

UNIVERSITY OF KANSAS  
LAWRENCE CAMPUS

University Safety & Health Manual

Prepared By

University Safety and Health Committee  
Department of Environment, Health and Safety  
Department of Human Resources

Revised Spring 2000

## FOREWORD

Each employee of the University of Kansas performs an essential role regardless of the type of position they occupy within the University. Proper job performance not only involves knowledge and skill but also requires a constant awareness of the importance of safety and health.

Faculty members and students in the numerous classrooms, studios or laboratories on campus or in University-sponsored field trips also require the knowledge, skill and awareness necessary to carry out assigned activities in a safe manner.

The University of Kansas safety and health program is designed to reduce accidents, save lives, eliminate suffering and reduce financial loss to employees, students and the State. This safety and health manual is issued with the intention that supervisors, employees and students will assume a greater degree of personal responsibility for the prevention of accidents; no job or activity is so important and no service so urgent that time cannot be taken to work in a safe manner. It is expected that these procedures will be adhered to in all university-related activities. When and where protective equipment, machine guards or other safety devices are required and employees and students have been trained in their proper use, the use of such equipment or devices is to be considered mandatory. When and where new safety devices are obtained and or training for new applications of existing devices is conducted, (that were not required for immediate compliance at the time this manual was distributed) these devices and or applications will also be considered mandatory.

The State Division of Industrial Safety and Health, State Fire Marshall's Office, State Department of Transportation, KU Department of Environment, Health and Safety, the KU Department of Human Resources and the University Safety and Health Committee were sources for the information contained in this manual. Failure to adhere to these requirements may result in injury to an employee/student or damage to University equipment or property. Recommendations for improvement in the manual are solicited. Information on revisions or additions to the manual will be provided as needed. Questions or feedback regarding these procedures should be directed to the KU Department of Environment, Health and Safety, 140 Burt Hall, 864-4089.

You should also be aware that there are other environment, health and safety procedures manuals that may need to be referred to in specific situations. The other manuals are the Laboratory Safety Manual and the Hazardous Materials and Waste Management Procedures Manual.

# The University of Kansas - Lawrence Campus

## Health and Safety Policy (As Approved by the Provost)

It is the policy of the University of Kansas-Lawrence to conduct all educational, research and campus activities safely and in a manner that protects the health of employees, students, and the public.

Each administrator is committed to the enforcement of the health and safety policies of the University and to promulgating appropriate safety practices within his or her area of responsibility.

All faculty members and others involved in instructional and/or research programs are responsible for seeing that the students in their courses and laboratories are properly trained and educated about applicable safety and health policies and practices prior to exposure to instructional or research hazards.

Each employee and student is entitled to have access to information about the University's health and safety policies and practices and is responsible for knowing and adhering to health and safety policies and practices as they are applicable to the instruction, research and work settings in which he or she participates.

Each employee is responsible for maintaining a safe work place. Employees have a continuing responsibility to develop and follow practices that achieve these goal.

Each employee who manages or supervises the work of others is additionally responsible for seeing that employees and students for whom they are responsible are properly trained and educated about safety and health practices.

Each guest of the University is expected to adhere to the health and safety policies of the University while on campus.

All University-related facilities, activities, and programs shall be designed, conducted, and operated in a manner which reasonably protects human health and safety. Adherence to these principles is necessary in order for the University to achieve its mission of providing quality instruction, research, and services.

The University strives to provide training and education conducive to the establishment and maintenance of safe educational, research and work environments.

# In An Emergency

## Dial 911

### For Routine Assistance

Accident/Injury Reporting: Send 1101-A forms to Human Resources		
Information/Questions Contact	Human Resources	864-4946
Air Quality: Noxious Vapors, Odors, Smells	Environment, Health & Safety	864-4089
Inadequate Ventilation/Airflow	Facilities Operations	864-4770
Animal Experiments: Permission/Complaints	Animal Care Unit	864-5587
Asbestos Concerns:	Environment, Health & Safety	864-4089
Biological Hazards: Approval/Use/Disposal	Environment, Health & Safety	864-4089
Chemical Hazards: Approval/Use/Disposal	Environment, Health & Safety	864-4089
Fire Hazards: Concerns/Complaints	Environment, Health & Safety	864-4089
Empty Fire Extinguishers	Facilities Operations	864-4770
Hazardous Materials: Approval/Use/Disposal	Environment, Health & Safety	864-4089
Human Experiments: Approval/Complaints	ACHE	864-3126
Advisory Committee on Human Experimentation		
Job Injuries Requiring Medical Treatment:	Lawrence Memorial Hospital	749-6100
Emergencies - Dial 911 or go to Emergency Room		
Non-Emergencies - Occupational Health Clinic (call for appointment)		840-3121
Laser Hazards: Approval/Use/Disposal	Environment, Health & Safety	864-4089
Lead Paint Concerns:	Environment, Health & Safety	864-4089
Radioactive Materials: Purchase/Use/Disposal	Environment, Health & Safety	864-4089
Resource Conservation/Recycling:	Environment, Health & Safety	864-4089
Safety Concerns: Unsafe Conditions/Practices	Environment, Health & Safety	864-4089
Safety Equipment: Selection Assistance	Environment, Health & Safety	864-4089
Safety Training: Manuals, Videos, Presentations	Environment, Health & Safety	864-4089
Temperature Control: Too Hot/Too Cold	Facilities Operations	864-4770
Traffic, Crime Prevention, or Security:	Public Safety	864-5900
Water Quality: Funny Taste/Smells/Colors	Environment, Health & Safety	864-4089
Water Quantity: Low Pressure/Flow	Facilities Operations	864-4770
Workers' Compensation: Information/Questions	Human Resources	864-7410

# The University of Kansas - Lawrence Campus

## University Safety & Health Committee

### Committee Members

Mike Russell, Environment, Health and Safety (Contact).....	864-4089
Linda Fund, Human Resources, . . . . .	864-4946
David Leach, Facilities Operations . . . . .	864-5622
Andy Pritchard, Aerospace Engineering . . . . .	842-8927
Kent Miller, Watson Library . . . . .	864-8989
John Mullens, Public Safety. . . . .	864-5572
Ruth Smith, Student Housing . . . . .	864-3097
Matthew Adeyanju, Health, Physical Education & Recreation. . . . .	864-0796

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# 1.0) RESPONSIBILITIES

## Supervisory 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 complied with at all times, 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.

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 (please see the appropriate Employee Handbook, section on Accident Reporting for additional information on accident reporting responsibility).

## Employee and Student 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 with regard to 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 (please see the Classified Employee Handbook for additional information about accident reporting responsibility).
- Submitting recommendations for improving safety and efficiency.

## **General Faculty/Student Safety and Guidance for Special Situations**

Note: For most faculty members and students in the classroom, some parts of this manual are not applicable. In this section, the faculty members/students are guided to those sections which are generally and universally applicable and provides general guidance for identifying when additional sections of this manual and/or the Laboratory Safety Program manual are applicable. Whenever assigned tasks involve the use of equipment or materials identified in this manual, the procedures in the sections applicable to that equipment or those materials shall be followed. The use of word, “employee” in this manual is inclusive of all students and faculty members when an assigned activity involves a procedure, material, or equipment identified in this manual.

### **Safety Procedures Applicable to all Faculty Members, Students and Employees**

The following are applicable to all faculty members/students:

- Office and Classroom Safety -- section 20
- General knowledge of “Fire Prevention and Protection” -- section 18.
- Emergency Weather and Weather Related Emergency Procedures -- section 22.
- Use of stairways and walking safety -- section 15, pages 15-2 & 15-3.
- The general parts of “Housekeeping - Physical Environment and Working Conditions” -- section 16, pages 16-1 & 16-2.
- Use and Care of Electrical Equipment -- section 14, page 14-1.

## **Guidance for Special Situations**

- Applicable procedures from sections 2, 10, 11, 12, 13 and 14 shall be followed when assigned tasks involve hand tools, power tools or power equipment.
- All of “Chemical Safety”, section 5, applies when the assigned tasks in a non-laboratory setting involve hazardous chemicals. See the section below on “Laboratory Safety” for the definition of “laboratory” and the additional safety requirements for laboratories.
- The requirements of section 3 shall be met whenever motorized equipment or university vehicles are used.
- Individuals who enter laboratories posted as hazard level 1, 2, 3, or 4 shall know (be trained) and meet the requirements specified in Section 21 and/or Appendix A of this manual, as applicable.

NOTE: Laboratory users of hazardous materials or radiation sources additionally must meet the applicable requirements of the KU-Lawrence Campus Laboratory Safety Manual.

## **Laboratory Safety**

- All activities performed in a laboratory are subject not only to the applicable portions of this manual but also the applicable parts of the Laboratory Safety Program manual which is available from the Dept. of Environment, Health & Safety. See definition below for “laboratory”.

### 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.)

There is one important exception of the restriction of the word “laboratory” to research and classroom related activities. Any use of radioactive materials or of Radiation Generating Devices by any one on campus is included under this definition of “laboratory” without exception and is subject to the Laboratory Safety Program.

### Definition of Laboratory Use of Hazardous Materials and/or Sources of Radiation

Any handling or use of such hazardous materials/radiation sources in which all of the following conditions are met:



- Manipulations of hazardous materials/radiation sources are carried out on a “laboratory scale”;
- Multiple procedures or hazardous materials/radiation sources are used;
- The procedures involved are not part of a production process, nor in any way simulate a production process;
- Protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous materials/radiation sources.

#### Definition of Laboratory Scale

Any work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. This does include work with sources of hazardous radiations at the research or classroom level. Laboratory scale excludes those workplaces whose function is to produce commercial quantities of materials.

Note to Faculty Members and Teaching Assistants: You are responsible for providing the appropriate training before you make an assignment which requires the use of equipment, materials or processes that are covered by any special situations such as those given in the representative but incomplete list above.

## **Reporting Safety Concerns**

The University strives to provide safe working conditions to protect employees against hazards. It is the obligation of each and 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 (864-4089).

EHS is available to assist with safety and health related questions, conducts inspections, review accident/injury issues, provides information and recommendations to eliminate/minimize hazardous situations and recurrence of accidents/injuries. EHS also can provide appropriate safety & health training and has a library of videotapes available for use. You can also find information at the EHS website: [WWW.EHS.UKANS.EDU](http://WWW.EHS.UKANS.EDU).

## **Accident/Injury Reporting**

All work-related accidents/injuries must be reported promptly to the immediate supervisor, especially if they may involve a claim for medical expenses or time loss beyond the date of the incident. The supervisor must report the accident/injury as soon as possible (preferably within 24 hours) by completing and submitting an accident/injury report form (1101-A) to the Department of Human Resources (an original and two copies).

Employees must keep their supervisor advised of any change in their condition, particularly if an employee seeks medical attention at a later date and an incident becomes a reportable accident. If no medical expense or time loss is involved at the time of the accident, then a record of the incident should be prepared and kept on file in the department.

## **Medical Treatment**

If medical treatment is needed as a result of an occupational injury or illness, employees must seek treatment at Lawrence Memorial Hospital (LMH). If immediate medical treatment is needed because of a life-threatening injury, extreme pain or discomfort, the employee should go directly to the LMH Emergency Room for treatment.

If the occupational injury or illness is not life threatening or does not involve extreme pain or discomfort, the employee should call the LMH Occupational Health Clinic at 840-3121 to schedule an appointment. Clinic hours are Monday through Friday from 8:00 a.m. to 5:00 p.m. This is the recommended treatment procedure for non-life threatening injuries, however, if an employee prefers to go to the LMH Emergency room, they may do so. Failure by the employee to go to LMH will result in a \$500 medical payment limit and claims will not be accepted by any applicable health insurance carrier. No lost time compensation will be paid. Optional treatment sources may be available, upon referral by LMH.

Self-treatment of minor injuries is encouraged. The injury should be treated as it would if the injury had occurred at home. Such treatment would not prevent coverage under the Workers' Compensation program if medical treatment is needed later.

## **Workers Compensation**

If a work-related accident or medical condition, including occupational illness occurs, the University provides to all "employees", including student employees and part-time employees, coverage under the Workers' Compensation Act. Coverage begins at the time of employment and provides for medical expenses and compensation for lost wages subject to a weekly maximum as the result of an occupational injury or illness. Any employee injured in the course of employment, may receive compensation for the injury, providing the injury is not caused by misconduct. Prompt reporting by the individual to their supervisor (24 hours) and Human Resources (48 hours) is required for all on-the-job accidents and apparent occupational illnesses as defined above. Failure to report an accident to your supervisor within 10 days of an accident will invalidate any subsequent claim for workers compensation. Coverage may also be provided for damage to personal property, such as prescription glasses, that occurs as a result of the performance of work. Employees should refer to their appropriate staff handbook for further details and information related to workers compensation such as lost time, medical bill submission, leave options, return to work, fraud and abuse, controlled substance testing, .

## **Campus Smoking Policy**

The University is committed to providing a safer, healthier environment for all employees, students and visitors. Most of our activities take place in buildings that were constructed many years ago and do not have modern ventilating systems. Even in newer buildings, conditions may be less than ideal. While we cannot rebuild our campus, we can adhere to practices that contribute to healthier conditions. Also, many individuals experience discomfort or allergic reactions when exposed to second-hand smoke and there is mounting evidence that it poses significant health risks. We all have an obligation to ensure a safe and healthy work environment.

For these reasons, a no-smoking policy has been adopted. Smoking is not permitted in any Lawrence campus or Regents Center building, or in the facilities of the Capitol Center in Topeka. Excluded from this policy are the residential facilities operated by Student Housing, the Kansas Union, the Adams Alumni Center, and the Kansas University Endowment Association, which have their own policies.

All members of the University community share the responsibility for adhering to this policy and for bringing it to the attention of visitors. Any complaints or concerns regarding this policy are to be directed to the Department of Human Resources.

## **2.0) PROTECTIVE CLOTHING & EQUIPMENT**

### **General Safety Procedures**

In order to reduce the possibility of accidents, operators of machines in which clothing or hair can become tangled will wear close fitting clothes and buttoned down sleeves, short-sleeved shirts or jackets. Neckties, gloves (except where required), rings or watches will not be worn. Long hair will be confined in a suitable head covering.

Employees assigned to shop or field activities will wear adequate clothing to prevent injuries from exposure to the weather, impact with objects and contact with hazardous substances.

Personal protective equipment is only effective when properly selected and used. Protective equipment, protective clothing, respiratory devices, and protective shields and barriers will be kept in an accessible location, (in proper working order) and in a sanitary condition.

### **Hard Hats**

Safety hard hats shall be worn by all employees when duties are being performed at all sites where potential hazards exist from fixed, falling or flying objects. Hard hats will be worn in areas where impact or penetration can be caused by fixed objects.

### **Eye and Face Protection**

Protective eye and/or face equipment shall be worn by all employees when there is a reasonable probability of injury which could be prevented by such equipment. Such protection is required for, but not limited to, the following operations and equipment:

Air Compressor, Spraying, Sand Blasting, Power Drilling, Wire Brushing, Tree and Bush Trimming, Abrasive Grinding, Power Brooming, Cutting Torch, Working Around Chipper, Welding and Welding Inspection, Use of Chemicals, Substances, Hand or Table Power Equipment, Weed Eaters, Edgers, etc.

## **Respiratory Protection**

### **General**

Work environments where airborne contaminants are present may require the use of respirators in order to protect the employee's health and safety. Engineering controls, such as enclosure or confinement of the operation, general and/or local ventilation, or substitution of a less toxic material, shall be initially implemented to eliminate as far as feasible any potential airborne contaminants (dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors). If, after these actions, respiratory hazards will still be present or produced, then the appropriate respiratory protection equipment shall be selected and provided to the employee.

### **Respiratory Hazards**

These include:

- oxygen deficiency,
- gas and vapor contaminants,
- particulate or fume contaminants, and the
- possible combination of any of these.

Respirators fall into three general classifications:

- air-purifying,
- air supplying, and
- combination air-purifying/air-supplying.

The selection of a respirator for any given situation requires consideration of the following factors:

- nature of the hazard,
- extent of the hazard,
- work requirements and conditions, and
- characteristics and limitations of available respirators.

### **Program Policy**

No employee shall be issued, required to wear, or use a respirator without the requirements of this program being met.

## Program Requirements

- 1) Written Respiratory Protection Plan - Employee's campus unit shall have a written respiratory protection plan approved by the Dept. of Environment, Health & Safety.
- 2) Hazard Assessment/Respirator Selection - The work supervisor is responsible for ensuring that the appropriate hazard assessment has been performed so that the proper respiratory protection can be and is selected.
- 3) Employee Medical Surveillance - each employee, prior to being assigned to an operation requiring respiratory protection, shall undergo examination by a licensed physician to determine that they are physically and physiologically capable of wearing and working with a respirator. As a minimum, this shall include a routine physical and a pulmonary function test.
- 4) Respirator Fit Testing - each employee assigned a respirator shall be fit tested to assure that the respirator assigned to them provides a tight seal. Employees with facial hair that interferes with the respirator's seal must either shave or shall not be allowed to wear air-purifying respirators. Employees shall not wear normal corrective lenses (glasses) with full-face respirators because the earpieces interfere with the seal. Special corrective lenses designed for full-face respirators can be purchased.
- 5) Respiratory Safety Training - Both the user of the respirator and the supervisor shall be trained in the proper selection, use, limitations, and maintenance of respirators.
- 6) Respirator Maintenance - The user of a respirator shall be responsible for performing routine inspection, maintenance, cleaning, and storage of their respirator if it is of the reusable type. Problems should be identified to the supervisor and defective respirators must immediately be repaired or replaced.

## Program Assistance

Contact the KU - Department of Environment, Health & Safety for assistance with any of the above **(864-4089)**.

## **Foot Protection**

Employees shall wear shoes suitable for the task performed. Shoes worn by field employees shall cover the foot, i.e., oxfords or boots. Arch protectors will be worn when operating equipment such as pneumatic hammers, tampers, and pavement breakers; or when climbing ladders is a frequent work requirement.

## **Gloves**

Where needed, employees shall wear gloves which are suited to their work. Special care must be taken when gloves must be worn while operating drill presses, power saws, and similar rotating equipment. Gloves must protect the employee from sharp edges, metal filings, sparks, splinters, etc., but must allow the employee complete control of the equipment in use.

