



***SAFETY MANUAL***

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# *RISK MANAGEMENT SERVICES SAFETY MANUAL*

## *FOREWORD*

The safety of students, faculty, staff and visitors is a principal consideration in every campus activity.

The goal of the University Safety Program is to develop positive attitudes regarding safety among all members of the University Community. It is essential that deans, directors, department heads, faculty and staff supervisors take an active part in initiating preventive measures to control hazards associated with activities under their direction. Safety is an integral part of all programs in which there is a risk of injury or health in the academic, research and service areas.

The success of this program depends upon the cooperation and support of everyone. This responsibility extends and includes everyone at the University of North Texas.

Signed

Chancellor



## *INTRODUCTION*

This manual has been prepared by the Risk Management Services (RMS) Office to establish basic procedures and provide general rules for the implementation of the risk management and environmental and safety program for The University of North Texas (UNT).

The manual is broad in coverage and is not intended to cover every procedure in depth. Each Department is encouraged to develop additional health and safety regulations applicable to their own specific operations, and to correlate those regulations with this Manual. Assistance in developing such departmental regulations is available from RMS.

All employees are required to become familiar with the contents of this Manual. It is suggested that one person in each School or Department having a copy or copies of this Manual be assigned the responsibility of assuring that every faculty and staff member reviews its contents, and that all future personnel do so shortly after their employment at the University and at least once a year thereafter. This person should also be responsible for posting updated Manual material, informing all departmental personnel of changes as they occur and maintaining a listing of all annual safety training.

The Manual format is comprised of two major sections:

SECTION I - Risk Management and Environmental Safety Program

SECTION II - Risk Management and Environmental Safety Standards

University personnel are encouraged to submit suggestions to the Risk Management Services Office at any time to improve the University's Safety Program.

The University of North Texas is deeply grateful to University of Texas, Austin, whose Environmental Health and Safety Manual was used as a guide in the development of this Manual.

Prepared by the University Risk Management Services Office.

Doug Welch, Director

## *SECTION I*

### *CHAPTER 1 - PURPOSE AND SCOPE*

#### **AUTHORIZATION AND GENERAL GUIDELINES FOR ESTABLISHMENT OF THE PROGRAM**

The requirement for establishing and maintaining standards for risk management and environmental safety is met by compliance with the intent of all appropriate Federal and State legislation relating to the University's Safety Program for the protection of all campus personnel.

The administrative guidelines necessary for the establishment of an effective health and safety program, coupled with regulations as set forth by Federal and State agencies, and University policies, provide the scope and structure of the Safety Program at the University of North Texas.

The basic considerations in establishing the Safety Program have been founded on the following objectives:

1. To ensure compliance with all provisions and standards of environmental and occupational health and safety laws.
2. To insure compliance with the safety requirements of the Occupational Health and Safety Act, the National Fire Codes and any State of Texas requirements.
3. To insure that the special needs of persons with disabilities are met by compliance with the provisions set forth in various government codes that require all facilities be made accessible and safe.
4. To insure compliance with any other legal requirements set forth by state or federal regulatory body concerned with the injury of anyone on campus.
5. To insure that the human factors of accident prevention, health and loss control be applied.

In the absence of State Office of Risk Management guidelines and appropriate State or Federal regulations in any given subject area, published standards of nationally recognized safety or health organizations have been used as guides in determining the applicable standards for the University of North Texas.

#### **SAFETY POLICY**

It is the policy of the University of North Texas to maintain a campus environment free of hazardous conditions for its students, faculty, staff, and visitors. No person shall be required to perform any task under unsafe or hazardous conditions.

The responsibility for the administration of the University Safety Program is assigned to the Director of Risk Management Services (RMS) who reports to the Senior Vice President of Administration. However, the implementation of the safety policy is the responsibility of faculty, staff, students, and other individuals associated with the University.

The University Safety and Transportation Steering Committee, appointed within the University, shall serve in an advisory and consultative capacity in all areas of safety to the University Risk Management Services Office, and act as an investigating panel at the request of the RMS Director.

The responsibility for policies and practices regarding license, procurement, and use of radioactive materials and sources of ionizing radiation is vested in the Radiation Safety Committee; but implementation of the radiation safety program is delegated to the University RMS Office. The RMS Director or his designee will serve as the Assistant Radiation Safety Officer (ARSO). Every prospective user of radioactive materials and sources of ionizing radiation must apply to the RSO for an authorization permit prior to the purchase and use of such material or equipment.

The University shall endeavor to comply with the intent of all appropriate Federal and State legislation that applies to the University's safety program. These acts along with supporting rules and regulations issued by the RMS Office will provide the necessary standards under which the University will conduct its safety program.

## *SECTION I*

### *CHAPTER 2 - PROGRAM RESPONSIBILITIES*

#### **GENERAL**

The ultimate responsibility for establishing and maintaining the Risk Management Services program on the UNT campus rests with the University Chancellor. Basic policies, which govern the activities and limitations of the Risk Management Services program, are thereby established under the final authority of the Chancellor.

However, the primary responsibility for providing and maintaining a healthy and safe campus environment on a day-to-day basis lies at the operational department level. In this way, the University effectively fulfills the basic requirement of all applicable laws and regulations associated with risk management and environmental safety.

Because of the wide diversity of operations within the University and the necessary differences in organizational structure within the various departments, it is recognized that certain responsibilities and expressed procedures in this program cannot be equally applied. There are, therefore, some details, which might be impossible or impractical for one department head to implement as directed, while another would have no difficulty in applying every one. Departments will, therefore, have some latitude in formulating and implementing alternate methods when necessary as long as the total Risk Management Services program's objectives are not compromised.

Every individual who participates in the life of the University, at any level, has the responsibility to actively participate in helping to create a safe campus environment. Specific responsibilities of all faculty and staff are directly proportional to their operational authority. The moral obligation implied of each individual for the safety of oneself and for one another is both obvious and unavoidable.

## **ORGANIZATIONAL CHART**

A detailed University organizational chart is maintained at:

[http://www.unt.edu/policy/UNT\\_Policy/volume2/table\\_of\\_contents.html#10.%20GENERAL%20ADMINISTRATIVE](http://www.unt.edu/policy/UNT_Policy/volume2/table_of_contents.html#10.%20GENERAL%20ADMINISTRATIVE)

### **DEANS, DEPARTMENT CHAIRS, ADMINISTRATORS**

It is the expressed responsibility of all Deans, Department Chairs, and Administrators to maintain healthful and safe working conditions within their jurisdictions, to monitor and exercise control over their assigned areas, and implement the following designated safety-related procedures:

1. Make every effort to maintain compliance with and observance of all campus health and safety regulations established by this Manual that are applicable to their particular environmental jurisdiction. Also, with the assistance of RMS, comply with Federal and State environmental and safety laws.
2. Identify facilities and equipment that present a health or safety hazard. If it becomes necessary to replace, upgrade, or add additional items of equipment to ensure a safe working environment, these items will be given priority over other purchases when allocating department or University funds.
3. Conduct, or have conducted, periodic safety inspection of the department and correct any deficiencies that might exist. Departments having hazardous operations are required to make frequent inspections. The RMS office is available for assistance and advice regarding any corrective measure to be taken, but the authority for implementing the necessary action(s) is the responsibility of the affected department. In addition, RMS will conduct safety and fire inspections of all University buildings on a periodic basis. A written report will be forwarded to the concerned department after each inspection. Deficiencies that are beyond the scope of the department's capabilities will be handled by RMS upon request. The department will be kept informed on all aspects of the project.
4. Ensure that all personnel are briefed and are familiar with department safety procedures and policies that enforce the implementation of procedures.
5. Provide necessary safety equipment and protective devices for each job. Insure this equipment is stored and maintained in satisfactory condition. RMS is available for assistance in determining what protective or safety equipment is required for a particular task.
6. Make every effort to seek prompt medical treatment for all faculty, staff, students or visitors that are injured and direct that all required reporting procedures for

- both accidents and injuries established in Section I, Chapter 4 of this Manual be followed to completion. When desired, maintain a fully supplied first aid kit in department area and be sure all employees know the location and proper use. It is recommended that some of your staff receive First Aid Training and CPR.
7. Direct the investigation and review all injuries, illnesses, or accidents occurring within the department that may result in any degree of loss or potential loss.
  8. Require all faculty and staff members to become familiar with the emergency procedures as published in Chapter 6 of this Manual.
  9. Actively solicit suggestions from faculty and staff, which will contribute to the constant improvement, and establishment of a hazard-free and healthy work environment.
  10. Direct supervisors to take immediate action to correct any unsafe behavior and to remediate any unsafe condition.

## **SUPERVISORS**

All Supervisors are responsible for instructing all personnel under their direction in exercising proper operational procedures, and seeing that all facilities and equipment under their jurisdiction are maintained in safe operating condition at all times.

Supervisors will provide initial training to newly assigned personnel and annual training for all employees. This training will include proper safety procedures, operation of equipment, wear and maintenance of safety equipment, and maintain a record of training for each individual. Supervisors may obtain assistance from RMS in providing this training or obtaining information on specialized training materials. Further, responsibilities of supervisors include:

1. Explain clearly to employees under their supervision all University safety regulations that are relevant to specific work duties, and enforce compliance with published standards in this Manual. If necessary, for complete understanding by all personnel, make arrangements for explanations in a foreign language.
2. Conduct training sessions for all employees to assure uniform safe operation and performance of all new or seldom used equipment.
3. Devise a motivational program to maintain employee interest in health and safety and encourage them to voluntarily observe safety rules and regulations at all times.
4. Provide personnel with needed personal protective equipment (PPE) and safety equipment, devices, and clothing, and demonstrate proper use prior to operation of equipment or performance of hazardous tasks.
5. Control unsafe practices and actions of employees such as running, smoking in

- prohibited areas, horseplay, operating machinery without safeguards, taking short cuts during job processes, etc.
6. Inspect all work areas for hazardous conditions or unsafe practices and initiate prompt corrective action(s) to eliminate causes of potential accidents.
  7. Maintain good housekeeping practices in all work areas as specified in Section II of this Manual.
  8. Report all unsafe conditions, equipment, unnecessary accumulation of hazardous wastes and work practices observed by yourself or workers on campus to the Department or RMS on the same day that such deficiencies are seen. Encourage employees to watch for and report such incidents immediately.
  9. Investigate all accidents promptly and complete all necessary forms to fully record such incidents.
  10. Make every effort to seek prompt medical treatment for employees that are injured, including transportation, if necessary. As necessary, use the first aid kit in the department area if an injury does not require medical treatment at the Health Center or off campus.
  11. Notify the Department of any employee who may be physically or emotionally incapable of performing duties in a safe manner.
  12. Include records of procedural violations causing occupational injuries and responsibilities for safety in performance appraisals of individual employees.
  13. Submit and encourage recommendations from employees to the Department for improving the safety and efficiency of the Department.
  14. Commend and recognize employees who maintain a uniformly safe environment and accident-free work record, or who develop unique safety devices or practices for their work area.
  15. Report any hazardous substance spill immediately to RMS, and as applicable, ensure compliance with the Texas Hazard Communication Act. RMS personnel are available to assist with compliance of any applicable law or regulation.

The supervisor is the person ultimately responsible for insuring that the University's safety program works. If the supervisor does not ensure that each worker uses the proper safety equipment, that this equipment is in good condition, and that the correct operating procedures are followed, the worker will not have a safe and healthy work environment. RMS may be contacted for assistance with training programs for a particular shop or operation.

## **FACULTY AND TEACHING ASSISTANTS**

Each faculty member and teaching assistant is responsible for the dissemination of information regarding safety regulations to all students (and employees) under their active academic jurisdiction. These responsibilities include, but are not limited to:

1. Explain to students all campus safety regulations and procedures established by this Manual and all departmental procedures that are pertinent to their specific academic tasks and/or activities.
2. Assure the proper use of manual or powered equipment by first demonstrating the correct operation, then providing initial personalized training and instruction, and thereafter maintaining periodic surveillance of individual users.
3. Provide students with adequate personal protective devices and clothing as needed for the proposed instruction or activity after first checking to see that such equipment is in good repair and complete in all component parts, sizes, and types.
4. Inspect instructional areas frequently for identification of, and prompt elimination of, unsafe practices and conditions. Request the Department Head to take specific corrective action to eliminate hazards. Advice and assistance is available from the RMS office.
5. Make every effort to seek prompt medical treatment from the Department, Student Health Center or a doctor of the student's choice, for all students that are injured.
6. Submit periodic recommendations for the improvement of the immediate academic environment to the appropriate Dean, Department Chair, or Administrator.
7. Refer to Section III of the Faculty Handbook and follow all instructions in the paragraph addressing, University Policy for Safety in Instructional Activities.



## **EMPLOYEES AND STUDENTS**

All University employees and students are subject to the campus health and safety regulations established in the Safety Manual and departmental procedures, which shall take precedence over any conflicting instructions except where lawful and applicable government regulations may be contrary to these rules. Compliance with the standards contained herein is vital to the creation and maintenance of a healthy and safe campus environment and to facilitate the pursuit of desired goals and activities for this University.

Responsibilities and rights of employees and students in achieving a healthy and safe campus environment are:

1. No employee or student shall perform any function or operation that is considered hazardous, or is known to be hazardous, before requesting advice or consulting with their Supervisor or Instructor as to the safe manner and appropriate procedure(s) for task completion. Health and safety problems not settled at the supervisory, instructor or department level may be appealed, following established University grievance procedures.
2. Understand and comply with all University and departmental safety instructions, whether written or oral, when performing assigned duties.
3. Use only tools and equipment approved or provided by the Supervisor or Instructor.
4. Always use appropriate safety equipment and guards, and work within established safety procedures, giving precedence to correct methods over expediency or shortcuts.
5. Report all unsafe conditions, practices or equipment to the Supervisor or Instructor whenever such deficiencies are observed and as often as necessary to assure correction.
6. Inform the Supervisor or Instructor immediately of all injuries or accidents, and assist injured persons in obtaining prompt medical treatment when necessary.
7. Your rights as an employee under the "Texas Hazard Communication Act" are:
  - a. Employees (students) who may be exposed to hazardous chemicals shall be informed of the exposure and shall have access to the workplace chemical list and Material Safety Data Sheets (MSDS) for the hazardous chemicals. Employees (students), on request, shall be provided a copy of a specific MSDS with trade secret information, if any, deleted. In addition, employees (students) shall receive training on the hazards of the chemicals and on measures they can take to protect themselves from those hazards and shall be provided with appropriate personal protective equipment.

- b. For further information concerning this Act, please contact the RMS Office.

### **OFF-CAMPUS ORGANIZATIONS**

University organizations and operations located off the main campus such as the System Center, the Ponder Research Facility, the Missile Base facility, the Dallas University Center, and Sheppard Air Force Base site are an integral part of the total campus community. Therefore, they are required to accept the same health and safety responsibilities as on-campus departments, and to follow all safety regulations and procedures established in this Manual. In addition, it is hoped that satellite groups will develop, publish and implement specialized safety instructions, as necessary, for their particular activities and needs after consultation with the Risk Management Services Office.

## *SECTION I*

### *CHAPTER 3 - PROGRAM ADMINISTRATION*

#### **GENERAL**

The University Risk Management Services office (RMS) coordinates the overall administration of health and safety program at the University of North Texas. Under the supervision of the RMS Director, RMS has the authority to plan, establish and manage priorities for the implementation of program objectives.

To fully support the various University personnel designated to be responsible for specific aspects of program activities, the RMS Office is the primary campus resource for broad technical and administrative procedures needed to coordinate the objectives of the master plan of the health and safety program. The role of the RMS Office includes, therefore, five salient features:

SURVEILLANCE

CONSULTATION

COMPLIANCE

EDUCATION

PROGRAM MANAGEMENT

(Risk Management,  
Hazardous Materials,  
Environmental Health & Compliance,  
Emergency Services)

## **RISK MANAGEMENT SERVICES**

The RMS Office is responsible for planning, implementing and administering the University's Risk Management Services program, and for providing supportive technical consultation, training, investigation, and inspection to assure compliance with the safety program established by this Manual. The RMS Office also formulates and adopts appropriate new codes, rules, standards, policies and procedures based on analysis and interpretation of pertinent state and federal health and safety laws.

A primary administrative function of RMS is to assist University Deans, Department Chairs, and Administrators in meeting their assigned health and safety responsibilities outlined in Section I, Chapter 2 of this Manual. To accomplish this, RMS works with all campus Administrators, academic departments, and specialized committees to provide technical and administrative policy and program direction in the continued development and implementation of health and safety programs designed to prevent and reduce accidents and to identify and eliminate environmental hazards and conditions.

RMS has the authority to request that Deans, Department Chairs, Administrators, Supervisors and other individuals abate unsafe conditions or operations when in the professional opinion of the RMS Director the condition or operation constitutes an imminent hazard to life and property. Other conditions or operations considered to be of a non-imminent nature, but in violation of standards published in this Manual, State, or Federal health and safety laws, will be recommended for correction through appropriate channels.

Administrative duties of RMS shall include, but not be limited to, the following program areas:

1. **Environmental inspections.** Promote safe and sanitary conditions of all campus buildings and grounds by conducting periodic health and safety inspections of all campus facilities. The RMS also investigates complaints to identify unsafe conditions, practices and procedures, violations of campus regulations and/or applicable state and federal laws, and report the results of such inspections to the responsible Dean, Department Chair or Administrator for correction.
2. **Liaison with governmental agencies.** Develop and maintain good working relationships with governmental agencies having jurisdiction or quasi-jurisdiction over matters affecting the health and safety of University employees, students and visitors.
3. **Procurement of machinery and equipment.** Assist departments in the design, purchase, and use of hazardous or potentially hazardous equipment. Also assure that all such items are in conformance with safe operating standards.
4. **Review of research projects.** Assist in the review of academic research

- proposals and contracts to assure that pertinent health and safety factors are incorporated in grants and projects submitted by and/or awarded to University personnel or departments.
5. **Emergency preparedness.** Assist in the continued development and implementation of University emergency procedures and the procurement of needed equipment, and provide technical consultation to campus emergency personnel.
  6. **Campus public events.** Monitor all campus public events, in conjunction with the Student Activities Office, to assure that proper consideration is given to environmental health and safety factors such as electrical equipment, food sanitation, temporary structures, waste disposal, fire safety, etc.
  7. **Machinery guarding.** Assure that campus machinery, equipment and powered tools are properly guarded in conformance with the standards contained in this Manual.
  8. **Electrical safety.** Assure that all electrical hazards, including cord-connected equipment in lab, shops and offices are identified and eliminated.
  9. **Fire protection.** Assure that University buildings, facilities, fire detection and fire suppression equipment are properly inspected at regular intervals and maintained to reduce the potential of fire losses. Also monitor the use of flammable liquids and materials.
  10. **Industrial hygiene.** Assure that the University has no unrecognized or excessive exposures to corrosive or toxic materials, fumes, gases, dusts, and biological or infectious agents in labs, shops, or other campus areas.
  11. **Radiation safety.** In cooperation with the Radiation Safety Committee, assure that proper surveillance and control of all ionizing and non-ionizing sources of radiation are in accordance with the University's policies.
  12. **Ventilation control.** Assure that all laboratory fume hoods and general room ventilation meet accepted flow rate standards as published in this manual.
  13. **Waste disposal.** Provide for the safe handling, storage, and disposal of hazardous and toxic liquid and solid waste. Also, maintain surveillance of waste disposal and investigate and evaluate complaints regarding general refuse collection and sewage for all campus buildings and areas.
  14. **Environmental sanitation.** Assure that maintenance of the campus environment is consistent with accepted standards of sanitation for buildings and grounds, water supply and distribution, and swimming pool and athletic facilities.
  15. **Food sanitation.** Assure that campus food services are operated and maintained

in compliance with the University's Food Sanitation Policies.

