likely to realize savings from road closure. However, those counties with less extensive road systems and relatively low population density are more likely to realize significant savings from closing relatively low-volume roads.

One of the assumptions in the study was that no road should be considered for closure if it is a single-access road; that is, there is no alternate route to access property along that route. The difficulty, according to Bowers, is that there are very few roads in the State, particularly in the eastern part of the State, that meet that criteria. There is almost always at least one house or field for which access is needed, and it's the only route to that property.

Conclusion
Whether you consider closing a road altogether, designating it as a minimum maintenance road, or just looking for options to manage your maintenance budget, it’s important to have the facts first. Identify the segments in your network with very low ADT and that are not single access; i.e., where other routes exist on which to access the rest of the road network. Those roads with low population density and less extensive road systems, according to Babcock, are likely to find benefits in considering road closure. See the next page for a follow-up on the study profiling Thomas and Pratt counties.

Note: Babcock’s study did not consider the benefits and costs of bridges on the road segments. To assess the total benefits and costs, it is important to consider the calculation of benefits and costs of loss of the use of a bridge(s) as identified in the Mulinazzi study, in your calculations. See below for a link to this study.

Counties with less extensive road systems and relatively low population density are more likely to realize significant savings from closing relatively low-volume roads.
To Maintain or to Close: What’s Happening in Thomas and Pratt Counties

In his study on the economics of road closures, Dr. Babcock selected three counties to measure the benefits and costs of keeping the roads system as it currently exists, as well as the benefits and costs of several scenarios of simulated county road closure. The findings for two of the counties were that Thomas County would benefit by closing the evaluated segments and that Pratt County would also benefit, assuming an annual maintenance cost per mile of $4,000, rather than the much more conservative cost of $3,000 per mile. We followed up with the road supervisors in these two counties to find out whether the economic model had been helpful in making some of these difficult decisions.

**Thomas County.** Thomas County has a population of approximately 8,000 and area of nearly 1,100 square miles, resulting in a population density of just over 7 people per square mile. Thomas County operates as a county township road system. Thomas County’s Road Department is responsible for a total of approximately 232 miles of roads, roughly divided equally between gravel and asphalt roads; in addition, the county has responsibility for approximately 175 miles of township roads. Thomas County per capita expenditures on county roads is $279. In 2012, the county chip-sealed 10 miles of road, completed overlays on 10 miles and recycled one mile. Total road maintenance cost for the county in 2012 was $1.5 million. Township maintenance costs was approximate $1.3 million.

Of 10 segments considered in the study ranging in length from approximately 2-3 miles each, six of the links had an ADT of 6 or less (4 links with 2 or less). We asked Claire Schrock, road supervisor of Thomas County, whether there had been any additional consideration for closing any roads on their network. For 2012, average maintenance cost per road mile in Thomas County is approximately $3,700, within the range of the assumptions made in the Babcock study. Schrock indicated that no changes have been made to the road network. Due to the drought in northwest Kansas, Schrock said, “it’s been too dry to do much road work;” he rated the weather, specifically the drought, as the biggest challenge in road maintenance in Thomas County. “Some day we’ll catch up,” says Schrock.

**Pratt County.** Pratt County has a population of just under 10,000 with a land area of 735 square miles resulting in a population density of just under 14 persons per square mile. Pratt County operates as a county unit road system. The Pratt County Road Department is responsible for a total of approximately 1,400 total as gravel roads. Pratt County per capita expenditures on county roads is $366. In 2012, the county chip-sealed 43 miles of road, completed overlays on 12 miles and graveled 1,262 miles. Total road maintenance cost for the county in 2012 was approximately $2.9 million. In addition, Pratt County constructed 7 miles of gravel road.

Of 10 segments considered in the study ranging in length from approximately 3-7 miles each, three of the links had an ADT of 5 or less, with an additional four links less than 20 ADT. The highest ADT considered on a single link was 53.

Randy Phillippi, road supervisor for the County, said they have not pursued closing any roads since the study was done. Pratt County does have 6-7 miles of minimum maintenance roads. However, Phillippi said: “I am not sure we’re getting anywhere with low maintenance roads. The condition deteriorates without regular maintenance, but the farmers still need to use the roads sometimes. Then it takes more work to fix a road in bad condition to allow access. I am not sure we’re gaining a lot by doing this rather than maintaining the road on a more regular basis.”

