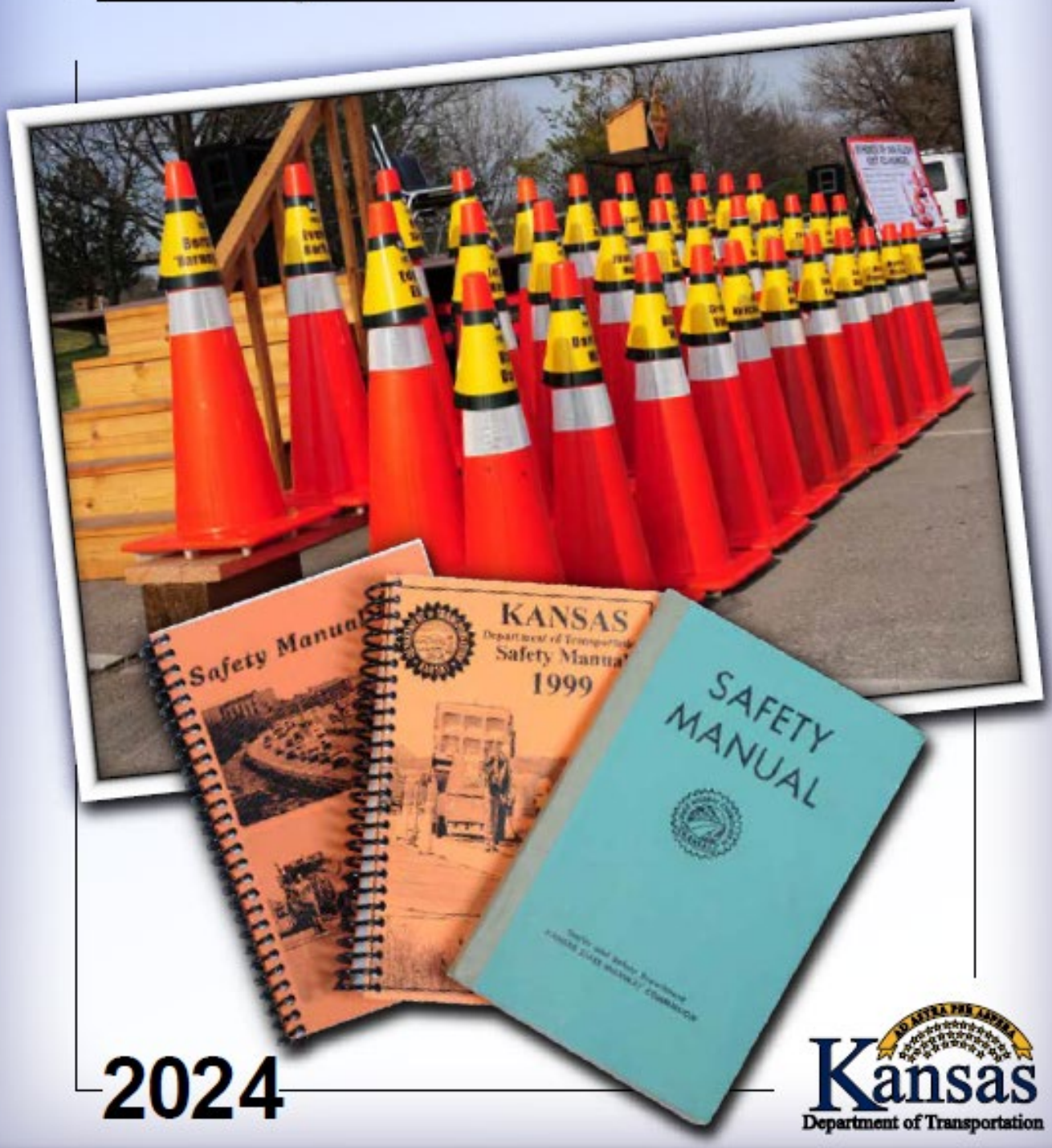
KDOT
SAFETY MANUAL



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Kansas
Department of Transportation

Contents

Introduction

For the purposes of this manual, the term “supervisor” refers to any employee of the Kansas Department of Transportation (KDOT) who is responsible for the assignment and overview of another employee’s work. Supervisors are responsible for the safety, as well as reviewing job performance, of employees they supervise. Within KDOT, supervisors include field supervisors, shop supervisors and office supervisors among others.

Field maintenance staff supervisors, construction staff supervisors and shop supervisors are responsible for scheduling and conducting weekly safety meetings. Accident prevention meetings are outlined in SOM 2.6.2, “Safety.” Safety meetings provide training in safe procedures for different aspects of each task. The meeting agenda should include a discussion of any incidents involving employee injuries, damage to equipment, or “near-miss” incidents. Safety specialists will work with supervisors to investigate incidents and determine the cause as well as the preventive measures that would help mitigate the possibility of future occurrences.

It is part of a supervisor’s responsibility to verify all assigned employees are trained in their position’s duties and that they are familiar with the KDOT Safety Manual. This can be accomplished by:

- Providing information on how to view the KDOT Safety Manual online.
- Providing training for the jobs they will be assigned.
- Conducting tailgate briefings prior to performing each job.
- Providing protective equipment, when necessary, to perform the job safely.

It is *critical* that all KDOT employees know exactly what is expected of them.

When employees are assigned to unfamiliar jobs or equipment, supervisors are responsible for reviewing specific instructions and precautions to be observed. *Do not* take prior experience for granted. Supervisors should also make sure all employees know how to safely use the tools and equipment they are expected to operate.

Supervisors are responsible for instructing employees to hold tailgate briefings before starting each new task. Tailgate briefings are on-the-job, situational awareness opportunities conducted with workers just before a job begins. The term “tailgate briefing” comes from the practice of meeting around the tailgate of a pickup truck on a jobsite. These briefings are a proven method of preventing accidents and on-the-job injuries. The briefings can be 5 to 10 minutes long and focus on the safety items that may be encountered during a particular work assignment. If you have multiple work assignments in a day, safety briefings should be held for each new assignment.

Supervisors shall set a good example. This means practicing safe work habits and using appropriate personal protective equipment. Supervisors should be alert to potential safety and/or health hazards for themselves, their peers and their subordinate employees. Do not use equipment if its condition poses any unnecessary hazard to employees or the public, or if continued use may cause further damage to that piece of equipment.

KDOT employees are required to follow the KDOT Safety Manual, unless at the direction of the supervisor when unusual circumstances arise where compliance might cause more hazard than protection. When this occurs, document the situation, including plans and/or actions taken to reduce the hazard and provide increased protection to employees.

Supervisors are expected to report corrective methods or procedures beyond their control to senior management. They are also expected to counsel employees who refuse to comply with safety guidelines and/or safe work practices and document the incident. Documentation of disciplinary actions should be included in the employee's personal records.

Notification of Accidents

Report incidents involving either personal injury or damage to equipment following provisions of SOM 1.10.1, "Accident, Damage and Loss Reporting," SOM 1.11.1, "Traffic Control Reviews," and SOM 2.2.5, "Workers Compensation," as appropriate.

Employee Responsibilities

KDOT employees are responsible for their own personal safety. They should assist fellow employees in their safety efforts while completing their assigned tasks. Each person must observe the rules, regulations, guidelines and instructions that relate to safe and efficient job performance.

Employees who refuse to comply with safety guidelines and safe work practices are subject to disciplinary actions up to and including dismissal.

KDOT employees are responsible for:

- Complying with provisions of the KDOT Safety Manual.
- Watching for safety hazards. Employees should take prompt, reasonable action to eliminate hazards or notify their supervisor (or other appropriate authority) to mitigate the hazard.
- Knowing the proper actions to take in case of an emergency such as fire, medical emergency, chemical spill, etc.
- Promptly reporting injuries and incidents as required by SOM 1.10.1, "Accident, Damage and Loss Reporting," SOM 1.11.1, "Traffic Control Reviews" and/or SOM 2.2.5, "Workers' Compensation."
- Familiarize themselves with appropriate safety precautions (e.g., protective equipment, special procedures, etc.) for specific jobs.
- Operating only the equipment that: 1. they have been trained to safely operate; and 2. their supervisor has authorized them to use.
- Recommending, either directly or through their supervisor, any measures they think may improve KDOT's safety and efficiency.

Section 1- Personal Protective Equipment

1.0 Purpose

The purpose of this section is to provide guidance to Kansas Department of Transportation (KDOT) employees who perform job duties which require the use of Personal Protective Equipment (PPE).

2.0 Scope and Applicability

This section affects KDOT employees whose job duties require the use of PPE.

3.0 Policy

KDOT employees performing work duties that require the use of PPE shall be trained on the appropriate use of PPE when performing work duties.

4.0 General Responsibilities

Each supervisor shall implement the applicable provisions in this section regarding the use of PPE. KDOT employees shall follow the applicable provisions in this section regarding the use of PPE and report unsafe acts or conditions to their supervisor. Specific responsibilities are found in Section 5.3.

KDOT employees working on a contractor's project shall follow the Prime Contractors Safety Program; unless KDOT's Safety Rules for PPE are more stringent, then those rules will be followed. Railroad Right of Way shall be handled in the same manner.

PPE must be kept reasonably clean and in a useable condition. PPE that is damaged or deemed to be not safe must be replaced. Employees are to be trained properly in the use, maintenance, and disposal of PPE. Items which are fitted to the individuals shall not be reissued to other employees, nor are they to be shared. Items that are owned by the employee and used on the job must be approved by the safety staff prior to use.

Personal Protective Equipment (PPE) is effective only when properly used. Employees operating machines, climbing ladders, handling material, or doing manual labor should wear clothing that is reasonably snug, particularly around the neck, torso, wrists, and ankles. There should be no loose cuff flaps or strings. Operators will not wear neckties or loose-sleeved clothing. Long hair should be "protected" i.e., tucked inside a cap, to avoid being caught in power-driven equipment. Employees assigned to shop and field activities will wear full-length trousers and sleeved shirts at all times. Work boots are required for shop and field employees. Specifications for work boots are defined in the PPE reimbursement policy.

Employees and supervisors will ensure that Personal Protective Equipment (PPE) is used when safety hazards exist. If an employee avoids or disregards an order to wear protective clothing or equipment, corrective or disciplinary action may be administered in accordance with current department policy.

The use of protective equipment for activities other than those stated in the KDOT Safety Manual will be at the supervisor's discretion.

Protective equipment, protective clothing, respiratory devices, and protective shields and barriers shall be kept in a reliable, sanitary condition.

5.0 Procedure

This section provides applicable definitions, establishes general provisions, and identifies responsibilities of KDOT employees regarding the use of PPE.

5.1 Definitions

ANSI- American National Standards Institute

PPE- Personal Protective Equipment, could include protection for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reasonof hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

5.2 General Provisions

5.2.1 Training

Training will be provided for the use of PPE. Each employee will be trained in:

- Hazard awareness
- When the use of PPE is necessary
- How to remove, adjust, and wear PPE
- Limitations of PPE
- Proper care, maintenance, useful life, and disposal of PPE

Employees must be trained in the use of PPE before the specific PPEs are put into use by the employee.

5.2.2 Hazard Assessment

A hazard assessment will be performed in the workplace to determine and identify hazards that would necessitate PPE.

Typically, the hazard assessment will consist of:

- A walk-through assessment to identify hazard sources based on general hazard categories
- Observation of the hazard sources
- Organizing data from the assessment
- Analyzing data from the assessment

The basic hazard categories that shall be considered in the walk-through survey are:

- Impact
- Penetration
- Compression (roll-over)
- Chemical
- Heat
- Harmful dust
- Light (optical radiation)

If hazards are present, then a hazard analysis shall be done to:

- Select the types of PPE that will mitigate or deter the identified hazards from harming the affected employee
- Communicate PPE selection decisions to each affected employee; and
- Select PPE that properly fits each affected employee.

5.2.3 Head Protection

Safety hard hats can protect employees from head injuries caused by fixed, falling, or flying objects,bump hazards in close or confined spaces, and electrical shocks or burns. The employee should adjust his/her hard hat, so it can be worn properly. It is the employee's responsibility to have their hard hat available each day, in the event duties assigned change.

OSHA 1910.135 and 1926.100

Protecting employees from potential head injuries is a key element of any safety program. A head injury can impair an employee for life, or it can be fatal. Wearing a safety helmet or hard hat is one of the easiest ways to protect an employee's head from injury. Hard hats can protect employees from impact and penetration hazards as well as from electrical shock and burn hazards.

Employees are trained to wear head protection if any of the following hazards exist:

- Objects might fall from above and strike them on the head
- They might bump their heads against fixed objects, such as exposed pipes or beams

In general, protective helmets or hard hats should do the following:

- Resist penetration by objects.
- Absorb the shock of a blow.
- Be water-resistant and slow burning.
- Be orange in color & (ANSI) Z89.1 compliant

- Resist a reasonable impact force without breaking or collapsing the shell or damaging the internal suspension
- Dissipate and/or absorb appropriate amounts of impact force to avoid transmitting the force to the head, spinal column, or other parts of the body
- Resist impact penetration
- Provide electrical protection as applicable
- Have clear instructions explaining proper adjustment and replacement of the suspension and headband.

Hard hats must have a hard-outer shell and a shock-absorbing lining that incorporates a headband and straps that suspend the shell from 1 to 1 1/4 inches (2.54 cm to 3.18 cm) away from the head. This type of design provides shock absorption during an impact and ventilation during normal wear. Protective headgear must meet ANSI Standard Z89.1-2009.

5.2.4 Hard Hats are required without exception when:

- In scissor lift, bucket truck, digger derrick truck, other aerial lifts and/or standing within 100' (one hundred feet) of bucket truck, digger derrick trucks, scissor lift, and other aerial lifts
- Operating chainsaw
- Operating weed eater
- Operating manual post pounder
- On bridge deck with overhead hazards
- When using large pneumatic tools (jackhammers)
- Below bridge deck when chance of falling objects exist
- Working under ladder or scaffold
- Using large pneumatic tools
- Using handheld post pounder
- Operating woodchipper

5.2.5 Duties that require Hard Hat, Face shield, Safety Glasses, Ear Plugs and Earmuffs

- Chain Saw Operator
- Woodchipper Operator
- Large air compressor/pneumatic tools Operator
- Jackhammer Operator

5.2.6 Duties that require Hard Hat, Face Shield or Safety Glasses, Ear Plugs or Earmuffs

- Weed eating
- Woodchipper Helper
- Large air compressor/pneumatic tools Helper

5.2.7 Duties that require additional Safety Equipment for Trained Employees

- Chainsaw operator and helper within 10 feet of the operator shall wear hard hat, face shield, safety glasses, ear plugs, earmuffs, gloves and cut resistant chaps.
- If the helper is more than 10 feet away from the chainsaw operator, they shall wear hard hat, face shield, safety glasses, (earmuffs or ear plugs), cut resistant chaps are recommended but not required.

5.3 Eye and Face Protection

Eye injuries can be caused by flying particles, cuts, chemicals, injurious light, heat rays, and blows to the face and eyes. There are three basic types of eye and face protection used at KDOT. These are:

- Safety glasses with side shields
- Goggles
- Face shields

Eye and face protection devices should reasonably protect against the hazard and be:

- Reasonably comfortable
- Properly fitted
- Durable
- Capable of being disinfected
- Easy to clean
- In good repair

The eye and face protection required will depend upon the hazards that are reasonably expected to be encountered.

KDOT employees must use appropriate eye or face protection when reasonably expected to be exposed to eye or face hazards from flying debris, pneumatic tools, molten metal, liquid chemicals, acids or caustic liquids, chemical gases, or

vapors.

5.4 Ear Protection

Exposure to high noise levels (90 dB per eight (8) hour Time Weighted Average - TWA) could cause hearing loss or impairment. Types of ear protection devices used at KDOT include:

- Ear plugs (NRR 32 or higher)
- Earmuffs (NRR 24 or higher)

5.5 Hand and Arm Protection

Hand and arm injuries can be caused in the workplace. Types of hand and arm protective wear used at KDOT include:

- Cut-resistant;
- High and low temperature;
- Electrical protection;
- Vibration;
- Chemical resistant; and
- Cut resistant jackets for bucket trucks.

The required hand and arm protective wear will be based upon the hazard.

The use of hand protection against skin absorption of harmful substances, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes shall be required.

5.6 Foot and Leg Protection

Employees are required to wear foot protection suitable for the task being performed. Athletic shoes (including running, cross-training, basketball, and tennis), house shoes, or sandals are not acceptable footwear for field operations. Work boot specifications are described in the PPE reimbursement policy.

Steel toe boots and metatarsal protectors should be worn when operating equipment such as pneumatic hammers, tampers, and pavement breakers.

Employees working in the railroad right of way, are required to have footwear with a safety-toe that conforms to the ANSI and Federal Railroad Administration (FRA) footwear requirements. When KDOT employees are working on a Construction project they will be required to abide by the safety rules of the contractor on that project.

5.7 Body Protection

Employees who are exposed to body hazards shall wear appropriate body protection. Examples include employees reasonably expected to be exposed to hazards in laboratories, welders, or employees reasonably expected to be exposed to other body hazards.

5.8 Hi Vis Apparel

KDOT approved high visibility colors are orange, strong yellow green, or a combination thereof. Apparel shall be solid colors, no camouflage patterns.

Daytime work

KDOT employees engaged in **flagging operations** shall wear KDOT approved (ANSI Class III Hi Vis) safety garments with retro-reflective striping and KDOT approved orange headwear. KDOT employees engaging in all other activities on the roadway (travel-way and shoulder); or right-of-way of state, county, or city roads; shall wear KDOT approved ANSI Class III Hi Vis top garment with retro-reflective striping, or a KDOT approved (ANSI Class III, 107-2015) shirt, jacket, sweatshirt, or coat.

Night-time or low visibility work

KDOT employees engaged in **flagging operations** shall wear ANSI Class III Hi Vis top garment and ANSI Class E pants or approved gaiters and KDOT approved orange headgear.
KDOT employees working behind a concrete safety barrier, new alignment or a closed road shall wear a KDOT approved ANSI CLASS III top garment in lieu of ANSI Class E pant.
KDOT employees working in a closed lane shall wear KDOT approved ANSI Class III top and Class E pant or Gaiter.

Compliance with the above paragraphs is required when any employee exits the equipment or vehicle.

Section 2- Respiratory Protection

1.0 Purpose

The purpose of this section is to provide guidance to Kansas Department of Transportation (KDOT) employees who perform job duties which expose them to airborne hazards.

2.0 Scope and Applicability

This section provides guidelines for the use of respiratory protection by KDOT employees who are known to encounter airborne hazards. This section provides guidelines concerning training on the use of respiratory protection by KDOT employees, presents information on written respiratory programs, administration requirements of a respiratory protection program, the need for hazard assessments, and guidelines on the selection of respirators.

This section provides the responsibilities for superintendents, supervisors, employees, and safety staff regarding the use of respiratory protection.

This section affects KDOT employees who are reasonably expected to be exposed to

environments where contaminants exceed the Permissible Exposure Limit (PEL) or are immediately dangerous to life and health.

3.0 Policy

KDOT employees shall use respirators when engineering and administrative controls are not used to reduce air contaminants below their PEL or to eliminate conditions dangerous to life and health. When respiratory hazards exist, employees shall use respiratory protection to reduce exposures below the PEL.

4.0 General Responsibilities

Each supervisor shall implement the applicable provisions in this section when using respiratory protection. KDOT employees shall follow the applicable provisions in this section and report any unsafe act or condition to his or her supervisor.
Specific responsibilities are outlined in Section 5.3.

5.0 Procedure

This section provides applicable definitions, establishes general provisions, and identifies **specific responsibilities** when KDOT employees perform work requiring the use of respiratory protection.

5.1 Definitions

Aerosol- Particles that are either solid or liquid and suspended in air.

American Industrial Hygiene Association (AIHA)- Professional organization of industrial hygiene.

Contaminant- A harmful, irritating, or nuisance airborne material.

Disposable Respirator- A respirator for which maintenance is not intended and that is designed to be discarded after excessive resistance, sorbent exhaustion, physical damage, or end-of-use-life renders it unsuitable for its intended use.

Dust- An aerosol consisting of mechanically produced solid particles derived from the breaking up of larger particles.

Exposure Limit- The maximum allowable concentration of a contaminant in the air to which an individual should be exposed. These may be time-weighted averages (TWA), excursion limits, ceiling limits, or short-term limits.

Filter- A component used in respirators to remove solid or liquid aerosols from the air.

Fit Check- A test conducted by the wearer to determine if the respirator is properly sealed to the face.

Fit Factor- A quantitative measure of the fit of a particular respirator to a particular individual.

Fit Test- The use of a challenge agent to evaluate the fit of a respirator on an individual.

Fume- Solid aerosols formed by the condensation of gas or vapor.

Hazardous Atmosphere- An atmosphere that contains contaminant(s) in excess of the exposure limit or is oxygen deficient.

High-Efficiency Filter- A filter that removes from the air 99.97% (percent) or more of the aerosols having a diameter of 0.3 or larger micrometers.

Immediately Dangerous to Life or Health (IDLH)- Any atmosphere that poses an immediate hazard to life or poses immediate irreversible debilitating effects on health.

Permissible Exposure Limit (PEL)- Regulatory limits for contaminants that may include:

- Eight-hour time weighted average (TWA);
- Short Term Exposure Limit (STEL);
- Ceiling (c); and
- Excursion Limits.

Qualified Person- Member of the safety staff who has training and experience in air monitoring, exposure assessment and workplace evaluations to control the job.

Workplace Exposure Evaluation- Coordination of air monitoring for contaminants in the workplace by the safety staff.

5.2 General Provisions

5.2.1 Training

Employees who are assigned respirators shall be trained in:

- Respirator limitations under various conditions;
- Protection factors of the various types of respirators;
- Use, maintenance, cleaning, disinfection, and storage of respirators; and
- Fit testing of the respirator face seal.

This training shall be provided upon initial job assignments requiring the use of respirators. Periodic refresher training shall be provided by the safety staff. Fit testing of respirators shall be conducted annually at a minimum.

5.2.2 Written Respirator Program

The specifics of respiratory protection are provided in KDOT's written Respiratory Protection Program. The key elements of this written respirator program are:

- Selecting respirators based upon employee exposure hazards.
- Training respirator users on the proper use and limitations of respirators.
- Assigning respirators to individual workers for their exclusive use.
- Cleaning and disinfecting respirators on a regular basis.