16. **Animal control.** Assure that the University community is not exposed to unsafe and potentially infectious animals.
17. **Vector control and pesticide use.** Assure the safe use, storage, and handling of pesticides, and the adequate control of insects and rodents to prevent or eliminate campus infestation.
18. **Personal protective equipment.** Assure the purchase and correct use of personal protective equipment is adequate for the health and safety of employees when hazards are encountered on campus.
19. **Safety training.** Provide for and promote education and training of campus personnel in health and safety practices.
20. **Building construction and space modification.** Identify Asbestos containing Building Materials prior to construction and renovation projects. Advise on applicable safety codes and practices in construction and in modification of new or existing campus buildings, equipment and facilities, grounds, roadways, and the construction or placement of temporary or permanent objects. Also, review construction plans as required by the Office of Facilities Planning & Construction.
21. **Services for disabled persons.** Provide advice and assistance on health and safety matters relevant to the needs of impaired persons on campus.
22. **Accident and injury investigations.** Conduct appropriate investigation of campus accidents reported to RMS that may involve University liability under Texas Tort Claims Act. Also, insure that the cause of any accident is removed or corrected where possible, and obtain the necessary photographs, evidence, and witness interviews.
23. **Accident statistics.** Compile and analyze in detail all University accident and injury statistics and cost data (when available), prepare and distribute periodic reports to Administrators and members of the Safety and Transportation Steering Committee.
24. **The "Right to Know Act".** RMS is the focal point for informing University employees of their right under this act.
25. **Asbestos Program.** Assure that the University is in compliance with Federal and State regulations. Inspecting condition of known asbestos containing materials on campus and operating maintenance permit program.

## **ADMINISTRATIVE COMMITTEES**

Safety-oriented committees function in specific areas of concern to administer, control or advise specialized activities. The RMS Director, or his designee will serve as an ex-officio member of all safety committees; and shall receive copies of any scheduled meeting minutes.

### **University Safety and Transportation Steering Committee**

The primary safety advisory committee at the University of North Texas is the University Safety and Transportation Steering Committee, established by the Chancellor as the campus wide committee to serve in an advisory and consultative capacity to RMS in all areas of safety, and act as an investigating panel at the request of the RMS Director.

Membership of the Committee is to be as representative as possible of the total University community and will meet quarterly.

### **Radiation Safety Committee**

The Radiation Safety Committee is established as a requirement of the University's broad radioactive materials license with membership appointed by the Chancellor. The Committee establishes policy and procedures for the use of radioactive materials and other sources of ionizing radiation. The Committee has the authority to enforce existing regulations and to initiate decisions relevant to the safety and health hazards associated with the use of ionizing radiation. Applications for the use of radioactive isotopes and radiation-producing equipment must be submitted to the Committee through the Radiation Protection Officer, for approval. The Committee also acts as a Board of Appeal regarding application decisions made by the Radiation Protection Officer.

The Radiation Safety Committee meets four times during the school year (September-June), and as needed.

### **Departmental Committees**

The departmental committees function in specific areas of concern to control specialized activities unique within their areas of responsibilities. The activities and scope of the departmental committees include, but are not limited to, the following areas of responsibilities:

1. Act as a central forum for discussion of accident-producing problems within their areas.
2. Reviews and acts on reports of various health and safety inspections conducted by committee members or by RMS personnel.
3. Develops new health and safety procedures and standards for areas of responsibility, for approval by RMS.

4. Conducts periodic analysis and evaluation of trends and progress in the control of accident frequency and severity.
5. Conducts training courses for faculty and staff in health and safety.
6. Annually reviews and recommends possible changes and additions to the departmental safety manuals following review and approval of RMS.

The department head, appoints membership of the departmental safety committee with the RMS Director or his designee, serving as an ex-officio member.



## *SECTION I*

### *CHAPTER 4 - PROGRAM PROCEDURES*

#### **GENERAL**

Adherence to proper health and safety procedures and standards has been proven to exert a profound effect on the reduction of personnel injuries, property damage, and work interruptions. Administrators, faculty, and staff can virtually eliminate the major causes of University accidents by placing continual emphasis on the procedures and standards published in this Manual.

#### **PRIORITIES FOR ACCIDENT PREVENTION**

In view of the many demands made on limited University resources, it is necessary to establish an order of priority for the abatement of hazards and violations identified by safety inspections conducted by either a department or the RMS office. Serious violations and hazards should always be given top priority and be corrected immediately, or consideration should be given to stopping operations affected by the violation(s) or hazard(s).

"A serious violation shall be deemed to exist in a place of employment if there is a substantial probability that death or serious physical harm could result from a condition which exists, or from one or more practices, means, methods, operations, or processes which have been adopted or are in use, in such places of employment..."

The following table identifies the hazard classifications used for establishing priorities for abatement of health and safety hazards:

HAZARD CLASSIFICATION

<b>ORDER OF PRIORITY OCCURANCE</b>	<b>PROBABILITY OF INJURY OR ILLNESS</b>	<b>SEVERITY OF INJURY OR ILLNESS</b>
1	Imminent danger situation	Immediate & serious or fatal
2	High chance of injury or illness	Serious or fatal
3	Moderate chance of injury or illness	Minor
4	Minimal or little chance of injury or illness	First aid case

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To eliminate accidents in high hazard areas, it is mandatory that each department thoroughly acquaints, all employees and students under their direction with the hazards that exist, and ensure that they fully understand the methods of performing each assigned job safely, or avoiding such hazards when they cannot be eliminated. When hazards and potential accident-causing situations are identified and understood, action should be accomplished in this order:

1. Eliminating the process or operation, or providing for a substitute action that can be done without the hazard, or,
2. Isolating the process or operation, or,
3. Providing guards to eliminate or minimize the hazard, or,
4. Providing personal protective equipment and enforcing its proper use.

## **HEALTH AND SAFETY INSPECTIONS**

In order to reduce unsafe campus conditions that expose faculty, staff, students and visitors to potentially hazardous operations or areas, which may result in personal injury or property damage, an effective health and safety inspection system is essential. Accordingly, this Manual assigns all University management personnel the responsibility to conduct, or have conducted, at least annually, health and safety inspections of the areas over which they have control. Such safety inspections may be of the informal type; however, some kind of written record should be maintained.

In addition, all teaching faculty, technicians, assistants, and supervisors should make daily "spot" inspection tours of their work and study areas. RMS will provide any person making a safety inspection with assistance to the extent requested.

RMS personnel make scheduled comprehensive inspections of all University facilities, machinery, operations and functions on a continuous basis. If the inspected facilities belong to a specific department, a report outlining the findings and recommended corrections will be sent directly to that specific department. However, in areas that are public in nature, such as hallways, the correction will be handled by RMS. All facilities and/or equipment found to be unsafe for use, as determined by RMS personnel, shall be removed from further use and rendered inoperable.

Identification and correction of hazardous conditions should first be carried out in those work/study areas having the greatest potential for serious accidents occurring. The following are the major factors to be considered when planning what campus equipment and facilities to inspect:

1. Areas having equipment or conditions that can contribute to serious accidents.
2. Number of accidents and/or injuries caused by specific equipment areas.
3. Employee and student complaints of hazardous conditions or equipment.
4. Number of University employees, students, or visitors who use such areas or equipment.

## **INJURY RECORD KEEPING AND STATISTICS PUBLICATION**

Complete records of all reported accidents and injuries occurring either on University property or at off-campus, University sponsored events, are maintained and analyzed by RMS. These records include those affecting faculty, staff, students and visitors. Statistics and certain other facts from these records are available to departments to be used for accident prevention purposes. In addition, departments should also maintain and analyze records of accidents occurring in their own area of operations.

## **EMPLOYEE HEALTH REQUIREMENTS**

If employment with the University requires or may require the use of a respirator, the prospective employee must first obtain a pre-occupational physical as determined by RMS. Physical fitness of faculty and staff employees is a prime requisite in the prevention of occupational injuries. It is, therefore, important that employees having limiting health problems be carefully evaluated to assure that their physical and mental health capability is compatible with their job assignment. Only those prospective employees who possess both general health and physical conditions compatible with the duties of the proposed position should be considered for employment with the University.

## **REPORTING HEALTH AND SAFETY SUGGESTIONS**

Employees and students having suggestions regarding health and safety matters should report their recommendations to their supervisor, instructor, or department head in writing. Supervisors, instructors, or department heads should seriously encourage and consider all safety suggestions and respond to them as soon as possible. Guidance or assistance in handling safety suggestions is available from RMS.

## **ACCIDENT INVESTIGATION**

Investigation of accidents is one of the major components of a comprehensive health and safety program. Every accident must be considered a total loss unless its true cause is objectively determined and all contributing deficiencies are corrected. If an accident-producing situation, or cause(s), is left undetected, uncorrected, not eliminated or controlled, a similar type of accident is certain to occur again. Although investigation, reporting and corrective follow-up of each accident will consume some time, it is a vital factor in accident prevention and represents relatively little of the total time lost due to the entire accident disruption.

In fact, the effort to prevent the recurrence of an accident through proper investigation is an investment that pays compounded safety benefits to the total University community. In addition, important information and facts needed for administrative reports and hearings that may be required can only be secured by means of thorough accident investigation and reporting.

Every University department is, therefore, required to ensure that all accidents and injuries occurring to employees, students, or visitors in areas under their jurisdiction are properly reported to RMS. All "near miss" incidents (close calls or near accidents) which, in the opinion of the department chair, appear to constitute a hazard to others are to be reported to RMS in writing, since this information is frequently as valuable as accident reports for identifying hazardous conditions or procedures that need correction.

## SECTION I

### CHAPTER 5 - SAFETY TRAINING

#### **GENERAL**

An effective accident prevention program is based on achieving and maintaining correct job performance. When people are trained to do their jobs properly, they will accomplish tasks safely. Safety training develops in people the desire, the knowledge, and the actions necessary to prevent accidents. Experience has proven that persons who have learned to recognize and correct unsafe conditions and practices measurably improve their chances of averting the pain, inconvenience, and economic loss due to accidental injury. It is important, therefore, that all University departments, supervisors, and instructors: 1) know how to train employees and students in the safe and proper way of doing their assigned jobs, and 2) know how to supervise employees and students.

Although training and education cannot be separated completely, safety education is broader in scope and covers subjects not normally included in a regular training program. This chapter deals only with safety training and is concerned with the goal of educating employees so that they are made aware of, and instructed to follow, the standards and procedures established by this Manual. Students in academic pursuits also should receive necessary safety training in the areas of their chosen careers.

Training is a primary way of influencing human behavior. Safe performance is encouraged at the University by departments when they spare no effort to create and sustain safe campus conditions, and by maintaining a safety program aimed at teaching people the facts about accident causes and preventive measures. Establishing safe work procedures, by teaching the procedures effectively, develops safe performance and by making sure that they are followed. A well-planned training program not only trains employees, but also helps to change other environmental factors and influences so that they will complement the effect of training.

No department, supervisor or instructor shall assume that a newly hired, newly assigned, or reassigned employee or student thoroughly knows all the safe procedures relative to his/her new job. The employee must always be trained in appropriate safety procedures.

#### **DEPARTMENT TRAINING RESPONSIBILITIES**

Every University department, or operating unit, is responsible for providing specific safety training to their employees and/or students. Each employee or student must be given sufficient instruction with respect to the job assignment that enables each to understand the task(s) to be performed and the predictable hazards that are to be avoided. General safety training is provided by RMS to departments as requested and is defined as that which is necessary for employees to be able to work safely in the total University

environment. Specific safety training is that training which is necessary to safely perform a special job function such as operating a power saw, etc. Both kinds of training are necessary if accidents are to be avoided. Departments are responsible for full participation by their employees in required training programs.

Since the immediate supervisor or instructor can most effectively provide training, it is recommended that departments require supervisors/instructors to train employees or students how to perform job tasks in a correct and safe manner. Supervisors and instructors are specifically assigned the responsibility to provide detailed safety training for all employees and students who are required to use hazardous machinery such as that found in woodworking shops, vehicle maintenance shops, metal working shops, laboratories, etc. In addition, each supervisor and/or instructor should prepare written safety instructions for operating all hazardous equipment and provide a copy of the instructions to each employee or student using that piece of equipment. Further, it is recommended that a list of the hazardous equipment and/or operations that each employee/student has been trained to operate be signed by that employee/student and kept on file in the department or shop office.

Specific safety training should be provided periodically, at least annually, and when there is a change in operations.

### **TRAINING THE NEW EMPLOYEE**

All new employees or students must be made aware of all immediate safety work considerations during their first day of employment. Also, specific safety and health policies and standards of this Manual pertaining to their work assignment are to be personally reviewed by employees and/or students before being allowed to begin work in a new job assignment. To determine on-going training needs, supervisors should observe employees frequently to see that short cuts or violations are not occurring.

General safety meetings or training sessions should be conducted a minimum of twice a year, or more often in hazardous environments, to assure that safe practices and procedures are being followed.

### **RISK MANAGEMENT SERVICES TRAINING RESPONSIBILITIES**

The responsibility for providing generalized safety-training programs as requested, and for coordinating and assisting departments in their specialized safety training programs, are functions of Risk Management Services (RMS).

### **SERVICES**

Departments or any operating unit may obtain the following assistance from RMS in developing a program of training, orientation, or information for their employees:

1. General safety training classes of approximately 30 minutes to 2 hours each may be provided for a variety of safety related subjects. Films, lectures,

demonstrations, and group discussions may be utilized as training aids in these classes.

2. Special assistance is provided for the avoidance of specific health and safety hazards unique to particular jobs or departments. Consultation meetings between the involved department and RMS normally may be required. These department programs may be an elaborate series of training sessions or just a brief talk.
3. Classes are designed to teach supervisory personnel how to achieve and operate a safer work unit and to help show supervisors how to better meet their training responsibilities. All such classes are tailored to the specific needs of the involved department.

### **MATERIALS**

The resource materials listed below generally are available free of charge from RMS on request:

1. A "Manual of Safety Training, Section II" is available for use by the University community.
2. RMS can assist in obtaining films and slides if sufficient notice is given. We will gladly offer assistance to any department in selecting or using training films and slides.
3. Printed materials. General safety pamphlets, posters, signs, and stickers normally are available to departments free of charge; however, more expensive items may require at-cost payment. Most of these items can be obtained immediately, but large quantities and special items will require special order from outside agencies such as the National Safety Council, Texas Safety Association, and National Fire Protection Association.

### *SECTION I*

## *CHAPTER 6 - EMERGENCY PREPAREDNESS*

### **GENERAL**

It is the responsibility of all University administrators, department chairs, supervisors, and faculty, to be aware of and to follow the emergency procedures established in this chapter. It is also their responsibility to insure that all employees and students under their direction know of, and are instructed to comply with, these procedures. In order to minimize injuries and property damage, it is the intention of the University that these published emergency procedures be followed in all critical situations.

The primary system for handling any kind of on-campus emergency is to telephone the University Police Department:

*9 1 1*

The campus police officers are available 24 hours a day, 7 days per week and are professionally prepared to respond to any type of campus emergency. Remember, to obtain help during an emergency, dial **911**. For non-emergency situations call **565-3000**.

Risk Management Services personnel are on duty or on call 24 hours a day. During normal business hours, they can be reached at 565-2109; after normal business hours, contact the campus operator or campus police for their assistance in contacting the safety person on call.



## **DO NOT CALL OFF-CAMPUS RESOURCES YOURSELF - CALL THE UNIVERSITY POLICE DEPARTMENT.**

### **REPORTING EMERGENCIES - GENERAL**

The quickest and easiest way to obtain professional help for any type of emergency not specifically covered by this manual is to use the 113 number or the number found on the EMERGENCY REFERRAL AND ASSISTANCE sheet located at the end of this chapter.

1. When calling, stay calm and carefully explain the problem and location to the dispatcher. If the emergency number 911 is busy, call the campus operator.
2. Quickly notify your supervisor or instructor of the emergency and begin to take the appropriate action warranted by the situation.

#### **REMEMBER!**

#### **KEEP YOURSELF CALM**

#### **KEEP OTHERS CALM**

### **BUILDING EVACUATION**

1. Be aware of all the marked exits from your area and building. See <http://web2.unt.edu/riskman/> for evacuation maps for download.
2. The evacuation alarm is a loud continuous bell or horn.
3. To activate the building alarm system, pull the handle on one of the red boxes located in the hallway.
4. When the building evacuation alarm is sounded or when you are ordered to leave by the campus police, walk quickly to the nearest marked exit and ask others to do the same.
5. Assist the handicapped in exiting the building and remember that elevators are reserved for use by the handicap.
6. Outside, proceed to a clear area that is at least 150 feet from the affected building. Keep walkways and streets clear for emergency vehicles. In case of evacuation, elevators may be disabled.
7. To the best of your ability and without re-entering the building, be available to

assist the campus police, fire department, Fire Warden and RMS office personnel in their attempts to determine that everyone has been evacuated safely.

8. An On-Scene Command Post will be set up near the emergency site by the University Police Department. Keep clear of the Post unless you have important information to report.
9. Do not return to the building until you are told to do so by the campus police.

## **FIRE**

Note: An evacuation map is available for download for each University building at the RMS website, [web2.unt.edu/riskman](http://web2.unt.edu/riskman)

1. Activate the building alarm if necessary or if directed to do so by the campus police.
2. On a minor fire that appears to be controllable, immediately call the campus police, then promptly direct the charge of a fire extinguisher toward the base of the flame. Get help, even if the fire appears to be small.
3. On large fires that are not immediately controllable, or after using the extinguisher, close all doors - but do not lock them - to confine the fire and reduce the oxygen.
4. Immediately call the campus police. Give your name and describe the location and size of the fire.
5. Notify your supervisor, then evacuate the building by quickly walking to the nearest exit, alerting people as you go. Leave the elevators for the handicapped and assist them as necessary. Elevators may be disabled in the event of a fire.
6. Once outside, move to a clear area without re-entering the building. Be available to assist the Fire Warden and RMS personnel and campus police in their attempts to determine that everyone has evacuated the building safely.
7. An On-Scene Command Post will be set up near the emergency site by the University Police Department. Keep clear of the Post unless you have important information to report.
8. DO NOT RETURN to the building until the campus police or RMS personnel tell you to do so, even if the alarm has stopped.
9. Report all fires to RMS, 565-2109.

