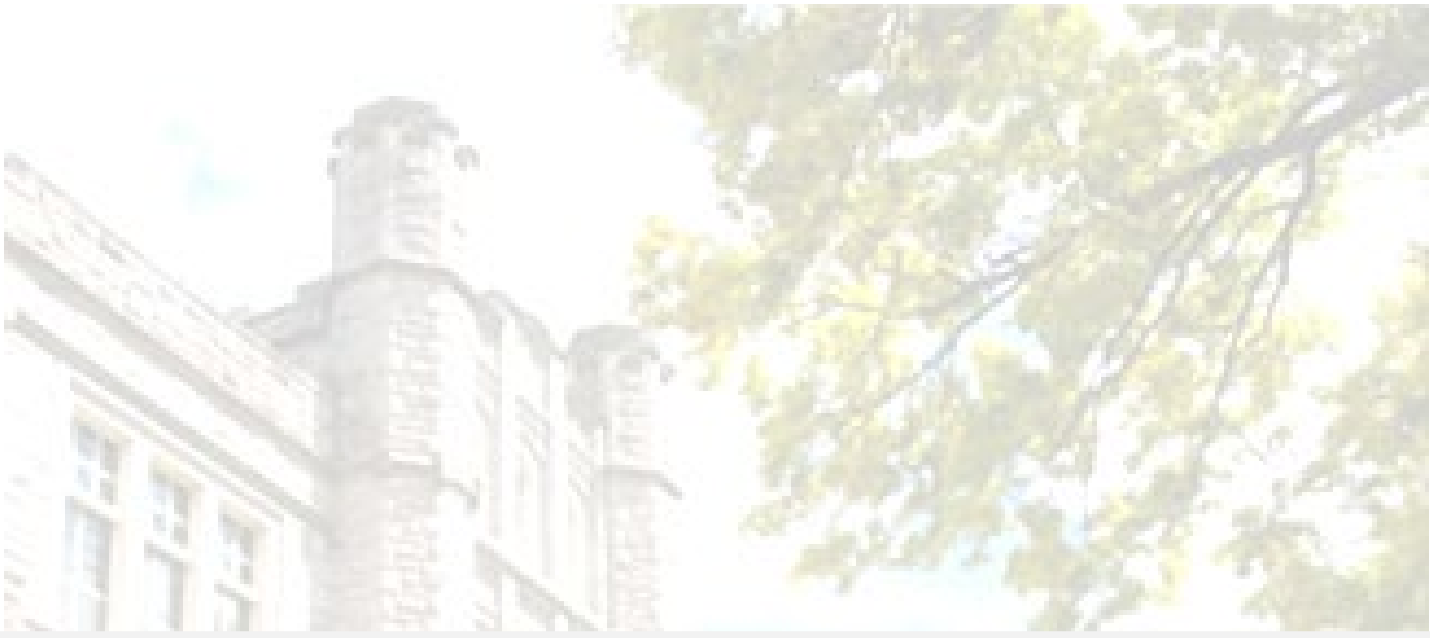

University of Central Missouri

Environmental, Health and Safety Manual 2021

COMMITMENT TO ENVIRONMENTAL, HEALTH AND SAFETY

September 1, 2021

The University of Central Missouri is committed to fostering a safe and healthy culture for our campus community's working and learning environment. Our campus community includes: faculty, staff, students, contractors, and visitors. UCM community members are encouraged to comply with all environmental, health, and safety laws, regulations, guidelines and best practices.

It is crucial that all members of our campus community take personal responsibility for their own safety by following best practices, procedures, and guidelines in the UCM Environmental, Health and Safety Manual. It is equally important that we work together as a TEAM and assume responsibility of one another by pointing out potential hazards when we see them and notifying others who aren't following safety guidelines, no matter how minor. All members play a key role in maintaining and continuously improving our safe and healthy campus environment.

The UCM Environmental, Health and Safety Handbook provides valuable information to help you incorporate safety into your daily activities and we encourage all campus community members to follow best practices, procedures, and guidelines. Depending on the potential hazards associated with your job, you may require additional training. Please ask your supervisor whether your position requires additional training, and let your supervisor know if you have questions about information in this handbook.

The Office of Environmental, Health and Safety (EHS) is responsible for implementing EHS programs, guidelines, and training at UCM and will work daily to help ensure UCM is a safe and healthy environment.

Thank you for your commitment to UCM's pledge to maintain and safeguard our campus safety and well-being.

Sincerely,

President

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1) General Safety & Responsibilities

Safety Foreword

The University of Central Missouri Environmental, Health, and Safety Department has implemented this campus-wide Safety and Health Manual to provide every employee a safe and healthy workplace. The goal for workplace safety is zero accidents, incidents, injuries, and occupational illnesses. This program includes procedures used to prevent risk and hazards in the workplace that will reduce workplace injuries and illnesses. All employees, supervisors, and managers must comply with the requirements and perform their specific responsibilities that are defined in this Safety and Health manual.

As a state institution, the University of Central Missouri is exempt from Occupational Safety and Health Administration (OSHA) regulations and standards. However, OSHA regulations are regarded as General Industry Minimal Standards and form the framework for the processes and procedures that are used to ensure safety and health on campus. Any OSHA regulations cited in this manual are intended as a reference for following industry standards.

Employees shall not be required to work in hazardous conditions without adequate training and supervision. Employees will not be disciplined for refusing to work in hazardous conditions or for reporting hazardous conditions. If questions arise concerning the safety of a specific task, the supervisor should contact the EHS on campus for assistance in finding a process that will reduce the hazards and allow for the task to be completely efficiently and safely.

Tasks and work activities should only be assigned to properly trained and qualified employees. Employees, including part-time student employees, should be trained properly and receive specific instruction on how to complete a task they are not familiar with. This includes how to identify workplace hazards and how to prevent incidents in the workplace. All employees should be trained how to identify safety and first aid equipment in the workplace.

All work-related accidents that involve personal injury or illness and/or time loss must be reported and filed in accordance with State and University policies and procedures. Immediate Supervisors should be notified of all work-related injuries and illnesses. If medical treatment is necessary, follow Human Resources Policies regarding Workers Compensation.

Supervisor Responsibilities

The term "Supervisor" refers to any departmental employee who has supervisory authority over other departmental employees or any faculty members/teaching assistants with students assigned to them. The supervisor is just as responsible for the safety of departmental employees/students as for their own work. Therefore, supervisors will train employees/students to be as familiar as possible with all sections of this manual, with special emphasis on aspects that apply directly to their work or activities.

Equipment will not be used if its condition poses a hazard to any individual or when continued use may cause further damage to the equipment. Work will be analyzed in advance to determine the safest, most efficient procedure and the physical protection necessary to perform each operation safely.

Tasks should be assigned only to appropriately qualified and trained individuals so that they may be performed in a safe manner. Employees/students assigned to unfamiliar tasks shall receive specific instructions on the precautions to be observed and will be advised as to the location of any applicable safety and first aid equipment.

University safety regulations, as outlined in this manual, are to be followed except when compliance with a particular regulation might, under unusual circumstances, constitute a hazard. When it is felt that a particular assignment will expose individuals to unusual hazards, a report of the condition shall be made to the Environment, Health and Safety Office

including plans formulated to reduce the hazards and/or increase the protection.

Employee Responsibilities

Employees/students have a responsibility for their own personal safety including control of hazards to others arising out of the performance of their tasks. They must observe the rules and instructions relating to safe, efficient performance of these tasks. Activities are safe and efficient only when all individuals are safety-conscious and mentally alert. All employees/students are responsible for:

- Working safely
- Following supervisory instructions regarding safety and health.
- Knowing exact duties in case of fire and other emergencies.
- Reporting any spill of hazardous material or other hazardous condition to your supervisor immediately.
- Reporting all accidents and injuries immediately in accordance with State and University policies and procedures. Follow UCM Human Resources policies.
- Submitting recommendations for improving safety and efficiency.

Faculty and Student Responsibilities

Not all sections in this manual pertain to faculty and students on campus. It is the responsibility of faculty and students to follow all Laboratory Safety Guidelines that are listed in this manual, please see SECTION 24 for more information. Prudent Practices in the Laboratory by the National Research Council is a useful reference source.

It is the duty of all faculty and students on campus to follow University safety guidelines, including but not limited to:

- Know Emergency Procedures
- Fire Prevention and Protection
- General Housekeeping

- Report Unsafe Conditions
- Report Hazardous Materials Spills
- Report All Accidents and Injuries Immediately
- Submit Recommendations to Improve Safety & Health on Campus

Environmental, Health, and Safety Department

The University of Central Missouri's EHS Department should be the first resource in reporting safety concerns and chemical waste disposal. The EHS Department consists of a Safety Manager and Environmental and Hazardous Materials Coordinator, their respective numbers are 660-543-4839 (Sam Hafley) and 660-543-4137 (Ariana White.) EHS will answer questions and work with other departments to ensure worker's safety on campus. The EHS Department oversees the overall revision and implementation of this Safety and Health Manual. This manual is a living document and will be updated as needed.

Incident/Injury Reporting

All work-related incidents and injuries should be immediately reported to your supervisor. If an injury required medical attention, follow Human Resource Policies regarding Workers Compensation.

2) Personal Protective Equipment (PPE)

General Safety

PPE is considered the last line of defense to prevent workplace injuries. Educational training and engineering controls should always be used first to reduce hazards in the workplace. PPE is required for certain tasks and procedures on campus. Refer to your direct supervisor to check if your assigned tasks require PPE.

Any worker that is operating a machine or gas-powered tool should avoid wearing loose fitting clothing that might increase your chances of getting

into an accident. Long hair should be tied and confined in a proper head covering.

Employees that work outside or in a shop/garage setting should wear suitable clothing to the weather. Weather Related Safety training is available on the UCM EHS Blackboard page.

PPE is only effective when used in the correct manner, items such as: gloves, hard hats, or face shields shouldn't be used in a "playful manner." Ensure that the PPE is suitable for the assigned task.

Hard Hats

Hard hats, sometimes referred to as safety helmets, shall be worn anytime on campus where hazards from falling or flying objects are present. Hard hats are designed to limit the penetration and damage you may receive if an overhead hazard happens to strike you. If your hard hat is damaged in any way, contact your supervisor. Hard hats must be worn at all construction project on campus.

Eye & Face Protection

Eye protection as well as face protection must be worn where hazards are present that has the probability to strike your face. Safety glasses shall be worn while doing any work on campus. Sunglasses that are compliant with ANSI Z87.1 may be worn if working outside.

Certain operations on campus are required to have a protective face shield, this includes but is not limited to: Abrasive grinding, welding, cutting wood, cutting metal, any hot work operation, spraying, use of air actuated/compressed tools, sand blasting, weed eaters, edgers, and many more operations.

Respiratory Protection

Some processes and workplace environments may require respiratory protection if airborne health hazards are present in sufficient amounts. Engineering controls, substitution of work procedures, and proper administrative training should be used to limit the risk of airborne particulates that can lead to a hazardous workplace. If airborne hazards (dusts, vapors, gases, smoke) are still present in the workplace then respiratory protection may be required. Respiratory protection should be used as a last resort to protect workers on campus, as PPE is the least effective of all control measures.

Types of Respiratory Hazards

One of the most common respiratory hazards on campus is oxygen deficiency, mainly caused by confined spaces on campus. Respiratory hazards caused by any type of hot work is also a concern, and respiratory protection should always be used.

Program Policy

All employees that are required to wear respiratory protection must meet the following program requirements.

- Employee Requirements
- Respiratory Hazards and Respiratory Protection Training
- Respiratory Protection Selection
- Respiratory Protection Fit Testing
- Medical Evaluation
- Respirator Maintenance

Contact Environmental, Health, and Safety in you have any questions.

High Visibility

High visibility clothing is required when working near roadways and any construction zones. Ask your supervisor for high visibility vests when needed.

Gloves

Employees should always wear gloves that are best suited to their work activities. Gloves should protect workers from sharp edges, pinch points, and metal shavings. Gloves should not restrict employees from properly operating equipment, as it is important to have complete control of a tool. If you have questions regarding gloves usage, ask your immediate supervisor.

Foot Protection

Employees should wear shoes that covert the entire foot and provide adequate foot and ankle support. Always wear shoes that are suitable for assigned work activities.

Hearing Protection

Hearing protection is required when operating loud power tools or certain vehicles on campus such as lawn mowers or weed eaters. Headphones, earbuds, or anything similar do NOT count as hearing protection.

3) Vehicle Safety

General Safety

Driving a vehicle is one of the more dangerous everyday activities, and it doesn't change when you're at work or school. According to the CDC, 90 people die a day from car accidents. Using proper driving techniques, paying attention, and wearing your seatbelt can help you stay safe while

operating a vehicle on campus. The speed limit on all campus roads is 15 MPH.

Driver Responsibilities

Every driver on campus has the responsibility to drive safe and to do their part in ensuring safety on campus. Whether it's an UCM employee, student, or visitor just driving through campus, all drivers shall follow federal, state, and local laws and regulation while operating a motor vehicle. Over 80% of traffic accidents are caused by distractions, the most common being a cell phone or hand-held device. Driving is a skill that requires your focused attention to safety operate your vehicle and respond to events that are happening around you. All UCM employees that drive a University owned vehicle must have a valid driver's license. Any driver that drives on UCM property has the responsibility to report any dangerous or hazardous conditions that may interfere with public safety on campus.

Motorized Vehicles

All motorized vehicles, including low speed vehicles, on campus are required to be maintained and operated in accordance with state and local law, as well as the University guidelines.

Forklift Safety

Forklifts are to only be driven by UCM employees who have the proper training and certification. Operators shall have their Forklift/Lull certifications up to date with all requirements in place. UCM Forklift Training is available on the EHS Blackboard page.

4) Chemical and Lab Safety

Definition of a Laboratory

Any campus area (internal room or outdoors area) where the “laboratory use” of hazardous materials and/or sources of hazardous radiations are present and used for research or teaching purposes or in direct support of such research or teaching activities. (Examples: chemical or biological storerooms for research laboratories or classrooms, shops directly used for support in such activities, studios, "prep" or "syntheses" facilities, etc.)

General Guidelines

Supervisors and Principal Investigators have primary responsibility for implementation of chemical safety policies and procedures. Students and staff are responsible for following procedures. Planning for and implementation of chemical safety must be part of every laboratory activity in which chemicals are used.

Reporting Safety Concerns

The University strives to provide safe working conditions to protect employees against hazards. It is the obligation of every employee to observe safety regulations, practice safety at all times, utilize safety equipment as prescribed and to report safety hazards, unsafe conditions, or unsafe acts to their supervisors. Imminent danger conditions (immediately dangerous to life and health) must be reported to the supervisor and EHS upon discovery. The employee should take appropriate action to keep personnel out of the area.

Other unsafe conditions or acts that are not imminent danger should be reported to your supervisor immediately and may also be reported to EHS. It is highly encouraged for the employee to resolve the situation if it is within their means to do so. If not, then it is the supervisor’s responsibility to see that it gets properly addressed.

If the unsafe condition or act has not been corrected within a reasonable amount of time (30 days or less depending upon severity), then the employee should notify EHS (660-543-4839).

EHS is available to assist with safety and health related questions, conduct inspections, review accident/injury issues, provide information and recommendations to eliminate/minimize hazardous situations and recurrence of accidents/injuries. EHS also can provide appropriate safety & health training.

5) Housekeeping

General Safety Procedures

Effective sanitation and good housekeeping is very important in the elimination of potential accident conditions. Hazards may involve not only the custodial worker, but also the public that they serve. In most circumstances the work area is also being occupied by the public or is a general traffic way. Awareness is the first step in eliminating potential hazards.

Most custodial accidents fall into certain basic categories such as:

- Slips and Falls
- Cuts
- Burns and irritation (chemical)
- Bumps and Bruises
- Electrical Shock
- Improper Lifting

Some potential situations in which the above accidents may occur are:

- The physical environment and working conditions.
- Improper lifting, carrying, and lowering.
- Improperly using, handling and storing power driven equipment.
- Fires.
- Hazardous materials.

- Electricity.
- Carrying trash bags or depositing trash in dumpsters.
- Objects in walkways such as boxes, cords, floor mats, etc.

Physical Environment and Working Conditions

Always open doors slowly, being most important where doors are not equipped with windows such as for bathrooms, offices, and classrooms.

