

2004 Workplace and Equipment Safety Fact Sheet

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Introduction

A portion of this Kansas Local Technical Assistance Program (KS LTAP) Fact Sheet: "Workplace and Equipment Safety" was taken from safety fact sheets provided by the Pennsylvania LTAP. KS LTAP staff rewrote some sections. Kansas county road and bridge staff reviewed an initial draft and gave input into the development of the final copy. The "Workplace and Equipment Fact Sheet" isn't an exhaustive listing of safety suggestions for Kansas public works staff; it is a simply written, specific list of considerations that will serve as a resource for safety conversations between workers and supervisors and supervisors and managers.

Additional copies of this fact sheet may be obtained by contacting KS LTAP. KS LTAP also provides workshops on safety topics and maintains a video and publication lending library. Contact us for more information or visit our web site at www.kutc.ku.edu.

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Hard Hat Use

You May Not Need A Hard Hat, If... That's right, you may not need to wear a hard hat if:

- ...**X-rays show** you have 4-inches of skull surrounding your brain and all the other sensitive wiring above your shoulders.
- ...**You have** six-months to live and five months have already gone by.
- ...**You're** the kind of person who enjoys playing Russian roulette.
- ...**You** enjoy being the center of attention – as when that 2-pound rock is pinched by the tires of a grader and flies across the road until it is stopped – by your head!

Questions and Comments About Hard Hats: For some reason, there's always someone who objects to wearing a hard hat. Here are some answers to most commonly heard objections and comments:

Why all the emphasis on hard hats? Remember, the brain is the control center of the body. The slightest damage to any part will cause a malfunction of some area of the body, either temporarily or permanently. The skull, under normal circumstances, protects the brain, but when the possibility of brain damage from outside sources exists, additional protection is required.

My hard hat is too hot in the summer. Tests in hot weather have shown that the temperature inside a hard hat is 12 degrees cooler than a baseball style cap. Your head is kept cool because of the ventilation provided by air spaces between the shell and the suspension. The hat's surface also reflects the heat.

My hard hat is too cold in winter. Liners that come down over the ears are readily available for use on cold days.

My hard hat is too heavy and strains my neck. The weight of the hat should go unnoticed if the hat is properly worn and maintained. The average safety hat weighs about 13 ounces. Your head weighs about 13 pounds. That is one ounce of protection for every pound of head. It's a real bargain.

How to Wear Your Hard Hat.

It is important that you properly adjust the inner suspension. The webbing and band should both be securely on your head and adjusted so that you can bend over without the hat falling off. The new ratchet adjustment helps by allowing a more accurate and faster adjustment.

By the way, chinstraps are available to afford maximum protection. Think of the limited protection a football player would have without a chinstraps on his helmet. Several injuries are reported each year when hard hats are knocked off and head injuries occur as a result. Remember, a hard hat cannot protect you if it is not on your head.

In addition to cushioning blows, your hat can protect against electric shock, chemical spills, or hot materials.

Hard hats must **not** be worn on top of everyday hats or parkas, and of course, you must not remove the suspension.

Periodically, check the shell for cracks and the suspension system for cracking, tearing, or fraying. Never paint, drill holes, or use solvents on your hard hat because they weaken the shell. As a general rule, the entire hat should be replaced every two years.

When to Wear A Hard Hat: Check with your supervisor for the official rules about safety and protective clothing. As a general rule, always wear a hard hat when working:

- On or adjacent to the traveled portion of the roadway.
- In contractor's hardhat zones.
- While operating heavy equipment.
- Where there is danger of head injury from impact, and/or falling or flying objects.
- Where there is danger of contact with a high voltage electric source.

Lifting and Carrying

Advice for Crew Members

Correct Lifting Techniques

Warm up with stretching exercises before attempting to lift any object.

Rock the load to estimate its weight. It is not advisable to lift an object weighing over half your body weight.

Use a crane, hoist, dolly, or other lifting and moving equipment when lifting or moving heavy or bulky objects.

Use a dolly or enlist a helper if the load is too bulky to see over.

Inspect objects for slivers, jagged or sharp edges before you begin lifting.

Consider repairing damaged loads before moving them.

Wipe off greasy, wet, slippery, or dirty objects before trying to handle them.

Position your feet correctly. One cause of muscle injury, particularly to the back, is the loss of balance due to working with your feet too close together. To minimize injury, place your feet about shoulder-width apart, with one foot in the proposed direction of movement and the other in a position where it can give thrust to the body.

Keep the load as close to your torso as possible. When your arms are held away from your body, they lose much of their strength and power. Tucking your arms in will help keep your body weight centered.

Keep your back relatively straight and your knees bent when lifting an object.

Bend over slightly (but don't bend your back into an extreme curve) and pull the load close to your torso when lifting a load that is too large to pass between your knees. If you are going to carry a compact load, squat down and straddle the object with your knees. Keep your back relatively straight, pull the load in toward your torso, and use your leg muscles to help lift the load. Remember your legs are four times as strong as your back.

Grasp an object correctly; keep your fingers away from pinch and shear points. Grasp boxes at alternate top and bottom corners; grasp stacked materials at alternate corners. Get a firm hold.

Move as smoothly as possible. If the load interferes with normal walking, get help or use mechanical aids. Seek advice from your supervisor.

Keep work areas free of debris to avoid tripping, and keep a clear view over the load.

Use extra caution when walking on ice and snow.

Never turn at the waist to change direction or to put an object down.