Chrome-tanned leather gloves or cloth gloves with leather palms, due to their resistance to abrasion, sparks, or molten metal, are recommended for general use and material handling jobs. Heat resistant gloves will be worn for protection against excessive heat.

For special situations gloves made from other materials may be necessary. Refer to M.S.D.S. for further information or contact Environment, Safety and Health.

## **Ear Protection**

Ear protection is required whenever Dba noise levels exceed limits as shown in Table 1 & 2 in Section 6, pages 6-2 and 6-5 (noise level plus exposure time).

## **Fluorescent Vests**

Safety fluorescent vests shall be worn at all times while engaging in operations upon or adjacent to a street open to traffic.

## **Safety Belts**

Employees shall wear safety belts when working at elevated levels not protected by handrails or a safety net or when working from suspended scaffolding. An elevated level is defined as a height of 6 feet or more above ground level.



## **Back Support Belts**

Because of the lack of supporting evidence for the effectiveness of Back Support Belts in the prevention of back injuries, there is no recommendation for their use as a safety item, at this time. There is some indication that they may be useful as a therapeutic device for those who have existing back problems. In those cases, individuals should contact a medical professional. If using a Back Support Belt on the job, follow these guidelines for their use.

- Only wear a belt while performing the strenuous task and then loosen it or remove it completely. The belt should be tight as possible while being worn.
- Never lift more than you would without the belt.
- Follow all proper lifting procedures as appears on page 8-2 of this manual.

## **Other Personal Protective Equipment**

Employees shall use appropriate protective equipment where hazards may be encountered capable of causing injury or impairment to the body and supervisors shall require such use. If an employee avoids or disregards a request to wear protective clothing or equipment required on a job, or a supervisor fails to provide or encourage use of appropriate safety equipment, corrective or disciplinary action may be administered in accordance with existing University procedure. At the discretion of the supervisor, employees may be required to wear protective equipment while engaging in work activities other than those specified in this manual.

## **3.0) VEHICLES & MOTORIZED EQUIPMENT**

### **General Safety Procedures**

All employees who operate motorized equipment and/or drive state vehicles will be required to have a valid Kansas drivers license.

Motorized equipment, which includes all vehicles, will be operated and maintained in compliance with the law and the directives of the University.

Motorized vehicles and/or equipment will not be driven or road tested at speeds in excess of the established speed limits, nor at speeds greater than is reasonable and prudent under the existing conditions; employees do not have special traffic privileges.

Employees who operate such equipment or vehicles will be familiar with the contents of the Kansas Driving Handbook, pertinent traffic laws, the appropriate equipment operator's manual, and the directives of the University. Employees will use seat belts and shoulder harnesses when such devices are provided on the vehicles or equipment they are operating or when a passenger. Standing in the back of vehicles is not permitted.

Operators will report all unsafe or defective equipment to their supervisors. All vehicles or equipment are to be cleaned regularly and maintained in a safe operating condition.

No operator will start, stop, slow down, turn, or back vehicles or equipment without using the proper signals and making certain that the maneuver can be exercised safely.

### **Vehicle or Equipment Operation**

Vehicles or equipment will not be stopped or parked where doing so may interfere with safe working operations or with the movement of pedestrians or traffic. Vehicles or equipment will not be left adjacent to the street in such a manner so as to constitute a traffic hazard, nor will it be parked on a curve or hill where it will obstruct the sight of traffic by other drivers.

Operators will not park and leave vehicles or equipment without setting brakes. Keys should be removed when vehicles are unattended. Chocks are to be placed under the wheels as an additional precaution where conditions warrant.

Vehicles or equipment being loaded or unloaded at a dock with a forklift or mechanical handling gear will have the brakes set and both rear wheels chocked. When parking non motorized equipment (trailers, air compressors, etc.) without brakes, the wheels will be chocked.

Extreme caution will be used when loading equipment or moving objects with a winch. When winches are used to assist in the loading, the operator will always be at the controls and employees, who are helping, will stand well clear of the cable.

Vehicle or equipment operators will reduce speed during periods of poor visibility and will turn on the headlamps as an added precaution.

Equipment which is customarily towed will not be towed unless safety chains are used in addition to the regular tow bar or connector. The safety chains will be permanently attached to all towed equipment and have sufficient strength to provide the safety needed if the tow bar should fail. Chains, hooks, and attachments will be kept in good repair and will be regularly inspected for weakened areas.

Operators will not tow a piece of equipment, which requires the use of the pintle hook or hitch, without first securing the pintle hook or hitch pin with wire, cotter pins, or other adequate devices.

When operating equipment for snow removal or sanding operations, caution will be exercised at all times. Snow or sanding operations will be in compliance with the existing directives.

Equipment operators shall shift into lower gears before descending steep hills; gears will not be disengaged nor the vehicle allowed to coast at any time.

Unauthorized persons will not ride in or operate University equipment.

No employee shall drive a vehicle when the view of the driver is obstructed to the front or sides of the vehicle or when the driver's control over the vehicle is impaired. (The number of persons in the front seat shall not exceed the number of seat belts provided.)

Employees will not be allowed to sit on the edge of or stand up in a pickup or truck box when the vehicle is in motion.

Employees are not permitted to ride on the hood, running board, or fender of any vehicle or equipment, nor project any part of the body beyond the sides of the equipment. No one is permitted to get on or off vehicles or equipment while it is in motion.

Persons are not permitted to ride as a passenger on a trailer, distributor, motor grader, tractor, front end loader, motorized mower, or like equipment, unless in training or required to assist in equipment operation or inspection.

Vehicle or equipment doors will be kept closed while the unit is in motion.

No one will open the door of any vehicle or piece of equipment on the side exposed to moving traffic unless and until it is safe to do so, and it can be done without interfering with the movement of other traffic.

Drivers will not permit vehicles or equipment to be loaded beyond their capacity nor will they permit material, supplies, or miscellaneous gear to be loaded on the running board, fender, hood, or truck box in any manner which would permit any portion of the load to extend beyond the fender line, be high enough to strike overhead obstacles, or in any manner interfere with the vision of the operator.

Warning devices placed upon University equipment will be in accordance with this manual and other directives.

There shall be a safety prop or block used beneath dump truck boxes for the protection of employees who are inspecting or repairing the equipment. The prop or block will be of sufficient strength to support the weight of the box. Caution: The prop or block must be removed when the box is being powered down to prevent damage to the frame.

An employee will not start the motor on self-propelled equipment unless seated in the driver's seat and certain that the gears are in neutral.

Tools carried on vehicles or equipment will be placed securely in compartments or otherwise fastened.

If a heater or starting fluid is used for cold weather starting, the manufacturer's recommendations will be followed. Since starting fluid is flammable, do not smoke when using such fluids, nor puncture or burn the container. Dispose of the container according to manufacturer's instructions.

Never refuel vehicles or equipment while the engine is running. Static electricity, a spark from the ignition system or a hot exhaust could cause the fuel to ignite.

Mechanical and hydraulic adjustments will be made only when the engine is off. The bucket is to be lowered to the ground when greasing or repairing a backhoe and loader or when the unit is parked.

Equipment control levers are to be activated only from the operator's seat.

Watch for overhead and underground high-voltage electrical lines and telephone lines. Be sure of gas and water line locations before starting work.

Make sure all pressure and temperature gauges are operating and are "in the green" before beginning work.

Chains, ropes, or tools will be removed from the floorboards before operating the machine; floorboards or mounting steps shall be grease and oil free to prevent slipping.

Always face or look in the direction that the equipment is traveling. Avoid sudden brake stops with a raised or loaded bucket and make sure the bucket does not pass over anyone.

Exercise extreme caution when working close to bank edges where there is soft footing, danger of collapse, or when loading at the base of a high bank where there is a possibility of the bank collapsing on the equipment.

The machine will be directly under the control of an authorized operator at all times while a load is suspended.

A radiator cap shall not be removed from an overheated radiator until the engine has cooled and the water has ceased boiling. Vehicles should be equipped with a safety petcock valve, which will be opened to let steam bleed off before the radiator cap is removed.

## **Tractors**

When operating a tractor, extreme caution must be exercised when driving up an incline. Engage the clutch gently; a tractor can upset if the center of gravity moves behind the point where the rear wheels touch the ground. If caught on a steep incline, back down very slowly and apply the brakes lightly. Weight on the front of the tractor will help in this type of situation.

Keep the tractor in gear when going downhill; this allows the tractor's engine to serve as a brake. Some tractors may have "free wheeling" in their transmission drive. Make sure that this type of transmission is in direct drive before attempting to use the engine as a brake. Stop the engine and set the brakes before getting off the tractor. Disengage the power take-off (PTO) when it's not in use. Use the PTO shield and make sure all shields are in place before using the unit.

In towing operations always hitch to the drawbar, take up the slack slowly, and never jerk the chains or cables.

Roll-over protection structures are not to be drilled, added to, or altered in any way.

## **Backhoe**

Lower the backhoe bucket to the ground before dismounting from the tractor and adequately block-up the backhoe when it is detached from the tractor.

Be careful of bystanders when lowering the stabilizers and operating the backhoe.

To prevent upsets, use caution in swinging a loaded bucket on inclines.

## **Loaders and Bulldozers**

Lower all attachments (blades or buckets) to the ground before dismounting from the equipment. Turn off the engine and set the parking brake before getting under the machine for any reason.

For travel speeds, raise the dozer blade approximately fifteen (15) inches off the ground and pitch back to afford maximum visibility; the loader bucket shall never exceed three (3) feet from the ground except when approaching the hauling unit or dumping point.

## **Operation Near Power Lines**

When operating near overhead electric lines, rated over fifty (50) KV, minimum clearance between the lines and any part of a vehicle or load will be ten (10) feet plus 0.4 inches for each KV over fifty (50) or twice the length of the line insulator but never less than ten (10) feet.

If an energized power line is contacted by a vehicle or piece of equipment, the operator shall stay with the machine until the vehicle or piece of equipment is cleared unless a fire breaks out. In this event, the operator can or will jump clear. The operator shall never climb down because contact between the machine and the ground could be established.

## **4.0) GROUNDS MAINTENANCE OPERATIONS**

### **General Safety Procedures**

Safety rules applying to all types of equipment are:

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

Never attempt to unclog or adjust operating 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.

### **Safety when Mowing with Self-Propelled Riding Mowers**

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 functioning at all times.

Keep all guards and shields in place.

Observe all motor vehicle laws.

## **Mowing with Small Hand Rotary 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 in order to provide adequate protection. In some cases, additional personal protective gear may be necessary. Consult the M.S.D.S. form or your supervisor if there is a question about protection from material being used. (see also Section 2)

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 - General Safety**

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.

## **Operation of 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 found in Section 6.

## **Use of 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 time as shown in Table 1 and 2 in Section 6. 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.

## **General Procedures for 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 sideshift.

## **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 side-slip 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 follow safe lifting procedures at all times. 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 keep hands away from moving parts at all times. Turn units off prior to any equipment cleaning or maintenance. Hearing protection devices will be used in accordance with the requirements under Noise Exposure, in Section 6.

## **5.0) CHEMICAL SAFETY**

### **Chemical Hazard Communication**

The purpose of this program is to provide appropriate information concerning the hazards of chemicals present and used at the University of Kansas - Lawrence Campus is available and to communicate this information to University personnel. This is necessary so that they may be informed of the potential risks associated with the hazardous chemicals in their work area and aware of how to protect their safety and health.

This program, hereafter referred to as the University of Kansas Chemical Hazard Communication Program (KU-CHCP), has been designed to meet the requirements established by the Kansas Department of Human Resources - Division of Industrial Safety and Health (KDHR-ISH). This state agency requires public sector employer's in Kansas to fully comply with the Federal Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard - 29 CFR 1910.1200. The Federal OSHA Hazard Communication Standard compels employers to provide employees with information concerning the hazards associated with the chemicals in their workplace. This standard requires a written hazard communication program, container labels and other forms of warning, inventory of chemicals, material safety data sheets, and chemical safety training and information sessions.

### **Program Policy**

No faculty, staff, or students of the University of Kansas - Lawrence Campus shall engage in any job, project, or task which presents the risk of exposure to hazardous chemicals without first having received the appropriate information and training as required by this program. This is necessary in order to protect the safety and health of University personnel and achieve the goals and requirements of the University's Safety and Health Policy.

### **Application**

The KU-CHCP applies to all chemicals or chemical products present at the University which meet the definition of a hazardous chemical and to which University personnel may be exposed under normal conditions of use or in a foreseeable emergency.

**Hazardous Chemical** - any chemical with one or more of the following properties:

- Physical Hazards: Combustible Liquid, Compressed Gas, Explosive, Flammable, Organic Peroxide, Oxidizer, Pyrophoric, Unstable, or Water Reactive.
- Health Hazards: Carcinogens, Corrosives, Irritants, Sensitizers, Toxic or Highly Toxic Agents, Reproductive Toxins, Hepatotoxins, Nephrotoxins, Neurotoxins, Hematopoietic System Agents, Agents which can damage the eyes, skin, lungs, or mucous membranes.
- This includes laboratory chemicals, cleaning agents, floor strippers, maintenance solvents and oils, paints and thinners, compressed gases, printing inks and solvents, photocopy inks and toners, and many other chemical products.

**Exceptions** - chemicals to which the KU-CHCP does not apply:

- Food, drugs, cosmetics, or alcoholic beverages packaged for sale to consumers or intended for personal consumption by employees in the workplace.
- Any consumer product or hazardous substance where it can be demonstrated that it is used in the workplace in the same manner as normal consumer use, and the use results in a duration and frequency of exposure which is not greater than consumer exposure.
- Any drug (as defined by the Federal Food, Drug, and Cosmetic Act) that is used in its final form for direct administration to the patient (Health Center Pharmacy).

**University Personnel** - means an individual representing or associated with the KU-Lawrence Campus in one of the following ways:

- Faculty, Staff, or Student Employees who may be exposed to hazardous chemicals under normal operating conditions or in a foreseeable emergency.
- Individuals engaged in either an academic, research, or volunteer relationship with the University but not classified as employees of the University and who may be exposed to hazardous chemicals under normal operating conditions or in a foreseeable emergency.
- University personnel who are never exposed to hazardous chemicals are not covered by this KU-CHCP.

## Responsibilities

**KU Dept. of Environment, Health & Safety** - shall have responsibility for campus-wide coordination of the KU-CHCP. This shall include the following:

- Development, review, and maintenance of the written KU-CHCP.
- Assist campus units in implementing the KU-CHCP.
- Develop appropriate general hazard communication training programs and perform general training sessions for campus units as requested.
- Develop and maintain a central repository for original copies of Material Safety Data Sheets forwarded by campus units and/or manufacturer's.
- Maintain a comprehensive, campus-wide chemical inventory list based upon the information provided from campus units.
- Perform periodic inspection of units to assess adherence to the KU-CHCP.

**Unit Director, Supervisor, or Designee** - shall have ultimate responsibility for compliance with all provisions of the KU-CHCP applicable within their unit. This includes:

- Unit specific chemical inventory list is developed and kept current.
- Appropriate container labeling and other forms of warning are in place.
- MSDS's for each hazardous chemical present in their unit are readily available to their employees from somewhere within the unit, or at their work areas.
- Each of their employees has been provided the appropriate (general and specific) Chemical Hazard Communication Information and Training.

**University Personnel** - shall be responsible for complying with all provisions of the KU-CHCP. This includes:

- Being aware of hazardous chemicals present in the work area and keeping supervisor apprised of chemical inventory changes.
- Make sure each container of hazardous chemical being used is properly labeled and appropriate hazard warnings are in place before performing tasks.
- Know where MSDS's are located and be familiar with the hazard information for the

chemicals routinely used.

- Pay attention to chemical hazard information and training provided and follow its requirements.

## **Chemical Inventory**

The unit director, supervisor, or designee shall establish and maintain a current inventory of all hazardous chemicals present in their unit.

- This may be accomplished as either a comprehensive unit chemical inventory list or may be a compilation of sub-unit (work areas) inventory lists.
- The chemical inventory list should be kept as current as possible (KU-EHS Dept. recommends monthly updating).

The unit director, supervisor, or designee shall keep the unit or sub-unit chemical inventory lists readily accessible to all unit employees. The unit director, supervisor, or designee shall submit the unit or sub-unit chemical inventory lists to the KU Dept. of Environment, Health and Safety no later than January 1 of each calendar year. As a minimum, the chemical inventory list shall contain the following information: (See page 5-10 for an example form)

- Identity of Hazardous Chemical - (Trade Name, Product name or Chemical Name)
- Chemical's Manufacturer - (Correspond to above)
- Location Information - (Building, Department, and Room# or Area)
- Quantity of Chemical Present - (Maximum Daily Amount & Average Daily Amount)

## **Labels and Other Forms of Warning**

### **Container Labels**

The Federal Hazard Communication Standard requires that chemical manufacturers, importers, and/or distributors shall ensure that each container of hazardous chemical(s) leaving their workplace is labeled, tagged, or marked with the following information:

- Identity of the Hazardous Chemical
- Appropriate Hazard Warning
- Name and Address of the chemical manufacturer, importer, or other responsible party.



The unit director, supervisor, or designee, shall be responsible for ensuring that all containers of hazardous chemicals which their unit receives are labeled with the information identified above.

- Containers of hazardous chemicals without this information shall not be accepted.
- The original manufacturer's/importer's/distributor's label shall not be removed or defaced from incoming containers unless it is immediately replaced with a label which provides the required information.

The unit director, supervisor, or designee, shall be responsible for ensuring that each container of hazardous chemical(s) stored/handled/used in or by their unit is labeled, tagged, or marked with the following minimum information:

- Identity of the Hazardous Chemical
- Appropriate Hazard Warning
- All container labels shall be legible, in English (as a minimum), and prominently displayed on the container.

### **Other Forms of Warning**

Appropriate hazard warning signs are to be displayed in areas where there may be sufficient concentration of airborne chemicals to present a physical or health hazard to employees. This would include areas such as: welding, indoor operation of internal combustion engines or devices, indoor application of paints or adhesives, grinding or sanding operations, removal of asbestos and/or lead containing materials, pesticide application, chemical mixing, usage or manipulation, or any other operation/activity which has the potential for hazardous emissions.