Before beginning any task, determine if protective clothing or equipment is required, (dress for the job). Example: wear a properly fitting shoe, with a non-skid sole in good repair (closed toe shoes afford added protection). Safety hats and glasses are a must in areas where low clearance, falling debris and potentially harmful liquid splashing may be present. When wearing gloves, make sure they fit properly, also that they are the type of glove for the task. Gloves should always be used when there is any possibility of contact with rough, sharp or caustic materials or Blood Borne Pathogens and other biohazards (see Section 11 for more information about Blood Borne Pathogen procedure.

When spills occur, wipe them up immediately. Traffic lanes and floor areas where traffic can be anticipated are to be kept free of all hazards such as spilled liquids. When mopping or cleaning floors, warning signs will be placed at the perimeters of the area to give warning to persons moving through the area that a potential hazard exists.

Allowing debris, trash, boxes, etc., to accumulate in traffic areas can turn these areas into a source of potential accidents. Never use chairs, stools, etc., as ladders. If the ladder will not allow you to work safely, secure another ladder or determine another means of performing the required tasks. (See page 6 for additional information about ladders). Exercise care when placing accumulated trash into trash dumpsters. On dumpsters equipped with safety rods, be certain that they are used.

Proper Lifting, Carrying, Lowering

See Section 8 for information about proper lifting, carrying, or lowering technique. Generally, exercise caution when lifting, carrying, or lowering heavy or bulky objects. If there is any doubt about the safe way to move an object, ask your supervisor for assistance in solving the problem. Squat down, keep your back straight and lift with your legs (if the object can be lifted without significant effort).

Hazardous Materials

Chemicals, including those used for cleaning, pesticides, etc., need to be used in the workplace. All containers of chemical compounds or solutions must clearly be marked and properly stored. If chemicals must be used, protect yourself and other persons from exposure to the chemicals. Wear proper protective gear (refer to Section 2 and the SDS).

Due to the large numbers of chemicals, questions about the proper use of a specific chemical, should be referred to your supervisor.

Remember, chemicals can be used safely if proper precautions are followed. Avoid inhaling chemicals or contact with skin. If clothing is contaminated, remove it. If skin is contaminated, flush it thoroughly with water and seek medical attention if necessary. Improper mixing of chemicals such as ammonia and bleach can release toxic gas, as well as increase potential for fire, explosion, serious injury or even death.

Machines Used for Custodial Services

Never use a machine that you have not been trained to use. All safety devices must be in place and in good repair. Make sure that cords are intact with no breaks in the insulation. Always use a grounded outlet. Make sure that the grounding prong has not been removed from the plug on the cord. Do not use an adapter without connecting the grounding tab on the adapter to the plate cover screw on the outlet.

Any maintenance, (adjustments or cleaning), are to always be accomplished when the machine has been unplugged or turned off.

Always keep fingers and other such extremities away from moving parts.

Always wait until the machine comes to a complete stop before checking, adjusting, or working on the equipment.

Before plugging any machine into an outlet, always check to insure that all switches are off.

When using machines such as floor buffers, always plan ahead by making sure that the area has been properly prepared and that warning signs have been posted in traffic areas.

Electrical cords must always be kept in view, to prevent running over them with the machine over it and to prevent tripping and falling over them by employees.

Proper daily cleaning and inspections for necessary maintenance, combined with scheduled servicing by trained technicians is a must for maintaining equipment in a safe operating condition.

6) Walking and Working Surfaces

Walking Safety

It is important for all the employees moving around the campus on their various duties to be aware of the possibility of hazards and spills. Employees should watch out for cable cords, objects, and other materials that are trip and fall hazards.

Report any possible hazards in the workplace or around the campus to your supervisor or remove them yourself, if possible. Whenever possible, use handrails when walking through the stairways.

During winter or rainy seasons, always be aware of slippery conditions resulting from freezing rain, snowfall, or wet surfaces.

Maintenance/facilities and planning crews try to clear sidewalks, steps, and other paths during snowfalls as quickly as possible.

Employees should be are of weather conditions and wear footwear and clothing appropriate to forecast or existing conditions. Take advantage of alternate routes, walkways or steps that have been cleared and treated. Contact facilities planning and operations or EHS department if you find steps or sidewalks that have not been cleared or treated within 3 to 4 hours.

Ladders

Employees working on tasks that cannot be accomplished from ground level should use ladders that are appropriate to the height. Use of substitutes such as stools or chairs is strictly not allowed.

When an employee is working with tall ladders (twice the employee's height) they must be accompanied by a fellow worker to steady the ladder to prevent swaying or falling over. Before working with portable ladders, the employee(s) should ensure that the ladders are equipped with non-slipping bases, and that the feet are levelled to prevent sideway tipping. Do not place boxes, barrels, or other unstable bases to obtain additional height.

Do not leave tools, materials, or equipment on top of a ladder or on the shelf of a stop ladder when the ladder is not in use.

Always use both hands when climbing or descending a ladder, and if materials are to be used at the top of the ladder then rope, block and pulley, or any other means should be used to raise the materials.

If a ladder is to be used in front of a doorway, then the door must be locked, blocked, or guarded.

Store the ladders after use to avoid falling or being knocked over.

Frequently inspect and maintain ladders in good condition to ensure that that the joints between the side rails, rungs, and steps are tight; all moveable parts operate freely without binding or undue looseness; and that all hardware and fittings are securely attached.

Scaffolds

Scaffolds are used in executing tasks that cannot be safely done from the ground using ladder(s). Front end loaders cannot be used as a substitute for scaffolding or for painting purposes. Only trained employees are allowed to erect scaffolds and should be supervised to ensure that standards and specifications are met.

Authorized maintenance personnel should inspect all scaffolds, ladders, machinery, equipment, and devices that are in use at frequent and regular intervals.

Stairways

Stairways that have both sides open should have railings along each side. Broken handrails, defective stair threads, or other hazards on the stairways should immediately be reported to EHS, which will then ensure that any defect or hazardous handrails are fixed.

Never use scaffolds that are damaged or weakened unless they are repaired.

7) Pedestrian Safety

General Safety

Use sidewalks where provided. Cross or enter streets where it is legal and safe to do so. Cross only at intersections and crosswalks and only with a green light and walk signal. Just because you are in a crosswalk, don't assume cars will stop!

What to Do

- Be predictable. Follow the rules of the road and obey signs and signals.
- Walk on sidewalks whenever they are available.
- If there is no sidewalk, walk facing traffic and as far from traffic as possible.
- Keep alert at all times; don't be distracted by electronic devices that take your eyes (and ears) off the road.
- Whenever possible, cross streets at crosswalks or intersections, where drivers expect pedestrians. Look for cars in all directions, including those turning left or right.
- If a crosswalk or intersection is not available, locate a well-lit area where you have the best view of traffic. Wait for a gap in traffic that allows enough time to cross safely; continue watching for traffic as you cross.
- Never assume a driver sees you. Make eye contact with drivers as they approach to make sure you are seen.
- Be visible at all times. Wear bright clothing during the day and wear reflective materials or use a flashlight at night.
- Watch for cars entering or exiting driveways or backing up in parking lots.
- Avoid alcohol and drugs when walking; they impair your abilities and your judgment.

8) Ergonomics

General Safety

Ergonomics matches the workplace to the worker in a bid to reduce worker exposure to workplace hazards such as inappropriate postures, force, and repetition.

Proper Lifting Techniques

Machines are being used in maintenance and material handling nowadays but most of the materials still require to be handled/moved by hand. Severe injuries such as hernia and back injuries are bound to happen if workers fail to adhere to proper material handling process.

If part or your main job entails lifting and carrying materials, EH&S can review your job tasks and recommend lifting equipment or work changes to reduce your risks of injury.

Do's & Don't of Safe Lifting:

Do:

- Place your feet and knees at least shoulder width apart or front to back in a wide-step position. This will allow you to bend at the hips, while keeping your back relatively straight.
- Squat with your chest and buttocks sticking out. If you do this correctly, your back will be flat, and your neck will balance in a relaxed neutral position.
- Take weight off one or both arms if possible.
- When you squat down or push back up, use your hand or elbow as support on your thigh or any available structure. This takes some of the compression and strain off of your lower back.

Don't:

- Lift with your feet close together as it can result in poor leverage, instability, and a tendency to round your back.
- Lift with your knees and hips straight.
- Tense or twist your neck when lifting.

Musculoskeletal Disorders

Musculoskeletal disorders (MSDs) affect the muscles, nerves, blood vessels, ligaments and tendons. Employees assigned to various duties within the university can be exposed to risk factors at work, such as bending, reaching overhead, lifting heavy items, repetition of tasks, working in awkward

postures, and pushing and pulling heavy loads. When workers are exposed to these known risk factors for MSDs, their risk of injury increases. It is the goal of this Safety and Health program to work with workers to ensure these risks are minimized to keep our workers safe and healthy.

9) Emergency Weather- and Weather-Related Emergency Procedures

General Safety

The following guidelines apply to weather-related emergency conditions on campus. Please review these procedures frequently and identify appropriate protected areas within reasonable proximity to your working, living, and classroom areas so that you may move quickly to safety should circumstances appear threatening or a warning be issued. Faculty members should review these guidelines with their classes at the beginning of each semester. Remember, these procedures are not to be confused with the normal procedures used to evacuate a building because of smoke, fire or other possible emergency situation.

Severe Storm or Tornado Watch

A thunderstorm or tornado watch is issued whenever weather conditions exist that could produce a severe storm in this area. A severe thunderstorm warning is issued when a storm is observed moving toward the area. In case of a severe thunderstorm watch or warning or a tornado watch:

- Sirens will not sound.
- Be alert to the possibility of high winds or hail. Should a storm develop, move away from windows exposed to the impact of high winds, debris, or hail into a protected area of hallway or an interior windowless room until the danger is past.

Tornado Warnings

A tornado warning is issued when a tornado has been sighted and is moving toward the Warrensburg area. In case of a tornado warning:

- Sirens will sound a three (3) minute warning signal.
- Move immediately to protected areas and remain there until the all-clear is given by local radio stations, National Weather Service Radio System, police or other official sources of information.
- Sirens ARE NOT used for an all-clear signal, and will only be sounded when a tornado warning is issued
- Interior protected areas usually recommended by the U.S. Weather Service include basements (especially those under reinforced concrete structures) or, if a basement is not available, the lowest level of a building, in an interior hallway or a room without windows or other exposed glass. In cases where there has been no prior warning or the warning has not provided sufficient time to move to an adequately protected area, moving into an interior hallway, windowless room, or under/behind heavy furniture may be of less risk than moving to lower levels.
- If you are out-of-doors when a tornado warning is sounded, take cover in a protected area if possible. If a protected area is not accessible, lie in a ditch or depression away from trees and power lines and cover your head with your hands.

Lightning Safety

If you are out-of-doors during a thunderstorm and have no time to reach a safe building or automobile, take shelter in a low area away from natural conductors of electricity (such as tall trees, power lines, open water, fences, etc.). If you feel your hair stand on end--indicating that lightning is about to strike--drop to your knees and bend forward putting your hands on the ground in a four-point stance. DO NOT lie flat on the ground.

These safety tips are to be observed when lightning threatens:

- Stay away from open doors and windows, fireplaces, radiators, stoves, metal pipes, sinks, and plug-in electrical appliances or tools.
- Don't use the telephone during the storm--lightning may strike telephone lines outside.
- Don't work on fences, telephone or power lines, pipelines, or structural steel fabrications.
- Don't use metal objects such as surveyor's rods or shovels; they make good lightning rods out of people.
- Don't handle flammable materials in open containers.
- Stop tractors and open vehicles, especially when pulling metal equipment, and dismount.
- Stay in your automobile, truck, or pick-up. They offer good lightning protection.
- Get out of and away from any body of water.
- Seek shelter in buildings.
- When there is not shelter, avoid the highest object in the area. If only isolated trees are nearby, your best protection is to crouch in the open, keeping twice as far away from isolated trees as the trees are high.
- Avoid hill tops, open spaces, wire fences, metal poles, exposed sheds, and any electrically conductive elevated objects.
- When you feel the electrical charge--if your hair stands on end or your skin tingles--lightning may be about to strike you. Drop to your knees and bend forward putting your hands on the ground in a four-point stance. Do not lie flat on the ground.

If you are driving a vehicle, proceed to the nearest sheltered area and wait in your car for the storm to pass. If a tornado is sighted or if a tornado warning has been sounded, leave the vehicle, and lie down in a ditch or depression between the approaching tornado and your vehicle. If the funnel is more than a mile away, you may drive at a right angle away from them.

Procedure in Case of Injury, Damage, or Hazardous Conditions

As soon as it is safe to do so, report injuries or hazardous conditions to the 911 Center; dialing 911 anywhere in Johnson county will put you in contact with the appropriate emergency service for that area. Be prepared to give your location and provide information on extent of injuries and any indication of respiratory or cardiac failure or severe bleeding.

If a telephone is not available, send someone to find a working telephone or to report the situation to a police officer or University staff member, specifically those involved with facilities maintenance, security, or authority for the structure.

In the event of an injury where blood or other potentially infectious materials are present, individuals assisting with first aid are to take precautions to protect themselves from exposure to disease.

- Do not move a seriously injured person unless the person is in jeopardy of further injury.
- Apply direct pressure to serious external bleeding.
- If a victim is having difficulty with breathing, clear the air passages, and check to see if the tongue is blocking the airway. If the victim is not breathing, use cardio-pulmonary or mouth-to-mouth resuscitation techniques if you are trained to provide them.

If damage to a building leaves the area uninhabitable, and a move can be made safely, evacuate the area. Evacuation of injured persons is only to be done when current shelter conditions present a threat to life (flooding or structural damage) and then must be done in a safe/approved manner.

10) Fire

Fire Hazards

Good housekeeping is a very important factor in elimination of fire hazards. Fire hazards to watch out include but not limited to:

- Spontaneous combustion hazards such as oil and grease rags not in approved containers.
- Accumulation of rubbish or trash.
- Open containers of flammable liquids.
- Flammable materials near heating devices.
- High hazard areas without portable fire extinguishers.
- Improperly fused electrical circuits.
- Misuse of flammable liquids.
- Misuse of matches and cigarettes.
- Failure to post "NO SMOKING" signs where flammable liquids are openly handled.
- Filling vehicle fuel tanks with engines running
- Overflow and/or spills when filling fuel tanks.

Ventilation systems are used, where necessary, to prevent accumulation of gases or vapors sufficient to cause flash fire and/or explosion.

All compressed gas cylinders must be stored upright and secured when carried in vehicles. Compressed gas cylinders must not be stored near heat or open flame.

Fire Extinguishers

Fire extinguishers ae classified into classes A, B, C, D, and K Extinguishment. Class ABC fire extinguishers are the standard fire extinguishers used by the university.

Class A fires involve ordinary combustible materials such as wood, paper, straw, grass, upholstery, cloth, tires, etc.

Class B fires involve flammable liquids such as gasoline, oil, grease, kerosene, paint, shellac, mineral spirits, diesel fuel, carbon disulfide, and other flammable liquids used in laboratories.

Class C fires involve electrical equipment, all electrical fires are to be treated as live until it is known that the electricity has been turned off.

- All personnel are to be acquainted with the various fire extinguishers, how they are operated, and how they are applied to the fire.
- Fire extinguishers will be maintained in a fully charged and operable condition and always kept in a designated place when not in use.
- Fire Extinguishers will be in plain view for quick access.
- All personnel should learn where the nearest fire extinguisher is to them.

Class D fires involve flammable metals including Lithium and Magnesium.

Class K fires involve cooking oils and grease.

Fire Causes

- **Electrical Equipment**- Electrical defects, generally due to poor maintenance, mostly in wiring, motors, switches, lamps, and heating elements. Follow the National Electrical Code. Establish regular maintenance.
- **Friction**- Hot bearings, misaligned or broken machine parts, poor adjustment. Follow a regular schedule of inspection, maintenance, and lubrication.
- **Open Flames**- Cutting and welding torches (chief offenders), gas and oil burners, misuse of gasoline torches. Follow the established welding precautions. Keep burners clean and properly adjusted. Do not use combustibles near open flames.
- **Smoking and Matches**- Dangerous near flammable liquids and in area where combustibles are used or stored. Smoke only in permitted area. Use prescribed receptacles. Smoking is prohibited inside all University Buildings.

- **Spontaneous Ignition-** Oily waste and rubbish. Remove waste daily. Isolate stored materials likely to heat spontaneously.
- **Hot Surfaces**- Exposure of combustibles to furnaces, hot ducts/flues, or electric lamps. Provide ample clearance, insulation, and air circulation. Check heating apparatus before leaving it unattended.
- **Static Electricity**- Dangerous in the presence of flammable vapors. Occurs where liquid flows from pipes, when walking across carpeted areas, in low humidity etc. Ground equipment. Use static eliminators. Humidify the atmosphere.