Set your load down close to your body, or place it on the near edge of a shelf or truck bed, then slide it back.

Never throw or drop loads or equipment from elevated places. Use a suitable lowering device.

Team Lifting

Adjust your load so that it is level. Lift, walk, and set down in unison. Call out commands of "lift," or "set down" if more than two are involved.

Place long sections of pipe on shoulders when carrying them, and use shoulder pads.

Advice for Supervisors

Locate storage areas and loading platforms in the most convenient locations. Storage racks should be within easy reach of the shortest employee; frequently handled heavy loads should be stored between knee and waist level; and carrying distances should be minimized.

Analyze current practices. Determine whether the job can be managed to eliminate manual handling as much as possible. Ordering material in smaller lots will result in safer lifting practices.

Provide proper lifting aids and provide safe use instruction.

Provide a list of physical requirements to prospective employees and physicians who do pre-employment physical examination.

Set aside a warm-up period for employees who routinely perform lifting tasks. Encourage other employees to participate.

Special Considerations for Season/Weather Conditions/Time of Day

Summer

If you must work in the heat, wear loose, lightweight, light-colored, layered clothing to help keep your body temperature down. This type of clothing reflects heat and sunlight and helps your body maintain normal temperatures. Layered clothing slows dehydration and minimized exposure.

Drink plenty of water to avoid dehydration.

Take frequent rest breaks. Humidity and heat decrease your body's endurance level by adding extra demands on your heart to cool your body, causing many to suffer from heat stroke.

Wear a hat/cap -- one that protects your neck and ears from sunburn.

Use sunscreen and wear sunglasses.

Winter

Dress in layers of thin clothing instead of single layers of thick clothing. You'll be warmer and as the temperature changes, you can easily remove layers to remain comfortable.

Choose mittens instead of gloves. They're warmer.

Wear a hat. Body heat is lost through the top of the head.

Cover your mouth with fabric (coat flap or scarf) to protect your lungs from directly inhaling the extreme cold air.

Keep a full change of clothes handy. The severity of hypothermia and frostbite increase when socks, boots, and gloves are wet.

Rainy Days: How do you keep dry and safe when working in the rain? Proper planning. To avoid condensation two important elements need to be considered in regard to your raingear: sizing and design. Worker visibility is also a major consideration in rainy weather.

Sizing: A slightly oversized suit with a vented cape-back, adequate sleeve size and room inside can make the garment pump hot air and moisture out of the rainwear system when you move. Likewise a rain suit that is too tight may be responsible for many condensation problems and water leaking into your suit.

Design: Breathable material for the exterior of the suit will make more difference in your comfort due to the suit's capacity to allow water to escape but still prevent it from returning. Breathable material keeps you dry and cooled off at the same time.

Visibility: Add fluorescent colors and retroreflective trim to all raingear ensembles.

Daytime: Wear orange, strong yellow-green or fluorescent colored warning garments such as vests, jackets or shirts, safety glasses and a white hard hat.

Nighttime Work: Wear retroreflective garments, safety glasses and a white hard hat. White outer garments with retroreflective material may be worn in lieu of colored vests, jackets, and/or shirts. White outer garments should not be worn during snow or fog conditions.

Safe Flagging

Advice for Flaggers

Constantly bear in mind that vehicles and drivers may be erratic, unpredictable, inattentive or careless - all create hazards for the flagger. In these cases be prepared to give warnings of danger to your fellow workers and the public when necessary.

Know and follow standard flagging procedures.

Wear an orange, yellow, strong yellow-green or fluorescent vest, shirt or jacket for daytime traffic control.

Wear an orange, yellow, strong yellow-green or fluorescent vest, shirt or jacket of retroreflective material - clearly visible from a full range of body motion - for nighttime traffic control.

Use a STOP/SLOW paddle with a rigid handle as your primary hand-signaling device.

Stand in a conspicuous position, visible to drivers from at least 500 feet on the right edge of the traveled way.

Never stand in an open traffic lane.

Do not stand near equipment or vehicles.

Do not allow yourself to become distracted by the work operations

Never turn your back to the traffic.

Stand alone. Do not allow others to congregate around you.

Avoid, as much as possible, creating extended delays for the public.

Do not leave your flagging station to pick up or replace signs or barricades.

Treat each and every driver courteously.

Be alert to changing conditions on the work site.

Do not leave your station until you are properly relieved.

Do not lean on vehicles or argue with motorists.

Wear adequate protection from the weather - sun screen, visored hats, sunglasses in the summer, sun protection and layered clothing during winter operations.

Use your work breaks to rehydrate - important in both cold and warm weather.

Make sure you have an escape route.

Always park vehicles so that they do not impede escape.

Advice for Supervisors

Locate your flagger far enough ahead of the work space so that approaching traffic has sufficient distance to stop before entering the work space. These distances should be based on approach speeds, friction factors, and pavement.

Be sure your flagger is familiar with your standard flagging procedures.

Provide adequate proper advance warning signs.

Be available to pick up or replace signs or barricades.

Be sure your evening flagging stations are illuminated.

Be sure to schedule rest breaks for your flagger.

Be sure your flagger has standard clothing and equipment.

Safety Equipment Suggestions

Weather-appropriate clothing

Sun protection

Water

Appropriate vest, shirt or jacket

Hard hat

Whistle, airhorn or other warning device

Prohibited Items

Personal radios, CD players, etc.