The unit director, supervisor, or designee shall ensure that any person producing a potentially hazardous environment has posted the appropriate area hazard warning signs before initiating the operation/activity. Contact the KU Office of Environment, Health & Safety for assistance in identifying and obtaining the appropriate area hazard warning signs.

## Material Safety Data Sheets

Chemical manufacturers, importers, and distributors are required to send a Material Safety Data Sheet (MSDS) with the initial shipment of a chemical or when MSDS information is updated. The MSDS contains detailed information about the chemical such as:

- The product identity as used on the container label.
- The chemical and common name(s) of the hazardous chemical(s).
- Physical and chemical characteristics of the hazardous chemical.
- The physical hazards of the hazardous chemical.
- The health hazards of the hazardous chemical.
- The hazardous chemical's primary routes of entry.
- The OSHA permissible exposure limit (PEL), ACGIH threshold limit value (TLV), or any other recommended exposure limit or safety level.
- Whether the hazardous chemical is a carcinogen or potential carcinogen.
- Generally applicable precautions for safe handling and use (hygiene practices, protective measures, spill clean-up procedures).
- Generally applicable control measures (engineering controls, work practices, PPE).
- Emergency and first-aid procedures,
- MSDS date of preparation or last changes to it.
- Name, address, and telephone number of party responsible for preparing or distributing the MSDS (Manufacturer, Importer, Distributor, etc.).

The Federal Hazard Communication Standard requires that the University must maintain in the workplace copies of the required MSDS's for each hazardous chemical present, and must ensure that they are readily accessible (no barriers to immediate employee access) during each work-shift to employees when they are in their work areas. Therefore, the unit director, supervisor, or designee shall make an MSDS for each hazardous chemical present in their unit readily available to employees within the unit.

- Original copies of MSDS's received by units may be forwarded to The KU Dept. of

Environment, Health & Safety for inclusion in a centralized MSDS repository.

- A copy of the MSDS must still be present in the work area where the chemical is stored/handled/used and maintained so as to make the MSDS readily available to the employee.
- The KU-EHS Dept. recommends either a Unit MSDS file cabinet or a Unit MSDS notebook. Units which have several or numerous work areas or sub-units should develop an MSDS notebook or file for each work-area or sub-unit.
- The MSDS notebook or file must correspond to the unit's hazardous chemical inventory list; and both should be located in an area readily accessible to all unit personnel.
- MSDS's are also accessible over the Internet. The KU-EHS Dept. maintains an MSDS link page at the EHS Website. Go to [WWW.EHS.UKANS.EDU](http://WWW.EHS.UKANS.EDU) and click on MSDS Links. From there you can search for many MSDS's.

The unit director, supervisor, or designee shall be responsible for initiating and documenting the efforts undertaken to obtain the appropriate MSDS if one is not available in the work area or one has not been received. Assistance in obtaining MSDS's from manufacturers, importers, and distributors is available from the Dept. of Environment, Health & Safety.

## **Employee Information and Training**

The Federal Hazard Communication Standard requires that the University must provide its employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment and whenever a new physical or health hazard for which they have not received training is introduced into their work area.

The unit director, supervisor, or designee, is responsible for providing each of their employees with the appropriate Chemical Hazard Communication Information and Training which must include the following, as a minimum:

- Location of hazardous materials in the workplace.
- Location, availability, and details of the University of Kansas written chemical hazard communication program.
- Methods and observations that may be used by personnel to detect the presence or release of hazardous chemicals in the work area.
- The physical and health hazards of the chemicals in the work area.

- The measures employees can take to protect themselves from these hazards, including specific procedures the University and/or unit has implemented to protect employees from exposure to hazardous chemicals (engineering controls, work practices, emergency procedures, personal protective equipment, waste disposal procedures, etc.).
- Location, availability, and details of unit specific hazard communication information, such as; unit chemical inventory lists, unit MSDS's, etc.

The KU Dept. of Environment, Health & Safety has developed general hazard communication and chemical safety training programs which meet these requirements and will gladly present them. A training session takes approximately 1-1.5 hours to present. Contact the KU-EHS Dept. to schedule a Chemical Hazard Communication Training Session.

In addition to general hazard communication training, it is the supervisor's responsibility to provide training on specific chemicals used/stored in the work area and whenever a new chemical hazard is introduced into the work area.

### **Training Documentation**

It is the responsibility of the unit director, supervisor, or designee to provide all required chemical hazard communication training and appropriately document that training. This shall include records which indicate the following: (See page 5-9 for example training log form)

- Employee name, position, SSN, and signature.
- Training session title, date, location, and instructor.
- Copy of training contents/outline or handout.

### **Non-Routine Tasks**

All tasks involving hazardous chemicals which are being done for the first time, or only periodically, shall be considered a non-routine tasks.

The unit director, supervisor, or designee shall provide any person required to perform a non-routine task with appropriate hazard communication training and sufficient time to review appropriate hazard information prior to initiation of the task. This information includes MSDS's, container labels, technical or product specification sheets, and any other appropriate hazard information. Contact the KU EHS OFFICE for assistance in collecting additional information or for review of safety/hazard concerns.

## **Contractor Notifications**

Contractor employees are to be informed of hazardous chemicals which they may encounter at their work location on campus and provided with the name of the University person(s) from whom chemical safety information is available. The unit directly overseeing (usually the Office of Design & Construction Management or Facilities Operations) the contractor is responsible for providing this information to the contractor.

Contractors who will be bringing and using hazardous chemicals on campus shall maintain MSDS's and a chemical inventory list at their campus work location. This information shall be readily available to the KU Dept. of Environment, Health & Safety, contracting unit, or local emergency service as needed.

## **Trade Secrets**

In some cases, the chemical manufacturer may withhold the complete chemical identity from the MSDS if it is a trade secret. However, the chemical and physical properties must be disclosed on the MSDS. Trade secret information will be made available to health professionals for medical treatment of exposed personnel, assessment of hazards and employee exposures, and selection of appropriate safety precautions. Contact the KU-EHS Dept. for further assistance.

## KU-CHCP

### UNIT SPECIFIC INFORMATION

- 1) Unit: \_\_\_\_\_
- 2) Unit Director: \_\_\_\_\_
- 3) Unit KU-CHCP Coordinator: \_\_\_\_\_
- 4) Unit/Work Area Chemical Inventory Coordinator: \_\_\_\_\_
- 5) Unit/Work Area Chemical Labeling Coordinator: \_\_\_\_\_
- 6) Unit/Work Area MSDS Coordinator: \_\_\_\_\_
- 7) Unit/Work Area Training Coordinator: \_\_\_\_\_
- 8) Unit/Work Area Location for Copy of KU-CHCP: \_\_\_\_\_
- 9) Unit/Work Area Location for Chemical Inventory List: \_\_\_\_\_
- 10) Unit/Work Area Location for MSDS's: \_\_\_\_\_

# KU-CHCP EMPLOYEE TRAINING LOG

UNIT: \_\_\_\_\_  
TRAINER: \_\_\_\_\_  
DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_  
TRAINING TOPIC: \_\_\_\_\_  
\_\_\_\_\_

EMPLOYEE NAME	POSITION	SSN	SIGNATURE

PAGE #: \_\_\_\_\_

# KU - CHCP HAZARDOUS CHEMICAL INVENTORY LIST

BUILDING: \_\_\_\_\_ UNIT: \_\_\_\_\_  
 ROOM#: \_\_\_\_\_ WORK AREA: \_\_\_\_\_

Chemical Identity	Manufacturer	Hazard	Max.Daily Amount	Avg. Daily Amount	Units

PAGE #: \_\_\_\_\_



## **Chemical Storage & Handling**

Because of the large number of chemicals in use on campus, it is impractical to state how to properly store each one or what effects each chemical will have if mishandled. For information on a specific chemical, you should consult the container label, MSDS, and your supervisor. Contact EHS Dept. (864-4089) if further assistance or information is needed.

### **General Safety Procedures for Ordering Chemicals**

- Estimate the amount of each chemical required by carefully preplanning the work task.
- Select only those chemicals for which the available ventilation is adequate.
- Obtain supervisor approval before ordering chemicals.
- Obtain and review hazard information (MSDS) prior to ordering new or unusual chemicals.
- Order chemicals in smallest quantity possible.
- Prepare for the storage and use of the substance (establish storage location, post appropriate warning signs, obtain necessary personal protective equipment, transmit proper handling information to personnel.)

### **General Safety Procedures for Receipt and Distribution of Chemicals**

- Do not accept any chemical whose container is not properly labeled.
- Review and observe specific information (container label & MSDS) on the safe handling and storage of the chemical.
- When transporting chemicals, verify that the load is stable and secure. Whenever possible, transport chemicals on freight-only elevators to avoid potential exposure to public.
- When transporting gas cylinders, use an appropriate hand truck (never drag or roll cylinder), leave valve cap on until the cylinder is in place, and handle only one cylinder at a time.

### **General Safety Procedures for the Storage of Chemicals**

- Keep all containers in good condition and properly labeled.
- Store incompatible chemicals separately (do not store unsegregated chemicals alphabetically).
- Segregate chemicals by hazard class (flammable compressed gases, non-flammable compressed gases, poisonous compressed gases, flammable liquids, combustible liquids, flammable solids, corrosives-acids, corrosives-bases, poisonous compounds, oxidizers, organic peroxides, spontaneously combustible reactives, water reactives, explosives, and radioactives).
- Segregation/separation of chemicals should be by physical means (walls, dikes, beams).
- Secure all storage shelves and cabinets to prevent tipping.
- Verify that storage locations are dry and adequately ventilated.
- Do not store chemicals above eye level.
- Keep flammable liquids in approved safety cans and safety cabinets.
- Containers of hazardous liquids should be stored in secondary containment.
- Should keep adequate supplies of spill control/cleanup absorbent on hand.

### **General Safety Procedures for the Handling and Usage of Chemicals**

- Know the hazards associated with the materials you are using (review labels & MSDS).
- Review emergency spill procedures and be familiar with your responsibilities.
- Know the locations and proper use of available safety equipment (emergency shower, eyewash, fire extinguisher, fire alarm, and emergency phone numbers).
- Avoid working alone with chemicals; use the buddy system if possible.
- Do not eat, drink, smoke, chew gum, or apply cosmetics, or store these items in areas where chemicals are stored or used.

- Confine long hair and loose clothing when working with chemicals.
- Wear the appropriate shoes at all times (no sandals, perforations, or open toed shoes).
- Wear personal protective equipment (eye protection, hand protection, clothing) appropriate to protect from the chemical's hazard.
- Wear appropriate respiratory equipment when airborne contaminants cannot be sufficiently restricted by engineering controls.
- Never depend upon a "smell" to detect or to warn of airborne chemicals.
- Do not smell, taste, or touch with bare hands, any chemicals.
- Should keep chemical containers closed at all times except when filling or removing material.
- Keep work areas clean and uncluttered and with chemicals and equipment properly labeled and stored. Clean up your own drips and minor spills immediately. Report other spills to your supervisor and dial (911) if it is an emergency (major spill or medical attention is needed).
- Do not leave potentially hazardous chemicals or processes unattended.
- Practice good personal hygiene by always washing your hands and face after handling chemicals and before eating, drinking, or smoking.

## Chemical Disposal

The University has a responsibility to dispose of waste chemicals in a safe and environmentally sound manner. Some chemicals can be disposed as normal solid waste, or down the sanitary sewer, but many may need to be disposed as hazardous waste. Below is some general chemical disposal information. For additional waste disposal information or a copy of the University's written chemical waste disposal program, contact the Department of Environment, Health & Safety (864-4089).

- Contact Department of Environment, Health & Safety before using chemicals to determine how spent, used, or unwanted material must be properly disposed.
- Collect spent or used material into a compatible container and label (in English) the container with the specific chemical content and volume. Keep container closed at all times except when filling. Collect different or incompatible chemicals into separate containers.
- Contact EHS Dept. (864-4089) to arrange for the removal and disposal of surplus, used, or unwanted chemicals.
- Practice pollution prevention: Chemical reuse, redistribution, source reduction, material substitution, procedure modifications, inventory management, reclamation, recycling, and Environment, Health and Safety approved waste reduction procedures are all viable techniques. Call the Environment, Health and Safety Department for pollution prevention assistance (864-4089).

## **6.0) OCCUPATIONAL/ENVIRONMENTAL CONTROLS**

(See Chapter 21 for Radiation Safety Principles.)

### **Sanitation**

An adequate supply of drinking water shall be provided at all work places. Portable containers used to dispense drinking water will be capable of being tightly closed and equipped with a tap. Drinking water containers will be clearly marked and will be kept sanitary. Single cups will be provided in a sanitary container. A waste container should be used for disposal of used cups.

### **Noise Exposure**

When employees are subject to sound levels exceeding those permitted by the State Division of Industrial Safety, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound exposure to permissible levels, suitable personal protective equipment will be used and employees affected will be scheduled for the hearing conservation program.

In order to prevent hearing loss which can result from prolonged exposures to excessive noise, protection against the effects of noise exposures will be provided to and/or used by all employees when sound levels exceed 85 Dba (slow response as measured on the A scale of a sound level meter or time weighted average) (see Table 1, page 6-2). When employees are subjected to sound levels exceeding those listed, administrative (limiting exposure time) or engineering controls (reducing the noise exposure level) should be utilized whenever possible to reduce noise exposure levels to within the limits specified. If such controls fail to reduce sound levels to within acceptable levels or during the time period that such controls are being implemented, personal protective equipment (ear muffs or ear plugs) will be used as specified to reduce noise exposures to at least 85 Dba. When ear plugs are used as hearing protection, they shall be properly fitted, cleaned daily, and maintained in a sanitary condition.

Table 1	
Sound Level (Dba - Slow Response) •	Maximum Exposure Without Protection (HEARING ours) ••
90	8
92	6
95	4
97	3
100	2
102	0
105	0
110	0
115	0

When noise levels exceed a given Dba level, exposure protection will be rounded off to that specified by the next higher Dba level (91 Dba = 6 hours without protection).

If noise level is constant, the period during which hearing protection will be worn follows the period of exposure without protection. If using a time weighted average, hearing protectors will be worn during periods of exposure that exceed the TWA as well as during the period specified in Table 1.

\*\*When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect will be considered or a time weighted average taken. An example of TWA is as follows:

An employee performs several tasks during the course of his/her working day. The duration and the noise level associated with each task are listed on page 6-3 (example):

	<u>Exposure</u>	<u>Noise Level</u>
a) Operation of pneumatic hammer.	1 hr.	100 Dba
b) Operation of surface grader.	4 hrs.	91 Dba
c) Operation of street cleaner.	2 hrs.	93 Dba
d) Using sand blaster.	1/3 hrs	112 Dba
e) Operating riding mower.	2/3 hrs.	101 Dba

To be compared to the 85 Dba TWA level specified, however, these values must be converted as follows:

a)	60 min.	x 100 db = 6,000
b)	240 min.	x 91 db = 21,840
c)	120 min.	x 93 db = 11,160
d)	20 min.	x 112 db = 2,240
e)	45 min.	x 101 db = 4,040

Total exposure = 45,280 db min.

For an eight (8) hr. day (480 min.), 45,280 db min./480 min. = 94.33 db TWA. The 94.33 Dba TWA exceeds the acceptable limit of 90 Dba TWA (Table 1 above), hence this employee must wear hearing protection as specified above and will be notified regarding his/her exposure to excessive noise (85 Dba or higher).

In order to prevent permanent hearing loss which may result from exposure to noise, "a continuing, effective hearing conservation program shall be administered whenever employee noise exposures exceed an eight (8) hour time-weighted average sound level (TWA) of 85 Dba (slow scale-noise level meter) or, equivalently, a noise dose of fifty (50) percent" (dosimeter reading). The hearing conservation program includes all of the following components to fulfill the minimum requirements set forth:

- A noise exposure monitoring program.
- Employee notification.
- An audiometric testing program including baseline and annual hearing examinations.
- The availability of hearing protectors including an evaluation of their effectiveness.
- A noise exposure training program.
- A system of record keeping.

The annual hearing examination will follow a fourteen (14) hour pre-exam period of no noise exposure to determine if a change in hearing sensitivity has occurred. The employee training program explains the effects of noise on hearing, the purpose of ear protectors, and the purpose of audiometric testing procedures and results. The record keeping system will include a record of the employee's most recent noise exposure assessment, audiometric test results, and training program participation. This information shall be maintained in an active, accessible file.

Supervisors with questions about noise levels, exposure, the need for hearing protection or employee monitoring, shall contact Environment, Health and Safety.



Table 2		
Examples of Noise Producing Maintenance Operations:		
Activity (Operator's Position)	Typical Sound Level (Dba-Slow Response)	Typical Maximum Exposure Without Hearing Protection
Riveting Steel	130	None
Chainsaw	119-120	None
Sandblasting	112	None
Pneumatic Hammer	100-106	None
Pneumatic Drill	103-104	None
Power Auger	102	None
Grader	91-94	4-6 Hours
High-loader	88-90	8 Hours
Core Drill	88-90	8 Hours
Street Cleaner	92-94	4-6 Hours
Surface Planer	96-102	None-2 Hours
Circular Saw	95-96	3-4 Hours
Belt Sander	99-102	None-2 Hours
Power Miter Box	105-107	None
Grinding Wheel	96-98	2-3 Hours
Tin Cutter	101-106	None
Riding Mower	100-101	None-2 Hours
Weed Eater	100-101	None-2 Hours

## **Airborne Contaminants** (Gases, Vapors, Fumes, Dusts and Mists)

Exposure from inhalation, ingestion, skin absorption or contact with any material or substance above the threshold limits for airborne contaminants is to be avoided. Administrative or engineering controls shall first be utilized, whenever feasible to reduce airborne contaminant levels. When controls are not feasible, personal protective equipment shall be used to keep employee exposure to air contaminants within permissible exposure limits. If there are any questions about acceptable limits or proper protective equipment, please contact the Environment, Health and Safety Department.