## **TORNADO SAFETY RULES**

Note: Please refer to the RMS website for shelter locations, which are included in each buildings' Evacuation Plan.

<http://web2.unt.edu/riskman>

When a tornado approaches:

Seek shelter inside, preferably a tornado cellar, underground excavation, or steel-framed or reinforced concrete building of substantial construction. **STAY AWAY FROM WINDOWS AND GLASS DOORS.**

1. **In Office Buildings:** stand in an interior hallway on a lower floor, preferably in the basement.
2. **In Homes, Small Buildings, and Vehicles:** Go to the basement or to an interior part of the lowest level (a closet, bathroom, or interior hall). Get under something sturdy.
3. **In Schools:** Whenever possible, go to an interior hallway on the lowest floor. Avoid auditoriums and gymnasiums or other structures with wide, free-span roofs.
4. **Listen to the Radio:** The radio and television stations will broadcast the latest tornado advisory information. Call the Weather Service only to report a tornado.

***REMEMBER:***

***TORNADO WATCH MEANS: TORNADOES ARE EXPECTED TO DEVELOP.***

***TORNADO WARNING MEANS: A TORNADO HAS ACTUALLY BEEN SIGHTED.***

## **EXPLOSION**

In the event a violent accident such as an explosion occurs on campus that could render a building area unsafe, take the following actions:

1. Immediately take cover under tables, desks or other such objects that will give protection against glass or debris.
2. After effects of the explosion have subsided, notify the campus police. Give your name, and describe the location and nature of the emergency.
3. If necessary or directed to do so by the campus police, activate the building alarm system.

4. Notify your supervisor, then evacuate the immediate area of the explosion.
  - Be aware of structural damage.
  - Stay away from glass doors and windows.
  - Do not touch or move any suspicious object.
5. Assist others, especially the injured and handicapped when evacuating the building.
6. Once outside, move to a clear area at least 150 feet away from the affected building. Keep walkways and streets clear for emergency vehicles. Be prepared to move if told to do so by campus police.
7. To the best of your ability and without re-entering the building be available to assist the RMS personnel and campus police in their attempts to determine that every one has evacuated the building safely.
8. An On-Scene Command Post will be set up near the emergency site by the University Police Department. Keep clear of the Post unless you have important information to report.
9. Do not return to the building until the campus police tell you to do so even if the alarm has ceased.

### **BOMB THREAT**

1. If you observe a suspicious object or potential bomb on campus, **DO NOT HANDLE THE OBJECT**. Clear the area and immediately call the campus police.
2. If you receive a phone call that a bomb or other explosive device has been placed on campus, gather as much of the following data that you can:

Date/Time of call:

Exact words of caller:

Questions to Ask Caller:

When is the bomb going to explode?

When did that time start?

What time is it now by your watch?

Where is the bomb right now?

What kind of bomb is it?

What does it look like?

Where did you place the bomb?

Description of the Caller's voice:

Male or Female?

Age of Caller (young, old, etc.)

Caller's accent?

Speech pattern.

Background noises (trains, planes, highway noises)

Does the voice sound familiar? If so, who did it sound like?

What time did caller hang up? Remarks?

3. Immediately notify the campus police and supply them with the information outlined above.
4. If the bomb threat is received by mail, do not handle the letter, envelope or package any further. Vacate the area at once, report to your supervisor and call the campus police.
5. The campus police will handle the situation now.
6. If an evacuation is warranted, the campus police will activate the building alarm.
7. Evacuate the building and follow the procedures as listed under Building Evacuation.
8. Remember, do not return to the building until directed to do so.

**VIOLENT OR CIVIL DISTURBANCE**

Everyone is asked to assist in making the campus a safe and peaceful place to carry on business as normally as possible. However, disturbances sometimes do occur and everyone should be aware of action to be taken.

1. A threatening disturbance should be reported immediately to the campus police and the following action taken:
  - Alert all employees in the area of the situation.
  - Lock all doors, secure all files, documents and equipment.
  - If necessary, cease operations and evacuate the building.
2. If you are the victim or are involved in any on-campus violation of the law such as assault, robbery, theft, overt sexual behavior, etc. **DO NOT TAKE ANY UNNECESSARY CHANCES!** Notify the campus police and provide the following information:
  - Nature of incident
  - Campus location
  - Description of person(s)
  - Description of property
3. Avoid provoking or obstructing anyone participating in a disturbance or demonstration.
4. Assist the campus police when they arrive by supplying them with all additional information and ask others to do the same.
5. The campus police will assess the situation upon their arrival and conduct any search necessary or disperse demonstrators as necessary.
6. If a class or lecture is disrupted the offending person or persons should be requested to leave. If they refuse, call the campus police.

### **CHEMICAL OR RADIATION SPILL**

Any campus spillage of a dangerous chemical or radioactive material will be reported immediately to Risk Management Services Office. During normal office hours, call 565-2109; after office hours, contact the campus operator or police.

1. When reporting, be specific about the nature of the material involved and location of accident. Risk Management Services personnel will respond immediately.
2. Vacate the affected area at once and seal it off to prevent further contamination of other areas.
3. Persons who may be contaminated because they were in the immediate area affected by the spill are to avoid contact with others as much as possible, remain

in the vicinity and give their names to RMS personnel. Required first aid and clean up by knowledgeable individual should be started at once.

4. If necessary because of the danger involved, or if directed to do so by RMS personnel, activate the building alarm system and follow the remaining steps.
5. Notify your supervisor, then evacuate the building by quickly walking to the nearest exit, alerting people as you go. Leave the elevators for the handicapped.
6. Once outside, move to a clear area at least 150 feet away from the affected building. Keep the walkways and streets clear for emergency vehicles.
7. To the best of your ability, and without re-entering the building, be available to assist the RMS personnel and campus police in their attempts to determine that everyone has been evacuated safely.
8. An On-Scene Command Post will be set up near the emergency site by the University Police Department. Keep clear of the Post unless you have important information to report.
9. Do not return to the building until RMS personnel or campus police tell you to do so, even if the alarm has ceased.

### **UTILITY PROBLEMS**

1. **Lighting** - Most major campus buildings are equipped with emergency lighting that will provide enough illumination in corridors and stairs for safe exiting. In the event of a major utility failure contact the Physical Plant at 565-2700. It is advisable for each department to have flashlights available.
2. **Elevator Failure** - All campus elevators are equipped with emergency phones or emergency bells. Stay calm and use them. Help will arrive shortly.
3. **Plumbing Problems** - Cease using all electric equipment, vacate the area and notify your supervisor, or contact Physical Plant at 565-2700.
4. **Gas Leak** - Cease all operations, immediately vacate the area and notify your supervisor and contact the Risk Management Services Office at 565-2109 and the Physical Plant at 565-2700.
5. **Ventilation** - If smoke or burning smells come from the ventilation system, report it to the RMS Office at 565-2109.
6. After normal office hours call campus police at 565-3000 for assistance.

If there is potential danger to the building occupants or if directed to do so activate the building alarm system and evacuate the building.

## **MEDICAL AND FIRST AID**

In case a serious injury or illness occurs on campus, immediately call campus police at 911. Give your name, describe the nature and severity of the medical problem and the location of the victim, then quickly perform the following:

1. Ask victim "What is wrong?"
2. Check breathing.
3. Control serious bleeding (avoid contact with blood).
4. Keep victim still and comfortable. Continue to assist the victim until help arrives.
5. Determine extent of injury or probable cause of illness.
6. Protect from all disturbance, reassure the victim and do not move victim unless absolutely necessary.
7. Look for emergency medical I.D. on victim, question witnesses and give all information to EMS personnel and/or campus police.

In case of a minor injury or illness, provide first aid care.

### **Severe Bleeding and Wounds**

1. Apply direct pressure on wound.
2. Use clean cloth or protected hand (avoid contact with blood).
3. Apply pressure to blood vessel, if necessary (nearest pressure point).
4. Elevate body part maintaining pressure.
5. Add more cloth if blood soaks through.
6. Keep pressure on wound until help arrives.
7. Use tourniquet only as a last resort.

### **Mouth to Mouth Resuscitation**

1. Place victim on side and remove any foreign matter from mouth with fingers.
2. Place victim on back.
3. Tilt victim's head back to open airway by lifting chin up to point at the



ceiling/sky.

4. Close victim's nostrils with fingers.
5. Inhale and place your mouth over victim's mouth. Then allow victim to exhale by removing your mouth (use a protective mouthpiece).
6. Exhale until victim's chest expands.
7. Repeat every five seconds.
8. Keep trying until help arrives.
9. If problem, check victim for airway obstruction.

### **Poisoning and Overdose**

1. Determine what substance is involved and how taken.
2. Stay with victim and assist as necessary.

### **Fainting, Unconsciousness and Shock**

1. Have victim lie down and rest.
2. Keep victim comfortable, not hot or cold.
3. Place victim on side if unconscious. Check for breathing if unconscious.
4. Ask or look for emergency medical I.D.
5. Treat other injuries as necessary.

### **Heart Attack**

1. Help victim to comfortable position.
2. Give resuscitation or CPR as necessary.
3. Keep victim comfortable, not hot or cold.
4. Ask for or look for emergency medical I.D. GET HELP!

### **Burns, Thermal and Chemical**

1. Immerse burned area in cold water for 15 minutes.

2. Flood chemical burn with cool water.
3. Cover burn with wet bandage.
4. Keep victim quiet and comfortable.

### **Choking**

1. Check victim's mouth and clear of any foreign matter.
2. If still choking, use abdominal thrusts (Heimlich Maneuver).

### **Fractures and Sprains**

1. Keep victim still.
2. Keep injured area immobile.

*PHONE NUMBERS*

***MEDICAL EMERGENCIES***

Student Health Center - 565-2333

Campus Police - 911

***MAJOR CRIME/DEATH OF A STUDENT***

Campus Police, Emergency - 911

Non-Emergency - 565-3000

***DEMONSTRATION, CONFRONTATIONS, OR DISRUPTIVE AND  
THREATENING BEHAVIOR***

Campus Police - 565-3000

***VIOLENT OR LIFE-THREATENING BEHAVIOR OR EVENTS (INCLUDING  
FIRE AND NATURAL DISASTERS***

Campus Police - 911

Risk Management Services - 565-2109

**COUNSELING SERVICES**

Counseling & Testing - 565-2741

Student Health Center - 565-2333

Rape Crisis Assistance - 382-RAPE

## *SECTION II - PREFACE*

The health and safety standards included in the following chapters are furnished for the guidance of all University employees and students. Compliance with these standards may not, by itself, prevent injuries or diseases, but will substantially aid in providing a safe and healthful environment, which is a fundamental prerequisite in controlling accidents and injuries. It is, therefore, of vital importance that every supervisor becomes familiar with those sections and standards in this Manual that pertain to the operation(s) under their control.

It should be understood that these are minimum standards that apply to all University operations, both on and off campus. Most are drawn from existing standards promulgated by either Federal or State occupational safety and health regulations. The remaining are derived from various consensus standards published by nationally recognized private organizations such as: National Fire Protection Association, American National Standards Institute, American Conference of Governmental Industrial Hygienists, and others.

In the event that existing or future Federal, or State regulations are found to differ from the requirements contained in this manual, those legally accepted regulations will be followed.

## *SECTION II*

### *CHAPTER 7 - GENERAL SAFETY RULES*

#### **GENERAL**

1. University employees shall not turn on, use, repair, or operate any machine, tool, vehicle, crane, electricity, gas, steam, air, acid, caustic or other dangerous material or equipment unless authorized by a supervisor.
2. Safety guards and devices furnished by the University or department will be used. Removal or non-use may be authorized only by the supervisor and approved by the department.
3. Approved personal protective equipment shall be worn whenever the exposure indicates the need for it, i.e., head and ear protection, face and eye protection, respiratory equipment, safety belts, protective footwear, etc. (see Chapter 13, Section II, "Personal Protective Equipment" for more details).
4. Only a tool, equipment, machinery, etc. that is properly maintained and adjusted may be used.
5. University-provided tools may not be modified unless authorized by a supervisor.
6. Floors must be kept free of paper clips, pencils, rubber bands, trash, coffee, food, and any other material or substance that might constitute a tripping or slipping hazard. Employees responsible for any such material or substance spilled will clean it up immediately.
7. Horseplay, running and practical jokes are prohibited in buildings because of potential slipping, tripping and collision hazards.

#### **CLOTHING AND SAFE DRESS**

1. Employees will wear clothing appropriate to their work assignments. Clothing will be in reasonably good condition and clean. Dirty clothes are a menace to health.
2. Supervisors are responsible for insuring that employees are informed as to the requirements for wearing apparel that is suitable for the type of work to be performed and the hazards involved.
3. For those working with machinery or in other hazardous operations, shirts,

blouses, trousers, slacks, coveralls, etc. should be well fitted, with no loose or flowing appendages. Sleeves, if full length, should be buttoned at the wrist. The practice of working without a shirt is not allowed.

4. Unless working conditions dictate otherwise, employees must wear shoes while at work. Shoes should be well fitted with good soles and heels and a style that completely covers the foot. Open-toe shoes, or lightweight shoes of the canvas "sneaker" type may not be safe. Safety shoes or safety toecaps are mandatory in foot-hazardous work. Because of sanitation and liability, persons with bare feet should not be allowed within campus buildings.
5. Employees with long hair who work around moving machinery must wear adequate hair covering to preclude the possibility of entanglement.
6. Jewelry such as rings, pendants, necklaces, earrings, watches (other than those with breakaway bands), etc., shall not be worn whenever they constitute a hazard, i.e. working around moving machinery, electrical or electronics equipment, etc.

### **COPY MACHINES**

1. There are two basic types of office copy machines in use on campus:
  - a. Dry photo copiers that use a powder type toner material, and
  - b. Wet photocopiers that sometimes use a combustible hydrocarbon-based toner.
2. All photocopiers, regardless of manufacturer, emit fumes at varying levels. In addition, some individual units and/or brands are more odorous than others. To date, tests have shown that none of the dry or wet photocopiers have been determined to present a health hazard to the users. However, it is recommended that all copiers be located only in work areas that have adequate ventilation. In addition, when possible, copiers should be so located that they are a minimum of 10 feet from any permanent employee workstation.

### **FLEXIBLE ELECTRIC CORDS**

1. Flexible cords will be maintained in good repair and must bear the Underwriters Laboratory label (UL) or meet standards of the NFPA 70. Do not use cords that are frayed or damaged.
2. Flexible cords should be short (6-8 feet in length), limited to temporary use, and never across traveled pathways unless suitably protected to avoid damage and the creation of tripping hazards.
3. Two-wire flexible cords and adapter plugs are not permitted on campus, since equipment is not grounded when connected to them.

4. Under no circumstances will any flexible cord or electrical cord be spliced, except by University electricians.
5. Never tack cords to the walls, etc., and keep cords away from pinch-points and hot or wet surfaces. Never string cords across the ceiling, over pipes, or near sinks, and never place cords and plugs under physical stress or tension (see Section II, Chapter 10, "Electrical Safety," for additional details).

### **WASHING WITH SOLVENTS**

1. Flammable liquids will not be used to clean floors, workbenches, or other large surface areas.
2. The substances listed below will not be used to clean machines, equipment, furniture or parts thereof:

List of substances:

Carbon disulfide  
Chloroform  
Ether  
Pentachloroethane  
Tetrachloroethane  
Tetrachloroethylene  
Trichloroethylene

### **LIFTING PROCEDURES**

In general, the limit of fifty pounds for men and twenty-five pounds for women has been established for continuous or repetitive lifting. Regardless of the weight, always size up the load. Make sure you can handle it by yourself. If not, get help!

The seven basic rules for proper lifting are illustrated below:

1. Approach the load and size it up (weight, size and shape). Consider your physical ability to handle the load.
2. Place the feet, 8 to 12 inches apart for good balance, close to the object to be lifted.
3. Bend the knees to the degree that is comfortable and get a good handhold. Then, using both leg and back muscles....
4. Lift the load straight up---smoothly and evenly. Pushing with your legs, keep load close to your body (If the weight seems too heavy, get assistance).

5. Lift the object into carrying position, making no turning or twisting movements until the lift is completed.
6. Turn your body with changes of foot position after looking over your path of travel, making sure it is clear.
7. Setting the load down is just as important as picking it up. Using leg and back muscles, comfortably lower the load by bending your knees. When load is securely positioned, release your grip.

### **OFFICE SAFETY**

1. Pencil sharpeners will not be installed where they might be striking hazards.
2. Electric cords on machines and desk lamps must be kept in good repair. Cords are to be replaced when outer insulation is broken.
3. All fans will be equipped with suitable guards. Fans will not be placed where they might be struck.
4. Thumbtacks and other sharp pointed objects should be kept in containers, not loose in desk drawers.
5. Individual upright shelves, lockers and cabinets will be fastened to floors or walls if the possibility of overturning exists. Where there are two (2) or more, they will be fastened together.
6. Not more than one (1) drawer of a file cabinet may be open at one time. Drawers should not be left open when not in use.
7. When it is necessary to store material on top of lockers or file cabinets, due regard must be given to the weight, shape and stability of the material.
8. Have defective chairs repaired or replaced promptly.
9. Do not tilt back in straight chairs. When sitting, keep both feet on the floor.
10. Extreme care must be exercised when cleaning glass used for desktops.
11. Use knives, razor blades, scissors or shears with care. Cutting edged instruments will be sheathed when not in use.
12. Paper cutters will be equipped with a safety bar. Blade spring tension will be adjusted so that the blade will not fall by its own weight.
13. Desks will be arranged so that electrical and telephone outlets and leads are not



- tripping hazards.
14. Splintered or jagged edges, or other defects found on office furniture will be promptly repaired or the equipment replaced.
  15. Spindle (spike) files should not be used.
  16. Never clean or lubricate electrical appliances when they are in operation. When cleaning electrical appliances, which are controlled by a switch on the machine, be sure the switch is turned off and the plug removed.
  17. Protection should be provided against moving parts on addressograph, bookkeeping, tabulating machines, and other types of power-driven office equipment.
  18. Personnel will not put broken glass in wastebaskets. If a tumbler or other piece of glassware has been broken, it is suggested that this material be packed in heavy paper, marked "broken glass" and placed alongside the wastebasket at the end of the day so that the person removing waste paper will not be cut accidentally.
  19. Distorted or damaged metal or wire baskets should be repaired or replaced promptly, since sharp edges and points can cause injury.
  20. Small ladders and stands used in some offices will be equipped with treads of non-slip material and safety feet. Never stand in chairs.
  21. Ladders having broken or split side rails or steps will be immediately taken out of service.

