

# KUTC Newsletter

Fall 2002

A Local Technical Assistance Program (LTAP) of The University of Kansas Transportation Center  
In cooperation with Kansas Department of Transportation and Federal Highway Administration

An issue dedicated to winter road maintenance

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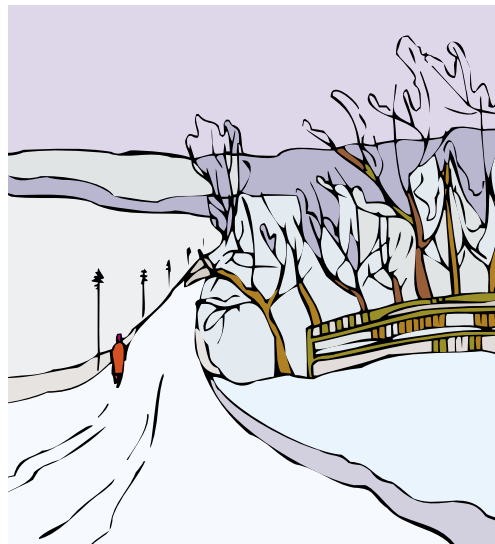
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## Make your winter maintenance strategies stick (and not the snow)



... by Geneva Jacobs .....

**W**inter maintenance isn't what it used to be. Traditional methods of clearing ice and snow, such as plowing, salting and sanding after a snow storm, are now "chemically enhanced" with deicing and anti-icing strategies.

### **Deicing**

Deicing is the process of applying chemicals (solid or brine) to snow, ice or frost that has already bonded to pavement.

The chemicals melt accumulated precipitation by decreasing its freezing temperature. Each deicing chemical has different properties that affect how long or at what temperatures it will be effective. The three

most common chemical deicing agents are sodium chloride (NaCl, or salt), magnesium chloride (MgCl) and calcium chloride (CaCl<sub>2</sub>).

One deicing strategy is to pre-wet sand with chemical brine before it is spread on the road surface. There is some debate about the overall effectiveness of this approach, however; see the article on page 8.

De-icing operations can take a toll on infrastructure. Chemicals, especially salt, corrode steel and concrete structures, causing cracking, scaling and peeling.

One way to decrease the use of chemicals (and decrease corrosion), is to apply the chemicals in a different way—before the precipitation has a chance to bond to the road. That process is called anti-icing.

### **Anti-icing**

With anti-icing, a chemical brine is applied to pavement at or before the beginning of a snowfall or ice storm. Again, the purpose is to lower the freeze temperature of the road. Accurate weather prediction is a key factor in a successful anti-icing program.

A successful program also requires periodic monitoring and reapplication of the brine to inhibit snow or ice from bonding to the roadway. If the products are properly used and there is a strong commitment from everyone involved, results are impressive. Anti-icing also helps prevent black ice from forming on bridge decks.

Research shows anti-icing can provide

*continued on page 2* ➤

## Winter maintenance, *continued from page 1*

increased traffic safety at the lowest cost over the long term. On average, only one anti-icing trip is necessary for every three conventional sanding/plowing trips. Because fewer trips are required, maintenance equipment has reduced wear and tear, and less sand is used. It takes much less effort to maintain a bare road.

Implementing an anti-icing program for an entire jurisdiction can be very costly. A road department that covers a large area but doesn't have a large fleet can opt to concentrate on treating major and problem intersections and then work on plowing the most heavily-traveled roads. The chemical brine on the pretreated intersections will make it easier to remove snow and ice from them once the highways are plowed.



Another alternative is to concentrate pretreatment on heavily traveled roads or ones that typically develop a lot of snow pack or ice.

### Winter maintenance case study: Topeka, Kansas

Topeka is one city using anti-icing as part of its winter maintenance plan. They pre-treat bridges and problem intersections with CaCl<sub>2</sub> combined with corrosion inhibitor, said Harry Peoples, Supervisor II.

"With anti-icing, the snow doesn't bond," he said. "We can remove it a lot faster and easier, especially at intersections that are on hills. Even just pretreating the roads without plowing creates a safer driving surface."

Topeka also uses salt in its winter maintenance plan. For freezing rain they use a 70 percent salt, 30 percent sand mix. When there is just snow, they use straight salt. As for specifics, Peoples said, "For a light snow, we use 200 lb of salt per lane mile. In a heavier snow storm, we will use 400-600

lb of salt per lane-mile."

Topeka has a phased plan for plowing. "We plow only certain areas when it snows two inches, and at four inches or more we plow everything," Peoples said. When Topeka's crews get stretched too thin, they contract assistance for snow removal.

Topeka's winter workhorses are dump trucks with liquid spreaders and aggregate spreaders for sand and salt. To minimize corrosion, city crews wash the equipment as soon as the storm ends.

In addition to cleaning the equipment, Topeka washes its bridges after a significant temperature rise to remove any salt residue. After washing, they pretreat the bridges with

"[Anti-icing] is very cost-effective and reduces the amount of man-hours you have to use."

—Harry Peoples, City of Topeka

CaCl<sub>2</sub> again.

In developing their winter maintenance strategy, Peoples says Topeka consulted with the Salt Institute and talked with staff at Scott Wood Industries about the use of CaCl<sub>2</sub>. They also consulted equipment manufacturers.

One piece of equipment that Peoples particularly likes is "a handy little gadget" called slinger chains, used when a truck operator is having trouble getting good traction. These are short links mounted at the wheel hub that are electronically operated. When the vehicle is moving at 15 mph, the links can be extended by the operator from inside the cab.

Another piece of equipment Topeka uses that aids operator safety is a GPS-based automatic vehicle locator (AVL) system. "That way, we can track down the vehicle, which is important in storm situations," Peoples said.

To obtain weather information

necessary for effective anti-icing and storm response, Topeka uses a combination of sources. They consult private weather firms, DTN, the Weather Channel and eight or nine different Internet sites. They average the forecasts from all of these different sources to develop their plan.

Topeka also uses RWIS (Road Weather Information System) data. RWIS uses road sensors located along primary roads that collect data on pavement temperature, snowfall rate, rain, sleet and the amount of anti-icing chemical remaining on the road. RWIS data helps Topeka to make more informed maintenance decisions about where and when to use chemical brine, how much to use, and how

many crew members to send out.

This results in a more effective use of staff, equipment and products.

Peoples recommends that other jurisdictions in Kansas add anti-icing to their winter maintenance plans. "It's very cost-effective and reduces the amount of man-hours you have to use," he said.

For more information, check out the two web sites we used as sources for this article. They have a lot of useful information and links.

