

KUTC Newsletter

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An issue on worker safety

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A real pain

Repetitive strain injuries and how to avoid them

... by Laura Snyder

[Editor's note: Worker safety in road departments depends on the good sense of the worker, quality equipment, training and policies of the employer, and citizens who pay attention when driving near road construction and maintenance activities. This issue will provide tips and resources for helping keep our road department employees safe and healthy on the job.—L.H.]

Whether you are an equipment operator who spends most of your day sitting in a vehicle, a mechanic who uses hand tools, or a GIS technician who sits at a desk all day, you might be at risk of developing a repetitive strain injury. Called musculoskeletal disorders, or MSDs, by the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA), these injuries include a number of disorders such as Carpal Tunnel Syndrome, tendonitis, and low back pain.

According to Jaye Cole, director of Lawrence Memorial Hospital's Kreider Rehabilitation Services, the term "musculoskeletal" refers to the soft tissues supporting the skeletal system injured by chronic

overuse or misuse, including muscles, tendons, ligaments, joints, and cartilage. Common symptoms of musculoskeletal disorders include pain, swelling, numbness, tenderness, muscle spasms, weakness, or loss of joint mobility or coordination.

A single strain or sprain will not cause a musculoskeletal disorder. You are more likely to develop an MSD over time from repetitive use and misuse.

Who is at risk?

Equipment operators and office staff who mostly sit throughout the day are especially susceptible to MSDs in the lower back.

Bonus in this issue: KUTC Newsletter article index for 2000-2004

Heavy lifting, such as shoveling gravel or changing attachments on a machine may contribute to the problem. Office staff can also suffer wrist injuries from regular keyboard use.

Road maintenance workers and mechanics risk inflammation of the wrists

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A real pain,
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and hands from using tool handles that are too short or dig into their wrists or palms. Vibration from power tools over time can cause MSDs, as can exerting extra force while lifting, pulling, pushing, or gripping a tool.

Medical conditions and lifestyle add to work-related MSDs. Joint disease, arthritis, diabetes, gout, pregnancy, and the use of oral contraceptives increase the risk of, or worsen, MSDs. Certain health conditions may slow the healing process. Arthritis especially “puts fuel to the fire” by contributing to an existing inflammatory process, said Cole.

Cole compares trying to perform a job task with an MSD to trying to drive a car with a bent axle. “You’re not going to get very far,” she said. “If you’re doing [the task] in a position that puts a lot of stress on the joints, you’re not going to be able to keep doing that.”

What can workers do to prevent MSDs?

Cole said MSDs are more likely to result from misuse than overuse. You can decrease the likelihood developing an MSD by: 1) maintaining good posture, 2) stretching, and 3) getting moderate exercise.

Slouching can cause back pain for workers who spend the majority of their time sitting. “If you sit it a slouched position all the time, it puts stress on ligaments that hold the bones in place,” said Cole. Even worse, when you have to exert yourself to lift something heavy, your ligaments will not be as strong and you will put your body at risk of injury.

When sitting for extended periods of time, try to sit upright. Place a rolled up or folded a towel in the small of your back to prevent slouching. You can also purchase lumbar pads that serve the same purpose.

Stretching is key to avoiding

Here are a few common musculoskeletal disorders and their symptoms:

Carpal Tunnel Syndrome is caused by constant bending of the wrist or pressing it too firmly against a hard object, like a tool or steering wheel. Compression of a nerve in the wrist causes inflammation and numbness in the hands, wrists, and fingers. **Tendonitis** is the inflammation of a tendon or its sheath-like outer layer. Typical tendons affected by work practices are in the wrist, fingers, elbow and rotator cuff in the shoulder. **Low back pain** is caused by frequent or incorrect lifting, pushing, pulling, bending, or reaching, or sitting incorrectly.

MSDs. Cole suggests planning simple stretch breaks every hour. During a break, stand up, walk around, stretch in the opposite direction of what your body has been doing, arch your back, then curl over and try to touch your toes. These exercises send new oxygen into the muscles and prevent tightness and stiffness from building up.

What can employers do?

MSDs cost the U.S. more than \$2.1 billion each year in workers’ compensation, according to the National Occupational Research Agenda. Taking steps to make your work conditions physically comfortable will increase your worker productivity, boost morale, and decrease workers’ compensation premiums. This practice, called ergonomics, involves choosing equipment, work spaces, and job tasks to fit the physical capabilities of workers of all shapes and sizes in order to prevent injuries.

As much as possible, make sure vehicle seats are comfortable, upright, and most importantly, adjustable. That way, the driver can ensure that there is a healthy distance from the seat to the foot pedals. The hips and knees of the driver in the seat should be at a 90 degree angle. The same principles apply to office chairs.

Mechanics can limit the incidence of MSDs by reevaluating tool size and shape. Look for tools that require the least amount of grip. Select vibrating tools that do not blow cold air over the hands. Cold air reduces blood flow in the hands and

decreases muscle strength, putting a worker at higher risk of injury. Thick handle surfaces on vibrating tools will decrease vibration without requiring a stronger grip.

In the office, use adjustable keyboard trays that allow for height to be fitted to individual workers. Keep your wrists straight while typing. Try using a padded wrist rest and be sure to keep the keyboard flat instead of tilted. The padded rest also keeps the wrists off sharp desk edges. Position your computer monitor directly in front you so you can avoid twisting your neck excessively.

Another thing an employer can do to prevent MSDs is *train*. Teach your workers about MSD prevention and encourage them to stretch and maintain good posture.

Federal and state guidelines

Neither the Occupational Safety and Health Administration (OSHA) nor the Kansas Department of Labor (KDOL) has an ergonomic standard. This makes it difficult to cite hazards unless injuries are actually reported, according to Rudy Leutzinger, Administrator of Industrial Safety and Health at KDOL.