Chairs

Reading materials

Personal cell phones

Shop Safety

Advice for all Shop Workers

Tripping

Keep access-ways and aisles free of debris.

Return tools and excess material to their proper storage area immediately after use.

Minimize the use of extension cords or other loose wires. When you do use them, properly cover or mark them to prevent tripping or shock.

Mark obstructions such as low overheads or short steps with highly visible warning signs.

Put small hand tools in their proper places. Small hand tools lying about or improperly stored are especially hazardous because they are a common sight; workers are less likely to notice a screwdriver on a step or an open knife on a table.

Slipping

Clean up spills promptly but do not use highly volatile solvents such as naphthalene or alcohol to clean up spills – use a biodegradable solvent (Floor Dry is a brand name that you might consider.).

Remove grease, oil, ice, snow, or mud from steps, walks, ladders, etc.

Stacking Materials

Do not allow material to protrude past shelf/bin edges.

Use a front-lip in stack bins to prevent material from falling out of the bin.

Use pallets to even the stacks when stacking uneven material.

Build a pyramid when stacking pipe – block the first layer.

Store all tires vertically in racks.

Sort excess lumber by size and store it in a separate area. Remove nails from lumber prior to stacking.

Securely strap all gas cylinders to a support unless they are being moved. The protective cap must be in place when moving a cylinder.

Combustibles/Hazardous Material

Store flammables in their designated areas and proper (and properly labeled) containers: oily rags in covered cans; paint in a paint locker; explosives in a protective hut; fuel oil and kerosene behind a concrete barrier. Use fire safety cabinets.

Ground gas cans to prevent sparking; refill empty gas cans with gasoline to prevent fume buildup.

Use NEPA approved gasoline transport containers at all times.

Keep all sources of ignition (lighted cigarettes, welding heaters, running vehicles, and sparks from steel striking concrete) away from combustible storage. Remember combustible gases are heavier than air and collect in potentially explosive pockets generally near the ground.

Know what each class of fire extinguisher does and how to operate each.

Check fire extinguishers monthly, and maintain records of inspection. Inspect yearly by a fire extinguisher company.

Know how to use a respirator to be safe around airborne toxic materials.

Leaning Equipment and Material

Store pipe, ladders, structural steel, etc., horizontally, or secure with brackets. Vibration from machines or accidental brushing could cause them to fall.

Advice for Supervisors

Designate (and label if possible) a storage space for everything.

Provide sufficient housekeeping tools: brooms, clean rags, and spill absorbers. Make sure that directions are followed when using chemical cleaners.

Define areas for scrap storage and schedule regular collection, removal, and disposal.

Assign clean-up responsibilities and make sure work sites are cleaned and cleared before quitting time. It is wise to provide a specific time for this activity.

Shop Safety (continued)

Avoid removing or procuring excess materials, parts, and tools from their designated storage areas or suppliers. This requires thoughtful job planning.

Provide proper class fire extinguishers:

Class A: Wood, paper, etc.

Class C: Electrical fires

Class B: Flammable liquids

Class D: Reactive metals

Properly label, regularly inspect, and maintain fire extinguishers in easily accessible locations.

Install non-slip treads on ramps and steps.

Remove weeds around combustible storage areas, including tanks and pipes where combustible material is stored or transported.

Clearly mark aisles and passageways.

Allow a minimum of 18" clearance between storage and sprinklers.

Secure all storage racks to the floor, wall and to each other.

Provide designated racks for sheet metal and pipe.

Suggestions for Training

Prepare a list of worksite items. Ask your crew to identify their proper storage place or procedure.

Draw a simple floor plan of your work area, and ask the crew to identify who is responsible for cleanup of each area. Assign clean up responsibilities for any unassigned areas.

Coordinate with your local fire department to provide your crew demonstrations of fire hazards and training in fire fighting.

Safety Equipment Suggestions

Safety glasses/goggles or shields

Hard hats

Steel toed shoes and metatarsal foot protection

Work gloves with palm and knuckle reinforcement

Safe Road Maintenance and Sign Installation

Advice for Crew Members

General Conditions

Make adjustments in driving techniques to accommodate the changing handling characteristics of your vehicle. As sewer cleaning trucks and street sweepers substantially increase or decrease their loads their centers of gravity will change depending on the load weight.

Use ear plugs or ear muffs in environments that are noisy, such as where jack hammers or vacuums are working, or where many pieces of equipment are running.

Wear the proper type of air mask or respirator in dusty environments, or, when available, use air conditioning. This will prevent damage to your lungs.

Wear the proper clothing for the job when using chemicals such as sewer grouting material, plant sprays, or insecticides. Some chemicals may require use of respirators, rubber gloves, and special clothing. Be sure to read the label and follow the instructions contained on it.

Use a professional laundry to clean work clothes on which chemicals are spilled; don't permit contaminated clothing to mix with home laundry. Be sure to tell the laundry what chemicals are on the clothing.

Be aware of the dangers inherent in spraying any kind of material that vaporizes or is a fine dust. Explosions may occur when ignition sources heat explosives. Confined spaces and still air are especially dangerous conditions where, in the absence of ventilation, explosive mixtures are ready to ignite. Explosive materials include, but are not limited to, gasoline, heavy solvents, and methane gas.

Do not work in the roadway without having proper traffic control devices in place.