Sources:
  http://www2.ku.edu/~kutc/pdf/ImpactClosingBridge.pdf
- 2012 Summary of County Engineers’ Annual Reports: Compiled by Kansas Department of Transportation Bureau of Local Projects.
- Local – Minimum Maintenance Roads Reclassification.
- Phillippi, Randy: Pratt County Road Supervisor. Telephone interview 6/27/14.
- Schrock, Claire: Thomas County Road Supervisor. Email interview 6/16/14.
- Seitz, Ron: Bureau Chief, Bureau of Local Programs, Kansas Department of Transportation. Telephone interview 6/18/14.
A Pedestrian Hybrid Beacon (PHB) is a traffic control device similar to the PELICAN pedestrian signal from Europe. It was first adopted in the United States by City of Tucson, Arizona in 1990s. The system is designed to increase motorists' awareness of pedestrians crossing the street. A PHB differs from pre-timed traffic signals and constant flash warning beacons because it is only activated by pedestrians when needed. This article will describe how they work and where they are especially effective.

Two traffic control devices in one

Being a “hybrid” beacon, a PHB functions like two types of traffic control devices into one: a traditional traffic signal and a stop sign. A “steady red” indication acts like a red traffic signal and means motorists are prohibited from crossing the crosswalk. After 5-7 seconds, the steady red changes to alternating flashing red, and acts like a stop sign, meaning motorists can proceed (after a complete stop at stop bar) if the pedestrian has safely completed that portion of the crossing.

Where are they best used?

PHBs are most effective at locations where traditional crosswalk signs and markings do not provide adequate safety measures and/or where installation of a conventional traffic signal is unwarranted and/or cost prohibitive. FHWA guidance says that good candidates are multi-lane, high-volume, high-speed roadways that pose a major challenge for pedestrians to cross. However, they can also be installed successfully on two-lane streets. PHBs can be installed mid-block and/or at an intersection. Where used, a PHB should be located outside the functional area of any nearby signalized intersection and outside of any turn lanes or acceleration lanes.

Benefits: Increased safety, less delay

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

Guidance for installation

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

Experience with PHBs in Lawrence

Lawrence, KS, has installed 10 PHBs in various locations, and more are on the way. The first one was a test installation when the technology was fairly new. It is on a school route that crosses a busy two-lane street. The project was done in conjunction with Kansas State University faculty, who reported to FHWA on the beacon’s effectiveness. Lawrence’s PHBs have been installed at locations requested by citizens where traffic volume and speed are such that the citizens feel uncomfortable crossing the street themselves or having their children or elderly neighbors cross unattended. None of the locations had a crash history. Some are at intersections, some are installed mid-block.

The streets on which the PHBs have been installed in Lawrence to date have been two-lane collectors or minor...
arterials. A few of them are one-way streets with two lanes.

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

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

He has noticed that some drivers treat the alternately flashing red beacon like a red light and do not proceed through the intersection when it is safe to do so. “Sometimes you’ll hear a horn honk,” he said. Woosley understands the confusion. “I doubt there is anything about [PHBs] in the Kansas Driving Handbook,” he said, “so it’s understandable people don’t always know what to do.”

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

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

Sources:
- Interview with David Woosley, June 19, 2014.

Kansas LTAP Newsletter Bidding Good-bye to Paper

By Pat Weaver

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

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

It’s easy to get signed up for this alert for each newsletter. Visit our website and click on “Kansas LTAP Email List” at our home page at http://www.ksltap.org. There is a short form to fill out. It should take just a minute or two. [If you are signed up on our old email list, please do so again. This is a new list.]

We recognize that for some of our readers electronic access may pose a hardship (slow internet connection, limited access to a computer, etc.) If this is the case, please email me at weaver@ku.edu or call (785) 864-2595 and we’ll be glad to work something out.

Good-bye paper, hello e-version! Same look, same great content, just in a different form. Sign up by September 1 to ensure you receive notice of the Fall issue (and future ones).
Supervisory Level Focus on Road Construction BMPs  By Richard Basore

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

It takes a “village”

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

Someone who may run over a sediment fence, or “temporarily” remove a ditch check (that doesn’t get reinstalled) may be an ancillary function contractor, such as fuel delivery, heavy equipment repair, pipeline, cable or electric pole relocation, etc.—not directly connected to the main project work.

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

Be on the lookout

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

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

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

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

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

Common BMP problems in Kansas
The main issues we see at construction sites in Kansas are:
- Lack of maintenance for BMPs,
- Sediment fences down, or washed under, or with broken stakes,
- Ditch checks overwhelmed or washed around,
- Curb inlet controls out of place, and
- Track-out of dirt or mud from the site.

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

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

Create an erosion control culture at the job site
Again, everyone on the site is another pair of eyes that can make note of how things are working (or not).

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

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

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

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

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

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

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

• A long delay between applying the binder and applying the aggregate (after applying the binder it begins to cool and harden, reducing the binding properties).

• Performing the chip seal late in the sealing season. By the Contract Documents the seasonal limits and weather conditions for chip seals are specified. Chip seals are intended to be performed during the warmer months.