If there is no injury reported, inspectors can still make recommendations for hazard abatements as a preventative measure. OSHA has a set of ergonomic guidelines, which Leutzinger said KDOL primarily relies upon when identifying hazards.

In state, city, and county agencies, hazards can be discovered either by

employee complaints or during inspections. Employees can phone in complaints to KDOL or to the Kansas Department of Administration's Division of Personnel Services.

Leutzinger said KDOL tries to perform inspections in the public sector every three to five years, but recent budget cuts have made it difficult to achieve the desired frequency of inspections.

Another way KDOL discovers hazards is to monitor reports of workers' compensation, injuries and illnesses. A high number of injuries would prompt KDOL to notify an agency and offer assistance in hazard abatement.

City or county agencies can be penalized under KSA 44-636 for \$25 to \$100 per hazard per day, but Leutzinger said KDOL has never assessed penalties. He said they are more concerned with getting the hazard corrected within the required 60 days. "As long as they do that, we don't see any reason to penalize or fine," he said.

For private contractors, OSHA's hazard penalties run up to \$7,000 for serious violations and up to \$70,000 for willful, repeated violations.

Inspectors may reduce fines depending on good faith of business owner or the size of the business. Private companies with less than 250 employees may request a free consultation with KDOL to assess safety hazards, develop training programs, and write a health and safety plan. For more information on this service for businesses, contact Rudy Leutzinger at (785)296-4386.

The sources for this article contain much more detailed information than we have space for here. All are available on-line.

Center for Disease Control:
Ergonomics— www.cdc.gov/od/ohs/Ergonomics/ergohome

Kansas Department of Labor:
Workers Compensation Industrial Safety and Health Section—

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Choosing and using the right work gloves

Work gloves cannot prevent hand injuries; only safe and conscientious work practices can do that. But choosing the right work glove for the job can help protect you from unnecessary injury and disability if an accident should occur. When protective handwear is required for the job you perform, make sure that the gloves you use fit well and are comfortable to wear and are rated to guard against the particular hand hazards you face.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against.

Disposable gloves. Disposable gloves, usually made of light-weight plastic, can help guard against mild irritants. (These gloves are often used for food-handling operations.)

Fabric gloves. Gloves made of cotton or fabric blends are generally used to improve your grip when handling slippery objects. They also help insulate your hands from mild heat or cold.

Rubber gloves. Although commonly called "rubber," these gloves may actually be made of rubber, neoprene, poly vinyl alcohol or vinyl. These gloves help protect hands from corrosives such as organic acids and petroleum-based products.

Leather gloves. These gloves are used to guard against injuries from

sparks or scraping against rough surfaces. They are also used in combination with an insulated liner when working with electricity.

Metal mesh gloves. These gloves are used to protect your hands from cuts and scratches. They are used most commonly by persons working with cutting tools or other sharp instruments.



Aluminized gloves. Gloves made of aluminized fabric are designed to insulate your hands from intense heat. These gloves are most commonly used by persons working with molten materials.

Although these are the most common types of work gloves, many gloves are designed to protect against specific hazards. For instance, workers exposed to radiation hazards wear specialized lead-lined gloves. It's also important to remember that your work may require that you use additional hand protection other than gloves which may include approved barrier creams, forearm cuffs, hand pads, mittens, or finger cots. Your supervisor can help you determine the appropriate protective handwear for your particular job, but only you can make them work—by wearing them.

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Photographs by Mehrdad Givechi

Road officials tour California safety improvements



Above, showcase participants from around the country gather for an on-site presentation of road safety features.

At left, J.R. McMahon, Miami County road supervisor, and Mike Graf, Ellis County public works administrator, attended from Kansas. Mehrdad Givechi, Kansas LTAP, also attended.

Below, participants were shown different treatments for signing certain situations on roads and were told which treatment was most effective for a given situation.



... by Lisa Harris

Last September, 188 road officials converged in Mendocino County, California, to attend a showcase of low-cost safety improvements for low-volume roads. Travel and registration scholarships were made available to many participants from local governments, including two Kansans: J.R. McMahon, Miami County and Mike Graf, Ellis County. Mehrdad Givechi of Kansas LTAP also participated in the showcase. The showcase was sponsored by a host of public and private organizations.

Why it was held

The workshop was held because of the need for low-cost safety improvements on rural roads in the United States, and because of Mendocino County's successful implementation of some low-cost measures. After studying their safety needs and implementing some changes, the county experienced a 42 percent decrease in accidents.

Comments from participants

McMahon said that while many of the improvements demonstrated at the showcase were common sense, sometimes common-sense solutions are overlooked in determining solu-

tions to problems. The showcase offered a good reminder to not overlook simple and low-cost solutions. Graf said he got some good ideas from the showcase and plans to conduct a drive-around safety audit in his county.

What's next? Givechi plans to develop a course for Kansas LTAP based on information and the

approach learned at the Mendocino showcase. Look for more information later in 2005. FHWA is also planning to produce two videotapes about information shared in the showcase.

For learn more about the Mendocino showcase or other showcases, visit <http://pdshowcase.org> or contact Mehrdad Givechi at (785) 864-2593. ■

Drive away those yawns

Ten ways to stay awake if you must drive when drowsy.

... by Courtney Hansen

Fatigue while driving is a major problem on America's roads. According to the National Sleep Foundation (NSF) one-fourth of 18- to 29-year-olds surveyed reported dozing off at the wheel.



Of course, the best way to combat this is to avoid driving drowsy. It's important to get a good night's sleep, learn to recognize when you're too tired to drive safely, and avoid driving late at night. Unfortunately for some of us, though, these tips just don't apply when we are called in the middle of the night to do emergency road maintenance. While the NSF states there is no "stay-awake" strategy proven to consistently increase alertness to a safe level, we found a few strategies that might help you stay awake if your sleep is interrupted by an emergency call.

- **Bring a bag of ice.** Chewing ice can help keep you awake, and if you rub an ice cube on your eyelids or on the back of your neck, the surprising chill will stimulate your senses.