Employee exposures to potentially harmful dusts, mists, gases, or vapors shall not exceed those levels specified in the current Federal Occupational Safety and Health Regulations (29CFR 1910). Whenever feasible, administrative (limiting exposure time) or engineering controls (local exhaust ventilation, process control, or chemical substitution) shall be used to keep the exposure of employees to within the levels prescribed by these standards. When such controls are not feasible as in non-routine, highly intermittent exposure periods, such as an emergency, personal protective equipment (eye and face protection, protective clothing or respiratory devices) shall be provided, used and maintained in a clean and sanitary condition. Personal protective equipment is required whenever hazardous materials can do bodily harm through absorption, inhalation, or physical contact. Any equipment used for these purposes must be approved for each particular use by a technically qualified person. Contact Environment, Health and Safety Department for assistance.

Respiratory protection shall be utilized in accordance with the regulations set forth in 2-1 under Respirators. Employees working with potentially hazardous airborne contaminants shall wash thoroughly and remove contaminated clothing before eating, drinking, or smoking or applying cosmetics.

## **Ventilation**

Whenever harmful dusts, fumes, mists, vapors, or gases exist or are produced by maintenance work in quantities likely to be harmful to employees, and prevention or elimination of such hazards is not practicable, the hazards shall be controlled by general ventilation, local exhaust ventilation, or other effective means. This ventilation is to continue during the operation as necessary to keep harmful materials below regulatory exposure levels.

## **Carbon Monoxide**

Common sources of carbon monoxide are internal combustion engines, exhausts, and fires. Carbon monoxide gas is not easily detected because it is odorless, colorless, tasteless, and non-irritating. It gives no warning of its presence and a victim may suddenly collapse. Symptoms such as headache, fatigue and dizziness appear in healthy workers at concentrations around Threshold Limit Value (twenty five (25) ppm). In addition, the health effect in exposed workers is dependent upon the carbon monoxide content of the blood, the partial pressure of the oxygen in the air breathed, the duration of exposure, the ambient temperature, the work effort (oxygen demand), the metabolic efficiency of the worker, health status, genotype and other factors. Preventive measures are:

- Working areas will be kept well supplied with fresh air. Whenever possible, exhaust ventilation will be provided to remove carbon monoxide gas at the point of origin.
- Persons with anemia heart disease or any chronic disease such as asthma or bronchitis shall not be allowed to work in gas exposure. Employees shall be asked prior to exposure if medical problems exist.
- Do not permit a person who has been ill due to acute poisoning to return to work without a doctor's permission.

## **Cutting Oils and Emulsions**

Machinists and other employees exposed to cutting oils and emulsions often suffer from skin disease affecting hairy portions of the arms and hands. Ultimately, numerous pimples and boils may appear. This is caused by oil and dirt clogging the pores of the skin with subsequent irritation and inflammation of the skin. Preventive measures are:

- Protective clothing shall be worn.
- A mineral oil free from irritants should be used in the cutting medium.
- The cutting fluid should be kept clean by filtration and sterilization.
- Workers are encouraged to scrub their hands and forearms frequently with soap, and hot water. Such washing should be thorough and done at least twice daily.

If the skin becomes chapped and dry, lanolin ointment or vegetable fat should be rubbed on the skin after washing. The use of petroleum jelly or cosmoline, which are mineral ointments, are discouraged, for reasons indicated above.

## Lead Poisoning

In construction and maintenance operations, the hazards of lead poisoning may be found in plumbing, soldering, painting, sanding, grinding or sandblasting of paint, and welding, cutting, or torching of painted steel. The poison is taken into the system by inhalation of lead fumes or dust, by swallowing tiny particles of lead, or by absorption of the lead through the skin from lead paint on the hands. The consumption of alcoholic beverages by persons exposed to lead poisoning may cause serious complications. Preventive measures are:

- Employees shall not disturb painted surfaces until they have been checked to determine whether lead is present in the paint at or above a hazardous level (0.5% by weight). Contact Environment, Health and Safety Department to have paint tested for presence of lead.
- Whenever possible, use materials containing lead products in a moist condition to avoid inhalation of the dust.
- Care shall be taken to avoid inhalation of lead fumes or dust formed on top of molten lead due to oxidation.
- Do not store food in a room containing lead products.
- Do not eat on the job. Go a distance away, wash hands with soap and water, and clean fingernails before eating.
- Employees working in areas where lead is present are not to carry tobacco or consume it on the job.
- Practice personal cleanliness.
- Persons suspected of having contacted lead poisoning shall contact a physician immediately.
- If excessive exposure is anticipated, an approved respirator will be used to provide adequate personal protection.

## **Spray Painting**

Although painters are the ones principally affected by spray painting, others in the vicinity of sprayers in operation or those entering rooms that have not been adequately ventilated after painting are also exposed to the same health hazards. The preventive measures that shall be applied for paint or lacquer exposures are the same as those for lead. Respirators shall be an approved type.

## **Lime, Cement, Calcium Chloride and Sodium Chloride**

Wet lime and cement principally affect the skin. Some persons are more susceptible than others to the action of these materials. The effect of lime or cement burns is the drying and subsequent cracking of the skin which opens the way for infection. Quicklime actually burns when wet due to the high heat of hydration. Tools and equipment will be provided and used to minimize the worker's contact with these materials. If possible, keep the exposed parts of the body away from direct contact with lime and cement. When working with these materials, wash the hands often and dry them thoroughly before returning to work. When the work is finished, wash the hands thoroughly with soap and warm water. Dry and apply lanolin ointment. Ample washing facilities shall be provided at a convenient location.

On cement work, surface finishers shall be provided with knee pads impervious to moisture. Extreme burns from lime or cement require the attention of a physician.

## **Epoxy Resins**

Because they have unusual bonding strength, epoxies are now being used in maintenance operations, especially in bonding new concrete to old concrete. They are also used in splicing concrete pile sections, as a "cold-weld" system for joining structural steel components, and in many other applications where their peculiar attributes solve a repair or structural problem.

The use of epoxy materials often involves uncured compounds, many of which are toxic. The curing agent (particularly amines) and solvents are the principal health hazards, but resins are also toxic to a degree. Unless workers take proper precautions, they can develop skin rashes, severe itching, eye irritation, and respiratory ailments. Tolerance to contact varies with the individual worker, but each additional over-exposure will increase sensitivity.

The personal protection needed by personnel working with toxic epoxy compounds varies with the epoxy and application. Troweling with epoxy mortars may require only plastic or rubber glove protection. A worker spraying epoxy will use a respirator approved for organic vapors and wear gloves and long sleeved clothing--so that all exposed skin areas are covered.

Epoxies, particularly those containing solvents are not to be used without adequate ventilation. Confined fumes and solvent vapors could seriously irritate the eyes, lungs, and respiratory tract after an exposure and may also introduce a fire and an explosion hazard.

Epoxies coming in contact with the skin are to be washed off immediately with soap, water, and a scrubbing brush. Do not use solvents. Many epoxy solvents are irritants and will not remove the epoxies, but rather will thin and spread it so as to cover a greater area of skin and penetrate more deeply. Care must be taken to see that other employees working adjacent to the mixing or application of epoxies are provided adequate personal protection or the operation shall be isolated to minimize exposure to other workers.

Typical Epoxies

Sinmast  
Sikadur Hi Mod  
Sika Colma Fix LV  
Kimmel  
Carter Waters Type I  
Carter Waters Type II

Typical Solvents

Cellosolve  
Xylene  
Benzene  
Methanol  
Methylene Dichloride  
Acetone  
Toluene (probably most common)  
Methyl Ethyl Ketone

## Bloodborne Pathogens

This section was included to explain the policies and procedures for protection against occupational exposure to Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV). In response to an advisory notice from the Kansas Department of Human Resources and the Governor's Office, the Lawrence Campus has established formal policies and procedures for all faculty, staff and student employees concerning steps recommended to reduce the risk of exposure to bloodborne pathogens. It is the intent of this training program to explain the following:

- Assignment of all employees to one (1) of three (3) categories for potential exposure, Category I, II or III.

A Category I employee performs tasks that involve exposure to blood, body fluids or tissue. A Category II employee normally performs tasks that do not involve exposure to blood, body fluids or tissue; however, their work may require the unplanned performance of such tasks. A Category III employee does not perform tasks that require contact with blood, body fluids or tissue.

- Methods of potential transmission.

Both HBV and HIV can be transmitted by the following body fluids, including: Blood, Semen, Vaginal Secretions, Saliva (HBV only if blood is visible\*), Vomitus (HBV only if blood is visible\*), \* Protection may be required by certain departments.

Transmission occurs when any of these body fluids comes in contact with a mucous membrane (eyes, mouth, nose or genitals) or non-intact skin. Transmission can also occur through punctures by sharp objects such as needles, broken glass, etc., which have any of the above listed body fluids on them.

Despite similarities in modes of transmission, the risk of HBV infection far exceeds that for HIV infection.

- Methods of Protection.

Category I employees will receive the series of HBV immunizations. The shots will be given at Watkins Health Center.

Category I employees and Category II employees who could come in contact with blood or body fluids must be provided with and utilize barrier protection equipment that is appropriate to work tasks performed (SOP's). This protection may include disposable latex or reusable rubber gloves, disposable gowns, disposable face masks, or foot protection. Face masks and gowns should be worn, particularly, if there is the potential for splattering or splashing of

blood or body fluid. Wash hands thoroughly and frequently.

- Actions To Take When a Person is Exposed To Blood or Body Fluids In The Performance of Work Tasks.

Stop what you are doing.

Remove contaminated clothing (disposable or otherwise) immediately. Non- disposable clothing should be placed in an approved bag and laundered (at university expense). Disposable clothing should be placed in an approved bag or container for disposal. Disposal suits will be provided for temporary use if an employee's regular clothing should become contaminated.

Wash the exposed skin area for two minutes with soap and water. If water is not immediately available, you may use hand cleaner, towelettes, etc. Then, when water is available, wash hands thoroughly.

Report the incident to your supervisor.

Any employee who has been exposed to blood or body fluids or suffers a wound as a result of contact with a sharp object or equipment that is contaminated should go to the Lawrence Memorial Hospital Emergency Room for treatment immediately (WITHIN TWENTY-FOUR (24) HOURS). The treatment may include the necessity to start the series of HBV inoculations. Again, it is imperative that treatment begin within twenty-four (24) hours of exposure.

- Action to Take With Contaminated Materials, Equipment or Disposable Clothing.

All contaminated materials, including sanitary napkins and tampons, equipment or disposable clothing must be placed in approved, marked bags or containers for proper disposal. Sharp objects, including needles, glassware, etc., must be placed in containers that will prevent injury to employees who are removing such material for disposal. If necessary, items, particularly those involving liquids, may need to be placed in double bags to reduce the possibility of leakage. Use appropriate barrier protection when handling contaminated materials. Spills should be cleaned using ten (10) percent chlorox solution or EPA approved\* disinfectant (you would not want to use chlorox solution on carpet, upholstered furniture, etc.) If maintenance and service employees or non-laboratory personnel find blood or fluid contaminated materials, sharps (glass, syringes, etc.) in the trash or room, leave it alone. Contact laboratory personnel to have it removed. If laboratory personnel are not available or chose not to remove contaminated materials, contact the Environment, Health and Safety Office, 864-4089.



Supervisors of classified, unclassified and student employees are responsible for training employees in the bloodborne pathogen handling requirements. In particular, supervisors must enforce compliance by the employees with established standard operating procedures (work tasks) as they involve contact or the potential for contact with blood or body fluids, sharp objects or other contaminated equipment, management of contaminated clothing, use of barrier protective equipment, and the management of spills, leakage, etc.

Supervisors must provide appropriate barrier protection equipment and enforce the use of such equipment according to SOP's. Disposable replacement clothing must be readily available, particularly in areas where there is a risk of contamination and regular clothing must be removed if contamination occurs.

If training is provided related to bloodborne pathogen procedures, a record of such training must be kept in the departmental office and copies to Human Resources. Likewise, training conducted centrally by Human Resources or other providers will be recorded with copies to the department.

Supervisors must also take prompt action to deal with exposure to bloodborne pathogens. If barrier protection equipment and other precautions do not prevent direct contact with blood or body fluids, as listed above, the supervisor must require treatment of the employee at the Lawrence Memorial Hospital Emergency Room immediately, or at the latest, within twenty-four (24) hours of exposure to blood or body fluids. Treatment may include the need to start HBV inoculations unless the employee is a Category I type and has already had the HBV inoculations. Contact with vomitus or body fluids that do not contain visible blood does not require treatment at Lawrence Memorial Hospital. Wash the exposed area thoroughly and remove contaminated barrier protection equipment or clothing (and launder) as a precaution. Lawrence Memorial Hospital will conduct post exposure counseling.

Such exposure must also be reported to Human Resources as quickly as possible. Exposure to bloodborne pathogens that results in medical treatment necessitates handling this situation just as you would any other occupational injury or illness. Call the incident in on the accident reporting hot-line (913) 296-0827 and complete an accident report form.

\* Lists of approved disinfectants are available in the Environment, Health & Safety Dept., at 864-4089.

Employees must adhere to bloodborne pathogen program requirements at all times. Employees must also wear necessary barrier protective equipment, follow prescribed disposal procedures, report any possible or actual exposure to your supervisor immediately and request appropriate medical treatment (go to Lawrence Memorial Hospital within twenty-four (24) hours of exposure).

Additional training will be provided as necessary. Information regarding bloodborne pathogens procedures, including proper disposal procedures for contaminated materials or sharp objects, is available in the Environment, Health and Safety Dept.. If supervisors or employees have any questions about this subject, please feel free to contact the Environment, Health and Safety at 864-4089.

### **Laboratory Animals**

Safety and health procedures apply when working with and caring for laboratory animals. Please see the handbook for the Use of Animals in Research and Education, Animal Care Unit, B054 Malott Hall, 864-5587.

### **Laboratory Safety**

Each unit conducting laboratory operations shall comply with the University's Laboratory Safety Manual. As a minimum, this plan requires each unit to protect laboratory personnel from hazardous exposures to physical and health risks in the laboratory. Contact the Department of Environment, Health & Safety (864-4089) for further information, assistance or a copy of the campus Laboratory Safety manual.

## **Confined Space Entry**

### **Program Policy**

No faculty, staff, or students of the University of Kansas - Lawrence Campus shall enter into any confined space or permit-required confined space without first having received the appropriate information and training as required by this program and ensuring that the safety requirements of this program have been implemented. This is necessary in order to protect the safety and health of University personnel and achieve the goals and requirements of the University's safety and Health Policy.

### **Definitions**

**Confined space** - A confined space is defined as an area which:

- has adequate size and configuration for employee entry;
- has limited means of access or egress; and
- is not designed for continuous employee occupancy. Confined spaces include but are not limited to manholes, boilers, pipelines, sewers, tunnels, silos and vats.

### **Permit-Required Confined Space (PRCS):**

A confined space with one or more of the following characteristics:

1. Contains or has a known potential to contain a hazardous atmosphere. Three of the most common atmospheric conditions that constitute hazards are oxygen deficiency, combustible gases and vapors, and toxic gases and vapors.
2. Contains a material with the potential for engulfment of an entrant.
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

### **Authorized Entrance:**

Only employees who are trained as an entrant and have obtained a permit signed by the entry supervisor may enter a permit required confined space.

**Attendant:**

At least one individual is to be stationed outside the permit required confined space who monitors the authorized entrants inside the space for the duration of the entry operations.

**Entry Supervisor:**

The entry supervisor is the department head, foreman, or supervisor responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry, for overseeing entry, and for terminating entry.

**Identification of PRCS**

Each department or unit responsible for identifying all confined spaces and those suspected of being a PRCS that their personnel may possibly be required to enter. Departments may contact the KU-EHS Dept. to assist in the evaluation of those spaces.

**Warning Signs**

PRCSs must be posted with warning signs or some other appropriate identifier notifying employees of any hazards that are present, and that only authorized entrants may enter the PRCS.

**Evaluation of PRCS Conditions**

Each PRCS must be evaluated to identify hazards; determine the severity of the hazards; and establish control procedures and practices by which the space may be entered safely. The KU "Confined Space Entry Permit" form (available from the EHS Dept.) May be used to perform the appropriate hazard evaluation.

Before entry into a PRCS is authorized, the conditions within the space must be tested to determine if acceptable entry conditions exist. The space is to be monitored during the course of entry operations to determine if acceptable entry conditions are being maintained. When testing for atmospheric hazards first test for oxygen deficiency, then for combustible gases and vapors, and then for toxic gases and vapors.

## **Pre-entry And Entry Practices And Procedures**

Each department is to develop written entry procedures and practices necessary for safe confined space entry operations, to be included in their confined space safety plan. Practices and procedures to be addressed include:

- isolating (locking and tagging) the PRCS;
- ventilation of the PRCS;
- providing vehicle and pedestrian barriers to protect entrants from external hazards; and,
- verifying that conditions are acceptable for entry.

## **Locking And Tagging**

No work is to be performed within a confined space until appropriate locking, tagging and/or isolation is accomplished to prevent the inadvertent actuation of operations or process associated with the space which might expose employees to hazardous conditions.

## **Required Equipment**

The following equipment is to be provided and maintained for proper use:

- testing and monitoring equipment
- ventilating equipment
- communications equipment
- personal protective equipment
- lighting equipment
- barriers and shields
- ladders
- rescue equipment
- other equipment necessary for safe entry

**Permit System**

Before entering a PRCS an authorized employee must complete the KU "Confined Space Entry Permit" (available from the EHS Dept.) and send to the entry supervisor, for approval. The permit must include: identity of the space; purpose of entry; date and duration of entry; list of authorized entrants; eligible attendants and individuals to be in charge of entry; hazards of the PRCS; measures of isolation of the space; measures to control potential hazards; the acceptable entry conditions; testing and monitoring equipment and procedures; rescue services in the event of an emergency; rescue equipment to be provided on-site; if necessary, communication procedures between authorized entrants and attendants; and personal protective equipment. After the confined space entry has been concluded, a copy of the completed permit is to be sent to the EHS Dept. The original should be maintained by the entry supervisor for recordkeeping.

**Rescue Team**

If an emergency arises that requires a rescue team, the KU Public Safety Dept. is to be contacted by calling 911. The rescue service is to be provided access to all PRCSs from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations. Non-entry retrieval methods are to be used unless the retrieval equipment would increase the overall risk of entry. Each authorized entrant is to use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level. For vertical type PRCSs more than 5 feet deep, a mechanical device for retrieval is to be available.