Fire Prevention

- Ventilation systems are used to prevent the accumulation of gases or vapors that can lead to/cause a fire and/or explosion.
- Exit doors are to never be blocked or obstructed. Allowing a quick and clear path to and through exit doors.
- Maintain and regularly test smoke alarms and fire alarm systems. Replace smoke alarm batteries every semester.

- Create and update detailed floor plans of buildings, and make them available to emergency personnel, resident advisors, and students.
- Conduct fire drills and practice escape routes and evacuation plans. Urge students to take each alarm seriously.

Fire Protection

There are many methods throughout this campus that can be used to protect people from fires. These methods include:

- Fire extinguishers
- Exit Signs and Emergency Lights
- Alarm Systems
- Sprinkler Systems
- Following Fire Prevention Protocols

Inspections, Maintenance, and Training

Fire extinguishers are to be inspected at least once a year. All combustibles and flammables are to be placed and stored and designated areas. An extinguisher showing defects will receive a complete maintenance check. If inspections reveal deficiencies, an extinguisher will be recharged, repaired, or replaced, as necessary. Extinguishers removed for recharging or maintenance will be replaced by spare extinguishers. The best time to stop a fire is before it starts. Even though buildings are properly designed and constructed with fire-safety features, periodic inspections are required. Supervisors will include periodic self-inspections in their fire safety program.

Class ABC Fire Extinguisher

Class ABC fire extinguishers are the standard fire extinguishers used by the university. Class A fires involve ordinary combustible materials such as wood, paper, straw, grass, upholstery, cloth, tires, etc. Class B fires involve flammable liquids such as gasoline, oil, grease, kerosene, paint, shellac, mineral spirits, diesel fuel, carbon disulfide, and other flammable liquids used in laboratories. Class C fires involve electrical equipment, all electrical fires are to be treated as live until it is known that the electricity has been turned off.

Inspections, Maintenance, and Training

Fire extinguishers are to be inspected and maintained according to National Fire Protection Association and the International Fire Code recommendations.

Training on to use is available on the EHS Blackboard page. To gain access to the training, contact Ariane White at x4137.

Hot Works Permit

The University of Central Missouri's (UCM) Hot Work Program is designed to minimize risks to our campus community, which includes faculty, staff, students, visitors, and contractors. UCM base our Environmental, Health and Safety programs on state and federal regulations, best practices, and manufacturer's recommendations. UCM is exempt from Occupational Health and Safety Administration (OSHA) standards; however, OSHA regulations are considered industry standards minimums.

A Hot Work Permit is required for any UCM operation that involves hot riveting, welding, flame cutting, or other fire or spark-producing activities. This includes, but is not limited to brazing, cutting, grinding, torch soldering, thawing pipes, and welding.

The Hot Work Permit Program shall be used to protect the UCM campus community and property from a potential fire during or after hot work operations. The program shall be used to minimize or eliminate fire hazards and injuries.

All Hot Work operations on UCM property by employees, students or outside contractors require a Hot Work Permit.

The Hot Work Permit Program does not apply to special designated areas that have been specifically equipped and approved for certain Hot Work operations, i.e., maintenance shops and designated welding areas. Designated areas will be inspected biannually to ensure all safety precautions are taken. Hot Work activities shall only be performed after all other alternatives have been considered and all means to avoid the Hot Work has been taken.

Definitions

Classifications of Fires –

- Class A: Combustibles
- Class B: Flammable Liquids and Gas
- Class C: Electrical

- Class D: Combustible Metals
- Class K: Cooking Oils and Fats

Combustibles – Highly flammable materials (cardboard, paper, chemicals, trash, building material, etc.). Must be removed or covered within 35 feet of Hot Work area

Designated Area - An area that has been specifically equipped to perform certain Hot Work activities

Fire Blanket - A safety device designed to extinguish small incipient (starting) *fires*. It consists of a sheet of fire-retardant material which is placed over a fire to smother it

Hot Work – Welding, flame cutting, grinding, soldering with torch, hot riveting

Hot Work Administrator – Designated UCM Facilities Employee that has been trained by UCM EHS and has the responsibly for all Hot Work operations, program compliance, and issuing the Hot Work Permits. Person completing permit is there to ensure proper procedures are followed.

Note: Person completing work shall not complete their own Hot Work Permit; only those names on the "Approved List" can complete a Hot Work Permit.

Hot Work Operator - Employee, student, or contractor who is qualified and authorized by UCM to perform Hot Work such as welding, brazing, soldering, and other associated work tasks

Hot Work Permit – A special UCM document issued by a UCM Facilities Representative for Hot Work operations that shall be displayed at a Hot Work site for the specific date and time on the permit

Fire System - Contact UCM Facilities (FPO) at ext. 4331 and Public Safety at ext. 4123. Inform them of Hot Work to be done. Provide specific information:

- Work being completed
- Location - be specific building, room #, etc.
- Date and length of time
- FPO - Life Safety may be able to cover the smoke detector or they may have to disabled they system in the specific area depending on work being completed and duration

Fire Watch – Trained personnel that continuously monitors the Hot Work area for potential fire hazards during the Hot Work and at least 30 minutes after the hot work has been completed. The fire watch shall:

- Have clear view of operation
- Remain in communication with workers
- Stop work if necessary
- Use extinguisher if necessary

Permit Process

- To obtain a Hot Work Permit, contact UCM Facilities at (660) 543-4331
- Hot Work area shall be inspected by **both** the Hot Work Operator that will perform the Hot Work **and** a Hot Work Administrator authorized to issue Hot Work Permits. The Hot Work Administrator will determine if a Hot Work Permit should be issued.
- Hot Work Administrator shall issue the Hot Work Permit and complete Part 1 of the permit to verify that all precautions have been taken.
- Hot Work Administrator/FPO representative who issues the Hot Work Permit must call or stop by Public Safety Dispatch (ext. 4123) prior to work being done to inform them of work.
- Public Safety Dispatch will immediately send an e-mail with details of Hot Work to be done to UCM EHS and Warrensburg Fire Department.
- Hot Work Permit shall be completed by the Hot Work Operator within 24 hours of when the Hot Work will be performed and the Hot Work Operator ensures all precautionary measures listed on the Hot Work Permit have been completed.
- Permit shall be posted at the Hot Work site clearly and visibly by the hot works operator and the time started shall be indicated.

- Permit **expires** at the end of the shift or after 8 hours, whichever is shorter.
- After the work is complete, the Hot Work Operator indicates time finished, obtains required signature, and returns the completed permit to the Hot Work Administrator.
- Hot Work Administrator/FPO representative will give completed Hot Work Permit copy to Public Safety Dispatch.
- Public Safety Dispatch will scan and electronically save completed Hot Work Permit

Before Hot Work:

- Search for any effective alternative methods to hot work
- If no alternative to hot work is possible, a Hot Work Permit will be issued
- Create fire emergency plan
- Have at least 2 escape routes identified
- Verify automatic fire suppression systems are in good working order
- Locate closest fire pull to Hot Work area
- Ensure portable fire extinguishers are in place nearby or available
- Remove all movable fire hazards in the vicinity (within 35ft of operation)
- If fire hazards cannot be moved, they should be covered completely with approved fire blanket (within 35ft of operation)
- If smoke is going to be an issue, exhaust ventilation needs to be used
- Consider toxic fumes: What is going to be welded? Will it create hazardous fumes? If so, ventilation is required.
- Guards should be used to confine the heat, sparks, and slag and to protect immovable fire hazards
- Inform all personnel involved with Hot Work of the emergency procedures
- Determine if a fire watch is necessary. A fire watch will be necessary if any of the following exist:
    a. Welding or cutting is performed in locations where a large fire might develop
    b. Appreciable combustibles is closer than 35 feet to the point of hot work operation

c. Appreciable combustibles are more than 35 feet away but are easily ignited by sparks
d. Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors

- If a fire watch is necessary, they should make sure that the hot work site has been made fire safe before allowing the work to begin
- Hot work is not permitted if any of the previous criteria cannot be met

During Hot Work:

- Be aware of risks during Hot Work
  - Burns
  - Fire
  - Explosion
  - Metal Fever
- Prevent risks as much as possible
  - Keep portable fire extinguishers within 25 feet of hot work
  - Remove combustibles within 35 feet of hot work
  - Cover non-removable combustibles with fire blanket or OSHA approved welding screen
  - Wear proper PPE
  - Have Fire Watch
- Appropriate PPE shall be worn during the entire Hot Work operation
  - Welding Helmet or Face Shield
  - Hand Protection
  - Body Protection
  - Leather Boots
- If a fire watch is necessary, they are responsible for the following:
  a. Having a clear view of and immediate access to all areas included in the fire watch
  b. Communicating with workers exposed to Hot Work
  c. Stopping work if necessary and restoring safe conditions in the Hot Work area
  d. Never leaving while the Hot Work is in progress
  e. Being prepared to initiate fire alarm and use an extinguisher if a fire starts

a. Remember P.A.S.S.
    i. Pull
    ii. Aim
    iii. Squeeze
    iv. Sweep (base of the fire at least 10 feet away)

After Hot Work:

- After the Hot Work has been completed the fire watch is responsible for:
    a. Inspecting the Hot Work area after the operation has been completed
    b. Monitoring the area for at least 30 minutes after the Hot Work has been completed to handle any potential fires
- Hot Work operator shall record time work is completed on the Hot Work Permit
- Hot Work Permit shall be signed and returned to permit administrator

11) Occupational Health Controls

Noise Exposure

If UCM employees are expected to be exposed to occupational noises louder than 90 dBA, engineering controls, administrative measures, or PPE needs to be used. Employees working around loud noises can request hearing protection from their supervisor or by contact the EHS department.

Airborne Contaminants

There can be many different contaminants in the workplace that can cause harm and damage to your respiratory system- gases, fumes, vapors, mists, and dusts. All of these contaminants must be identified and reduced in the workplace. UCM has various programs and procedures in place to eliminate or these hazards. Contact EHS if you have questions or concerns.

Ventilation

Ventilation systems are the best way to filter out unwanted and hazardous contaminants in the workplace. Ventilation is used to ensure work operations can run as effectively and efficiently as possible with limited interruptions.

Bloodborne Pathogens

The University of Central Missouri's (UCM) Bloodborne Pathogens Program is designed to minimize exposure to our campus community, which includes faculty, staff, students, visitors, and contractors. As UCM moves forward, we are basing our Environmental, Health and Safety programs on state and federal regulations and best practices. Currently, UCM is exempt from Occupational Health and Safety Administration (OSHA) standards; however, OSHA regulations are considered industry standards minimums. Our goal is to create and maintain a safe, healthy working and learning environment for our campus community,

Definitions

Bloodborne Pathogens: Bloodborne Pathogens are infectious microorganisms in human blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

Biohazard Bags and Sharps Containers: Containers and bags that are labeled as biohazards, closable, puncture resistant, and leak-proof.

Campus Community: Anyone who is on campus. This includes faculty, staff, students, visitors, and contractors.

Contamination: The presence of blood or other potentially infectious materials on an item or surface.

Contaminated Sharps: Any contaminated object that can penetrate the skin including, but not limited to, needles, broken glass, broken mirrors, and broken capillary tubes.

Decontamination: The use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Engineering Controls: Controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

Exposure Incident: A specific eye, mouth, non-intact skin, or contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Occupational Exposure: The possibility of skin, eye, or contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Personal Protective Equipment (PPE): Specialized clothing or equipment worn for protection against a hazard. General work clothing (e.g., uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard is not considered to be personal protective equipment. PPE will be provided and replaced as needed with no cost.

Potentially Infectious Materials: These are materials that can carry bloodborne pathogens. They include but are not limited to; human blood and blood products, semen, vaginal secretions, spinal fluid, amniotic fluid, breast milk (only by ingestion), and cultures or other solutions containing specific bloodborne pathogens.

Regulated Waste: Blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

Routes of Exposure: Bloodborne pathogens may enter the body and infect by accidental cut by; a sharp object contaminated with the pathogen, open cuts or skin abrasions that come into contact with infections material, unprotected sexual activity with someone who is infected with the disease, or touching a contaminated object then touching your mouth, eyes nose or open skin.

Sharps Injury Log: Log for recording injuries from contaminated sharps.
Sharps: An item that is designed to cut or puncture skin. Sharps include needles, syringes with needles, scalpel blades, lancets, and razor blades, broken vials and laboratory slides contaminated with infectious agents or human blood.

Injury Protections: A non-needle sharp or a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

Universal Precautions: Is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Personal Protective Equipment
When there is occupational exposure, each UCM department will provide appropriate PPE, such as gloves, face shields, eye protection, and aprons. PPE will be no cost to employees and chosen based on the anticipated exposure to blood or other potentially infectious materials.

The PPE will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through or reach the employee's clothing, skin, eyes, mouth, or mucous membranes under normal conditions of use and for the duration of time for which the protective equipment will be used.

All PPE will be removed prior to leaving the work area and/or if the protective clothing is contaminated with blood or infectious material.

Contaminated PPE shall be disposed of properly in a red biohazard bag along with other infectious material.

Engineering and Work Practice Controls

Engineering and work practice controls will be used to eliminate or minimize campus community exposure. Engineering controls will be examined and maintained or replaced to ensure their effectiveness. PPE will also be used if there is exposure potential. There are appropriate hand washing facilities available, if they are not possible, appropriate antiseptic hand cleanser or antiseptic towelettes will be provided. Employees shall wash their hands with soap and running water as soon as possible after any exposures and after removing personal protective equipment.
Bending, recapping, or needle removal must be accomplished through the use of a mechanical device or a one-handed technique.

Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.

Housekeeping

The worksite shall be maintained in a clean and sanitary condition. All contaminated equipment and work surfaces will be decontaminated immediately after contact with blood or other potentially infectious materials. Protective coverings, such as plastic wrap, aluminum foil, or absorbent paper used to cover equipment and environmental surfaces will be removed and replaced if they become contaminated.

Do not pick up broken glassware directly with the hands. Use a brush and dustpan, tongs, or forceps. Dispose of any known or suspected contaminated sharps immediately in containers that are closeable, puncture-resistant, leak-proof on sides and bottom, and marked with an appropriate biohazard label.

When containers of contaminated sharps are being moved from the area of use or discovery, closed them immediately before removal or replacement

to prevent spillage or protrusion of contents during handling, storage, transport, or shipping. Reusable sharps that are contaminated with blood or other potentially infectious materials will not be stored or processed in a manner that requires employees to reach by hand into the containers. These reusable containers shall not be opened, emptied, or cleaned in a way that could expose an employee to injury.

Regulated Waste Disposal

Regulated waste disposal will be in accordance with UCM's policy as well as applicable federal, state, and local regulations. Contaminated sharps and other regulated waste will be discarded immediately or as soon as feasible in biohazard labeled containers that are closable, puncture resistant, and leakproof. Containers for contaminated sharps will be maintained upright throughout use, easily accessible to personnel, replaced routinely, and not be allowed to overfill.

When moving contaminated sharps or other regulated waste, the containers will be biohazard labeled and closed to prevent spillage or protrusion during handling, storage, transport, or shipping. Secondary containers will be used if leakage is possible. The second container will also be biohazard labeled, closable, and constructed to contain all contents and prevent leakage.
For questions regarding regulated waste contact UCM's Environmental Coordinator or UCM Health Center.

Laundry

Contaminated laundry will be handled as little as possible while being placed in biohazard labeled transport bags or containers. Do not sort or rinse contaminated laundry in the location of use. Wet contaminated laundry will be place in leak proof bags or containers. Employees who have contact with contaminated laundry shall wear protective gloves and other appropriate PPE.

Vaccination

If a person is exposed, the treating physician may provide the Hepatitis B Vaccination. There will also be a post-exposure evaluation and follow-up for those who receive the vaccination. The vaccine is not mandatory. If the person does do not want to receive the hepatitis B vaccine, they must sign a waiver.

Documentation of the type of exposure and how it happened should be made. Along with the information of the individual who was exposed. The exposed individual's blood may be tested and documented as soon as possible in order to determine if HBV and HIV is present. The individual's consent is not required by law.

Training

There will be training over bloodborne pathogens prior to a task where an employee has occupational exposure or potential exposure to human blood or human fluids. This training will then be annually thereafter. UCM will provide additional training when changes such as modification of tasks or procedures or institution of new tasks or procedures affect the employee's occupational exposure.