Asphalt Sealing/Patching/Paving

Wear the proper clothing when working around asphalt. This includes long-sleeve shirts, long trousers without cuffs, hard-soled shoes, and gloves. These articles of clothing are necessary due to the extreme heat given off by the asphalt, coupled with the possibility of contact with the asphalt itself. Heat burns will occur if skin comes in contact with hot asphalt, since the asphalt is normally in the range of 275 to 375 degrees Fahrenheit.

Make deliberate movements when handling hot asphalt. Deliberate movements will help minimize spills.

Be sure the asphalt always covers the heating coils in a kettle. If this precaution is not followed, the heating coils could melt and allow open flames to contact the asphalt which will result in either a fire or an explosion.

Break asphalt into small chunks, 1 to 3 pounds each, when recharging a kettle. Do not throw the chunks into the kettle. To prevent splashing, slide them in.

Keep the asphalt temperature below its flash point. Do not trust the kettle thermometer unless you have checked its accuracy. The flash point of most asphalt is in the range of 375-450 degrees Fahrenheit.

Keep the spout used in crack sealing as close to the ground as possible to prevent splashing and burns.

Douse skin splashed with hot asphalt with cold water to cool it, but do not remove the asphalt from the skin. Cover the burn to prevent infection. Consult a physician to have any asphalt removed from your skin.

Turn off the heat source if the kettle discharges thick white to yellow smoke, and allow the asphalt to cool about 30 degrees before turning the heat back on. The thick smoke indicates that the flash point has been reached. Keep all other sources of flame away during the cooling period.

Do not eat in the area where asphalt fumes are present to assure that the fine airborne solids don't contaminate your food. Asphalt fumes can cause respiratory complication. Minimize your exposure to asphalt fumes.

Safe Road Maintenance and Sign Installation (continued)

Concrete Patching/Paving

- Wear** the proper respirator when working around cement and aggregate dust.
- Read** the label on chemical spray to determine its contents and use the spray as it was designed.
- Always** spray downwind to prevent inhalation of the spray.
- Never** pour water into an acid when mixing concrete treatment agents. The resulting reaction is violent.
- Always** pour acid into water.
- Know** the location of, and how to operate, the eyewash and deluge shower in case of an acid spill.

Painting

- Always** use the properly designed respirator to avoid breathing paint and its solvents.
- Remember** that many paint pigments and solvents are classified as hazardous materials. Read and follow the label.
- Be** especially wary of dusts when sanding or grinding off lead-based paint.
- Do not** heat paint inside an enclosed structure unless the ventilation equipment meets the National Fire Protection Code.
- Keep out** of the direct spray area when spraying paint. Paint sprayed at a pressure of only 30 pounds per square inch can become imbedded in your skin.
- Do not** use high pressure air to blow dust from your clothing. Air sprayed at a pressure of 30 pounds per square inch can imbed dust and clothing in your skin.
- Never** field-rig a high pressure hose coupling. Always use a factory-made and tested coupling.
- Do not** exceed the pressure rating on hoses and couplings.
- Keep** paint containers closed and in a ventilated area. When not in use, keep paint containers in a designated and approved paint storage cabinet.

Pneumatic Tools

- Wear** hearing protection while working with air tools that operate in a range above 85 decibals.
- Take** frequent breaks when you operate an air-hammer to reduce the cumulative effects of vibration and noise.
- Wear** safety shoes with while operating an air-hammer.
- Do not** guide the air-hammer tool with your feet to start a drill hole.
- Wear** eye protection to protect against flying chips during the drilling operation.
- Be sure** a deadman switch is standard equipment on your air-hammer, and be sure that it is in operating order.
- Employ** wet drilling rather than dry drilling to reduce the amount of flying debris and dust.
- Properly secure** hose connections.
- Vent** the compressor air tank prior to removing the hoses or disconnecting the air-hammer after completing an operation.
- Use** retainer clips on an air-hammer to prevent premature tool ejection.
- Do not** allow the heads of cutting tools to mushroom. Deformed heads should be ground to their original shape. This will prevent splinters from chipping off the tool when being struck.
- Warm** the cutting tool before use in very cold weather to prevent spalling during use.
- Check** bolts for adequate tightness and the chuck-bushing for excessive wear before using any tool.
- Pay** attention to where chips are thrown when cleaning a pot-hole with air pressure. Chips can travel up to 25 miles per hour and pose a significant hazard to those nearby.

Safe Road Maintenance and Sign Installation (continued)

Sign Installation

Make sure proper underground facility locates have been completed.

Install signs to *MUTCD* guidelines.

Be prepared with safety vests, safety glasses, and fire extinguishers.

Be alert to surrounding traffic conditions.

Review the work zone plan before you leave the shop.

Advice For Supervisors

Reduce the effects of vibration and fatigue on the operator by installing thick rubber hand grips on the air hammer.

Encourage workers to leave the immediate area when they are not laying asphalt. Prolonged breathing of asphalt fumes can lead to respiratory complications.

Be alert to medical considerations when laying hot asphalt. Watch for flushed skin, reduced perspiration, and sluggish movements. If these symptoms are present, get the worker to a cool place and allow small quantities of water until the symptoms pass. If a worker passes out, call the emergency squad immediately. Don't wait for him/her to revive.

Review the contents and hazards of the materials your crew may handle and coach them on the proper protective procedures to be used.

Review safety guidelines for safe operation of equipment and coach your crew on safe operating procedures, this should include traffic control.

Schedule sign installation work based on weather conditions.

Make sure each sign installation vehicle is equipped with an *MUTCD*.