- Storing respirators in convenient, clean and sanitary locations.
- Inspecting respirators during routine cleaning for worn or damaged parts.
- Conducting surveillance of work area conditions and degrees of employee exposure or stress.
- Conducting inspections to evaluate the continued effectiveness of the program.
- Not assigning respirators until it has been medically determined that the employee is physically able to perform the work and use the equipment.

5.2.3 Administration

Safety staff shall implement and administer the respirator program, selection of respirators, training, and record-keeping.

5.2.4 Hazard Assessment

Safety staff shall assess employee exposures to airborne contaminants prior to the employee using a respirator. Based on the assessment, an appropriate respirator shall be selected for the exposure. Exposure assessments should be based on air monitoring data, process information, work environment, historical data, and work practices relative to the type of contaminant.

The PEL of an air contaminant does not have to be exceeded for an employee to use a respirator. The employee may request the use of a respirator because of a nuisance exposure or for personal reasons. Requests shall be evaluated by safety staff.

5.2.5 Respirator Selection

The types of respirators used at KDOT are:

- Negative pressure air purifying
- Powered air purifying respirator (PAPR); and
- Airline
- Disposable or single use type

The types of cartridges used on respirators are:

- Dust, particulate – used for welding, cutting, nuisance dust
- HEPA – used for asbestos, lead, silica
- Organic – used for solvent vapors; and
- Acid gas – used for hydrogen sulfide, chlorine, sulfur dioxide.

5.2.6 Recordkeeping

Records shall be kept on each employee who receives training and fit testing. This record shall include the name, location of respirator use, type of contaminant(s) that the employee is reasonably expected to be exposed to, respirator type, tester, medical evaluation, and results of fit testing.

5.2.7 Purchasing

Respirators shall be purchased and kept in stock in combination with an adequate supply of cartridges and replacement parts.

5.2.8 Medical

Employees who are candidates to use a respirator shall receive a medical examination by a licensed physician or other appropriate licensed health care professional. A work and personal history form filled out by the candidate shall be provided to the physician or other licensed health care professional. The physician or other licensed health care professional shall determine if the employee is capable of wearing the selected respirator. No employee shall wear a respirator until a medical exam and fit testing has been completed. See safety staff for appropriate respiratory protection forms.

5.2.9 Voluntary Respirator Use

Voluntary use of disposable respirators is allowed. Prior to voluntarily using a respirator, the employee must complete safety meeting 117. Supervisors shall document that the employee has completed safety meeting 117.

5.3 Specific Responsibilities

5.3.1 Supervisors

Supervisors, who supervise employees whose job duties require the employees to work with respiratory protection, shall obtain and coordinate the required training for affected employees.

Supervisors will not allow any employee who has not received the required training or medical evaluation to perform any of the tasks or activities requiring respiratory protection.

Supervisors shall monitor whether an employee's use of a respirator is correct. Supervisors shall be responsible for communicating respirator needs to safety staff.

5.3.2 Employees

Employees shall comply with applicable guidelines in this section. They will appropriately maintain and clean the respirators assigned to them and properly store the respirator when not in use.

5.3.3 Safety Staff

Safety staff shall aid supervisors or others as applicable on matters concerning this section. Safety staff shall assist in developing or securing the required training.

Safety staff shall develop a written respirator program and provide respirator fit testing, program review, and training.

Safety staff shall coordinate the required training for affected employees.

Safety staff shall be responsible for ordering respirators, cartridges, and replacement parts.

Safety staff shall be responsible for implementing the respirator program, selecting respirators, training, and recordkeeping.

Section 3- Fall Protection

5.1.1 Training

Training will cover fall hazards and the selection, inspection, installation, care and use of fall protection systems, fall protection plans and fall protection equipment.

This training should be completed before an employee begins working in an area where fall hazards exist. It is recommended that re-training occurs every three years or when equipment or job conditions change. Re-training should also occur if there is an indication or incident that suggests lack of knowledge or skill.

The strength requirements for the personal fall arrest systems as outlined in this program is limited to employees whose combined tools and body weight is less than 310 lbs. Employees with previous neck / back surgery must provide a written medical release before wearing personal fall protection systems.

The fall protection training includes the following areas:

- Recognition of fall hazards in the workplace
- The procedures for erecting, maintaining, disassembling, and inspecting fall protection systems
- The use and operation of conventional fall protection systems
- Application and use of fall protection plan, controlled access zones and safety monitoring systems
- The possible effect falls may have on the human body
- Emergency procedures and rescue

5.1.2 Fall Protection for Elevated Walking/Working Surfaces

Fall protection, related to facility maintenance work or inspection work prior to or after a construction project is complete, is required for elevated walking/working surfaces four (4) feet or more above a lower level.

When working at heights six (6) feet or more above a lower level, employees must use one of the following conventional fall protection systems: guardrail system, personal fall arrest system or safety net system. The use of a fall protection plan is only allowed for specific walking/working surfaces and under certain conditions.

Structural Integrity

Prior to beginning work on any elevated walking working surface, the structural integrity and strength of the surface must be evaluated to determine if it is sufficient to support both the worker and any needed equipment.

Unprotected Sides and Edges

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side(s) that is four (4) feet or more for a fixed permanent structure above a lower level; or six (6) feet or more for construction above a lower level shall use fall protection of guardrail systems, personal fall arrest systems or safety net systems.

Leading Edge

Each employee who is constructing a leading edge six (6) feet or more above lower levels shall use fall protection of guardrail systems, personal fall arrest systems or safety net systems.

Each employee on a walking/working surface six (6) feet or more above a lower level where leading edges are under construction, but who is not engaged in the leading-edge work, shall use fall protection of a guardrail system or personal fall arrest system.

When a fall protection plan is in place for employees engaged in the leading-edge work and a controlled access zone has already been established for the leading-edge work, the control line may be used in lieu of a guardrail along the edge that is parallel to the leading edge.

Hoist areas

Each employee in a hoist area must use a guardrail system or a personal fall arrest system when working six (6) feet or more above a lower level. If the guardrail systems are removed to facilitate the hoisting operation and the employee must lean over the edge of the access opening; that employee shall use a personal fall arrest system.

Holes

Walking/working surfaces with holes, including skylights, auger and bridge that are six (6) feet or more above a lower level shall have guardrail systems placed around the hole or covers placed over the hole.

If a guardrail is not placed around the hole on a walking/working surface that is six (6) feet or more above a lower level, the employees on the walking/working surface should use personal fall arrest systems.

Holes (including skylights) should be covered. These covers must be capable of supporting twice the weight of a worker, equipment or load that may be imposed on the cover. Covers should be secured to prevent disengagement and shall be marked with the word “HOLE or COVER.”

Formwork and reinforcing steel.

Each employee on the face of formwork or reinforcing steel that is six (6) feet or more above the lower levels should use fall arrest systems, or positioning device systems.

Protruding reinforcing steel that an employee could fall onto or into when falling from a height of six (6) feet or more shall be guarded or covered.

Ramps, runways, headwalls, and other walkways.

Ramps, runways, and other walkways located six (6) feet or more above lower levels should use guardrail systems.

Excavations, Caissons, Pits, Shafts

Excavation six (6) feet or more in depth should have in place guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barriers.

Caissons, pits, shafts or similar excavations six (6) feet or more in depth should have in place guardrail systems, fences, barricades, or covers.

Steel Erection

Employees working on steel erection projects that place them six (6) feet or more above a lower level shall use a guardrail system, personal fall arrest system or safety net system.

Roofing

Low-slope roofs (Slope less than 4 in 12)

Each employee engaged in roofing activities on low-slope roofs, with unprotected sides and edges six (6) feet or more above lower levels shall use guardrail systems, personal fall arrest systems, safety net systems or a warning line system and safety monitoring system.

Steep roofs (Slope greater than 4 in 12)

Each employee engaged in roofing activities on a steep roof with unprotected sides and edges six (6) feet or more above lower levels shall use guardrail system with toe boards, a personal fall arrest system or a safety net system.

Pre-cast concrete erection

Each employee engaged in the erection of pre-cast concrete members (including, but not limited to the erection of bridge beams and columns) that is six (6) feet or more above lower levels should use a guardrail system, a personal fall arrest system or a safety net system.

Wall Openings

Employees working on, at, above or near wall openings, including those with chutes attached, where the outside bottom edge of the wall openings is six (6) feet or more above a lower level and the inside bottom edge of the wall opening is less than 39 inches above the walking/workingsurface, should use a guardrail system, a personal fall arrest system or a safety net system.

5.1.3 Conventional Fall Protection Systems, Criteria and Use

The conventional fall protection systems used by most workers include guardrail systems, personal fall arrest systems and occasionally safety net systems. Guardrail systems offer a positive barrier and should be considered first when selecting a fall protection system. Personal fall arrest systems do not prevent falls but are designed to arrest and eventually stop a fall.

Safety nets do not prevent falls but generally serve to catch employees, equipment and/or tools.Positioning device systems are allowed for specific steel erection construction. Warning line systems can be used for low slope roofing work. These systems and the requirements for each are outlined in the following sections.

5.1.4 Guardrail Systems

Guardrails must contain a top-rail, mid-rail, post and possibly a toe board. Toe boards are required when employees or others are below a walking/working surface and there is a reasonably foreseeable potential for material, equipment or tools to fall below. Under no circumstances should an employee climb onto a guardrail or hook a fall arrest system to a guardrail.

Guardrails must meet the following requirements:

Materials: Guardrails could be made of wood, wire rope, metal pipe or structural steel. No steel or plastic banding may be used on wire rope. Manila, plastic, or synthetic rope cannot be used for top rails or mid-rails.

All sizes and dimensions are nominal.

- Wood: (Construction Grade lumber)
- Top Rail & Post: 2x4
- Mid-rail: 2x4
- Toe board: 1x4
- Wire Rope: ¼ inch wire rope with flags every 6 feet
- Wire Rope: Rails & post schedule 40 pipe with a minimum diameter of 1 ½ inch
- Structural Steel: Rails & post, 2 inches by 2 inches by 3/8-inch angels

Post Spacing:

- Materials listed above: 8 feet on center

Height Requirements:

- Top Rail: Must be 42 inches plus or minus 3 inches above the walking/working surface
- Mid-Rail: Must be midway between the top rail and the walking/working surface
- Toe Board: Must be at least 3 ½ inches tall, placed no more than ¼ inch above the walking working surface

Strength: The guardrail system shall be capable of withstanding, without failure, a minimum of 200 lbs. applied within 2 inches of the top edge of the top-rail in any direction. Mid-rails must be capable of withstanding 150 lbs. applied in any direction along the mid-rail.

NOTE: The materials as previously outlined meet the strength requirements outlined in this section.

5.1.5 Personal Fall Arrest Systems

A personal fall arrest system is designed to arrest and then stop an employee falling from an elevated walking/working surface. It

consists of one or two anchorages, connectors, and a bodyharness and may include a lanyard with a deceleration device, lifeline, or a suitable combinationof these. Body belts are not to be used as part of a personal fall arrest system.

Each component of a personal fall arrest system is vital. The success of the system to arrest and then stop an employee that has fallen is dependent on elements of the system.

System Requirements:

- The strength requirements for the personal fall arrest systems as outlined in this section are limited to employees whose combined tools and body weight is less than 310 lbs.
- The system shall be designed to limit the free fall of an employee to six (6) feet, which limits the arresting force on an employee's body to 900 lbs.
- If employees are unable to rescue themselves after a fall while using a personal fall arrest system, call 911 or the local fire department/rescue service for assistance. Only employees trained in rescue procedures should attempt to rescue an individual who has fallen. If a fall injury occurs and the employee has impacted a lower level, call 911or the local fire department/rescue service for assistance and use appropriate first aid measures. Do not move a victim unless necessary.

Components

Inspection requirements

Parts of the Personal Fall Arrest System shall be inspected prior to use for signs of fraying, corrosion, weld burns, and overall condition. If any of these conditions are found,the part must be immediately taken out of service and given to the Safety Specialist for inspection.

Lanyards shall be given to safety staff and destroyed if they have been exposed to any impact or shock loading or involved in a fall.

Other components of a personal fall arrest system subjected to impact loading shall be removed from service and shall not be used again until it has been inspected and determined by a competent person to be undamaged and suitable

for reuse. Body harnesses and components shall be used only as part of a fall arrest system.

Anchorage

The selection of adequate anchorage points is critical. The fall arrest system is dependent on this one element.

Anchorages must be capable of supporting at least 5,000 lbs. for every person using the anchorages or designed to maintain a safety factor of at least two.

Lifelines

Lifelines should be protected against being cut or abraded.

Horizontal lifelines shall be designed with a safety factor of at least two, installed, and used under the supervision of a trained person. The height of the horizontal lifeline should be such that free fall distances are limited to 6 feet. Ideally, this places the lifeline height at or above the middle of the shoulder blade of the user.

If the lifeline is supported with stanchions or post between anchorage's that do not allow the double locking snap hook on a lanyard to pass freely by the stanchion or post, then two lanyards must be used to achieve 100% fall protection.

Vertical lifelines shall have a minimum breaking strength of 5000 lbs. Vertical lifelines shall be used to only support one person per line.

A self-retracting lifeline that does not limit free fall to two (2) feet must be equipped with a deceleration device that limits free fall to six (6) feet or less.

Connectors (Snap hooks, Carabineers, etc.)

Connectors shall be drop forged, pressed, or formed steel with a corrosion-resistant finish and a minimum tensile strength of 5000 lbs. Surfaces of connectors should be smooth to prevent damage to interfacing parts of the system.

- Only double locking snap hooks or carabiners are allowed.
- Snap hooks or carabiners should never be snapped together.
- Snap hooks or carabiners should not be connected to

any object that is not dimensionally compatible or that does not allow the device to close fully and lock.

Lanyards

- Lanyards shall have a minimum tensile strength of 5000 lbs. and be made of syntheticfibers.
- A lanyard longer than two (2) feet must have a deceleration unit.
- When selecting lanyards longer than two (2) feet, consideration must be given to obstructions below the walking working surface that could be a hazard for a falling worker. Hazards should be eliminated before work begins.
- Do not wrap or knot a lanyard around itself while in use as this reduces the strength.
- A personal fall arrest system shall not be attached to a guardrail system, hoist or scaffold.

Body Harness

- Shall be made of synthetic fibers
- Each employee using a body harness should be fitted with and use a body harness that fits tightly without slack in the straps.
- The back D-ring should be centered between the shoulder blades of the wearer.
- The back D-ring shall only be used for fall arrest.
- Side or chest D-rings are not to be used with any lanyards longer than 2 feet.

5.1.6 Personal Fall Arrest Systems

The warning line shall have a minimum tensile strength of 500 lbs.

Warning Line Layout Requirements:

- Warning lines consist of ropes, wires, or chains and supporting stanchions flagged with high visibility tape every 6 feet.
- The lowest point of the line, including sag, should not be less than 34 inches from the walking/working surface.
- The highest point in the line should not be more than 39 inches from the walking/working surface.
- The stanchions shall be capable of resisting without tipping, a force of 16 pounds applied perpendicular to the line and horizontally against the

stanchion 30 inches above the walking/working surface.

- Lines shall be attached to the stanchion such that pulling on one section does not result in slack being taken up in adjacent sections before the stanchion tips over.
- Warning lines shall be erected no less than 6 feet from the roof edge when no mechanical equipment is in use.

If mechanical equipment is being used, the warning line must be erected as follows:

- Lines perpendicular to the direction of travel must be 10 feet from the roof edge.
- Lines parallel to the direction of travel must be 6 feet from the roof edge.
- Access Points, material handling areas, storage areas and hoisting areas shall be connected to the work area by 2 warning lines and, when not in use, shall be locked by an equivalent material to guide a person away from walking directly into the work area.

5.1.7 Safety Net Systems

Safety nets are designed to catch a falling worker, tools and/or debris before they reach a lower level. Safety net systems are not used by KDOT; however, private contractors occasionally use them.

5.1.8 Suspension Trauma Strap

The Suspension Trauma Safety Strap allows the worker who is suspended to stand up in their harness and to relieve the pressure being applied to the arteries and veins around the top of their legs. The continuous loop design allows both sides of the harness to relieve the pressure being applied to the legs. The strap accommodates either having one foot or both feet in the loop at a time - it relieves the pressure to both sides with just one foot in the strap allowing for added movement of the legs. The strap may allow for increased comfort, balance and improved circulation in the legs while suspended and waiting for rescue.

Inspection: During harness inspections check the suspension strap assembly, the cover, the connection to harness, and the webbing. Materials must be free of cuts, broken fibers, deterioration, modifications, fraying, uneven thickness, and hard or shiny spots. Look for tears, abrasions, burns, discoloration, or knots. Verify that one cover is marked “hook” and the other “loop”. If inspection reveals a defective condition, remove the unit from service immediately and give it to the district safety staff.

5.1.9 Emergency Procedures and Rescue

Worksites that require employees to wear personal fall protection must have an established emergency procedure and rescue plan.

Employees at worksites that required personal fall protection should know the following information:

- Emergency services phone numbers
- Supervisor/Superintendents phone number
- The phone numbers for utilities that are present in the worksite area
- The identity of the two (2) that are ground crew, trained or competent persons for each aerial lift on the worksite.

The ground crew, trained or competent person shall be trained in the following areas:

- steps for self-rescue
- physiology of suspension trauma and the use of suspension trauma safety steps
- self-evacuation from an aerial truck basket
- procedures for inspecting personal fall protection equipment
- proper selection of anchor points and equipment placement for personal fall protection
- proper operation of rescue equipment
- proper procedures for coworker rescue
- injury management including First Aid and CPR

Snooper operators in District 1 and bridge inspectors in the Bureau of Design Bridge Management shall attend classes annually on rescue techniques. The rescue training shall include instruction on:

Protective helmets	Protective eyewear
Gloves, lightweight leather	Snooper truck with operator
Hi-Reach truck with operator	Extension ladder
Anchor straps, 2 feet to 8 feet	Truck with bumper mounted rescue winch
Harnesses with suspension trauma safetysteps	Clothing and footwear suitable for environment
Descent device with line	Back-up pack with RPM system
Beamers, up to 24 inches	Rope, 150 feet
Carabineers	175 lb. rescue manikin
4:1 raising system	Brake-bar rack with line

5.1.10 Specific Responsibilities

Supervisors

- Supervisors, who oversee employees whose job duties require the use of PPE, shall obtain and coordinate the required training for affected employees

Employees

- Employees shall comply with applicable guidelines contained in this section and training.
- Employees are to report any unsafe acts associated with this section to their supervisors.
- Employees shall identify and report hazards which may require the use of PPE.
- Employees who are assigned PPE are to keep their assigned PPE available and in good working condition.
- Employees assigned PPE are to replace their assigned PPE when the PPE becomes worn or unsafe.

Safety Staff

- Safety staff will help supervisors or others as applicable on matters concerning this section.
- Safety staff shall perform hazard assessments.
- Safety staff will train other KDOT employees to perform hazard assessments.
- A KDOT employee trained in performing hazard assessments can perform hazard assessments.
- Safety staff will provide consultative and audit assistance for implementation of this section.

Section 4 – Bloodborne Pathogens Exposure Control Plan

1.0 Purpose

The purpose of this Exposure Control Plan (ECP) is to provide guidance to KDOT employees to eliminate or minimize exposure to bloodborne pathogens in accordance with the Occupational Safety and Health Administration's (OSHA) standard set forth in 29 C.F.R. 1910.1030.

2.0 Scope and Applicability

This section affects KDOT employees whose job duties require them to have exposure to blood and Other Potentially Infectious Material (OPIM).

3.0 Policy

This plan requires KDOT to identify tasks and procedures where occupational exposure to blood or OPIM occurs, without regard to personal protective equipment (PPE).

The ECP must also set forth the schedule for implementing other provisions of the standard and specify the procedure for evaluating circumstances surrounding exposure incidents. This plan must be accessible to employees during their work shifts and available to the Kansas Department of Labor (KDOL).

4.0 Exposure Control Plan Administration

The District Safety Specialist or another designee of the Senior Manager is responsible for implementing the ECP and will maintain, review and update the ECP annually or when tasks and procedures are added/changed.

Those employees who are determined to have occupational or non-occupational exposure to blood or OPIM should comply with the procedures and work practices outlined in this ECP.

PPE and supplies for potential bloodborne pathogen and OPIM exposure will be provided and maintained. Accident/injury/exposure records and training and health records will be maintained and made available to the employee. Health records will only be made available to those with proper consent from the employee.

5.0 Employee Exposure Determination

KDOT has completed a Bloodborne Pathogen Exposure Determination and has determined at-risk employees who may come into contact with human blood or other potentially infectious material at KDOT. These include but are not limited to:

- Facility employees who handle plumbing, sewer, septic or stabilization pond duties.
- Employees who clean and maintain restrooms at facilities or rest areas.
- Employees with non-occupational exposure, including those trained to render first aid and CPR in emergency situations and positions who are required to clean up accident or emergency sites.

6.0 Methods of Implementation and Control

6.1 Employee Training

Employees at risk of exposure will receive bloodborne pathogen interactive training. This training will cover epidemiology, symptoms and modes of transmission; procedures and PPE usage on how to protect themselves from exposure to blood and OPIM; and post-exposure evaluations on how to handle biohazardous material. A training record will be maintained for each employee in KDOT's learning management system.

As designated by KDOT, a hepatitis B vaccine should be offered free of charge to employees before exposure. This also applies to those who have been exposed to bloodborne pathogens while performing CPR on duty as a good Samaritan and have not been designated to perform first aid/CPR by KDOT.

6.2 Universal Precautions

Employees should utilize universal precautions when rendering first aid, CPR or cleaning up an accident or emergency site. Universal precautions constitute an infection control method that requires employees to assume that all human and animal blood and bodily fluids are infectious for HIV, HBV or other potential bloodborne pathogens and should be treated accordingly.

6.3 Engineering Controls and Work Practices

Prevent or minimize exposure to bloodborne pathogens by:

- Using appropriate PPE for the type of exposure.
- Making hand washing facilities available at KDOT offices and shops.
- Washing hands after removing protective gloves.
- Making alternative hand washing measures available such as antiseptic towelettes when necessary.
- Cleaning areas so others don't have contact with blood or OPIM.
- Providing plastic bags for disposal of items that cannot be decontaminated.