### Sources

[www.winterwizard.com](http://www.winterwizard.com)

[www.fhwa.dot.gov/winter/index.html](http://www.fhwa.dot.gov/winter/index.html)

"Anti-icing Technology Tested in Kansas," *KUTC Newsletter*, Summer 1995. ■

# Developing an anti-icing program from scratch: A report from Ellis County, Ks.

... by Lisa Harris . . . . .

**E**llis County, in Central/Western Kansas has 150 miles of paved road and a modest budget to maintain them. The county plans to add anti-icing to their winter maintenance strategy. We'll tell you why—and how they plan to do it.

## First they saw the success of other programs....

About a year and a half ago, the county decided to look into anti-icing after seeing its successful use by the City of Hays and by the Kansas Department of Transportation. Where Ellis County's jurisdiction overlaps with Hays, the two governments treat some of each other's roads. County staff noticed a significant difference between the roads Hays pretreated with salt brine and those the county treated conventionally with salt and sand. The same is true of the pretreated state roads that run through the county, maintained by KDOT's District 3.

## Then they did some homework...

Mike Graf, Ellis County's public works administrator, credits Art Wolfe in District 3 for being a "tremendous resource" for educating county staff about anti-icing. The county visited the KDOT area shop and learned how salt brine is made, tested, and applied to the road.

Ellis County also talked to two local road departments that have some experience with anti-icing—Dickinson County and the City of Hays. Hays adopted methods similar to KDOT's, using pressurized sprayers that can be calibrated to distribute the liquid evenly. Dickinson County took a lower-cost approach, using a simple gravity-feed system. Dickinson County trucks must maintain a con-

sistent speed to spread the brine evenly along the pavement. It is not as precise, but Dickinson County told Graf "it does the job."

In addition to talking with other road maintenance departments, Graf and his shop foreman, Mark Polifka, attended the APWA Snow Roadeo in Salina in September 2002. They had a chance to see anti-icing equipment and gather information.

## Then they formulated a plan...

Ellis County has decided to ease into their anti-icing program by pretreating heavily traveled roads first and then building from there. Targeted roads include major collectors and roads adjacent to the city limits for Hays, Victoria and the City of Ellis. The county also plans to pretreat Route 40 which gets up to 7500 vehicles per day along some stretches.

They plan to use existing equipment by modifying three tandem-axle water trucks used in the summer during the construction season. They will replace the current long spreader bar at the back of each truck with a shorter one, probably home-made of PVC pipe with holes drilled into it. This is similar to Dickinson County's cost-saving method, and makes sense to Ellis County right now, when funds are so limited. Polifka aims to apply about 35-40 gallons of brine per lane mile.

The tank on each truck holds 3300 gallons. The tanks are fiberglass, so they will not corrode. They will be washed out after each use, using water mixed with a neutralizer to inhibit the corrosive qualities of the waste liquid.

Besides making the new spreaders, Ellis County will have to purchase a storage tank for the brine, a hydrometer to check the saline concentration of the brine, and a mixing tank. They are considering buying a

mixing tank made by Veritech Industries that sells for \$6-7,000.

The county plans to follow KDOT's practices and mix brine to a specific gravity of 1.200, which is about 2.3 lb. of salt per gallon of water. Brine would be mixed and stored at the public works department's main facility, centrally located in the county.

Ellis County plans to use only salt for their anti-icing program. "We know that KDOT and Hays have had good success pretreating with salt in our area," Polifka said, "and it costs less than other chemicals."

Staying on top of predicted weather conditions is an important part of anti-icing, and the county is well prepared for that. They currently have a DTN System for weather information, and they can get pavement data from the KDOT's Walker Weather Station in eastern Ellis County.

"We're really fortunate that the station is right in our county and that KDOT shares the data with us," said Graf. The county obtains the station's pavement data from a KDOT web site: [www.roadweather.com](http://www.roadweather.com).

## And now...

While Ellis County now has a plan for anti-icing, they've decided to put the plan on hold for the time being. The recent budget crunch may make it difficult for them to purchase the extra equipment they need this season.

"We are going to hold off implementing the program until the budget funding issues are clarified in the Spring of 2003, and then decide if we can justify the expense," said Graf.

For more information how Ellis County developed their anti-icing strategy, call Mark Polifka, shop foreman, at (785) 628-9455 or e-mail him at [mark@elliscounty.net](mailto:mark@elliscounty.net). ■

# New CDs on winter maintenance

... by Geneva Jacobs .....

The Kansas LTAP is offering these two new CDs through their lending library. To order, turn to page 15.



## Winter Maintenance Training Materials CD-ROM,

produced by the Salt Institute, 2002. This CD-ROM contains handouts and Power Point presentations designed to help local governments become more proficient in a variety of areas concerning winter operations.

Some of these materials are already available from the KUTC Lending Library in hard copy, and some are new.

This CD-ROM is useful as an instructor's guide for leading snow and ice training and for use as a supervisor's information resource.

### Handouts . . .

- The managerial handout (5 pages) and insert are designed as introductory materials for public officials and professional snowfighters.
- The technical handout (5 pages) is designed as an introduction to snowplow operator safety.
- The materials handout (8 pages) is designed as an introductory guide for operators and supervisors on common winter maintenance materials.
- There are also a series of reference files to serve as handouts for guidance in a variety of areas, as follows:

*Snowball...Snowfighter* (45 slides). A Power Point presentation on salt application on roadways.

*Snowfighters Handbook* (27 pages). A guide for snow and ice control.

*Salt Storage Handbook* (23 pages). Describes steps for proper salt storage.

*Salt Storage Summary* (4 pages). A summary of the above handbook.

*Deicing Salt Facts* (4 pages). Contains basic facts on using salt for deicing.

*Calibration Chart* (1 page). This chart is for agency use when spreading salt.

### Training . . .

This section has four Power Point presentations that can be used by agency staff. Each one can stand alone or be combined with another show.

- Managerial. The goal of this presentation is to introduce and prepare local government officials and managers for implementing a snowfighting program that is both efficient and safe (70 slides).
- Technical. Reviews winter operations, planning and organization and provides key elements for creating a comprehensive winter plan (123 slides).
- Equipment. Reviews a variety of equipment types, associated winter accessories, calibration techniques and the importance of proper equipment maintenance (148 slides).

- Materials. This presentation reviews commonly available winter maintenance materials, such as salt and other chemicals, and compares their effectiveness. Also addressed are safe handling and storage practices for winter maintenance materials (103 slides).

The CD-ROM also contains notes and recommendations on the delivery of an effective Power Point presentation using the sessions provided.