- **Belt out some tunes.** It's always a good idea to have a passenger awake

and willing to keep a conversation with you, but if this isn't an option, the radio can be a suitable substitute. Turn it to an upbeat station with songs you know and shout the lyrics. You may look silly, but you'll

look much sillier with the front of your vehicle scrunched up against a telephone pole or tree.

- **Keep the cab cool.** Warm air and a comfy driver's seat are very good at facilitating sleep. Keeping the air around you colder than you would for comfort should help you stay alert.

- **Bring a "high-effort" snack.** Eat something that requires a bit of effort, such as sunflower seeds with the shell still on. Make sure that you don't eat too much, though, and don't bring something that requires so much effort that you're distracted from driving.

- **Do a mini-workout.** Exercise some of your lesser-used muscles to get your circulation going. Flex your stomach muscles, your calves, etc. This will wake up your muscles and help your blood carry more oxygen to your brain.

- **Suck on a strong mint or sour candy.** This will stimulate your taste buds and give you something to do with the muscles around your mouth besides yawn.

- **Take a break.** If you feel as though you're going to fall asleep, take a little break. Get up, stretch, and run around your vehicle a couple of times to wake up your body.

- **Play a mental game.** To keep yourself from getting a deadly case of "highway hypnosis," play a game that forces you to notice your surroundings. For example, try to find something that starts with the first letter of the alphabet, then the second, and so on.

- **Use caffeine effectively.** Most people think that taking one large dose of caffeine will keep them up for hours, but the reality is that the drug wears off quickly, and the "fall" after it's gone from your bloodstream will actually leave you feeling more tired than before. If you're going to use caffeine to stay awake, take small doses every 20-30 minutes.

- **Plan ahead if possible.** If you know you're going to be on call in the night, try to get some sleep beforehand. At the least, take a short nap of about 20 minutes. If you have more time than this, get at least one and a half to two hours of sleep. This will allow your body to complete at least one cycle of deep sleep. Sleeping more than 20 minutes but less than an hour and a half will almost certainly cause a disruption in deep sleep, which may leave you extremely tired.

Sources: Tips for staying awake are from www.eHow.com and www.soyouwanna.com, privately-run collections of information and instructions that feature input from readers. Statistics are from the National Sleep Foundation Web site at: www.sleepfoundation.org. ■

This Web site has work zone tips for everyone

www.ops.fhwa.dot.gov/wz/index.asp

... Courtney Hansen

Much like the roads to which it is dedicated, the Federal Highway Administration's work zone Web site has undergone an overhaul. The new Web site, at www.ops.fhwa.dot.gov/wz/index.asp, is broken down into eight sections, and within each is a wealth of information. Some of it applies to larger transportation agencies, while some of

what has worked in similar situations or share a solution that worked well on their own projects. A best practices guide from Colorado is also found here. While our neighbor to the west has some different roadway challenges than Kansas, its road workers also have to deal with many of the same issues, and having easy access to two such guides can only be an aid in finding information you need.

The 90-minute best practices

useful if alternate routes are impractical. These strategies and others are found on the Web site, which describes each approach as well as when and how to use it.

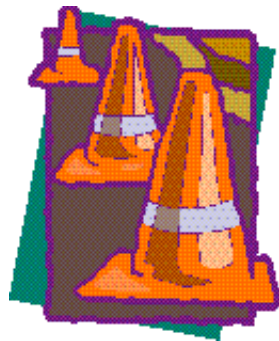
—In the "ITS & Technology" section, Web site visitors can read about the ITS Peer-to-Peer program, a national technical assistance program that provides free short term assistance, usually in the form of one-on-one information exchange, to those who request it. For example, the program will provide agencies with assistance with traveler safety and security, emergency services, and fleet operation and maintenance.

—A work zone self-assessment guide can be found in the "Performance Measurement" section. This tool can be adapted to the size of any project or organization. Using this tool, you can evaluate your agency's use of work zones and identify areas that need attention.

—The "Outreach and Training" section contains downloadable workshops for improving work zone practices as well as both a list of National Highway Institute courses and a directory of Local Technical Assistance Program (LTAP) centers.

—A guide to creating work zone incident management policies is included in the "Work Zone & Traffic Analysis" section.

If you can't find what you're looking for, the Web site also includes an alphabetical subject index for locating information more easily. The site contains much more useful information than what has been outlined here, so doing a bit of your own exploration may lead you to information you didn't know was so easy to find. ■



The site provides a work zone self-assessment guide that can be adapted to the size of any project or organization. Using this tool, you can evaluate your agency's use of work zones and identify problem areas and solutions.

it pertains to those with more modest projects and budgets.

Each of the eight sections has several different features. For example, the section entitled "Best Practices" has a guidebook and a link to a related training module. Visitors can even submit their own best practices to share with others. The "Regulation and Policy" section links to the *Manual on Uniform Traffic Control Devices*, and other FHWA publications related to work zone safety.

While just about all the information on the Web site is useful to some degree, the following areas you may find particularly so.

—The "Best Practices" section helps agencies compare their work zone procedures with those of other agencies. Project planners can find out

training module link outlines a course that could be offered to road workers to introduce them to the information in FHWA's best practices guidebook.

—Another page worth looking at is the Utah LTAP's innovative contracting page. Located in the "Contracting Strategies" section, it outlines several approaches to contracting work zone work that make the process more efficient. For example, the site advocates using "cost plus time" bidding to make sure that getting the lowest price on a contract doesn't mean prolonging the life of the project. To the same end, it also suggests building "lane rental" into the contract, where contractors pay to rent any road space they need to close off while working on the project. This is particularly

Ellis County's one-day training refresher

... by Lisa Harris

Safety is priority number one in highway agencies, but sometimes safety awareness can get lost in the shuffle of just trying to get the job done. It's helpful to give your staff training opportunities as a reminder.