**Training**

Employees who are assigned duties that may require entry into PRCS must receive training on confined space entry procedures, the permit system, and hazard recognition and control procedures. Authorized entrants, attendants, and supervisors in charge of entry are to receive training in their respective confined space duties and responsibilities. Training is to be provided before employees are first assigned duties pertaining to PRCSs and whenever there is a change in assigned duties in PRCS operations. Contact KU-EHS Dept. to arrange for appropriate training.

## **Departmental Confined Space Safety Plan**

Each department, shop, or work unit is to complete a Confined Space Safety Plan that provides the following:

- identify confined spaces and permit required confined spaces;
- describe procedures and practices necessary for safe permit space entry;
- identify equipment that will be needed;
- designate of persons who are authorized as entrants, attendants, or supervisors;
- evaluate hazards of the confined space.

A copy of the completed plan is to be forwarded to KU-EHS Dept. for review, approval and recordkeeping.

## **Review of PRCS Program**

Entry operations are to be reviewed when there is reason to believe that the measures taken may not protect the employees and at least annually. The program is to be revised to correct any deficiencies found.

## **Entry into Non-Permit Confined Spaces**

Precautions must be taken for entry into non-permit required spaces. The space atmosphere must be tested for oxygen concentration, combustible gas or vapor, and potential toxic contaminants. Any hazardous conditions detected must be reported to the supervisor and the Environment, Health and Safety Office. Manholes and confined spaces with limited ventilation must be power ventilated with a blower (minimum capacity 750 cfm) operating at its maximum rated speed for a minimum of five (5) minutes. Larger confined spaces (greater than 1000 cubic feet) must be ventilated for at least ten (10) minutes. The blower must be in continuous operation while anyone is in the confined space.

## **7.0) MAINTENANCE SHOPS AND YARDS**

### **Shops**

#### **Safety Inspections**

Supervisors will make regular inspections for fire and safety hazards.

Supervisors will store combustible materials in a safe place.

Supervisors will inspect work areas regularly and maintain floors free of oil and walkways clear of tools or equipment. Grease, oil, or similar substances which cause hazards will be removed or covered by an approved adsorbent.

Supervisors will hold regular safety meetings to keep employees mindful of the hazards in shop areas.

#### **Hydraulic Automotive Lifts**

Every hydraulic automotive lift is to have a brake that will automatically hold twice the rated load at any level when lifting ceases.

Hydraulic lifts are to have safety devices which hold the load independent of the lifting mechanism at the maximum "up" position.

Lifts will never be used for vehicles beyond their capacity or to lift one end of the vehicle only.

The condition of lifts are to be checked monthly. Leaks will be repaired and oil levels maintained on hydraulic lifts.

Controls on lifts will require continuous pressure from the operator and shall be located so that the operator will not be struck by the falling load if the lift should fail.

Persons are not to stand in front of vehicles being driven onto the lifts. No person will remain in a vehicle being lifted.

No bystanders will be allowed near equipment being lifted.

All lifts are to have safety legs which will hold the load if the lift fails. Employees will always place these legs properly before working under raised equipment.

A removable railing or cover will be provided for grease pits.



## **Lubrication**

Employees are not to put their hands over a grease gun nozzle because grease can be forced under the skin if the gun handle is pulled.

When lubricating springs, employees will stand clear of the clouds of lubricant spray so as not to breathe it.

The tops of grease cylinders must be securely screwed or clamped in place to prevent blowing off under pressure.

## **Mounting Heavy Duty Tires and Rims**

Safety cages are to be provided and used when inflating high-pressure tires in shops.

Alternate procedures that are to be taken when safety cages are not available include:

- Positioning the tire under lift truck forks.
- Chaining the lock rings to the assembly by passing chains entirely around the cross section of the tire at each ninety (90) degree point.
- The use of an extension type air hose and pressure gauge.

Special rolling fixtures are to be used when available for mounting and dismounting heavy duty tires. Tires with calcium chloride solutions in them will be handled mechanically.

When wheels are removed in shops, the remaining wheels are to be chocked and vehicle brakes set.

## **Jacks**

Before jacks are used on vehicles, the jack and the vehicle will be firmly blocked against any horizontal movement. All possibility of the jack slipping will be eliminated. The lifting head on the jack will be large enough to securely hold the part of the vehicle against which pressure is being exerted.

Heavy parts, such as engines, will always be handled with jacks, dollies, hoists, cranes, or forklift trucks. Metal-to-metal contact between this apparatus and the parts being handled is to be avoided; properly fitted wood blocks or suitable pieces of cloth will be used to separate metal from metal and increase the friction of contact.

## **Grinders**

Grinding wheels will be kept dressed and all guards are to be kept in place and properly adjusted.

Eye protective devices will be kept clean and will be used.

## **Batteries**

When handling batteries, caution is to be exercised to prevent acid or electrical burns. There is also the possibility of the battery exploding and splashing the acid.

To jump-start, remember:

- Use Batteries with the same voltage.
- Both negative posts will be grounded.
- Check fluid, check for freezing.
- Vehicles are not to be touching.
- Ignitions and accessories are to be off, gears in "park" or "neutral", and brakes on.

Batteries are to have all cells covered when lifted. Hand cart clamp/grip type carrying devices are to be provided for moving the batteries around the shop.

Eye washing facilities are to be provided near the battery servicing area; do not use water under pressure greater than about fifteen (15) psi, as this can be harmful to the eyes.

When batteries are installed and connected or when "jumpers" are used for auxiliary starting, the ignition must be turned off. The supervisor will be consulted for proper procedures in "jumping" batteries.

Smoking is not permitted in the changing areas. "NO SMOKING" signs are to be posted.

## **Special Instructions for Maintenance-free Batteries**

The maintenance-free battery is, as the name implies, totally maintenance-free and has non removable battery cell caps. WATER NEVER NEEDS TO BE ADDED TO THE MAINTENANCE-FREE BATTERY. The battery is completely sealed, except for small vent holes in the cover. These vent holes allow what small amount of gases are produced in the battery, to escape. The special chemical composition inside the battery reduces the production of gas to an extremely small amount at normal charging voltages.

The maintenance-free battery contains a visual test indicator which signals when an adequate charge level exists (green indicator), when charging is required (black), or when replacement is required (yellow).

#### Test Indicators

The maintenance-free battery has a built-in temperature compensated hydrometer in the top which provides visual information for battery testing.

Under normal operating conditions, two indications can be observed.

- **Green Dot Visible in viewing port.**  
Any green appearance is interpreted as a "green dot" and the battery is adequately charged. On rare occasions, following prolonged cranking, the green dot may still be visible but the battery will not function. Should this occur, charge battery as described in "jump-start" procedures.
- **Dark or green dot not visible in viewing port.**  
This observation normally indicates a battery in low charge condition. It is safe to connect jumper cables as described in "jump-start" procedures.
- **Yellow or clear (no color) in viewing port.**  
This indicates a defective battery and is to be replaced. You are **NOT** to CHARGE, TEST, OR JUMP-START a battery in this condition.

#### Charging Procedures

When it is necessary to charge a maintenance-free battery, the following safety precautions must be followed:

- Do not charge the battery if the green dot is visible, except immediately following prolonged cranking.
- Do not charge the battery if the hydrometer (test indicator) is clear or light yellow.
- If the battery feels hot, or if violent gassing or spewing through the vent hole occurs, discontinue charging or reduce charging rate.
- Charge the battery only until the green dot appears. Do not overcharge.
- When charging batteries there are fumes created that are potentially explosive. Do not smoke around a charging battery.

## **Vehicles**

In areas where vehicles are constantly moving, such as wash racks, special precautionary measures will be observed. No vehicle is to ever be backed into a shop without the assistance of a signal person.

Mechanics will not work under vehicles while lying on "creepers" if there is any danger that another vehicle will pass through the area where their legs are exposed. If necessary, adjacent vehicles are to be locked and tagged, or adjacent spaces will be blocked with barricades.

Mechanics will make sure that engines are not started and equipment not moved while they are working on that vehicle. They will always:

Remove the key or lockout starting switch.

Place a warning tag on the starting control or steering wheel.

Block wheels during maintenance.

When working on front-end loaders, lock bars are to be installed to hold front and rear units rigidly in line.

When mechanics must work on running engines, care will be exercised to avoid moving parts. Fan blades should be guarded and adjustments made only after shutting off the engine.

Vehicles will be securely blocked with proper axle safety stands when either end of vehicle has been raised and wheels are clear of the floor.

Exhaust ventilation pipe will be connected to vehicle exhaust system if engine is to run for a prolonged period of time in a closed shop area.

Mechanic's creepers are to never be left on the caster wheels in an open floor area. They will be rolled under the vehicle until the mechanic returns or leaned vertically against the vehicle or work bench.

## **Compressed Air Equipment**

All shop employees shall be familiar with air compressor operating and maintenance instructions.

Rotating pulleys and belts on compressors and electric motors will be properly guarded.

Electric motor driven compressors will be periodically checked and any deteriorated flexible cords or plugs replaced.

The drain valve on the air tank will be opened frequently after all air is bled off to prevent excessive accumulation of liquid.

Air tanks will be protected by adequate safety-relief valves. Valves will be tested at regular intervals for good operating condition.

High pressure compressed air will not be used to blow dirt from clothing or the body; thirty (30) psi. is maximum pressure allowable for cleaning purposes.

### **Electrical Tools**

All electrical tools will be grounded, or double insulated.

The electrical cords will be inspected frequently and replaced when the insulation is cracked through or frayed to expose the metal wiring.

## **Storage Yards**

### **Housekeeping**

Materials will be stacked safely and in an orderly manner.

Equipment and vehicles are to be parked in a manner to keep backing at a minimum or properly backed against a fence when driven into a yard.

Driveways and footpaths will be maintained in a satisfactory condition and material will not be stored within these areas.

Loading platforms shall be constructed and maintained for safety and convenience of handling heavy equipment or materials.

Storage areas are to be kept free of accumulation of materials that constitute hazards from tripping, cutting, fire, explosion, pest harborage, etc. Vegetation control is to be exercised as necessary.

## **Underground Tank Vents**

Vent pipes from underground gasoline and fuel oil tanks are to be located so that the discharge point is:

- Outside of the building.
- Higher than the fill pipe opening.
- Not less than twelve (12) feet above the adjacent ground level.

Vent pipe openings will be located so that flammable vapors will not enter doors, windows, or become trapped under eaves or other structures. It is important that vent pipes discharge upward only in order to disperse vapors.

Each underground tank is to be vented through piping adequate in size to prevent a blowback of any vapor or liquid while the tank is being filled. Vent pipes will not be less than one and one-fourth (1¼) inches inside-diameter.

### **Tank Openings (Other than vents)**

Connections for all tank openings will be vapor or liquid-tight.

If the openings for manual gauging are independent of the fill pipe, the openings are to have a liquid tight cover. When filling and emptying connections are not being used, they will be closed and liquid-tight.

### **Ramp Area and Pump Island**

"NO SMOKING" signs will be posted and visible to employees fueling their vehicles.

The hose retractors on the fuel pump will be maintained in proper working order. Retractors will minimize the tripping hazard created by pump hoses.

Adequate lighting is to be provided around the pump island for night work.

All electrical wiring in and around the pump and island will be explosion proof, U/L approved, enclosed type.

Emergency power cutoffs for fuel pumps will be clearly identified, easily accessible, and located away from the pumps (preferably, not more than 100 feet).

Fuel pumps will be mounted on either a concrete island or protected against collision damage by protective barriers.

## **8.0) MATERIAL HANDLING AND STORAGE**

### **General Safety Procedures**

Materials are to be segregated with respect to kind, size, and length and then placed in neat, orderly stacks that are safe from falling. If the stacks are high, they are to be stepped back as the height increases and will be secured by cross-piling or cross-tying. Stacks of materials will be arranged to allow for passageways.

### **Lifting**

In spite of the increased use of machinery and equipment in maintenance, much material is still moved by hand. The human body is subject to severe damage in the form of back injury or hernia if caution is not observed in the handling process. Each applicable employee will be instructed in the proper method of lifting heavy objects. Supervisors will assign an adequate number of people to each lifting job. 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.
- Please see Section 2 for more information about back support belts.

## **Lumber**

Lumber is to be stacked on solid level sills and not exceed twenty (20) feet in height. Lumber to be handled manually will not exceed sixteen (16) feet in height.

Cross-strips or cross-piling are to be used where the stack is more than four (4) feet high. The top of each stack will be kept as level as possible when lumber is being removed. Used lumber is to have all nails removed before it is stacked. Two (2) persons shall carry long boards and care is to be exercised at corners and crosswalks.

## **Sacked Materials**

Sacked materials, such as fertilizer, herbicides, food products, cement, etc., are to be carefully piled when placed in storage and will be carefully removed so as to keep the piles in a stable condition.

Material will be stored so as not to create a hazard. Bags stored in tiers will be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapsing.

## **Pipe and Round Post Storage**

All pipe, round wood, or concrete posts will be carefully stacked and blocked to prevent spreading or rolling. When removing pipe, round posts, or barrels from a stack, use caution in case the stack should roll.

## **Use of Mechanical Equipment**

### **Forklifts**

Forklift trucks will be operated within the speed limits specified by the supervisor. Safe speed is determined by the type of load, space, and congestion in work areas.

Always face the direction in which you are traveling. When backing, look behind to be sure all is clear.

Pedestrian safety is a responsibility of the forklift operator. Always come to a complete stop and sound horn at blind corners and before entering doorways.

Arms or legs are to never be placed between the uprights of the mast, outside of the mast, or outside of the running lines of the forklift while in motion. Riders are not permitted on any forklift or towed equipment.



Do not load the forklift or endeavor to transport loads which are above its rated capacity. Don't lift unstable loads; they shall be repiled or banded.

Forklifts with or without loads, will travel with the forks about six (6) inches above the floor. Never attempt to lift or lower loads while traveling. The tilt control will be used to bring the center of gravity of the load closer to the drive wheels, as this keeps the load from spilling.

Bridge plates between docks and trucks must be sufficiently wide, strong, and securely anchored. Forklift operators will drive over plates slowly. Do not operate a forklift too close to the edge of a loading dock.

Never butt loads with the forks or with the rear end of the forklift. Trucks will be chocked while being loaded with a forklift. After driving a forklift into an elevator, turn the motor off and set the brakes.

### **Hand Trucks**

Do not overload a two-wheel hand truck. To make sure that the load is stable, place it so that the weight is on the axle and not on the handle. The same warning against overloading applies to the four-wheel hand truck. Never stack a load so high that it might fall or restrict vision ahead.

Hand trucks are meant to be pushed and not pulled, with the exception of the four-wheel truck with swivel axle and tongue, which is designed for pulling, and the motorized hand truck, which can be operated either way. Never pull a non-motorized four-wheel truck down an incline.

Be sure of clearance to prevent hand injury. Be careful of pedestrians who may not be watching or objects on floor that can pitch the load forward. When leaving a hand truck, put the handle up so it will not become a tripping hazard.

## 9.0) FLAMMABLE GASES AND LIQUIDS

### General Safety Procedures

New products and processes are being developed so rapidly that it is difficult to maintain an up-to-date listing of all flammable liquids and gases. Furthermore, some substances may present little or no exposure hazard under ideal conditions and very serious exposure problems under less favorable conditions. The following list identifies some of the substances commonly present on construction projects and used in maintenance operations which create hazards through their storage, handling, and use.

Gases: Acetylene, Hydrogen, Illuminating gas, Ethylene, Natural gas, L.P. gas

Oxygen (While not flammable itself, adds to the extent of a fire. Section 13 outlines the use of oxygen in welding operations.)

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 will be considered flammable unless their label clearly indicates otherwise. Conditions on construction projects and maintenance jobs change so rapidly that extreme care is required whenever flammable liquids or gases are being used.

The following applies when handling flammable liquids and gases:

- Flammable liquid and gas storage areas will be located where the fire department has access to the site.
- The telephone number of the local fire department will be posted at all telephones.

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.

Structures to be used for the storage of flammable liquids or gases are to be fire-resistant construction and located away from burning, welding, and other operations involving the generation of heat.

Structures to be used for the storage of flammable liquids or gases will be well-ventilated. A complete change of air within the room six (6) times per hour is recommended.

Motors, switches, and other electrical equipment (including light fixtures and bulbs) within such storage areas will be of a type approved for these areas.

Suitable fire extinguishers will be located within the area and adjacent to it.

Flammable liquids and gases will be stored in containers that positively identify the contents. If there is any question as to the contents of a container, it should not be used until it has been positively identified and labeled.

The storage of flammable liquids and gases are to be kept to a practical minimum. All large quantities will be stored below ground.

Personnel having access to storage areas are to be trained in the characteristics of stored substances, hazards, and precautions which must be taken to avoid accidents.

Care must be taken when handling containers so that they are not damaged.

Containers used for storing and dispensing flammable liquids will be approved for such use. Flammable liquids will never be dispensed into containers which are not approved.

If a container has once been used for one substance, it can not be used for another until it has been thoroughly purged.

Containers, nozzles, and related dispensing equipment is to be identified as to use, be of an approved type, stored to avoid damage, and inspected regularly.

Pumps, containers, and other types of dispensing equipment are to be kept clean and free of contaminants.

Tools to be used in storage and dispensing areas will be of the non-sparking type.

When transferring flammable liquids from storage containers to approved small containers, the two will be bonded to prevent static sparks before the transfer begins.

The transfer or mixing of flammable liquids will only be done in well-ventilated areas. Personnel engaged in the handling of flammable liquids must insist that no sources of ignition be brought into the designated area. Damaged or faulty dispensing equipment or containers will be replaced or repaired immediately.

## **Refueling Equipment**

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

Shut off the ignition before beginning refueling operations. If the filler is near the engine, permit the engine to cool before refueling.

Avoid spillage by remaining at the nozzle until refueling has been completed. Never completely fill a fuel tank or container. Allow for fuel expansion.

Use approved dispensing equipment: pumps, hoses, nozzles, etc.

Smoking is not permitted within fueling areas or where vapors could accumulate: pits, depressions, etc. Fueling operations should be conducted in open air. All fueling areas are to be provided with type ABC fire extinguisher.

If spillage should occur, an approved drying or absorbing agent is to be used. Do not wash spillage into sewers, cesspools, or septic tanks.

### **Use of Flammable Liquids and Gases**

Use only approved solvents for cleaning operations. Never use gasoline. Never use flammable liquids in the presence of welding, burning, or other operations involving open flames, sparks, or the generation of heat. Never use containers that do not positively identify the contents.