6.4 Housekeeping

Employees responsible for cleaning and decontaminating work surfaces following an accident or emergency treatment should:

- Decontaminate work surfaces with an appropriate disinfectant of one part household bleach and 10 parts water after any spill of blood or OPIM.
- Pick up contaminated items using mechanical means such as tongs, brushes and/or dustpans.
- Discard all regulated waste into a marked plastic bag, seal the bag, then place it into another bag and seal.

6.5 Hepatitis B Vaccination

The hepatitis B vaccine is administered in a series of three doses over a six-month period.

New employees who have completed their hepatitis B vaccination series prior to employment with KDOT shall provide documentation of vaccination.

Current and new employees whose job classification at KDOT is designated at risk and who have **NOT** previously been vaccinated must be provided the opportunity to receive a hepatitis B vaccine information sheet and offered the hepatitis B vaccination at no cost.

Employees who choose to consent or refuse the vaccine shall sign a **KDOT Hepatitis B Immunization Consent/Refusal** form. Employees who refuse may opt to receive the vaccine at a later date.

6.6 Post Exposure and Follow-Up

Post exposure evaluation and follow-up will be provided at no cost for employees who have had an exposure incident in the workplace.

Any employee having an exposure incident while performing KDOT duties is responsible for completing the following:

- Notifying his or her supervisor.
- Completing an 1101a injury report.
- Contacting their Human Resource Professional.
- Seeing a medical doctor and providing them with ECP forms 1 and 2.

KDOT will offer the following for any employee having an exposure incident while performing their KDOT duties:

- A confidential medical exam that documents the circumstances of exposure.
- Identification and testing of the source individual, with consent.
- Testing of the exposed employee's blood with consent.
- Counseling services for the employee.
- A copy of KDOT's **Health Care Provider Written Opinion for Post-Exposure Evaluation** form to be provided to the employee within 15 days of the medical evaluation.

The employee or their supervisor shall also fill out the **Post Exposure Incident** form. Additionally, at the direction of the examining licensed health care professional, KDOT should make the hepatitis B vaccine and vaccination series available within 24 hours of possible. Vaccination may not be required if:

- The employee has already completed the hepatitis B vaccination series.
- An antibody test has revealed that the employee has hepatitis B antibodies.
- There are medical reasons, usually determined by a physician, to not give the vaccine.

An employee who refuses the vaccination is required to sign a **KDOT Hepatitis B Immunization Consent/Refusal** form, which will be retained indefinitely in the employee's personnel file.

6.7 Record Keeping

KDOT will maintain employee medical, training and accident/incident records.

Medical records will be maintained for employees who have had workplace exposure. Employee medical records are confidential and will not be disclosed or reported without the employee's express written consent.

Training records will be maintained in KDOT's learning management system.

Tracking forms such as the 1101a personal injury form will be maintained for accidents/incidents involving employee exposure. Exposure events will be documented as an injury if documentation is required. All exposure forms will be kept 15 years past exposure.

Section 5 – Confined Space Entry

1.0 Purpose

The purpose of this section is to provide guidance to KDOT employees whose job duties require them to work within confined spaces.

2.0 Scope and Applicability

A confined area or space is one which, by design, has limited openings for entry and exit, unfavorable natural ventilation that could contain or produce dangerous air contaminants and is not intended for continuous employee occupancy. Confined spaces are located throughout KDOT and may present hazards to the employees who perform work activities in them.

Topics in this section include provisions for training, definition of a confined space, details on the hazards of confined spaces, identifying confined spaces, evaluating confined spaces and the requirements for permit-required confined space entry and recordkeeping.

This section applies to any operation that requires KDOT employees to enter or work inside any existing tank, manhole, sump, vault, pit, culvert or similar confined space. It applies to, but is not limited to, the following KDOT employees and operations:

- Employees who enter weigh station pits.
- Employees who enter trenches.
- Maintenance and bridge employees who work in pipes, caissons and culverts.
- Inspectors and maintenance employees who work in specified bridge beam areas.
- Employees who work at sewage and water treatment facilities located at rest areas or welcome centers.
- Maintenance employees who work in catch basin areas.
- Employees who enter paint tanks.
- Employees who enter salt brine tanks.

3.0 Policy

Confined spaces shall be identified and posted with warning signs at each KDOT facility and/or jobsite as applicable. When confined space hazards exist that cannot be eliminated, engineering practices, administrative practices, safe work practices, PPE usage and proper training regarding confined space entry will be implemented.

4.0 General Responsibilities

Supervisors and employees must implement KDOT's safety policy and procedure for confined space entry. KDOT employees must report unsafe conditions to their supervisor. Specific requirements are found in Section 5.3.

5.0 Procedure

KDOT employees performing duties that require working within or near a confined space shall be trained in the appropriate practices and guidelines set forth when performing work duties.

5.1 Definitions

This section provides applicable definitions, establishes general provisions and identifies responsibilities.

Attendant: a trained employee who remains outside the permit-required confined space while work is being performed.

Competent person: a KDOT employee who has a minimum of eight hours of training in the hazards of and appropriate procedures for working in a confined space. The employee should be capable of identifying existing and predictable hazards in the surroundings or working conditions that are deemed unsanitary, hazardous or dangerous and has authorization to take prompt corrective measures to eliminate or mitigate the hazard.

Confined space: a space that, by design, has limited openings for entry and exit, may lack adequate ventilation and may contain or produce dangerous air contamination.

Entrant: a KDOT employee who is authorized and trained to enter a permit-required confined space.

Entry permit: a written document provided by KDOT to allow and control entry into a permit-required space.

Entry leader: the employee responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, authorizing entry, overseeing entry operations and terminating entry as required.

Hot work permits: a permit allowing employees to perform work involving welding, cutting or any other task that would deplete oxygen, create toxic fumes and/or vapors or create the potential for fire or explosion.

Lower Explosive Limit (LEL): the minimum concentration of a combustible/flammable gas or vapor in the air that could ignite if an ignition source is present.

Oxygen deficiency: an atmosphere containing oxygen at a concentration of less than 19.5% by volume as measured by an oxygen measuring device.

Oxygen enriched: an atmosphere containing oxygen at a concentration of greater than 23.5% by volume as measured by an oxygen measuring device.

Upper Explosive Limit (UEL): the maximum concentration of a combustible/flammable gas or vapor in the air before its saturation point, which could ignite if an ignition source is present.

5.2 General Provisions

5.2.1 Training

The formal written confined space training program is designed to provide employees with the necessary understanding, skills and knowledge to work in confined spaces.

The components of this formal training program include instruction on:

- Types of confined spaces
- Confined space hazards
- Atmospheric testing of confined spaces
- Cleaning and ventilation
- Lockout of confined spaces
- PPE
- Respirator use and care
- Buddy systems and emergency procedures
- Communication procedures
- Emergency rescue and procedures
- Hot work

Initial awareness training is provided to all maintenance employees. A minimum of one competently trained person is required to be present prior to KDOT employees entering a confined space (recommended one per subarea). Training must be conducted whenever an employee's duties include working in a confined space, when duties change or are increased, whenever hazards have changed in the confined space where the employee may be working or whenever an evaluation of the confined space entry program identifies inadequacies in the employee's knowledge.

Other employees designated to enter permit-required confined space work areas, including entrants, attendants and rescue team members, will be trained in the following areas:

Emergency entry and exit procedures	Applicable respirators
First aid and CPR	Lockout barriers at worksites
Safety equipment use	Rescue equipment
Permit system	Work practices

Competent persons shall be trained in:

- Atmospheric testing methods
- Meter calibration
- Atmospheric behaviors of oxygen, combustible and toxic gases

5.2.2 Confined Spaces

At KDOT, a confined space is one that:

- Is large enough for a person to enter and perform assigned work.
- Has entry and exit openings that may be limited in size and/or number.
- Is not intended for continuous human occupancy.

5.2.3 Hazards of Confined Spaces

Confined spaces may present hazards to employees due to the nature of the space's shape, size, lack of ventilation, proximity to toxic gases or other contributing substances. Hazardous atmospheres may expose employees to risk of death, incapacitation, injury or acute illness. These hazardous atmospheres include:

- A flammable gas, vapor or mist in excess of 10% of its LEL.
- An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric oxygen concentration below 19.5% or above 23.5%.
- An atmospheric concentration of any substance for which a permissible exposure limit is published in Subpart Z of 29 CFR Part 1910 and could result in employee exposure in excess of its permissible limit(s).
- Any atmospheric condition recognized as immediately dangerous to life or health.

General safety hazards include but are not limited to:

- Physical hazards including non-chemical, physiologic stressors such as noise, vibration, slick/wet surfaces, falling objects, temperature extremes, employee fatigue and engulfment.
- Structural hazards including confined space areas that may contain structural defects.
- Electrical hazards including shock, burns and/or electrocution due to exposed or ungrounded electrical energy sources.
- Mechanical hazards including any inadvertent mechanical movement of or within a confined space that threatens the safety of the employee(s) working in the confined space.
- Biological hazards including bacterial action, which can consume oxygen to produce carbon monoxide or emit hydrogen sulfide or methane.
- Radiation hazards with sources that can inadvertently expose employee(s) to dangerous levels of radiation.

5.2.4 Identifying Confined Spaces at Your Facility

Superintendents and supervisors shall identify and locate confined spaces by visually surveying the worksite/facility to identify confined spaces that are present and could be included in the confined space inventory.

If a workspace meets the confined space criteria, note it for inclusion in your worksite/facility's confined space inventory. Appendix A provides a convenient format for inventorying confined spaces.

5.2.5 Evaluating Confined Spaces

Once confined spaces have been identified, they are then evaluated to determine any hazardous atmospheres and/or general safety hazards that may be present.

A hazardous atmospheric evaluation is performed by conducting atmospheric testing to assess the conditions in the confined space.

General safety hazards shall be assessed by physical observation. Physical observation shall include a visual assessment of:

- The potential to be engulfed.
- The internal configuration of the confined space.
- Other serious safety or health hazards.

Assessment shall be based on knowledge of existing conditions and use of the confined space along with actual and reasonably potential hazards posed by materials and substances in the confined space.

If any atmospheric or general safety hazards are present, the confined space is considered a permit-required confined space. If no atmospheric or general safety hazards are present, it is not considered a permit-required confined space.

If a change in use or configuration of a non-permit space increases hazards to an entrant, the space must be reevaluated for possible reclassification to a permit-required confined space.

A permit-required confined space may be reclassified by the Department of Labor to a non-permit space if:

- The permit-required confined space poses no atmospheric hazards and general safety hazards are eliminated without entry.
- Entry is necessary to eliminate hazards and such entry is performed in accordance with the Confined Space Entry program and testing and inspection during that entry indicates that hazards have been eliminated.
- The basis for determining the hazard is eliminated and documented.

Reclassification is effective as long as the hazards remain eliminated.

5.2.6 Permit-Required Confined Space Entry Requirements

Once permit-required confined spaces have been identified, no employee(s) shall enter the space until the following requirements have been met:

- Establishing a permit system.
- Conducting pre-entry atmospheric testing.

- Isolating energy sources (lockout/tagout).
- Ventilating and cleaning the confined space.
- Posting permit-required confined spaces with warning signs.
- Having appropriate PPE.
- Having appropriate tools in place.
- Having attendants in place.
- Having rescue teams in place.

The permit system for each worksite/facility shall include a listing of the permit-required confined spaces, a warning sign/label at each permit-required confined space and permit issuance by a competent person or safety staff.

Once a permit-required confined space is identified, it will be marked with a sign advising personnel and the public as to the dangers involved. Where practical, all permit-required confined spaces shall be secured to reasonably prevent entry by non-authorized persons.

A competent person must authorize entry, prepare and sign written permits, order corrective measures when necessary and cancel permits when work is completed. The entry permit must be completed and posted in a conspicuous location near the entrance. Permits must be available to all entrants at the time of entry and should extend only for the duration of the task. Permits must be retained for a year to facilitate review of the confined space program at the applicable KDOT area office.

If welding is to be performed in the confined space, a hot work permit must be obtained whether the confined space is permit-required or not.

Pre-entry atmospheric testing for the confined space shall be performed prior to employee(s) entrance.

Energy sources will be isolated by physical disconnection, double blocking, bleeding or lockout/tagout procedures. Energy isolation must be verified. Ventilation and cleaning shall be performed to empty, flush or purge confined spaces from the outside if feasible.

During pre-entry ventilation, the blowing duct outlet should be positioned for uniform dilution and elimination of any hazardous atmospheres pockets as shown in Figure 1:

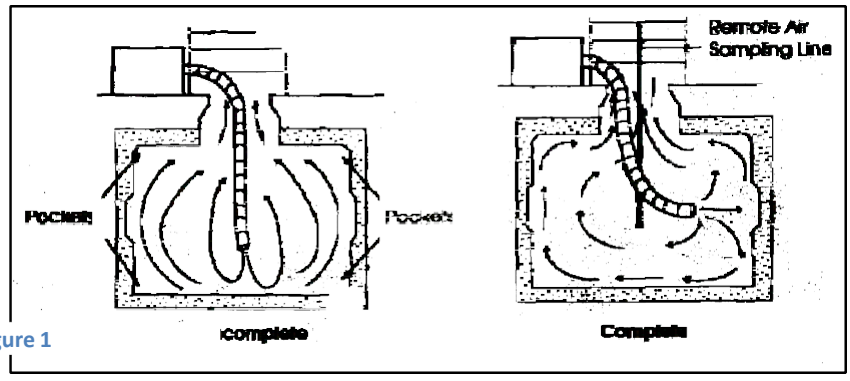


Figure 1

When a hazardous atmosphere is detected, ventilation will continue until the space has no harmful concentration of toxic gases or vapors and has attained acceptable oxygen concentrations. To confirm that harmful concentrations of toxic gases or vapors have been depleted, the atmosphere must be tested three consecutive times with safe level results.

The attendant stationed outside the permit-required confined spaces shall:

- Be trained in rescue.
- Not enter the permit-required confined space.
- Remain at the confined space entrance while persons are within the confined space.
- Have means to summon assistance.
- Have safety and rescue equipment on hand.

The attendant is responsible for alerting others that a rescue is in progress and for taking appropriate measures when others are in the confined space. No employee is to enter a confined space if another employee enters the confined space. Appropriate communications shall be established with the use of radios or walkie-talkies if an employee in the confined space is out of sight or earshot of the attendant.

According to the Department of Labor, rescue teams, equipment and self-contained breathing apparatuses must be available for permit-required confined spaces. These rescue teams and equipment may be local fire department staff and equipment.

5.2.7 Emergency Procedures and Rescue

If a hazard arises within the confined space, personnel in the space will immediately exit and contact the entry supervisor. The entry supervisor will re-evaluate the space to determine the appropriate course of action.

Personnel will immediately evacuate the space when any of the gas monitor alarm points are activated.

If at any time there is any questionable action or non-movement by the authorized entrant, the attendant will make a verbal check. If there is no response or a questionable response, the worker in the space will be ordered to immediately evacuate.

If possible, authorized entrants will initiate self-rescue by exiting the confined space.

If self-rescue is not possible, the attendant will retrieve the entrant via the connected retrieval line. If the attendant is unable to retrieve the entrant via the lifeline, the attendant will call 911.

If the entrant is disabled due to falling or impact, call 911. Do not remove them from the confined space unless they are in immediate danger.

Only trained and properly protected people are to initiate a rescue.

5.2.8 Recordkeeping

Recordkeeping requirements include:

- Retaining each cancelled permit for at least one year to facilitate review of the permit-required confined spaces program.
- Documenting problems encountered while working within the confined space on the permit to facilitate revisions to program.
- Certification of training with the names of the trainers and training dates.
- Reclassification from permit to non-permit space certification with the date, location and signature of person making determination.

5.3 General Responsibilities

Superintendents and/or supervisors shall be responsible for identifying confined spaces at their worksite/facility and evaluating those spaces to determine if a permit is required prior to entry.

Supervisors shall not allow any employee who has not received the required training to perform any of the tasks or activities associated with this section.

Supervisors are responsible for knowing where confined and permit-required confined spaces are located at their worksite/facility and for posting those spaces with warning signs.

Supervisors will provide employees with PPE as required for work related to confined space entry.

Supervisors are responsible for training employees on equipment needed when working in a confined space.

Employees shall comply with all applicable guidelines contained in this section. Employees are never to enter confined spaces unless trained and authorized.

The **entrant** does the assigned task and is responsible for reviewing the permit before entry.

The **attendant** is responsible for maintaining communication with the entrant while the entrant is within the confined space.

The **entry leader** makes sure that only employees who are trained and authorized are allowed to enter confined spaces and are responsible for obtaining proper permits. Entry leaders must be familiar with hazards associated with the entry operation and notify all entrants of such hazards associated with the operation.

The **competent person** is responsible for entry into non-permit spaces. They are required to verify contents of confined space prior to entry and suspend entry and notify safety staff if contents are believed to be different than tank markings or if conditions change.

Safety staff shall assist superintendents, supervisors or others as applicable on any matter concerning this section. They will assist in developing or obtaining the required training for competent people. They will also maintain the Permit-Required Confined Spaces Inventory (Appendix A) for their district.

Safety staff will be responsible for checking the atmosphere of a confined space by correctly reading and using gas detection instruments and for documenting the confined space atmospheric measurements for permit-required confined spaces before every entry.

APPENDIX A: Confined Spaces Inventory

Facility: **Location:** **Inventory Date:**				
Space	**Purpose**	**Hazards**	**ID #**	**Permit Req'd (Y/N)**

This inventory must be kept up to date. All operational changes should always be evaluated for their impact on this facility's confined spaces.

The entrant does the assigned task and is responsible for reviewing the permit before entry.

Section 6 – Excavation, Trenching and Shoring

1.0 Purpose

The purpose of this section is to provide guidance for KDOT employees who perform job duties in or near trenches or other excavations.

2.0 Scope and Applicability

This section affects KDOT employees whose job duties require entrance into trenches, excavation sites or inspections of such sites.

3.0 Policy

Employees working in or near trenches and excavations shall be provided with training in recognizing and mitigating unsafe conditions. Trenches and excavations shall be evaluated and monitored by a competent person prior to employees entering and while employees are working.

4.0 General Responsibilities

Each supervisor must implement the applicable provisions in this section when working in or near trenches or other excavations. KDOT employees shall follow the applicable provisions in this section and report any unsafe act or condition to their supervisor. Specific requirements are detailed in Section 5.3.

5.0 Procedure

This section provides definitions, establishes general provisions and identifies specific responsibilities when KDOT employees perform work duties involving excavations, trenching and shoring.

5.1 Definitions

Bell-bottom pier hole: a type of shaft or footing excavation that the bottom of which is made larger than the cross section above, resulting in a bell shape.

Benching: a method mitigating cave-ins by excavating the sides of an excavation to form one or a series of horizontal steps, usually with vertical surfaces between levels.

Competent person: a person who has a minimum of eight hours of training on the hazards of working in and around trenches and excavations. The competent person can identify existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous or dangerous to employees and has authorization to take prompt, corrective measures to eliminate or mitigate the hazard.

Cross braces: the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or walls.

Excavation: any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Faces or sides: the vertical or inclined earth surfaces formed as a result of excavation work.

Protective system: a method of preventing or reducing the occurrence of trench collapse that includes sloping, shoring, trench boxes or other systems of protection.

Ramp: an inclined walking or working surface that is used to gain access to one point from another and constructed from earth or structural materials such as steel or wood.

Shoring: a structure such as a metal hydraulic, mechanical or timber system that supports the side of an excavation and is designed to prevent cave-ins.

Sloping: a method of preventing or reducing the occurrence of cave-ins by excavating the sides of an excavation to a stable incline. The angle of incline required to prevent a cave-in varies with differences in factors such as the soil type, environmental conditions of exposure and application of surcharge loads, which are additional forces applied on the soil surface behind the retaining wall.

Stable rock: natural solid mineral materials that are excavated with vertical sides and could remain intact while exposed. Unstable rock is stable when the rock material on the side or sides of the excavation is secured against cave-in or movement by rock, bolts or another protective system that has been designed by a Registered Professional Engineer.

Registered professional engineer (RPE): a registered professional engineer designs the trench support system whenever the excavation is deeper than 20 feet.

Support system: a structure such as underpinning, bracing or shoring installed to support the sides of an excavation.

Tabulated data: tables and charts approved by a RPE and used to design and construct a protective system.

Trench: a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width and the width of a trench at the bottom is not greater than 15 feet.

Uprights: the vertical members of a trench shoring system placed in contact with the earth and positioned so that individual members do not contact each other. Uprights that are placed so that individual members are closely spaced, in contact with or interconnected to each other are often referred to as sheeting.

Wales: horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members or earth.

5.2 General Provisions

5.2.1 Surface Encumbrances

Surface encumbrances, such as trees, boulders, adjacent structures, utility poles, large equipment, etc. that create a hazard shall be removed or supported as necessary.

5.2.2 Utility Installations

The location of utility installations that may be encountered during excavation work shall be determined prior to opening an excavation. If unidentified underground installations are uncovered, suspend excavation and contact the utility company. When possible, equipment should maintain a minimum clearance of 15 feet from overhead utilities or other protective measures implemented by the utility company.

Determine the actual location of known underground utilities by hand digging if the dirt work is within 24 inches of the marked utility.

Plan the excavation to avoid damage to or minimize interference with underground utilities in and near the excavation area.

Provide support for underground utilities in the excavated area, including during backfill operations, as may be reasonably necessary for the protection of such underground utilities.

Include the same procedures for utilities on KDOT property that may have been installed by KDOT and are not identified by Kansas One-Call.

Buried telephone/cable copper line: Call Kansas One-Call to have utilities marked prior to excavation. Follow the marks left by the utility company showing the location of the buried telephone/cable copper line. Never assume the depth of the buried telephone/cable copper line without verifying. The person digging is responsible for verifying the depth of the buried telephone/cable copper line. Hand dig or vacuum excavate to verify the depth. Call the utility owner to lower the lines when necessary.