## *SECTION II*

### *CHAPTER 8 - BUILDINGS*

#### **ADMINISTRATIVE RESPONSIBILITY FOR BUILDINGS**

The responsibility for the safe condition of all buildings and equipment therein rests with the department(s) occupying the building. However, the RMS Office may be called upon at anytime for assistance.

#### **BUILDING INSPECTIONS**

Occupants of University buildings will make periodic inspections to keep hazards at a minimum in all areas. Covering such items as:

1. Good housekeeping.
2. Condition of stair treads, floor tiles and carpeting for tripping hazards.
3. Exposed floor electrical and telephone outlets for tripping hazards.
4. Loose stairway railings.
5. Windows for cracked glass.
6. Walls and doorframes for protrusions.
7. Office furniture and machines in need of repair.
8. Proper storage of materials.
9. Adequate lighting and ventilation.
10. Insects and other pests.
11. Proper closing and locking of security doors.

Departments should document the location and descriptions of all discrepancies noted and submit requests for correction to the Building Representative.

## **SPACE CAPACITIES**

The number of persons permitted in any classroom, laboratory, assembly areas, dining rooms, shops and vocational rooms is the responsibility of the University Fire Marshall, UNT Facilities, in accordance with NFPA standards. Any deviation from posted limits must have the approval of the Fire Marshall.

## **CORRIDORS AND AISLES**

### **1. Corridors**

- a. Every corridor will be not less in width than 44 inches.
- b. Corridors will have a clear height of not less than 7 feet measured to the lowest projection from the ceiling.
- c. The required width of corridors shall be unobstructed by furniture, storage or other items.

### **2. Aisles**

- a. Every portion of every building that has permanently installed seats, tables, equipment or similar materials will be provided with aisles leading to an exit.
- b. Where aisles are required, machinery equipment, parts and stocks will be so arranged and spaced as to provide not less than 6 feet, 8 inches headroom to a safe means of egress from the building. In existing installations, which do not comply with the minimum headroom clearance and is impracticable to correct, a suitable warning sign will be placed near or on the obstruction or padded.

## **DOORS**

1. Every door required to serve as an exit will be so designed and constructed that the way of exit travel is obvious and direct.
2. Any door used as an exit will be so designed and installed that when a force is applied to the door on the side from which egress is to be made, it will swing in the direction of exit travel from any position to the full instant use of the opening in which it is installed. During its opening process or when fully opened, a door will not obstruct the exit width.
3. Every required exit doorway shall be of a size as determined by NFPA standards for occupancy of the building.
4. Exit doors will be able to be opened from the inside without the use of a key or

any special knowledge or effort, unless there is a readily visible, durable sign on or adjacent to the door informing the building occupants that the door is locked.

5. A latch or other fastening device on a door will be provided with a knob, handle, panic bar, or other simple type of releasing device, the method of operations of which is obvious even in darkness.
6. A door designed to be kept normally closed as a means of egress, such as a door to a stair enclosure or stairwell, will be provided with a reliable self-closing mechanism, and will not at any time be secured in the open position. Signs should be posted on such doors.
7. When a door is required to be equipped with panic hardware, the panic hardware will cause the door latch to release when sufficient force is applied to the releasing devices in the direction of exit travel. No lock, padlock, hasp, bar, chain, other device, or combination thereof will be installed or maintained at any time or in connection with any door on which panic hardware is required if such device prevents, or is intended to prevent the free use of the door for purpose of egress.
8. Doors swinging both ways, located between rooms such as kitchen and dining rooms will be provided with view areas. One view area will be provided for each door of swinging double doors.
9. No turnstile or similar device to restrict travel to one direction, or to collect fares or admission charges, will be so placed as to obstruct any required means of egress.

## **ELEVATORS**

1. In each elevator there will be posted a card or plate indicating the safe carrying capacity. The safe capacity for passenger elevators will be expressed in terms of the maximum number of passengers and for freight elevators in terms of the number of pounds. The rated capacity will never be exceeded.
2. Self-service elevators will have operating instructions and emergency procedures clearly outlined and posted inside the car.
3. Passengers will guard against tripping when entering or leaving an elevator. No one will get on or off an elevator while it is in motion.
4. Passengers will not use freight elevators unless they are authorized for passenger use. Cars not authorized for passenger use will carry signs to that effect.
5. Passenger elevators and automatic operation freight elevators will be provided with an emergency alarm system, operable from within the car, which will provide effective means for summoning assistance at all hours in case of

emergency.

6. Exposed gears, sprockets, tape or rope sheaves or drums of selectors, floor controllers or signal machines and the ropes, chains, or tapes for driving same, in machine rooms and secondary machinery spaces, will be guarded to protect against accidental contact.

## **EXITS**

1. Every building or usable portion thereof will have at least one exit and will have not less than two exits where required.
2. When more than one exit is required from a story, at least two of the exits will be remote from each other and so arranged and constructed as to minimize any possibility that both may be blocked by any one fire or other emergency condition.
3. Exits will be so located and arranged that they are readily accessible at all times. Where exits are not immediately accessible from an open floor area, safe and continuous passageways, aisles, or corridors leading directly to every exit and so arranged as to provide convenient access for each occupant to at least two exits by separate ways of travel will be maintained.
4. Exits from a room may open into an adjoining or intervening room or area provided such adjoining room is accessory to the area served and provides direct access to an exit.
5. Exits will be so arranged so that there will be no pockets or dead ends exceeding 20 feet in length in which occupants may be trapped.
6. All exits will discharge directly to the street, or to a yard, court, or other open space that gives safe access to a public way.
7. No obstruction or storage will be placed in the required width of an exit.
8. A sign will be provided at every required exit doorway and whenever otherwise required to clearly indicate the direction of egress.
9. Every required sign designating an exit or way of exit will be so located and of such size, color, and design as to be readily visible. No decorations, furnishings, or equipment that impair visibility of an exit sign will be permitted.
10. Every sign will be suitably illuminated by a reliable light source and maintained on a separate circuit or separate source of power.

## **GUARDRAILS**

1. Guardrails will be provided on all open sides of unenclosed roof openings, open landings, balconies or porches, platforms, runways, ramps, or working levels more than 30 inches above the floor ground, or other working area. Wherever guardrail protection is required state or federal standards will be applied.
2. A guardrail will consist of top rail, mid rail or equivalent protection, and posts, and will have a vertical height within the range of 42 inches to 45 inches from the upper surface of the top rail to the floor, platform, runway, or ramp level. Such rails will be so constructed as to withstand a force of 200 pounds applied downward or horizontally at any point.

## **PLACES OF ASSEMBLY**

1. Every place of assembly will maintain aisle and/or corridors in accordance with the provisions of this Chapter "Corridors and Aisles."
2. Where smoking is permitted, there will be provided proper ashtrays, and at other convenient places approved noncombustible ashtrays or match receivers.
3. Fire extinguishers will be visible and accessible at all times.
4. No person will permit overcrowding or admittance of any person beyond the approved capacity of any place of public assemblage.
5. No person will cause or permit any open flame to be used in any place of public assembly except when used in conjunction with approved heating or cooking appliances, or with special approval from the RMS Office.

## **STAIRWAYS**

Every stairway or ramp serving any building or portion thereof will conform to the requirements as set forth in NFPA and other state or federal standards.

## **WORK SPACE ACCESS**

Every permanent elevated location, where there is machinery, equipment, or material that is customarily operated, adjusted, or otherwise handled, will be provided with a safe platform or maintenance runway. Access will be by means of either fixed ladders or permanent ramps or stairways.

## *SECTION II*

### *CHAPTER 9 - CHEMICAL AND AIRBORNE CONTAMINANTS*

#### **GENERAL**

Exposures by inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration or amount which exceeds the applicable limit established by a standard, or in the absence of an applicable standard, which has the capacity to produce personal injury or illness to persons shall be avoided or protective equipment shall be provided and used.

Feasible administrative or engineering controls such as work rotation, time limitations, process or local exhaust ventilation and/or process isolation, must first be determined and implemented in all cases. Whenever engineering and administrative controls fail to achieve full compliance, protective equipment or protective equipment in addition to other measures is to be used as the method of protecting the employees. Such protection must be according to the standards outlined in Chapter 19, "Personal Protective Equipment."

When local exhaust ventilation is used it shall be designed and operated to prevent harmful exposure. The exhaust system will be designed, constructed, installed, inspected, tested, maintained, and operated as to insure the required protection by maintaining a volume and velocity of exhaust air sufficient to gather the harmful material and to convey them to suitable points of safe disposal.

#### **ACIDS AND ALKALIES**

The most used dangerous chemical compounds and mixtures used on campus are acidic or alkaline (corrosive).

1. In general acids and alkalis are similar in their injurious properties in that either may cause:
  - a. Chemical burn by direct contact with the skin or eyes or indirectly through the clothing.
  - b. Intoxication or suffocation by inhalation of the fumes. The fumes of some compounds are toxic or poisonous while others will displace air thereby producing a suffocating atmosphere.
  - c. Poisoning when taken internally.

- d. Fire and explosion because of their instability under adverse storage conditions. Also, some acids are strong oxidizing agents that can generate ignition temperatures upon contact with organic materials and other chemicals.
2. Precautions: The following general precautions are to be observed in operations involving the handling of acids and alkalis. See the Chemical Hygiene Plan for additional info.
- a. Signs should be posted near established operations, warning others of the principal hazards of the operation of the chemicals being used. All containers will be plainly marked with an appropriate warning legend or painted a distinctive color or otherwise distinguished.
  - b. Safety showers and eye fountains will be provided near work areas. Showers will have deluge-type heads and quick-opening or automatic valves. Eye fountains will be capable of simultaneously washing both eyes.
  - c. Where injurious fumes are habitually generated by a fixed installation, permanent exhaust ventilation will be provided. Temporary fuming conditions may be ventilated by portable equipment or personnel should wear respirators approved for the type and concentrations of the fumes encountered.
  - d. Unless the results of a reaction are definitely known, acids and alkalis will not be mixed with other chemicals. The diluting of acids with water can generate considerable heat; acid should always be added to water, not water to acid.
3. Protective Clothing: Workers who handle acids and alkalis should be provided, depending on the severity of exposure, with the following clothing:
- a. Chemically resistant rubber or plastic gloves.
  - b. Rubber or plastic chemical goggles. Where complete face protection is required, plastic face shields should be worn in addition to the chemical goggles.
  - c. Chemically resistant rubber boots, overshoes or shoes with resistant soles depending on the nature of the exposure.
  - d. Rubber plastic aprons.
4. Respiratory Protection: Since air purifying respirators are approved for maximum atmospheric concentration of only 2 to 3 percent of the contaminant, use is not recommended unless it is known that the fume concentration is less and there will



be sufficient oxygen to support life (greater than 16% by volume). Self-contained breathing apparatus should be available for emergencies where neither the oxygen content nor the contaminant concentration, are definitely known.

### **AIRBORNE CONTAMINANTS**

(See Chemical Hygiene Plan for additional info)

1. This section presents concentration limits for airborne contaminants to which nearly all workers may be exposed daily during a 40-hour workweek for a working lifetime without adverse effect. Because of some variation in individual susceptibility, an occasional worker may suffer discomfort, aggravation of a pre-existing condition, or occupational disease upon exposure to concentrations even below the values specified by this Section. The concentration limits established by the American Conference of Governmental Industrial Hygienists reflect medical opinion and are intended to be used in accordance with good industrial hygiene practice by qualified persons.
2. The Threshold Limit Values and Biological Exposure Index booklet is only intended as a guide for the most commonly used materials on campus. In addition, these concentration limits are reviewed and updated each year by the American Conference of Governmental Industrial Hygienists.
3. All questions on current concentration limits or substances not listed are to be referred to the RMS Office. When appropriate, necessary sampling with instruments will be performed by RMS personnel.
4. The time-weighted average concentration of an airborne contaminant to which an employee is exposed during a workday shall not exceed the 8-hour time-weighted average concentration value specified for the substance by the Threshold Limit Values.
5. Threshold Limit Value - Ceiling - the concentration that should NEVER be exceeded.

### **CHEMICAL HANDLING AND FIRST AID**

Listed in this Section are the Safety procedures to be followed when using or handling the various chemicals that are in most common usage on campus. Because of the potential danger, additional procedures are shown for acids and alkalis, oxidizers, and solvents. Safety procedures for chemicals not listed may be obtained from the RMS Office.

Also included in this Section are first-aid procedures to be used in chemical burn emergencies. Basic general first-aid procedures are shown below while specific instructions are listed with each specific chemical.

1. In general the severity of chemical burns depends upon the following factors:

- a. Corrosiveness of the chemical.
- b. Concentration of the chemical.
- c. Temperature of the chemical or its solution.
- d. Duration and surface area of the contact.

The first three factors are set by the properties of the chemical itself. The fourth factor, duration and surface area of the contact can be controlled by proper prompt first-aid treatment without delay.

2. The need for immediate and thorough washing with water cannot be over-emphasized. This is the only method for limiting the severity of the burn; the loss of only a few seconds can be vital. The use of neutralizing agents such as a 5% solution of sodium bicarbonate is not generally recommended.
3. If a person's clothing becomes soaked with a corrosive chemical, burning will continue until the clothing is removed. With chemicals that produce heat upon contact with water, it is particularly important to remove contaminated clothing quickly before irrigation is begun. Delay of irrigation can be kept to a minimum by inserting a hose underneath the clothing and starting to flush the burned area with running water while the clothing is being removed.
4. Chemicals act very rapidly on eyes and may cause blindness unless care is given immediately. Therefore, the eye should be irrigated with water immediately, and **IRRIGATION SHOULD CONTINUE UNTIL MEDICAL HELP ARRIVES**. Irrigation can be accomplished by the use of an eye wash fountain (preferably), shower bath, hose, drinking fountain or any other type of water container. If you can lift the eyelids while irrigating, do so!

If a hose is employed, a slow stream of water should be used. A fast stream of water would cause mechanical injury to the eye and drive the chemical back under the eyelids.

5. Persons exposed to acid or alkali fumes should be removed to an uncontaminated area and kept under observation until the probability of developing complications or delayed pulmonary reaction is no longer present. If oxygen inhalation apparatus is available, oxygen may be administered but only by a person authorized by a physician. If the patient is overcome and apparently not breathing, artificial respiration should be started immediately.
6. When acids or alkalis are taken internally, antidotes should be given at once.
7. Make every effort to find out exactly what the chemical constituents of the solution are and its concentrations. This information may be useful for decisions involving medical treatment.

### **Acetic Acid, Glacial**

DANGER!

Causes severe burns.

Do not get liquid or vapor in eyes, on skin, on clothing.

Keep away from heat and open flame.

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes for eyes, get medical attention.

Store in area maintained above 62N F.

### **Acetone**

DANGER!

Extremely flammable.

Keep away from heat, sparks, and open flame.

Use with adequate ventilation.

Avoid prolonged or repeated contact with skin.

### **Ammonia**

WARNING!

Hazardous liquid.

Liquid causes burn.

Gas extremely irritating.

Do not breathe gas.

Do not get in eyes, on skin, on clothing.

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician at once in case of burns, especially to the eyes, nose, and throat, or if the patient is unconscious.

### **Benzene (Benzol)**

DANGER!

Extremely flammable.

Vapor harmful - poison.

Keep away from heat, sparks, and open flame.

Use only with adequate ventilation.

Avoid prolonged or repeated breathing of vapor.

Avoid prolonged or repeated contact with skin.

### **tert.-Butyl Alcohol**

WARNING!

Flammable.

Keep away from heat and open flame.

Use with adequate ventilation.

Avoid prolonged breathing of vapor.

Avoid prolonged or repeated contact with skin.

### **Carbon Dioxide, Solid ("dry ice")**

WARNING!

Extremely cold (-109° F. below zero).

Causes severe burns.

Liberates heavy gas that may cause suffocation.

Do not get on skin or hands.

Do not taste.

Do not put in stoppered or closed containers.

Do not enter places where used or stored until adequately ventilated.

### **Chlorine**

DANGER!

Hazardous liquid and gas under pressure.

Avoid breathing air containing this gas.

Avoid contact with skin or eyes.

Do not heat cylinders.

Have available emergency gas masks approved by U.S. Bureau of Mines for chlorine service.

Handle and use only in accordance with practice recommended by the chlorine producer.

In case of exposure, remove patient to fresh air, keep him warm and quiet and send for a physician.

### **Chloroform**

WARNING!

Vapor harmful.

Use only with adequate ventilation.

Avoid breathing vapor.

Avoid prolonged or repeated contact with skin.

Do not take internally.

### **Cyclohexane**

DANGER!

Extremely flammable.

Keep away from heat, sparks, and open flame.

Use with adequate ventilation.

Avoid prolonged breathing of vapor.

### **Dioxane (1,4-Diethylene Dioxide)**

WARNING!

Flammable.

Vapor harmful.

Tends to form explosive peroxides especially when anhydrous.

Keep away from heat and open flame.

Use only with adequate ventilation.

Avoid prolonged breathing of vapor.

Avoid prolonged or repeated contact with skin.

Do not allow evaporation to near dryness. Addition of water or appropriate reducing agents will lessen peroxide formation.

### **Ethyl Ether**

DANGER!

Highly volatile.

Tends to form explosive peroxides especially when anhydrous.

Keep away from heat, sparks, and open flame.

Do not allow evaporation to near dryness. Addition of water or appropriate reducing agents will lessen peroxide formation.

### **Formaldehyde Solution**

WARNING!

Causes irritation of skin, eyes, nose, and throat.

Avoid prolonged or repeated contact.

Avoid prolonged breathing of vapor.

Use with adequate ventilation.

If swallowed: Give a tablespoon full of salt in a glass of warm water and repeat until vomit fluid is clear. Give milk, or white of egg beaten with water. Call a physician at once.

### **Hydrochloric Acid (Muriatic Acid)**

WARNING!

Causes burns.

Avoid contact with skin and eyes.

Avoid breathing vapor.

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

### **Hydrogen Chloride**

DANGER!

Hazardous liquid.

Causes burns.

Extremely irritating.

Do not breathe gas.

Do not get in eyes or on skin.

In case of contact immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

### **Mercury (Metal)**

WARNING!

Vapor harmful.

Avoid breathing vapor.

Can be absorbed through skin.

### **Methanol**

DANGER!

Flammable.

Vapor harmful.

May be fatal if swallowed.

Cannot be made nonpoisonous.

If swallowed: Give a tablespoon of salt in a glass of warm water and repeat until vomit fluid is clear. Give two teaspoonfuls of baking soda in a glass of water.

Have patient lie down and keep warm. Cover eyes to exclude light. Call a physician.