**Best Practices for Road Weather Management,** produced by the Federal Highway Administration, 2002.

This CD has information on responding to a variety of weather-related roadway hazards, including snow and ice. Four winter maintenance case studies are presented:

*Minnesota DOT Anti-Icing/Deicing System.* This profiles an automated anti-icing system installed on a 1,950 ft, eight-lane bridge near downtown Minneapolis. The bridge deck often froze due to moisture rising from the Mississippi river below. Liquid KAc (potassium acetate), an anti-icing agent, was pumped onto the bridge from 76 spray nozzles. The system has two sensors that check air and subsurface temperature, pavement temperature and condition, and precipitation type and intensity.

When certain values are met, a computer automatically activates flashing beacons to alert motorists and one of 13 different spray programs is initiated. Each program activates different valves in varying sequences and frequencies based on the situation.

Conventional treatment strategies such as plowing, salting and sanding supplement automated anti-icing

when appropriate.

The project has been credited with a 68 percent decline in winter crashes, reduced traffic congestion, and lower material costs.

*Montana DOT Anti-Icing/Deicing Operations.* This case study compares different anti-icing/deicing techniques used by two adjacent road maintenance divisions during a snow storm in December 2000.

The first division had an average of eight inches of snow. The conditions in the second division were more severe: They had 15 inches of snow followed by eight hours of freezing rain. The divisions had different strategies for chemically treating snow and ice. Both divisions use abrasives to improve traction.

The first division applied 3,000 gallons of MgCl before and during the storm, achieving bare pavement. The second division pre-wet their abrasives with 800 gallons of MgCl and used an additional 750 gallons of MgCl for anti-icing and deicing in an air quality nonattainment area where dust from abrasives can affect air quality. They had a more reactive than proactive treatment strategy, waiting longer to treat the roads.

Once the storm passed, drivers complained about the striking differences in the road conditions between the two divisions. The first division had bare pavement; the second had pavement with compacted snow and ice.

The first division used a 7.5 percent salt-to-sand ratio compared to the second division, which used a 4 percent ratio (in part to try to assure they would have enough MgCl to last the season). As a result of the study, the second division increased the chemical content of their salt-to-sand ratio to 7 percent.

This case study has some good lane-mile application statistics and provides a good argument for treating roads before snow and ice accumulate.

*continued on page 14* ►

## Where the blade meets the gravel



These participants in gravel roads training in Ottawa offered by Kansas LTAP got up close and personal by directly observing a motorgrader operator working on a road. This on-site training was so well received that LTAP will be adding it to all of its gravel roads training.

Above, participants check the grader's work. Below, trainers and participants pose in front of a motorgrader provided by Franklin County for the workshop. About 30 people attended this Ottawa session; about 250 attended the 12 gravel road maintenance sessions offered by Kansas LTAP in 2002. ■



# Roadeo winners love the competition

... by Geneva Jacobs . . . . .

Road maintenance workers had special opportunities to show their stuff this year. Here's a report on two Snow Roadeos held in Kansas. As you will see, these events cover much more than snow plow operation.

## KC-Metro Chapter

The American Public Works Association (APWA) and the Mo-Kan Street Systems Committee recently hosted the 15th annual Snow Rodeo, a five-day competition (October 7-11, 2002), in Gardner, KS. The rodeo tests the expertise and insight of equipment operators from different agencies while giving them a chance to learn new techniques and have fun.

Around 300 state, county and city employees from 25 agencies participated in a variety of wild and crazy events including the backhoe, wheel loader, motorgrader, skid steer loader, snowplow operation, street sweeper, mechanic's rodeo and team competition.

The top winners received a free trip sometime in the spring to the Caterpillar factory in Decatur, IL.

Participants from Johnson County, KS, claimed the overall team trophy. Their agency has participated in the Snow Rodeo since 1991. Other winners are:

### Snowplow

1st – John Rickey, Johnson County  
2nd – Paul Stauch, Overland Park  
3rd – Bryan Leighow, Blue Springs, MO

### Sweeper

1st – Pat Dickerson, Overland Park  
2nd – Tim Lawrence, Johnson County Wastewater  
3rd – Mark Newell, Olathe

### Backhoe

1st – Dale Yates, Kansas City, MO, Wastewater Division  
2nd – Chuck Walston, Shawnee  
3rd – Richmond Anderson, Kansas City, MO, Water Services Division

### Wheel Loader

1st – Pat Vaughn, Johnson County  
2nd – Alan Cumutte, Overland Park  
3rd – Chris Faddis, Shawnee

### Mechanic

1st – Gerald Spry, Lawrence  
2nd – Norman Cass, Leawood  
3rd – Tim Hays, Lawrence

### Skid Steer

1st – Rick Roberts, Olathe  
2nd – Michael Redel, Olathe  
3rd – Anthony Williams, Johnson County, KS, Public Works

### Motorgrader

1st – Richard Noble, Jr., Johnson County  
2nd – Steve Donham, Johnson County  
3rd – Joe Schoenberger, Kansas City, MO

Competition wasn't the only excitement offered at this Snow Rodeo.

“If you improve your skills because of the competition, regardless of where you place, you are a winner.” —John Rickey

Twenty different vendors provided participants with the opportunity to view and operate new equipment.

Gerald Spry, winner of the Mechanic competition, suggests that other competitors “Give it a try if the opportunity presents itself.” Spry's event had a 150-question written test

in addition to seven hands-on repair stations. Included in the hands-on tests, which competitors had only 10 minutes to complete, were electrical diagnosis, metal fabrication, fuel injection component identification and personal safety. Spry's agency (Lawrence) has been attending the Snow Rodeo for the past seven years.

Pat Dickerson was the winner of the Street Sweeper competition. His city, Overland Park, has been attending the Snow Rodeo competitions for the past 15 years. Dickerson's cautions other competitors: “Look out—I'll be back!”

Rick Noble of Johnson County put his 20 years of experience to work by winning the Motor Grader competition. His advice for other competitors is “Practice, practice, practice.”

John Rickey, also from Johnson County, chose to compete in the Snowplow event because he had demonstrated the capability to perform well at a yearly refresher training meeting. His coworkers encouraged him to compete and supported him throughout the competition, giving him the edge to win first place.

Rickey said “Any one of my coworkers has the ability to excel in this event. Winning was a team effort.

“These competitions are about improving your skills,” he said. “Focus on improving your ability to operate the equipment. If you improve your skills because of the competition, regardless of where you place, you are a winner.”

While he was at the Snow Rodeo,

Rickey had the opportunity to check out the new Bobcat skid steers and the new modifications that have been made to steering capabilities.