Ellis County Public Works holds a one-day refresher each fall, and safety is a major focus. Shop Foreman Mark Polifka and Public Works Secretary Donnetta Pfieler did most of the planning and preparation for the last session, on November 18, 2004. The refresher mixed presentations with hands-on activities to keep things interesting.

The morning departmental session included an activity where teams of workers joined together to complete a task for a prize. *Planning, communication and team* -

Agenda on 11-18-04

- 7:30-8:00—Refreshments
- 8:00-9:30—Departmental administrative and safety issues, and team activity
- 9:30-10:00—Carl Eyman from KWORC gave a presentation on winter driving safety, and showed a video presentation.
- 10:00-10:15—Break
- 10:15-11:15—Dave Keener from Vance Brothers talked about safe maintenance and operation of the department's crack sealer, including a walk-around.
- 11:15-12:10—Carl Eyman gave a refresher on chainsaw safety, and showed videotape on the topic.
- 12:10-1:00—Lunch provided by the county
- 1:00-2:00—Tim Mullin, UP Railroad, gave a presentation on railroad safety, with videotape.
- 2:00-4:00—Representatives from Foley Equipment, Hays Mack, and Sellers Tractor helped present walk-around inspections for a loader, mower, snow plow and spreader owned by the county.

discover. Public Works Administrator Mike Graf said "Sometimes our staff spotted problems we didn't even see

Sometimes our staff spotted problems we didn't even see when setting up the tests. It's an interesting exercise, and it's good for everyone involved.

work were necessary to complete the task effectively. This hands-on exercise demonstrated the importance of these three aspects of public works. [Look for more about this team-building activity in a future issue.]

The afternoon session with equipment walk-arounds included some simulated problems for employees to

when setting up the tests. It's an interesting exercise and good for everyone involved." Problems included missing bolts and pins in various places, missing safety features, leaks, and more.

For more information about setting up a refresher like this one, call Mark Polifka at (785) 628-9455. ■

Foundation accepting applications for memorial scholarship



The American Road & Transportation Builders Association

Transportation Development Foundation (ARTBA-TDF) is now accepting nominations for the Highway Worker Memorial Scholarship Program for the 2005 academic year. The program provides financial assistance to help the children of highway construction workers killed or permanently disabled in the line of duty pursue post-high school education.

The scholarship program was launched in October 1999 through a generous \$100,000 gift from the families of past ARTBA Chairmen Jack and Stan Lanford of Roanoke, Va.

Over the past five years, more than 25 students have been selected as scholarship recipients. The scholarships have a value up to \$2,000 to attend a post-secondary institution of learning that requires a high school diploma or Graduate Equivalent Degree (GED). Scholarships are supported by contributions from highway construction industry executives, firms and labor groups nationwide.

Go to www.artba.org for information on eligibility and selection criteria.

Applications must be postmarked by April 15, 2005. To obtain a copy of the application, contact ARTBA's Rhonda Britton at (202) 289-4434 or go online to the association's Internet Web site at www.artba.org. Scholarship winners will be announced on or before July 15, 2005.

Source: www.artba.org ■

KDOT Komer

State and local road workers learn together at KDOT training Expo

... by Laura Snyder

If you're looking for a way to brush up on your safety skills, share ideas with workers from around the state, and view and ride the latest equipment, check out the Kansas Maintenance Training Expo this fall.

Who attends?

Every fall over 700 transportation workers gather in Salina for the Kansas Department of Transportation's Maintenance Training Expo. The sixth annual Expo, held Sept. 8 and 9, 2004, had 600 attendees from KDOT, 100 from local agencies, and workers from the Kansas Transportation Authority, according to Jaci Vogel, state maintenance engineer and chair of the Snow and Ice Committee. KDOT rotates their workers every three years to give everyone a chance to attend the Expo. Last year, eight different counties and cities in Kansas sent staff to the Expo. Vogel said the Expo is specifically aimed at maintenance crews and supervisors, both veterans and those new to the field.

How it started

KDOT organizes the Expo, which expanded two years ago from winter training to include year-round maintenance training. Although the Expo was originally for KDOT workers only, it is now open to local governments as well. The Kansas Chapter of the American Public Works Association helps publicize the event.

What to expect

The event lasts for one and a half

days. Participants register in advance for particular areas of interest and are assigned to a group. At the Expo, participants gather into these groups for the day. People from the same organization usually do not end up in the same group.

Each group has about 45 to 50 participants and attends about a dozen classroom sessions and a ride and drive session. The group also visits the vendors together.

Duane Zook, street superintendent for the city of Salina, said breaking into groups is an excellent way to meet people. "Most of the time when you go to a meeting, you stay in your comfort zone, with the people you know," said Zook. "When you split up in groups, you get to talk about what different agencies do."

Variety of sessions

The 2004 Expo included sessions on topics such as maintenance and trouble-shooting of hydraulic spreader controls, proper snow plowing, weather forecasting, spreader settings, and using automated vehicle location systems.

Lon Schrader, street supervisor for the city of Abilene, said he enjoyed the trenching and excavating and the Road Weather Information Systems (RWIS) sessions the most. RWIS is a method of putting sensors in the pavement in different locations across the state. The sensors report the temperature, precipitation, and amount of de-icing chemicals on the roadways from those particular locations.

Equipment

About 100 vendors display equipment

each year, including bulldozers, motor graders, tractors, mowers, back hoes, and crack-sealing machines. The Expo includes a two-hour period to chat with the vendors about new equipment and practices.

"It's fun getting an opportunity to talk to the vendors, to see what's out there, and if it might suit our needs differently," said Zook.

Schrader tells new attendees to use the opportunity to learn about the newest equipment. "I tell these guys to try and see as much new equipment as possible, even if you can only dream about ever having it!" he said.