The training program will be within 10 days before to possible exposure. The training will contain a general explanation of the epidemiology and symptoms of bloodborne diseases, how they are transmitted, an explanation of the exposure control plan, how to prevent or reduce exposure, and the proper way to remove, handle, dispose, and decontaminate the personal protective equipment used when dealing with the possible contaminate.

Information on each vaccination will be provided. This information includes its efficacy, method of administration, and the benefits of being vaccinated. The procedure of reporting the incident and the medical follow up that will be made available should be discussed, also.

Training records are kept. The dates of the training sessions, contents, name of person or persons conducting the training and names and job titles of all persons attending are maintained for three years from the date the training occurred.

Labels

Biohazard warning labels are affixed to containers of blood or regulated waste, refrigerators and freezers containing blood or other potentially infectious material and other containers used to store, transport, or ship these materials. Biohazard labels are either fluorescent orange, orange-red, or with lettering and symbols in a contrasting color. These labels shall be affixed as close as close to the container as possible. Individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment, or disposal are exempted from the labeling requirement. Regulated waste that has been decontaminated does not need to be labeled.

Sharps injury log

The information in the sharps injury log shall be recorded and maintained in a way that protects the confidentiality of the injured person. This log contains: the type and brand of device involved in the incident, the department or work area where the exposure incident occurred, and an explanation of how the incident occurred. The Worker's compensation form can be used as the sharp injury log. Document the required information listed above on the form. A copy of the submitted form is kept for future reference.

Confined Space

The University of Central Missouri's Confined Space Guidelines have been created to enable employees to recognize confined spaces and take appropriate precautions to protect persons working in and around confined spaces. Employees must be aware of potential hazardous which could include hazardous atmospheres, engulfment, energized utilities, and other safety or health hazards.

No UCM employee will be permitted to enter a confined space unless the employee has successfully completed training and have the appropriate tools and equipment to enter the space.

These guidelines are based on OSHA 29 CFR 1910.146. Even though the University is exempt from OSHA regulations, these regulations are known as "industry minimum standards" and should be followed to provide a safe working environment.

Responsibilities

Supervisors are responsible for the overall "permit required" for confined space entry and must coordinate all entry procedures, test, permits, equipment, and other relevant activities. The following duties are required by the supervisor before entry:

- Determine if the space is confined space permit required
- If permit required confined space, complete confined space permit required section of Confined Space Worksheet
- Provide proper equipment and tools for employees to enter space
- Review possible hazards with employees
- Verify air monitoring, entry procedures, and equipment are in place prior to employees entering the space
- Ensure all employees have received proper training prior to entering space
- Review emergency procedures prior to employees entering space
- Maintain Confined Space Worksheets and send copy of worksheets to EHS

Employees are responsible for "non-permit required" confined space entry and must coordinate all entry procedures, tests, permits, equipment, and other relevant activities. The following duties are required by employees prior to entry:

- Complete the Confined Space Worksheet – non-permit required sections
- Ensure all proper tools and equipment associated with entering a confined space are present prior to entering space
- Understand hazards associate with confined spaces
- Report any previously unidentified hazards associated with space to supervisor immediately

- Ensure worksheet is completed including all test have been conducted and tools / equipment are in place prior to entry
- Ensure proper training has been completed prior to entering space
- Communicate emergency procedures with co-workers prior to entering space

Attendant – At least one employee is required to remain outside confined spaces, permit or non-permit required, at all times. This employee shall be known as the "attendant" and their responsibilities shall be:

- Understand all hazards of entry
- Aware of possible behavior effects of hazard exposure
- Continuously monitors all entrants
- Remains on post until relieved by another attendant
- Communicates with attendants to assess status of entrants
- Assesses conditions inside and outside of confined space
- Summon rescue and other emergency services if needed.

Definitions

Acceptable entry conditions - the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter and work within the space.

Attendant - an individual stationed outside permit space who monitors the authorized entrants and who performs all attendant's duties.

Authorized entrant - an employee who is authorized to enter a permit space.

Blanking or Blinding - the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined space means a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- Is not designed for continuous employee occupancy.

"Double block and bleed" means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

"Emergency" means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

"Engulfment" means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

"Entry" means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. "Entry permit (permit)" means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in paragraph (f) of this section.

"Entry supervisor" means the person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as

required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

"Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL).
- Airborne combustible dust at a concentration that meets or exceeds its LFL.
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit.
    a. NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.
- Any other atmospheric condition that is immediately dangerous to life or health.

NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, section 1910.1200 of this Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

"Hot work permit" means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

"Immediately dangerous to life or health (IDLH)" means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

NOTE: Some materials -- hydrogen fluoride gas and cadmium vapor, for example -- may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

"Inerting" means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. NOTE: This procedure produces an IDLH oxygen-deficient atmosphere.

"Isolation" means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

"Line breaking" means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

"Non-permit confined space" means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.
"Oxygen deficient atmosphere" means an atmosphere containing less than 19.5 percent oxygen by volume.

"Oxygen enriched atmosphere" means an atmosphere containing more than 23.5 percent oxygen by volume.

"Permit-required confined space (permit space)" means a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazard.

"Permit-required confined space program (permit space program)" means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

"Permit system" means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

"Prohibited condition" means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

"Rescue service" means the personnel designated to rescue employees from permit spaces.

"Retrieval system" means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

"Testing" means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

NOTE: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to

determine if acceptable entry conditions are present immediately prior to, and during, entry.

12) Environmental Management and Hazardous Waste

Environmental Compliance

Keeping the University compliant with environmental regulations is the responsibility of all staff, faculty, and students involved in environmentally regulated activities. Any department (academic or administrative) that stores/uses chemicals and/or creates chemical waste is likely to incur some type of compliance responsibility and is therefore responsible for ensuring that proper regulatory procedures are followed. Applicable regulations may include chemical storage and worker safety as well as waste management.

EHS is committed to:

- Ensuring that each department is trained and knowledgeable of the regulations they are expected to comply with.
- Providing consulting assistance and to make general compliance training available to departments (general training may not be sufficient for specialized activities and may require additional resources).
- Conducting compliance inspections to identify compliance issues for departments.

Stormwater Pollution Prevention Program and Spill Prevention, Control, and Countermeasure Plan

The Stormwater Pollution Prevention Program (SWPPP) and the Spill Prevention, Control, and Countermeasure Plan (SPCC) are two plans implemented by the federal Environmental Protection Agency. These two plans work together to protect the environment from potential spills and activities that could pollute the surrounding environment.

Official written plans are maintained, reviewed, and revised by the Environmental and Hazardous Materials Coordinator.

Staff that manage pollutants such as oil, pesticides, herbicides, or any chemical used outdoors should request training on the SWPPP and SPCC. This training is considered mandatory for certain departments, as designated by the Environmental and Hazardous Materials Coordinator.

Chemical Storage

All chemicals stored at UCM must:

- Be accurately labeled
- Be stored only in adequate containers
    - No milk jugs, soda bottles, etc.
- Be stored only in areas designated for chemical storage
- Have an SDS readily available
    - Either in a designated binder
    - Online in the chemical inventory database
- Be stored in accordance with the Safety Data Sheet
    - Chemicals that are incompatible with other chemicals shall be stored in a manner that will prevent the chemicals from encountering
        - This can be a wall or secondary containment that can hold the entire contents of the container in case of a leak.
        - Flammable chemicals shall be stored at least 50 feet from potential ignition sources
- Be inspected regularly for damage
    - If a container is damaged, the chemical should be immediately transferred to a new container.
- Be stored in a safe and organized manner

EHS shall implement an inventory system to identify the location of chemicals and to reduce purchasing excess chemicals. This system shall be maintained by the EHS department, with access to designated staff.

Hazardous Materials Handling

The management of environmental hazards, including the transportation and use of all hazardous materials and the proper treatment and/or disposal of hazardous waste generated through University research, academic, and service and support staff operations, must comply with the applicable Federal and/or State statutes, and their associated rules and regulations.

Those handling hazardous materials should consult the Safety Data Sheet (SDS) for proper handling and required personal protective equipment.

Some materials may require training or supervision to use. If any person does not feel safe or adequately trained to use a hazardous material, they may refuse to handle it or request training.

Hazardous Waste Disposal

The EHS Department is responsible for maintaining compliance with the environmental regulations including proper handling and disposal of solid and hazardous waste. All solid and liquid wastes generated on the campuses of UCM are subject to determination as possible hazardous waste. The initial determination shall be conducted by the person generating the waste, with a final determination to be conducted by the Environmental and Hazardous Materials Coordinator.

Hazardous waste can be generated though regular maintenance activities, lab research, or as expired/unwanted surplus materials.

The Environmental and Hazardous Materials Coordinator may be contacted to assist in making the determination before requesting disposal of any waste that is not listed as routine disposable.

Any person requesting disposal of any waste that is determined to require non-routine disposal shall complete a Chemical Surplus Pickup Request

Form and submit it to the Environmental and Hazardous Materials Coordinator. See **Section 14** for details on completing this form.

Hazardous Waste Training

Employees/students managing hazardous waste shall not work in unsupervised positions until training is completed. This training shall be received at least annually of the initial training and shall be provided by the Environmental and Hazardous Materials Coordinator.

Failure to complete the mandatory training may result in noncompliance with state and federal regulations, and every effort should be made to complete training.

Chemical Spills

In case of a chemical spill, upon discovery, the following steps shall be taken.

If the spill is small and the employee can identify the chemical, the employee may clean up the spill if they are confident in doing so. Notifying the supervisor is strongly encouraged. The spill shall be cleaned up with any relevant guidance from the SDS.

If the spill is large, or of unknown origin, the employee shall immediately notify UCM Public Safety, their supervisor, and EHS. The employee shall attempt to safely stop the source of the spill. Efforts to prevent the spill from spreading shall be taken if safe to do so. This can be down by creating a barricade with absorbent material. If there is no means of safely doing so, the employee shall evacuate the area immediately.

13) Hazard Communication

Labeling Chemicals

All chemicals shall be accurately labeled. Chemicals in their original containers shall not have the original label obscured in any way. If a chemical is split into several containers, the additional containers shall be labeled with the chemical name, manufacturer, and any relevant hazards. The following types of labels may be used on chemical containers or storage areas to indicate potential hazards.

GHS Labels

GHS Labels are the current standard for labeling set forth by the Globally Harmonized System of Classification and Labelling of Chemicals. These are black and white labels in the shape of a diamond with a red border. At the center of the diamond is a pictogram indicating the hazard of the chemical. A single chemical can have multiple GHS Labels indicating multiple hazards.

These labels can be found on the original container, as well as in the SDS. Any container or SDS older than 2012 may not have these labels.

NFPA Diamonds

The National Fire Protection Association (NFPA) developed a labeling program to help first responders determine the potential risks of hazardous materials. The label is in the shape of a diamond with a different color at each of the four corners.

The four colors consist of:

- Red=Flammability
- Blue=Health
- Yellow=Instability/Reactivity
- White=Special Notice or Non-Standard symbol (such as oxidizer, reactive with water, corrosive, etc.)

Within each color will be a number between 0-4 denoting the seriousness of the hazard. The number 0 will be present if there is no hazard, and the number 4 represents the greatest hazard.

NFPA Diamond labels can be found on large tanks and on the doors of chemical storage rooms.

HMIS Labels

HMIS Labels, or Hazardous Materials Identification System, is a labeling system similar to NFPA Diamonds. It uses four colors, and the number rating 0-4. 0 represents no hazard, while 4 represents the greatest hazard.

- Red=Flammability
- Blue=Health
- Yellow=Reactivity
- White=Personal Protective Equipment

These labels may be found on containers of chemicals.

UN Numbers

UN Numbers are assigned to hazardous materials by the United Nations Committee of Experts on the Transport of Dangerous Goods. These are four-digit numbers that can be found in the center of a DOT placard or label, or on shipping documents. The UN Number correlates to a specific shipping name which gives a description of the material.

A DOT diamond label with the UN Number may be found on outer containers of chemicals or on the container itself if there is no outer container.

Safety Data Sheets

All chemical manufacturers and importers are required to supply an appropriate Safety Data Sheet (SDS) to their customers. Chemical manufactures typically develop their own SDS. All users should be able to access an SDS for all hazardous chemicals used.

The SDS contains important information about the hazards and proper use of the chemical, including first aid measures, accidental release measures, and more. There are 16 sections on a standardized SDS.

UCM requires that an SDS is available for all chemicals used on site. It is important to identify where these can be found. At UCM, these can be stored:

- Physically in a binder in the area the chemicals are used
- Online via QR code scanner access
- Online via UCM's Chemical Inventory website at ucmo.chemicalsafety.com

Each department at UCM is responsible for maintaining a Safety Data Sheet file for all chemicals within their department. Departments may also send a request to EHS to have an SDS added to the Chemical Inventory website.

Access to Training

EHS shall provide training related to environmental and safety for faculty, staff, and student employees. If any person desires specific training, they may submit a request to the Safety Manager.

Training shall be available:

- Online via Blackboard at any time
- Live, online with advanced scheduling
- Live, in person with advanced scheduling

Certain trainings are considered mandatory and scheduled on a regular basis at the discretion of EHS. Failure to complete the mandatory training

may result in noncompliance with state and federal regulations, and every effort should be made to complete training.

14) Chemical Surplus

EHS will remove and properly dispose of any unusable chemical material that does not fall under general trash. This may include, but is not limited to expired chemicals, unwanted chemicals, hazardous wastes, products and materials such as batteries, lamps, or electronics that is deemed unsafe for regular trash disposal.

It is the responsibility of the original department that the material belongs to, to determine if the material needs to be removed. EHS may request the department to make a decision on chemicals that are discovered during walk throughs that are apparently abandoned. The originating department must also make the initial determination of the type of hazard the material may present. EHS will make a final determination before disposal.

To request a chemical surplus pickup, the originating department shall complete a Chemical Surplus Pickup Request Form. This form can be found by searching on UCM's website. The form shall be completed and emailed to ehs@ucmo.edu. To fill out the form, the following information is required to the best of the generator's knowledge:

- Name of person requesting pickup
- Department
- Location of chemicals
- Contact Number
- Date
- Chemical Name
- Container
    - Type (bottle, box, vial, bag, etc.)
    - Size
    - Percent full
- Physical State
    - Solid

    - Liquid
    - Gas
    - Aerosol
- Hazard Classification
    - Flammable
    - Corrosive
    - Reactive
    - Toxic
    - Oxidizer
    - Halogenated

Once the form is completed and submitted, the Environmental and Hazardous Materials Coordinator will work with the requester to schedule a pickup in a timely manner.

15) Flammable Liquids and Gases

General Safety

Some substances may present little or no exposure hazard under ideal conditions and very serious exposure problems under less favorable conditions. The following identifies commonly used substances that can create hazards through storage, handling, and use:

- Gases: Acetylene, Hydrogen, Illuminating gas, Ethylene, Natural gas, L.P. gas
- Liquids: Ether, Turpentine, Gasoline, Paints, Naphtha, Varnishes, Benzol, Dryers, Alcohol, Polishing solutions, Kerosene, Cleaning fluids, Fuel oil, Trichloroethylene, Petroleum, Perchloroethylene, Hydrocarbons (Gas drips), etc.

All liquids need to be handled as flammables unless the label clearly states otherwise. Projects across campus either construction or maintenance change so often which calls for caution when flammable liquid or gases are present.

Areas to be used for storing flammable liquids or gases will be located away from equipment, materials, or structures that could become involved if a fire breaks out in the storage area.

Any flammable liquids and gases will be stored in clearly labeled containers that identify the contents. If there is any question to the contents of a container, do not use that container until the contents can be positively identified.

Storage in Equipment/Electrical Rooms. Combustible material shall not be stored in boiler rooms, mechanical rooms, elevator rooms, or electrical equipment rooms per International Fire Code 315.3.3

Re-Fueling Equipment

The fueling of vehicles or internal combustion engines requires special attention to these procedures:

- Before refueling shut off ignition. If the filler is near the engine, permit the engine to cool before refueling.
- Do not leave the nozzle unattended while refueling. Do not completely fill a fuel tank or container. Allow for fuel expansion.
- Use approved dispensing equipment: pumps, hoses, nozzles, etc.
- Smoking is prohibited within fueling areas or where vapors could build up: pits, depressions, etc. Fueling should be done in open air. All fueling areas are to be provided with type ABC fire extinguisher.
- If a spill occurs, use an approved drying/absorbing agent to clean up. Do not wash spillage into waterways or sewers. Make sure spill is thoroughly cleaned.