Pre-plan your work zone - have a traffic plan ready for review.

Be sure to provide your crews with equipment that is in good working order.

Safety Equipment Suggestions

Safety glasses or face shields

Ear plugs or ear muffs

Safety shoes with metatarsal protection

Proper clothing

Dust masks or respirators

Safety vests

Thermometers (for hot asphalt)

Rubber boots (for concrete work)

Hard hats

Rubber gloves and aprons

Cones and barricades

Signs, standards, and flashers

Safe Vehicle Maintenance

Advice for Maintenance Personnel

Make daily and routine maintenance your priorities to reduce the possibility of catastrophic failures.

Resolve each equipment defect complaint.

Acquire training to properly diagnose and eliminate equipment defects. Vehicle manufacturers who give clinics on new equipment care are a good source for training.

Mount multipiece rims using guard cage.

Mark pit edges and lifts with paint or tape to prevent falls and bumps.

Provide adequate ventilation for solvent vapors, gasoline vapors, other chemicals, and exhaust fumes.

Spray paint only in approved paint booths.

Know and employ proper maintenance methods to reduce contact with asbestos and eliminate asbestos dust.

Monitor welding to assure fire hazards are eliminated from the area and proper ventilation is utilized.

Use small power tools safely: they can electrocute the unwary operator.

Don't stand in liquids.

Don't use in explosive environments.

Don't use a tool with a frayed cord or exposed conductors.

Don't use a tool with a broken off grounding plug.

Guard grinding wheels against explosion. Use the proper rated wheel in the grinding device.

Remove all ignition sources from the fuel area.

Clean up spills immediately.

Do not wear clothing that has been in contact with flammable liquids.

Never hang clothes or rags near operating machinery lines, heating vents, or ventilation ducts.

Monitor noise in the shop.

Advice for Vehicle Operators

Come to work fit to work. Sick operators may be relieved from duty.

Report all medications that might affect your driving ability.

Maintain an appropriate driver's license.

Follow your written pre-trip inspection routine before taking any vehicle out of the yard. That routine inspection might include:

Check major controlling functions: steering and brakes, hydraulics, cables, heating and exhaust units.

Check safety equipment: lights, flashers, alarms, fire extinguishers, first aid kits.

Clean all glass and mirrors, clean out the floor of the cab, etc.

Check the exhaust system for leaks.

Calibrate appropriate controls for proper operation.

Repair and clean equipment **only** when it is not running.

Ventilate the cab. Use air conditioning when working in dusty conditions.

Use mirrors, horn and warning signals, and spotters when backing equipment.

Turn off the motor before exiting. Avoid dismounting into traffic. Always use steps and hand holds.

Drive defensively, yield the right-of-way.

Use your seat belt.

Check to be sure that all the required safety equipment is on your vehicle. Review the proper use of each item: backup alarms, load tie downs, towing devices, wheel chocks, outriggers, and fire extinguishers.

Advice for Supervisors

Routinely check with your drivers to be sure their driver's licenses are current. Do not allow any employee who has an inappropriate or expired license to drive until the problem is corrected. Make note of any employee who has a driver's license that will expire prior to the next routine check.

Routinely check your drivers for disabilities: color blindness, visual correction requirements, etc.

Routinely provide drivers with driver training or driver's tests. The training or test should be both a practical demonstration of the driver's ability to handle the equipment and a review of state driving laws.

Safe Vehicle Maintenance (continued)

Require proficiency on specialized equipment.

Review proper backing procedures. Impress upon your drivers the usefulness of a spotter in backing up.

Develop a written pre-trip inspection routine, if one isn't already in place, and provide laminated copies to each crew member.

Know your equipment and the condition it is in. You are responsible for providing the best possible equipment for your crew to use.

Inform operators about the types of minor repairs they are allowed to make on their vehicles. Communicate your repair policy with all of your operators.

Make the process for obtaining new equipment a team effort. Request input from the foreman and operators who will use it. Tailor specifications to assure your new equipment will meet the needs of the users.

Watch carefully for alcohol or drug abuse. Supervisors who knowingly permit an employee to work under the influence of alcohol or drugs may also be subject to disciplinary action and possible personal liability.

Check maintenance area safety:

1. Inspect condition of mechanics' hand tools.
2. Check the functioning of ventilation equipment for effective removal of exhaust, paint spray, welding solvent fumes, and break and clutch lining asbestos dust.
3. Check the condition of power tool cords and hoses.
4. Ensure that tires, lubricants, paint, and parts are safely stored.
5. Check equipment operators' and mechanics' reports for prompt repair of defective safety equipment – lights, wipers, horns, mirrors, etc.
6. Ensure that maintenance reports are completed promptly and correctly dated.

Snow and Ice Operations Safety

Advice for Crew Members

Take a dry-run of your assigned route before ice and snow arrive. Make a record of your concerns and, in some instances, flag hazards for ease in sighting during a storm. Check especially for these hazards:

Low hanging cables	Sign posts
Deep side ditches	Fire hydrants
Steep shoulders	Guardrails
Raised manholes	Fences
Offset curb and pavement joints	Congested areas
Railroad crossings	Mail boxes
Yield and merge intersections	Narrow roadways
Blind and left-turn intersections	
Special maneuvering areas, cul-de-sacs, steep grades, dead ends	

Avoid situations that require backing up. If it is necessary, in such areas as cul-de-sacs, dead ends, or steep hills, use a spotter.