In addition to viewing new equipment from vendors, a ride and drive session was added two years ago. Participants operate skid steer loaders, motor graders, bucket trucks, and other machines, provided by KDOT. Vogel thinks it is important for workers to keep up with new technology. "There is a need for this, because equipment and technology are continually changing," she said. "It's not a stagnant world."

Safety

Review of safety practices is also a strong theme at the Expo. Presentations in 2004 that addressed safety included preparation, application, and safety for crack sealing; traffic control in work zones; proper trenching and excavating; and chain-saw maintenance and safety.

Schrader suggests attending all of the sessions to review proper techniques and safety. "You are going to hear some things that might be old

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KDOT Maintenance Expo, *continued from page 8*

news to you because you've done it before, but there's always something that you can learn from somebody there," said Schrader.

Zook agreed. "Some people have a tendency to just visit the vendors out there and not attend all of the sessions, but there's a lot to learn sitting in a class, too," he said.

Expert panels

Some of the most popular sessions at the Expo are the expert panels. Each panel is made up of three people — usually one KDOT employee and two others whose agencies differ by size or location. The panel members discuss methods used by KDOT and in their own cities or counties, and field questions from the audience.

Zook has participated in an expert panel the last two years and said the audiences respond well. Zook's panel discussed the differences between using salt brine on icy roads, which KDOT uses, and magnesium chloride, which Salina uses.

Schrader sees the expert panels as a good educational opportunity. "You know, when you're working in a town of 6,000 people, there's bound to be people doing things differently somewhere else," he said.

Popular with attendees

The Expo has continued to draw a crowd every year. "We fill up every motel in the city of Salina," said Randy West, maintenance engineer for District Two in Salina and member of the Snow and Ice Committee. Vogel attributes the popularity of the Expo to the opportunity for transportation workers from different agencies and locations across the state to share strategies. "The more diverse the attendants, the greater the experience," said Vogel. "We're all sharing and gaining and know where improvements need to be made."

Although attendance has slightly decreased in the last two years, Vogel believes this is due to tough economic times, when funds for training are more difficult to free-up. Still, it's a bargain. The \$35 registration fee, which includes a lunch and dinner, has stayed the same over the years.

Vogel thinks the Expo can help attendees better cope with economic struggles. "In difficult economic times, you are having to do more with less, and fewer people," said Vogel. "You just need to work smarter and take advantage of improved processes." The Expo provides an opportunity for workers to meet and discuss different strategies.

The next KDOT Maintenance Expo is September 7-8, 2005, in Salina. Give your crews a break after a long summer of road work by taking them along. It's a good learning experience, and it's fun, too. Contact Jaci Vogel at (785) 296-3576 for a registration form.

Sources

"Maintenance Training Expo garners high marks," by David Greiser, *Translines*, Kansas Department of Transportation, Oct. 2004.

Sixth Annual Kansas Maintenance Training Expo attendee registration information, from KDOT. ■

Ten Commandments for Shop Mechanics



1. Thou shalt keep thy shop neat and clean with tools in place and oil spills cleaned up lest thou slip and fall, banging thy head or slipping thy disk.
2. Thou shalt wear eye protection when welding, chopping, sanding, or grinding; otherwise, thou may become a lifelong companion to a seeing eye dog.
3. Thou shalt block up vehicles being serviced; do not trust jacks and hoists because their failure could crush thee.
4. Thou shalt not use thy legs as a sawhorse for power tools lest thou become a one-legged worker.
5. Thou shalt lay thy butane lighter far aside when welding. It is equivalent to a stick of dynamite and could blow thee to thy eternal reward.
6. Thou shalt not use thy file as a pry, thy pliers as a wrench, or thy knife as a punch, lest thou skin thy knuckles or cut thy hand and take the name of thy Lord in vain.
7. Thou shalt discard thy broken and badly worn tools because they will lead to disaster and bloodshed.
8. Thou shalt inflate tires in a cage, lest the ring fly off and behead thee.
9. Thou shalt keep fire extinguishers in operating condition and never use gasoline as a cleaning agent, lest thee exit through the roof.
10. Thou shalt match thy tool to the job and thou shalt watch out for fellow workers. Be thy brother's keeper in the shop.

(from Rhode Island LTAP newsletter)

This and that Tips from Toolboxtopics.com

Welcome new leaders in the profession. Congratulations to these new elected leaders in Kansas: Mike Graf, president, Kansas County Highway Association; Suzanne Loomis, who has agreed to serve a second term as president, Kansas Chapter of the American Public Works Association (AWPA), and Steve Schmidt, president of the Kansas City Metro Chapter of APWA.

New county road scholar grads.

The Kansas County Highway Association, in cooperation with Kansas LTAP and the Kansas Association of Counties, is pleased to announce its second group of road scholar graduates, 34 in all. They are:

Coffey County: Marty Black, Bruce Hegwald, Marcus Raymer, Robert Reed, Doug Young, John Zuern; **Jefferson County:** LeRoy Boyd, Eric Colgrove, Pat Harrington, Terry Hehn, Dennis Henning, Phillip Hoffman, Jim Polaski, Douglas Porter, Ted Roberts, Fred Smelser, Larry Stephens, Sam Summerville, Gary Thoma, Erik Welborn, Don Wright Marlin Youngquist; **Osage County:** Glen Tyson; **Saline County:** Max Adkins, Craig Combs, Dennis Cooley, Chris Friess, Robert Gluckman, Tim McDanel, Jerry Peters, Mike Reinbold, John Taylor; **Smith County:** Dale Gager; **Stanton County:** Curtis Houser. Congratulations!

Hydraulic modeling course to be offered in June. Kansas LTAP is hosting a course entitled "Hydraulic Modeling with HEC-RAS 3.1.2 and HEC-GeoRAS 3.1.1" on June 1-2 in Lawrence. The course is designed for county and city staff who manage water runoff, and consultants who act on behalf of those entities. For more information, call Rose Lichtenberg at (785) 864-2594. ■

The above Web site is worth a look. It is maintained by a retired insurance agent who has a passion for safety and wants to pass it on. You'll find common-sense tips for your crews. The author provides facts and figures without detailed references, so be aware that these are not scientific studies. But the information seems sensible. Here are a few examples, adapted slightly. —L. Harris, editor.