Pat Vaughn won the Wheel Loader competition even though he has only a year of experience operating this particular piece of machinery. He felt that the support, training and advice he received from his Johnson County supervisor and coworkers made a big difference in his confidence level and his performance in the event.

Vaughn's advice about the Rodeo is: "Don't get frustrated if you don't finish well. There is always next year waiting for you to be the champion. Remember it is a team competition, so always support your team!"

While at the competition, Vaughn had the opportunity to try out most of the Bobcat machines and enjoyed the equipment Caterpillar had on display.

To learn more about the KC-Metro APWA Snow Plow Rodeo, visit: <http://midamericasnorodeo.com>

### The Kansas Chapter

The Snow Rodeo for the Kansas APWA chapter took place on September 5, 2002 at the Salina, KS Bicentennial Center. The following were the top 3 placers in each event:

#### Truck Snowplow

- 1st – Jack Goates, Salina
- 2nd – Rhyne Marshall, Junction City
- 3rd – Jerry Wiesendanger, Salina

#### Front Loader

- 1st – Bob Klein, Salina
- 2nd – Lon Schrader, Abilene
- 3rd – Rich Hill, Salina

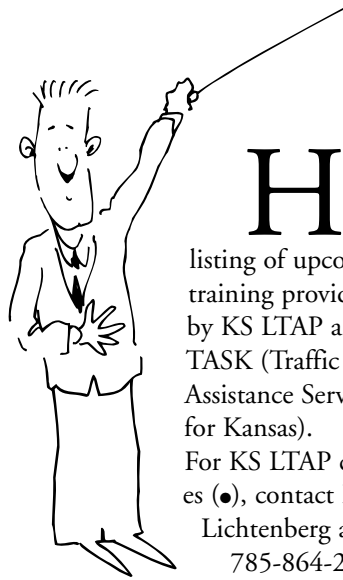
#### Motor Grader

- 1st – Roger Nelson, Riley County
- 2nd – Gary Haas, Ellis County
- 3rd – Mark Windholtz, Hays

Salina, which produced several winners, has been participating in the Snow Rodeo for the last four years.  
*continued on page 8* ►

# Do we have training for you!

... by Rose Lichtenberg . . . . .



**H**ere is a tentative listing of upcoming training provided by KS LTAP and TASK (Traffic Assistance Services for Kansas).

For KS LTAP courses (●), contact Rose Lichtenberg at 785-864-2594.

For TASK courses (▲), contact KSU at 785-532-5569.

You may also look at our training calendar (and, in some cases, register online) at [www.kutc.ku.edu](http://www.kutc.ku.edu).

The "\*" courses are required courses for the Kansas County Road Scholar Technical Skills Program.

### ▲ MUTCD for Technicians \*

KU and KSU to provide instruction.  
January 14 in Hays  
May 13 in Hutchinson

### ● Work Place and Equipment Safety \*

KDHE, KWORC, and law enforcement to provide instruction. New in 2003.

January 29 in Topeka  
February 13 in Iola  
March 11 in Garden City  
March 12 in Hays  
March 13 in Salina

### ● Traffic Engineering Inspection School

KDOT's Bureau of Traffic Engineering annual school.  
February 4-6 in Hutchinson  
February 18-20 in Lawrence

### ● Culverts and Drainage \*

KS LTAP instructor. Offered annually.  
March 3 in Dodge City  
March 4 in Hays  
March 5 in Salina  
March 6 in Chanute  
March 7 in Lawrence

### ● Older Driver Highway Design Workshop

FHWA instructors, many hands-on activities. New in 2003.  
March 4 in Wichita  
March 5 in Lawrence

### ▲ Traffic Engineering for Technicians \*

KSU and KU to provide instruction.  
March 17-20 in Chanute

### ● Gravel Road Maintenance \*

KS LTAP instructor. Offered annually in the Spring.  
March 25 - April 9 at 5 locations across Kansas

### ● Paved Road Maintenance \*

KAPA, consultant/vendor, and KS LTAP will provide instruction. Offered annually in the Spring.  
March 17-April 2 at 6 locations across Kansas

### ● Risk Management for Road Crews \*

Tom Mulinazzi will teach this course. New in 2003.  
April 2 in Salina  
April 9 in Topeka

### ▲ Geometric Design of Very Low-Volume Local Roads

KU and KSU to provide instruction.  
June 26 in Salina ■

# To sand or not to sand?

... by Geneva Jacobs .....

Sand is often applied on roads in icy and snowy weather to provide better traction for vehicles and improve safety. However, sand is only effective in a few situations—and its use has some drawbacks. Sand can accumulate in large amounts and must be swept up following the winter months. Much of the sand remains behind in catch basins, drainage pipes, outfalls and in or around roadways.

The University of New Hampshire (UNH) Technology Transfer Center published an article in Fall 2001 on the *Pros and Cons of Sand on Ice and Snowpack*. The following summarizes their main points.



Sand can only provide traction when it stays on the road. But studies have shown that after sand hits the road, it doesn't stay there long. About 30 percent of dry sand applied to a road will scatter immediately. Vehicles can quickly sweep off much of the rest. As few as a dozen fast-moving vehicles can sweep dry sand from roads.

UNH cited a University of Iowa (UI) study on county roads that examined the effectiveness of dry abrasives on a variety of roads, paved and gravel. See the box above for UI's findings. The study found that, in most cases, dry abrasives do not stay on the road long enough to significantly improve traction.

Does wetting the sand help keep it on the road? UI compared three different methods for prewetting abrasives with deicing chemicals to help answer this question. The methods were: 1) prewetting abrasives in the stockpile, 2) prewetting while loading trucks, and 3) adding brine to abrasives at the truck spinner. They found that none of these prewetting methods

## Recommended Abrasives Applications

<i>Road Type</i>	<i>Use of Dry Abrasives</i>
High speed urban roads (speeds > 30mph)	...inappropriate
Low speed urban roads (speeds < 30mph)	...only where snow pack persists
Urban intersections	...only where snow pack persists
Rural roads and intersections (paved)	...inappropriate
Rural roads and intersections (gravel)	...only on hills and curves
Rural intersections	...only on gravel approaches

significantly helped sand stay on the roads.

UI's study also showed that, on gravel roads, crushed gravel spread on hills and curves helps increase friction better than sand. Crushed gravel is also better-wearing after winter's end.

Sand is sometimes mixed with salt to prevent the sand from freezing. Research shows that a 10:1 mixture of sand and salt is usually sufficient to prevent the sand from freezing.