Never apply heat to flammable liquids or solvents unless the manufacturer of the product specifically indicates to what degree it is safe to do so.

Dispose of wiping rags or other materials in approved containers. Containers of flammable liquids are to be returned to proper storage areas at the close of each day.

Many petroleum products are toxic in addition to being flammable; avoid any prolonged contact with the skin. Most flammable gases and liquids are asphyxiants. Whenever flammable substances are being used, adequate ventilation is to be provided. One cubic foot per minute per square foot of floor area is recommended.

### **Purging Tanks and Containers**

Tanks or containers that have contained flammable liquids or gases will be thoroughly purged before any repair work is attempted. The proper purging of tanks requires adequate facilities and trained personnel. Purging can be accomplished either by steaming or by the use of inert gases.

With any of the procedures, if a fire should occur, an alarm will or should be activated, the K.U. Police Dept. (911) is to be called immediately and the area evacuated (unless employees trained in fire fighting procedure are present).

## **10.0) MACHINE GUARDING**

### **General Safety Procedures**

Rotating members, reciprocation arms, moving belts, meshing gears, cutting teeth, and parts in impact or shear are examples of the types of action and motion requiring protection. They are not particular to any one machine but are basic to mechanical devices used for productive purposes.

Any rotating object is dangerous. Even smooth, slow-rotating shafts, belts, or pulleys can grip clothing or hair, and through mere skin contact, could force an arm or hand into a dangerous position.

Since safety standards cannot be made which will cover every conceivable hazardous mechanical exposure, and prefabricated guards/shields may not be available, it is often necessary to design and fabricate protective devices which will provide protection against various hazardous situations. These protective devices should be designed to eliminate the hazard, create no hazard of their own, be sturdy enough to withstand normal wear, and should not interfere with production. Examples of University machines, tools and equipment which require guards are:

#### **Abrasive wheels on bench grinders**

The safety guard will cover the spindle end and nut flange projections, It will be mounted so as to maintain proper alignment with the wheel. The strength of the fastenings will exceed the strength of the guard. The exposed area of the grinding wheel and sides for the safety guards will not exceed more than one-fourth ( $\frac{1}{4}$ ) of the entire wheel. Work rests should be kept adjusted close to the wheel with a maximum distance of one-eighth ( $\frac{1}{8}$ ) inch.

#### **Circular saws**

They will be provided with a hood that covers the saw blade at all times. The hood should adjust itself automatically to the thickness of the material being cut. A spreader and anti-kickback device will be provided. The exposed part of the saw underneath the table will be guarded.

#### **Radial Saws**

In addition to a hood enclosing the blade, an adjustable stop will be provided to limit forward travel and the head should be automatically return to the starting position. When used for ripping, a spreader and an anti-kickback device should be provided.

### **Drill Presses**

The V-belt of all drill presses including usual front and rear pulleys, will be guarded to protect the operator from contact or breakage.

### **Fan Blades**

When the periphery of the blades is less than seven feet above the floor or working level, the blades are to be guarded. The guard will have openings no longer than one-half (1/2) inch. The use of concentric rings with space between them not exceeding one-half (1/2) inch is acceptable, provided they are adequately supported.

### **Power Lawnmowers**

All power-driven chains, belts, and gears are to be guarded to prevent the operators' accidental contact during normal starting, mounting, and operation of the machine.

## 11.0) 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-eighth ( $\frac{1}{8}$ ) 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 or stilson wrenches will not be used as monkey wrenches. Keep jaw corrugations on stilson 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 ground 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; finish with a pin punch.

## **Hatchets, Axes, Adzes, and Cornknives**

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 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 right handed person. Reverse if 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.

## **Hacksaws**

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.

## **12.0) POWER TOOLS**

### **General Safety Procedures**

The majority of 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, twistlock 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. Hand held 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 of these 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 table top 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 (1/2) inch inside diameter will have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

## **13.0) 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 in order 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 fuelgas 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 so as 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.

## **14.0) ELECTRICAL**

### **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 hand held 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 make shift 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 CO<sup>2</sup> 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 Program**

### **Purpose**

The purpose of the Lockout/Tagout procedure is to state clearly 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.

### **General**

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 a number of 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 insure 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.

### **Safety Lockouts**

- 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 start up of the equipment when the installer is not available.

## **Conclusion**

- This program will only protect the affected employees if those employees follow the guidelines given and participate in the carrying out of these procedure in a responsible manner. *EACH AND EVERY INDIVIDUAL EMPLOYEE IS IN THE END RESPONSIBLE FOR HIS OR HER OWN SAFETY ON THE JOB.* Your supervisor is responsible for not only your safety in performing the jobs you do, but also is responsible for seeing to it that you are properly informed of safety measures that you can take to protect yourself on the job.
- If you are not informed of the safety rules or feel that you have not been adequately provided with other information that is necessary for the safe and efficient performance of your job, please communicate these needs to your supervisor, department head or to the Environment, Health and Safety Dept. at 864-4089.
- Additionally if you have suggestions or constructive complaints about the methods or procedure used please let your management know. You work with the equipment your ideas are valuable. We all are working for a injury free workplace.



## 15.0) WALKING AND WORKING SURFACES

### Ladders

Always use a ladder, appropriate to the height, where work is to be accomplished that cannot be reached from ground level. Substitutes such as chairs, stools, etc., are not permitted. Never overreach from or stand higher than two (2) rungs from the top of a ladder.

Portable metal ladders will not be used around energized electrical equipment or near transmission lines when there is a chance of accidental contact with those lines. The bottoms of metal step ladder legs will be equipped with insulated, nonslip material.

When using a tall ladder (twice the employee's height) have a fellow worker steady it to prevent it from swaying or falling over. The bottom of the ladder will be placed so that an employee standing at the base of the ladder just touches a ladder rung when arms are extended forward horizontally.

Portable ladders will be equipped with non-slipping bases. The feet will be level to prevent tipping sideways.

Ladders will not be placed on boxes, barrels, or other unstable bases so as to obtain additional height.

Materials, tools or equipment will not be left on top of a ladder or on the shelf of a step ladder if the ladder is not in use.

If material is to be used at the top of the ladder, it will be raised with a rope, block and pulley, or by other means. Nothing will be carried which prevents the use of both hands in climbing or descending a ladder. Always face the ladder when climbing and descending. Use both hands to grip the side rails.

A ladder will not be placed in front of a doorway unless the door is locked, blocked, or guarded.

After using a ladder, it will be stored so that it will not fall or be knocked over.

Ladders will be frequently inspected and maintained in good condition to insure that the joints between the side rails, rungs, and steps are tight; all hardware and fittings are securely attached; and that the movable parts operate freely without binding or undue looseness.

In order that defects may be readily discovered, ladders will not be painted but may be preserved with linseed oil, shellac, or other transparent preservatives which will not conceal the condition of the wood.

Wood ladders, when not in use, are to be stored at a location where they will not be exposed to extreme conditions of heat or moisture and where there is good ventilation. They will not be stored under radiators, stoves, steam pipes, etc.

Ladders stored in a horizontal position will be supported at a sufficient number of points to prevent sagging and permanent set.

Ladders with broken or missing rungs, steps broken, split side rails, or other faulty or defective construction will not be used. When ladders with such defects are discovered, they will be withdrawn from service, repaired, or destroyed.

## **Scaffolds**

Scaffolds are required for any work that cannot be safely done from the ground by use of a ladder. Front end loader buckets will not be used for painting or used as a substitute for scaffolding.

Only properly trained workers may erect scaffolds, and they will be supervised to insure that the scaffolds are built according to proper specifications.

All scaffolds, ladders, machinery, equipment, and devices will be inspected at frequent and regular intervals while in use. Any scaffolding found damaged or weakened will not be used until repairs have been made.

## **Stairways**

Employees are to immediately report defective handrails, stair treads, or other hazards on the stairways. Broken or split treads or otherwise seriously hazardous treads on stairways will be properly replaced or repaired.

Every stairway of four (4) risers or more will be railed. Railings will not be less than thirty (30) inches or more than thirty-four (34) inches high, measured vertically from the upper surface of the riser. If it is necessary to install a hand rail higher than thirty-four (34) inches, a center rail will be installed. Railings will be maintained in a firm and secure condition. Stairways having both sides open will have a railing along each side.

## **Walking Safety**

Employees are continually moving about their respective work areas, walking to and from work and to and from campus buildings in the course of their work. When walking inside a building, employees should be aware of the possibility of hazards and spills. Watch out for objects, cords, etc. that could cause an employee to trip and fall. Avoid carrying object that obscure vision. Use hand rails when going up and down stairways, whenever possible. If work areas should be wet, clean up spill as soon as possible. Wear appropriate non-skid

footwear if wet conditions exist frequently. Report hazards to your supervisor or remove them yourself, if possible. If walking outside, again, use hand rails when using steps. Avoid carrying objects that obscure vision. Depending upon the time of year, be aware of the possibility of slippery conditions generated by snowfall, freezing rain, or wet surfaces. You should be particularly cautious when surfaces have thawed during the day or from use of salt and sand, then have refrozen as temperatures drop in the afternoon or evening.

Maintenance crews try to clear sidewalks, steps and drives as quickly as possible. Obviously, they cannot clear them all at the same time. Continuing snowfall or freezing rain, thawing and refreezing only compounds the problem.

Whenever possible, employees should be aware of weather conditions and wear footwear and clothing appropriate to existing or forecast conditions. If slippery conditions exist or are forecast to occur, avoid wearing leather and plastic soled shoes or high heels. Crepe or rubber soles usually provide a better grip on snow and ice.

It may become necessary to use an alternate route to take advantage of walkways and steps that have been cleared and treated. If conditions where you are walking are icy and hazardous, you may find safer footing by walking alongside the sidewalk where snow may not be as packed down or icy.

If you find steps or sidewalks that have not been cleared or treated within four hours of the end of snowfall or freezing rain, it is suggested that you contact Facilities Operations or the Housing Maintenance Department, whichever is appropriate, to report these conditions.

## **16.0) 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 class rooms.

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 particular 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 bio hazards (see Section 6 for more information about Blood Borne Pathogen procedure). There is particular need for custodial staff to use gloves when handling trash dumped from chutes or trash

receptacles or when handling plastic bags of trash.

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 15-1 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. The city dumpsters are a different case (city dumpsters do not have safety rods).

## **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. (See Section 2 for information about back belt use). 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 work place. 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 MSDS).

Due to the large numbers of chemicals, questions about the proper use of a specific chemical, should be referred to your supervisor, the Environment, Health and Safety Office (864-4089) check the label or check the applicable M.S.D.S. The same sources may be used to determine what may be needed in the way of personal protection.

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.

## **17.0) FOOD SERVICE OPERATIONS**

### **General Rules**

- Keep the area clean. (Spills and dropped food scraps are hazards that can be eliminated.)
- No kitchen equipment will be operated unless the employee has been instructed on its use and operation.
- Pay attention to the tool or machine being used. Lack of complete attention will cause an injury.
- Report unsafe conditions and faulty equipment immediately to your supervisor. It may prevent an injury to you or someone else.
- No loose-fitting clothes (loose aprons, sleeves, etc.) or jewelry will be worn during operation of machinery.
- If your position involves heavy lifting, follow safe lifting procedure (see Section 2 and 8).
- Do not run in dining services facilities.
- Even when extra care is taken, a tile floor can still present a dangerous hazard. Wear the proper shoes and check them often for wear. Worn footwear is a hazard in itself and must be watched closely.

### **Transporting Food**

- Trays are not to be overloaded.
- Dishes and containers with hot liquids will be transported on trays and/or carts in such a way as to prevent spills.
- Containers with hot liquids will not be overfilled and will be handled with extreme care at all times.

- When carrying loaded trays, food products, etc., the following must be noted:
  - Be aware of floor conditions ahead of you.
  - Be aware of others in the area to avoid collisions.
  - Move carefully and attentively at all times.
  - Special attention will be given when entering and exiting kitchen with reference to floor conditions and traffic flow.

## **Safety Procedures for Slick Floors**

Wet floors produce accidents. The following procedures are to be followed:

- If a spill occurs, the employee responsible is to clean it up immediately.
- When cleaning up a spill, wipe up, then dry area immediately.
- If unable to attend to a spill immediately, bring it to the attention of your supervisor.
- Always use WET FLOOR signs when mopping and cleaning.

The following pages list special rules and policies on safe working habits in the kitchen. Learn them, remember them, and use them at all times. It is part of your job.

## **Cooking Operations**

- While removing heavy containers of hot liquid or material, have adequate assistance and know where the container can be placed safely.
- Work areas will be cleaned before moving hot containers from ovens and/or stoves.
- Oven doors will be closed when not in use.
- Cooking will be done with a minimum amount of water to reduce boiling over and handling problems when pouring off hot liquids.
- Only dry cloths, towels, pot holders, or mitts will be used when handling hot utensils.
- Covers will be removed carefully to allow steam to escape, avoiding scalding of hands and/or face.
- Handles of cooking utensils must be kept away from the open flames.



## **Food Service Equipment & Utensils**

- When using knives, total attention will be given to cutting procedure.
- Cutting away from your body and away from fellow workers will be standard procedure.
- When drying a knife, the sharp edge will be kept away from the body.
- Proper (color coded) cutting boards will always be used.
- Knives will be stored in proper place when not in use.
- Do not leave a knife in the sink or where it cannot be easily seen.
- Remove steel particles from knives after they have been sharpened.
- Knives will be kept sharp at all times, as they will not require as much pressure and there will be less danger of slipping.
- A knife will be used only for the operation for which it was intended.
- If a knife falls, do not grab for it.
- Aluminum foil and plastic wrap cartons have sharp edges also. If these items slip or fall, do not grab for them.

## **Grinders**

- The grinder operation will always be fed with food stomper.
- Never should the hand or fingers be used for the above use, and never should it be positioned nearer than the shaft of the feed chute.
- Before attempting any cleaning, adjustments, or service, the machine will be switched "off" and power supply disconnected.

## **Cutter And Choppers**

- Before machine is operated, all parts and guards will be properly installed in accordance with the machine's instructions.
- When installing attachment shaft and resetting the blades, care will be exercised to ensure proper installation.
- The bowl will be free of any foreign material before use.
- If an article is dropped into the unit, power will be turned off and unit disconnected before any recovery is attempted.
- Hands will be kept from under the cover at all times.
- Switch will be in "off" position' and power supply disconnected before any cleaning will be attempted.
- All machine attachments will be stored in a safe and proper place when not in use.
- Always use the steel mesh glove when cleaning slicer blades.

## **Mixers**

- No loose-fitting clothes (loose aprons, sleeves, etc.) or jewelry will be worn during mixer operation.
- Mixer bowl will be installed correctly and securely, and the correct agitator will be used at all times.
- Large enough bowls will be used to prevent spillage.
- Should any type of overload occur, the mixer will be stopped immediately for corrective action.
- The switch will be in the "off" position and power supply disconnected before any wiping, scraping, adjustments, cleaning, or removal of a bowl or its contents is attempted.
- Utensils (spoons, rubber spatulas, scrapers, etc.) will never be used for scraping while paddles are in motion.

- Hands will be completely clear of the mixer while in operation.
- Mixer bowl will be transported on wheels provided, and not lifted or dragged to prep areas.

## **Slicers**

- The gravity face guard will be used at all times, and hands will be kept away from the blade when the slicer is in operation.
- The following policy will be followed when cleaning slicers:
  - Disconnect the electrical plug and turn gauge to "zero" (close blade).
  - Do not touch the cutting edge.
  - Remember to always use your steel glove when cleaning the machine.
  - Cover the hand that rotates the blade with protective cloth.
  - Clean the blade from center outward.
  - Replace all guards that were removed during cleaning operation.

## **Safety During Refuse Disposal**

- Do not fill containers to overflowing.
- Waste will be put in containers, not around them.
- Food scraps will be placed in proper containers.
- Compactor access walks and ramps will be kept free of spilled waste and debris.

## **Safety During Receiving and Storage Operations**

- Correct lifting procedures will be followed at all times;  
Bend at the knees, straight down.  
Lift with legs, not back.  
Get help if needed.
- In order to prevent lacerations, boxes, cases, etc. will not be lifted by wire, plastic strap, etc.
- When opening boxes, care will be taken due to protruding staples that might be present.
- Boxes, cases, etc., will always be picked up from the bottom whenever possible to prevent the bottom from falling out and spilling its contents.
- Crates, barrels, cartons, boxes, etc. will be opened away from food and strong attention given to contamination from wires, staples, splinters, etc.
- When storing materials, heavy and bulky objects will be located on lower shelves or racks.
- Loading docks and receiving areas will be kept free of accumulated trash.

## 18.0) FIRE PREVENTION AND PROTECTION

### Fire Prevention

Good housekeeping is a very important factor in elimination of fire hazards. Some fire hazards to look for are:

- 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.
- Use of gasoline as a cleaning agent.

Ventilation systems are to be used, where necessary, to prevent accumulation of gases or vapors sufficient to cause flash fire and/or explosion. All electrical fixtures and switches will be vapor and spark proof.

Full oxygen cylinders are not to be stored close to full acetylene cylinders in buildings unless separated by a wall or by a distance of twenty (20) feet.

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

A class ABC fire extinguisher will be located a safe distance, but no further than seventy-five (75) feet away from gasoline dispensing equipment.

Exit doors must never be blocked or inoperative while the building is occupied.

## **Fire Protection**

The telephone number to report a fire 911.

All personnel are to be acquainted with the various types of fires which can occur.

All personnel are to be acquainted with the various fire extinguishers, how they are operated, and how they are applied to the fire.

Travel distance to a class ABC fire extinguisher will not exceed seventy-five (75) feet.

Travel distance to a class B or BC fire extinguisher will not exceed fifty (50) feet.

Fire extinguishers will be maintained in a fully charged and operable condition and kept in a designated place at all times when not in use.

Fire extinguishers will not be obstructed from view.

In locations where obstruction cannot be completely avoided, means will be provided to indicate the location of the extinguisher.

## **Classes of Fire and Extinguishing Agents**

### **Class A**

This class fire involves ordinary combustible materials such as wood, paper, straw, grass, upholstery, cloth, tires, etc. This type of fire is generally extinguished by soaking and cooling, using a water type class A or ABC extinguisher.