Buried fiber-optic cable: Call Kansas One-Call to have utilities marked prior to excavation. Follow the marks left by the utility company showing the location of the buried fiber optic cable. Never assume the depth of the buried fiber optic cable without verifying. The person digging is responsible for verifying the depth of the buried fiber optic cable. Hand dig or vacuum excavate to verify the depth. Do not drive over fiber optic cable when ground cover is reduced. Call the utility owner to lower the cable when necessary.

Overhead electrical lines: Use caution when working around**.** When possible, keep equipment and employees a minimum of 15 feet from power lines. Call the utility line owner and explain your project. Typically, within five business days, the utility owner should arrange to have brush and trees under or near the overhead power line trimmed to a safe distance. The cuttings are usually left for KDOT employees to remove.

Guy wires: Do NOT operate equipment on guy wires. KDOT employees must report to their supervisor when they observe that a colored shield is missing, or brush/vegetation is covering part of the guy wire.

Gas pipeline: Do NOT operate heavy equipment over an exposed pipeline.

Water lines: Do NOT operate heavy equipment over a pipeline that is exposed.

Water meters: Do NOT operate heavy equipment over or next to unmarked meters. It is important to watch for and report unmarked meters to your supervisor as soon as possible.

5.2.3 Access and Egress

A stairway, ladder, ramp or other means of egress shall be in any trench that is 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees while exiting the trench.

Structural ramps shall be designed by a competent person. When ramps are to be used by equipment, the design of the ramps should be developed by an RPE competent in structural design.

5.2.4 Vehicular Traffic

Employees in a work area shall wear retro-reflective vests or other high visibility clothing that meets KDOT requirements (ANSI Class III Hi Vis top garment).

5.2.5 Falling Loads

Employees are not permitted under any loads being handled by lifting or digging equipment.

Employees are required to stand away from any vehicle being loaded or unloaded.

5.2.6 Mobile Equipment

Warning systems such as barricades, hand and/or mechanical signals or stop logs shall be used when mobile equipment is operated near the edge of an excavation and the operator does not have a clear and direct view of the edge.

5.2.7 Hazardous Atmospheres

Air quality tests shall be performed by safety staff before employees enter excavations where a hazardous atmosphere exists or could reasonably be expected to exist. Excavations or trenching in the vicinity of gasoline storage tanks, underground pipelines or sewer lines could reasonably be expected to cause a hazardous atmosphere.

Employees shall not enter any excavation that tests as having a hazardous atmosphere.

5.2.8 Water Accumulation

Employees shall not work in excavations where there is accumulated water or water is accumulating unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to adequately protect employees vary with each situation but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water or use of a safety harness and lifeline.

5.2.9 Stability of Adjacent Structures

Support systems such as shoring, bracing or underpinning shall be used to provide stability whenever the stability of adjoining buildings, walls or other structures is endangered by excavation operations.

5.2.10 Employee Protection

When loose rock or soil on the walls of an excavation poses a hazard to employees, an adequate means of protection shall be provided. Such protection shall consist of scaling to remove loose material, installation of protective barricades required for trenches 5 feet deep or more or other means of equivalent protection.

Excavated material or equipment that could pose a hazard to employees by falling or rolling into an excavation shall be kept at least 2 feet from the edge of the excavation.

Walkways or bridges with standard guard rails shall be provided whenever employees are required to cross over excavations. Jump overs by employees are prohibited.

5.2.11 Inspections

Excavations and trenches shall be inspected by a competent person prior to the start of work and monitored continuously while employees are working within the excavated or trenched area.

The competent person shall conduct an inspection whenever a hazard-increasing event, such as a rainstorm, occurs.

Whenever a hazardous condition is detected, the competent person shall instruct employees to immediately evacuate the excavation or trench until an adequate means of protection is provided.

5.2.12 Training

Employees selected to be competent persons on KDOT projects shall receive detailed training on:

- Hazards associated with trenching and excavation.
- Soil classifications.
- Appropriate slopes for different soil types and conditions.
- Proper installation of shielding and shoring.
- Recognition of hazardous conditions caused by machinery, traffic, utilities and weather conditions.
- Emergency procedures and rescue.

5.2.13 Emergency Procedures and Rescue

In the event of a collapse or cave-in:

- Call 911.
- Immediately request help from units trained in trench/confined space rescue.
- DO NOT ENTER the trench.
- Those persons in the trench who can remove themselves or be removed with minimal assistance should be removed.
- Try to locate victim(s) hidden beneath the cave-in by looking for items such as tools or shovels.
- Do NOT use machinery to locate or dig the victim(s) out.
- Do NOT remove victim(s) by tying a rope around them and pulling the rope.

5.3 Specific Responsibilities

5.3.1 Superintendent/Supervisors

Superintendents/supervisors who supervise employees whose job duties require work in and around trenches and excavation shall obtain and coordinate the required training for affected employees.

Superintendents/supervisors shall designate a competent person to be in charge of each trench or excavation covered by this procedure and shall provide for at least one competent person to be on-site while work is being done.

Superintendent/supervisors shall call 1-800-DIG-SAFE, or 811, and contact other local utilities before any excavation takes place.

Superintendent/supervisors shall contact safety staff prior to any planned excavation of 4 feet or greater in depth.

5.3.2 Competent Persons

Each site shall have a competent person who evaluates conditions and remains on-site while employees are working in the trench or excavation.

Competent persons must be familiar with this section.

The competent person shall evaluate the work site prior to excavation and determine what utilities are affected. Utility companies should be notified at least two full working days prior to starting work unless emergency conditions exist.

Competent persons shall contact safety staff in the event a planned excavation has changed scope and will exceed 4 feet in depth.

The competent person shall choose either sloping or shielding/shoring as the protective system. A slope of 1.5:1 or flatter must be used if sloping is the protective system used.

The competent person shall inspect the condition of the trench or excavation and protective system prior to each work shift and while work is being conducted in or around the trench or excavation. They shall also conduct an inspection after a rainstorm or other hazard-increasing event.

Warning systems must be in place when mobile equipment is working near the edge of a trench or excavation. These systems must be inspected by a competent person.

Information on the site evaluation and protective system selected shall be available on-site and provided by the competent person.

If a hazard is detected, the competent person shall remove employees from the trench or excavation and not permit employees to enter.

5.3.3 Employees

Employees shall complete KDOT-required trenching and excavation awareness training prior to entering any excavation.

Employees are responsible for and shall report any and all unsafe conditions or equipment to the competent person.

Employees shall immediately evacuate any trench or excavation when they suspect a collapse is imminent or when directed to do so by the competent person.

Section 7 – General Safety Program

1.0 Purpose

The purpose of this section is to provide guidance for KDOT employees who perform job duties that expose them to hazards.

This program provides an overview of general safety practices and how these practices shall be incorporated into the KDOT work environment.

2.0 Scope and Applicability

This section sets forth minimum requirements for general safety in KDOT shops, yards and projects. KDOT employees working in these location(s) who identify safety hazards need to contact their safety staff as soon as practical for specialized guidance if they do not have the ability to correct the hazard.

3.0 Policy

KDOT employees performing duties performed within the ordinary scope of employment may be required to identify hazards and make corrections to limit or eliminate exposure.

4.0 General Responsibilities

Each supervisor shall implement the applicable provisions in this section when employees are working in KDOT buildings, shops, labs, yards and on projects.

Supervisors must make sure all employees know how to identify hazards, make corrections and report the hazards to them.

5.0 Types of Hazards

The following are examples of common hazards that employees may encounter in the KDOT workplace:

Chemicals: chemicals that field workers might use can be different than chemicals an office worker uses. However, regardless of where it's used, a chemical can cause general and physical threats.

Electrical cords: electrical cords may pose a hazard if they are damaged or frayed.

Combustibles and flammables: fire and explosion hazards exist at any work location. The possibility of fire and explosion increases in areas that store large amounts of combustibles, flammable solids or liquids and explosive materials.

Hand-powered tools and equipment: hand-powered tools and equipment can pose hazards If not used properly. Before use, make sure tool safety guards are in place.

Heat-generating sources: heat-generating sources can create a fire hazard if not properly maintained.

Motorized equipment accidents: the use of motor vehicles can be a hazard even when the use is proper and appropriate. However, the risk of injury may increase when a motor vehicle is not properly used or maintained.

Office equipment: office equipment, such as copiers, paper cutters and shredders can pose a hazard if not properly maintained and used appropriately.

Items/substances blocking walking paths: items and substances in walking paths can pose a hazard that may cause tripping, slipping or falling.

Workplace violence: workplace violence can take place in any department, office, facility or workstation at any time and pose a hazard to those in and near the affected location. Refer to SOM 2.6.1 - “Workplace Violence and Threats.”

Electronic devices/cell phones and earbuds: numerous studies have shown that the use of cell phones (including all applications on the phone) is distracting. Most of the work performed by KDOT employees requires that employees not be distracted from the task at hand. Employees may carry cell phones while on official state business but are subject to the following restrictions:

- Avoid excessive use during duty hours.
- Refrain from use while operating vehicles and equipment or while working in situations where the ability to hear warnings or warning sounds is necessary for the safety of the employee and others.
- According to FMCSA guidelines, 49 CFR 392, Subpart H, no driver may use a hand-held mobile telephone or engage in texting while driving a Commercial Motor Vehicle (CMV).
- Avoid use when it will interfere with work procedures or where use will affect productivity or safety of the employee or others.

Refer to SOM 1.15.5 – “Telephone Usage.”

Listening to music on devices that limit outside noise can produce a safety hazard by masking environmental sounds that need to be heard, especially on active work sites where attention to moving equipment, heavy machinery, vehicle traffic and safety warning signals may be compromised. Employees shall not use earbuds, headphones or other devices that provide music or other noise directly into the ears while operating vehicles and equipment or while working in situations where the ability to hear warnings or warning sounds is necessary for the safety of the employee and others; where the use will interfere with work procedures; or where use will affect productivity or safety of the employee or others.

6.0 Slips, Trips and Falls

Slips, trips and falls are the leading cause of injury in any workplace. Good housekeeping and awareness of your surroundings help reduce the chances of becoming injured by a slip, trip or fall.

6.1 Preventing Slips, Trips and Falls

Walk with caution on wet surfaces as they may become slippery when wet with any type of substance.

Use handrails, when provided, when ascending and descending stairs. If an unsafe condition is noticed, report the condition to your supervisor or safety staff as soon as practical.

Hold on to something solid when attempting to sit or while you stand from a sitting position.

Use approved step stools and ladders in the workplace. If the ladder appears damaged or is not appropriate for the task at hand, do not attempt to complete the task until you have located an appropriate ladder. Report any unsafe climbing device to your supervisor.

Wear acceptable footwear for your work environment.

Clean up spills when they are noticed. If you are required to leave the area to get supplies or call for additional help, make reasonable attempts to warn others of the spill to prevent injury.

Do not run in the workplace.

Be aware of doors that can be opened toward you. Do not stand or position yourself for long periods of time in an area where you can be struck by an opening door.

7.0 KDOT Buildings

7.1 Office/Shop Layout

Emergency exits and passageways must be kept free and clear of obstructions. Furniture and equipment should be arranged so that chairs and equipment are not stored in walkways and file and desk drawers are not protruding into walkways.

7.2 Office/Shop Lighting

There are measures to prevent and control poor lighting conditions in the work environment. These include, but are not limited to:

- Installation of emergency lighting.
- Regular maintenance of the lighting system should be performed monthly.
- Replacing burnt bulbs and repairing faulty lamp circuits.
- Using a light-colored, matte finish on walls, ceilings and floors to reduce glare.
- Positioning office workers to face away from sources of glare. Adjustable shades should be used if workers face a window.

Diffused light will help reduce shadows. Indirect and task lighting are recommended, especially when workspaces are separated by dividers.

7.3 Fire Prevention

See KDOT Maintenance Manual 10.30

8.0 Housekeeping

KDOT work areas shall be kept reasonably clean and all debris and trash always disposed of in a proper manner. Equipment, machinery and office equipment shall be laid out in a manner to allow for proper operation without unnecessary congestion.

Examples of good housekeeping include, but are not limited to:

- Keeping floors, work areas and passageways clear of obstructions such as loose parts, boxes, packing materials or tools that protrude into the walkway or have the potential to result in unsure footing.
- Keeping stairwells clear. Do not store boxes, files or other items in stairwells or on stairwell landings. Do not store flammable items under stairways.
- Picking up dropped pencils, pens and other items that could cause a person to slip, trip or fall.
- Properly disposing of trash and debris in a timely manner. Avoid overfilling wastebaskets and dumpsters.
- Reporting uneven and defective flooring, worn spots in carpets, chipped tiles and worn stair treads to appropriate personnel.
- Maintaining reasonably clean and organized conditions of office equipment, storage and work areas

In areas where wet or damp conditions routinely exist, appropriate drainage shall be maintained on a regular basis. Grating, mats, raised platforms or anti-slip strips can be used for control or prevention of slippery conditions.

9.0 Workstation Setup

9.1 Ergonomics

Ergonomics is the study of the type of work employees perform, the environment in which they work, and the tools associated with the job or assigned task(s). The goal of ergonomics is to design workstations in line with the type of work being performed. Workstation designs can have an impact on the user's health and well-being.

The most common health complaints associated with workstation setups include, but are not limited to:

- Head
- Neck
- Upper and lower back
- Arms, hands, elbows and wrists
- Eyes
- Shoulders

When preparing a computer terminal/workstation, consideration should be given to:

- Workstation design
- Nature of the task(s)
- Repetitiveness of the job
- Work pace
- Degree of postural constraint
- Personal attributes of the worker
- Work/rest schedules

The key is to maintain the body in a relaxed, neutral position. The ideal work position is to have the arms hanging relaxed from the shoulders. If a keyboard is used, arms should be bent at right angles at the elbow with hands held in a straight line and forearms and elbows close to the body. The head should be in line with the body and slightly forward. Employees should be able to keep their neck in a neutral position and minimize the need to continuously look up or to the side while working. Additionally, workstations should be designed so tools are within reach without having to frequently lean, bend or twist at the waist.

10.0 Electronic Office Equipment Hazards

Unsafe/non-approved equipment: inspection should be conducted on KDOT equipment to identify faulty items. Electronic equipment can develop electrical shorts creating fire and/or shock hazards. Equipment and cords should be inspected regularly, and a qualified individual shall make necessary repairs.

Live parts unguarded: wall receptacles and electrical transmission equipment shall be designed and installed so that no current-carrying parts are exposed. All receptacle cover plates shall be kept tight. All broken and/or cracked cover plates, as well as unsafe electrical conditions, shall be reported to the supervisor or safety specialist.

Working on live equipment: disconnect electrical equipment before cleaning, adjusting or applying flammable solutions. If a guard is removed to clean or repair parts, replace the guard before testing the equipment and returning the equipment to service.

Blocking electrical panel doors: if an electrical malfunction occurs, the panel door and anything else in front of the door could become very hot. Electrical panel doors shall always be kept closed to prevent electrical flashover in the event of an electrical malfunction. Nothing shall be stored within 30 inches of an electrical panel.

10.1 Heat Generating Equipment

Improper care, storage or placement of any type of equipment that generates heat could ignite a fire, impose bodily injury or even cause death.

10.2 Safe Practices for Heat Generating Equipment

- Do not store any items within 30 inches of electrical panels.
- Use only Underwriters Laboratory listed equipment.
- Properly attach grounding prongs.
- Plug equipment directly into an outlet. Do not use an extension cord.
- Use heaters equipped with tip-over protection.
- Turn off items when not in use.
- Never leave equipment unattended.

11.0 Office/Shop/Field Equipment Safeguarding

11.1 Personal Protective Equipment (PPE)

The following guidelines regarding the use of PPE for general safety include, but are not limited to:

- Proper clothing (attire appropriate for the worksite, including foot protection).
- PPE (eye protection, hearing protection, respiratory protection).
- Snug-fitting clothes and safety shoes shall be worn by employees performing work duties in the shop, yard, along the roadway or where hazards may be present.
- When a long-sleeved shirt is worn, the sleeves shall be rolled down and buttoned.
- Safety glasses with side shields shall be worn when working with or around shop equipment. Goggles or face shields may be necessary for the following types of work:
  - Grinding
  - Sanding
  - Chipping
  - Sandblasting
  - Welding
  - Glass working
- Approved hard hats must be worn when there is a reasonably foreseeable chance of objects falling from above.
- Suitable gloves, preferably leather, must be worn when working with the following equipment or materials:
  - Sharp-edged metal or material
  - Signs
  - Rough lumber
  - Weed eaters
  - Chains
  - Chainsaws
  - Jack hammers
  - Any other equipment that can reasonably cause physical damage to the hands

11.2 Safety Guidelines

General safety should include:

- Identify and know the hazards associated with the work you are performing.
- Before using any tools or equipment, be educated on the proper use and operation of the item(s).
- Appropriate safety gear and protective clothing for the task being conducted must be worn.
- Nitrile gloves must be worn when cleaning with degreasers or ferric chloride.
- Check for adequate ventilation prior to performing tasks that create vapors, dust and/or fumes.

- Keep work areas free from slip, trip and fall hazards (oil, cords, debris, etc.) when not necessary for the task being conducted. It is recommended that electrical cords pull down from an overhead pulley rather than lying on the floor.
- Clean up all spills as soon as practical. Make others aware of danger to avoid unnecessary hazards.
- Remove sawdust, wood chips and metal chips regularly.
- Leave tool and equipment guards in place when the tool or equipment is in use.
- Know where fire extinguishers are located and how to properly use them.
- Electrically powered hand tools and equipment should be properly grounded.
- Electrical cords should not be frayed, worn or cracked.
- When the use of an extension cord is permitted, the extension cord shall be large enough for the load and distance.
- Secure compressed gas cylinders. Never use compressed gas to clean clothing or skin.
- Use flashback arrestors on cutting/welding torches.
- Wear infrared safety goggles when exposed to intense light (i.e. light welding, cutting, soldering, etc.).

11.3 Hand Tools

Hand tools are non-powered tools. They include axes, wrenches, hammers, chisels, screwdrivers and other hand-operated mechanisms that are operated without the use of electricity or other power.

11.4 Care of Hand Tools

- Keep tools in safe working condition including any tools and equipment that you may personally own and use for your KDOT employment.
- Protect tools against corrosion damage by wiping off accumulated grease and dirt.
- Clean tools thoroughly with a nonflammable, nonirritating solvent when necessary.
- Lubricate moving and adjustable parts to prevent wear and misalignment.
- Keep edged tools sharp.
- Use an oilstone or grindstone for tool sharpening. If an abrasive wheel must be used for this task, grind only a small amount at a time with the tools resting not more than 1/8 of an inch from the wheel. Hold the tool lightly against the wheel to prevent overheating. Dip frequently in water to keep the surface cool as to retain metal hardness and hold the cutting edge.
- Use eye and face protection when using an abrasive wheel.
- When not in use, store tools in suitable boxes, containers or hang on racks where available.
- Protect cutting edges and do not place or store tools where they might roll off benches or tables.
- Heavier tools shall be stored in locations where they are not a potential trip hazard.

- Repair damaged or worn tools prior to use. Do not do temporary or makeshift repairs. If tools cannot be repaired on the job, red tag them and refer them to the appropriate shop, or discard and replace.
- Wear safety glasses when performing a job that could result in an item chipping or splintering.
- Use the appropriate tool for the job being performed.
- Replace loose, splintered or cracked handles on tools to prevent injury.
- Use the proper size and type of wrench to tighten or loosen nuts.
- When using a chisel, always chip or cut away from yourself. Use a soft-headed hammer or mallet to strike a wooden chisel handle as a metal hammer or mallet may cause the handle to split.
- Do not use a wrench if the jaws are sprung.
- Do not use impact tools, such as chisels, wedges or drift pins, if their heads are mushroom shaped. The heads may shatter upon impact.
- Direct saw blades, knives and other tools away from aisle areas, yourself and other employees.
- Keep knives and scissors sharp.
- Use spark-resistant tools made from brass, plastic, aluminum or wood when working around flammable hazards
- Store each tool in a specific place.
- Unguarded hand tools shall not be stored in drawers. Store knives or chisels in their scabbards.
- Sturdy hooks shall be used when tools are hung for storage. Heavy tools, such as axes and sledges, should be stored with the heavy end down.

11.5 Insulation Used in Shops

Asbestos, man-made mineral fibers and urethane foam may cause respiratory hazards. To protect yourself from these and other respiratory hazards, minimize your exposure to particulate matter from insulation, fumes, dusts and aerosols. Refer to your safety specialist for more information on asbestos.

11.6 Ladders

Ladders come in different styles including step, straight and extension, and vary in construction. Construction of ladders may consist of wood, aluminum or fiberglass. Basic safety steps must be considered, and the proper ladder utilized for the type of work being performed.

Ladders sold within the United States are rated as:

Type IA: heavy-duty industrial ladder rated to hold up to a maximum of 300 lbs.

Type II: medium-duty commercial ladder rated to hold up to a maximum of 225 lbs.

Type III: light-duty household ladder rated to hold up to a maximum of 200 lbs.

Basic safety tips for using any ladder:

- Always choose the proper ladder for the type of work to be done.
- Make certain the ladder can carry the amount of weight that will be applied.
- Place ladders on a solid, level surface.
- Visually inspect that the ladder is in good condition prior to us

Proper use for Type IA and Type II (straight and extension ladders):

- Always face the ladder when climbing up or down.
- Always keep three points of contact while on a ladder.
- Keep your body centered between the rails of the ladder. Do not lean.
- For every 4 feet of rise, the base of the ladder should be 1 foot away from the object the top of the ladder is resting on. For example, if the ladder is raised 12 feet, its base should be 3 feet from the object it is resting on. Ladders should extend 3 feet beyond the top resting point.
- Never stand or sit on the top four rungs of a straight or extension ladder.
- When possible, tie the top of a straight or extension ladder to supports and stake and tie the feet of the ladder. Have a person steady the ladder if it cannot be secured in another fashion.
- To open an extension ladder, brace the bottom end and push the rungs or rails out.

Proper use for Type III (stepladder):

- Place on a level and solid surface. Use a board under the feet when on a soft surface.
- Make certain the spreader is locked in place prior to climbing.
- Do not stand on the top platform or top step or stand or sit on the top two rungs.
- Do not use the bucket support as a step.