Some road departments mix their sand with a lot more salt and use the mixture for de-icing roadways. Studies have shown that at least 300 pounds of a 50/50 mixture must be applied per road mile to be effective in melting ice or packed snow at freezing temperatures. That's a lot of sand. UNH recommends using just the salt for most applications.

The University of New Hampshire concluded that, with a few exceptions, the best winter maintenance practice to provide safe roads is to plow and apply chemicals to achieve bare pavement. For gravel road hills, curves and intersections, spreading crushed gravel appears to be a good alternative to sand. It stays on the road better and is better-wearing.

Source: [www.t2.unh.edu/fall01/pg6-7.html](http://www.t2.unh.edu/fall01/pg6-7.html). ■

## APWA snow roadeos, continued from page 7

Jack Goates, winner of the Truck Snowplow, last operated this piece of equipment for Salina in 1994, before he moved into the position of Flood Control Supervisor. His previous 21 years of experience in snowplow operation helped him to come out on top in that event.

Goates advises other competitors to "Take your time. The courses are set up more for skill than speed."

Bob Klein added to the group of Salina winners when he took first place in the front loader competition. He received the opportunity to compete in this event at the Snow Roadeo when he obtained high scores in the same competition at Salina's Street Division annual training of snow removal equipment.

Klein doesn't mind a little friendly competition, especially when it's with operators from around the state. His advice to competitors is: "Try to relax and have fun with it." Both Goates and Klein said they would like the opportunity to compete again next year.

For more information on the Kansas Chapter Snow Roadeo, contact Jack Goates, City of Salina, Department of Engineering/General Services/Flood, (785) 309-5750, [jack.goates@salina.org](mailto:jack.goates@salina.org) ■

**KDOT Korner**

# Tell those haulers: “Ask for permission, not forgiveness”

[In our last issue, we described permit procedures in Kansas that govern the transport of oversized loads on the state highway system. The Kansas Department of Transportation requires operators of these loads to use low volume (local) roads as often as possible as they travel through the state.

In this article we will look at how a few local highway departments are handling this issue. —Ed.]

... by Geneva Jacobs . . . . .

**P**roblems can quickly arise when large and oversized loads travel on local roads. Moving a house is one such example, but more common in Kansas is the transportation of construction equipment such as bulldozers, cranes and trusses. These loads can easily weigh 140,000 to 240,000 lb and create forces equivalent to thousands of normal car movements. Loads such as these can damage roadways, bridges, road signs, traffic signals and trees.

A city or county permit program for heavy and oversized loads can effectively address many of these issues. This article will look at the benefits of a permit program, ideas for developing one, and some successful existing local programs in Kansas.

**Permit program benefits**

Mickey Thull, engineer for the City of Wichita, said that one of the benefits of his city’s permit program is two-way communication. Road and bridge departments can designate acceptable routes for the vehicle to avoid bridges and roads for which the weight of the load is over capacity either in width or weight.

Cooperation between permit seekers and the local government creates benefits for both sides. If a hauler avoids hitting signs or overpasses, they avoid damaging their loads.

Another mutual benefit of a permit program is that it allows the city to design a route around any road maintenance that is planned or is currently being done, said Thull. Movers were previously caught off guard by road construction or damaged roads; advance notice saves time and effort.

Jerry Fowler, Saline County Engineer, noted that manufactured houses being moved through their county did not always take the safest route, causing damage to signs. His permit program directs the movers to a county-approved route. Although it’s a longer route, the truck operator avoids what could result in a difficult or dangerous situation.

**Getting a program going**

One place to start in developing a city or county permit program is to review the KDOT state permit, which regulates the state highways (described in our last issue). Wichita modeled their plan from the state permit. This is a good way to go; the state program has already proven effective, and once implemented, the state will automatically be familiar with your permit regulations.

State knowledge of local permit requirements protects local governments. When movers are hauling loads for long distances through several jurisdictions, KDOT advises them when it is necessary to call the city or county in order to plan a route

through the local roads. Fowler gave an example of an oversized vehicle leaving the state highway for Saline County roads. Saline County has to approve a local permit before the load can travel through their region.

Glen Tyson, road supervisor for Osage County, spoke with some other counties, such as Coffey and Franklin, when developing his county’s permit program. Osage County sees a variety of heavy and oversized loads, particularly manufactured homes, traveling through the area. Tyson gathered ideas both from other road supervisors and permit seekers when developing details for their program.

Tyson noted that before their program was in place, county crew members had to be pulled off other jobs to “do the work of the sign person” or to follow the load to ensure the safety of both the equipment operator and other motorists. Their program now designates a particular person who is responsible for responding to wide and heavy loads moving through the county. And with a permit program in place, that person knows about the loads in advance and can plan around other work as needed.

When developing your permit program, identify a couple of different routes through your jurisdiction, if possible. These can be modified with area growth or decline. Route selection can be difficult, especially for extremely wide loads. Fowler said the most recent such example in Saline County was finding a route for an electrical transformer with 14 axles. Having already gone through the process of identifying potential haul routes helped the county develop an appropriate route in a timely manner.

*continued on page 10* ➤

## Local permits for oversize loads, *continued from page 9*

### Issuing a permit

Design your permit application process to be fairly painless to encourage haulers to use it. Local agencies in Kansas that already have permit programs typically approve applications when they are properly filled-out, unless the load is excessively heavy or wide. Loads 115–120 tons or heavier are considered superloads, which can be too much for some roadways and bridges.

Kansas statute allows county clerks to issue oversized load permits, but in some cases county engineers have now taken over this responsibility.

Hub Caspar, engineer for Anderson and Coffey counties, believes that Kansas statutes “need to be updated to reflect permit issuance by the Road and Bridge Department.”

In Anderson County, Caspar is in charge of issuing the permits. In Coffey County, however, the county clerk issues these permits, with Caspar and Robert Reed, the road supervisor, being asked only to verify that the loads will be safe when crossing roads and bridges, without consideration of wear and tear and other factors that affect a highway department.

The designation of permit issuer is clearly something to explore when developing a new permit program.

### Plan ahead for dealing with signs and trees

*Signs.* In Osage County, when houses or other wide loads are moved, the road signs are adjusted along the route, Tyson said. Sign adjustment is typically required for oversize loads.

In Caspar’s jurisdictions, all signs are removed “should there be cause for concern about overwidth,” he said. Fowler said that signs along the haul route in Saline County are pulled out when loads move through the area.

This method works as long as the

county receives accurate information about the timing of the move. Lack of accurate advance notice could result in signs being pulled up too early or put back overly late—with liability implications for the county.