### **Class B**

This type of fire involves flammable liquids such as gasoline, oil, grease, kerosene, paint, shellac, mineral spirits, diesel fuel, carbon disulfide, and other flammable liquids used in laboratories. This class of fire is normally extinguished by smothering, using a class B or ABC extinguisher.

**Class C**

This is a fire involving electrical equipment. All electrical fires are to be treated as live until it is known that the electricity has been turned off. When the electricity is turned off, it ceases to be an electrical fire. Carbon dioxide and dry chemical extinguishers are to be used on electrical fires.

In case of an electrical fire, turn off the electricity. In most cases, the fire will go out. Never use a Class A (water type) extinguisher on an electrical fire because this may cause electrocution. Class ABC or C must be used on electrical fires.

**Class D Combustible Metals**

There are a number of metals that are combustible. The relative effectiveness of extinguishers for use on specific combustible metal fires is detailed on the extinguisher faceplate.

(Extinguishment by smothering with special powders).

Examples of combustible metals, include magnesium, titanium, zirconium, sodium and potassium.

**Class D Extinguishment**

The extremely high temperature of some burning metals makes water and other common extinguishing agents ineffective. There is no agent available that will effectively control fires in all combustible metals. Special extinguishing agents are available for control of fire in each of the metals and are marked specifically for that metal.

Fire extinguishers will either be labeled as to their class, or the area behind the extinguisher, on the mounting, will contain the identification.

## **Inspection and Maintenance**

Dry chemical extinguishers will be equipped with a pressure gauge or an indicator which is easily visible without removing the extinguisher from its bracket.

Extinguishers will have a durable tag securely attached to show the inspection date and signature of the person who performed this service.

Extinguishers will be inspected annually to insure that they are in their designated places, that they have not been actuated or tampered with, and to detect any obvious damage, corrosion, or other impairments. 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.

## **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.

## **19.0) FIELD CONSTRUCTION ACTIVITIES**

### **General Safety Procedures**

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, such as Section 2 - Protective Clothing and Equipment, Section 3 - Vehicle and Motorized Equipment Operations, Section 6 - Noise Exposure, Section 11 - Hand Tools and Section 15 - 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.

For the purpose of this section, a trench excavation shall be 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 at all times 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 designed 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. Spalling 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 than 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. Crossbracing must be used. Braces can be removed to permit insertion of pipe, etc., into the unit. If the unit requires crossbraces, 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.

### **Very 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 its 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.

On other occasions, the bottom will heave slightly and then suddenly become a bubbling mass of quicksand.

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 PILING 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, sheetpile 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.

## **Bracing**

For excavations which are relatively shallow, vertical sheeting or sheet piling may be supported by inclined timber braces or struts called "rakes" or "rakers."

The high end of each brace bears against a wale or waler, and the low end bears against a foot block of timber.

Several struts, each of which may bear against a different wale, may bear against the same foot block.

Such bracing is referred to as "spur bracing."

Bracing must be wedged tightly in place to keep movement to a minimum.

## **Cross-Lot Bracing**

For deeper excavations, the regular bracing method cannot be used.

Instead, the bracing is extended across the entire width of the excavated area to the opposite side by a method referred to as "cross-bracing."

Temporary beams must remain in place in most cases as the excavation levels continue downward to provide lateral support while the bracing is being installed.

## **Soldier Beams, Breast Boards, and Sheeting**

Another common method of face support in basement excavation is the use of soldier beams and breast boards (lagging).

Soldier beams are vertical, wide-flange I-beams driven deep into the ground (a few feet apart) before excavation starts.

Breast boards are timber planks which must be long enough to achieve end bearing on the flanges of the soldier beams and which vary in thickness from two to four inches.

### **Contract Sheeting**

This patented method parallels, in some respect, the welded stud method just discussed. It uses a clip, five inches in diameter, which is attached to the flange of the soldier beam. The clip contains a hole with a  $\frac{3}{4}$  inch threaded "J" bolt inserted into it, holding the steel plates that retain the lagging boards.

### **Safety in the Area**

Proper bracing, barricading, and shoring to create safe working conditions in trenching are necessary.

Workers must be able to get out of trenches quickly in the event of accidents, usually by ladders. In any trench four feet deep or more, there must be exit ladders from the floor of the trench extending above the top of the excavation. A worker should not be required to travel more than twenty-five (25) ft. to reach the ladder.

When employees are exposed to excavation or trenching operations that are not in compliance with safety standards, they shall immediately vacate that hazardous exposure and inform the appropriate supervisor having jurisdiction over such operation of the unsafe conditions.

## **20.0) OFFICE & CLASSROOM SAFETY**

### **General Safety Procedure**

#### **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.

## Keyboard Safety & Work Station Ergonomics

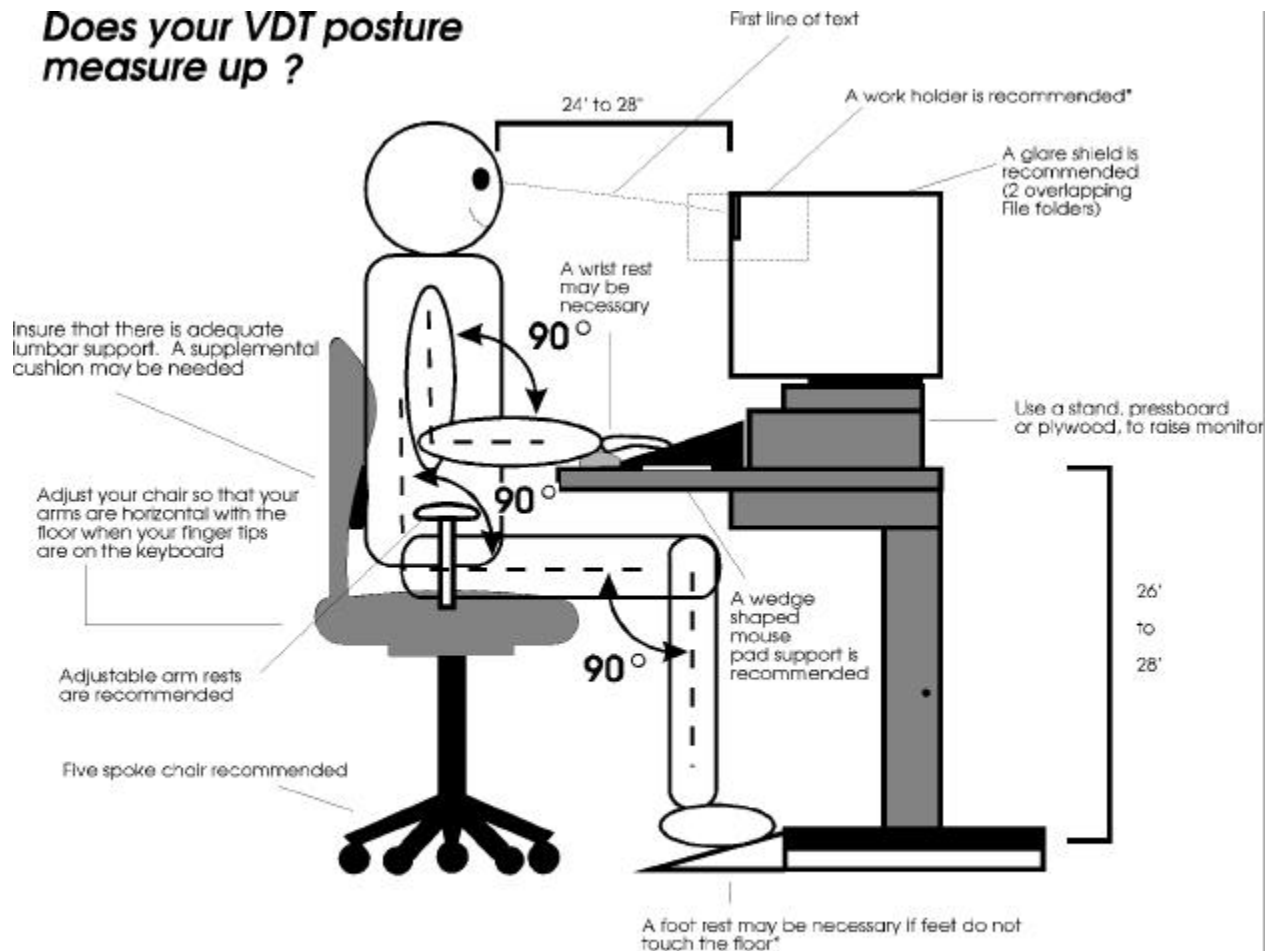
Ergonomics refers to whether or not your chair, desk, computer table, keyboard and computer monitor, etc. are properly adjusted to your physical stature during the performance of your work tasks. Improper adjustment can cause, neck ache, shoulder ache, pain or discomfort in your wrists or hands, poor circulation, etc. Repetitive use injuries are rapidly becoming a leading cause of lost work time. Your chair is a common source of these problems. It is very important that you check the adjustment of your chair. Check the seat height and the tension on the back support. Proper adjustment includes:

- Setting the seat height so that your finger tips are slightly higher than the tips of your elbows when touching the keyboard (see graphics on following pages). This may require chair or table height adjustment. The upper portion of your legs should be horizontal with the floor and the lower portion of your legs are perpendicular to the floor. Your feet should be flat on the floor or on a foot support. A back support may be necessary if your chair is not ergonomically designed.
- When using a computer or terminal, the top of the monitor should be level with your eyes so that you are looking downward slightly at the screen. Glare from windows or other light source should be avoided. A glare shield can be placed over the top of the monitor to reduce reflection or glare. (Two overlapping file folders can be used as a glare shield. Caution--do not cover up heat vents in the monitor). A glare shield may make it difficult to see the screen and has not been proven to be cost effective.
- You should be sitting directly in front of the keyboard and monitor, with both feet on the floor or a foot support.
- It is recommended that you get up, stretch, and walk around the room periodically before continuing keyboard work (keyboard used four (4) or more hours per day or more). Sample ergonomic exercises are on the following pages. Other exercises are available in Human Resources.

We have had isolated reports of repetitive work task medical problems such as tendinitis, overuse syndrome and carpal tunnel syndrome, as well as, the ongoing cases of muscle tension and fatigue that may produce periodic pain and discomfort. To avoid such problems, proper work station adjustment and posture is extremely important.

Again, adjust your chair and monitor height properly; sit directly in front of your keyboard and monitor; and, if it is necessary to spend a lot of time working at a keyboard, get up, stretch, and walk across the room for a few minutes, periodically, before continuing with your keyboard work tasks.

## Does your VDT posture measure up ?



**Please refer to the previous page for specific information about proper keyboard ergonomics (work station posture).**

If you spend much time at a VDT, compare your own situation to the above illustration. See how arms and legs are at 90 degree angles to the body? Notice how wrists extend in a straight line from the elbows through the finger tips. This is important in preventing injury to your hand and arms. You may need to make adjustments if your posture and work station ergonomics do not comply with these recommendations.

**\* Available at the Office Supply Store in Strong Hall.**

Improper work station location/adjustment or improper posture can result in a variety of medical problems. The following is information about what can result if steps are not taken to insure that the working environment and employee posture is properly managed from an ergonomic standpoint:

- **Eye Strain.** This can occur if a keyboard operator spends extremely long periods of time in front of a VDT, day after day. Eye strain is not considered to be a continuing, cumulative problem. Closing the eyes for a few minutes periodically; focusing on a distant object; choosing alternate work tasks; using eye drops; avoiding glare; etc., usually clears up this condition.
- **Moderate Aches and Pains.** Continued use of a PC/VDT, particularly, where proper ergonomics/posture is not taken into consideration, can result in wrist or arm discomfort, head ache, neck ache, back ache, shoulder ache, etc. First, insure that the work station is properly adjusted and correct posture is employed (see reverse side). Then, if symptoms continue, stretch periodically; get up and move around for a few minutes; choose an alternative work task; etc. This will generally relieve these symptoms.
- **Chronic Pain.** If the steps suggested above are not effective and pain or discomfort make it difficult to come to work or continue to work, you should advise your supervisor and call the Lawrence Memorial Hospital Occupational Health Clinic at 749-6467. The clinic is open Monday thru Friday from 8:00 a.m. to 5:00 p.m. If there is extreme pain or discomfort, you could go directly to the Lawrence Memorial Hospital Emergency Room for treatment seven (7) days per week, twenty-four (24) hours per day. An 1101-A form must be completed and the case called in on the accident hot line at (913) 296-0827. In such cases, tendinitis, overuse syndrome, or Carpal Tunnel Syndrome could exist. Treatment can include medication; a medical leave of absence; physical therapy; or, even surgery, if the diagnosis is Carpal Tunnel Syndrome.

**AN IMPORTANT POINT IS THAT MEDICAL TREATMENT, INCLUDING SURGERY, MAY NOT PREVENT A REOCCURRENCE OF SYMPTOMS IF NEEDED MODIFICATIONS ARE NOT MADE IN THE WORK STATION OR EMPLOYEE'S POSTURE.**

If there are questions about proper work station adjustment, posture or physical concerns, please feel free to contact the Environment, Health and Safety Dept. at 864-4089. Work site inspections may be arranged upon request.

DO NOT DO THESE EXERCISES IF THEY CAUSE PAIN. CONSULT YOUR DOCTOR!  
WRIST AND FOREARM STRETCHES:

A: Upper forearm stretch

1. Sit with feet flat on floor.
2. Extend both arms in front of you, palms down.
3. Make a light fist with your left hand, thumb tucked in.
4. Grab hold of knuckles of your left hand so that your right thumb crisscrosses over your left thumb.
5. Bending, pull left hand down with your right hand, keeping both elbows straight.
6. Rotate your arms counter clockwise.
7. Rotate your arms clockwise.
8. Open the fingers of your left hand and gently stretch more.
9. Follow steps 1-8 above with the right hand.  
Keep your shoulders relaxed.

Keep your shoulders relaxed.

**4**

**6**

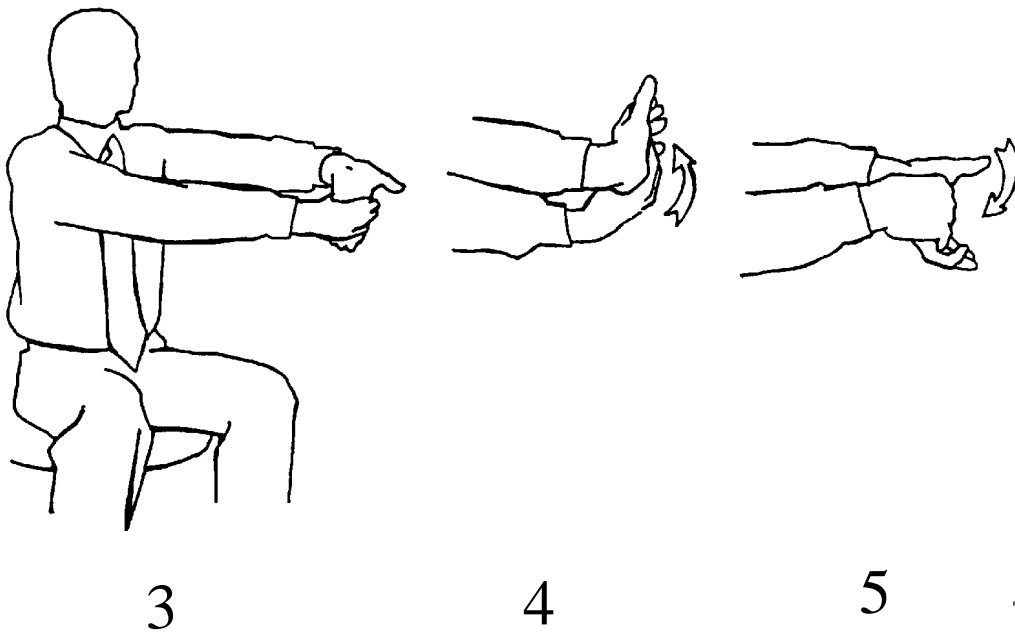
**7**

DO NOT DO THESE EXERCISES IF THEY CAUSE PAIN. CONSULT YOUR DOCTOR!  
WRIST AND FOREARM STRETCHES:

B: Under forearm stretch

1. Sit with feet flat on floor.
2. Extend your left arm in front of you, palm up.
3. Using the fingers of your right hand, pull left hand down with your right hand, keeping both elbows straight.
4. Rotate your arms counter clockwise.
5. Rotate your arms clockwise.
6. Follow steps 1-6 above with the right hand.

Keep your shoulders relaxed.



## **21.0) RADIATION SAFETY PRINCIPLES**

### **General Radiation Safety Procedures**

The University wishes to assure itself that none of its personnel are exposed to ionizing radiation from radioactive materials or radiation sources/devices unnecessarily. With this in mind, the simple instructions given below have been established.

Rooms containing radioactive material are posted with the standard "Caution, Radioactive Materials" signs. In addition, some rooms are posted as radiation hazard level II or III. Such rooms should not pose any external radiation hazards. Rooms or areas in which the possibility of external radiation exposures exist are posted with "Caution, Radiation Area" signs and are marked as radiation hazard level IV. Principles to be observed for rooms or areas posted with one of the above signs are given below.

#### **Directions for Rooms with Radioactive Materials (Hazard Level I through or IV )**

- Do not touch or handle any materials on benches, in refrigerators, freezers, drawers, incubators, or hoods in such rooms.
- Do not move or handle any items (waste drums, etc.) on the floor labeled with "Caution, Radioactive Materials" signs.
- Do not loiter, smoke, eat or drink in rooms posted with "Radioactive Materials" signs. Take breaks elsewhere.
- Do not admit others into locked and secured rooms which contain radioactive materials and/or radiation sources unless you have been specifically authorized to do so by the laboratory supervisor.
- If you accidentally break a laboratory container or you have any other indication that you have caused spillage of radioactive materials to occur, do not clean up the materials yourself. Call the supervisor of that laboratory and/or one of the emergency numbers.
- In your movements avoid spreading or dispersing the spilled materials. If no one is available to place calls for you, move only to the nearest phone, preferably the one in the laboratory.
- In case of a radiation emergency, between 8:00 a.m. and 5:00 p.m. call 864-4089. After 5:00 p.m. call the K.U. Police at 911. Give building and room number to the person called. Indicate if there is a fire or medical emergency involved. The dispatcher will notify EHS Dept. and the fire department.