Keep your plow blades and hoppers in working condition. Frostbite can occur if you perform outdoor maintenance/repair work on your equipment.

Be cautious of frostbite, which can be dangerous. Severe pain followed by a feeling of warmth are the signs. Do not be fooled by the apparent return of warmth. Return to the shop and seek aid from a qualified individual.

Watch for pedestrians when plowing. Do not exceed 25-30 miles per hour. At speeds greater than this, even an adult could be knocked down by the force of thrown snow.

Stay with your truck if it is immobilized. Keep fresh air circulating to avoid carbon monoxide buildup; run your motor sparingly and open the downwind window to provide ventilation.

Dress in layers so that you can make yourself comfortable at changing temperatures.

Attend training on the safe handling of chemicals used in snow and ice control operations.

Check the cab of the truck for exhaust seepage. Carbon monoxide is colorless, odorless, and tasteless. If you feel drowsy, check the cab.

Advice for Supervisors

Assign each truck to a particular area. If a problem arises, you will know where to locate your vehicle.

Keep track of your crew. Equip each truck with a two-way communication device or establish check points for the trucks on their route. Keep a record of the trucks loading at the sand/salt storage areas. A disabled truck may be identified when it doesn't show up as expected.

Be wary of fatigue in your crew. The duration of a shift should be communicated to crew members.

Pre-qualify drivers to re-acquaint them with the equipment. This may minimize problems during plowing operations.

Check with your drivers often to determine if they have noticed any vision problems. If they have, a rest period may be in order. Falling snow, blowing snow, extended night driving, sun glare, and white-outs lead to eye fatigue. Vision acuity and depth perception capability of the eye may be reduced and may increase the possibility of an accident.

Check with a physician if doubt arises concerning a driver's vision. Certain eye defects, which affect perception and color blindness, may disqualify a driver from plowing operations, even though the driver is qualified for normal work operations.

Treat your private contractors the same way you treat your staff. Expect, train, and require the same safety procedures from them as you do from your own crew members.

Exercise care when storing and handling all ice control chemicals. The manufacturer's Material Safety Data Sheet (MSDS) should be posted wherever chemicals are stored and handled.

Check the cab of the truck for exhaust seepage. Carbon monoxide is colorless, odorless, and tasteless. If the driver feels drowsy, check the cab.

Provide training on the safe handling of chemicals.

Place your salt on an impermeable pad to avoid contamination.

Snow and Ice Operations Safety

(continued)

Safety Equipment Suggestions

Warm, dry, light-colored clothing
Flashing lights
Ice scraper
Flashlight

First aid kits
Two-way radio, cell phone or other communication device
Shovel
Sunglasses

Safe Trenching

Advice for Crew Members

Keep all tools, material, and spoil at least 2 feet from the edge of the trench.

Do not drive equipment up to the edge of the trench.

Inspect the trench for signs of failure after a rain and first thing every morning.

Do not jump across the trench. Erect a bridge or other suitable passage.

Locate emergency exits from the trench no more than 25 feet apart. Ramps, or ladders extending at least three feet past the top of the trench and tied securely, are adequate.

Take care when working adjacent to sidewalks, buildings, utility poles, trees, or similar structures. In some cases, underpinning may be necessary.

Install shoring from the top down, remove shoring from the bottom up. This will reduce the chances of ditch collapse during the installation/removal operation.

Install jacks or bracing perpendicular to the trench sides to prevent them from kicking out under pressure.

Do not support construction equipment on the shoring unless it was specifically designed for that function.

Backfill the trench immediately after the shoring is removed. A trench has a greater possibility of cave-in due to the construction activity at that time.

Keep out of the space needed to operate excavating and backfilling equipment. No one but the operator should be near a vehicle being loaded or unloaded.

Use life lines in excavations over 15 feet deep due to the danger of asphyxiants or poisonous gases collecting in the trench bottom.

Advice for Supervisors

Test and classify soil before digging/trenching.

Use qualified people to design the shoring or trench shields. Any trench more than five feet deep must be shored.

Remember, if you design the shoring plan, account for equipment and traffic vibration.

Cut back the trench sides at the angle of repose of the soil if no shoring is used.

Extend sheeting or shielding at least 18 inches above the bottom of the sloped part of the excavation.

Locate utilities before you dig.

Expose ground utilities by hand to prevent damage to them and injury to your workers.

Inspect frequently. If cave-ins, tension cracks along the top of the trench, or slumping at the bottom of the trench are discovered, clear the area of workers until the cause is ascertained and the problem remedied.

Always post a lookout to observe the trench workers. This lookout should be located out of harm's way but near enough to fully observe all of the trench workers.

Never have all your workers in the trench at the same time.

If a Trench Collapses

Do not stay in the trench.

Do not attempt a rescue.

Do not try to dig trapped persons out by using a shovel

Do not remove any hand tools.

Do not use heavy equipment.

Call 911.

Notify the supervisor.

Note the exact time and location of the trapped worker.

Stop any nearby traffic that might cause vibration.

Keep everyone back at least 50 feet away from the edge of the trench.

Safe Trenching (continued)

Safety Equipment Suggestions

Safety glasses
Safety shoes
Walkways
Sound shoring material
Cell Phone

Hard hats
Gloves
Ladders
Ear protection

Safe Forestry Operations

Advice for Crew Members

Wood Chipping

Set up the chipper away from combustible material.

Keep the chipper emergency shut-off within reach of the operator.