### **Methylene Chloride**

CAUTION!

Use with adequate ventilation.

Avoid prolonged or repeated breathing of vapor.

Avoid prolonged or repeated contact with skin.

Do not take internally.

### **Methyl Ethyl Ketone**

(Same as t-Butyl Alcohol).

### **Nitric Acid**

DANGER!

Causes severe burns.

Vapor extremely hazardous.

May cause nitrous gas poisoning.

Spillage may cause fire or liberate dangerous gas.

Do not breathe vapor.

Do not get in eyes, on skin or on clothing.

In case of contact immediately flush skin or eyes with plenty of water for at least 15 minutes; get medical attention.

### **Perchloric Acid**

DANGER!

Strong oxidant.

Corrosive liquid.

Contact with combustible material may cause fire or explosion, especially if heated.

Keep container closed and away from combustible material, dehydrating agents and heat.

Do not get in eyes, on skin or on clothing.

In case of spillage, flush with plenty of water and remove contaminated articles.  
In case of contact, immediately remove all contaminated clothing and flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before reuse.

### **Petroleum Naphthas and Solvents**

(For solvents, having a flash point between 80° F. and 150° F.).

CAUTION!

Keep away from heat and open flame.

Use with adequate ventilation.

Avoid prolonged breathing of vapor.

Avoid prolonged or repeated contact with skin.

### **Potassium Hydroxide**

(Same as Sodium Hydroxide).

### **Pyridine**

WARNING!

Flammable.

Vapor harmful.

Keep away from heat and open flame.

Use only with adequate ventilation.

Avoid prolonged or repeated breathing of vapor.

Avoid prolonged or repeated contact with skin.

### **Sodium Hydroxide (Caustic Soda)**

WARNING!

Causes severe burns to skin and eyes.

Avoid contact with skin, eyes, and clothing.

Do not take internally.

When handling, wear goggles or face shield.

When making solutions, add Sodium Hydroxide slowly to surface of solution to avoid violent spattering.

In case of contact, immediately flush skin with plenty of water and wash with vinegar; for eyes, flush with plenty of water for at least 15 minutes and get medical attention.

### **Sulfur dioxide**

WARNING!

Extremely irritating gas and liquid under pressure.

Liquid causes burns.

Avoid breathing gas.

### **Sulfuric Acid**

DANGER!

Causes severe burns.

Do not get in eyes, on skin or on clothing.

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes get medical attention.

Do not add water to contents while in a container because of violent reaction.

### **Toluene (Toluol)**

WARNING!

Flammable.

Vapor harmful.

Keep away from heat and open flame.

Keep container closed.

Use only with adequate ventilation.

Avoid prolonged breathing of vapor.

Avoid prolonged or repeated contact with skin.

### **Trichloroethylene**

WARNING!

Vapor harmful.

Use only with adequate ventilation.

Avoid prolonged or repeated breathing of vapor.

Avoid prolonged or repeated contact with skin.

Do not take internally.

## **OXIDIZERS**

(See Chemical Hygiene Plan for additional info)

1. Chlorates, perchlorates, peroxides, and other oxidizing agents shall be separated in storage from flammable or combustible materials and from mineral acids. Separation may be by distance or by barrier, and shall be appropriate to the quantities and natures of the substances.
2. If such oxidizing agents are spilled on wooden benches or other combustible material, the contaminated area or material shall be swept, washed or otherwise cleaned sufficiently so that the oxidizing material is effectively removed.
3. When oxidizing substances are mixed with flammable or combustible substances, amounts of such mixtures and materials shall be kept to the smallest practicable quantity.
4. All containers must be kept covered or closed which contain an oxidizing agent and shall be plainly marked with an appropriate warning legend, painted a distinctive color or otherwise distinguished.



## **SOLVENTS**

(See Chemical Hygiene Plan for additional info)

1. A large number of solvents are used on this campus, and often selected on the basis of the respective chemical properties. Many, however, are needed merely as a good degreasing agent. When this is true, one of the major factors to consider in the selection of a solvent is its relative hazard potential. Two hazard ratings currently used are described as follows:
  - a. **Relative Inhalation Hazard at Room Temperature.** The relative inhalation hazard is a function of a solvent's toxicity and the amount that volatilizes and thus is available for inhalation at room temperature. The listed values of relative inhalation hazards are normalized to 1,1,1-trichloroethane, a widely used solvent.
  - b. **Fire Hazard Rating.** This is based upon the solvent's flash point, which is defined, as the lowest temperature at which there is sufficient vapors to form a flammable mixture at the surface of the liquid. The solvents are rated according to the following schedule.

### **FLASH POINT**

### **FIRE HAZARD RATING**

Less than 20°  
20° to 80° F.  
Over 80° F.  
None

High  
Moderate  
Slight  
Non-flammable

- c. **Substitution.** Carbon tetrachloride and benzene are two solvents which are in use at the University. One can readily see from the table that these solvents are among the most toxic of the common solvents. Whenever possible a less hazardous compound should be substituted, e.g.,

For carbon tetrachloride  
Substitute 1,1,1-trichloroethane.

For benzene  
Substitute xylene.

For flammable solvent  
Substitute less flammable solvent.

2. The "Relative Inhalation Hazard" does not take into account differences in temperature or manner of use. The evaporation rate is greatly increased when the liquid is heated and/or sprayed.

3. In addition to being highly toxic, carbon disulfide, carbon tetrachloride and benzene are also absorbed through the skin in sufficient quantities to produce toxic effects independent of inhalation exposures.
4. Most solvents will dissolve the oils from exposed skin. Therefore, the use of organic solvents for hand cleaning is discouraged.
5. Most solvents have a characteristic odor. However, this cannot be relied upon to give an adequate warning of hazardous exposures. In many cases the odor threshold is above the threshold of hazardous concentrations for prolonged or repeated exposures.
6. Chlorinated solvents break down to extremely toxic phosgene gas when used in the presence of intense heat or ultraviolet radiation.
7. If solvents are used in large, open areas, the correct respirator to use is the one that specifies protection against "organic vapors". However, the respirator must be properly fitted and worn. If solvents are used inside of closed tanks or other unventilated areas, special equipped air respirators and/or proper ventilation must be provided. All persons required to use respirators must be given a pulmonary function test (PFT) and be trained and fit tested. Call the RMS Office for assistance.

## SECTION II

### CHAPTER 10 - ELECTRICAL SAFETY

#### GENERAL

1. The following table is helpful in understanding that a very small amount of electrical current is hazardous:

<b>CURRENT IN MILLIAMPERES (MA)</b>	<b>EFFECT</b>
2 ma AC or 10 ma DC	Threshold of sensation: a strong tingling.
10 ma AC or 60 ma DC	Let go current, above which one freezes due to muscular concentration.
100 ma AC or 500 ma DC	Death due to heart fibrillation and paralysis of breathing.

The current passing through the body is the key factor in any shock accident. Most of the over 1000 electric shock fatalities that occur in the U.S. every year are due to voltages of less than 440 volts. It is imperative that respect is given all electrical equipment and circuits and that adequate precautions be taken regardless of voltage.

2. Listed below are some electrical safety precautions. Typical body resistances are on the order of 1000 ohms. Keep your resistance high by keeping hands and feet dry. Shoes must be worn at work (rubber soled shoes are preferable).

The removal of rings and watches is recommended. Persons should never hold an energized electric appliance with wet hands, or when wearing wet shoes. Do not touch electrical appliances when working at a sink. Know the location of all power plugs and off-switches on all equipment. Assume all electronics equipment devices are potentially lethal.

3. Report all shocks and defective equipment. A shock means something is wrong! The slightest shock when operating an electrical appliance in one location might, in another situation, result in instant death if part of the body made only slightly better contact with the ground or a grounded metallic object.
4. Rely on qualified electricians to do repairs. Consult Physical Plant Utilities Department when in doubt.

5. In case of an accident:
  - a. Break connections to victim by turning off the power or by using a non-conducting object to separate victim and source.
  - b. Begin artificial respiration as quickly as possible. External cardiac massage may also be helpful.
  - c. Obtain emergency assistance quickly by calling 911.
  - d. When an electrical fire occurs, use CO<sub>2</sub> or all-purpose dry chemical extinguishers only.

### **DISCONNECTING, MEANS OF**

1. All switches, circuit breakers, fuses and other control and protective devices will be so located or arranged that they may be safely operated, removed or repaired.
2. Each disconnecting means for motors and appliances, and each service, feeder, or branch circuit at the point where it originates will be legibly marked to indicate its purpose unless located and arranged so that the purpose is evident. The marking will be of sufficient durability to withstand the environment involved.
3. Devices intended to break current will have an interrupting capacity sufficient for the voltage employed and for the current that must be interrupted.

### **FLEXIBLE CORDS**

1. Flexible cords will be used **only** for: a) pendants, b) wiring of fixtures, c) connection of portable lamps or appliances, d) elevator cables, e) wiring of cranes and hoists, f) connection of stationary equipment to facilitate their frequent interchange, g) prevention of the transmission of noise or vibration, h) fixed or stationary appliances where the fastening means and mechanical connections are designed to permit removal for maintenance and repair, i) data processing cables.
2. Flexible cords will not be used: a) as a substitute for the fixed wiring of a structure, b) where run through holes in walls, ceilings, or floors, c) where run through doorways, windows or similar openings, d) where attached to building surfaces, e) where concealed behind building walls, ceilings, or floors.
3. Flexible cords will be used only in continuous lengths without splice or tape when initially installed. The repair of hard-service flexible cords No. 12 and larger will be permitted if the completed splice retains the insulation, outer sheath properties, flexibility, and usage characteristics of the cord being spliced.

4. Flexible cords will be so connected to devices and to fittings that tension will not be transmitted to joints or terminal screws. This will be accomplished by a knot in the cord, winding with tape, by a special fitting designed for that purpose or by other approved means that will prevent a pull on the cord from being directly transmitted to joints or terminal screws.

### **GROUND-FAULT CIRCUIT PROTECTION**

1. To protect employees and students using portable electrical equipment in outdoors, wet, or other hazardous locations, ground-fault circuit interrupters (GFCI) will be used at all times when these conditions exist.
2. All 120-volt, AC, single phase, 15-and 20-ampere receptacle outlets in outdoor, wet, or other hazardous locations, will have approved ground-fault circuit interrupters.

### **GROUNDING EQUIPMENT CONNECTED BY CORD AND PLUG**

1. Under any of the conditions described in (a) through (e) below, exposed non-current-carrying metal parts of cord-and plug-connected equipment likely to become energized, will be grounded.
  - a. In hazardous locations (flammable liquids and gases present).
  - b. Where operated at over 150 volts to ground.

#### **Exception No. 1:**

Motors, where guarded.

#### **Exception No. 2:**

Metal frames of electrically heated appliances.

- c. Potentially hazardous portable, hand-held, motor-operated tools and appliances such as drills, wet scrubbers, sanders and saws.
- d. Cord and/or plug-connected appliances used in damp or wet locations or by persons standing on the ground or on metal floors or working inside of metal tanks or boilers.
- e. Portable tools likely to be used in wet and conductive locations.

#### **Exception No. 1:**

Portable tools or lighting likely to be used in wet and conductive locations will not be required to be grounded where supplied through an isolating transformer with an ungrounded secondary of not over 50 volts.

**Exception No. 2:**

Listed portable tools and appliances protected by an approved system of double insulation, or its equivalent, will not be required to be grounded. Where such a system is employed, the equipment will be distinctly marked.

**GROUNDING FIXED EQUIPMENT**

1. Exposed non-current carrying metal parts of fixed equipment likely to become energized under abnormal conditions will be grounded under any of the conditions specified in (a) through (f) below.
  - a. Where within 8 feet vertically or 5 feet horizontally of ground or grounded metal objects and subject to contact by persons.
  - b. Where located in a wet or damp location and not isolated.
  - c. Where in electrical contact with metal.
  - d. Where in a hazardous location.
  - e. Where supplied by a metal-clad, metal-sheathed, or metal-raceway wiring method.
  - f. Where equipment operated with any terminal at over 150 volts to ground.

**Exception No. 1:**

Enclosures for switches or circuit breakers that are used for other than service equipment and accessible to qualified persons only.

**Exception No. 2:**

Metal frames of electrically heated devices, exempted by special permission, in which case the frames will be permanently and effectively insulated from ground.

2. Exposed, non-current-carrying metal parts of the kinds of equipment described in (a) through (e) below, regardless of voltage, will be grounded.
  - a. Switchboard frames and structures supporting switching equipment.

**Exception:**

Frames of DC, single-polarity switchboards where effectively insulated.

- b. Generator and motor frames in an electrically operated organ.

**Exception:**

Where the generator is effectively insulated from ground and from the motor driving it.

- c. Motor frames.
- d. Enclosures for motor controllers.

**Exception:**

Lined covers of snap switches.

- e. Electric equipment for elevators and cranes.

### **Grounding of Live Parts**

1. Live parts of electric equipment operating at 50 volts or more will be guarded against accidental contact by approved cabinets or other forms of approved enclosures or by any of the following means.
  - a. By location in a room, vault or similar enclosure that is accessible only to qualified persons.
  - b. By suitable permanent, substantial partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts.
  - c. By location on a suitable balcony, gallery or platform so elevated and arranged as to exclude unqualified persons.
2. Entrances to rooms and other guarded locations containing exposed live parts will be marked with conspicuous warning signs forbidding unqualified persons to enter.

## **Methods of Grounding**

1. The grounding connection for metal non-current carrying equipment will be made on the supply side of the service disconnecting means.
2. The path to ground from circuits, equipment and conductor enclosures will:
  - a. Be permanent and continuous.
  - b. Have ample carrying capacity to conduct safely any currents liable to be imposed on it.
  - c. Have impedance sufficiently low to limit the potential above ground and to facilitate the operation of the over current devices in the circuit.
3. Metal non-current carrying fixed equipment where required to be grounded will be grounded by one of the methods indicated in (a) below.
  - a. By an equipment grounding conductor contained within the same raceway, cable or cord or otherwise run with the circuit conductors. The conductor cover will have a continuous outer finish that is either green or green with one or more yellow stripes.

### **Exception:**

An insulated grounding conductor larger than No. 6 will, at the time of insulation, be permitted to be suitably identified as a grounding conductor at each end and at every point where the conductor is accessible.

4. Non-current carrying metal parts of cord and plug-connected equipment, that requires grounding, will be grounded by one of the methods indicated in (a), (b), or (c) below.
  - a. By means of the metal enclosure of the conductors supplying such equipment if grounding-type attachment plug with one fixed grounding contact is used for grounding the metal enclosure and if the metal enclosure of the conductors is secured to the attachment plug and to equipment by connectors approved for the purpose.
  - b. By means of a grounding conductor run with the power supply conductors in a cable assembly or flexible cord properly terminated in grounding-type attachment plug with one fixed grounding contact. The covering will have a continuous outer finish that is either green or green with one or more yellow stripes.
  - c. By means of a separate flexible wire, or strap, insulated or bare, protected as well as practicable against physical damage.



## **OUTDOOR CONDUCTOR - CLEARANCES**

1. For outside wiring all conductors will comply with clearances specified below:

MINIMUM  
CLEARANCE  
Low Voltage  
0-750 volts

Above and along thoroughfares	20 feet
Above areas where it is possible to drive vehicles	16 feet
Above areas accessible to pedestrians only	12 feet
Above structures	8 feet
Distance away from windows, doors, scaffolds, or similar locations will be maintained not less than:	3 feet

## **WORK PROCEDURES**

1. Only qualified persons shall work on energized equipment and/or wiring.
2. No employee shall work in such proximity to any part of an electric power circuit unless the employee is protected against electric shock by de-energizing the circuit and grounding it or by guarding it by effective insulation or other means.
3. Suitable protective equipment or devices shall be provided and used on or near energized equipment for the protection of employees where there is a recognized hazard of electrical shock or burns. In lieu of protective equipment, barricades may be used to provide protection from exposed energized equipment.
4. Equipment or circuits that are de-energized shall be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized.
5. All reasonable means shall be provided to bar unauthorized persons and/or equipment from the immediate vicinity of the work in progress.

## **WORKING SPACE AROUND ELECTRICAL EQUIPMENT**

1. Sufficient access and working space will be provided and maintained around all electrical equipment to permit ready and safe operation and maintenance of such equipment.
2. The dimension of the working space in the direction of access to live parts operating at 600 volts or less which require examination, adjustment, servicing, or maintenance while alive, will not be less than indicated in the Table. In addition to the dimensions shown in the Table, the workspace will not be less than 30 inches wide in front of the electrical equipment. Distances will be measured from the live parts if such are exposed or from the enclosure front or opening if such are enclosed. Concrete, brick, or tile walls will be considered as grounded.

### **WORKING CLEARANCES**

<b>Voltage to Ground</b> *Condition:	<b>Minimum Clear Distance (feet)</b>		
	a	b	c
0-150	2-1/2	2-1/2	3
151-600	2-1/2	3-1/2	4

#### **\*Conditions:**

- a. Exposed live parts on one side and no live or grounded parts on the other side of the working space.
  - b. Exposed live parts on one side and grounded parts on the other side.
  - c. Exposed live parts on both sides of the workspace.
3. Working space required by this Section will not be used for storage.
  4. At least one entrance of sufficient area will be provided to give access to the working space around electronic equipment.
  5. Adequate illumination will be provided for all working spaces around electrical equipment. The light outlets will be so arranged that persons changing lamps, or making repairs, on the lighting system will not be endangered by live parts or other equipment.
  6. The minimum headroom of working spaces around switchboards, panel boards and control centers that require manual operation or where there are live parts exposed at any time will be 6-1/4 feet.

## *SECTION II*

### *CHAPTER 11 - ENVIRONMENTAL CONTROLS*

#### **COLD STORAGE ROOMS**

(A cold storage space is a room used for the preservation of substances by controlled temperatures).

1. Every cold storage room will have at least one door that can be opened from the inside.
2. Doors may be padlocked or otherwise securely locked from the outside if the room is equipped with an inside release mechanism which will release the latch and open the door when the latch is padlocked. Exceptions will be subject to approval by the RMS Office.
3. Illumination will be provided in the room. This may be either a constantly burning lamp without switch control or a lamp controlled by a switch to be located inside near the door. If a switch is used, means will be provided to indicate its location in the dark.
4. Cold storage rooms cooled directly by refrigerant coils that are located inside the room and are subject to collision damage will have at least two exits remotely located from each other. This order will not apply to cold storage rooms having a floor area of less than 200 square feet.