How to lift safely



Lifting safety starts before you lift. Remember: You only have one back and you must take care of it. The factors that determine if objects can be lifted and carried safely are:

- Approach the load and size it up (weight, size and shape). Consider your physical ability to handle the load. Get help if there is any doubt.
- Place your feet close to the object to be lifted and 8-10 inches apart; one foot alongside and the other behind the object.
- Bend your knees to the degree that it is comfortable and get a good handhold. Then, using your leg and back muscles, lift the load straight up, smoothly and evenly. Pushing with your legs, keep the load close to your body.
- Lift the object into carrying position, making no turning or twisting movements until the lift is completed.
- Turn your body with changes of foot position, after looking over your path of travel to make sure it is clear.
- Setting the load down is just as important as picking it up. Use your leg and back muscles, and comfortably lower the load by bending your knees. When the load is securely positioned, release your grip.
- Over-reaching and stretching to reach overhead objects may result in strains or falls. Use a ladder instead of pallets, chairs, boxes carts or flat tops.
- Avoid awkward positions or twisting movements while lifting.
- And again, get help if the weight, shape or size factor indicates that the object cannot be lifted or carried safely.

Are you recovering from back pain from a prior injury? Is it job-related? How do you know?

Back pain can affect us both on and off the job, and it is important to understand and have some knowledge of the various causes of backaches. These causes are:

- 70 percent result from degeneration or aging of the spinal disc;
- 20 percent are due to inflammation (arthritis, urinary infection, etc.);
- 10 percent are due to actual back injuries and miscellaneous causes.

If you suffer from back pain, it may or may not be job-related. A diagnosis and evaluation by a doctor can help you understand your particular condition and help you understand how to treat it.

Hard hat exemption program

If you are one of those individuals who believes a hardhat, in general, is just a pain in the you-know-what, this program is for you.

Every employee is required to wear a hardhat on the job. But if you earn a certificate of exemption, you will be excused from this requirement. The program works like this: If your head meets the standards for head protection, you don't need a hardhat. Upon successful completion of testing, you will receive a certificate identifying your head as conforming to American National Standards Institute requirements (ANSI Z89.1 and Z89.2 classes A, B, C and D). You will also receive a wallet-sized card you must carry at all times. The tests include the following:

You will undergo a 24-hour water immersion test. A maximum of permitted absorption is 0.5% by weight. Air will be provided for the 24 hours at no charge.

Next, an impact test will be conducted. While lying horizontally, with your head resting on a steel plate, an 8-lb. steel ball will be dropped on it several times from a



height of 5 feet. If your head is not damaged, you pass.

Next, your head will be subjected to the application of a variety of acids, solvents, oils, and industrial gasses. It must pass with no damage or deficiencies.

A propane torch will be used to determine if your head is fire resistant. If slow burning, you may only achieve a Class A or B rating. If there are any holes in your head, it will restrict you from a Class A rating.

On the final test, you must sustain 2200 volts AC, 60 Hz, for three minutes with leakage currents not exceeding nine milli-amperes. Breakdown threshold has been established at 30,000 volts.

All tests must be conducted at a variety of temperatures ranging from -20 degrees to 140 degrees F.

If you don't feel you can qualify, don't despair. Although not as pretty as your hairdo, your hardhat does provide protection for your head from all the above. Remember that unless you receive an exemption certificate, you must continue wearing your hardhat. Not wearing one is a privilege that will be granted only to those with proper certification and designated as genuine *hard heads*.

Easy as 1-2-3

Falling while getting into or out of heavy equipment or a truck, hooking up air and electrical lines, or mounting or dismounting trailers is a sure way to get seriously hurt. An insurance industry study showed that falls from vehicles produced injuries that were almost 25 percent worse than other types of injuries.

Even an ankle sprain can play havoc with your ability to use the clutch. Minor injuries can cost you big in terms of lost income and downtime.

The biggest single cause of falls from a vehicle is driver error and failure to follow the THREE-POINT rule.

What can you do to avoid falls?

No matter what type of access system your vehicle has available, use the

THREE-POINT system to significantly reduce the chance of a slip or fall. **The THREE-POINT system means three of your four limbs are in contact with the vehicle at all times—two hands and one foot, or two feet and one hand.**

The THREE-POINT system allows a person to have maximum stability and support, thereby reducing the likelihood of slipping and falling. Be a winner; use the THREE-POINT system.

Here are a few do's and don'ts to keep in mind when entering and exiting heavy equipment and trucks:

DO'S

- Wear footwear with good support.
- Exit and enter facing the cab.
- Get a firm grip on rails or handles with your hands.
- Look for obstacles on the ground below before exiting.
- Use extra caution in bad weather.

DON'Ts

- Don't climb down with something in your free hand. Put it on the vehicle floor and reach up for it when you get down on the ground.
- Don't rush to climb out after a long run. Descend slowly, to avoid straining a muscle.
- Don't ever jump out. You may land off balance or on an uneven surface, and fall.
- Don't use tires or wheel hubs as a step surface.
- Don't use the door frame or door edge as a handhold.
- Don't become an injury statistic.

The only person who can prevent a fall is you! The professional driver or operator knows all the do's and don'ts of getting in and out of vehicles and practices the THREE-POINT rule every day.

A Leg Up

That sinking feeling...

Some impact-absorbing surfaces for playgrounds and trails have a down-side in terms of accessibility.



... by Courtney Hansen

Since 2001, the Access Board and the USDA Forest Service have been studying materials for use on playgrounds and trails that are both accessible and impact-absorbing. Many commonly-used surfacing options, such as pea gravel or wood chips, absorb impact well, but fail the accessibility test. Wheelchairs and walkers can sink down into these surfaces, causing the person to get stuck or even tip over. Some surfacing options have better accessibility, such as molded rubber tiles, but these options tend to be too expensive for use on large playgrounds or trails.