16) Shop Safety

Supervisor Responsibilities

Supervisors should conduct regular safety inspections for physical, chemical, and ergonomic hazards in their shops. This includes ensuring their shops are following good housekeeping standards that will reduce the likelihood of slips, trips, and falls. Supervisors should conduct regular safety meetings with their department to increase safety awareness.

17) Hand Tools

Care of Tools

Tools are to be kept in safe working condition.

Protect tools against corrosion damage; wipe off accumulated grease and dirt. Clean thoroughly with a nonflammable, nonirritating solvent when necessary, and wipe clean. Lubricate moving and adjustable parts to prevent wear and misalignment.

Sharp tools improve accuracy and are safer to use than dull tools. 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 tool rest not more than one-eight (c) inch from the wheel. Hold the tool lightly against the wheel to prevent overheating. Dip frequently in water to keep the tool cool. This retains metal hardness and the cutting edge. Eye protection will be used.

When not in use, tools are to be stored in suitable boxes, containers, or hung on racks. Cutting edges will be protected and tools will not be placed where they might roll off benches or tables. Be sure that the storage area is moisture free to prevent corrosion. Heavier tools will be placed where they will not be tripped over.

All damaged or worn tools will be promptly repaired. Temporary, makeshift repairs are prohibited. If tools cannot be repaired on the job, they will be red tagged and sent to the appropriate shop for repair or replacement.

Using Tools

The weight, size, and type of tool will be selected to fit the job at hand. Do not substitute pliers for hammers, screwdrivers for pinch bars, chisels, etc. Handles will be tightly fitted. Check wood handles carefully for splitting and cracking. Tighten with wedges as necessary. Most hand tools are conductors of electricity. Use extreme caution in working around electrical circuits. Insulated and non-conducting tools will be tested frequently. In the presence of flammable materials or explosive dusts and vapors, use non-sparking tools.

Wrenches

Select the correct size and type of wrench for each job. Do not extend the wrench handle with a pipe or other "cheater". Never use a wrench as a hammer. Pipe wrenches will not be used as monkey wrenches. Keep jaw corrugations on pipe wrenches sharp and clean. Keep handles and adjusting screws on all wrenches in good condition. When possible, wrenches will be placed on nuts with the jaw opening facing the direction that the handle will move. When possible, pull, do not push on the wrench.

Chisels

A chisel should be large enough for the job and should be driven with a hammer of sufficient weight. Use the proper chisel for the material being cut. A chisel is to be held with a steady but relaxed grip. Keep your eyes on the cutting edge of the chisel. A chisel being struck by another employee will be held by tongs or other devices. Goggles will be worn when chipping. Always chip away from the body and protect others with screening. Repair or replace mushroomed chisels and cracked or broken chisel handles. When sharpening, maintain the original shape and angle.

Punches

A punch should be straight, suitable, and heavy enough for the work. Punches should be accurately grounded at all times. Start a punch with light taps. Hold securely, especially on rounded surfaces. When knocking out rivets and pins, begin with a starting punch and finish with a pin punch.

Hatchets, Axes, Adzes, and Corn Knives

Be careful to avoid rebounding of a hatchet or axe towards you or other employees. When trimming a tree on the ground, keep the trunk between the swing of the tool and the feet and legs. Clear sufficient space for the tool movement.

When using an adze, spread the legs with the object to be trimmed between the legs. Cut straight back with a gentle swing.

Hammers

When using a hammer, make certain that the head is on tight, keep hands dry and concentrate on the object to be driven. Avoid using a hammer as a pry bar. Some work tasks may necessitate wearing eye protection when using a hammer.

Screwdrivers

Do not use a screwdriver as a chisel, pry-bar, or for any other purpose than that intended. Select a screwdriver to fit the size of the screw being driven. Do not grind a screwdriver blade to a fine point to fit all sizes of screw heads. Keep the tip ground properly and squared across. Handles should fit the shank tightly. Never drive a screw with a hammer.

Files

Use the proper type of file. The cut should be on the forward pass of the file. When filing small objects, clamp them securely. When teeth become clogged, clean thoroughly. Clogged teeth may cause the file to slip, exposing the hands to injury.

Files should be equipped with handles of proper size for the file tang. Tap the file into the handle by striking the handle on a flat surface. Do not drive the handle on a file with a hammer. Do not use files for pry-bars, punches, etc. File metal is usually very brittle and will snap.

Hand Saws

Use a saw of proper shape and size with the correct teeth for the size of cut and material being sawed. Keep the teeth and blades properly set. Protect the teeth when not in use.

Hold the saw firmly and start the cut carefully and slowly to avoid blade jumping. When starting a cut, hold rip saws at a sixty (60) degree angle with the board and crosscut saws at a forty-five (45) degree angle. Place the fingers to the left of the cut mark with the thumb upright and pressing against the blade (procedure for a right-handed person. Reverse if user is left-handed). Pull upward until the blade bites. Start with a partial cut, then set the saw at the proper angle.

Check the material being cut for nails, knots, and other objects that may damage the saw or cause it to buckle. Pieces being cut are to be firmly held in place. If long pieces are being cut, a helper or a supporting bench is to be used to prevent pinching at the cut.

Hack Saws

The proper blade should be selected for the material being cut. The blade teeth should point forward. Blades should be rigid and the frame should be properly aligned. Use strong, steady, strokes, directed away from the

body. The entire length of the blade should be used in a stroke. Hard materials should be cut more slowly than soft materials.

Thin, flat pieces should not be cut edge to edge. They should be securely clamped and cut so that several teeth are cutting at all times.

Pliers

Pliers should be used only when no other tool will do the job. Never use pliers as wrenches. Use cutting pliers only for cutting soft metals, never for hard metals or as nail pullers. Use insulated pliers for electrical work.

Picks

Pick handles will be free of splinters, splits, and cracks. The head will be firmly affixed to the handle. Be sure that the area in back and to the sides are clear when swinging.

Shovels

Shovel handles will be free of splinters, cracks, and splits. The blade will be sharp and free of jagged or split edges.

Jacks

Select a jack heavy enough to raise and hold the load. Be sure that swivel heads and caps are in good condition and function properly.

Jacks will rest on a firm, level foundation adequate to support the load. Be sure that the jack cannot tip and is in line with the vertical movement of the load. After raising a load, securely block it before removing the jack. It is advisable to shore-up a load that must remain in a raised position for any length of time.

Lubricate jacks frequently and store them where they are protected from moisture or damage. Inspect frequently and repair promptly.

18) Power Tools

General Safety Procedures

Most power tool accidents are caused by improper handling and poor maintenance of equipment. These can be corrected by proper training of personnel. The following applies to all types of power tools: Good housekeeping is essential to good workmanship. All tools will be neatly stored when not in use. Work areas will be maintained in an orderly fashion. Equipment maintenance will be systematic. Damaged equipment will be taken out of service. Tools will be cleaned, tested, and inspected regularly. Safety equipment, such as guards, will be left in place. Gloves, safety shoes, and safety glasses will be worn when needed. Only authorized personnel with proper training will be permitted to operate power tools.

Electric Tools

Electric tools will be provided with grounding connections or be double insulated. Power cables will be checked frequently for breaks in the insulation and defective cables repaired or replaced. When more than a single extension cord is connected to a power source, twist lock connectors should be used. Electric tools will be disconnected when changing attachments, repairing them, or making minor adjustments on them. When electric tools are used in wet areas, the operator may be exposed to a potential shock hazard. Insulated footwear is recommended. Avoid bodily contact with grounded objects other than the tool in use.

Gasoline Engine-Driven Tools

Gasoline engine-driven tools will not be used in unventilated areas. Gasoline will be stored in a safe place and handled with caution. Only U/L approved safety cans, which are equipped with flash-back screens, vents, and pouring spouts are to be used. Never use glass containers. Engines will be stopped and cooled before refueling.

Portable Hand Saws

Operators will wear eye protection when operating portable hand saws. Handheld power saws will be equipped with a fixed guard over the upper half of the blade and a movable guard covering the lower half of the blade. Both guards will be left in place. Blocking of the lower guard is prohibited. Small pieces being cut are to be secured by bench clamps or by some other means. Saw blades will be regularly checked and kept in good condition. The blade used will be as recommended for the material being cut. A saw will not be jammed or crowded into the work. Green or wet material will be cut slowly and with extra caution. Operators exposed to dust, as when cutting concrete, tile, lead, or stone, are to wear approved respirators. Check all material being cut for nails, hard knots, etc.

Table or Bench Saws

The operating table and surrounding area will be kept clean and clear of all debris. Blade guards, complete with splitter and non-kickback attachments, are to be in place and operate freely. Operators will wear eye protection. When ripping short stock, the use of a "pusher" stick is required. The saw will be turned off when not in use. The switch should be locked to prevent unauthorized use. The piece being cut will be firmly held against the back guide or fence. All materials will be cut in a single, steady pass. It is dangerous to stop the saw before the cut is completed. If this is done, the blade is to be turning freely and at full speed before the cut is resumed. When cutting a warped board, be sure that it touches the tabletop at the line of the cut.

Swing Cut-Off Saws

Swing cut-off saws are to have the upper half of the saw completely covered. A device should be provided to return the saw automatically to the back of the table when released. A limit chain or stopping device is to be provided to prevent the saw from swinging beyond the front edge of the table. If counterweights are used, they will be secured with chains or a

cable fastened to the counterweights and enclosed so that they cannot fall on the operator or others if they should break loose. Horizontal pull saws are to be guarded on the upper half of the blade and be provided with limit stops. When ripping, an anti-kickback attachment is to be provided and adjusted for the thickness of the lumber being cut.

Chain Saws

Chain saws will be used with extreme caution because the cutting mechanism is unguarded. Operators will be carefully instructed in the use of this tool. Depth limit guards are provided by several manufacturers and will be used to prevent binding at the point of blade contact with the material being cut (see Section 4 for additional information about chainsaw operations).

Power Hammers (power or air activated)

Power hammers must be used with extreme care and caution. Operators must be trained in the use of such equipment. Eye and ear protection required. When using, make certain that no one is in the immediate area.

Drills

Whenever possible provide a prick punch or pilot hole for the drill. Always select the correct bit for the material being drilled. If the bit is long enough to pass through the material, protect against damage or injury on the far side. Small pieces to be drilled will be secured to prevent spinning. Care will be taken to prevent sleeves or other clothing from being wound around the drill. Wear short or close-fitting sleeves or roll them up.

Portable Grinders

Portable grinders will be equipped with hood guards. Wheels will be inspected regularly. Cracked abrasive wheels will be discarded because

they may fly into pieces and cause an injury. A wheel of proper RPM rating will be used.

Bench Grinders

Bench grinders will be equipped with eye shields and will have wheel, spindle, and adjustable tongue guards. Wheels will be inspected regularly and cracked wheels will be discarded. Wheels of the proper RPM rating will be used. Tool rests will be in place and properly adjusted. All abrasive wheels will be ring-tested before mounting.

Sanders

The abrasive belt or disc cannot be guarded and the only way of avoiding injury is to use caution. Sanders should move away from the body.

Pneumatic Tools

Pneumatic power tools will be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected. Safety clips or retainers on pneumatic impact tools will be securely installed and maintained to prevent attachments from being accidentally expelled. The use of hoses for hoisting or lowering tools is not permitted. All hoses exceeding one-half (½) inch inside diameter will have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

19) Welding, Cutting, and Brazing

Arc Welding

Screens, shields, or other safeguards are to be provided for the protection of workers or combustible materials below or otherwise exposed to sparks or falling objects. When others must work nearby, they will be protected from the arc rays by screens or other adequate individual protection. When welding or cutting lead, zinc, cadmium-coated, lead-

bearing, or other toxic materials, provisions will be made for the removal of fumes and/or the use of proper personal respiratory protection.

Protective Clothing and Equipment

Protective clothing for any welding operation will vary with the size, nature, and location of the work. Some recommended/required protective measures for welders and helpers are:

- Flame-resistant gauntlet gloves should be worn.
- Flame-resistant aprons of leather, asbestos, or other suitable material should be used as protection against radiated heat and sparks.
- Clothing will be free of oil and grease. Woolen clothing, not as readily ignited as untreated cotton clothing, aids in protecting the welder from changes in temperature.
- Pockets and cuffs invite sparks. Collars and cuffs should be buttoned and cuffs turned up inside pants. Pockets should be eliminated from the front of vests, shirts and aprons or have buttoned flaps. Low-cut shoes with unprotected tops are not permitted. Leather caps worn under helmets will prevent head burns during overhead welding. Ear protection is sometimes desirable for overhead welding and in confined places.
- High quality welding helmets of glass fiber, vulcanized fiber, chromed leather, or other suitable material should be worn. The proper shade of welding lenses are to be worn and an adequate supply of cover lenses are to be available. Hand-held shields are generally substituted for helmets on light, intermittent work. Employees assisting welders will also wear protective lenses to protect the eyes.
- Safety goggles or glasses will be worn under the helmet during chipping and cleaning. These goggles should have tinted lenses which afford ultraviolet and infrared radiation protection.

Welding Equipment

Only standard electric arc-welding equipment, such as generators, motor-generator units, transformers, rectifiers, etc., conforming to the requirements of the National Electrical Manufacturers' Association or the Underwriters' Laboratories, Inc., are to be used. Power circuits will be installed and maintained in accordance with the National Electrical Code. Check the voltage for which the machine is wired before connecting. Frames of all electric welding machines, operated from power circuits, will be effectively grounded with No. 8 wire or heavier. Electrode and ground cables will be supported so as not to create obstructions interfering with the safe passage of employees. The ground lead for the welding circuit will be mechanically strong and electrically adequate for the service required. An electrode holder, with an adequate rated current capacity and with insulation against shock, shorting, or flashing when laid on grounded material, will be used.

Chipping and Cleaning

When removing excess weld metal, faulty weldments, or slag, and the welder removes or raises his shield to see, safety goggles or a protective face shield will be used. Always chip away from the face. The chips flying from the cleaning hammer are dangerous, especially to the eyes. Gloves will be worn to protect the hands and wrists. To protect other personnel in the area, screening or shielding is required. Gloves will be worn when wire-brushing weld metal or when cleaning and brushing surfaces to be welded. Use caution to avoid metal slivers and sharp edges.

Fire Prevention in Welding and Cutting

In welding and cutting operations, suitable fire extinguishing equipment will be maintained, ready for instant use. Such equipment may consist of pails of water, buckets of sand, or portable extinguishers, depending upon the nature and quantity of the combustible material exposed to the welding activity. A welder's helper or other employee should be used to

watch for fires whenever cutting or welding is performed in locations where a fire might develop. It is also advisable to have this watch continued at least thirty (30) minutes after completion of the welding operation to detect and extinguish possible smoldering fires.

Precautions

Good housekeeping. Remove all loose, easily combustible materials such as wood shavings, wood scraps, sawdust, paper, rags, and especially oil and grease-soaked materials. Remove all highly volatile materials such as gasoline and solvents. The fumes from such materials seek floor level areas and may travel many feet. Wood planking, scaffolds, wooden forms, and other combustible materials which cannot be removed will be shielded. Avoid coming into contact with hot metal or slag in order to avoid burns.

Explosion Hazards

Cutting or repair welding of closed containers which have contained flammable liquids, requires extreme caution. Containers are to be thoroughly steam cleaned. If removal and handling for steam cleaning is impracticable, the container may be filled with water or an inert gas. Frequent checking with an explosive vapor meter is recommended.

Ventilation for all Welding and Cutting

Mechanical ventilation is to be provided when welding or cutting is done indoors under the following conditions:

- In a space of less than 10,000 cubic feet per welder.
- In a room having a ceiling height of less than sixteen (16) feet.
- In the cutting of stainless steel or any inside welding where the following are used: fluorine compounds, zinc-bearing metals, lead, beryllium, cadmium, mercury, or cleaning compounds.

Minimum Rate

Such ventilation is to be at the minimum rate of 2,000 cubic feet per minute per welder, except where local exhaust hoods or booths are provided. Approved respirators may also be substituted for the required ventilation if an acceptable program is enforced.

Gas Welding and Cutting

Use only U/L and F/M approved oxyacetylene welding and cutting equipment. Anti-flashback valves will be used on both hoses. Avoid oil contamination of gauge connections. Oxyacetylene welding and cutting equipment will never be left unattended for more than a fifteen (15) minute period with the valves in the open position.