Crew members must be trained to remove and re-install signs properly. In some cases, signs must be placed at a specific angle towards oncoming traffic to be seen effectively. Osage County had some problems in the

Osage County had some problems in the past because they assigned whichever crew member was available at the moment to respond to a large or oversized load. Tyson mentioned problems such as accidentally switching signs, not getting the signs back up in time, or securing them poorly so they leaned or even fell over.

past because they assigned whichever crew member was available at the moment to respond to a large or oversized load. Tyson mentioned problems such as accidentally switching signs, not getting the signs in a timely fashion, or securing them poorly so they leaned or even fell over.

Osage County addressed this problem by installing sign posts with springs along their approved haul routes. These signs have a primary post in the ground with a secondary post set on a spring, which allows the signs to be folded down.

“Now we just send the sign guy out to fold down the signs. We feel safe and know we are prepared,” Tyson said. This new method saves the county time, too.

In Wichita signs are attached on Telspar material with a two-piece post. The bottom post is mounted on a base in the ground. The second post (to which the sign is attached) is attached to the first post with a bolt for easy sign removal. When a wide

load is going to travel through the area, municipal workers can quickly adjust the signs rather than remove them from the site.

*Trees.* The Kansas Forest Service (phone 785-532-3300) can do an assessment for you to determine if wide loads will damage foliage on the routes you are considering. If wide loads are moved through the area frequently, it may be necessary to trim

or even permanently remove and/or relocate trees to prevent their damage.

### Permit types

The two main types of permits are annual and “single trip.”

*Annual permits.* In Osage County about two manufactured houses are moved weekly due to businesses such as Wardcraft and Dream Houses. These operations use annual permits for superloads, which in Osage County requires a \$200 bond, a \$10 permit fee which goes through the Road and Bridge Office and a \$5 processing fee through the county clerk’s office.

In Wichita about 40 annual permits at \$100 each are issued each year. For example, Quick Transfer World Headquarters, whose vehicles enter Wichita from cities such as Topeka and Kansas City, purchase an annual permit that authorizes 10 trucks to use double and triple trailers to travel a short distance into the city

## Good reasons to create a local permit program

- ✓ You get more control over safety when routes that you approve are used.
- ✓ No more wasting time scrambling around at the last minute to prepare for heavy and wide loads.
- ✓ Make some new friends when talking to other road departments and likely permit seekers when developing your plan.
- ✓ Reduce wear and tear on your vulnerable bridges and roads.
- ✓ You have an excuse to get cool new spring sign posts for your roads.
- ✓ You can generate income from permit fees (or at least spend less money on road, bridge and sign repair).
- ✓ Power! You can regulate the movement of objects that are larger than life.

limits to reach their respective destinations—stores such as Wal-Mart. Without the permit, the drivers would be forced to uncouple their trailers at the end of the turnpike and leave them at the turnpike gate while they moved each trailer individually. The annual permit saves time and money for the company and, because of the short distances traveled after exiting the turnpike, few motorists are affected by these trips.

*Single trip permits.* Single trip permits are generally more common than annual permits at the local level. An example of a single trip is moving heavy equipment from a work site into storage.

Wichita issues about 100 single trip permits every year for \$10 each. Around 50-70 single-trip permits are issued in Osage County, also for \$10, plus a \$5 processing fee.

### Permit enforcement

For the most part, there have been few instances of people not following rules. (Or getting caught, anyway.) Instances include haulers moving loads heavier than agreed upon, not renewing annual permits yet still moving heavy loads, using a route

other than the approved route because it's faster, or never purchasing a permit in the first place.

The City of Wichita does not chase down rule-breakers. But Thull said: "I don't have a problem reminding haulers to purchase their permit if we catch them on the road without one. If they get stopped they will get in trouble, which reinforces the idea of getting their permits."

There is always the option of asking the local sheriff or State Highway Patrol to step in. Thull said that Wichita rarely notifies the Highway Patrol, but will if there is a problem. He gave these examples: "A group may try to go on a route that is not a haul route—or maybe the load is too high for the road they want to use, so they use a road without the proper load capacity."

Some Kansas highway patrol vehicles are equipped to weigh loads at any location. Operators who fail to comply with regulations are fined.

Saline County had a problem with companies with unapproved wide loads pulling signs out of the ground and leaving them in the ditch. Fowler said they worked closely with the Sheriff's department in that case.

Wichita has anticipated the possi-

bility of haulers faking permits and have numbered their permits to prevent this.

### Program success

The best argument for developing a new permit program is the success of other local programs in Kansas. The City of Wichita has had their program in place for the better part of the last decade. Osage County's program has been in place for some time, but only strictly enforced since 1998, after which they began to see many benefits. Saline County's program has been around since the Kansas permit regulations were implemented about a decade ago. All three of these road departments are very pleased with their programs.

One key to the success of these programs is making it easy for haulers to obtain a permit and allowing some flexibility. In Wichita, for example, permit holders are allowed, with permission, to revise the permit to allow for a different vehicle or possibly add another vehicle to the permit. This happens once or twice yearly due to vehicle selling and trading which may have occurred since the permit issue date. The ability to reschedule due to bad weather and to make other minor revisions promotes cooperation among the highway department, businesses and the community.

For more information on the local permit programs mentioned in this article, contact Glen Tyson from Osage County at (785) 828-4416, Mickey Thull from the City of Wichita at (316) 268-4501, Hub Caspar from Anderson County at (785) 448-3724, or Jerry Fowler from Salina County at (785) 826-6527.

Information on KDOT's permit program for oversized and heavy loads is available in a booklet entitled *Trucking Through Kansas*, available from the KUTC Lending Library. For a copy, turn to page 15. ■

## A Leg Up

# Agency liability doesn't stop at the curb

... by Andy Briscoe, Salt Institute . . .

**W**inter maintenance liability is not limited to roadways. Sidewalks also play a key role in the safety (or unsafety) of pedestrians. Some road departments maintain sidewalks. Most, however, delegate that responsibility to property owners; those departments should take care to include enforcement of any sidewalk laws or policies in their winter maintenance plans.

The Salt Institute recently conducted an informal survey of roadway managers regarding their practices of sidewalk snow-clearing. Most agencies we surveyed have some sort of written policy directing the property owner to remove accumulated snow "within 24 hours of the end of the snowstorm." One agency allows up to 48 hours to get the sidewalk cleared.

However, if necessary, some cities will "assist" with snow removal from sidewalks, using contractors. Penalties for property owners not complying with municipal ordinances range from \$35 for a first-time offense to \$100 per day.