#### **ENVIRONMENTAL TEMPERATURES**

1. Under certain conditions working in hot environments can cause dehydration, muscle cramps, exhaustion, and collapse. In addition, most people under humid conditions will be uncomfortable when the temperature exceeds 70° F. However, studies have shown that a health hazard usually occurs only when the air temperature exceeds a high level around 86° F., there is little ventilation, and the type of work is relatively heavy. The recommended maximum inside work temperatures are those shown in the Table which are based on studies done by the American Conference of Governmental Industrial Hygienists:

## **\* WORK LOAD**

<b><u>WORK-REST REGIMEN</u></b>	<b><u>LIGHT Degrees F</u></b>	<b><u>MODERATE Degrees F</u></b>	<b><u>HEAVY Degrees F</u></b>
Continuous work	86.0°	80.1°	77.0°
75% work- 25% rest	87.1°	82.4°	78.6°
50% work- 50% rest	88.5°	84.9°	82.2°
25% work- 75% rest	89.9°	87.9°	86.0°

### **\*Work Load**

Light	-	Sitting, deskwork.
Moderate	-	Standing, light, or moderate work at machine or bench.
Heavy	-	Intermittent, heavy lifting, pulling, climbing.

2. Low temperatures only become hazardous to health when they drop below freezing and are accompanied by substantial wind. However, it is possible for cool temperatures to make people uncomfortable and to affect work and study performance. For this reason it is recommended that inside work temperatures never be allowed to stay below 64° F. for long periods of time.
3. Texas state government has recommended that temperature control devices (thermostats) be set at a maximum of 65° Fahrenheit for winter heating and at a minimum of 78° Fahrenheit for summer cooling. If inside temperatures are kept between a high of 78° and a low of 65° almost everyone will be comfortable and no one will be subject to a health hazard based on temperatures.

## **EXHAUST VENTILATION**

1. Whenever harmful dusts, fumes, mists, vapors or gases exist, or are produced in quantities giving rise to harmful exposure of employees, and prevention or elimination of such hazards is not practicable, such hazards will be controlled by the application of exhaust ventilation or other effective mechanical means.

2. Exhaust ventilation when used as described in (1) will be designed to prevent dispersion into the air of dusts, fumes, mists, vapors, and gases in concentrations causing harmful exposure. Such exhaust systems shall be so designed that dusts, fumes, mists, vapors, or gases are not drawn through the work area of employees.
3. The exhaust system will be in operation continually during all operations for which it is designed to serve. It is essential that the exhaust system be continued in operation for a time after the work process has ceased in order to ensure the removal of the harmful elements to the required extent.
4. The air outlet from every dust separator, and the dusts, fumes, mists, vapors, or gases collected by an exhaust system will discharge to the outside atmosphere.

### GENERAL VENTILATION

1. Criteria for determining comfort ventilation involve several factors. These factors determining thermal comfort air temperature, relative humidity, air movement, radiant heat, season and climate, body activity and clothing.
2. The general atmosphere in all rooms occupied by employees and students will be ventilated by natural or mechanical ventilation or a combination thereof, to ensure a comfortable general work atmosphere.
3. Ventilating requirements for any given space are governed by so many variables (density and activity of occupants, nature of work, seasonal temperatures, etc.) that space does not permit a detailed treatment of the subject. However, in the absence of exceptional heat loads and hazardous atmospheres, the following Table can be used for estimating minimum ventilating requirements under various conditions of crowding:

<u>AIR SPACE IN ROOM IN CUBIC FEET PER PERSON</u>	<u>CUBIC FEET OF OUTSIDE AIR PER MINUTE PER PERSON</u>
Less than 200	20
201-500	15
501-1000	10
Over 1000	5

4. Provisions should be made for the entrance of clean, tempered air into the building to replace air removed by exhaust systems. The volume flow of such make-up air should be equal to or greater than the exhaust rate.

5. Inlets should be arranged and located so that workers are not subjected to drafts of air having a temperature of more than 10° F. below room temperature.
6. The intake for the air supply shall be so located as to prevent, insofar as possible, the intake of contaminants from exhaust systems, process vents, or other sources.

### **ILLUMINATION**

1. Illumination that is adequate and suitable to provide a reasonably safe campus environment shall be provided in all walking, working and service areas and for all difficult seeing tasks.
2. Good quality of lighting free of excessive glare, brightness, etc., shall be provided. There shall be good direction and uniform distribution of illumination. Checking for general quality requirements can usually be done by visual observation and without need of instrumentation.
3. There shall be a sufficient quantity of illumination in all work planes. Determination as to the adequacy or quantity of illumination shall be made by use of a light meter. The recommended quantity of light should be provided at the point and in the plane at which the seeing task is performed.
4. While there are several hundred different seeing tasks with prescribed levels of illumination, most campus areas are covered by the following Table:

### **CAMPUS LIGHTING LEVELS**

The following are recommended lighting levels that should be considered the minimum acceptable levels. The Illumination Engineering Society Lighting Reference Handbook provides the following guideline.

	<u>Foot-candle Range</u>
LABORATORY WORK: Prolonged, Visually Difficult and Critical	100-200
OFFICE WORK: Prolonged, Visually Difficulty or Critical	50-100
NORMAL OFFICE WORK, CLASSROOM: Reading, Writing, etc.	50-100
	<u>Foot-candle Range</u>
INSPECTION, STAIRWELLS, SHIPPING AND RECEIVING	20-50

MECHANICAL SHOP	20-50
CIRCULATION AREAS within OFFICE SPACE	20-50
HALLWAYS	5-10
PUBLIC AREAS, CIRCULATION AREAS	5-10
SHIPPING AND RECEIVING	20-50
SHOP STORAGE	5-10
PARKING LOTS	.2-.9
EXTERIOR SECURITY LIGHTING	1-5

5. Where the required amount for difficult seeing tasks or quality of lighting cannot be obtained by general lighting methods, supplementary lighting meeting the following requirements shall be provided.
  - a. Supplementary luminaries should be permanently mounted in location to produce the best lighting efforts.
  - b. The luminaries must be mechanically and electrically rigged to withstand possible rough handling.
  - c. Lamps should be guarded and of a type to withstand this service.
  - d. Guards or other means should protect the user from excessive heat.
  - e. All possible precautions should be taken to prevent electrical shock to the user.

## **NOISE CONTROL**

1. Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table A when measured on the A scale of a sound level meter at a slow response.
2. When employees are subjected to sound exceeding those listed in Table A, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table A, personal protective equipment shall be provided.
3. In all cases where the sound levels exceed the values shown herein, a continuing, effective hearing conservation program shall be administered.

**TABLE A**  
**PERMISSIBLE NOISE EXPOSURES**

Duration per day, hours	Sound level dB slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

*Source: 29 CFR 1910 Table G-16*

4. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.
5. Standards for nuisance noise levels do not exist. However, the Table below is a guide to desirable noise levels within classrooms, conference rooms, laboratories, and private offices.



<b><u>DESCRIPTION</u></b>	<b><u>dB</u></b>
Very quiet	0-38
Quiet	38-50
Moderately noisy <i>(At 58 dBA, it takes a slightly raised voice to be heard at 3 feet and efficiency may just begin to be reduced.)</i>	50-63
Noisy <i>(At 63 dBA, telephone use becomes difficult.)</i>	63-75
Very noisy <i>(At 78 dBA, telephone use is unsatisfactory.)</i>	75-88
Intolerably noisy	Above 88

6. Engineering controls such as enclosures and partitions are the recommended method of noise control. Personal protective equipment such as earplugs and special earmuffs that screen out harmful sounds while allowing conversational tones to be heard can only be used on a temporary basis or when engineering methods do not work. Another consideration is that an effort must always be made to limit the time spent in a noisy environment.
7. Departments should keep noise levels as low as possible and seek the advice of the RMS Office on all questions regarding noise.

If your employees are exposed to occupational noise at or above 85 dBA averaged over an 8-hour period, then you must institute a hearing conservation program that includes regular testing of employees' hearing by qualified professionals. The OSHA occupational noise standard, at 29 CFR 1910.95, sets forth the requirements for a hearing conservation program.

If sound levels exceed OSHA standards for 8 hr. permissible noise exposure level of 90 dBA, then engineering controls will be administered. If after engineering controls are in place and sound levels are still above threshold limits, hearing protection will be provided and a hearing conservation program shall be administered.

## *SECTION II*

### *CHAPTER 12 - FIRE PROTECTION*

#### **GENERAL**

1. All fires, regardless of how minor or if burned out prior to discovery, will be reported either orally or in writing to the RMS Office. As in the case of accidents and injuries, the information derived from these reports will materially assist in identifying those areas and conditions that are particularly fire hazardous. The reports will be analyzed and, if possible, corrective action to eliminate the hazard will be taken immediately.
2. All drapes, curtains, drops and all other similar material, including Christmas trees, located in corridors, stairways, lobbies, passageways and balconies used as required exits that would tend to increase the fire and panic hazard will be made from a non-flammable material, or will be treated and maintained in a flame-retardant condition by means of a flame-retardant solution or process approved by the Safety Director. In addition, any decorative material will not conceal exit lights, fire alarms, wet standpipe hose cabinets, and fire extinguisher locations.

#### **FIRE ALARMS**

1. Manual fire alarm stations will be used only for emergency or signaling purposes.
2. Each station will be securely mounted so that the bottom of the station is 4 1/2 feet above the floor level.
3. Manual fire alarm stations will be distributed throughout campus buildings so that they are unobstructed, readily accessible and located in the normal path of exit from an area.
4. The audible signal will be of sufficient duration and intensity so that it is capable of being heard by persons of average hearing ability at all locations inside the affected building. Warning lights should be installed in areas where hearing impaired persons work. Sound level of audible signal should not exceed 120 dBA. Warning lights should flash at a frequency less than 5 Hz.
5. All alarm systems will be under the supervision of qualified persons. These persons will cause proper tests and inspections to be made at regular intervals and will have general charge of all alterations and additions to the systems under their supervision.

6. Fire extinguishers will be provided for the protection of both the building structure, if combustible, the occupancy hazards contained therein, and for the protection of life.
7. Minimal sizes and number of fire extinguishers for flammable liquids (Class B) and energized electrical equipment (Class C) will be provided on the basis of NFPA requirements.
8. Extinguishers will be periodically inspected to ensure they are in their designated places, to ensure they have not been actuated or tampered with and to detect any obvious physical damage, corrosion, or other impairments.
9. Extinguishers removed from the premises to be recharged will be replaced by spare extinguishers during the period they are gone.

### **SPECIAL FIRE EXTINGUISHING SYSTEMS**

1. Where there is a possibility that personnel may be exposed to a carbon dioxide, dry chemical or other specialized discharge, suitable safeguards will be provided to ensure prompt evacuation of, prevent entry into such atmospheres and provide means for prompt rescue of any trapped personnel. Such safety items as personnel training, warning signs, discharge alarms, pre-discharge alarms and respiratory protection will be considered.
2. Total flooding systems will be designed, installed, tested and maintained in accordance with the applicable NFPA codes.
3. These systems will be maintained in full operating condition at all times.
4. All specialized extinguishing systems including alarms, shutdown, and other associated equipment will be thoroughly inspected and checked for proper operation by a licensed competent inspector.

### **SPRINKLER SYSTEMS**

1. Every high hazard occupancy will have automatic sprinkler protection or such other protection as may be appropriate to the particular hazard, including explosion venting designed to minimize danger to occupants in case of fire or other emergency before they have time to utilize exits to escape.
2. Before shutting off a section of the fire sprinkler system to make system connections, notify the RMS Office. Additional protection may have to be required.
3. Sprinklers that are so located as to be subject to mechanical injury (in either the upright or the pendent position) will be protected with approved guards.

4. Sprinklers will not be painted and any sprinklers which have been painted, except for factory applied coatings applied for identification of temperature ratings will be replaced with new approved sprinklers.
5. Water flow alarms will be provided on all sprinkler installations. All systems should be equipped with either alarms to outdoor locations or connected to the Physical Plant.
6. Clearance of at least 36 inches will be maintained between sprinkler deflectors and top of storage to reduce possibility of obstruction to the distribution of water.
7. In order to ensure proper operation of the automatic sprinkler systems the RMS Office will have each system pressure tested on a periodic basis at times that will cause the least disruption of normal activity.

### **STANDPIPES, HOSES AND HYDRANTS**

1. Hose outlets will be within easy reach of a person standing on the floor and in no case should be over six feet from the floor. Hose stations will be located conspicuously within the immediate area and not be obstructed. In buildings divided by numerous partitions, standpipes should be so located that the streams can be brought to bear in any room.
2. A hose valve will be provided at each standpipe outlet for attachment of hose.

### **VENTING EXPLOSIONS**

1. Vents are required in building areas containing operations where flammable gases, vapors or mists may be present in explosive concentrations in air.
2. Highly hazardous operations should be separated into individual units by pressure resisting walls, and each unit so formed should be vented to the outside of the building.
3. When venting a room, building or piece of equipment, consideration must be given to the location into which an explosion is to be vented.

## SECTION II

### CHAPTER 13 - FLAMMABLE LIQUIDS AND MATERIALS

(See Chemical Hygiene Plan for Additional Info)

#### GENERAL

1. Limit the quantities at any one location to those actually necessary, but not to exceed the limits specified below.
2. Prohibit smoking and eliminate other possible ignition sources wherever flammable liquids are stored or used.
3. Avoid sparks from static charges generated by pouring; connect dispensing and receiving containers (if metal) by a suitable electrical conductor.
4. Provide fire barriers, fire alarms and fire equipment, as appropriate, at all locations of storage and use.
5. Prevent accumulation of vapors by careful handling and by providing adequate ventilation.
6. Use only approved containers, e.g. safety cans (\*) or metal drums, for all transportation and handling.
7. Label every container used for flammable liquids with the name of the material and the words "Danger - Flammable - Keep away from heat, sparks and open flames - Keep closed when not in use."

#### CLASSIFICATION AND HANDLING RESTRICTIONS

##### **Classification Code**

Flash points  
Boiling points  
Flammability hazard

##### **IA**

less than 73° F.  
less than 100° F.  
extremely high

##### **Classification Code**

Flash points  
Boiling points  
Flammability hazard

##### **IB**

less than 73° F.  
greater 100° F.  
very high

<b>Classification Code</b>	<b>IC</b>
Flash points	73° to 100° F.
Boiling points	- - -
Flammability hazard	high

<b>Classification Code</b>	<b>II</b>
Flash points	100° to 140° F.
Boiling points	- - -
Flammability hazard	moderate

<b>Maximum container size</b>	<b>IA</b>
Glass containers	1 pint
Metal cans	5 gallons
Safety cans (*)	5 gallons
Metal drums	60 gallons

<b>Maximum container size</b>	<b>IB</b>
Glass containers	1 quart
Metal cans	5 gallons
Safety cans (*)	5 gallons
Metal drums	60 gallons

<b>Maximum container size</b>	<b>IC</b>
Glass containers	1 gallon
Metal cans	5 gallons
Safety cans (*)	5 gallons
Metal drums	60 gallons

<b>Maximum container size</b>	<b>II</b>
Glass containers	1 gallon
Metal cans	5 gallons
Safety cans (*)	5 gallons
Metal drums	60 gallons

## Maximum quantities at any location

(Isolated, special purpose bldg.)

IA	1100 gallons
IB	2200 gallons
IC	4400 gallons
II	8800 gallons

(Special storage rooms (\*\*\*) with automatic extinguishers),

All classifications - 5 gal./sq. ft. but not to exceed 750 gallons.

(Special storage rooms (\*\*\*) without automatic extinguishers),

All classifications - 2 gal./sq. ft. but not to exceed 300 gallons.

(Laboratories and other areas of use not in safety cans),

All classifications - 10 gallons

(Laboratories and other areas of use in approved safety can (\*),

All classifications - 25 gallons

(Laboratories and other areas of use in approved safety cabinets (\*\*),

All classifications - 60 gallons

\* Safety cans must be equipped with automatic closure for evaporation control and overpressure relief's; they must be equipped with flame arrestors and Teflon gaskets at all openings.

\*\* Safety cabinets must be of double-wall steel construction with three-point locking door and a two-inch sill at the bottom of the door. Label: "Flammable - Keep Fire Away".

\*\*\* Inside storage rooms must have approved self-closing fire doors, liquid-tight seal where walls join the floor, a four-inch sill or equivalent sump with drain to a safe location; a gravity or mechanical ventilation system shall provide at least six complete changes of air per hour.

8. Detailed information and recommendations for specific situations may be obtained from the RMS Office.

## **REFRIGERATORS, STORAGE IN**

1. Flammables should never be stored in any conventional refrigerator. "Explosion-proof" refrigerators are commercially available for this purpose. As an alternative, many existing refrigerators can be successfully modified to remove these sparking or arcing sources within the storage compartment. While these modifications do not render the refrigerator "explosion-proof," they may be safely used for limited storage of flammable materials. The modifications must include the following as a minimum:
  - a. Refrigerator control (including the temperature control) must be removed to outside of cabinet; it should be located on top near back edge and securely attached to the refrigerator body.
  - b. New temperature sensing element installed in approximate location as the original.
  - c. The internal lighting circuit must be disconnected and all wires taped at receptacle or back so that user cannot reactivate light. Note that this eliminates the compartment light.
  - d. Heaters or other electrical devices (such as may be in "butter" compartments) must be disconnected and wires taped.
  - e. Any holes on inside wall where control switch was removed must be completely sealed.

The above applies to freezer units as well as refrigerators. On "frost-free" refrigerators or freezers, fan motors of the non-sparking "induction" type are permissible; however, all other modifications must be made as described above.

2. Refrigerators used for storage of flammable liquids will be labeled "Laboratory Safe."



## **VAPORS, FLAMMABLE**

1. Ventilation will be sufficient so that under normal operating conditions concentrations of flammable vapors of gases in buildings, rooms or similarly enclosed places will not exceed 20 percent of the lower explosive limit for such vapors.
2. No source of ignition shall be permitted in any location, indoors or outdoors, where the concentration of the flammable gases or vapors exceeds or may reasonably be expected to exceed 20 percent of the lower explosive limit in the working atmosphere. Tests will be made to ascertain that this limit is not exceeded before a source of ignition is introduced into such locations, and such tests shall be repeated frequently.
3. Smoking is forbidden in any location where flammable vapor is present.

## *SECTION II*

### *CHAPTER 14 - GROUNDS*

#### **ANIMALS ON CAMPUS**

There are significant health and safety hazards and nuisances created by unrestrained animals (primarily dogs) on campus. Accordingly, the following guidelines will be enforced relating to animals:

1. Animals will not be brought onto the University property unless they are under the complete control of the owner and present no hazard to people. Its owner will not regard the wearing of a muzzle by a dog as control.
2. Dogs may not be brought onto the campus grounds except where:
  - a. They are secured to a leash, cord, chain, or similar direct physical control of a maximum length of six (6) feet, the other end of which is retained by a person; or,
  - b. Securely confined in a vehicle, cage, or similar restrictive convenience.
3. Animals, including dogs, may not be tethered on campus.
4. Animals are not permitted in any campus building even though leashed except for:
  - a. Seeing-eye dogs serving their owners.
  - b. Animals involved in authorized research.
5. Dogs and cats must have a valid license as evidence of current rabies vaccinations.
6. Animals, including dogs and cats, on campus, found running at large or without evidence of current rabies vaccination are subject to being picked up by the City of Denton Animal Control.