Storing Cylinders

Compressed gas cylinders will be kept away from excessive heat, not be stored where they might be damaged or knocked over by passing or falling objects and will be stored at least twenty (20) feet away from highly combustible materials. When a cylinder is designed to have a valve protection cap, caps will be in place except when the cylinder is connected for use.

Acetylene cylinders will be stored in a vertical valve-end-up position, shielded from the direct rays of the sun, and protected from accumulations of ice and snow. Oxygen cylinders in storage will be separated from fuel gas cylinders or combustible materials, especially oil and grease, by a minimum distance of twenty (20) feet or by a noncombustible barrier at least five (5) feet high having a fire-resistant rating of at least one-half (½) hour.

Cylinders will be stored to avoid possible destruction or obliteration of coloring, tags, and other means of identifying the contents.

Using Cylinders

Cylinders will be placed in a rack, chained, or otherwise positively secured against tipping over. They will be used in the order received from the supplier. When empty, the valve will be closed and the cylinder marked accordingly.

Keep the cylinders from contact with electric wires and shield them against sparks or flame from welding and cutting.

Do not allow storing, temporary or otherwise, tools, materials, or anything else on top of cylinders. While in use, the valve key wrench will be kept in place on the valve spindle.

Handling Cylinders

Whenever a cylinder is being transported, remove the regulator and be sure that the valve protection cap is in place. Never use valves or caps for lifting. For raising or lowering, use a suitable sling, boat, cradle, or platform. Always handle carefully. Do not drop or jar. Do not lift with electromagnets. Cylinders may be moved by tilting and rolling on the bottom edge. Avoid dragging and sliding. When moving with a hand truck, be sure that the cylinders are securely held in place.

20) Ground Maintenance

The following safety rules apply to all types of equipment.

- Direct equipment discharge away from other employees, pedestrians, streets, sidewalks, parked cars, or other property, if possible.
- Never attempt to unclog or adjust running equipment.
- Operators of equipment will wear a hard hat and protective clothing appropriate to the job.
- Never wear loose clothing near power take-off or other operating equipment.
- Keep bodily extremities away from moving parts or hot objects on equipment.

Mower Safety

UCM employees that work with/near mowers or any type of grass trimmer should complete the UCM Mower Safety Training and quiz on Blackboard. Refer to that training for PPE requirements and procedures/guidelines.

Check the area for debris before mowing. (This should be for riding mower as well as hand mowers.)

Direct equipment discharge away from other employees, pedestrians, streets, sidewalks, parked cars, or other property, if possible.

Persons other than the operator are not permitted to ride on a self-propelled mowing unit.

Always shut off the engine and set the parking brake when dismounting from a mowing unit. Permit the engines to cool sufficiently before refueling.

Always drive a mowing unit at speeds compatible with safety. Special care should be exercised when traversing rough ground, crossing ditches and slopes, when turning or when driving on sidewalks, streets, or drives (blade should be disengaged).

When operating on steep grades, use care to maintain proper stability. Note: If the needed stability of the mower or the slope or the ability to safely remain in the operator's seat is in doubt, do not use the riding mower.

Make certain that the seat actuated safety switch is always functioning.

Keep all guards and shields in place.

Observe all motor vehicle laws.

Mowing with Push Mowers

Direct equipment discharge away from other employees, pedestrians, streets, sidewalks, parked cars, or other property, if possible.

Check the area for debris before mowing.

Stay off wet slopes.

Disconnect the ignition wire when cleaning or replacing blades.

Shut off the engine when the mower is unattended or when refueling.

The mower blade must be disengaged when crossing sidewalks or roadways.

Do not operate the motor at speeds in excess of the manufacturer's instructions.

Keep all safety guards and shields in place.
Keep bodily extremities away from mowing parts or hot objects on equipment.

Exercise care when lifting or lowering pieces of equipment. Use leg muscles to lift. Do not lift objects that cannot be lifted easily; get help.

Spraying

Read and follow instructions contained in the label on liquid or powder concentrates.

Employees operating sprayers who may be exposed to spray materials shall have a thorough knowledge of the chemicals being used. The hands and face will be washed before eating, drinking, or smoking after spraying. Food and drink will be kept in closed containers away from contamination.

Personal protective equipment appropriate to the spraying operation is required. Generally, all such operations require use of a rain suit, hat, and goggles to provide adequate protection. In some cases, additional personal protective gear may be necessary. Consult the SDS form or your supervisor if there is a question about protection from material being used.
When filling tanks you must use a water source equipped with back-flow prevention.

When filling tanks, avoid splashing concentrated pesticide or herbicide. If you or your clothes are splashed by concentrated pesticide or herbicide, take corrective action immediately.

Caution will be taken to prevent excess spray material from escaping into streams and ponds, drains or other open areas where contamination may result. Do not spray near building air intakes. Consult your supervisor, the M.S.D.S., or the label for the material in question before filling the tank to determine what precautions to take.

The operation and maintenance of the spray power equipment will be the responsibility of an employee who is well versed in its operating functions.

Surfaces on the spray tank will be kept reasonably free from accumulation of spray material. This equipment must be washed off at least once daily when in use.

An adequate platform with railings shall be provided for the protection of nozzle operators when the top of the spray tank is used as a spraying platform.

Plates, pipes, and hinges will be inspected before each use for deterioration caused by corrosive action of spray materials.

Hose and hose connections will be inspected before each use. A pressurized spray hose can cause injury and/or contamination if the hose becomes inadvertently disengaged.

Tree Trimming

When it is necessary to work near or between live conductors, the utility company will be asked to cover the wire with rubber protection, relocate it, or de-energize the circuit temporarily until the job has been completed.

Before performing overhead tree trimming, secure the area to protect pedestrians and traffic. Use barricades or cones and have a ground person serve as a lookout.

When using hydraulic lifting devices to trim trees and the boom and associated equipment might not be insulated, the boom will not be raised and projected over live conductors.

When working from the bucket of a "boom truck" you must wear a safety belt and be secured to the bucket with a safety line or lanyard.

Safety hard hats, plastic eye shields, safety glasses with side shields, or goggles will be worn to protect employees from being scratched or struck by twigs, branches, or flying debris from chippers.

Before any employee climbs a tree, it will be checked for structural weaknesses or other hazards, i.e., dead limbs, overhead wires, etc.

All tree climbing over ten (10) feet must be done with a rope and saddle.

Chain Saws

The supervisor will insure that any employee permitted to operate a chain saw is qualified to do so in a safe manner. A proficiency form signed by the employee will be placed in the employee's file prior to the operation of potentially dangerous equipment.

The operator of a chain saw will not allow anyone within a six (6) foot radius of the saw when it is in operation; the operator will be responsible for the safe operation of the saw.

The engine will be shut off when moving a chain saw from one location to another; the handle will be held with the cutting bar directed towards the rear.

When starting gasoline-operated chain saws with pull cords, the saw will be held firmly on the ground or on some solid object.

Hot saws will be permitted to cool for two (2) or three (3) minutes before refueling. A hot saw will be placed on a log, stump, or on bare ground rather than on dry litter or slash.

Refueling will be done in an area free of flammable materials. When possible, metal-to-metal contact will be maintained. (Some gas cans and tanks are plastic.)

Saws will be moved at least ten (10) feet upwind from the refueling location before the motor is started.

Chain saw operators shall wear approved eye protection. Hearing protection devices are to be used in accordance with Noise Exposure requirements.

Trimming, Pruning or Edging Equipment

Care shall be exercised to insure that other people are not in the immediate vicinity of nylon string trimmers, electric clippers, and other related equipment when in operation.

Keep equipment clean and in safe operating condition.

Eye protection, gloves and other appropriate personal protective equipment will be used. Ear protection is to be used if noise levels exceed the minimum tolerance.

Be certain that power cords are free from broken insulation, are grounded and U.L. listed.

Do not operate electric powered equipment when material is wet. Keep bodily extremities away from operating parts. Exercise care when trimming hard to reach areas.

Snow Removal and Ice Control

Employees will wear clothing and footwear suitable to conditions in their assigned work area.

Operators must know how to handle their vehicles and equipment during adverse weather conditions. The following procedures will be observed at all times:

• Exhaust systems of equipment for winter operations will be thoroughly checked for leaks.
• Lights and windows will be frequently cleaned during snow and ice removal operations. Amber rotating beacons shall be used by equipment working in traffic lanes.
• If it becomes necessary to stop equipment in the traffic lane while plowing snow or spreading sand or chemicals, traffic will be warned by operating amber rotating beacons or by using hazard warning flashers.
• Material spreaders will be adequately secured to the truck and hopper type spreaders blocked to prevent side shift.

Snow Removal using Motorized Equipment

Snow removal equipment will not be operated against the flow of traffic except when operating through the low side of deep drifts and only then under such control as is necessary to avoid a collision.

Precautions, particularly with V-plows, will be exercised when passing or meeting traffic or pedestrians to avoid throwing heavy snow or ice or obstructing the vision of motorists or pedestrians.

Operators will use extra care when meeting opposing traffic to avoid sideslip when removing packed snow or ice with one-way plows or trucks equipped with a side-mounted wing.

Operators will use care when removing snow in the vicinity of parked vehicles on or adjacent to the traveled way. Even though cars may be illegally parked, reasonable care will be taken consistent with the clearing the street.

Operators will exercise reasonable care to prevent damage to roadway, curbing, shrubs, bushes, trees, etc.

Hand Procedures for Snow Removal

Employees using shovels or power blowers will always follow safe lifting procedures.

Avoid taking excessively large shovel fulls.

Snow blower operators will not aim discharge at other employees, pedestrians, or vehicles and will watch out for foreign objects that may be sucked into the blower.

Operators will always keep hands away from moving parts.

Turn units off prior to any equipment cleaning or maintenance.

21) Electrical Safety

General Safety Procedures

Only a trained person using the proper tools and personal protective equipment will be permitted to work on electrical installations.

Wires should not be routed over or under other power lines, telephone lines, or antennas. Weather-tight connections will always be used in

exposed areas. No electrical work will be performed on a hot line except by qualified personnel. When possible, lock out equipment is to be used to prevent power from being turned on while work is in progress.

Electrical equipment and circuits will be plainly labeled, especially when two or more voltages are used. Switches and outlets will be grounded, and in any explosive atmosphere, they will be of the U/L approved, enclosed type.

Motors will be installed so that both the current carrying parts and the mechanical components are guarded to prevent persons from coming in contact with them.

To prevent overloading, circuits will always be provided with fuses or other similar devices. These devices will be of such size that they will operate at a point lower than the carrying capacity of the circuit. Additional loads above the normal are to be placed in use only after a qualified electrician has checked the circuit to determine if the circuit can carry the extra load.

Switchboards, fuse cut-out panels, motor control equipment, and other current carrying equipment will be grounded. Insulated gloves do not necessarily provide protection when they are wet. Damp weather can be dangerous to personnel working around electricity.

Only U/L approved three-wire extension cords are to be used for handheld power tools.

Regard all wires as live and dangerous. Do not permit objects being handled to come in contact with electrical lines. Aisles or passageways leading to electrical panels will be kept clear and free of any obstructions. All power source switches will be labeled as to what they operate. All electrical panels and connections are to have appropriate cover plates in place.

Use and Care of Electrical Equipment

Electrical equipment must be plugged in securely and properly grounded.

Always report immediately any frayed wires, broken conduits, etc., to the supervisor.

Never use equipment when there is doubt as to its electrical safety.

Cords are not be extended across traffic areas and floors. Use the nearest outlet or cord protection to prevent it from becoming damaged or a hazard to traffic in the area. Warning signs in traffic areas can be used effectively.

Always remember to unplug equipment before cleaning or performing maintenance.

Liquids and electrical equipment do not mix. Extreme caution must always be exercised when electrical equipment must be operated in and/or around liquids of any kind.

When cleaning small electrical appliances, (mixers, toasters, can openers), never submerge in water. Unplug the unit, then wipe clean with appropriate cleaners and/or sanitizer, keeping liquids to a minimum.

Never use makeshift repairs, such as taping an electrical line etc., always obtain such repairs from an authorized repairman.

Never remove the ground prong from the plug end of an electrical cord. If an electrical fire occurs, and you must respond, never use water to extinguish it. Use only the approved dry powder C02 type extinguisher for such emergencies and call the fire department immediately.

Never grab or touch a person being electrically shocked. First determine the electrical source and immediately proceed to break the circuit. It may require using a wooden broom handle or similar non-conductive material to move the wire away from the victim. When the circuit has been broken

(on wire moved), render first aid if knowledgeable or get help immediately (time is important).

Lockout Tagout

The purpose of the Lockout/Tagout procedure is to clearly state the responsibilities of those persons who will be involved in the installation, repair, inspection, and maintenance upkeep of equipment where the unexpected start up or release of stored energy could occur and could cause personal injury.

Under this procedure, persons working on equipment or machinery without the protection of lockout devices and/or individualized safety tags, or the unauthorized removal of tags and locks, starting or operating equipment or valves without all parties removing their tags and locks prior to starting, will result in disciplinary action and could result in dismissal.

Each department is expected to maintain an adequate supply of safety/danger tags to supply the workers in their area. Individuals who will be authorized to perform work on operational equipment will be issued several individualized locks. Spare locks will be maintained by the section supervisors. The supervisor will maintain a lock common to an Authorized Supervisor(s) on the other shift(s).

Each individual working on a machine or piece of equipment will be responsible for placing his/her lock and tag on valves, switches, or other items to ensure the equipment they are working on cannot be energized while the work is being performed.

Tagout

All personnel who are responsible for inspecting, maintaining, installing, or removing equipment from service are required to install a tag on valves, power disconnects, switches or other devices that are used to shut off an energy source during the time when that individual is exposed to a potentially hazardous condition.

Additional tags may be placed on the equipment for the purpose of informing would-be users of the equipment that a present or potential hazard exists if the equipment is operated.

When shutting down and tagging equipment make certain that all pressurized or energized lines and all mechanical devices that could pose a danger to the worker performing the repairs, are shut down properly and tested to assure that it is in a "de-energized state" before continuing the work.

The tags placed on the equipment should have the name of the employee placing the tag and the date and time the tag was applied.

The equipment should only be considered safe when all lines into and out of the equipment are isolated in such a way as to prevent the possibility of the employee working on the equipment from being exposed to potentially hazardous energy sources (Such as steam, electrical discharge, gas, chemicals, rotating mechanical equipment etc.)

Some equipment which is maintained such as fume hoods, equipment that supports research projects and/or other processes may cause additional safety hazards if correct procedure for notification of department or users of the equipment are not followed. Specific guidelines are written for posted Radiation, Chemical and Biohazard areas. Shut down of equipment that might directly endanger the life limb or property of other persons should only be done with supervisory approval and with prior notification of affected parties.

Persons applying danger tags should notify their appropriate supervisor that they will be tagging or have tagged a piece of equipment even if the tag is only going to be in place for a short duration. Effective communication is a large part of maintaining a safe working environment.

Lockout Locks

Safety locks will be installed by the employee to isolate valves, switches, circuit breakers and other devices as necessary to insure that those devices cannot be adjusted, removed, energized, de-energized or otherwise altered during the time that personnel can be exposed to potential hazards associated with the equipment being serviced.

If a safety lock is installed it must have with it a safety or danger tag, properly filled out.

Electrical circuits will only be considered locked out when the disconnecting means (safety switch, circuit breaker, etc.) has been placed in the off position, tagged, locked and the key removed from the lock. The circuit should then be tested (electrical instrument) by the service personnel to assure that it is de-energized.

Circuits carrying voltages above 480 volts and equipment carrying voltages above 480 volts will be serviced by the Electrical Shop only, unless specifically authorized by the Electrical Supervisor. Lockouts of such circuits will only be performed in the presence of and with the authorization of the Electrical Department.

If authorized maintenance is to be performed on de-energized circuits which would normally carry a voltage of greater than 480 volts persons performing that maintenance will apply their locks in addition to the lock of the Electrical Supervisor while the work is being performed. The Electrical Supervisor will assure that all safety measures and grounding of the de-energized high voltage circuit is properly performed before the work will commence.

If additional equipment is interlocked with the piece of equipment being locked out in such a way that the interlocking circuits could cause the piece of equipment being locked out to operate or be energized during service operations, the auxiliary or interlocked equipment must also be tagged and locked off. It is the responsibility of the service personnel to properly test the equipment to assure that the potential hazards are controlled so as not

to endanger themselves or others during the service operations. If the service personnel is not familiar with the proper de-energization of a piece of equipment, he/she should notify the Supervisor so the proper methods can be demonstrated.