Do not feed wood with imbedded nails or other foreign objects into the chipper. Remove foreign objects to prevent ejecting them or chipping a blade.

Do not overfeed the chipper with large limbs. The resulting kickback could cause injury.

Wear safety glasses. The entire crew should wear safety glasses due to the potential for flying debris.

Turn off and lock out the chipper when it is not in use.

Do not wear loose fitting clothing which could become entangled and draw you into the chipper.

REMEMBER: the chipper is SELF-FEEDING!

Wear gloves that you can slip off easily, but not so loose that they impair your ability to do the job safely.

Wear heavy soled shoes to prevent injuring your feet in brush stubble.

Make sure all outrigger pads are firmly in contact with the ground to prevent the chipper from walking or tipping over.

Know and follow the limits of the machine.

Securely tie down your debris load to prevent it from shifting once the truck is loaded with limbs and stumps. If the strapping shows signs of excessive wear, replace it.

Stump Grinding

Wear ear muffs or plugs when grinding.

Wear safety glasses to avoid flying debris.

Check the teeth on the grinder for tightness before beginning to grind. Vibrations during grinding may loosen the teeth.

Keep the operating controls and safety stop within easy reach of the operator at all times.

Be aware of the location of all crew members during the grinding operation.

Brush Clearing

Machetes - use in light brush (less than one inch in diameter trunks)

Keep your machete in a scabbard when it is not in use.

Sharpen your machete to assure a clean bite. The blade should not be sharpened for the first six inches from the handle nor the last two inches from the point.

Install a sabre-type hand guard on the machete. This will help prevent the tool from accidentally being thrown during a swing.

Do not hit the ground with your machete. The flexible blade could recoil from the impact, resulting in an injury.

Clear the swing area prior to advancing through a brushy area. An interrupted swing could deflect the tool into the user.

Ax, Brush Ax, or Hatchet - use in heavier brush (more than one inch in diameter trunks)

Keep axes sharp. Dull axes tend to glance off wood while sharp axes bite into the wood.

Use hatchets for small jobs such as splitting wood. Lightly tap the log to start the hatchet, then lift the log and force the hatchet through by striking the log on a solid block of wood.

Do not use the hatchet to drive nails. The head of the hatchet is not tempered to withstand the force of driving, and a metal splinter may pop off.

Mowing

Do not remove the throw guards from your mower.

Operate riding mowers up and down the slope to prevent tipping the machine.

Operate push-type mowers across the slope to prevent the operator from falling into or under the machine.

Safe Forestry Operations (continued)

Read the manual before you operate your mower. New equipment may look similar to that used previously, but may require special knowledge.

Wear close fitting clothing to avoid getting tangled up in the mower.

Check to be sure the area to be mowed is clear of debris prior to mowing. Some mowers are capable of throwing objects at a speed of 25 miles per hour.

Turn off the engine and disconnect the spark plug wire when working on your mower.

Wear safety shoes while operating a push mower.

Wear light colored clothing during summer months to minimize heat discomfort. Dark clothing will absorb more heat than light colored clothing.

Tree Felling

Be alert to the dangers power lines may pose. Assume that all lines are energized unless the power company is present.

Rope off your work area to keep civilians out.

Use trained flaggers to control and direct traffic through your work area when working adjacent to a highway.

Do not attempt to move a fallen electrical wire. Station an observer at a safe distance from the wire and keep everyone away from this area.

Do not use metal or painted wood ladders. They are highly conductive to electricity. Under the right circumstances, which vary according to the prevailing weather conditions, electricity can arc up to 10 feet. Work outside this 10-foot area when working around unknown lines.

Use nonconductive handles (wood, rubber coated, plastic coated, or fiberglass). They will not totally eliminate the danger of electrocution, but they will substantially reduce the risk.

DO NOT USE AERIAL BUCKETS WITHIN 10 FEET OF ANY POWER LINE!

Post a trained observer/spotter to direct the felling operation and to watch the clearances from the power lines.

Chain-Saw Operation

Wear eye protection when you operate a chain-saw. To minimize the chance of material entering your eyes, stand upwind of the cutting operation so the chips blow away from you.

Use ear plugs or ear muffs if you are in close proximity to an operating chain-saw.

Do not force the cut. Binding may result. Allow the chain to cut naturally.

Keep a clear work area. Debris in the area may lead to an injury.

Keep the saw within close proximity of your body. This will help you avoid back strain.

Avoid being electrocuted. Do not use electric tools from an aerial bucket. The problem of grounding is compounded.

Notes About Personal Injury

Be alert to poisonous plants such as poison ivy, poison oak, or poison sumac. In the event that contact is made, use a lotion or liniment to counteract the effects. In the event of a massive contact, medical advice may be warranted.

Do not burn poisonous plants. Smoke from the burning plant may injure you just as much as direct contact.

Immediately treat insect bites, cuts, and animal bites. Animal bites should have medical treatment to address the possibility of rabies.

Do not take snake bites lightly. Go to the hospital immediately, especially if you are not sure if the snake was poisonous.

Safe Forestry Operations (continued)

Advice for Supervisors

Report animal bites to Animal Control, and get the victim to the hospital. In this instance, no wound is too small. Animals may carry rabies. If it is possible to capture the animal, do so with care. If the animal cannot be captured, try to find where it lives (also applicable to snakes).

Never allow an untrained worker to operate a chain-saw unsupervised.