**Additional Directions for Rooms Designated as Radiation Hazard Level III**

Other than going directly to an office within a Level III lab, no work is to be initiated in such lab until you have checked with the laboratory supervisor (other than disposal of "cold" trash). Non-hazardous trash containers must be marked by lab supervisors. The rules given previously still apply.

**Additional Directions for Rooms Designated as Radiation Hazard Level IV**

Do not enter such rooms or areas before you have received permission and direct instructions from the EHS Dept. - Radiation Safety Services. When called upon, they will monitor the area while it is being serviced if deemed necessary. If you have any questions or doubts about conditions in a laboratory call the Environment, Health and Safety Dept. at 864-4089.

**Explanatory Notes**

We also want you to know something about the effects of radiation. It is known that very high doses of radiation, 50,000 millirems or more (a millirem is a unit of dose equivalent), can cause small changes in blood cell counts. Even higher doses can cause illness. This might be contrasted with a chest x-ray which would give an exposure from ten (10) to thirty (30) millirems and with natural background radiation to 100 millirems/year in Kansas. Your normal operations should not lead to doses of ten (10) millirem per year (1/10 of natural background) if the simple rules given above are followed and such doses have no detectable effect on our health. Although the unborn child is more sensitive to radiation than adults, competent medical authorities and scientists believe that an accumulative dose as high as 500 millirems during pregnancy will cause no harm. However, you may discuss any questions you may have either with the EHS Dept. Radiation Safety Services or even the State Bureau of Radiation Control.

Our records show that even individuals directly working with the radioactive materials and radiation devices on a regular basis have very low exposures, usually undetectable. If you do not handle materials in the rooms containing radioactive chemicals, you should not receive any measurable or significant exposure.

Note: All those who work with radioactive materials, sources, or devices must have specialized training. Check with the EHS Dept.-Radiation Safety Services before you handle radiation sources.

## **Equipment Disposal Procedure**

All Radiation Waste as well as any equipment containing a radioactive source must be disposed of by the EHS Dept. - Radiation Safety Services. Never move equipment which has the following labels on them until you have called the EHS (864-4089) and obtained approval to move such equipment even if the director of the laboratory has requested it. (The EHS Dept. must know the location of such equipment at all times without exception.)

Labels identifying equipment which shall not be moved without prior authorization from EHS Dept.-Radiation Safety Services may be either or both of the following:

## **Caution, Radioactive Materials**

**and/or**

## **NOTICE**

**Please DO NOT MOVE without  
notifying Radiation Safety Services  
at 864-4089**

## 22.0) EMERGENCY PROCEDURES

### Emergency Weather and Weather Related Emergency Procedures

#### General Safety Procedures

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 Warning

A tornado warning is issued when a tornado has been sighted and is moving toward the Lawrence 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, pipe lines, 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 the funnel.

## **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 E911 Center; dialing 911 any where in Douglas 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.

### **Emergency First-Aid Procedures**

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. (see page 6-8 for Bloodborne Pathogen Policy).

- 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.

## **EMERGENCY NOTIFICATION PROCEDURES**

While the University Police, Human Resources, University Relations and a variety of other University administrative offices may be a normal source of information, under emergency circumstances these areas need to be a focal point for incoming information that may require continued emergency response or administrative decisions. The source of general information while emergency conditions exist is university telephone number 864-SNOW (for emergency information twelve (12) months of the year). Other sources for information during these times are:

- The University's Information Center (864-3506) is kept abreast of emergency and post-emergency information that pertains to the University for dissemination to the community.
- While all local radio and television stations do provide on-going community emergency information, the University radio stations KJHK FM 90.7 and KANU FM 91.5 will also broadcast post-emergency information specific to the campus when provided by University authorities. This information can include, but not necessarily be limited to, street/building closings, work/class schedule changes, special event information, etc.
- Human Resources provides information dealing with employees work status due to evacuations or other types of emergency situations that displace persons from their normal work stations.
- During normal University hours, Telecommunications can provide general JayTalk broadcasts to all users when requested by University authorities. As the Ethernet expands, a similar general user message system will be developed.

# APPENDIX A

## Access to and Working Safely in Laboratories

There are many different types of academic, research and support laboratories in operation at the KU- Lawrence Campus. They present a wide diversity of hazards due to unique activities being conducted or the various hazardous materials/radiation generating devices which may be in use. There are often times when various individuals (visitors, non-laboratory personnel such as maintenance or support staff, other departmental lab personnel) desire or require access into the laboratory environment.

It is critical that individuals be aware of the hazards present in the lab and the proper procedures for accessing and working safely in that environment in order to protect themselves from potential exposure to hazardous materials/radiation generating devices and prevent adverse health effects. The procedures below have been extracted from the KU Laboratory Safety Manual and may be found in Part I - Section 2.5 of that manual.

## Access Restrictions Applicable to Visitors & Non-Laboratory Personnel

### Restrictions Applicable to Visitors, Non-Laboratory Personnel and/or Non-Laboratory Authorized Occupants in Rooms with Hazardous Materials (LSM Part I-Section 2.5.1)

#### ! Restrictions for Rooms posted with Level I or II Hazards (LSM Part I-Section 2.5.1.1)

Visitors may:

Walk to an inner office (if there is one) by the closest route without touching anything route.

Enter the room and remain near the entrance until an authorized user has been requested and established as an escort.

Visitors shall not:

Touch or handle any items, furniture, or equipment in the room.

Authorized Users shall:

Briefly inform the visitor of the nature of the hazards in the room, provide any special laboratory specific instructions if needed, and supervise the visitor in such a fashion that exposure to Hazardous Materials is avoided if possible. Visitors are not allowed if the exposure is likely to be at a level greater than that permitted for the general public.

Authorized Occupants who are not laboratory personnel shall:

Not touch the surfaces of laboratory bench tops, hoods, safety cabinets, etc or items in or on such furniture and equipment in Level I and II laboratories unless such contact is required to perform the necessary service and the Authorized Laboratory Supervisor has specifically cleared the equipment to be serviced as being free of contamination and has provided access to that equipment by removing all potentially contaminated materials and containers which may be in the way.

NOTE 1: Examples of Authorized Occupants who are non-laboratory personnel would be FO Housekeeping and Maintenance employees, Public Safety/Security personnel, Unit non-lab staff, etc.

NOTE 2: In laboratories posted at Level I or II, the Authorized Laboratory Supervisor need not be present with the Authorized Occupant provided that the Authorized Laboratory Supervisor has certified to the supervisor of the Authorized Occupant that the service may be provided without risk of exposure to Hazardous Materials.

REMINDER: Housekeeping activities in laboratories with Hazardous Materials are restricted to cleaning floors and removing normal uncontaminated trash. Office personnel also shall not touch items and surfaces of equipment/furniture in the laboratory.

Not touch or handle any containers clearly labeled as containing hazardous chemicals, hazardous biological agents, or radioactive materials.

NOTE: This restriction applies to all Authorized Occupants. Authorized Occupants shall not move or manipulate such containers and shall not be asked to do so by Authorized Users or the Authorized Laboratory Supervisor.



! Restrictions for rooms posted with level III and IV Hazards (LSM Part I - Section 2.5.1.2)

Visitors shall:

Knock on the door and wait for an escort and shall not enter the room until a qualified escort is available.

Not touch or handle any items, furniture, or equipment in the room.

Authorized Laboratory Supervisors shall:

Briefly inform the visitor of the nature of the hazards in the room, provide any special laboratory specific instructions if needed, and supervise the visitor in such a fashion that exposure to Hazardous Materials is avoided if possible. Visitors are not allowed if the exposure is likely to be at a level greater than that permitted for the general public.

Authorized Occupants for Level I & II labs and not part of the laboratory staff shall:

Not enter a laboratory posted as containing Level III or IV hazards unless accompanied by the Authorized Laboratory Supervisor (or EHS-Approved designee as posted) who is responsible for guiding the activity of the individual in such a fashion that contact with Hazardous Materials is avoided.

Not touch any items in the laboratory or any surfaces associated with laboratory benches, storage cabinets, hoods, and other equipment in rooms posted as containing Level III or IV hazards unless the Authorized Laboratory Supervisor (or EHS-approved designee as posted) has certified the items or surfaces which need to be serviced as being free from contamination with Hazardous Materials and is present to supervise the individual so that other hazards will not be encountered by the individual.

NOTE: For Level III or IV laboratories, there are no non-laboratory Authorized Occupants because unsupervised occupancy and/or activities are prohibited by such personnel. Furthermore, only personnel who have the training required for an Authorized User in Level I & II labs may perform supervised work in a Level III or IV lab. All non-laboratory personnel must be under the direct supervision of the Authorized Laboratory Supervisor (or EHS-approved designee as posted) while in a level III or IV lab.

## **Access Restrictions for Authorized Occupants (lab personnel)**

### **Restrictions Applicable to Laboratory Personnel who are Authorized Occupants in Rooms with Hazardous Materials at any levels I - IV (See LSM Part I - Section 2.5.2).**

Authorized Occupants who are laboratory personnel shall:

Not touch or handle any containers clearly labeled as containing hazardous chemicals, hazardous biological agents, or radioactive materials for which they have not been certified as an Authorized User (LSM Part I - Section 2.5.2.1).

Not touch or handle any equipment, containers, or other items that are in an area which has been marked and labeled as one in which Hazardous Materials are being used for which the Authorized Occupant has not been certified as an Authorized User (LSM Part I - Section 2.5.2.2).

NOTE 1: This means that no equipment or materials may ever be removed from such an area by the Authorized Occupant. The Authorized User for that area must decontaminate the materials/equipment, remove labels and markings and place them outside the area before an Authorized Occupant may have access to them.

NOTE 2: An example of an Authorized Occupant is an individual who is an Authorized User of hazardous chemicals but is not an Authorized User of Radioactive Materials. Such an Authorized Occupant may not handle radioactive materials and may not remove items from an area reserved for work with radioactive materials even if the item is unlabeled.

## Procedures for Safe Conduct and Work in Labs

### General Procedures (LSM Part I - Section 2.5.3)

Authorized Users and Authorized Occupants shall (unless “should” is introduced):

- ! Review and be familiar with applicable emergency procedures (LSM Part I - Section 2.5.3.1).
- ! Know the locations of available safety equipment and how to use such equipment (LSM Part I - Section 2.5.3.2).
- ! Not engage in behavior which compromises safety (LSM Part I - Section 2.5.3.3).
  - Not throw objects, run, push individuals, play practical jokes, or engage in any other "horseplay". Note: Sudden loud noises are also to be avoided.
- ! Not eat, drink, smoke, chew tobacco or gum, or apply cosmetics, or store these items in areas where Hazardous Materials are stored or used (LSM Part I - Section 2.5.3.4).

NOTE 1: These items have been known to become contaminated from airborne Hazardous Materials or from contacting contaminated work surfaces, thus allowing the hazardous contaminant to be ingested, inhaled, or absorbed through the skin.

NOTE 2: No one, including authorized occupants or visitors, are permitted to introduce into the laboratory items which are meant to be ingested or applied to the body or the containers for such items. The only exception is the following: If access to a room which is not an authorized laboratory--for example, an office--is not available except through an authorized laboratory, items may be taken directly to such a room by the nearest and safest route. Such items may not be placed on any surface in the laboratory during that transfer through the laboratory.

NOTE 3: By habit, there should be no ‘hand to face or body’ contact while working with Hazardous Materials.

NOTE 4: “Area” includes the whole room in which the Hazardous Materials are used.

REMINDER: Smoking is not allowed in any university building.

- ! Practice good housekeeping (LSM Part I - Section 2.5.3.5)

EXAMPLES: Clean up all debris or mess from your activities. Drawers and cabinets should be closed and furniture returned to normal location when finished, Aisles and exits must be free of obstructions. Spilled materials and broken glassware must be carefully and promptly cleaned up. The floors must be kept free of materials which might cause slipping.

NOTE 1: Authorized Occupants, upon noticing spilled Hazardous Materials or contaminated broken glassware, should inform an authorized user about the spill and request a "clean up". They shall not perform such clean up themselves. Authorized Occupants shall clean up non hazardous spills (water, for example) or uncontaminated broken objects which they caused.

- ! Dispose of all sharp objects ("sharps"), such as broken glassware and hypodermic needles, in an EHS-approved container. There are no exceptions to this requirement. Go to I-6.2.1.4 for detailed procedures for handling this type of waste (LSM Part I - Section 2.5.3.6).

NOTE 1: This applies to Authorized Occupants who have created uncontaminated sharp objects. Authorized Occupants should request Authorized Users to take care of the disposal of potentially contaminated sharps and shall not handle such items if they are potentially contaminated.

- ! Practice good personal hygiene by always washing hands and face after handling Hazardous Materials or working in a room with Hazardous Materials and before leaving the area for eating, drinking, or smoking (LSM Part I - Section 2.5.3.7)

- ! Wear appropriate clothing and shoes at all times as follows: (LSM Part I - Section 2.5.3.8)

Wear shoes that cover the entire foot. Bare feet, sandals, and open-toed shoes are not permitted in labs where chemical, physical, biological, or radioactive material hazards are present.

Wear clothes that cover as much of the body area as possible. Shorts worn without a protective full-length laboratory coat are prohibited. Women who prefer dresses to slacks or long pants are encouraged to wear a long laboratory coat for additional protection.

(Should) wear gloves when the assigned activity requires contact with potentially contaminated surfaces or items in rooms posted with Level I or II hazards and shall wear gloves for such activities in rooms posted with Level III or IV hazards.

NOTE 1: The restrictions given in 2.5.1 above specify that there shall be no contact with surfaces and items in any laboratory with Hazardous Materials if the assignment does not require it. Housekeeping is restricted to cleaning floors and emptying normal uncontaminated trash. Their assignment does not require contact with other items or furniture/equipment surfaces in the room. That is also true of general office personnel.

Wear appropriate eye and or face protection if the assigned activity might involve the creation of materials that might hit the face or eye and shall minimize the amount of bare skin that is exposed (long sleeved shirts--etc).

Wear any special safety apparel specified by the posting at the entrance of a laboratory. The Authorized Laboratory Supervisor shall instruct the Authorized Occupant in the proper use of the safety apparel.

NOTE 1: There may be laboratories in which Authorized Occupants are required to wear special safety apparel--lab coats, gloves, safety glasses, etc. The laboratory-specific SOP's will stipulate when this is required and such requirements must be posted at the entrance. (Such situations should be very rare at KU.)

- ! Know the meaning of posted warning signs and labels and comply with applicable restrictions and procedures mandated by those signs and labels (LSM Part I - Section 2.5.3.9).

- ! Wear appropriate personal protective equipment/apparel (eye protection, hand protection, clothing, etc.) to protect from hazard of inadvertent contamination with Hazardous Materials or exposure to radiations as directed (LSM Part I - Section 2.5.3.10).

NOTE 1: In some cases, laboratory specific Standard Operating Procedures may require Authorized Occupant's to use special Personal Protective Equipment.

- ! Perform activities so that the creation of splashes or aerosols is prevented or, as a last resort, minimized (LSM Part I - Section 2.5.3.11).
- ! Use the "buddy system" if at all possible. This means that occupants working in laboratories should have someone within calling distance and preferably within sight (LSM Part I - Section 2.5.3.12).
- ! Not intentionally smell, taste, or touch with bare hands, any Hazardous Materials, containers with Hazardous Materials, or surfaces bearing warning labels (LSM Part I - Section 2.5.3.13).
- ! Keep containers of hazardous materials being used closed at all times, except when filling/dispensing (LSM Part I - Section 2.5.3.14).
- ! Not leave potentially Hazardous Materials or processes unattended (LSM Part I - Section 2.5.3.15).
- ! Use equipment only for its intended purpose (LSM Part I - Section 2.5.3.16).
- ! Know the hazards and follow applicable Standard Operating Procedure associated with the Hazardous Materials/Radiation Generating Devices being used as specified in Parts II, III, IV or V. Know and observe laboratory specific Standard Operating Procedure and/or permit conditions as applicable for the materials/Radiation Generating Devices (LSM Part I - Section 2.5.3.17).
- ! Be alert to unsafe conditions and actions and pursue correction of such unsafe conditions and actions (LSM Part I - Section 2.5.3.18). Someone else's accident can be as dangerous to you as any you might have.
- ! Think, act, and encourage safety until it becomes a habit (LSM Part I - Section 2.5.3.19).

## **Reporting Unsafe Conditions and/or Actions in Labs (LSM Part I - Section 2.5.4)**

It is the policy of the University that any individual on campus may request an inspection or evaluation by the EHS staff of conditions which they believe may constitute a health or safety hazard. However, when the conditions or actions constitute only a minor risk/hazard, individuals are to report to and work with the responsible laboratory supervisor in correcting the conditions or modifying the behaviors. If the conditions or actions create an imminent danger or a serious risk/hazard, the EHS shall be notified immediately. Confidentiality, to the extent permitted by regulations and possible under the circumstances, will be maintained by the EHS for the one notifying the EHS of the unsafe condition/acts if requested to do so.

Any person who has identified an unsafe condition or act shall:

- ! Immediately report the unsafe condition or act to the EHS at 4-4089 if imminent danger or a serious risk/hazard is involved (LSM Part I - Section 2.5.4.1).

NOTE 1: If it is actually an emergency, the emergency procedures shall be followed. If the person reporting to the EHS and/or the Authorized Laboratory Supervisor has the expertise to take corrective actions, they should do so, especially if timely action might eliminate the hazard.

- ! Take corrective action 'as soon as it is reasonably achievable' if the condition is a minor risk/hazard and the condition or behavior can be safely corrected. Report it to the Authorized Laboratory Supervisor only if it is likely to occur again (LSM Part I - Section 2.5.4.2) .
- ! Remind an individual performing an unsafe act or who is not following required Standard Operating Procedures of the correct procedure (LSM Part I - Section 2.5.4.3) .
- ! Report continuing and uncorrected minor risks/hazards to the Authorized Laboratory Supervisor/Unit Safety Coordinator. If no corrections are made, the EHS should be informed (LSM Part I - Section 2.5.4.4).
- ! All of the procedures specified above should be carried out in the spirit of a mutual support and caring and not as adversaries.