• Low amount of binder was applied. A fog seal may be applied after the fact that may help hold the chips in place.

• Selecting the wrong type of binder for prevailing conditions. As soon as the problem is discovered, change to the preferred binder. An example the electronic charge of the binder and the aggregate are the same.

• Excessive amounts of dust or a film of moisture on the aggregate particles affecting adhesion. If dust is the problem, perform extra pre-binder brooming. If moisture is the cause, delay starting the chip seal until the moisture has evaporated.

• Opening the chip seal to high speed traffic before adhesion is fully developed. Keep the roadway closed until the binder has set.

• A rainstorm occurring after applying the chip seal, but prior to the development of adhesion or curing. This may require resealing the area affected, or applying a fog seal, depending on the amount of lost aggregate.

• Applying excessive cover material causing embedded aggregate to be dislodged under traffic. Once discovered, decrease the amount of aggregate being applied.
may come from more than one loader bucket. (Follow KDOT’s Construction Manual for stockpile sampling requirements.)

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

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

- **Full Trucks.** Fill every haul truck to its predetermined calibrated level. Over or under filling affects the amount the Contractor delivers and is paid for. Any irregular filling affects the application rate. Uniformity is the key to success for a quality chip sealing application.

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

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

**In sum**

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

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**KDOT’s Haul Road Provision Updated**

By Lisa Harris

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

KDOT addresses local road damage through haul road agreements with their contractors, who must repair road damage they cause on designated haul roads. However, the route from a commercial asphalt plant or quarry to the state highway is not eligible to be designated as a haul road. Any damage on that route must be repaired at the local government’s expense.

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

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

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

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

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

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**Sources:**

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

By Lisa Harris

See download/ordering information on next page.

2014 Roadway Safety Guide: Primer for Community Leaders

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

Recognize, React, Recover

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

LOW COST GIS SOLUTIONS FOR CITIES AND COUNTIES

New! The goal of this training is to raise the level of knowledge and use of basic data sources and low-cost GIS applications by local road and bridge staff. You'll learn what data is readily available to Kansas counties and cities and basic techniques for data acquisition, manipulation and management specific to road and bridge assets. You'll become familiar with and practice applying data to shape files, and practice data representation in Google Earth and other low-cost applications for local decision-makers and the public. Instructors are Matt Landes and Matt Oehlert from Miami County. August 14 in Lawrence.

CALENDAR

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

TRAINING:

2014...

Local/State Project Coordination – ▲L3r
Webinar, date TBD

Low-Cost GIS Solutions for Cities and Counties
August 14 in Lawrence

Low Cost Safety Improvements
September 16 in Dodge City

Road Safety Assessment – ▲L3e
September 23 in Pittsburg

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

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

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

Highway Safety Manual (HSM) Lite
November 4 in Wichita

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

Bridge Maintenance
November 18 in Hutchinson
November 19 in Manhattan

WEBINARS: COMING FALL 2014:

The Future of Right of Way Training in Kansas
in September

Introduction to Acquiring Right of Way
Following the Uniform Act
in October

UPCOMING MEETINGS:

APWA-KS Roundtable
September 11 in Junction City
Call Ray Ibarra, (785) 238-7142

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

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

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

▲L1 = KS Road Scholar Program Level 1 — Technical skills required course.
▲L2 = KS Road Scholar Program Level 2 — Supervisory skills courses are provided by the Kansas Association of Counties. Go to http://www.kansascounties.org and click on “Education Program.”
▲L3-r = KS Road Scholar Program Level 3 — Master Road Scholar required course.
▲L3-e = KS Road Scholar Program Level 3 — Master Road Scholar elective course.
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 & DVDs
You are free to keep these unless otherwise noted.
Or you can download at the links provided.

2014 Roadway Safety Guide: Primer for Community Leaders
See description on page 14. Download at:
http://www.e-digitaleditions.com/i/271708

Recognize, React, Recover (DVD)
See description on page 14.
❑ Send a copy. Use the order form below.

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

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

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

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

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

REQUEST FORM
❑ send materials indicated   ❑ address correction   ❑ add to LTAP Newsletter e-mail list   ❑ send Road Scholar Program brochure
❑ add to KS LTAP email discussion list

Name______________________________________________________ Phone number ________________________________

Position________________________________________ E-mail address ____________________________________________

Agency _______________________________________________________________________________________

Street Address __________________________________________________________________________________________

City ___________________________ State ___________ Zip+4 _________________________________

*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.
SAVE A TREE!
If you would rather link to our newsletter electronically instead of receiving a hard copy, send your email address to LHarris@ku.edu and we'll send a notice to you when each issue is published.

Is your mailing information correct?
Please fax changes to (785) 864-3199 or email Lisa Harris at LHarris@ku.edu.