Additional guidelines for safe ladder usage include, but are not limited to:

- Carry ladders horizontally with the front end slightly higher than the back end.
- Be aware of overhead obstructions and power lines when placing/using a ladder.
- Use a wooden or fiberglass ladder if working near electrical sources.
- Never place the top of a ladder against a window or an uneven surface.
- Do not place a ladder in front of a door unless you lock and barricade the door and post a warning sign on the opposite side of the door.
- Wear shoes with slip-resistant soles when climbing and using a ladder. Make sure the soles are clean and dry.
- Only one person should be on a ladder at a time.

- When working on a ladder, carry small tools in a tool belt. Use a rope to raise and lower heavy tools.
- Do not leave raised or open ladders unattended.
- Store ladders away from heat and moisture.
- Destroy and dispose of unsafe ladders.

11.7 Power Tools

Power tools operate at high speeds and consequences of accidents involving power tools are often tragic. Accidents are often caused by the following:

- Touching cutting, drilling or grinding components.
- Getting items such as clothing or body parts caught in moving parts.
- Suffering electrical shock due to improper grounding, equipment defects or operator misuse.
- Being struck by particles that eject during normal operation.
- Touching hot tools or work pieces.

In addition to the general guidelines, additional safety guidelines for working with power tools include, but are not limited to:

- Wear appropriate personal protective equipment.
- Do not wear loose clothing.
- Do not wear dangling jewelry or rings that could get caught in moving machinery.
- Use the correct tool for the specific task. Do not use a tool or attachment for something it was not designed to do.
- Select the correct bit, blade, cutter or grinder wheel for the material you are working with.
- Keep all guards in place and appropriately cover exposed belts, pulleys, gears and shafts that could cause injury.
- Prior to plugging or unplugging tools, be sure the power switch is in the OFF position.
- Operate power tools at the correct speed for the job and discontinue use if you become distracted from the job you are performing.
- Do not rely on strength to perform an operation. The correct tool, blade and method shall not require excessive strength. If undue force is necessary, you may be using the wrong tool or have a dull blade.
- Before clearing jams, blockages or performing maintenance on power tools, disconnect the power tool from the power source. Do not use your hand to clear jams or blockages; use an appropriate tool.
- Do not reach over equipment while it is running.
- Do not disable or tamper with safety releases or other automatic switches.
- Use a push stick to move material through a machine when appropriate. Never use your hands or fingers in place of a push stick.
- Keep a firm grip on portable power tools when in use. Remove chuck keys or adjusting tools from equipment prior to operation.

- Ask bystanders to move away from moving or stationary operating machinery.
- Do not operate power tools when you are sick, fatigued or taking strong medication.
- When possible, secure work pieces with a clamp or vise. Use a jig for pieces that are unstable or do not lie flat.

11.8 Machine/Tool Guards

The following areas shall have guards in place:

- Point of operation: the area where the machine either cuts, bends, molds or forms the material.
- Pinch/nip point: the area where moving machine parts can trap, pinch or crush body parts (e.g. roller feeds, intermeshing gears, etc.).
- Sharp edges.
- Stored potential energy.

There are three types of guards that protect people from moving machinery.

Fixed guards: permanent machine parts that completely encase potential hazards. These guards generally provide maximum operator protection.

Interlocked guards: guards that are connected to a machine's power source. If the guard is opened or removed, the machine automatically disengages. Interlocking guards provide adequate protection to the operator and allow easy machine maintenance.

Self-adjusting guards: guards that can change their position to allow materials to pass through the moving components of the tool. These guards accommodate various types of materials but provide less protection to the operator.

Important:

Guards must be in place. If a guard is removed to perform maintenance or repairs, follow lockout/tag out procedures. Replace the guard after repairs are completed. Do not disable or move machine guards for any reason. If you notice that a guard is missing or damaged, contact your supervisor and have the guard replaced or repaired before beginning work.

Hand-held power tools typically have less guarding in place than stationary power tools.

11.9 Safety Guidelines for Operating Equipment/Tools

In addition to the safety suggestions for general power tool usage, there are specific safety requirements for each type of tool. The following sections cover safety guidelines for these tools:

- Drill presses
- Grinders
- Jointers and shapers
- Lathes
- Nail/air guns
- Planers
- Forging machines
- Sanders
- Saws including band, circular, radial arm and table

11.9.1 Drill Press Safety

Safety guidelines when operating drill presses:

- Securely fasten materials with a tool vise to prevent spinning. Do not use your hands to secure materials.
- Use a center punch to score material before drilling.
- Do not loosen the chuck unless the power is switched to “OFF.”
- Remove the chuck key before turning the switch to “ON.”
- Lower the spindle before removing the chuck.
- Do not use a regular auger bit in a drill press.
- Frequently back the drill out of deep cuts to clean and cool the bit.

11.9.2 Grinder Safety

Safety guidelines when operating grinders:

- Clear the area of combustible or flammable materials prior to use to avoid sparks that could ignite a fire. A guard shall cover at least 270 degrees of the grinding wheel on bench-mounted machines.
- Place the grinder tool rest 1/8 of an inch from the wheel, slightly above the center line.
- Allow the grinder to reach full speed before stepping onto the grinding position. Faulty wheels usually break at the start of an operation.
- Unless otherwise designed, grind on the face of the wheel.
- Use vise-grip pliers or clamps to hold small pieces.
- Slowly move material across the face of the wheel in a uniform manner to keep the wheel sound for longer periods of time.
- Do not grind non-ferrous materials.

- Periodically check grinder wheels for soundness. Suspend the wheel on a string and tap it; if the wheel rings, it is probably sound.
- Replace badly worn or cracked wheels.
- Do not use a wheel that has been dropped or received a heavy blow, even if there is no apparent damage.
- Before using a new wheel, let the wheel run a few seconds at full speed to check its balance.

11.9.3 Lathe Safety

Safety guidelines for working with metal lathes:

- Make sure gear and belt guards are in place.
- Do not leave a chuck wrench in a chuck.
- Keep hands off chuck rims when a lathe is in operation.
- Do not attempt to screw the chuck onto the lathe spindle with the power on as to prevent cross-threading. Stop the machine, place a board under the chuck and then screw on by hand.
- Properly adjust steady rests to conform to the material being worked on.
- When filing work on a lathe, always face the head stock and chuck.
- Properly clamp the tailstock tool holder and material before powering on the lathe.
- Do not adjust the lathe while it is running.
- Do not use a wrench on revolving work or parts.
- Use a brush to remove chips. Do not use your hands.
- When possible, use pipe sleeves to cover work protruding from the end of the lathe.
- Remove the tool bit before removing your work from the lathe.

11.9.4 Nail/Air Gun Safety (Pneumatic Fastening Tools)

Nail and air guns are powered by compressed air. The main danger associated with pneumatic fastening tools is injury from one of the tool's attachments or fasteners.

Safety guidelines when operating pneumatic tools:

- Pneumatic tools that shoot nails, rivets or staples shall be equipped with a device that keeps fasteners from ejecting until the muzzle is pressed against a firm surface.
- Keep your finger off the trigger until you are ready to begin work. Most pneumatic tools have a “hair-trigger” that requires little pressure to activate the gun.
- Do not drive fasteners into brittle surfaces or areas where the fastener may pass through the material and protrude on the other side.

11.9.5 Forging Machines

Once punchers, shears and benders are activated, it is impossible to stop them until the end of a cycle.

Hammers: die keys and shims must be made from a grade of material that will not unduly crack or splinter.

Presses: manually operated valves and switches must be identified and readily accessible.

Power-driven hammers: every steam or air hammer must have a safety cylinder head to act as a cushion if the rod should break or pull out of the ram.

Gravity hammers: air-lift hammers must have a safety cylinder head.

Forging and trimming presses: when dies are being changed or maintenance is being performed on the press, the following guidelines shall be used:

- The power to the pressure is locked out.
- The flywheel is at rest.
- The ram is blocked with a material of the appropriate strength.

Inspection and maintenance of hammers and presses: hammers must be positioned or installed in such a manner that they remain on or are anchored to foundations sufficient to support them according to applicable engineering standards.

11.9.6 Sander Safety

Safety guidelines for operating circular and belt sanders:

- Sanding belts should not be too tight or too loose.
- Never operate a sanding disk if the paper is too loose.
- Use the correct grade of abrasive material.
- When using circular sanders, the work should not be greater than 1/4 inch from the edge of the worktable.
- Do not push materials against sanders with excessive force.
- Sand only on the down stroke side of a disk sander.
- Use a jig for small pieces that are difficult to hold securely. Do not hold small pieces by hand.

11.9.7 Saw Safety

There are numerous types of power saws, such as band saws, circular saws, radial arm saws, saber saws and table saws. Regardless of the type of saw being used, never reach over the saw line to position or guide materials.

Safety guidelines for operating band saws:

- Set the blade evenly with the proper amount of tension.
- Keep hands on either side of the cut line. Do not reach across the cut line.
- Do not stand to the right of the saw.
- Make sure the radius of your cutting area is not too small for the saw blade.
- If you hear a rhythmic click, power down the saw and check the blade for cracks.

Safety guidelines for operating circular saws:

- Set the cutting depth as shallow as possible. Avoid letting the blade protrude much below the stock being cut.
- Never set the saw down until the blade has stopped rotating.
- Be sure the blade guard is attached and working properly.
- Change blades only when the saw is unplugged.
- Start blade before engaging material.
- Do not overreach; keep proper footing and balance.

Safety guidelines for operating a radial arm saw:

- Push the saw blade against the stop before powering on.
- Never stack pieces of wood on top of each other when using this saw. The top piece may kick over.
- Do not leave the saw hanging over the end of the arm.

Safety guidelines for operating circular table saws:

- Circular table saws are required to have a hood over the portion of the saw above the table. The hood must automatically adjust to the thickness of and remain in contact with the material being cut.
- Circular table saws are required to have a spreader aligned with the blade. The spreader must be spaced no more than 1/2 of an inch behind the largest blade mounted in the saw. Providing a spreader while grooving, dadoing or rabbeting is not required.
- Circular table saws used for ripping must have non-kickback fingers or dogs.
- Feed rolls and blades of self-feed circular table saws must be protected by a hood or guard to prevent an employee's hand from coming into contact.

Safety guidelines for operating chop saws:

- All guards must be in place and operational.
- Use only manufacturer's recommended blade RPM and sizes.
- Always inspect the blade for damage and keep it tight before using.
- Unplug the saw before changing or adjusting the blade.
- Clamp all material securely against the fence when cutting.
- Start blade before engaging material.
- Never cut small pieces. Long material should be supported at table height.
- Never place hands or fingers in the path of the blade.
- After completing a cut, release trigger switch and allow the blade to stop.

12.0 Automotive Repair and Shop Safety

12.1 General

- Emergency showers/eye wash stations shall be inspected and tested on a weekly basis.
- Fire extinguishers shall be inspected monthly.
- Flammable or combustible materials shall be stored in suitable containers.
- Work areas shall be inspected on a regular basis.
- Floors shall be free of oil.
- Walkways shall be clear of tools or equipment.
- Spilled grease, oil or similar slipping hazards shall be removed or covered by approved absorbents until they can be removed.
- Shops shall be kept reasonably clean and free of clutter.
- Small tools shall be stored in their appropriate place when not in use.
- Floors shall be kept reasonably clean. Floors shall NEVER be cleaned with gasoline or other flammable materials
- During vehicle maintenance and repair operations in closed shop areas, the exhaust suction fan is to be connected to the exhaust system while the engine is running to remove fumes from the workspace.

12.2 Cleaning with Solvents

- Follow the manufacturer's directions.
- Use solvents only in areas with adequate ventilation.
- Avoid repeated or prolonged breathing of solvent vapors.
- Avoid solvent contact with eyes by wearing chemical goggles.
- Wear protective gloves to avoid repeated or prolonged contact with skin. Wash hands with soap and water following solvent use, even if protective gloves are used.
- Dispose of solvent compounds appropriately and in accordance with label directions.
- Oily rags shall be kept in approved containers with tight covers.

12.3 Hydraulic Automotive Lifts

- Hydraulic automotive lifts must have a brake that will automatically hold twice the rated load at any level when lifting ceases.
- Hydraulic automatic lifts will have safety devices that hold the load independent of the lifting means at the maximum "UP" position.
- Do not use hydraulic automatic lifts beyond their capacity or only lift one end of a vehicle.
- Check the condition of hydraulic automatic lifts monthly. Repair leaks and maintain oil levels.
- Controls on hydraulic automatic lifts require continuous pressure. Lifts shall be far enough away from controls to prevent being struck by the falling load if the lift should fail.

- Do not stand in front of vehicles being driven onto lifts.
- No person is to be in a vehicle being lifted.
- Do not allow bystanders near equipment being lifted.
- Place safety legs under raised equipment to hold the load in the event the hydraulic automatic lift fails.
- A removable railing or cover shall be used for grease pits. The load capacity of the railing or cover shall be clearly marked.

12.4 Grease Guns

- Never put your hands over a grease gun nozzle as grease can be forced under the skin if the gun handle is pulled.
- Securely screw or clamp the tops of grease cylinders in place to prevent blowing off the cylinder when under pressure.

12.5 Mounting Heavy-Duty Tires and Rims

- Multiple-piece rim tires shall only be repaired at a shop with proper tools and safety cages. If your shop does not have the proper tools and safety cages to make the repairs, the tire shall be taken to a local commercial tire repair facility.
- Inflate tires to the proper pounds per square inch. Do not overinflate or underinflate tires.
- Rim charts shall be posted in the shop near the area where tire repairs are made.
- When available, use special rolling fixtures for mounting and dismounting heavy-duty tires.
- Tires with calcium chloride solutions require special repair equipment. Use the appropriate equipment when repairing tires with calcium chloride solutions.
- When wheels are removed in shops, chock the remaining wheels and set the vehicle brakes.

12.6 Jacks

Jacks are most often used to change tires on vehicles but may be used for other tasks such as inspecting brakes or exhaust systems. Safety guidelines for working with jacks:

- Before using a jack to raise a vehicle, firmly block the wheels and engage the parking brake to prevent movement. Use of bricks, wooden wedges or metal wheel chocks is recommended.
- The lifting head on the jack shall be large enough to securely hold the part of the vehicle against which pressure is being exerted.
- Select a jack heavy enough to raise and hold the load. The swivel heads and caps shall be in good condition and function properly.
- The jack shall be resting on a firm, level foundation when lifting a load.
- Block or crib the base of the jack to create a firm level foundation if necessary.
- The jack shall be in line with the vertical movement of the load and in a position that it will not foreseeably tip.

- After raising the load, securely block the load with jack stands before removing the jack. Do NOT substitute boxes, stones or bricks as they can slip out or break while an employee is under the vehicle.
- Properly support loads that must remain in a raised position for any length of time.
- Move under equipment only when it is supported by approved jack stands to prevent being crushed.
- Lubricate jacks frequently and store them where they are protected from moisture and damage.
- Inspect jacks prior to use and repair when necessary.
- Do not exceed the manufacturer's rated capacity, which shall be legibly marked on all jacks.
- Jacks shall have a positive stop to prevent over-travel.
- Always lift heavy items, such as engines, with jacks, dollies, hoists, cranes or forklift trucks. Avoid metal-to-metal contact between the lifting apparatus and the parts being handled by using properly fitted wood blocks or suitable pieces of cloth to separate metal from metal and to increase the friction of contact.

12.7 Batteries

Be familiar with proper safety procedures in jumping batteries.

- Do not charge or jump batteries near flammable or combustible materials.
- The ignition must be in the "OFF" position when batteries are installed.
- The ignition must be in the "OFF" position when jumper cables are being attached for auxiliary starting.

12.8 Equipment

Do not back a vehicle into a shop without the assistance of a spotter.

Mechanics will not work under vehicles if it is foreseeable that another vehicle may pass through the area where their legs are exposed. If necessary, lock and tag adjacent vehicles, or block adjacent space with barricades.

Safety precautions to be followed before working on any vehicle:

- Remove and retain the key or lock-out the starting switch.
- Place a warning tab on the starting control or steering wheel.
- Block wheels.
- When working on front-end loaders, install lock bars to hold front and rear units rigidly in line.
- When working on running engines, avoid moving parts and place guards on fan blades.
- Securely block vehicles with proper axle safety stands when either end is raised and when the wheels are lifted from the floor.
- Connect an exhaust ventilation pipe to the vehicle's exhaust system if the engine is running in a closed shop area.

- Do not leave mechanic's creepers on caster wheels in an open floor area. Roll them under the vehicle or lean them vertically against the vehicle, wall or workbench.

12.9 Compressed Air Equipment

- All employees who work with air compressors shall be familiar with their operating and maintenance instructions.
- Use proper guards on rotating pulleys and belts on compressors and electric motors.
- Periodically check electric motor-driven compressors and replace any deteriorated flexible cords or plugs.
- Periodically open the drain valve on the air tank to prevent excessive accumulation of liquid.
- Test valves weekly for good operating condition.
- Do not use compressed air to blow dirt from clothing or the body.
- Nozzle may be used for cleaning operations which includes a Pressure Reducer or a relief device which will reduce the air pressure to less than 30 psi if the nozzle is dead ended and wear eye protection.

12.10 Spray Paint Booths

- Use adequate ventilation when working with paint or painting equipment.
- Avoid flames or other sources of ignition when working with paint or painting equipment.
- Use the spray paint booth, if available, when working with paints, varnishes and thinners.
- Wear appropriate personal protective equipment when working with paint.
- Clean the spray paint booths and ventilation ducts frequently to avoid heavy accumulations of paint, dust and pigment.

12.11 Welding and Cutting

Welding and cutting shall be performed in a designated shop area. If welding or cutting is required to be performed in a location other than a designated shop area, the person performing the welding or cutting must have proper authorization from their supervisor or superintendent.

Before conducting welding or cutting operations, equipment shall be inspected for the following:

- Welding leads must be completely insulated and in good condition.
- Cutting tools must be leak-free and equipped with proper fittings, gauges, regulators and flashback devices.
- Oxygen and acetylene tanks must be secured in a safe place.

In addition, follow these safety guidelines for welding and cutting procedures:

- Conduct welding and cutting operations in a designated area free from flammable materials.
- When welding or cutting is necessary in an undesignated or hazardous area, recruit someone nearby to act as a fire attendant.

- Periodically check welding and cutting areas for combustible atmospheres.
- While welding, frequently check for sparks that may cause a fire.
- Remove unused gas cylinders from the welding and cutting area.
- Keep hoses out of doorways and away from other people. A flattened hose can cause a flashback.
- Mark hot metal with a sign or other warning when welding or cutting operations are complete.
- Store unused oxygen cylinders a minimum of 20 feet away from fuel gas cylinders or separate by a non-combustible barrier at least 5 feet tall with a minimum 1/2 hour fire resistant rating.

12.11.1 Welding Guidelines

A welding helmet visor that is dark enough to provide adequate protection is required.

A fireproof apron and fireproof gloves must be worn. Placement of a welding curtain is required.

There are three types of welders:

Alternating Current (AC) welders: these welders are used for standard welding procedures. AC welders are powered by an electrical cord.

Direct Current (DC) welders: these are portable welders that are commonly used in manholes. DC welders have their own power supply.

Wire-feed welders: these welders use inert gas for light metal work (e.g. stainless steel, aluminum, etc.).

Common hazards associated with welding include the following:

- Electrocution
- Burns
- Ultraviolet radiation exposure
- Oxygen depletion
- Sparking

In addition to the general guidelines for welding and cutting, follow these specific guidelines for welding operations:

- The welding area must be a non-reflective, noncombustible surface.
- Adequate ventilation and exhaust shall be present.
- Electrical cords shall be properly grounded. It is advisable for cords to pull down from an overhead pulley.

12.11.2 Cutting Guidelines

Follow the safety guidelines below:

- Store acetylene bottles upright and in a secure location.
- Acetylene/oxygen systems must be equipped with flame or flashback arrestors.
- Keep cylinder fittings and hoses free from oil and grease.
- Repair or replace defective hoses by splicing. Do not use tape.
- Do not tamper with or attempt to repair cylinders, valves or regulators.
- Do not interchange regulators or pressure gauges with other gas cylinders.
- Purge hoses and torches before connecting a cylinder.
- Set acetylene pressure at or below 15 PSIG (pounds per square inch, gauge). Use the minimum acceptable flow rate.
- Use an approved lighter to light a torch; do not use matches.

13.0 Yard Safety

13.1 Housekeeping

- Stack materials in an orderly manner that reduces the chance of toppling or falling.
- Park equipment and vehicles in a manner to keep backing to a minimum.
- Maintain driveways and footpaths in a satisfactory condition and keep them clear of materials.
- Maintain loading platforms and docks for convenient handling of heavy equipment or materials.
- Keep storage areas free from accumulation of unnecessary materials.
- Control vegetation as necessary.

13.2 Underground Storage Tanks

Maintain underground storage tanks to comply with current EPA and/or OSHA requirements.

Refer to Spill Control and Counter Measure Plan (SPCC)

13.3 Ramp Area and Pump Island

Smoking:

- Smoking is not permitted within fueling areas or areas where fuel vapors could accumulate.
- “NO SMOKING within 100 feet” signs must be posted and visible to employees fueling vehicles.

Pumps:

- Keep hose retractors on fuel pumps in proper working order. Retractors help minimize tripping hazards created by pump hoses.
- Use approved dispensing equipment: pumps, hoses, nozzles, etc.

Vehicle:

- Turn off the engine before refueling.
- Avoid spillage by remaining at the nozzle until refueling is complete.
- Do not completely fill fuel tanks or containers to allow for expansion of the fuel.

Electrical:

- Provide adequate lighting around the pump island for night fueling operations.
- Use explosion-proof, UL-approved, enclosed-type electrical wiring in and around the pump and island.

Fuel Pumps:

- Emergency power cutoffs for fuel pumps must be clearly identified, easily accessible and located not more than 100 feet away from the pumps.
- Fuel pumps shall be mounted on a concrete island or protected by barriers.

Safety:

- 24-hour fuel pumps will have at least one fire extinguisher with a rating of not less than 40-B:C (B- Flammable liquids C- Electrical equipment) located within 50 feet of each pump.
- If spills occur, use an approved drying or absorbing agent. Do not wash spillage into sewers, cesspools or septic tanks.
- Appropriately dispose of used drying or absorbing agents.

14.0 Material Handling

14.1 Back Injury Prevention

Before manually lifting an item, consider the following:

- Do you need to lift the item manually?
- How heavy is it?
- Where are you moving the item from?
- Where are you moving the item to?
- What route will you follow?