The real question is: "How does an agency enforce its written policy?" Most agencies we surveyed don't issue tickets for property owners who don't keep their sidewalks clear of snow and ice. However, about a third of our respondents do issue tickets, putting teeth into their written policy to maintain pedestrian safety.

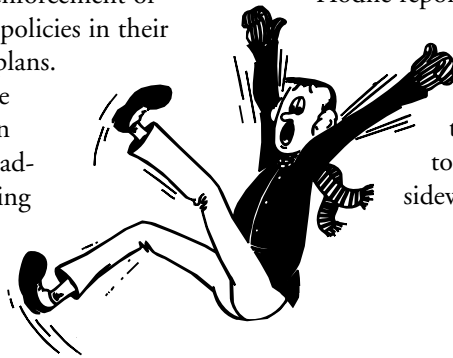
In the 2001/2002 winter season,

Madison, Wisconsin's Department of Planning and Development, which is charged with implementing their written sidewalk policy, issued 820 citations. Complaints can be filed on-line.

William Stowe in Des Moines said city inspectors ticketed 250 people for violating the city's sidewalk ordinance in the same winter season. And in West Des Moines, Bret

Hodne reported having

issued 51 tickets of which four required the city to step in to finally get the sidewalk clean.



If a pedestrian slips and falls on a poorly-maintained sidewalk, it often leads to a lawsuit alleging negligence. Half the time, attempts to be compensated for such injuries draw in the public agency—even when the homeowner has the "primary" responsibility. In only about a quarter of the suits is the homeowner alone targeted for legal recovery.

Over half of the agencies responding to our survey reported being sued for a sidewalk accident. Some agencies have successfully defended themselves. Some settled out of court. The City of Chilliwack near Vancouver, British Columbia, for example, reported agreeing to a \$25,000 settlement after

being sued back in 1996/97 when a woman fell on an ice-covered sidewalk where the city was the adjacent property owner. All municipalities that were sued incurred legal expense to defend themselves.

Last year I remember reading an article titled "Sidewalk ice lands residents in court" in the *Detroit Free Press*. It described how 63-year-old Sophia Kratas and 28 other Lincoln Park residents were charged with failing to remove their snow from the sidewalks in front of their houses. The charge is a misdemeanor punishable by up to 90 days in jail and a \$500 fine. In Lincoln Park, as in other

If a pedestrian slips and falls on a poorly-maintained sidewalk, it often leads to a lawsuit alleging negligence. Half the time, attempts to be compensated for such injuries draw in the public agency—even when the homeowner has the primary responsibility.

metro-Detroit communities, homeowners must remove snow from the sidewalk within 24 hours. Salt or sawdust must be placed on patches of ice within 12 hours.

In seems when postal workers can't easily travel the sidewalks in Lincoln Park, they notify the city clerk. The clerk mails copies of the city ordinance to those in violation. Someone is sent out to inspect the situation, and if the problem persists, a ticket is issued. Kratas said the first time she heard of the city ordinance

was when a copy arrived in her mailbox with her ticket. The ticket charges her with one count of snow/ice accumulation. It was issued on Feb. 10 for snow that fell on Feb. 4.

While most of us accept the duty of shoveling our own sidewalks, some citizens go above-and-beyond. Nick Coleman, a staff columnist for the *Twin Cities Pioneer Planet* writes, "I want the sidewalks shoveled, and I want them shoveled now. I have been wielding the winter tools for 40 years now, and I approach shoveling as an art form... I even shovel a path through the yard so the mail carrier doesn't have to wallow on his journey to my door... I shovel figure-eights into the back yard drifts so my dog can take her exercise without drowning... I have even sneaked across the street to dig through the plow-drifts blocking my neighbor's walkway... Shoveling is my passion."

Needless to say, Coleman exceeds any municipality's expectations. Can we clone him?

I just received a copy of *Contracting for Snow Removal Business—Watch Your Step—A Greensure Risk Management Program*.

It's by Scott McEachern, a.k.a. "The Snow Man." McEachern makes his living talking about how a person can sue for "slip and fall" injuries. He strives to provide a better understanding of the potential liabilities arising from snow removal operations and the methods of reducing and limiting risk.

McEachern's primary focus is Canada since he hails from there. He points out that a Canadian contractor is obligated to remove snow as defined within the Occupier's Liability Act. This places the contractor in a position of having to defend his or her actions as "reasonable." McEachern goes on to cover what can be done, contract clauses and negotiations, subcontracting responsibilities, site maps, a defense preparation, data collection, choosing better customers (!), how insurance companies react, and out of court settlements. Want more information? Write McEachern at Reeds & Associates, 232 Kent St., W. #5, Lindsay, ON, Canada, K9V 6A4.

One thing is for sure: Whoever is responsible, we want to prevent injuries. Slips and falls are a major health care issue, to say nothing of the pain and suffering of someone injured

in a fall on a slippery sidewalk. Municipalities may have "delegated" responsibility for clearing sidewalks to homeowners, but they can't always hide when homeowners dodge their responsibilities and someone gets hurt—and when "ambulance chasing" lawyers are looking for deep pockets.

Just how many resources should be devoted to enforcing sidewalk-clearing ordinances is a judgment for local politicians, but public works officials and risk managers should educate their policy-makers about potential liabilities. After all, the public's demand for winter safety and mobility isn't confined to roadways alone; it includes pedestrian safety and mobility, too.

This article was adapted with permission from an article dated Spring 2002 on [www.saltinstitute.org](http://www.saltinstitute.org). ■

## LTAP Partners with Salt Institute

... by Geneva Jacobs . . . . .



The National LTAP Association has recently partnered with the Salt Institute with the goal of improving winter maintenance training

for local government road departments. Both groups see a need for LTAP and agency trainers to have better quality and variety of materials for winter maintenance training.

LTAP has organized a national advisory committee to assess existing training materials and identify new materials that would be useful to local road departments.

The Salt Institute has agreed to pay at least \$10,000 per year for developing training materials. The National LTAP Association will encourage the LTAP Centers to use these materials in their training. ■

## Sedgwick County gets more out of their treated sand

New side tanks on dump trucks have significantly improved the effectiveness of Sedgwick County's use of CaCl<sub>2</sub> with sand for snow and ice control.

Before installing the side tanks, the county added CaCl<sub>2</sub> brine to the top of the wet sand loads in their trucks, assuming it would trickle down to the bottom and treat the whole load.

"That didn't work," said Martin Seiter, road maintenance crew chief. The chemical tended to accumulate towards the top of the pile, and when

the sand was applied, some roads received more CaCl<sub>2</sub> than was needed and others received little or none.