To address this dilemma, researchers have been testing bonding agents on engineered wood fiber-wood pieces designed to be compacted into a more solid surface. The bonding agents, theoretically, allow the top layer of the wood pieces to stay together, creating a more stable surface while retaining the wood's impact-absorbing qualities, and remaining relatively inexpensive. Here's more about the tests they conducted:

Stage 1: Laboratory testing

In the first stage of testing, 12 samples with different binders of varying depth were placed in boxes 18 inches square with a 12 inch depth. Each sample was tested for accessibility using a rotational penetrometer—essentially a wheelchair caster mounted on a stand and rotated in four 90-degree segments. After this procedure, the surface is then evaluated to discover how much damage was done by the wheel.

Samples were also tested for impact absorption using an impactor—a hemispherical object capable of measuring the rate of deceleration as it hits the ground.

If the binders prove to be a viable way to make playgrounds and trails accessible, they will provide a solution that is much more cost-effective than most other surfacing materials on the market.

Several drops were executed to determine the effect of prolonged use. In these preliminary tests, only one type of bonding agent was eliminated, and this was because it reacted with water to create a potentially toxic substance. Others were deemed acceptable in lab conditions and were recommended for use in the second round of testing.

Stage 2: Field performance testing

Four binders: one silicone, one latex, one foaming polyurethane and one

non-foaming polyurethane were tested in the second stage, at various thicknesses. Test surfaces tested were:

- 2 inches of 35 percent silicone.
- 1.5 inches of 40 percent silicone.
- 1.5 inches of 30 percent foaming polyurethane.
- 1 inch of 30 percent foaming polyurethane over a layer of geotextile.
- Control sample; no binder.
- 2.5 inches of 30 percent latex.
- 2 inches of 25 percent latex over a layer of geotextile.
- 1.5 inches of 30 percent non-foaming polyurethane.

Each sample in Stage 2 was 4 feet square with a 15 inch depth. At the bottom of the sample was placed a layer of geotextile, covered with three inches of 3/4-inch rock. This was covered with another layer of geotextile, followed by the 12-inch layer of engineered wood fiber with the bonding agent at the top. The surfaces were tested outdoors over a 6-month period beginning in February so that the

samples would be exposed to both cold and heat.

The surfaces were periodically tested for accessibility and impact absorption just as in the first stage. All surfaces absorbed impact satisfactorily; however, the researchers found that the silicone binder became unstable over time. This stage also incorporated testing for durability and drainage. The study found that in all the bonded surfaces, the top layer prevented the underlying wood from drying, possibly causing the wood to

deteriorate; more research is necessary to determine if this would be prohibitive to public use of these systems.

Conclusions

At the close of the study, researchers found that the non-foaming polyurethane and the latex binders were the most suitable in terms of maintaining a balance between firmness and cushioning. The foaming polyurethane formed a hard shell over time which quickly became brittle, and the silicone began to deteriorate, breaking apart instead of remaining one continuous mat.

Stage 3: Field assessment

Last year, the Access Board and the Forest Service began a field test in Wisconsin of the two most suitable binders, on both a playground and a trail located in state parks. The use of public locations for this final stage will allow the surfaces to be subjected to daily use.

In this stage of testing, researchers are looking to see if the binders retain their impact-absorbing abilities and stability under normal wear and tear. They are also looking to see if the wood fibers drain effectively. If the binders prove to be a viable way to make playgrounds and trails accessible, they will provide a solution that is much more cost-effective than most others on the market. Hopefully, this will encourage a movement to make more surfaces accessible to those with disabilities.

The results of the final stage of testing should be released in the next few months. The complete report on Stage 1 can be downloaded at www.fpl.fs.fed.us/documnts/fplgtr/fplgtr135.pdf. The Stage 2 report is located at www.fpl.fs.fed.us/documnts/fplgtr/fplgtr138.pdf.

For more information on this study, contact Bill Botten at (202) 272-0014 or by e-mail at botten@access-board.gov. ■

Keeping our roads safer

... by Lisa Harris

I thought a relevant this issue on work would be a report and alcohol abuse among road workers and how affects safety. However, in researching this topic, I found there's not much to write about. That's because Kansas road departments are apparently doing a good job of keeping problem employees off their payrolls.

Road departments have some of the lowest rates of positive drug and alcohol tests among agencies in



the state, said Tim Harris, sales manager for the Consortium, Inc. Harris's organization is the state's primary drug and alcohol testing coordinator.

Road and public works departments also have some of the best compliance records in following drug and alcohol testing procedures. Harris describes road departments as "shining stars" in this regard among various types of agencies in the state.

Kansas road departments obviously take the potential safety concerns of drug and alcohol abuse seriously. Thank you for helping keep our roads—and your employees—safer! ■

National Work Zone Awareness Week

April 3-9, 2005

Visit the National Work Zone Safety Information Clearinghouse Web Site for data on work zone crashes and fatalities. <http://wzsafety.tamu.edu>.

FHWA's work zone Web site has fact sheets for motorists about driving through work zones. www.ops.fhwa.dot.gov/wz/resources/facts_stats.htm.