Consider using mechanical means of lifting such as a dolly, hand truck or forklift when possible. If the item needs to be moved manually and it is heavy and/or awkward, assistance with lifting should be obtained.

- When using mechanical help, the load should be pushed, not pulled.
- When moving an item from a hard-to-reach place, the lifter should be positioned as close to the load as possible.
- Make adequate room for your hands and arms prior to lifting.
- If possible, remove adjacent obstructions on either side of and above and below the load prior to lifting.
- Have a plan on where to set the item down after its lifted if necessary. Allow yourself as much room as possible to set the load down.
- Check your path prior to lifting. Remove trip hazards, protect openings and get help if needed to move heavy materials up a ladder.
- Make sure to have sufficient lighting to see where you are going when moving a load.
- Stabilize uneven or loose ground on your pathway or choose an alternate path to avoid unstable ground.

14.2 Proper Lifting Techniques

Familiarize yourself with and practice these techniques before you lift:

Plan Ahead:

- Know what you are lifting and how you will lift it.
- Be aware of the weight of the object.
- Determine whether the object is safe to lift on your own.
- Make sure that the work area is flat, dry and clear of any debris.

Check your Pathway:

- Make sure the lifting path is clear.
- Remove any tripping hazards or debris in the pathway.
- Check for wet or slick surfaces.

Use Ergonomic Equipment:

- Consider using lift assists, forklifts, dollies, carts, hand trucks or a hoist.
- Make sure you are trained before using the equipment.

Get Help When Needed:

- When lifting awkward or heavy loads, utilize a two-person lift.
- Make sure you lift at the same time and keep the load level.

Wear Proper PPE:

- Wear the proper protective shoes and gloves appropriate for the assigned task.

Lifting Techniques:

- Stand with feet shoulder width apart alongside the object to be lifted.
- Squat down and get as close to the object as possible.
- Get a good grip on the object.
- Lift with your legs, not your back.

- Keep the object close to your body/torso.
- Center the weight over your feet; do not lean backward or forward.
- Avoid twisting; instead, turn with your entire body.

NOTE: avoid cumulative and repetitive lifting tasks if possible.

15.0 Electrical Safety

Regard all electric wires as live and dangerous. Do not allow any objects to encounter electrical wires.

- Only a trained person using proper tools and PPE will be permitted to work on electrical installations.
- Do not route wires over or under other power lines, telephone lines or antennas.
- Always use weather-tight connections in exposed areas.
- Label electrical equipment and circuits plainly. Ground switches and outlets. In any explosive atmosphere, use UL-approved, enclosed-type wiring.
- Install motors so the current-carrying parts and mechanical components are guarded to prevent people from coming in contact with them.
- To prevent overloading, always provide circuits with breakers, fuses or other devices. These devices will be of such size that they operate at a point lower than the carrying capacity of the circuit. Check with a qualified electrician before placing loads above normal.
- Ground switchboards, breakers or fuse panels, motor control equipment and other current carrying equipment.
- Damp weather can be dangerous to personnel working around electricity. Insulated gloves may not provide effective protection when they are wet.
- Use only UL-approved, three-wire extension cords for handheld power tools.
- Keep aisles and passageways leading to electrical panels clear and free of any obstructions.
- Label all power source switches.
- Conductors used either as a grounded conductor or as an equipment-grounding conductor will be identifiable and distinguishable from all other conductors.
- Do not attach a grounded conductor to any terminal or lead that will reverse polarity.
- Do not use a grounding terminal or a grounding-type device on a receptacle, cord connector or attachment plug for purposes other than grounding.
- Do not run power cords through windows, walkways or doorways or fasten to buildings.
- Before using power or extension cords, examine for missing ground pins, damage to outer sheath and spliced cords. If damage is found, remove the cord from service.
- Do not use power cords and extension cords as permanent wiring.
- Protect power and extension cords from being run over by vehicles, forklifts and carts.

Section 8 – Hazardous Communication

1.0 Purpose

The purpose of this section is to provide guidance to KDOT employees who perform job duties that expose them to hazardous chemicals.

2.0 Scope and Applicability

This section applies to KDOT employees who are exposed to chemical hazards during the performance of their job duties.

3.0 Policy

KDOT employees will not handle hazardous chemicals during the scope of their employment until they have been trained in KDOT's hazardous communication program. When chemical hazards are present, appropriate engineering, administrative and safe work practices and/or PPE will be used.

4.0 General Responsibilities

Supervisors will implement the appropriate provisions in this section when work duties require employee exposure hazardous chemicals. KDOT employees will follow the applicable provisions of this section when their work duties require them to be exposed to hazardous chemicals and report unsafe acts or conditions to their supervisor.

5.0 Procedure

This section provides applicable definitions, establishes general provisions and identifies responsibilities when work duties require KDOT employees to be exposed to chemical hazards.

5.1 Definitions

Chemical manufacturer: a manufacturing facility classified as being where chemicals are produced for use and distribution.

Chemical name: the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry, the Chemical Abstracts Service or a name that should identify the chemical for the purpose of conducting a hazard evaluation.

Common name: any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

Distributor: any business other than a chemical manufacturer or importer that supplies hazardous chemicals to other distributors or purchasers.

Exposure is when an employee is subjected to a chemical that is a physical or health hazard and includes potential (accidental or possible) exposure. Exposure includes the following routes of entry inhalation, ingestion, skin contact or absorption.

Facility: one or more establishments or buildings located at one contiguous site in Kansas.

Hazardous chemical: elements, chemical compounds or mixtures of elements and/or compounds that could pose a physical or health hazard.

Label: any written, printed or graphic material displayed on or affixed to containers of hazardous chemicals.

Particulate Matter: (PM) is made up of tiny particles (tiny pieces) of solids or liquids that are in the air. These particles may include dust, dirt, soot, smoke, or drops of liquid.

Safety Data Sheet (SDS): a chemical information sheet drawn up in conformity with hazardous chemical standards.

Storage or container: a vessel for storing or holding hazardous chemicals that does not include pipes used to transfer substances or fuel tanks of self-propelled internal combustion vehicles.

5.2 General Provisions

5.2.1 Training

Employees whose job duties require working with hazardous chemicals will be trained to work appropriately with those chemicals. Training will include information on:

- Accessing and use of the SDS online library.
- Operations in the work area where hazardous chemicals are present.
- The location and availability of the written hazardous communication program.
- Physical and health hazards of the chemicals in the work areas.
- Measures employees should take to protect themselves from hazardous chemicals.
- Methods and observations to detect the presence of a hazardous chemical.
- Available engineering controls, work practices and PPE to mitigate against the hazards of chemicals.
- How to read and interpret information on labels and SDS.

Employees will be trained at the time of initial employment or assignment, as well as whenever a new hazard is introduced into their workplace. Refresher training may be provided online annually. Such training will be documented.

5.2.2 Chemical Hazards

Hazardous chemicals can cause physical and/or health hazards. Physical hazards produce a dangerous situation outside the body, while health hazards could cause damage either immediately from short-term (acute) exposure or slowly through long-term (chronic) exposure.

Exposure to chemical hazards can occur through inhalation (breathing dust, vapors or mists), ingestion (eating or smoking while working around hazardous chemicals) or absorption (chemicals entering the body through exposed skin, cuts, scratches or broken skin).

The common types of hazardous chemicals found at KDOT include, but are not limited to:

Acids	Adhesives	Caustics
Cleaning agents	Degreasing agents	Inks
Lacquers	Paints	Pesticides
Dusts	Flammables	Glues
Greases	Petroleum products	Solder
Strippers	Thinners	Wood preservatives
Sealers		

5.2.3 Safety Data Sheets (SDS)

SDS are fact sheets for hazardous chemicals provided by the chemical manufacturer. They must be available for every hazardous chemical in the work area and contain information about the chemical including:

- Chemical product and company identification
- Hazard identification
- Composition information and ingredients
- First aid measures
- Firefighting measures
- Accidental release measures
- Handling and storage
- Exposure controls and personal protection
- Physical and chemical properties
- Stability and reactivity
- Toxicological information
- Ecological (environmental) information
- Disposal considerations
- Transport information
- Regulatory information
- Other information

5.2.4 Obtaining SDS Sheets

SDS sheets can be obtained from the chemical supplier or KDOT safety staff. New chemical product purchases will have their SDS retained for review of the hazards associated with the chemical. A copy of the subject SDS should be forwarded to the safety staff when the chemical is purchased.

5.2.5 Labels and Labeling

Warning labels should alert employees that a chemical may be dangerous and identify the hazards of the chemical. Labels are required on:

- All containers of hazardous material in the workplace.

- All containers of hazardous material being shipped from one workplace to another, such as containers used for oil, lubricant or cleaning agents. The labels must be prominently displayed and contain:
  - The identity of the chemical.
  - Appropriate hazard warnings (physical and health).
  - The chemical manufacturer's name and address.

On stationary containers, signs or placards may be used in place of labels. Labels shall not be defaced or removed from containers holding hazardous chemicals. Portable fuel tanks stored in the back of maintenance vehicles should also be labeled.

5.2.6 KDOT's Hazardous Communication Program

KDOT's hazardous communication program can be used at any facility, worksite, work unit or work location. KDOT's hazard communication program includes:

- Facility or worksite identification
- Program elements contact list
- Chemical list
- Container labeling provisions
- SDS availability
- Non-routine tasks hazard awareness provisions
- Hazardous communication provisions for contractors
- Employee training documentation

The supervisor of each facility or worksite with a hazardous communication program shall oversee all the program elements.

Affected employees should know the location and availability of their hazard communication program.

5.2.7 Nuclear Surface Moisture-Density Gauge Labeling and Requirements

The nuclear surface moisture-density gauge used to test soil density and moisture on various projects shall be labeled. These instruments are licensed under the Kansas Department of Health and Environment (KDHE) and the regulations are listed under Kansas Radiation Protection Regulations and Kansas Administrative Regulations 28-35-133 through 28-35-505.

Placarding and storage: both the KDHE and the EPA require KDOT to notify employees and the public of the radiation presence of the gauge. Under these regulations, any building and area within a structure housing equipment that emits radiation must have the required OSHA or right-to-know warning signs.

Vehicle placards: these are not required since the source is not an active source or emits less than 0.1 mSv/hr (millisievert per hour) of radiation.

OSHA/EPA/KDHE warning signs: each radiation area shall be conspicuously posted with an OSHA warning sign or signs that have a yellow background with black writing and the conventional radiation symbol on it and the words “Caution” for the main entrance of a building, and “Caution Radioactive Materials” on the door to the room the gauge is stored in. Reference K.A.R. 28-35-219(a)&(b): Caution signs and labels for radiation areas:

Main door sign on the facility

Door where the gauge is stored

KDHE/EPA Storage Requirements for Radioactive Devices:

K.A.R.28-35-184(g): Stating each portable gauge licensee shall use at least two independent physical controls that form tangible barriers to secure each portable gauge from unauthorized removal whenever the portable gauge is not under the control and constant surveillance of the licensee. Please note: “tangible barrier” means something easily seen or recognized; for example: a door to a building and then a door to a room. According to KDHE/EPA/FHWA regulations, a gate to a facility is not a tangible device.

Handling and Storage of Nuclear Gauges:

Operators of nuclear gauges shall observe the following precautions:

- Never leave the gauge unattended, unless properly stored. The carrying case must be locked whenever the gauge is being transported or stored.
- If a gauge is left in a vehicle, the vehicle must be locked.
- The gauge and carrying case shall be protected from moisture at all times.
- Probes should always be in the locked or safe position (source of ionizing radiation closed) unless performing a test.
- When transporting the gauge by vehicle, the gauge shall be in a locked storage area in the pickup bed, van or in the trunk of car and must be least 4 feet away from any occupant. A copy of SOM 1.13.2 shall always accompany the nuclear gauge. This document and the survey meter must be in the transport vehicle and immediately accessible to the driver during transport on a public highway. Additionally, the Bill of Lading must accompany the driver of the vehicle when transporting the gauge on a public highway.
- Bill of Lading must have the following information:
  - Name of shipper (KDOT)

    - Description of the shipment (proper shipping name, material identification number, hazard class, type of package, name and activity of each nuclide, category of labeling, transport, index, etc.)
    - Emergency response telephone number
    - Document signed by the shipper
- Gauges shall not be stored overnight in vehicles or in field laboratories.
- At night, gauges shall be stored in a locked room or building which is signed with a standard“Caution Radioactive Material” sign.
- Gauges shall be stored in an area at least 4 feet from the working or living area of any personnel.
- Project personnel employed by both the State and contractor shall be fully informed that a nuclear gauge is in use on the project. Equipment operators on the project shall also be alerted to its use.
- For roadway paving operations, it is recommended to have an extended red flag mounted or prominently displayed on the vehicle to mark the general location of the nuclear gauge when performing tests. A flashing light on the vehicle is also recommended.
- When a nuclear gauge is transferred between operators, the gauge shall be scanned for radioactivity as set forth in this directive, and the readings shall be recorded in the field logbook. The names of persons making the survey, date and other pertinent data will also be recorded.
-

5.2.8 Particulate Inhalation Hazards

Particulate Matter (PM) is made up of tiny particles of solids that are in the air. These particles may include dust, dirt, soot, smoke and contain vapor. Microscopic particles that cannot be seen are the most harmful and are able to get deep into the lungs and penetrate the alveoli.

When an employee’s job duty exposures them to above the Permissible Exposure Limit (PEL) to Silica, Lead Paint, or Asbestos that employee should be trained. The Industrial Hygiene section should be contacted before conducting any work, activities which might release Silica, Lead or Asbestos for information and training about safe work practices to prevent exposure.

You may be exposed to the following types of Particulate Matter at KDOT.

- **Respirable Crystalline Silica** Exposure. Could happen during construction, maintenance, and material testing.
    - Training and PPE may be needed. Please reach out to the safety section if you need guidance or proper PPE.
- **Welding (metal) fumes**. During welding, grinding, and cutting metal for fabrication, repair, and/or maintenance activities with or without coatings.
    - Painted coating may contain Lead, Chrome, or Mercury and require ventilation to keep inhalation hazards below OSHA’s Permissible Exposure Limit (PEL).

- **Exposure to Vapors, Fumes, and Particulate Matter** in laboratories when warming asphalt or burning off asphaltic binders, especially those that contain heavy petroleum, modifiers, and/or additives when completing the KT-57 and KT-58 method.
- **Lead Based Paint**. When prepping surfaces that contain Lead Paint that do not have proper ventilation. Such as sanding, scraping, or grinding of any painted surface that contains more than 2.5 mg/l of Lead and might lead to an exposure above the OSHA action level (AL) of 30 µg/m3 or 3 mg/m3.
- **EPA/OSHA listed solvents** when working with some epoxy/resin-based concretes and prepping for autobody painting.
- **Asbestos (friable and non-friable).** If the material is accidentally disturbed or requires removal for repair or renovation the Industrial Hygiene section must be notified Immediately. These materials include:
    - Pipe insulation or mudded joint fittings on domestic or thermal water lines, asbestos containing cement (Transite): old flu pipe, portico tiles and/or siding. Use care when working around materials that contain asbestos do not disturb or remove any suspect materials without contacting your Industrial Hygiene group to have it tested.

5.2.8.a Silica Hazards

Crystalline Silica has 3 types that are respirable. The most common form is Quartz, the other 2 forms are Cristobalite and Tridymite.

Respirable Crystalline Silica (RCS) has 3 types of RCS that are dangerous when inhaled deep into the lungs. The most common form is Quartz, which is found in sand, granite, some limestones and mined volcanic ash. The other 2 forms are Cristobalite and Tridymite which are created during significant heat events like volcanic, magma, or meteorite impact.

Respirable Crystalline Silica is a naturally occurring substance and it makes up most of the Earth's crust. The size of silica that is harmful is 100 times smaller than beach sand. Respirable silica is so small it is not visible to the naked eye.

Depending on the exposure level, the inhalation of small particles of respirable crystalline silica can cause silicosis, dust-related lung disease and other associated diseases, such as tuberculosis and lung cancer.

Materials containing crystalline silica may be hazardous if used or processed in ways that produce high concentrations of dust. Operations that can create airborne silica exposure at the **Kansas Department of Transportation (KDOT) include:**

- Maintenance of pavement systems includes but not limited to milling, sandblasting, drilling, cutting, grinding, hammering, dry or mechanical sweeping of asphalt and concrete pavement systems.
- Laboratory activities involving the processing and testing of aggregates (limestone, gravel, sand, fly and volcanic ash), soil, cement, volcanic ash, crushed glass and other test materials that contain silica. This includes housekeeping activities to prevent accumulation of silica containing dust.

- Sampling of aggregates (limestone, gravel, sand, fly and volcanic ash) from mines (quarries), project and materials sites.
- Oversight of construction pavement operations to include but not limited to milling, sandblasting, drilling, cutting, grinding, hammering, dry or mechanical sweeping of asphalt and concrete pavement systems.
- Renovation, construction, and demolition of buildings that would include sheetrock, cinderblock, and concrete.

CURRENT EXPOSURE LIMITS

Permissible Exposure Level (PEL) for respirable crystalline silica of 50 micrograms per cubic meter (ug/m3) calculated as an 8-hour Time Weighted Average (TWA). The Action Level (AL) is 25 ug/m3. The Safety section is committed to minimizing employee exposure to silica through using a hierarchy of controls: Engineering controls, Work Practice controls and personal protective equipment (PPE) if needed.

CONTROL METHODS

The Safety section is committed to minimizing employee exposure to silica through using a hierarchy of controls: Engineering controls, Work Practice controls and Personal Protective Equipment (PPE) will be used to lower exposure to RCS.
Employees with exposure to RCS should have a working knowledge of the OSHA's 1926.1153 Respirable Crystalline Silica Table 1 and KDOT's Table 1, Specified Exposure Control Methods Table for that duty or equipment. These documents can be found on the Safety Page (or whatever wording and place you want in here).

Type of Controls:

Engineering controls are devices or methods that collect, suppress or abate dust. Like vacuums equipment Silica grade HEPA filtration, Local Exhaust systems that either filter or release dust outdoors or point of contact wetting systems.

Work Practice controls are training, competent people overseeing duties. Employees must perform regular maintenance on all equipment designed to reduce silica/dust exposure. To include but limited to continuous wetting systems, vacuums, and point source controls in an operating function.

Personal Protective Equipment (PPE) would be respirators and clothing designed to reduce exposure by the concentration of air borne silica. Voluntary use of face filtering respirators is allowed after that employee is trained on how to wear them. Please contact your District Safety Specialist for instructions on how to use and fit testing.

5.3 Spill Prevention Control and Countermeasure Plan

KDOT Spill Prevention Control and Countermeasure Plan

DISTRICT ?

FACILITY OWNER AND OPERATOR:

Address and Telephone:

Kansas Department of Transportation
Bureau of Maintenance
Eisenhower State Office Building
700 SW Harrison St.
Topeka, KS. 66603

785-296-3566

CERTIFICATION

I hereby certify that I have examined the plan and being familiar with the provisions of 40 CFR Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Area Engineer: _____

Signature: _____

Registration Number: _____

State: Kansas

Date: _____

Facility Operator Address and Telephone:

District ?
Address
City, State, Zip
Phone

District Contacts:

District Maintenance Engineer

Name	0ffice Number	Cell Phone

District Engineer

Name	0ffice Number	Cell Phone

****

Area ?
? Sub-Area
Address
City, State, Zip
Phone

Area Contact(s):

Area Superintendent

Name	0ffice Number	Cell Phone

Sub Area Supervisor

Name	0ffice Number	Cell Phone

EMERGENCY CONTACTS:

Call 911	**911**
Provide the shipping paper emergency number if available	
Chemtrec emergency response	**1-800-424-9300**
National Response Center (spill in a body of water)	**1-800-424-8802**
State of Kansas Spill Reporting Number	**1-785-291-3333**

POTENTIAL SPILL PREDICTIONS AND CONTROLS:

Unleaded Fuel Tanks:

The unleaded fuel tanks are both underground and aboveground. The underground fuel tanks have a maximum capacity of as much as 10,000 gallons and the aboveground fuel tanks have a maximum capacity of as much as 10,000 gallons. The aboveground tanks are of steel construction with a secondary containment consisting of either a square steel box or double wall tank. A leak in the aboveground fuel tank should be contained by secondary containment and detected by visual inspection. The underground fuel tanks are monitored by an electronic leak detection system. The greatest chance for a spill would be during filling. Filling is monitored so that a spill should be controlled quickly. Underground fuel tanks are equipped with either an over fill alarm that activates when the tank reaches 90% capacity or a flapper valve that closes in the fill tubes. A spill should be controlled by the use of the spill kits and /or other appropriate absorbent material located in the shop.

Diesel Fuel Tanks:

The diesel fuel tanks are both underground and aboveground. The underground fuel tanks have a maximum capacity of as much as 10,000 gallons and the above ground fuel tanks have a maximum capacity of 7,000 gallons. The aboveground tanks are of steel construction with a secondary containment consisting of either a square steel box or double wall tank. A leak in the aboveground fuel tank should be contained by secondary containment and detected by visual inspection. The underground fuel tanks are monitored by an electronic leak detection system. The greatest chance for a spill would be during filling. Filling is monitored so that a spill should be controlled quickly. Underground fuel tanks are equipped with either an overfill alarm that activates when the tank reaches 90% capacity or a flapper valve that closes in the fill tubes. A spill should be controlled using the spill kits and /or other appropriate absorbent material located in the shop.

USED OIL TANKS:

All of the used oil tanks are aboveground with a maximum storage capacity of 1000 gallons. A spill should be controlled by the use of the spill kits and /or other appropriate absorbent material located in the shop.

ASPHALT TANKS:

All of the Asphalt storage tanks in this area are aboveground storage tanks with a maximum storage capacity of 4000, 8000, and 10,000 gallons. These tanks are made of steel with a 1/4" minimum thickness on the top and a 5/16" minimum thickness on the ends (See attached). Dikes are built to protect the environment if an accident or failure of the tank were to occur. Figure 12-1, in the Construction Manual, explains how those dikes should be constructed. Dikes must at least equal tank capacity. The greatest chance for spill would occur through tank failure or human error. These tanks must be checked to make sure all valves are properly closed and that they cannot be tampered with.