If more than one employee is involved in the maintenance, installation or removal of a piece of equipment, each employee that is involved with that operation or would be exposed to safety hazards do to the inadvertent energization of that equipment should also place his/her lock and tag on the appropriate equipment.

All tags must be properly signed and dated.

Anytime a piece of equipment is determined to be unsafe to operate it will be tagged and locked out.

Safety tags and locks will be used whenever a piece of equipment is being repaired, serviced, adjusted, or inspected unless for troubleshooting purposes that equipment must be left in the energized state to determine a problem cause. Once the problem cause has been determined and prior to repairs being made to correct the problem the machine will be tagged and locked out.

If there is no provision for locking out a piece of equipment a Safety Tag will be used without a lock, however, other safety measures should be taken to insure the safety of the service personnel, such as, removing the valve handle, removing the circuit wires, and taping them or installing a mechanical block to prevent the service personnel from being exposed to potential hazards from the inadvertent energization of equipment. The equipment must not be capable of energizing during service or maintenance operations.

Additional tags may be utilized at a work sight such as the PM Trouble Indicator or Danger Do Not Operate tags where it is deemed necessary by the equipment operator, service personnel or supervisor.

When repairs, adjustments, inspections, or other maintenance operations are completed, each individual who has tagged or locked out a piece of equipment will be responsible for removing his/her individual lock and tag. Once that individual's tag and/or lock is removed he/she should not reenter the equipment area where he/she will be exposed to potential hazard unless the tag and lock are re-installed.

When maintenance operations are complete the machine or equipment should be restored to full operating condition and all locking and tagging devices should be removed from the area. DO NOT LEAVE TAGS ON EQUIPMENT WHEN THE WORK IS COMPLETED.

Supervisory Responsibility

Each supervisor is responsible for the safety of his/her employees. Supervisors of other shops or departments that are working on the same job site may require that locks and tags be placed in addition to and/or on additional equipment that may be interlocked with another piece under maintenance repair. It will be the policy of the department that personnel lock and tag out devices regardless of lead shop or personnel that are already engaged in service, maintenance, or inspection of a piece of equipment if personnel will be assisting or for separate reasons performing work in said equipment.

The immediate shift supervisor of personnel performing maintenance operations on a piece of equipment will install his/her tag and lock on equipment for equipment which will be shut down for extended periods beyond his/her immediate shift.

If the responsibility for the repair of the equipment tagged and locked out will be transferred to another shift or another shop contact will be made with the appropriate department head, shop supervisor or other responsible party and provisions will be made for the transfer of responsibility for the tag and lock. This action will be documented by the supervisor initiating the transfer.

If a lock and tag is left on a piece of equipment that must be energized and the employee who placed the tag and lock has left work, an effort will be made by the supervisor to contact the individual at his/her residence. If contact cannot be established with the party that installed the lock and tag, it will be the responsibility of the supervisor to inspect the equipment and area of the equipment to assure that all personnel are safely out of the hazard area before authorizing the removal of the lock and tag and energization of the equipment. The supervisor must be present during the removal of the tag and lock and startup of the equipment when the installer is not available.

22) Construction Safety

General Safety

Personal protective equipment will be worn when there is a reasonable probability of injury that can be prevented by such equipment. Avoid passing near equipment which is being unloaded.

During pouring operations, be alert for loose ties or supports which may cause the forms to collapse. Avoid working near vertical excavations, especially when cracks, boulders, or heaves are evident.

Working on or Adjacent to a Roadway

When working on or adjacent to a roadway, a reflective vest will be worn, traffic cones and warning signs will be used and a flag person will be placed in the construction area if construction limits roadway access for traffic.

Other Constructions Safety Procedures

Other safety procedures related to maintenance and construction work are listed elsewhere in this manual, see Section 2 - Protective Clothing and Equipment, Section 3 - Vehicle and Motorized Equipment Operations, Section 11 - Noise Exposure, Section 18 - Hand Tools, Section 19 - Power

Tools, and Section 6 - Walking and Working Surfaces. You should be familiar with these procedures and adhere to them.

Excavation, Trenching and Shoring Requirements

General Excavation Classification Scope These requirements apply to all open excavations made in the earth's surface into which employees are expected to enter. A trench excavation is defined as a narrow excavation made below the surface of the ground where the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than fifteen (15) feet.

Requirements

The University and contractors thereof will always comply fully with the following requirements:

- All materials in proximity to the excavation site must be stored, arranged, or secured in such a manner as to prevent the material from accidentally falling into the trench.
- Appropriate University employees are to notify utility companies or owners and request that underground utilities or installations be located prior to commencement of excavation.
- Adequate means of egress will be maintained at all times.
- Excavations located near public vehicular traffic shall be barricaded and employees shall be provided with and wear warning vests.
- All mobile construction equipment shall be equipped with warning system.
- In excavations greater than four (4) feet in depth, or where oxygen deficiency or other hazardous atmospheres could reasonably be expected to exist, testing must be performed prior to the entry of employees.
- If a hazardous atmosphere is verified at a trenching site, emergency rescue equipment must be available and attended (SCBA, Lifelines, etc.).
- Inspection of trenching operations for hazardous conditions must be performed daily or when changing conditions warrant (rain, different

soil type, etc.). Upon detection of a hazardous condition employees must be removed from excavation at once.

- Protective systems for excavations will be used. This shall include the inspection and certification by a registered professional engineer of the appropriate excavation discipline or field (i.e., it would be inappropriate for an electrical engineer to approve shoring design).
- Both visual and manual soil testing will be performed by a" competent person" to determine soil type.

Competent Person Responsibilities

A "competent person" is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. Listed below are some of the duties of the competent person:

- Conduct test for soil classification.
- Understand standards and any data provided.
- Determine proper/sloping/shoring system.
- Recognize and reclassify soil after changing conditions.
- Determine if damaged shoring/shielding equipment/system is adequate for employee protection.
- Conduct tests for hazardous atmosphere.
- Assess design of structural ramp - background in structural design is required.
- Locate underground utilities/installations.
- Monitor water devices to ensure proper operation.
- Perform daily inspections of excavations and adjacent areas. These requirements in no way relieve the department of their lawful obligation to fully comply with applicable excavation and trenching procedures.

Rock Excavation

Rock excavation usually requires blasting. There are exceptions when material, which would be classed as rock, would not be blasted. If the rock is not too hard, it can be trenched or otherwise dug by pneumatic pavement breakers. Shafts can be sunk in soft rock with large diameter core drills. Some fairly soft rock can be moved by common excavation methods, such as by ripping it with a rooter and moving it with a scraper.

Stripping is the preparatory step of making bare or clearing the overburden. The same methods and choices are available for this operation as for earth excavation, when relatively little is present.

It is very common in rock foundations for groundwater to continually spring up through new seams which are uncovered. Drainage in these conditions is usually virtually impossible, and grading is kept to the minimum required to move and protect equipment.

Common Excavation

Common excavation is generally interpreted as including machine excavation, structural excavation, and grading problems. The principles of safety involved in actual excavation parallel those relating to trenching excavation and were covered under the topic of trenching.

The safety aspects applicable to machinery and equipment which are used to do the excavation are discussed in the topics dealing with machinery and equipment.

Large-scale excavation refers to excavation of greater volume (greater than trenching, for example) such as those for large buildings, etc.

There are a number of factors pertinent to all excavation, whether large scale, common, trenching, or other. All are constantly influenced by the location or environment of the excavation or proposed excavation.

Fundamentally, environment can be divided into two general categories:

- Excavation in the open areas or under circumstances where the normal angle of repose or response principle can be applied (canals, road work, etc.).
- Excavation in a confined area or under circumstances which require the use of sheeting, shoring, piling, or other means of soil retention (buildings, side hill cuts, etc.).

Angle of Repose

When the area in which an excavation is being made is large enough to permit it, the sides of the cut shall be sloped at the natural angle of degree which the sloped surface would develop in weathering.

Normally, this angle would be not less than one and one-half (1½) feet on the horizontal to each foot on the vertical.

When it is not possible to slope to the angle of repose, shoring must be erected to prevent a cave-in.

Measurement of Angle of Repose

The angle of repose should be measured as accurately as possible. Measurement can be made quickly with an inclinometer or, if a combination square is used, in connection with a spirit level and aligned with a board at the edge of the slope. There are several ways to measure the angle of repose, but "eye balling" is not considered a valid measurement technique.

A common way of measuring angle of repose involves the use of a pole with a weighted string which is lowered into the center of the trench.

Measuring Stability of Sloping Soil

Stability of slopes may be measured by use of a Seismitron. The instrument's probe or receiver may be placed on the slope surface, but results are more accurate if it is placed in a drilled hole in the bank. It picks

up tiny sounds of ground movement called microseisms and amplifies them so they can be heard through earphones. Either earphones or automatic recording apparatus may be used for listening. There is the problem of distinguishing between ground noises and those caused by machinery, talking, and other interferences.

Trenching

Trenching is probably the major area of concern in excavation work from an accident prevention standpoint. A trench is:

A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than fifteen (15) feet.

Cave-ins

Cave-ins may be caused by:

- Hydrostatic pressures from freezing or thawing.
- Vibration from vehicles or equipment operating inside the trench, or nearby; • Improper sloping of trench walls.
- Failure to place removed soil, equipment or material at a safe distance from the edge of the trench (at least two (2) feet).
- Failure to shore properly and to brace trench walls.

Cave-ins sometimes occur when shoring is being installed or removed. A common, contributing factor to cave-ins is the tendency to omit shoring when the trench is to be left open for only a short time.

Lack of Space

To some extent, all employees engaged in trenching operations are exposed to the hazards of cave-ins. Trenches are usually narrow and the lack of space sometimes complicates the danger of a cave-in.

Warning Signals

Experienced employees can sometimes detect approaching danger of cave-ins from tension cracks, moisture, and changes in soil texture. Inexperienced employees are less likely to recognize these indications.

Associated Hazards

Trench employees are exposed to hazards involving much more than soil movement. Underground utility lines often present dangerous surprises and account for a large number of fatalities in excavation.

It is necessary to locate underground utility lines before digging begins. But, even with advanced survey techniques, the exact location of such lines is difficult to determine until digging is in progress.

In work areas where the exact location of underground electrical power lines is unknown, employees using jackhammers, bars, or other hand tools which may contact a line shall be provided with insulated protective gloves.

Utility lines for water, steam, and gas present hazardous conditions which require the worker to use protective equipment and to obtain as much advanced information about the location as possible. Carbon monoxide can reach hazardous concentrations in excavations. Accordingly, provisions shall be made for detection and suppression of heavier than air gasses.

The failure to use personal protective equipment has resulted in many injuries which could have been prevented.

Shoring

The reasons for earth support in trenching (or other excavation) are:

- Control of property damage.
- Safety of personnel.

In a remote location, or where buildings are some distance away, the reasons for sidewall support may include limiting the quantity of material to be moved, expediting the job, and protecting workers; but structure protection would not be involved. In such a case, extreme rigidity of the means of the sidewall support would not be required. In any case, the timber stresses should not exceed the safe working stress value of the support.

Nearby Structures or Utilities

When a structure is close enough to lie within the limiting plane of rupture, the timbering must be rigid enough to prevent all movement of the earth which supports such a structure.

Sheeting and timbering must be designated to minimize any flexing of planks and timbers. This is because masonry is very weak in tension and any slight movement which alters the distribution of stresses will cause the foundation and walls to crack. Spalding of interior plaster may result.

Underground utilities and nearby structures, therefore, require that displacement of the soil adjacent to the cut be kept at an absolute minimum. Sheeting and bracing must be used and must be kept "tight." In the "active state" of trenching there are settlements and lateral movements of the solid adjacent to the sheeting, which can be as much as 0.5 percent of the depth of the cut, notwithstanding good quality material and the best workmanship.

Damage to nearby structures from soil movement as described above can be controlled or reduced by stressing the struts-exerting pressure upon the sheeting and forcing it against the soil walls.

Sheeting thus designed and braced has the effect of holding the "at rest" pressure of the soil. The struts must be re-stressed regularly to insure that the shoring remains tight. Pouring dry sand between sheeting and supported ground helps keep ground subsidence to a minimum if done as soon as shoring is set.

Shoring Mechanics

The pressure of the earth is resisted by the vertically placed sheeting, which transmits its load to the horizontal walers. This load on the walers is transmitted by horizontal struts or braces to the walers and sheeting, sustaining a force equal and opposite in direction from that exerted by the lateral earth pressure of the earth wall.

Trench shoring and its appurtenances will not remain in sound condition for weeks on end without attention. Gradual changes and deterioration will inevitably take place.

It shall be checked daily, following blasting, after any falls of material upon or near it, and after other occurrences which may affect its stability.

- Timber may dry out, causing shrinkage.
- Ground may dry out, shrink, and loosen the shoring
- Ground may absorb moisture, swell, and displace the shoring.
- Shoring members may be displaced or damaged when struck by materials lowered into the trench by equipment or vehicles.
- Soil may leak into the trench from behind the shoring and loosen it.
- Shoring or its support may rot.

The Sliding Trench Shield

The sliding trench shield, or box, is defined as follows:
A shoring system composed of steel plates and bracing, welded, or bolted together, which supports the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

It is not intended to entirely displace conventional shoring but will substantially reduce its use.

Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and

maintained in a manner which will provide protection equal to or greater that the sheeting or shoring required for the trench.

Usually, it is constructed of about one (1) inch gauge steel plate. The length and side panel height is optional, depending upon the need. The front end is closed, with some models having a sled-type plow attached to facilitate ease in dragging the unit. The rear end may be closed or have an open structural arch. Cross bracing must be used. Braces can be removed to permit insertion of pipe, etc., into the unit. If the unit requires cross braces, they should always be replaced after being raised for any reason.

A unit can be designed for various widths, heights, and lengths through the use of interchangeable bolted plates.

Joints

When the sheeting reaches down to an underlying rock formation into which the cut must be carried by drilling and blasting, the joint between the bottom of the sheeting and the rock formation should be kept tight.

In this situation, the upper part of the cut being made through the soil should be at least a foot wider than the cut which is to be made through the rock. This is to provide a ledge to hold the sheeting and the earth behind it.

There are two important reasons for preventing such voids:

- To prevent pressure from the opposite side of the trench or cut from sting the sheeting and timbering system into the void.
- To prevent slumping of the soil from under structures which may be located on the same side of the trench as the void.

In the event of blasting, the sheeting system including any joints which have been sealed, should be closely inspected to make sure there has been no disturbance that would permit movement. This should be done even in cases where a void problem been corrected.

Soft Locations

When sheeting must be installed in very wet conditions such as bogs or marshes, it is subjected to unequally distributed stresses and unpredictable earth movement. This can cause one wall of the trench sheeting to raise or lower. Adequate provision, such as diagonal cross-bracing, must be made to prevent the timber system from jack-knifing and collapsing.

Under such conditions, such as marshes, bogs, mud, and quicksand, the sheeting and timbering structure must be sufficiently rigid to hold the sheeting vertically true to prevent any lifting tendency.

Drainage

In fine sands, improperly installed drainage can in some cases remove soil particles and cause a subsidence of the ground surface. It can also cause the sand to lose it capillary moisture and dry out to the point at which the sand loses the strength provided by the moisture and cause the face of the trench to slide.

Small tension cracks can be grouted or filled with asphalt to keep out the water. Canvas, plastic, or similar material can be used to cover large cracks or the face of the trench.

Other means of combating the surface water problem are diversion ditches and the use of excavated material such as a dike. Where water of either ground or surface type is a problem, a trench should not be left open longer than necessary.

Warnings of Potential Problems

Evaluation of the soil, sheeting, drainage, or other steps taken in trenching operations do not remove the need for a continuous watch on the excavation for signs of trouble. Even the most carefully evaluated measures can be in error, or conditions can change causing a failure to occur.

Subsidence of the ground surface adjacent to the walls of a cut is the first sign of trouble. However slowly it may occur, if such subsidence continues, it is very serious.

The second sign of trouble is the tension cracks which form in the ground surface parallel to the trench, thus delineating the most critical zone.

A third sign that failure is imminent, is the spalling of small chunks of soil from the face of the trench wall.

A quick bottom condition ordinarily occurs quite suddenly when water is pumped from an excavation.

Sometimes small sand boils or mud volcanoes will give warning of instability by appearing at various points.

It is important to note that most failures of trench walls happen during late winter and early spring. This is the period when soils are wet and water tables are high. Anytime there is a continued period of wet weather, whether from rain or melting snow, the danger of failing trench walls is greater.