A real pain, continued from page 3

www.dol.ks.gov/wc/html/wcSHARP_DEE.html

Kansas Statute No. 44-636:
www.kslegislature.org/cgi-bin/statutes/index.cgi

National Occupational Research Agenda. **Musculoskeletal Disorders of the Upper Extremities—**
www.cdc.gov/niosh/nrmusc.html

U.S. Department of Labor, Occupational Safety and Health Administration. **Ergonomics: Enforcement—**www.osha.gov/SLTC/ergonomics/enforcement.html

U.S. Department of Labor, Occupational Safety and Health

Administration. **Ergonomics: FAQs—**www.osha.gov/SLTC/ergonomics/faqs.html

U.S. Department of Labor, Occupational Safety and Health Administration: **OSHA Facts Sheet - OSHA Inspections—**www.osha.gov/OshDoc/data_General_Facts/factsheet-inspections.pdf

U.S. Department of Labor. **Lost-worktime Injuries and Illnesses: Characteristics and Resulting Time Away From Work, 2002—**<http://stats.bls.gov/news.release/osh2.nr0.htm>

Washington State Department of Labor and Industries: **About Ergonomics—**www.lni.wa.gov/Safety/Topics/Ergonomics/default.asp ■

Reviews

... by Lisa Harris

2004 Workplace and Equipment Safety Fact Sheet,

Kansas LTAP. This is a workplace safety primer for road departments. It provides a simply-written, specific list of considerations to serve as a resource for safety conversations between workers and supervisors or supervisors and managers. Topics include hard hat use, tips for safe lifting, shop safety, trenching, safe motor grader and snow plow operation, sign installation safety, and more. Kansas county road and bridge staff reviewed the initial draft and gave input to help develop the final draft. 22 pages.

Guardrail Maintenance, Utah DOT, 1993. Examines maintenance procedures for three types of guardrail

installations. Covers removing damaged components, hanging new rail, and replacing posts. Safety is stressed. 15 minutes.

Safe Tree and Brush Removal,

Illinois DOT, 2003. This videotape demonstrates chain saw safety and maintenance, sawing techniques, felling trees, and trimming brush. 19 minutes.

Microsurfacing Application,

FHWA, November 2002. This is booklet number 5 in a "Pavement Preservation Checklist Series" jointly produced by the Federal Highway Administration and the Foundation for Pavement Preservation. It outlines the steps in a microsurfacing project, from bidding to clean-up and re-opening the road to traffic. It assumes

prior knowledge of microsurfacing and whether it is a good candidate surface treatment for the particular project. A few typical microsurfacing problems and solutions and are also covered. 13 pages.

State of Kansas Traffic Control Handbook for Flaggers,

KDOT, 1996. This excellent booklet, used by KDOT flaggers, explains flagger responsibilities, do's and don'ts, and specific information about hand signals, signing, and safety. ■

Calendar

See our web site for even more calendar listings.
Go to www.kutc.ku.edu and click on "Training Calendar."

... 2005

April 3-9
National Work Zone
Awareness Week

April 5-6
*NHI Course: Design
and Implementation of
Erosion and Sediment
Control
in Manhattan, KS

▲ *Culverts & Drainage
April 4—Garden City
April 5—Hays
April 6—Junction City
April 7—Wichita
April 8—Topeka

April 15-21
NACE 2005
in Bismarck, ND
Call 202-393-5041

April 17-20
APWA North American
Snow Conference
in Kansas City, MO
Call 816-472-6100

April 27-29
APWA/KCHA Joint
Meeting
in Salina, KS
Call Suzanne Loomis
at 316-284-6020

May 3-5
*NHI Course:
Computerized Traffic
Signal Systems
in Lawrence, KS

May 15-21
National Public Works
Week

May 19
APWA Roundtable
in Dodge City, KS
Call Suzanne Loomis
at 316-284-6020

May 24-25
Kansas Transportation
Safety Conference
in Wichita, KS
Call Kristin Tate, KU
Continuing Education,
785-864-4790

*June 1-2
Hydraulic Modeling
with HEC-RAS 3.1.2 and
HEC-GeRAS 3.1.1
in Lawrence, KS

*July 23-27
National LTAP
Conference
in Dubuque, IA

August 18
APWA Kansas Chapter
Snow Rodeo
in Manhattan, KS
Call Suzanne Loomis
at 316-284-6020

*September 27-29
NHI Course: Urban
Drainage Design
in Topeka, KS

▲ *Fall 2005
Bridge Maintenance
2 locations in KS

November 17
APWA Roundtable
in Ottawa, KS
Call Suzanne Loomis
at 316-284-6020

*For information on calendar items indicated with an * or to suggest a topic for an LTAP workshop, contact: Rose Lichtenberg, LTAP Training Coordinator, 785/864-2594, rosemary@ku.edu.

**To arrange for an APWA "Click Listen and Learn" workshop at your own location, call Ashley Gann at 816/472-6100 ext. 3511. Cost is \$150 per downlink.

▲ = meets Kansas County Road Scholar Program requirements

Free Resources

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

KUTC Materials Request, 1530 W. 15th St., Room 2160, Lawrence, Kansas 66045
or fax to 785/864-3199

Videotapes

Two-week loan period. Two video limit per request.

- Guardrail Maintenance**
15 minutes, Utah DOT, 2003.
- Safe Tree and Brush Removal**
19 minutes, Illinois DOT, 2003.

Publications

You are free to keep these unless otherwise noted.

- 2004 Workplace and Equipment Safety Fact Sheet**
Kansas LTAP, 2004.
- Microsurfacing Application**
Federal Highway Administration, 2002.
- State of Kansas Traffic Control Handbook for Flaggers**
Kansas DOT, 1996.

Equipment

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

- Turning Movement Counter Board DB-400, Jamar Technologies, Inc.**
A basic model for recording turning movements at intersections. The board is 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.

Order Form

Name	Phone number	

Position	E-mail address	

Agency		

Street Address		

City	State	Zip + 4

- send materials indicated
- address correction
- add to newsletter mail list
- send *KUTC 2004 Lending Library Catalog*

Note: Our video and publication catalog is accessible online, in a searchable format. Visit: www.ksltap.kutc.ku.edu

*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.

Kansas LTAP

Let us at the KUTC help you find the answers to your transportation-related questions.

KUTC, 1530 W. 15th St. #2160, Lawrence, KS, 66045
Call 785/864-5658 (fax 785/864-3199)
www.ksltap.kutc.ku.edu

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, townships, 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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