TANK MARKING AND LABELING REQUIRMENTS:

Underground

Underground storage tank fill ports should be identified according to its product by color code and/or identification label placed in the spill bucket. A sign defining the product/color code should be posted in a location visible to the delivery driver from the tank location. The color code is: **Diesel** – (Green or Yellow), **Unleaded** – (White, Blue or Red).

Above Ground

Aboveground storage tanks should be labeled with the following labels:

Product Label, **Product Placard** or **NFPA 704 label**. and **No Smoking.** The product placard or NFPA 704 label is required on all four sides of the tank or three sides if the tank is near a building.

FUEL DISPENSING SYSTEMS

Sign, Label and Hose Requirements

Class I Fuel – Gasoline Dispenser

The gasoline fuel dispenser needs to be labeled and signed as follows:

1. **Product Label**
2. **No Smoking** or **No Smoking within 100 Feet**
3. **Shut off Engine**
4. **It is unlawful to dispense gasoline into unapproved containers**

Hose Requirements:

- Dispensing hose must have **emergency breakaway device** installed. When the hose is equipped with a **retriever**, the breakaway device shall be installed between the place where the retriever attaches to the hose and the nozzle.

- Nozzle must be an automatic closing type.

Class II Fuel – Diesel Dispenser

The diesel fuel dispenser needs labeled and signed as follows:

1. **Product Label**
2. **No Smoking** or **No Smoking within 100 Feet**

Hose Requirements:

- Dispensing hose must have **emergency breakaway device** installed. When the hose is equipped with a **retriever**, the breakaway device shall be installed between the place where the retriever attaches to the hose and the nozzle.

- The nozzle must be an automatic closing type.

24 Hour access fuel delivery systems require an emergency shut off switch in view from the fuel island and marked with an **Emergency Shut Off Sign,** if a leak occurs.

PERSONNEL TRAINING AND SPILL PREVENTION PROCEDURES:

Personnel Instructions:
KDOT employees are required to attend at least **two safety meetings** per year on the topic of spills. The meetings shall cover policies and procedures regarding the reporting and cleanup of the various types of spills that KDOT employees may experience. These may include fuel, asphalt, oil, and various other fluids. Training sessions may include hands-on experience on

how to handle tools and equipment during a spill. All KDOT shops are required to have a spill kit. KDOT has supplied all their shops with Slik-wik Spill Kits. These kits contain the following:

Subarea shops:

Absorbs up to 65 gallons
1-95 gallon Over Pak (outside dimension-31" diameter x 41" high)
60 - 18" x 18" heavyweight sorbent pads
15 - 3" x 144" "Allwik SOC's"
8 - 18" x 18" x 2" "Allwik Pillows"
20 - sorbent wipes
1 - Caution-Spill sign
10 - disposal bags with ties
1 - Emergency Response Guidebook (ERG)
1 - folding drum dolly

District and Area shops:

Absorbs up to 150 gallons
1 - Storage box and lid (outside dimensions 44" long x 48" wide x 31" high) with 5" wheels
150 - 18" x 18" heavyweight sorbent pads
30 - 3" x 144" Allwik SOC's
16 - 18" x 18" x 2" Allwik Pillows
40 - sorbent wipes
1 - Caution-Spill sign
30 - disposal bags with ties
1 - Emergency Response Guidebook (ERG)

Use of appropriate absorbent material is suitable for small spill cleanup if the spill occurs on flat concrete or asphalt surface away from drainage systems or waterways. The material should be collected and disposed of in accordance with KDOT policies on hazardous and/or waste disposal procedures.

STREAM POLLUTION

Owners or persons responsible for an accidental discharge or spill of materials which are detrimental to the quality of water in the State must report such incidents to the **KDHE; phone 785-291-3333** anytime: day, night, or weekends.

DISTANCE TO NAVIGABLE WATERS AND FLOW PATH:
Consult with topographical maps attached. Topographical maps included within this program represent the entire county. A mark shall be made on these maps to determine an approximate location of the storage tanks within the counties.

PREVENTION MEASURES PROVIDED:

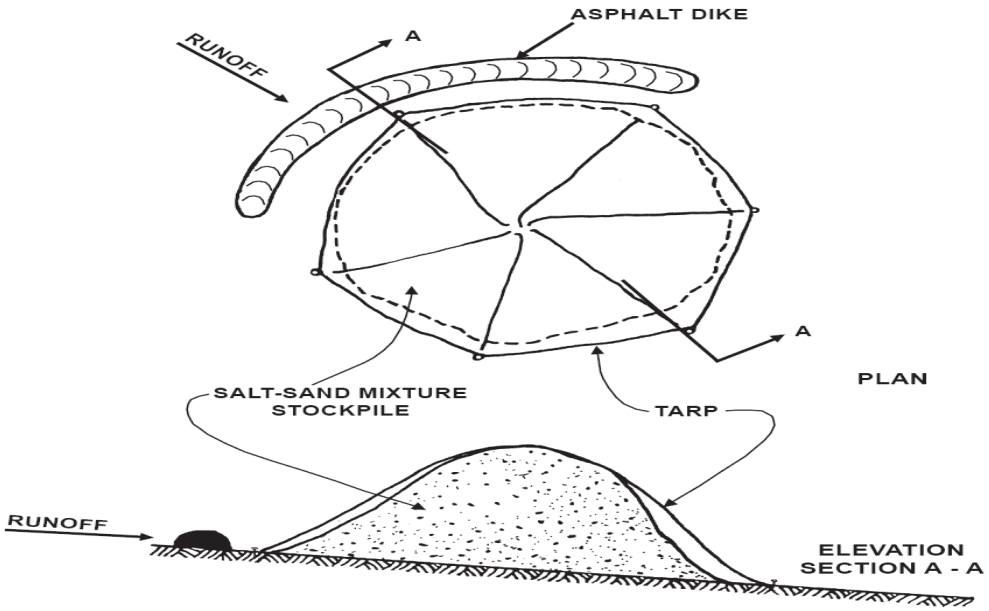
KDOT shall provide the following measures to prevent spills as well as limiting the damage caused if a spill were to occur.

-Dikes shall be built and maintained around any storage tank that may cause a spill.

- KDOT. employees shall discuss, in two yearly safety meetings, what procedures to follow in the event of a spill.

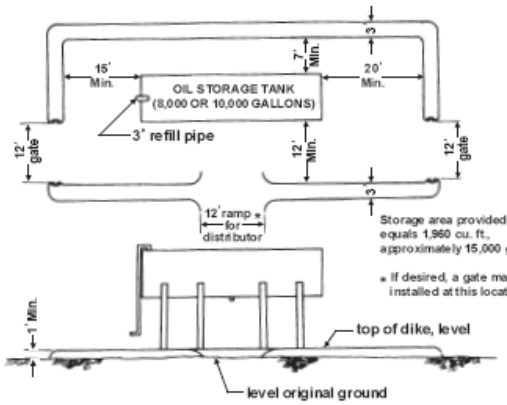
-All KDOT district, area, and subarea shops shall be equipped with spill kits for the clean-up of spills.

-All tank valves will be kept locked when not in use. Fenced yards where tanks are located shall be kept locked during non-business hours.
-The Supervisor or a competent designee shall perform monthly inspections of above ground storage locations. Documentation will be maintained on the monthly inspection report form.

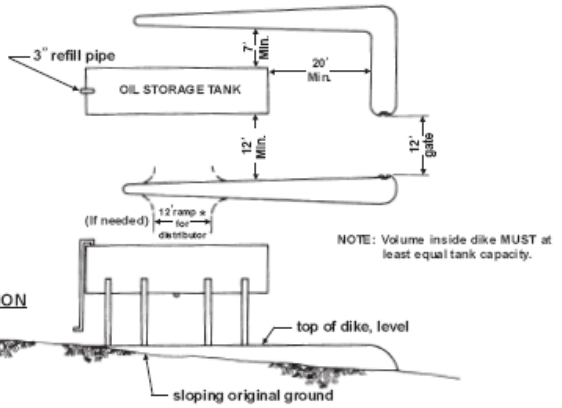


CONSTRUCT AN ASPHALT DIKE TO PREVENT RUNOFF FROM ENTERING THE SALT-SAND STOCKPILE

SALT-SAND-STORAGE
FIGURE 12-2



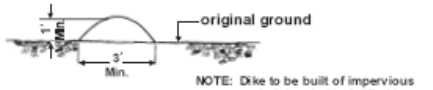
PLAN



NOTE: Volume inside dike MUST at least equal tank capacity.

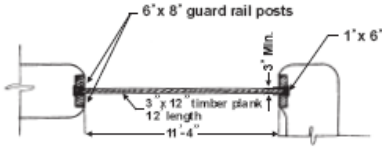
ELEVATION

TYPICAL SPILL PREVENTION CONTROL DIKE



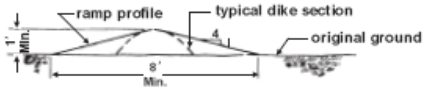
NOTE: Dike to be built of impervious material and wheel rolled to obtain compaction and desired shape.

TYPICAL DIKE CROSS SECTION



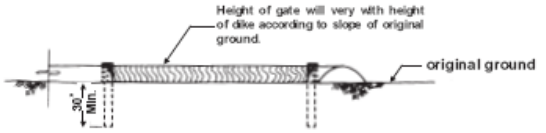
NOTE: Planking for gates must NOT be removed from plant site.

PLAN



NOTE: Length of the ramp will very with the height of the dike.

TYPICAL RAMP CROSS SECTION



ELEVATION

GATE DETAIL

GENERAL NOTE:
1. District to determine tank locations requiring Spill Prevention Control.
2. All valves on tanks requiring Spill Prevention Control must be locked.
3. Plank-style gates should be used only when ramp-style access is not practical.

ASPHALT SPILL CONTROLL
TYPICAL DIKE
FIGURE 12-1

KDOT ABOVEGROUND STORAGE TANK MONTHLY INSPECTION CHECKLIST

Date: _____

Time: _____

Inspector: _____

Location(s): _____

X= Satisfactory
NA= Not Applicable
0= Repair or Adjustment Required
C= See Comment Under Remarks and Recommendations

AST's

_____ Tank surfaces checked for signs of leakage.

_____ Tank condition good (no rusting, corrosion, pitting).

_____ Bolts, rivets, or seams are not damaged.

_____ Tank foundation intact.

_____ Level gauges and alarms working properly.

_____ Vents are not obstructed.

_____ Valves, flanges, and gaskets are free from leaks.

_____ Containment walls are intact.

_____ No visible oil sheen in containment area.

_____ No standing liquid in containment area.

_____ Fence and gates intact.

_____ Gates have locks.

_____ AST's locked when not in use.

_____ Starter controls for pumps locked when not in use.

_____ Lighting is working properly.

Remarks and Recommendations:

_____

_____

_____

***If a tank does not contain any material, it does not have to be inspected**

Updated 10-14-2013

Area Storage Tanks Permitted: Your Districts' Storage Tank Inventory

KDOT INV NO	LOC	KDHE INV #	INSTAL YEAR	TANK CAP	PROD STORD	CNTY	LOCATION DESCRIPTION
030-0591	300	26695 U005	1991	2000	DSL	NT	312 S 2ND AVE. NORTON, DISTRICT SHOP
030-0591	300	26695 U006	1991	1000	UNLD	NT	312 S 2ND AVE. NORTON, DISTRICT SHOP
757-3022	311	41406-01	1952	8000	ASPH	SM	E. ON US-36, SMITH CENTER RANGE 13W SECTION 23 TWN 3S
757-3027	311	41406-02	1937	8000	ASPH	SM	E. ON US-36, SMITH CENTER RANGE 13W SECTION 23 TWN 3S
031-8946	311	40120-02	2009	2000	DSL	SM	N JUNCTION US-36 & US-281
031-0491	312	26677U003	1991	2000	DSL	PL	PHILLIPSBURG AREA SHOP RANGE 18W SECTION 35 TWN 3S
030-0491	312	26677U004	1991	1000	UNLD	PL	PHILLIPSBURG, AREA SHOP
757-3062	312	26677-01	1952	8000	ASPH	PL	S. ON US-183, PHILLIPSBURG
758-3016	312	41392-03	1956	10000	ASPH	PL	S. ON US-183, PHILLIPSBURG
757-3072	313	43771-02	1952	8000	ASPH	NT	6 MI. WEST AND 3 MI. SOUTH OF NORTON ON K-383
757-3011	313	43771-01	1941	10000	ASPH	NT	6 MI. WEST AND 3 MI. SOUTH OF NORTON ON K-383
031-8947	314	40121-02	2009	2000	DSL	OB	N. ON US-24, OSBORNE
758-3017	314	43988-01	2003	10000	ASPH	OB	N. ON US-24, OSBORNE RANGE 12W SECTION 8 TWN 7S
758-5014	314	43988-02	2003	10000	ASPH	OB	N. ON US-24, OSBORNE RANGE 12W.SECTION 8 TWN 7S
031-8926	315	26685-04	2008	2000	DSL	RO	321 CYPRESS ST.,STOCKTON
757-3058	315	44199-01	1958	8000	ASPH	RO	N. ON US-183, STOCKTON RANGE 12W SECTION 5 TWN 7S
757-3052	315	26683-01	1952	8000	ASPH	RO	K-18 WEST OF PLAINVILLE RANGE 18W SECTION 34 TWN 9S

Area Storage Tanks Not Permitted - (less than 660 gallons):

KDOT INV NO	LOC	INSTAL YEAR	TANK CAP	PROD STORD	CNTY	LOCATION DESCRIPTION
PL – 1	312		275	USED OIL	PL	AREA SHOP, PHILLIPSBURG
NT - 1	300		564	USED OIL	NT	NORTON DISTRICT SHOP
OB – 1	314		317	USED OIL	OB	OSBORNE SUB-AREA
RO – 1	315		295	USED OIL	RO	STOCKTON SUB-AREA
SM - 1	311		317	USED OIL	SM	SMITH CENTER SUB-AREA

TANKS IN USE:

The tanks listed in this program are accurate at the time this report was prepared. Corrections shall be made within this report if a tank is removed from service, moved, or returned to service. All applicable rules apply to tanks until they are removed from service and dismantled.

SPILL HISTORY:

District _____? Complex has not experienced any significant spills.

Key:

- "KDOT INV NO" = Number assigned by KDOT to identify tank.
- "LOC" = Location listed as District, Area, Subarea.
- "KDHE INV #" = Number given by Kansas Department of Health and Environment to identify tank.
- "INSTALL YEAR" = The year the tank was installed at its present location.
- "TANK CAP" = The amount of material the tank can contain, few tanks if any are filled to capacity.
- "PROD STORED" = The material stored in each tank.
  -UNL = Unleaded Fuel
  -DSL = Diesel Fuel
  -ASPH = Asphalt Material
  -OIL= Used Oil
- "CNTY" = Abbreviation of the county where the tank is located.
- "LOCATION DESCRIPTION" = A more detailed explanation of the exact location of the tan

K.D.O.T. CERTIFICATION OF THE APPLICABILITY

OF THE SUBSTANTIAL HARM CRITERIA CHECKLIST

FACILITY NAME: _____

FACILITY ADDRESS _____

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?
   Yes_____ No_____

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?
Yes_____ No_____

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the formula in Attachment C-III, Appendix C, 40 CFR 112 or a comparable formula[1]) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments, see Appendices I,II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Environments" (Section 10, Appendix E, 40 CFR 112 for availability) and the applicable Area Contingency Plan.
Yes_____ No_____

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula (Attachment C-III, Appendix C, 40 CFR 112 or a comparable formula[1]) such that a discharge from the facility would shut down a public drinking water intake[2]?
Yes_____ No_____

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?
Yes_____ No_____

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

_____ _____

Name(please print or type) Signature

_____ _____

Title Date

[1] If a comparable formula is used, documentation of the reliability and analytical soundness of the comparable formula must be attached to this form.

[2] For the purposes of 40 CFR Part 112, public drinking water intakes are analogous to public water systems as described at 40 CFR 143.2(c).

5.4 Specific Requirements

5.4.1 Supervisors

Supervisors who oversee employees whose job duties require working with hazardous chemicals shall obtain and coordinate the required training for affected employees. Supervisors also shall:

- Verify compliance with the hazardous communication program.
- Periodically inspect labels on hazardous chemicals for legibility in facilities where hazardous chemicals are used by employees.
- Provide or coordinate training for affected employees on the use of appropriate PPE for working with hazardous chemicals.
- Retain a copy of the SDS that arrives with the chemical upon purchase and/or delivery.
- Submit a chemical inventory of those chemicals stored and used at their worksite to the safety staff in January of each year.

5.4.2 Employees

Employees will be trained before working with any hazardous chemicals.

Employees are responsible for reviewing chemical labels for procedures and hazards prior to using any hazardous chemical. They will report any unlabeled or defaced label on these containers to their immediate supervisor.

Employees shall wear the appropriate PPE prior to working with any hazardous chemical.

5.4.3 Safety Staff

Safety staff shall:

Coordinate all elements associated with KDOT's hazardous communications program.

Help supervisors or others as necessary on any matter concerning this section.

Maintain a list of all hazardous chemicals used at KDOT. Safety staff shall maintain all other documentation required by this program.

Section 9 – Equipment Operating Safety

1.0 Purpose

The purpose of this section is to provide guidance to KDOT employees who perform job duties operating KDOT equipment, either owned or leased.

2.0 Scope and Applicability

This section provides guidance for the operation of KDOT equipment. The equipment listed herein may include but is not limited to automobiles, vans, trucks, loaders, graders, backhoes, excavators, tractors, trailers, skid steers, mowers, winches, hoists, track loaders, bucket trucks, digger-derrick trucks, scissor lifts or any other type of vehicle owned, leased or used by KDOT.

KDOT engineers, superintendents, supervisors, employees and safety staff are responsible in part for the training, use and operation of KDOT equipment in different environments as job duties dictate.

Equipment will be operated and maintained in compliance with applicable laws and department directives.

3.0 Policy

KDOT employees should be trained in the operation and use of equipment owned or leased by KDOT prior to the employee using the equipment.

4.0 General Responsibilities

The equipment you operate belongs to or is leased by the State of Kansas. As the operator, you are the custodian of that property. Treat it with care and respect.

KDOT employees operating vehicles or equipment in the course and scope of their employment are required to take a defensive driving course when reasonably available after employment and every third year thereafter. (SOM 2.6.2, “Safety”)

Such employees are also to be familiar with the Kansas Driving Handbook, Kansas Commercial Driver License Manual, KDOT Equipment Users Handbook and pertinent laws as applicable.

5.0 Operation Guidelines

5.1 Seat Belts

Persons operating or riding in vehicles or equipment in the course and scope of their employment shall use lap and shoulder belts when such devices are provided in the vehicle or on the equipment. Persons who operate vehicles or equipment shall operate them in accordance with state law, KDOT’s Maintenance Manual and KDOT SOMs.

5.2 Pre-Trip Inspection

When applicable, reference the Kansas Commercial Driver License Manual, as well as KDOT Maintenance Manual, Chapter 9, Section 9.16, “Inspections.”

5.3 Riding in or on KDOT Equipment

- KDOT employees shall not ride or work from the bed or tailgate of pickups on trailers or on/in the back of dump trucks that are moving in any direction.
- KDOT employees shall not ride in or work out of any equipment loader bucket.
- KDOT employees shall not ride on the hood, tailgate, running board or utility box of any piece of equipment, nor extend body parts beyond the sides of the equipment.

Exception: truck-mounted cone baskets.

- KDOT employees may ride in approved, truck-mounted cone baskets for the sole purpose of placing and retrieving traffic cones in work zones.
- KDOT employees using this basket must have attended operator training for the use of cone baskets.

5.4 General Safety

Watch for bystanders when lowering equipment attachments and stabilizers to the ground. Dismount only when the equipment is stopped, and parking brake is set.

When driving equipment to and from the job site that has left and right brake control pedals, the left and right brake control pedals should be locked together to prevent loss of control from pivoting.

Rollover protection structures are not to be drilled, added to or altered in any way.

To prevent upsets, slowly swing loaded backhoe buckets when on hillsides and slopes.Turn off the engine and set the parking brake before getting under equipment.

An attendant will remain with any machine holding a suspended load.

6.0 Transporting Equipment

Do not load transport equipment beyond its capacity.

Load in a manner so that no portion of the load extends beyond the fender line or will strike overhead obstacles.

Loads should not interfere with the operator’s vision.

Secure the equipment load so that it does not shift or spill during normal operation.

Use Grade 70 or 100 chains and matching adjustable bindings when transporting equipment.

Flags and other warning devices placed on state-owned equipment will conform to standards set in the KDOT Maintenance Manual and Federal Motor Carrier Safety Regulations Handbook.

6.1 Loading and Unloading

Loading and unloading equipment using tilt-top and lowboy trailers with winches

When loading equipment on tilt-top or lowboy trailers, winches will be used. An assigned operator will operate the controls and assist employees at the rear of the cable.

A winch is required during the following operations when loading and unloading:

- Non-powered equipment or vehicles.
- Steel-faced or combination rollers.
- Steel-tracked equipment.
- If the Landoll or tilt-top trailer deck is wet in any area from any source.
- If tires of the equipment or vehicles being loaded are wet, muddy or slippery.

7.0 Equipment Recovery

It is KDOT's policy to provide a safe and healthy workplace for employees. This program will provide a method to help safeguard employees from being injured while working with recovery equipment. It is also the intent of this policy to comply with federal OSHA requirements.

7.1 General Program Management

7.1.1 Responsibility

The District Safety Specialist is responsible for all facets of this program and has full authority to make necessary decisions.

7.1.2 Plan Review and Update

To keep this program up to date, the plan shall be reviewed and updated annually and/or whenever new or modified equipment and procedures are implemented that could affect the occupational exposure of employees.

7.1.3 Guidelines for Recovery Operations

The Division of Safety will approve tow ropes, straps and accessories to be used. Equipment will be inspected before and after each use. Be sure a tag is on the tow rope indicating the rope identification, size and maximum strength of the rope before using. When equipment becomes questionable for use, a trained individual or the District Safety Specialist will be contacted for the final go/no go evaluation. Tow ropes can be repaired but

allow your District Safety Specialist to determine if they should or can be repaired. Only trained individuals will be in charge or involved in the recovery of equipment.