Suggested Safety Equipment

Safety glasses
Ear plugs/ear muffs
Safety shoes
Hard hats
Loose gloves

Non-conducting tools
Safety lines
Safety vests
Cones
Signs and flashers

Safe Motor Grader Operation

Advice for Operators

Do read the operator's manual.

Do a pre-trip inspection.

Clean windows, lights, etc, and clean any debris from the floor of the grader.

Do not let anyone ride along - inside or outside the cab.

Look, then look again, before backing up.

Move your vehicle at a slow speed in congested areas.

Give the right-of-way to loaded vehicles.

Watch for overhead dangers.

Know your work area. Check weight limitations, types of surfaces, and clearances.

Report defective equipment.

Keep your mind on your job.

Select a safe parking area.

Shut down your grader according to the operator's manual.

Wear your hardhat.

Wear your seatbelt.

Wear your safety gloves and appropriate safety gear.

Remove the ignition key when leaving your grader unattended.

Ground your blade when leaving your grader unattended.

Use colored flags on each end of moldboard when blading.

Shift your blade to the center of the grader and lock it when your grader is parked.

Be aware that boarding and exiting the grader may put you in danger of slipping, tripping or falling. Use a three-point (two feet and one hand or one foot and two hands) approach when entering or exiting the cab.

Be sure your grader has the following on board:

A slow moving vehicle triangle for the back of your grader.

A visible fire extinguisher - know how to use it, and make sure it is properly charged.

A hand shovel in good condition.

The operator's manual.

Communicate with traffic.

Use flashing safety lights on your grader when blading.

Keep your headlights on whenever you operate a motor grader.

Be alert to traffic waiting to pass, and provide the driving public passing opportunities

Use signing and proper flaggers to warn traffic of work in progress or as warning if the grader is left unattended.

Make sure your signs and sign locations conform to the *Manual On Uniform Traffic Control Devices (MUTCD)* or the official manual on traffic control devices (sign manual) for Kansas.

Safety Equipment Suggestions

Reflective vest

Hard hat

Work gloves

Seat belt

Radio or Phone

Ear protection

Road work ahead signs

Close fitting clothing

Safety work shoes

Solid Waste Collection Safety

Advice for Crew Members

Work smoothly when loading the packer. Jerking tends to increase the possibility of back injury.

Don't ride on the jump steps, except for rides of one block or less. Ride in the cab.

Never ride in the hopper. Packer blades have been known to cycle on their own during transit.

Handle with extreme care those containers that have rusted bottoms, steel splinters, or other similar hazards. Report these containers to the route supervisor.

Be especially observant for containers that are frozen to the ground in winter. They can cause severe strains when lifting because the effective weight may be eight to ten times the actual weight.

Watch for nails and splinters when gathering scrap.

Do not lift bags from the bottom. Broken glass tends to settle to the bottom of the bag and could result in an injury.

Do not lift cans or bags over fences or hedges. Walk around these barriers.

ALWAYS WATCH FOR TRAFFIC.

Dump containers from your hip level whenever possible. This position results in the least back strain.

Do not antagonize animals. If an animal bites a worker, identify the animal and attempt to find out where it lives. The animal should be checked for rabies. Do not attempt to catch it - leave that to Animal Control.

Do not throw empty cans from the truck to the sidewalk or full bags from the curb to the hopper. You may hit your partner coming around the truck.

Do not reposition material in the hopper. Keep your hands out of the hopper because of danger of recycle. Remember, recycle is more likely as the packer approaches capacity.

Do not hold onto or ride the loading sill. The packing cycle may self-actuate, which would result in injury to fingers, toes, or any other part of the body that is in the way.

Do not jump from, or onto, a moving truck.

Observe the packing cycle. Make certain that the motion of the packer blade will not endanger yourself or another worker.

Know where the emergency stop controls are and how to operate them properly.

Do not override or disconnect the safety controls. If they are not working properly, get them fixed. They are there for your protection.

Do not scavenge. You may get caught in a recycle.

Use a shovel and broom rather than your hands to clean up a spill.

Stand away from the opening to avoid being hit by ejected garbage when loading the packer.

Never stand under a raised hopper unless it is properly blocked and supported.

Never drive the truck with the hopper in a raised position. The truck is very unstable at this time due to the high center of gravity.

Lock out the controls and keep the keys with you at all times if you must enter the packer body.

Do not handle suspected hazardous materials. Report them to the route supervisor for disposal.

Do not let civilians congregate around the packer.

Advice for Supervisors

Ensure that the riding steps are self-cleaning, of adequate size, and within the body line of the truck to provide safe transport for the riding crew for short distances.

Locate handholds in areas that are not awkward to use.

Enact and adhere to a garbage can standard.. Standards might specify can size, weight, capacity, location, and condition. This will help minimize worker injury.

Design the collection routes, whenever possible, for right turns and right side collection only. This is a good way to prevent traffic conflicts.

Watch carefully for alcohol or drug abuse. Supervisors who knowingly permit an employee to work under the influence of alcohol or drugs may also be subject to disciplinary action and possible personal liability.

Report animal bites to Animal Control, and get the victim to the hospital. In this instance, no wound is too small. Animals may carry rabies. If it is possible to capture the animal, do so with care. If the animal cannot be captured, try to find where it lives (this also goes for snakes).

Solid Waste Collection Safety (continued)

Safety Equipment Suggestions

Safety glasses or face shields

Safety shoes with cleats

Heavy gloves with palm and knuckle protection

Hard hats

First aid kits

Safety vests