#### **PEST CONTROL**

1. With few exceptions, pesticides are potentially toxic to human beings and in some cases are flammable or explosive. All persons who mix, store or apply pesticides should have full knowledge of the characteristics, effects, and precautions applicable to the material being used.

2. All University employees engaged in pesticide application work are to be licensed by the State of Texas.
3. Private contractors who apply pesticides on campus must also be licensed by the State of Texas.
4. Pesticides and other chemicals used in pest control must be used in accordance with instructions on the container label.
5. Do not spray liquid pesticides on electrical outlets or equipment; use dust or powder.
6. Chemicals consisting of high vapor toxicity must not be applied in large quantities in unventilated areas.
7. Surplus pesticides must be disposed of in a manner that will not permit harm to people, animals or the environment. Contact the RMS Office for proper disposal procedures.
8. The spray equipment tank should be equipped with a leak proof latch. The mixing system should be so designed that it eliminates spills during transfer and mixing.
9. Do not apply pesticides in laboratories, office areas or any occupied areas without authorization from the individual responsible for that area.
10. Persons requesting pesticide application must contact all personnel in the affected area.
11. All necessary safety equipment must be available during application of pesticides, such as respirators, gloves, face shields or goggles and aprons if the job warrants their use.

### **EXCAVATIONS**

1. Employees will not work in or adjacent to any excavation until a reasonable examination has been made to determine that no conditions exist exposing them to injury from moving ground.
2. Prior to opening an excavation, effort will be made to determine whether underground installations, e.g. sewer, electric lines, etc., will be encountered.
3. The walls and faces of all excavations 5 feet or more in depth that employees will enter shall be effectively guarded by a shoring system, sloping of the ground or other equivalent means.

4. Where a shoring system is used it will consist of wood timbers or equivalent with sheathing as needed, properly designed and installed to sustain all existing and expected loads. Wood sheathing or uprights will not be less than 2 inches in nominal thickness, except that 3/4-inch thick plywood panels may be used in addition to the 2-inch material, as in aid in holding loose material. In lieu of the above shoring systems the use of properly maintained hydraulic metal jack shoring units with equivalent strength is acceptable.
5. In lieu of a shoring system, the sides or walls of an excavation may be sloped, provided equivalent protection is thus afforded. Where sloping is a substitute for shoring that would otherwise be needed, it will be 3/4 horizontal to 1 vertical except where the instability of a material requires a slope greater than 3/4 to 1.
6. Excavation work will at all times be under the immediate supervision of someone with authority and qualifications to modify the shoring system or work methods, as necessary, to provide greater safety. He will examine the material under excavation and improve the shoring or methods beyond the minimum requirements, as necessary, to insure protection of workmen from moving ground.
7. Excavated material will be prevented from falling back into the area where men are working. In no case will the excavated material be placed closer than 2 feet from the edge of the excavations 5 feet or more in depth. Maintain at least 1-foot clearance for lesser depths.
8. Convenient and safe means will be provided for workmen to enter and leave the excavated area. This will consist of a standard stairway, ladder or ramp securely fastened in place at suitably guarded or protected locations so as to require no more than 25 feet of lateral travel.
9. No excavation will take place below the level of the base of an adjacent foundation, retaining wall or other structure until it has been determined that such excavation will in no way create a hazard or until adequate safety measures have been taken. If sidewalks are to be undermined they will be supported to carry a minimum live load of 125 ponds per square foot.
10. Adequate barrier physical protection will be provided at all excavations. All wells, pits, shafts, etc., will be barricaded or covered upon completion of exploration and similar operations. Temporary walls, pits, shifts, etc., shall be backfilled.

### **TREE TRIMMING**

1. Employees engaged in pruning, trimming, removing or clearing trees will be required to consider all overhead and underground electrical power conductors with potentially fatal voltages. Electric shock will occur when an employee, by either direct or indirect contact with an energized conductor, energized tree limb,

- tool, equipment or other object, provides a path for the flow of electricity to a grounded object or to the ground itself.
2. The Grounds Supervisor will ensure that a close inspection is made before climbing, entering or working around any tree to determine whether an electrical power conductor passes within reaching distance of an employee working in the tree. If any of these conditions exist either directly or indirectly, an electrical hazard will be considered to exist unless de-energizing the lines or installing protective equipment can remove the hazard.
  3. Only qualified line clearance tree trimmers familiar with the special techniques and hazards involved in line clearance will be permitted to perform the work if it is found that an electrical hazard exists.
  4. During all tree-working operations aloft where an electrical hazard of more than 600 volts exists, there will be a second employee qualified in line clearance tree trimming within normal voice communication.

## *SECTION II*

### *CHAPTER 15 - HAZARDOUS MATERIALS*

(See Chemical Hygiene Plan for Additional Info)

#### **ASBESTOS**

1. Asbestos must be removed when it poses a threat to release airborne asbestos fibers and it cannot be reliably repaired or isolated. Such "must remove" mandates are to be determined by RMS.
2. Where there is no compelling mandate to remove asbestos, decisions to remove, rather than repair, damaged friable asbestos materials should be based on degree of risk to facility occupants, use of the facility, feasibility of repair, frequency of repair, and cost-effectiveness.
3. When safety and budgetary allowances permit, complete removal of Asbestos Containing Material (ACM) is desirable and should be included in planning prior to renovation projects.
4. All Maintenance and Custodial personnel are required to attend a 2 Hour Asbestos Awareness Training class annually. All newly hired Maintenance and Custodial Personnel must be trained within 60 days of being hired. RMS will conduct the Awareness Training.

5. All Maintenance personnel are required to obtain a Maintenance Permit from RMS before disturbing any building materials that may be ACM. It is to be assumed that any building material is asbestos containing unless identified as non-asbestos containing material by RMS.
6. ACM is to be removed by a licensed abatement contractor prior to minor construction, repair, or renovation.
7. Only qualified (certified and/or licensed) personnel are authorized to collect, encapsulate, abate, remove, disturb or dispose of ACM. These activities involving ACM must be done in accordance with applicable federal and state laws.
8. Some ACM surveys, projects, or repairs may require prompt completion. Therefore, a local contractor, qualified and licensed to conduct asbestos surveys and do repair or removal work will be retained for such services.
9. The RMS office shall be contacted whenever asbestos is found as part of any building material on campus, such as ceilings, floor tiles, pipe insulation, etc.
10. The RMS office is to be contacted immediately if ACM is found disturbed, or if it is suspected that non-qualified workers are disturbing or conducting asbestos related activities, or it is observed that persons disturbing ACM are not taking appropriate safety precautions to protect themselves, students, faculty, or staff of the University.

### **COMPRESSED GAS**

1. Cylinders will be stored in well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials such as oil or grease.
2. Cylinders may be stored in the open, but in such cases protection is needed against the weather, from the dampness of the ground and should therefore be shaded against the direct rays of the sun. Bulk storage is to be in approved rooms or outside enclosures. Bulk storage cylinders should be chained and security measures taken to prevent tampering and loss.
3. Do not store empty cylinders with the full ones and do not place cylinders where they may become part of an electrical circuit.
4. All gas cylinders in service or storage, empty or full, will be securely held upright in substantial racks or secured to other rigid structures so that they will not fall or be knocked over. During storage, cylinder caps should be in place.
5. All cylinders are to be considered full unless properly identified as empty. Empty cylinders should be returned to the supplier and not be permitted to accumulate.

To prevent contamination and even explosive mixtures in cylinders, always leave at least 25 psig minimum pressure in all "empty" cylinders. Do not leave an empty cylinder attached to a pressurized system.

6. Portable service gas cylinders will be conveyed by suitable trucks; to which, they must be securely fastened. During movement, cylinder caps should be in place.
7. Compressed gas cylinders will be legibly marked, for the purpose of identifying the gas content, with either the chemical or the trade name of the gas. Such marking will be by means of labeling and shall not be readily removable. The marking will be placed on the shoulder of the cylinder.
8. Cylinders should not be accepted unless the cylinder contents are clearly labeled. Do not accept cylinders which are damaged or do not have a valve protection cap.
9. Oxygen cylinders will never be stored near highly combustible materials, or other fuel gas cylinders, nor near any other substances likely to cause or accelerate fire.

Systems used for other gases must never be used for oxygen.

10. No attempt will ever be made to transfer gases from one cylinder to another, to refill cylinders or to mix gases in a cylinder.
11. Never force a gas cylinder valve. If the wheel or the small wrench provided cannot open the valve, the cylinder should be returned.
12. Use Compressed Gas Association (CGA) approved fittings and components.
13. Each department will determine that compressed gas cylinders under his control are in a safe condition to the extent that this can be determined by visual and other inspection. Cylinders with distinct visual bulges will be removed from service until the nature of the defect is determined.
14. Compressed gas cylinders will have pressure relief devices installed and maintained in accordance with requirements of the Compressed Gas Association. Types of safety relief devices are as follows:

- Frangible disc
- Fusible plug
- Safety relief valve

15. Piping used with compressed gases will be steel, wrought iron, brass or copper pipe, or seamless copper, brass or stainless steel tubing. Piping systems will be protected by pressure relief devices set to function at not more than the design pressure of the systems and discharging upwards to a safe location.

## **ETHER STORAGE**

1. To limit the explosion potential created by peroxide formation in ether, the following requirements must be satisfied:
  - a. All ether storage containers will be labeled with the date of purchase.
  - b. Isopropyl ether and anhydrous ethers will be kept for no longer than six months and other ethers for no longer than one year.

## **LASERS**

Outlined below are generalized rules for the safe use of lasers.

1. Only qualified and trained employees will be assigned to install, adjust and operate laser equipment.
2. Proof of the qualification of the laser equipment operator will be available and in possession of operator at all times.
3. Employees, when working in areas in which a potential exposure to direct or reflected laser light greater than 0.005 watts (5mW) exists, will be provided with eye protection devices which filter wave lengths emitted by the laser.
4. Areas in which lasers are used will be posted with standard laser placards.
5. Beam shutters or caps will be utilized or the laser turned off when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as overnight or at change of shifts, the laser will be turned off.
6. Only mechanical or electronic means will be used as a detector for guiding the internal alignment of the laser.
7. The laser beam will not be directed at any individual or across open spaces (hallway, aisles, etc.) accessible to people.
8. Shiny surfaces, which can cause specular reflections should be covered or otherwise removed from the laboratory.
9. Laser equipment will bear a label to indicate maximum output.
10. Employees will not be exposed to light intensities above:
  - a. Direct staring: 1 microwatt per square centimeter;



- b. Incidental observing: 1 milliwatt per square centimeter;
  - c. Diffused reflected light: 2 1/2 watts per square centimeter.
11. Laser unit in operation should be set up above the heads of the employees, when possible.

### **MERCURY**

1. Although acute mercury poisoning may result from ingestion of mercury and its salts, the principal hazard in the laboratory comes from its cumulative effects on the system acquired by continuous inhalation of even low concentrations of its vapor and by contact with contaminated equipment and materials.
2. The maximum allowable concentration of mercury vapor in air is only 0.05 milligrams per cubic meter of air. Levels above this may constitute a health hazard depending upon exposure time.
3. Good housekeeping is, therefore, of prime importance in eliminating the possibility of mercury poisoning. Mercury should be kept in sturdy, tightly closed and clearly labeled containers. Mercury should never be heated in uncovered containers unless the immediate area is well ventilated.
4. Spills of mercury should be reported to RMS immediately. Spill area should be isolated. Mercury clean-up spill kit should be available anywhere that mercury is in use. The RMS office will train personnel in clean up of mercury spills.

### **MICROWAVES**

1. Microwave radiation is an electromagnetic radiation with both magnetic and electrical fields. These amounts of energy are incapable of breaking the bonds between molecules and are therefore known as non-ionizing radiation. Although the energy from the photon is not adequate to break the bond, heating does occur which can cause dissociation through heat excitation or the boiling of a molecule, causing it to burst. It is thought that the human body can easily deal with short durations at a low power level. As a generalized rule, 5 mW/sq cm at 5 cm from exterior surface of oven is considered the maximum permissible exposure for humans.
2. Microwave ovens are one of the more closely regulated microwave radiation sources, operating in the 915-2450 MHz range. The Electronic Products Radiation Control Act of 1968 caused the manufacturers to come forth with various types of safety devices and to comply with standards for microwave leakage.

Rules to insure safety are as follows:

- a. Follow the manufacturer's operating instruction manual explicitly.
- b. Before operation, examine the oven for possible damage caused during shipping.
- c. When the oven is on, do not put your face near the door to watch the cooking of food.
- d. Never insert objects (e.g. fork, aluminum foil, etc.) through the window screen or the door seal of a microwave oven.
- e. Do not tamper with or modify the oven's safety interlocks or controls.
- f. Never operate an empty oven. If testing, use approximately one half pint of water in a glass or ceramic container.
- g. Keep oven, oven door, and door seals clean. Utilize a suitable detergent and scrubbing device as recommended by the manufacturer.
- h. Have the oven serviced at the prescribed intervals by a qualified microwave oven serviceman.
- i. When in doubt, have the microwave oven surveyed by the RMS Office.

## **RADIATION SAFETY**

Radionuclides are being used at the University under a broad radioactive materials license issued by the State of Texas. Although the license specifies the responsibilities governing both use and disposal of radioactive materials and radiation producing machines, they are broad enough to require interpretation by a specialist in radiation safety and protection. For consultation regarding every ionizing and non-ionizing radiation safety problem at any stage of design or operation, contact the Radiation Safety Officer, (RSO) X-3282.

Persons who are planning to use, or who are already using, ionizing or non-ionizing sources of radiation should contact the Radiation Safety Committee or RSO (x3282) for information on operational procedures and monitoring requirements.

## **ULTRAVIOLET LAMPS**

The unfiltered ultraviolet radiation from germicidal lamps, usually in the 2537 Angstrom range, is extremely irritating to the eye, which is the "critical organ" for ultraviolet radiation. Exposure at close range for even a short time (a few seconds) may produce painful eye irritation that can be disabling for a few days, and longer exposures may result in permanent damage.

1. Personnel using ultraviolet lamps of low intensity (e.g., 15 watt germicidal) should wear glasses with side shields (either prescription glass on non-UV-transmitting glassblower's glasses) and opaque rubber gloves. For high intensity light sources further protective devices are needed: wrap-around, non-UV transmitting face mask, arm and body covering such as long sleeve shirt and laboratory coat, in addition to opaque gloves.
2. Ultraviolet lamps in biological safety cabinets or special enclosures will be turned on only when the cabinet or enclosure is not in use.
3. Maintenance personnel servicing or cleaning lamps are exposed to the rays of the lamps to a greater extent than other people; therefore, the light fixture should bear a warning label placed on the outside of the reflector. The warning should instruct them to turn the lamp off before attempting to work in the immediate vicinity.

## ***SECTION II***

### ***CHAPTER 16 - LABORATORY SAFETY***

(See Chemical Hygiene Plan for Additional Info)

#### **GENERAL**

1. Housekeeping: Good housekeeping is essential for the safe operation of all laboratories. Main aisles and exits will be free from obstructions. Floors should be clean and free from oil, water and other material that may cause slipping. Equipment, reagents, etc., should be returned to their proper location immediately after use. All containers must be clearly marked and correctly labeled. Waste will be deposited in metal containers having self-closing covers. Separate containers will be provided for broken glassware.
2. Inspection: Laboratory space and equipment will be inspected at frequent and regular intervals in an effort to eliminate unsafe conditions and prevent unsafe acts before accidents occur.
3. Horseplay: Horseplay will not be tolerated in any laboratory at any time. Running is forbidden, except in cases of emergency. Liquefied gases, dry ice, air hose, and knives, for example, should never be used as playthings.
4. Emergencies: Definite procedures should be established in each laboratory for the handling of such emergencies as fire, explosion, unexpected release of toxic fumes, etc.

5. Clothing: Clothing suitable for laboratory work will be worn at all times. Protective clothing as outlined in Chapter 19, "Personal Protective Equipment," may also be necessary.
6. Goggles: Students and employees working in laboratories will be required to wear protective goggles or protective face shields when there is any possibility of explosion, implosion, violent chemical reaction, splashing chemicals, injurious radiation or other occurrences hazardous to the eyes.
7. Washing Hands: Traces of laboratory chemicals left in contact with the skin may produce dermatitis or severe burns. It is an excellent practice to wash the hands and arms frequently during the course of the day.
8. Electrical: Never overload electrical circuits! When using electrical equipment around sinks or other wet conditions, be sure a ground fault circuit interrupter protects the outlet. A sticker identifies all such outlets. Be certain that all high voltage equipment, such as lasers, are protected, preferably via completely grounded enclosures with interlocks.
9. Working Alone: Students and employees should never conduct potentially hazardous experiments during off-hours such as nights and weekends unless there are two or more persons present.
10. Lab Safety Instruction: All students, graduate students, staff and faculty, should be thoroughly trained in applicable lab safety practices before they are allowed to begin any unsupervised lab work. This can best be achieved by having each instructor, at the beginning of each course, advise his students of the requirements for safety apparel and accessories, the particular hazards that may be encountered and rules and procedures to prevent or minimize the hazards. Fire and accident first aid procedures, to include location and use of fire extinguishers and safety showers, should be reviewed.
11. Fume Hoods: Experiments involving toxic or flammable materials should be conducted in a fume hood. Work of a hazardous nature should never be performed where any resultant fire might block egress.
12. Exits: Every laboratory room where hazardous work is performed should have at least two exits if possible as widely separated as practical.
13. Extinguishers: The laboratory should be adequately equipped with fire extinguishers of the type suitable to combat the kind of fire which might be expected to occur.
14. Safety Showers: Laboratories should be equipped with safety showers for chemical removal or fire dousing. Their location should be clearly marked and employees instructed in their use.

15. Storage Shelves: All open shelves on which hazardous chemicals are stored, should be equipped with a safety lip or restraining bar to prevent accidental breakage.
16. Food: No food or drinks will be allowed in the laboratory.

### **ANIMALS IN LABS**

In accordance with UNT Policy all University personnel involved in research or teaching activities involving animals must comply with the directives and guidelines established by the University Committee for Animal Care and Facilities. However, regardless of established policy the following considerations will be given to the bodily comfort of lab animals.