Recovery operations should be done with three people and clear communication signals should be established prior to beginning. When recovering equipment:

- Choose the appropriate tow rope for the recovery; 37,500 or 100,000-pound maximum strength rope sizes are approved by KDOT.
- Select a vehicle heavier than the stuck vehicle to do the pulling.
- Make sure the towing route is free of obstacles and hazards.
- Only use appropriate attachment points when towing equipment.
- Use traffic control when necessary.
- Maintain a safe zone for those watching the operation.
- Do not connect two ropes together. If more than one rope is necessary, call a tow truck.
- After a failed attempt, those running the operation may decide to try again after appropriate, agreed-upon changes are made. After three failed attempts, a tow truck will be called to recover the equipment.
- Clean and store equipment after each use.
- If there are any safety concerns that anyone is uncomfortable with, call a tow truck.

If a snowplow gets stuck and the access point available for towing is from the front end behind the blade, a tow truck will be used to pull out the snowplow.

Chains will not be used for equipment recovery.

8.0 Motorized Equipment Safety Guidelines

8.1 General Program Management

8.1.1 Responsibility

The District Safety Specialist is responsible for all facets of this program and has full authority to make necessary decisions.

8.1.2 Plan Review and Update

To keep this program up to date, the plan shall be reviewed and updated annually and/or whenever new or modified equipment and procedures are implemented that could affect the occupational exposure of our employees.

8.2 Weed Eaters

It is KDOT's policy to provide a safe and healthy workplace for our employees. Because a weed eater, or trimmer, is a high-speed, fast-cutting power tool, special safety precautions must be observed to reduce the risk of injury.

This program will provide a method to help safeguard employees from being injured while working with weed eaters. It is also the intent of this policy to comply with federal OSHA requirements.

8.2.1 Personal Protective Equipment

Apply the following recommendations and information regarding PPE when operating weed eaters:

- PPE: all PPE required for operating a weed eater must fit properly and be in good condition.
- Clothing: clothes should fit well and should not have loose or ragged edges that can get caught on limbs or brush. Do not wear shorts, sandals or go barefoot when operating a weed eater.
- Leg chaps (optional): protective leg chaps should be made from ballistic nylon or Kevlar to protect the legs from the weed eater.
- Hard hat: wear a properly fitted hard hat that is comfortable and provides protection from small falling limbs or debris.
- Face protection: wear either a full-face shield, face screen, safety goggles or safety glasses with side shields to protect your face from flying debris, twigs and gravel.
- Hearing protection: wear earplugs and/or earmuffs to protect your hearing from the noise levels associated with running a weed eater, which can exceed 90 decibels. Use hearing protection with a minimum noise reduction rating of 25 to reduce the risk of noise-induced hearing loss.
- Footwear: wear approved work boots with aggressive-treaded soles to protect you from slipping and to protect your feet from potential contact with the string or blades.
- Gloves: wear leather gloves to protect hands from cuts, abrasions or splinters.

Good footwear is very important. Wear sturdy boots with non-slip soles; steel-toed boots are recommended. The KDOT PPE Policy provides work boot specifications for acceptable footwear.

8.2.2 Weed Eater/Brush Cutter w/Blade Attached Procedures

This unit is sometimes referred to as a clearing saw to indicate it as a high-powered trimmer/brush cutter that is particularly suited for use with a circular saw blade for clearing saplings or small trees.

Do not use a weed eater/brush cutter without training. It is important that you read, fully understand and observe the safety precautions and warnings associated with this equipment. Because this is a high-speed, fast-cutting power tool sometimes equipped with sharp cutting blade, special precautions must be observed to reduce the risk of personal injury.

If the rotating line or blade comes in contact with your body, it will cut you. If it encounters a solid object such as a rock or concrete, it may fling material directly or ricochet it in the direction of bystanders or the operator.

Contact with any solid object will also dull the blade and could cause severe enough damage that the blade will need to be replaced.

Never modify this power tool in any way. Only use attachments expressly approved by the manufacturer.

To reduce the risk of loss of control and serious injury to the operator or bystanders by a kickout, never use a circular saw blade on a trimmer/brush cutter with a loop handle. Only use on equipment with a bicycle handle.

Always inspect equipment before operating to be sure the tool is in good operating condition.

Replace cracked, damaged or worn-out heads and cracked, bent, warped, damaged, dull or worn-out blades as soon as practical.

It is mandatory that brush cutters are equipped with a handlebar, harness and deflector. The harness must be used when operating this machine.

Recommended PPE:

- Helmet with face shield
- Safety glasses
- Ear plugs or muffs
- Gloves
- Long pants
- KDOT-approved work boots; steel toed boots are recommended

Tips for use:

- To reduce the risk of injury and property damage from flying debris, keep bystanders and vehicles at least 50 feet away from the operation.
- Do not carry or transport the tool while the cutting attachment is moving.
- Carry the tool in a horizontal position with the blade behind you and the engine in front of you.
- Always shut the engine off and make sure the cutting attachment has stopped before setting the tool down.

- Do not allow other people in the general area when starting.
- Do not drop start.
- Operate with both hands.
- Never hold the cutting attachment above the waist. The higher the cutting attachment is off the ground, the greater the risk of loss of control and of cuttings being thrown sideways.
- Use the tool like a scythe to cut grass by sweeping it back and forth in an arc.

8.3 Chain Saws

8.3.1 Policy Statement

It is the policy of KDOT to provide a safe and healthy workplace for employees. This program will provide a method to help safeguard employees from being injured while working with chain saws. It is also the intent of this policy to comply with the federal OSHA requirements listed in 29 CFR 1910.266.

Always follow the KDOT Chain Saw Policy.

Front hand guard: the front hand guard is a paddle-like device located ahead of the front (top) handle of the chain saw to stop the operator's left hand from coming in contact with the chain if this hand slips off the handle.

Chain brake: chain brakes are a feature of gas chainsaws and reduce the risk of injury by immediately stopping the saw's chain if kickback occurs. Usually, the chain brake is activated by contact with the front hand guard, but it may also be activated by a sudden jerk of the chain saw (inertia activated feature). It is strongly recommended to purchase chain saws with both types of chain brake activations.

Throttle trigger interlock: this feature prevents the accidental opening of the throttle.

Stop switch: the stop switch should be easy for an operator to activate with his or her right thumb while gripping the saw's rear handle.

Antivibration system or vibration damping: an antivibration system can reduce operator fatigue and decrease the strain placed on the operator's hands. Vibration damping, achieved through rubber bushings and/or metal springs on the chain saw, reduces the operator's exposure to vibration.

Rear hand guard: a guard on the lower part of the chain saw by the rear handle that helps protect the operator's right hand from a broken or jumping chain.

Reduced kickback or anti-kickback chain: most consumer chain saws are equipped with low-kickback chains or chains designed to have reduced kickback energy.

Chain catcher: this feature is designed to catch a broken or jumping chain.

Continuous pressure throttle: this feature shuts off power to a chain saw when pressure is reduced.

Muffler: the muffler limits the noise level of the saw and directs hot exhaust gases away from the operator.

Spark arrestor: a spark arrestor prevents sparks from being ejected by the exhaust.

8.3.2 General Program Management

Responsibility

The District Safety Specialist is responsible for all facets of this program and has full authority to make necessary decisions.

Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated.

Operators shall be familiar with the operator's manual, perform a pre-operation check of equipment, remove equipment from service for repairs and wear proper PPE consistent with hazards.

Plan Review and Update

To keep this program up to date, the plan shall be reviewed and updated annually and/or whenever new or modified equipment and procedures are implemented that could affect the occupational exposure of employees.

8.3.3 General Program

Training

All operators shall complete training before using a chain saw. Training shall include familiarization with the operator's manual. All operators shall also be trained in:

- Selecting the right tool for the job
- Knowing the hazards of the tool
- Following the manufacturer's operating and inspection rules
- Having guards in place
- Maintaining tools
- Storing tools properly

Operators should also know what causes and how to avoid kickback, pushback and pull in.

Training shall be provided to operators prior to chain saw use. Periodic refresher training shall be conducted at the discretion of the District Safety Specialist.

Inspection

All chain saws shall be inspected regularly and before use. If an inspection reveals missing or broken guards, damaged equipment housing or missing or broken tool retainers, the saw shall not be used and shall be tagged and removed from service.

Maintenance

A chain saw in proper working condition is safer and easier to operate than a poorly maintained machine. Before using your chain saw:

- Make sure the chain is properly sharpened.
- Make sure the chain is properly tensioned on the chainsaw bar.
- Make sure the chain oiler reservoir is filled with proper bar and chain oil.

Maintaining proper chain tension during chain saw operation is important because a loose chain could come off, and a tight chain could bind and overheat. When sharpening the cutters on the chain, wear gloves and cover the chain with a heavy rag. Make sure your chain-oiling system is working properly.

Personal Protective Equipment

All employees working within 10 feet of a chain saw shall wear:

- Protective eyewear with side shields
- Face shield
- Hard hat
- Hearing protection; ear plugs minimum
- Hand protection
- High visibility clothing if working next to the roadway
- KDOT-approved boots

All employees working with a chain saw shall wear:

- Protective eyewear with side shields
- Hard hat with a face shield
- Hearing protection including both ear plugs and muffs
- Chain saw chaps
- KDOT-approved boots
- Gloves

Loose-fitting clothing should not be worn when operating a chain saw.

Trauma kits will be available on site with each chainsaw that is in use. Trauma kits will contain these supplies.

- 1 - CAT tourniquet

- 1 - 5' Hemostatic Gauze Dressing
- 1 - 4 in. Flat Dressing
- 1 pair - Nitrile Gloves - Large
- 1 - Trauma Shears
- 1 - Mini Permanent Marker, BLK

First aid kits shall be available at all work sites where trees are being cut. The contents of the first aid kit shall contain the supplies listed in the current KDOT Safety Manual and are listed below.

KIT CONTENTS

ITEM	QUANTITY
1" X 3" Adhesive Bandages	2 Boxes of 16
3" Bandage Compress	2
Triangular Bandage	1
4" X 4" Gauze Pads	2 Boxes
Antiseptic Swabs	10
CPR Barrier	2
Latex Gloves	2 Pair
2" X 6' Gauze	2
Cold Pack	1
Fingertip Bandage	10

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Operation

Engage the chain brake before attempting to start the chain saw. Operators should maintain two points of contact with the chain saw (other than the hand on the starter rope) when starting. Study and practice the two approved starting methods for gas-powered chain saws described in the operator's and/or safety manual. Never hold the starter rope and use the weight of the saw to "drop start" the saw. Serious injury may occur from the recoil of the chain saw bar.

While operating the chain saw, try to maintain secure footing and balance. Always hold the chain saw firmly with the right hand on the rear handle and the left hand on the front handle and use an encircling grip (fingers over/thumb under on each handle). Remember to turn off the chain saw, engage the chain brake and carry the saw with the bar facing towards your back and muffler away from you when walking more than 50 feet or across hazardous terrain. When moving short distances – less than 50 feet – engage the chain brake with the chain saw running.

Begin and continue cutting at full throttle and cut only one log at a time. Use caution when reinserting the chainsaw blade into a previous cut and withdrawing it from the current cut. Do not cut limbs or brush with the nose of the guide bar. Be aware of the location of the guide bar nose when starting or operating the chain saw and do not let it come into contact with an object.

Do not attempt a chain saw cutting technique called "bore cutting" (plunge cutting) without hands-on training and supervised practice so you are able to properly complete and demonstrate proficiency in this cutting technique.

Fuel

Always use the following precautions when handling fuel and refueling a chain saw:

- Store fuel in an approved container.
- Beware of static electricity or sparks between the saw and fuel can.
- Do not remove the fuel tank cap while the engine is running.
- Avoid spilling fuel and immediately clean up any spill.
- Do not smoke while refueling.

8.4 KDOT Pole Saw Procedures

Power pole saw operators must become familiar with the type, model and basic operations of pole saws. Never underestimate the value of reading the owner's manual before operating a pole saw. Check the owner's manual for required and preventative maintenance as well as proper starting, harness and shaft adjustment procedures. Take the following actions before using a pole saw:

- Visually inspect the pole saw prior to operation and be sure there are no missing or loose nuts or bolts.
- Inspect the air filter and clean as necessary.
- Inspect the guide bar for wear, and clean, repair or replace as necessary.
- Inspect the drive sprocket for wear and replace as necessary.
- Inspect and be sure the chain is sharp with the proper tension.
- Fuel the saw and fill the bar oil reservoir if needed.

When operating a pole saw, never stand directly under the cutting system, limb or wood being cut.

Identify and set up a safe cutting and falling zone so falling limbs and/or wood will not strike you or anyone else during the operation. Always check for power lines and/or potentially energized conductors and maintain at least a 10-foot limit of approach.

Do a thorough job risk and operation assessment. Remember the acronym **HOPE:** identify and address any potential **hazards** and **obstacles, plan** your work and make sure you have all the **equipment** needed to safely and efficiently work your plan.

When removing limbs, use a three-step cutting method:

- **Step 1:** Make the first cut at least 18 inches from the branch collar with an undercut approximately 1/3 of the way up through the branch, being very careful not to pinch the saw.
- **Step 2**: At full speed, cut directly on top of the first cut, sawing from the top down until the branch drops. Remember to stand clear and expect the unexpected.
- **Step 3:** Make the final cut just outside the branch collar. Be careful not to tear the bark if you are making a pruning cut. This may require an additional cut to shorten and lighten the stub before making the final collar cut.

8.5 Tractors

When operating a tractor on any incline, engage the clutch gently. A tractor can tipover if:

- The incline is too steep (3:1 or steeper).
- The clutch is engaged abruptly.
- The towing point on the tractor is too high.

If caught on a steep incline, back down very slowly and apply the brakes lightly. Weight on the front of the tractor will help.

Keep the tractor in low gear when going downhill. This allows the tractor's engine to serve as a brake. Make sure that freewheeling transmission is in direct drive before attempting to use the engine as a brake.

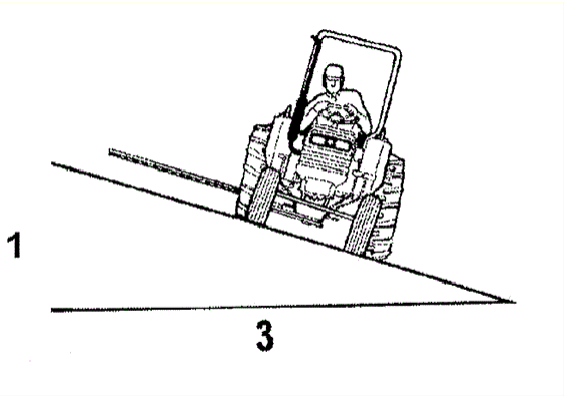
Before getting off of the tractor, stop the engine, set the brakes and disengage the Power Take-Off (PTO). Use the PTO shield and make sure shields are in place before using the unit.

In towing operations, hitch to the drawbar, take up the slack slowly and do not jerk the strap or tow rope.

8.6 Tractors and Mowing

Before mowing, the operator shall make a site assessment noting the conditions of the terrain, including slopes, moisture on vegetation, frozen ground, culverts, ditches, drop offs, signs, utility markers and other conditions on the right of way that would affect mowing.

3:1 or greater horizontal to vertical slopes require specialized slope mowing equipment. Any slopes steeper than 3:1 should generally be left un-mowed.



8.7 Backhoes

Backhoe buckets must be lowered to the ground before dismounting from the tractor. Watch for bystanders when lowering the stabilizers and operating the backhoe. To prevent upsets, slowly swing a loaded bucket on hillsides.

8.8 Loaders and Dozers

No employee will ride in or work from the bucket of a front-end loader.

When operating at travel speeds, keep the blade or bucket high enough off the ground and rolled back to keep it from gouging into the roadway. If available, lock out hydraulics during travel. The loader bucket should be kept low to the ground except when approaching to dump the load.

Lower all attachments including blades and buckets before dismounting the equipment. If you must get under the machine, turn off the engine and set the parking brake before doing so.

8.9 Aerial Equipment

Only authorized and trained personnel will be allowed to perform work from aerial equipment. This includes bucket trucks, digger-derrick trucks, scissor lifts, snooper trucks and mobile elevated work platforms.

The following will be observed when working with, on or around any aerial equipment:

- The competent person will be responsible for all operations required in placing aerial equipment in operation, using the device and restoring it to the travel position.
- Test controls before using to determine they are working properly.
- Mark controls with their function. Do not operate lower-level controls unless you have obtained permission from the worker in the lift, except in case of an emergency.
- Wear proper fall protection and attach a self-retracting lanyard to an approved anchor point.
- No employee shall be in the bucket without proper fall protection when the bucket is in a raised position.
- Position the equipment in the lane in which the work is being performed with safety lights operating properly. Use proper traffic control devices for the operation.
- Stand on the floor of the basket or platform. Do not sit or climb on the edge of the basket or platform or use planks, ladders or other devices in or on the basket for a work position.
- Comply with the boom and basket or platform load limits specified by the manufacturer.
- Use outriggers when a bucket is in use. Position them on pads or a solid surface. Wheel chocks should also be used, and the brakes set.
- Do not move an aerial lift truck with workers in the basket, except when using equipment specially designed for this type of operation.

Before moving aerial equipment for travel, inspect the boom to see that it is properly cradled and that outriggers are in the stowed position.

Do not alter the insulated portion of aerial equipment in any manner that might reduce its insulation value.

When necessary to work within **15 feet** of energized overhead utility lines, call the utility company to inquire if the utility company wants to place shields on the lines prior to work.

Inspect aerial equipment in accordance with manufacturer's specifications.

Before performing boring operations, call **1-800-DIG SAFE** to locate and mark underground utilities.

8.10 Zero Turn Radius (ZTR) Mower

Safe Operation Training

When operating a ZTR mower, the operator shall wear:

- Boots that meet KDOT policy
- Hearing protection
- Eye protection
- Hi-vis apparel per KDOT Hi-Vis Policy

Before operating the mower, inspect safety devices and attachments to confirm both are operating correctly.

Perform maintenance checks prior to operation and report needed repairs or safety concerns to a supervisor.

Operating procedures:

- Wear seat belt.
- Do not carry passengers on the mower.
- Start the engine from the driver's seat.
- Do not place hands and/or feet underneath the mower while the engine is running.
- Keep your feet on the machine while operating.
- Understand and practice the use of controls prior to operation.
- Stay clear of moving parts.
- Do not disable safety devices.

Survey the terrain for possible hazards prior to mowing.

- Do NOT operate a ZTR mower on a slope greater than 15 degrees or 3:1.
- Keep movements slow and steady.
- Decrease speed when traveling down slopes or around sharp corners.
- Maintain a 10-foot clearance from retaining walls, culverts, wing walls, embankments, excavations, unprotected ditches, water and other drop offs.
- Avoid sudden movements when starting, stopping or turning.
- Mow up and down inclines, not across the incline.
- AVOID WET SLOPES.
- Avoid holes, rocks, roots and other obstacles that may cause tipping.

Shutdown procedures:

- Disengage the blade and other attachments.
- Shift the controls to neutral.
- Set the parking brake.
- Set the throttle to idle.
- Lower the attachments to the ground.
- Turn off the engine.

- Unhook seat belt.
- Remove the key.
- Exit mower.

Loading and unloading procedures:

Read the operator's manual for instructions. Before loading mowing equipment on a trailer:

- Select a level surface.
- Block the rear wheels of the transport vehicle.
- Attach appropriate ramps to the transport vehicle.
- Back the mower up the ramp and drive forward down the ramp.
- Secure mower with tie downs.
- Do not load or unload the mower while the blade is engaged.

When loading and unloading at the job site, park away from traffic in a location off the paved surface of the road if possible.

Section 10 – Lock Out / Tag Out Procedures

1.0 Purpose

This procedure established the minimum requirements for the Lock out/Tag out of energy and isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out/tagged out before employees perform any servicing or maintenance where the unexpected energization, start-up of the machine or equipment or release of stored energy could cause injury or death.

2.0 Employee Responsibilities

2.1 Authorized Employees

Shall be knowledgeable about the Lock out/Tag out procedures for each piece of equipment, the type and magnitude of the energy that each piece of equipment utilizes, and the hazards of the energy.

2.2 Affected Employees

Whose work operations are or may be in the area shall be instructed in the purpose and use ofthe Lock out/Tag out procedure. This procedure prohibits attempting to restart the equipment during Lock out/Tag out.

3.0 Survey of Equipment

Survey of equipment to identify all isolating devices to determine which switch(s), valve(s)

or other energy isolating devices apply for the equipment to be Lock out/Tag out. More than one energy source electrical, mechanical or other(s) may be involved.

4.0 Sequence of Lock Out Tag Out Procedures

4.1 Lock Out/Tag Out Machines and Equipment

- Shall understand the hazards thereof. Notify all affected employees that a Lock out/Tag out system is going to be utilized and the reason why. The authorized employees shall know the type and magnitude of energy that the machine or equipment utilizes, and the hazards involved.
- If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.) Deactivate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
- Lock out/Tag out the energy isolating devices with assigned · individual locks and tags.
- Ensure that the equipment is disconnected from the energy source(s) by checking that no personnel are exposed, and then verify the isolation of the equipment by operating the push button or normal operating control(s) or by testing to make certain the equipment will not operate. CAUTION: Return operating control(s) to "neutral" or "off" position after the test. The machine or equipment is now locked out. Servicing of equipment may be done at this time.

4.2 Restoring Power to Machines and Equipment

- After the servicing and/or maintenance are complete and equipment is ready for normal operations, check the area around the machine or equipment to ensure that no one is exposed.
- Lockout/Tag out devices may be removed:
  - After all tools have been removed from the machine or equipment.
  - Guards have been reinstalled.
  - All employees are in the clear.
  - Controls are in the neutral position.

5.0 Lock Out/Tag Out Involving More Than One Person

In the preceding steps, if more than one individual is required to Lock out/Tag out equipment, each shall place his/her own personal Lock out/Tag out device on the energy isolating device(s). When an energy isolating device cannot accept multiple tags, a multiple Lock out/Tag out device may be used.

6.0 Basic Rules Using Lock Out/Tag Out Procedure

All equipment shall be locked out or tagged out to protect against accidental or inadvertent operation.Do not attempt to operate any switch, valve, or other energy isolating device when it is locked or tagged out.

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