Trouble signs mean that IMMEDIATE action must be taken. First, braces must be installed in the trench. If the trench already has bracing, extra bracing must be used for reinforcement. Second, cracks should be sealed and covers installed. While precaution action is being taken to prevent failure of the trench wall, all personnel and equipment not essential to the action being taken should be kept out of the trench and away from the area.

Dismantling of Shoring

Trenching problems are usually related to the depth of the trench, condition of the soil, amount of water, and to external loads. These problems can be overcome, as prescribed in appropriate standards, by shoring, drainage, and speedy completion of the work.

Underpinning and Shoring

Supporting a structure next to an excavation operation, either by underpinning or shoring, is designed to prevent injury to workers involved in the excavation and to the occupants of the existing structure.

Structures which mount concentrated loading near the wall of an excavation--particularly, high, or heavy structures usually must be underpinned or shored when the excavation goes below the grade of its footings.

The effect of underpinning is to provide an extension of foundation downward to a stable bearing.

The effect of shoring is to transfer the loading point of the weight involved away from the footing which normally carries it.

Underpinning can be a series of concrete panels poured into pits dug underneath the footing to be supported, extending downward to the necessary grade. Underpinning also can be accomplished by installing steel piles beneath the footing by jacking.

Bearing Capacities

Since shoring usually involves a high concentration of loading, it is important that the bearing capacity of the soil be adequate.

The Standard Building Code recommended by the National Board of Fire Underwriters refers the following:

- Where there is no excessive ground water, silt, or soft clay, and when circumstances prohibit thorough appraisal of the soil, a "rule of thumb" of two (2) tons per square foot often is used.
- However, "substitute appraisals" should not be used in place of proper soil examination and testing when it is available.

Methods of Support

When the cut is vertical, such as along a sidewalk or higher bank, the face of the cut must be tightly SHORED AND BRACED with walers and struts.

When the cut is deep, or bracing is otherwise impossible, STEEL SHEET PILLING can be used if driven to a depth which will provide sufficient cantilever action in supporting earth pressure and imposed loads.

When the loading is too great to be supported by merely driving the SHEET PILING, the top of the sheet piling may be anchored by tying it back to a "deadman" (which should lie beyond the angle of repose).

CROSS-LOT BRACING also may be used if it is possible to carry the bracing across to the opposite side of an excavation for a support base.

Not only must width, depth, soil, loads, and similar factors be taken into consideration in support planning, weather factors also must be given close attention, particularly if the excavation must remain open for a long period.

This operation applies to the excavation of basements in tall buildings.

Such excavations may extend several stories below ground and groundwater level.

Support methods include vertical and horizontal sheeting, sheet pile cofferdams, and pneumatic-caisson cofferdams.

Caissons

The upper section of the excavation, above groundwater level may have a single diaphragm of sheeting or sheet piling to protect it; and the lower section may be protected by a double-wall steel sheet piling coffer, dam, inside of which the basement wall is built. A pneumatic-caisson cofferdam also may be used for the lower portion.

In any case, the sheeting, sheet piling, or cofferdam would completely surround the area being excavated.

OSHA Compliance

As a state institution, the University of Central Missouri is exempt from Occupational Safety and Health Administration (OSHA) regulations and standards. However, OSHA regulations are regarded as General Industry Minimal Standards and form the framework for the processes and procedures that are used to ensure safety and health on campus. Any OSHA regulations cited in this manual are intended as a reference for following industry standards.

23) Office & Classroom Safety

Good Housekeeping

Good housekeeping is essential for safety. Return all equipment and supplies to proper locations. Keep floors clear of liquids and objects which may cause someone to slip and fall.

Passageways

Between-desk shortcuts often contain hidden hazards. Use the aisles instead of shortcuts and remain alert to potential safety hazards. Employees are to avoid leaving mail carts, furniture dollies, etc., in passageways or aisles. If it is necessary to do so, place objects close to walls and clear of well-traveled pathways, doorways, and hall intersections.

Running

Do not run at work. No function is so urgent that you must run to get it accomplished. Approach and open doors with caution to avoid striking someone on the other side. Keep to the right in corridors and at corners. Use handrails when going up or down stairways and carefully take one stair

at a time. Even in an emergency situation, such as fire evacuation, move quickly to the nearest exit, do not run.

Chairs

Avoid tilting chairs. Chairs are to be pushed under desks and tables when not in use. Do not stand on chairs, particularly those with castors.

Flooring

Employees are to report any broken, cracked, or warped tile on floors or turned up corners on rugs that pose potential safety problems to building maintenance personnel.

Emergency Procedures/Special Precautions

Employees are to be familiar with first aid locations and emergency procedures. Learn the location of medical equipment, fire extinguishers, and all exits in your area. If these locations and procedures are unknown, ask your supervisor. Care is also to be exercised with chemicals in the work area. Correction fluid thinner, glues, and chemicals used with copiers can be toxic if it comes in contact with skin or is inhaled. M.S.D.S. forms are available or call 864-4089 for assistance.

Sharp Objects

Do not use a razor for cutting paper, or a pin to fasten papers. Do not leave sharp, unsheathed objects in drawers, cabinets, bins, or in pockets. Broken glass-topped desks and veneer surfaces on furniture that expose employees to possible injury are to be promptly repaired. Broken glass and other sharp objects are to be disposed of in a box and stapled or taped shut. This will prevent custodial workers from injuring themselves on such materials.

Office Machine Operations

Employees are not to operate a machine until they have been thoroughly trained to operate it safely. Supervisors are to make sure employees understand and follow machine instructions.

Electrical Safety

Disconnect electrical equipment before repair or maintenance. Electrical machines are to always be shut off and the electrical circuit should be disconnected before attempting to adjust or clean the machine. Only qualified personnel are to make the adjustments. Electrical cords are not to be left loose on the floor where someone could trip over them. Arrange to have them anchored in appropriate conduit to a floor, desk, or wall. Do not place loose wires under carpet or under floor pads. All electrical cords are to be in good condition, free from cuts and frayed insulation. Proper grounding is to be used with all heavy-duty electrical equipment.

Lifting, Bending, or Twisting

The general rules for lifting are:

- Get a good footing.
- Place the feet about a shoulder-width apart, one foot to the side of the object to be lifted or lowered.
- Bend at the knees to grasp the weight.
- Keep the back straight.
- Get a firm hold.
- Lift gradually by straightening the legs. Do not use a jerking motion to lift.
- Avoid twisting your body while carrying or lifting heavy objects. Turn your feet in the direction of intended movement.
- When the weight is too heavy or bulky to lift comfortably--get help or ask your supervisor to determine the safe way to deal with the problem.

When putting a load down, reverse the above procedures. Avoid dropping materials as this can not only damage property or materials but may cause personal injury.

Climbing

Office furniture and equipment is not to be used as a means of reaching and climbing. Use a ladder for any task that requires high reaching.

Files

Keep file and desk drawers closed when not in use. Open only one file drawer at a time and keep the heaviest drawers at the bottom to avoid tipping the files.

Paper Cutting

Use hand-operated paper trimmers or "Guillotine" type paper cutters with utmost caution. Never leave the blade in an upright position and keep the guard in place at all times.

Electrical Appliances

Heating appliances are not to be left on when unattended. Coffee pots, hot plates, and space heaters are the most common fire hazards of this type.

24) Asbestos Disturbance Program

Asbestos Disturbance Program Purpose

The purpose of this program is to provide safe and efficient procedures and work practices for University employees who are required to disturb possible asbestos containing materials. These procedures and practices will be implemented in compliance with all applicable state and federal regulations that pertain to asbestos disturbance.

Objectives

The objectives of the Asbestos Disturbance Program for the University of Central Missouri include:

- To comply with all state and federal regulations regarding asbestos disturbance.
- To assess the feasibility of reducing the asbestos disturbance work actions.
- To limit the amount of asbestos containing material disturbances.
- To identify, evaluate, and eliminate potential hazards within asbestos disturbance work actions.
- To assess the risk of each workplace hazard and to implement corrective preventative actions to ensure worker protection.
- To establish and implement a permit system for asbestos disturbance operations.
- To train and educate employees on proper procedures, techniques, and precautions who may perform asbestos disturbance operations.

Regulations and References

The following regulations pertain to this Asbestos Disturbance Program:

- Occupational Safety and Health Standards for General Industry (1910 Subpart Z)
- OSHA 29 CFR Subpart Z 1910.1001(a)
- OSHA 29 CFR Subpart Z 1910.1001(c)
- OSHA Permissible Exposure Limit (PEL)- 0.1 fiber per cubic meter of air over an 8-hour time limit.
- Occupational Safety and Health Standards for Construction Industry (1926 Subpart Z)
- OSHA 29 CFR Subpart Z 1926.1101
- Environmental Protection Agency
- The Asbestos Hazard Emergency Response Act (AHERA)
- Clean Air Act (CAA)
- Spill Prevention, Control, and Countermeasure (SPCC)
- Asbestos Worker Protection (EPA 40 CFR Part 763 Subpart G)

Responsibilities

Environmental, Health, and Safety Manager

UCM's EHS Manager is designated as the first contact for issues, questions, and concerns concerning the departmental asbestos disturbance program.

The EHS Department is responsible for establishing and maintaining a written asbestos disturbance program that includes oversight and evaluations of the asbestos disturbances of employees and contractors.

The EHS Manager is responsible for establishing and maintaining a training program that will provide possibly exposed employees with the knowledge, understanding, and skills required to safely perform asbestos disturbance work operations.

The EHS Department shall review the Asbestos Disturbance Program annually and revise the program as needed to ensure that employees are adequately trained and protected from airborne asbestos hazards in the workplace.

The EHS Department is responsible for providing employees with the personal protective equipment required to safety perform asbestos disturbance work duties.

The EHS Department is available to provide training on proper asbestos disturbance techniques and to assist in work operations.

Facility Manager

The Facility Manager is responsible for identifying workers that may be asked or expected to conduct asbestos disturbance work operations, ensuring that these workers have the required training and skills to follow the procedures and guidelines that follow in this program.

The Facility Manager is responsible for facilitating this program, along with the EHS Manager, to ensure absolute safety is ensured for asbestos disturbances work operations.

Facility Supervisors

Facility Supervisors are responsible for determining if acceptable workplace conditions allow for asbestos disturbance work operations.

Facility Supervisors are responsible for planning, authorizing, and supervising work operations to ensure asbestos disturbance operations are being completed safely.

Facility Supervisors can terminate or postpone any asbestos disturbance work operations that may contain health and safety hazards, it's their duty to ensure these hazards are controlled and are no longer present before asbestos disturbance work operations can be continued.

Facility Supervisors shall be trained on necessary skills and responsibilities required to perform adequate work functions regarding the operations and procedures outlined in this program.

Trained and Authorized Employees

Trained and authorized employees are responsible for evaluating and assessing their work environment to determine the safety and hazards potential regarding their asbestos disturbance work operations.

Trained and authorized employees are responsible for postponing work operations if they determine asbestos disturbance work operations cannot be performed safely.

Trained and authorized employees are responsible for assessing the work environment and only performing asbestos disturbance work operations if they can be performed without harming non-trained/authorized personnel in the work area as well as ensuring the environment is not harmed while conducting work operations.

Trained and authorized employees are responsible for following all procedures and guidelines outlined in this program and contacting their direct supervisor (facility supervisor) with any questions or concerns.

Trained and authorized employees have the right and responsibility to refuse work in a work environment they feel uncomfortable or unsafe in until a facility supervisor has deemed the work environment and operations to be safe and approval has been given.

Procedures and Guidelines

FAA Approved "Shaving Cream" Method

The "Shaving Cream" method is an EHS Department and Facilities, Planning, and Operations approved method of drilling into possible asbestos containing material. The "Shaving Cream" method is OSHA approved (with limitations listed below) and is industry approved and recommended in the Occupational Safety and Health field.

The Facility Manager and Supervisors are required to provide a trained and certified asbestos disturbance Competent Person. These trained and authorized persons will be able to drill holes through asbestos containing materials- floor tiles, adhesives, and wall matrix.

All work will be performed following this Federal Aviation Administration (FAA) approved "Shaving Cream" asbestos removal guidelines.

Drilling Through Asbestos Flooring Materials

Scope: To provide guidance and procedures for safe and proper drilling methods through flooring that is less than three square feet of asbestos containing flooring and/or wall matrix materials.

Equipment:

- HEPA Vacuum (3M Model #497 or similarly comparable)

- Amended water, wet sponge(s), or shaving cream/gel
- Ground Fault Circuit Interrupter (GFCI) Adapter
- Disposable Towels (preferably baby wipes or soapy wet paper towels)
- Zip-Lock or 6 mil plastic bags
- Personal Protective Equipment:
- Safety Glasses (ANSI Z87.1)
- All other University required PPE outline in the UCM Safety and Health Manual
- No respiratory protection is required as long as a Negative Exposure Assessment will be conducted and recorded in accordance with OSHA 29 CFR 1926.1101 regarding the OSHA PEL of 0.1 f/cc.

Respiratory protection (half or full-face respirators) are recommended while performing asbestos disturbance work operations.

If thermal system insulation or surfacing materials are being disturbed, then a half-face respirator with P100 filters must be used at a minimum.

Respiratory protection should be decided on a case by case scenario, contact EHS for questions or recommendations regarding respiratory protection.

Training

Anyone performing this work activity must complete the Competent Persons for Class III work (16 hours) in accordance with OSHA 1926.1101. The course must also comply with EPA requirements (listed under section 2.1) and regulations. The course must comply additionally with 40 CFR 763.92(a)(2) or it's adequate equivalent.

Complete the Asbestos Disturbance Training on UCM Blackboard provided to you by EHS. Complete the annual refresher training as needed.

Procedure

Obtain an Asbestos Disturbance Work Permit from FPO Manager. Remember to keep permit with you while performing Asbestos Disturbance work operations.

Identify and block off work areas where the Asbestos Disturbance work operations are being performed. Allow only authorized personnel with the required training to enter the work area. EHS can provide you with proper Asbestos warning signs and barricade tape.

Assess the work area before work is started, clean the area if any visible dust or debris is present.

Prepare work area with a plastic or canvas drop cloth. Install polyethylene sheet around work area to catch any debris that may become airborne.

Place any tools, equipment, and materials inside the barricaded area, ensuring it is not a trip hazard or presents an opportunity for theft. Note: Use a GFCI adapter for any power tool that is used with any type of wet methods.

Mark the area to be drilled, FPO Supervisor should provide you with the location, plans, and materials needed.

Flooring and/or wall materials

Center the drill bit on the marked location first. Take an upside-down waxed paper cup and fill with shaving cream over the location to be drilled or cut. The shaving cream foam should cover the entire area to be impacted by the tip of the drill bit or the cutting edge of the tool.

Note: Do not use a Styrofoam cup, as the drilling activities can cause it to disintegrate.
Center a wet paper towel over the end of the cup. Place the drill bit though the paper towel and add shaving cream into the cup.

Make sure you fill the cup entirely with shaving cream to ensure there are no air gaps in the cup.

When drilling into ceilings or any material above your head, fill the cup up to the brim to maintain a good seal.

Start drilling the hole, using a low speed until the entire cutting edge of the tool has passed through the floor tile and into the substrate. Finish drilling to the desired depth.

Run a proper HEPA vacuum with the intake hose directing at the point where the drilling is happening. You want the HEPA vacuum to remove any dust that may become airborne.

After drilling, remove all cuttings and debris using a wet/dry HEPA vacuum.

HEPA vacuum and wet wipe accessible dust or debris that is generated in the general work area.

Wet wipe the drop cloth used in the work area and the surfaces adjacent to the area where the hole was cut or drilled.

Clean all tools, equipment, and work area by wet wiping and using a HEPA vacuum. Return tools and equipment to outside the work area.

Separate, package, and properly label any asbestos waste for proper disposal.
Decontaminate the packaged waste and remove the asbestos containing waste to outside of the work area.

Apply lockdown encapsulant, wherever required, using a hand or garden sprayer to surfaces there the asbestos containing material was removed or disturbed.

Remove the drop cloth and place into the contaminated disposal bags.

Complete a visual inspection of the post-work area. This must be performed by a 16-hour trained competent person.

Transport waste to designated asbestos waste storage area.

Return the tools, equipment, and materials to FPO storage area.
Restore normal accessibility to work area.

Contact Environmental, Health, and Safety with any questions regarding this program.
EHS Manager- Sam Hafley (660) 543-4839