The new side tanks, equipped with sprayers, allow the county to spray the sand just before the spinner distributes it on the road. This method ensures the chemical is distributed evenly in the sand and on the road. The county is using less CaCl<sub>2</sub> with this method, as well.

For more information, call Bob Kraus, Sedgwick County road supervisor, at (316) 383-7901. ■

## New CDs on winter maintenance, *continued from page 5*

*City of New York, NY Anti-Icing/Deicing System.* This profiles a fixed anti-icing system developed for a portion of the Brooklyn Bridge. The system sprays anti-icing chemical on the bridge deck in adverse weather conditions. Anti-icing reduces the use of road salt (a contributor to bridge structure corrosion).

The system includes a chemical storage tank containing liquid KAc, a pump, a network of PVC pipes, check valves with an in-line filtration system, 50 self-cleaning spray nozzles and a dynamic message sign (DMS). A closed circuit TV camera is also used so that operators can visually monitor the anti-icing system.

Sections of the bridge treated with KAc had better levels of service and less snow accumulation than road segments treated by maintenance vehicles. The system was most effective when chemical applications were

begun at the onset of weather events. If sprayed too soon, the chemical was dispersed by vehicles and needed to be reapplied. Bridge life was extended and treatment cost minimized when using this anti-icing system.

*Idaho DOT Anti-Icing/Deicing Operations.* For this case study, a 29 mile section of US Route 12 was analyzed. This section was chosen because it is prone to black ice and heavy snowfall. Liquid MgCl was used instead of high quantities of abrasives.

Maintenance vehicles were deployed when impending bad weather was predicted on an internet weather service. Trucks previously used to spray weed-killing and other chemicals were modified to dispense the liquid MgCl. Chemical application rates varied depending on the nature of the threat. Several areas along the highway were repeatedly checked to determine when frost on shoulder lanes began to migrate to the

travel lanes. (These areas indicate when the road should be retreated to ensure that chemical concentrations are high enough to prevent freezing.)

Winter road maintenance activities were analyzed for five years prior to the anti-icing program and for three years after implementation. Mobility, productivity and safety were all enhanced due to the anti-icing treatment strategy. A single application of MgCl was effective at improving traction for 3 to 7 days after application. Snow and ice were cleared faster, operation costs declined and productivity was enhanced. Wintertime crashes were also reduced.

Anti-icing was expanded to other highways throughout Idaho as a result of this anti-icing program's success. ■

## Calendar

See our web site for even more calendar listings. [www.kutc.ku.edu](http://www.kutc.ku.edu)

### ... 2003 ...

\*KDOT Traffic Engineering Inspection School  
Feb. 4-6—Hutchinson  
Feb. 18-20—Lawrence

\*Workplace and Equipment Safety  
February 13—Iola  
March 11—Garden City  
March 12—Hays  
March 13—Salina

\*Culverts & Drainage  
March 3—Dodge City  
March 4—Hays  
March 5—Salina  
March 6—Chanute  
March 7—Lawrence

\*Older Driver Highway Design Workshop  
March 4—Wichita  
March 5—Topeka

\*\*March 13  
Click, Listen and Learn: Understand the Value of Your Right of Way

\*March 17-20  
Traffic Engineering for Technicians in Chanute

\*March 17-April 2  
Paved Road Maintenance  
6 sessions in Kansas

\*March 25-April 9  
Gravel Road Maintenance  
5 sessions in Kansas

March 23-27  
NACE Annual Conference in Buloxi, MS  
Call 202/393-5041

\*Risk Management for Road Crews  
April 2—Salina  
April 9—Topeka

\*\*April 9  
Click, Listen and Learn: Selection of Consultants

April 30-May 2  
Spring Meeting of Kansas Chapter APWA in Manhattan, KS  
Email Chuck Williams at [Williams@manhattan.ks.us](mailto:Williams@manhattan.ks.us)

May 12-14  
Spring Meeting, Kansas County Hwy Association in Manhattan, KS  
Call Rod Meredith at (785) 539-2981

\*May 13  
MUTCD for Technicians in Hutchinson

May 20-21  
Transportation Safety Conference in Wichita  
Call KU Continuing Education at 877/404-5823

\*\*May 22  
Click, Listen and Learn: Managing the Public Response

For information on calendar items indicated with a \* or to suggest a topic for a future LTAP workshop, contact:

Rose Lichtenberg, LTAP Training Coordinator  
785/864-2594  
[rosemary@ku.edu](mailto:rosemary@ku.edu)

\*\*To register for the APWA/LTAP "Click Listen and Learn" workshops, call Ashley Gann at (816) 472-6100 ext. 3511. Cost is \$150 per site.

Also see our training article on page 7.

# Free Resources

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

KUTC Materials Request, 1530 W. 15th St., Room 2011, Lawrence, Kansas 66045 or fax to 785/864-3199

## Videos .....

One video per lending request. Two week lending period.

**Forest Roads and the Environment**

by U.S. Forest Service, March 2002. This video examines the effect of maintaining gravel roads on water quality. It poses this question: How can we have the roads we need and safeguard the environment? It contains a particularly good segment on what sedimentation is, how it happens, and how it affects water bodies and wildlife. The setting of this video is the Coronado National Forest in southern Arizona which gets less than 12 inches of rain per year. It shows how to maintain gravel roads while being sensitive to a dry and vulnerable environment.

## CDs .....

Two week lending period.

**Winter Maintenance Training Materials CD-ROM**

produced by the Salt Institute, 2002.

**Best Practices for Road Weather Management**

produced by the Federal Highway Administration, 2002.

## Publications .....

You are free to keep these unless otherwise noted.

**Trucking Through Kansas...2002**

This booklet consolidates the regulatory requirements for the trucking industry in Kansas. Published by KDOT, 2002.

## Equipment .....

Available free—for loan to local highway agencies. Call us at (785) 864-5658 to arrange time period needed for loan. There could be a waiting list for these items.

**Jamar Technologies, Inc. (DB-400) Turning Movement Counter Board**

A basic model for recording turning movements at intersections. The board is is lightweight and comes with its own case.

**Jamar Technologies, Inc. (TDC-8) Turning Movement Counter Board**

Can be used to do turning movement counts, classification counts, gap studies, stop-delay studies, speed studies, and travel time studies. The board is is lightweight and comes with its own case.

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# Kansas LTAP

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The Kansas Local Technical Assistance Program (LTAP) is an educational, research and service program of the Kansas University Transportation Center (KUTC), located in the University of Kansas School of Engineering. Its purpose is to provide information to local and county highway agencies and transportation personnel by translating into understandable terms the latest technologies in the areas of roads, highways and bridges.

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

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