1. Animals will be kindly treated, properly fed, and properly housed.
2. The animal quarters will be provided with proper lighting, ventilation, and heating to maintain comfort of the animal. Equipment must be adequate for the proper care and treatment of all animals kept or used. Cages or other enclosures will be large enough to permit reasonable freedom of movement. Adequate facilities will be provided for keeping animal quarters and equipment clean. Overcrowding must be avoided in order to limit the transmission of animal diseases. The animals will be maintained in a room separate from any other activity of the University.
3. Capable personnel will be employed for the adequate care and feeding of the animals. In animal facilities, one individual will be in complete charge of, and therefore, responsible for, the entire operation of the unit. Their training should include a knowledge of the means of transmission of disease and an understanding of the precautions necessary to prevent this. All personnel handling animals will be immunized against tetanus.
4. Any operation likely to cause greater discomfort than the attending anesthetization will not be undertaken until the animal is first rendered incapable of perceiving pain. The animals will be maintained in that condition until the operation is completed. At the conclusion of experiments, the animals must be killed painlessly or given care to minimize discomfort that is essentially equivalent to that rendered human beings following an operation.
5. Exception may be made to the foregoing rules only with expressed permission of the Animal Care Committee. This permission may be granted only when the foregoing considerations would defeat the purpose of the work.

### **BIOHAZARDS**

1. An etiologic agent is a viable microorganism or its toxin, which causes or may cause human disease. A diagnostic specimen is any human or animal material including, but not limited to, excreta, secreta, blood and its components.
2. Specific Safety Procedures:
  - a. Only authorized employees, students and visitors should be allowed to enter infectious disease laboratories or areas.
  - b. No-access areas should be posted with signs reading "Warning - Highly Infectious: Keep out."
  - c. All infectious or toxic materials, equipment or apparatus should be autoclaved or otherwise disinfected before being washed or disposed of.
  - d. Insure that all virulent fluid cultures or viable powdered infectious materials in glass vessels are transported, incubated and stored in easily handled, non-breakable, leak proof containers.
  - e. On the exterior door of each lab an emergency notification sign must be posted by the responsible researcher, giving instructions to follow in the event of an emergency such as a fire or spill.
  - f. Floors, laboratory benches and other surfaces in the rooms in which infectious substances are handled should be disinfected.
  - g. No infectious materials should be pipetted by mouth. Hand or automatic pipetting devices must be used.
  - h. Food for human consumption should not be taken into infectious disease laboratories. Eating, drinking and smoking will not be permitted.
  - i. To minimize the hazard to maintenance personnel, or emergency crews, at the close of each workday, all infectious or toxic material should be:
    - (1) Placed in the refrigerator,
    - (2) Placed in the incubator, or
    - (3) Autoclaved or otherwise disinfected before the building is closed.
  - j. No infectious waste substances should be allowed to enter a building drainage or refuse disposal system without proper sterilization.
  - k. No person should transport off campus any etiologic agent unless such material is packaged to withstand leakage of contents. Specific warning labels are also required on all such packages.

## **ODOR CONTROL**

Odor control is any process that makes olfactory experiences more acceptable to people. With the exception of those substances that emit fumes, vapors, mists, gases, etc., that are themselves toxic and hazardous, most odors are only a nuisance. However, regardless of whether they are harmful or merely obnoxious, it is the responsibility of every department to control the emission of odors that might under some conditions interfere with the activities of others. Therefore, the following guidelines are recommended:

1. Substitution of low odor chemicals for the more highly odorous ones.
2. The removal of odors by means of mechanical methods such as fume hoods or other exhaust systems as described in Chapter 11 of this Manual.
3. Complete isolation from the main campus of any activity that involves the use of odorous substances that cannot be controlled to the extent that it would not be bothersome to others.

## **CHEMICAL HANDLING**

(See Chemical Hygiene Plan for additional info)

1. Operations and movements should be planned before handling hazardous chemicals.
2. When mixing acid and water, the acid must always be poured slowly into water, not water into acid. Persons should avoid inhaling acid fumes. Any pouring, mixing, or dispensing of acid shall be in a ventilated hood.
3. Large containers such as carboys are to be handled mechanically by tilters or cradles.
4. Personnel dispensing or handling chemicals should always wear proper protective equipment.
5. Where accidental spills or contamination by toxic substances occur in the laboratory, clean up and monitoring of the area should begin at once. Contact the RMS office for assistance.
6. Safety cans, carts, acid bottle carriers and other safety transport devices should be used to carry chemicals about the laboratory. No corrosive or toxic chemical is to be carried down hallways or in elevators unless they are in safety containers or have equivalent protection.
7. Where the eyes or body of any person may be exposed to injurious corrosive materials, emergency deluge showers and eye wash equipment will be provided in the immediate vicinity of the potential exposure. Deluge showers and emergency

eyewashes will be tested annually. Showers with automatic shutoff valves will be adjusted to run for a minimum of 15 seconds.

### **CHEMICAL SPILL CLEAN-UP**

1. Acid Spill Clean up
  - a. Boxes containing soda ash should be kept in strategic locations by users of acids.
  - b. Do not throw the entire contents of the box on the spill area. Use a large beaker or cup to throw the soda ash on the area. Apply small amounts of the neutralizer, starting at the edges and moving inward.
  - c. Remain some distance from the spill, since some acids will release highly corrosive fumes, which can affect your eyes, lungs, and skin. Always use proper protective equipment.
  - d. Block off the spill area and call the RMS Office at 2109 for assistance.
  - e. Report the incident to the RMS Office. Future accidents can sometimes be prevented by the information gained from accident reports, whether someone is injured or not.
  
2. Base Spill Clean up
  - a. A 10% mixture of hydrochloric acid and water is used for neutralizing liquid base spills.
  - b. Dry spills of base should be handled by picking up the solid using a shovel or scoop. The remaining powder may be handled by adding the water and 10% hydrochloric acid solution. Do not dump large quantities of the neutralizing solution on the spill because a violent reaction may occur.
  - c. Personal protective equipment consisting of goggles and gloves should be worn during clean up.
  - d. Call the RMS Office for assistance and disposal.
  - e. Report the incident to the RMS Office.

### **CHEMICAL WASTE DISPOSAL**

(See Chemical Hygiene Plan for additional info)

1. The disposal of chemical waste is the responsibility of the RMS Office. A special facility is available on campus to package and ready for shipment of waste materials for subsequent shipment to licensed commercial disposal companies.



2. It is the responsibility of the waste originators to contact RMS through our webpage Hazardous Waste Pickup Request Form with the information required for our removal of their wastes.
3. Call RMS to requests chemical waste disposal. Each container of chemicals will have labels with the following information:
  - Chemical and brand names
  - Part number
  - Any other information pertaining to the chemical(s)
4. Radioactive waste disposal information is available from the Radiation Safety Officer, or the RMS Office.
5. Wastes will be picked up immediately if:
  - a. They are in leaking containers.
  - b. Potential situations involve imminent danger.

### **FUME HOODS**

1. Laboratory-type fume hoods will be used to prevent harmful exposure of hazardous substances to students, faculty and staff. All fume hoods will conform to the provisions of this section.
2. Fume hood face velocities will be sufficient to maintain an inward flow of air across the entire face of the hood under all operating conditions. The hood will provide confinement of the possible hazards of the user for the work that is performed. The exhaust system will provide an average face velocity of at least 50 feet per minute. For high hazard materials, where TLV concentration limits are 10 ppm or 0.1 mg/M<sup>3</sup> or less, a face velocity of 100 fpm is necessary. Radioactive materials require a minimum average face velocity of 100 fpm.
3. Any hood failing to meet airflow requirements will be considered deficient and will be posted with a plainly visible caution sticker that prohibits use of hazardous substances within the hood.
4. Mechanical ventilation will remain in operation at all times when hoods are in use and for a sufficient time thereafter to clear hoods of airborne hazardous substances in the hood; bottles/containers will be covered or capped.
5. When determining the need for a fume hood, consider TLV's, toxicity, vapor pressure, flammability, possible formation of toxic dusts, aerosols, mists, vapors or gases, smoke and pathogenic or carcinogenic properties. Use a fume hood when in doubt.

6. To protect persons on the roof, exhaust stacks of high hazards hoods will extend at least 7 feet above the roof and discharge vertically upward.
7. Most sashes are not designed as "Safety Shields" and, therefore, supplementary shields must be used for body protection when working with potentially violent reactive chemical.
8. Highly toxic material is commonly stored in the fume hood to provide continuous ventilation in the event of leakage. Such storage is satisfactory; however, this practice appears to encourage storing other materials in the hood that do not require exhaust ventilation. Such excess storage clutter reduces the efficiency of the best-engineered hood by impeding the free movement of air. Dirty glassware and equipment, water baths, stirrers, ring stands, etc., should be removed from the hood when not in actual use.
9. Local exhaust ventilation (special exhaust systems designed to ventilate a small special area) is used to collect contaminants from specialized procedures. When properly installed, these special exhaust systems are preferred, rather than having to place the equipment in a standard fume hood, where valuable fume hood space would be lost for other work.

### **GLASSWARE HANDLING**

1. Cracked, chipped, broken or otherwise damaged glassware should be immediately repaired or discarded. Do not keep pipettes with ragged edges or shortened headpiece.
2. Broken glass should be removed with a brush and dustpan or cardboard. Absorbent cotton may also be used to pick up fine pieces of broken glass. Cotton should be held with tongs. Never use a towel to clean up broken glass. Broken glassware or any other material likely to cause injury to the hands is not to be disposed of with waste paper or other harmless materials. Use a cardboard box, lined with a double layer of plastic, and leave flaps open until filled. Then tape flaps closed and mark box "Broken Glass."
3. Exercise care when inserting glass tubing into rubber or cork stoppers, as severe injury can result from breakage of the tubing. The following practices should be used when handling glass tubing, rod or thermometers:
  - a. Fire polish the ends of tubing and rods.
  - b. Use a suitable lubricant such as glycerol, glycerin, soapy water or water. Match stopper holes and tubing size.
  - c. Protect hands with leather gloves or towel.

- d. Apply necessary force in a lengthwise direction while slowly twisting tube. Good practice is to hold stopper or tubing between thumb and forefinger and grasp tubing close to point of insertion.
  - e. When stoppers and tubing become sealed to glass, they should not be removed by force. Glass and rubber may be separated by pushing the handle end of file parallel with tubing at the same time, add water to the openings. A cork borer may also be used to separate rubber and glass.
4. When breaking a small-bore glass tube or rod it should first be scratched with a file at the point of the desired break; then, holding the glass in front of the body with the scratch away from the operator and with the thumbs pressing firmly outward at the point opposite the file scratch, snap quickly with both hands as if snapping a twig. Sharp ends of tubing should be fire-polished before using or putting back into stock. Larger tubing (over 12mm) will have to be cut with a hot wire, cutting wheel, or by applying a hot piece of glass rod over file scratch.
5. All glass vessels, one liter or over, used in high vacuum systems, are to be enclosed with screening or safety glass shields or wrapped with tape. Suction flasks will collapse violently under vacuum if cracked or otherwise weakened. Tamping flasks, when suction is on full is an unsafe practice.
6. Glass apparatus used at pressure above atmospheric is to be completely shielded to prevent the escape of flying particles or the container contents in the vent of breakage. To prevent the inadvertent application of pressure; glass vessels that are used at atmospheric pressure, but are connected to a source of high pressure, should be protected by a mercury or water seal.
7. Glass cleaning:
- a. Dirty glass should be removed from the work area immediately after use. It should not be allowed to accumulate on bench tops or sinks.
  - b. All glassware is to be rinsed of toxic, corrosive, or other dangerous materials before being turned over to dishwashing personnel. Organic residues can react with strong oxidizing agents.
  - c. To remove organic materials from glassware, use soap and water, a suitable solvent, a spatula, or, if necessary, cleaning solution (dichromate-sulfuric acid), for most resistant deposits. Never use nitric acid or mixed nitrating acids with organic materials.

## **INFECTIOUS AND ANIMAL WASTES DISPOSAL**

The following procedure will be used in disposal of all infectious and animal wastes:

1. All infectious waste will be rendered non-infectious by autoclave, placed in a sturdy, leak-proof container and disposed of in the large outdoor trash bins.

2. Non-infectious animal waste may be placed in sturdy, leak-proof containers and disposed of in the large outdoor trash bins. Double bagging is an acceptable procedure.
3. While animals are waiting to be rendered non-infectious, they will be refrigerated at 35° F to 40N F until time of treatment and ultimate disposal.

### **LABORATORY EQUIPMENT**

1. Never remove guards or other safeguards from equipment or attempt to defeat their purpose. Inspect and maintain equipment and accessories to prevent injuries. Equipment that is in a state of disrepair, or is otherwise unsafe, must be disconnected from the power supply and repaired or discarded.

2. Equipment which uses gas, such as flame photometers, etc., should be reviewed for the following:

Safeguards to prevent inadvertent ignition.  
Check valves to prevent gas from surging back into gas line.  
Flame arrestors to prevent flashback.  
Gas tight fittings and piping.  
Pressure limiting devices.

3. When installing a centrifuge carefully consider location, type and use. Make certain it is securely anchored and instruct all users on the importance of balancing before use. Also consider:

Adequate shielding against accidental "fly-aways",  
Prevention of "walking",  
Top equipped with disconnect switch which shuts off rotor if opened,  
Positive locking of head, and  
Electrical grounding.

4. Hand protection (tongs, heavy duty leather gloves, etc.) is needed when placing or removing samples from ovens, furnaces, and hot plates. Mantles must be used only with suitable variable power stats to avoid exceeding rated wattage. Also review for:

Blowout panels or magnetic latches (latches are more desirable if they open at pressures just above one atmosphere),  
Reliable, well-maintained, thermostatic controls marked in definite units,  
Electrical grounding of cabinets and conductive parts, and  
On-off switch with pilot light is required for hot plates, soldering irons, etc.

5. All cords for heating units must have insulation designed for such and be U.L. approved. Provide temperature override cutoffs on constant temperature baths.

6. Pressure release controls on approved design must be provided to safely open autoclaves.

## *SECTION II*

### *CHAPTER 17 - MACHINERY AND MACHINE GUARDING*

#### **GENERAL**

1. Machine guarding will be provided to protect the operator and other persons in the machine area from injury as a result of coming in contact with the work in progress and/or moving parts of the mechanical motions of the machines.
2. Guards will be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard will be such that it does not offer an accident hazard in itself.
3. The point of operation of machines whose operation exposes an employee to injury will be guarded.
4. The guarding device will be in conformity with appropriate standards, or be so designed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.
5. Distinct from guarding at the point of operation but complementary to it is the matter of guarding moving parts of equipment used in the mechanical transmission of power. These mechanisms include shafting, belts, pulleys, gears, etc.
6. There will be conspicuously displayed safety signage at all machines driven by electric motors that are controlled by fully automatic starters and which may injure employees, permanent signs giving warning that the machines are automatically controlled and may start at any time.

#### **ABRASIVE WHEELS**

1. Abrasive wheels will be used only on machines provided with safety guards.
2. Such safety guards will be hoods of such design and construction as to effectively protect the employee from flying fragments of a bursting wheel insofar as the operation will permit.
3. The hood guard will cover the spindle end, nut, and flange projections. The safety guard will be mounted so as to maintain proper alignment with the wheel, and the strength of the fastenings will exceed the strength of the guard.
4. On offhand grinding machines, work rests will be used to support the work. They will be of rigid construction and kept adjusted closely to the wheel with a

maximum opening of one-eighth inch to prevent the work from being jammed between the wheel and the rest.

5. An adjustable tongue-guard will be installed at the top end of the hood-guard and clearance to the wheel periphery will not exceed one-fourth inch.
6. The maximum angular exposure of the grinding wheel periphery and sides for hoods used on bench mounted machines floor stands should not exceed 90° or one-fourth of the periphery. This exposure will begin at a point not more than 65° above the horizontal plane of the wheel spindle.
7. Whenever the nature of the work requires contact with the wheel below the horizontal plane of the spindle, the exposure will not exceed 125°.
8. Immediately before mounting, all wheels will be closely inspected and sounded by the user (ring test) to make sure they have not been damaged. The spindle speed of the machine will be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.

### **CLEANING, REPAIRING AND SERVICING**

1. Machinery or equipment capable of movement will be stopped and the power source locked off or disengaged to prevent inadvertent movement during cleaning, servicing or adjusting operations.
2. Every power driven machine equipped with lockable controls or readily adaptable to lockable controls will be locked out or positively sealed in the "off" position during repair work. Machines not equipped with lockable controls or readily adaptable to lockable controls shall be considered in compliance with this order when positive means are taken, such as de-energizing or disconnecting the equipment from its source of power, or other action that will prevent the machine from inadvertent movement.
3. A sufficient number of accident prevention signs or tags and padlocks, or other similarly effective means will be provided and used. Signs, tags or padlocks, will have means by which they can be readily secured to the controls.
4. If the machinery or equipment must be capable of movement during this period in order to perform the specific tasks, the employees will minimize the hazard of movement by the use of extension tools (e.g. extended swabs, brushes, scrapers) or other methods or means. Employees will be made familiar with the safe use and maintenance of such tools by thorough training.

## **MACHINES, MISCELLANEOUS**

1. When the periphery of the blades of a fan are less than seven (7) feet above the ground, floor, or working level, the blades will be guarded. The guard will have openings no larger than one-half (1/2) inch.
2. Each washing machine and dryer will be equipped with an interlocking device that will prevent the inside cylinder from moving when the outer door on the case or shell is open, and will also prevent the door from being opened while the inside cylinder is in motion.
3. The in-running sides of power operated rollers or cylinders on printing type presses will be provided with a guard so arranged that the material can be fed to the rollers without permitting the operator's fingers to be caught between the rollers or cylinders.
4. Power-driven Guillotine Paper Cutters will be provided with:
  - a. A non-repeat device that will automatically lock the clutch mechanism into place so that the cutter cannot make a second stroke until the hand lever is again moved into the starting position.
  - b. A starting device that requires the simultaneous action of both hands during the cutting motion of the knife.
  - c. Simultaneous operation of paper cutters by more than one operator will not be permitted or required by the employer.
5. Hand powered paper cutters will have a safety bar to prevent fingers holding paper from coming into contact with the blade. The blade will also be adjusted so as to not fall when released.
6. Horizontal tilting type mixers will be provided with a cover over the top of the mixer. An interlocking device shall be provided so that power cannot be applied to the agitators unless the mixer is in operating position, with cover in place. The mixer when tilted will be operated with the cover open only if equipped with an electrical push button when operating the mixer with the cover open; the button will be located so that the operator cannot reach into the mixer while pressing the button.

## **METALWORKING EQUIPMENT**

1. Metal lathe faceplates and chucks should have no projection; or circular shields should be installed to prevent accidental contact with projections. Safety type lathe dogs, with no projecting setscrews should be used. Splashguards should be provided to protect the operator and the working area from cutting or cooling



- fluids thrown from the work. Pipe guards or other enclosures should be installed to prevent injury from stock projecting from turret lathes or automatic screw machines.
2. Milling machines should have a transparent shield over the cutter that will prevent accidental contact with the cutter and serve also as a chip guard. Guards may be adjustable.
  3. Drill presses should have the spindle enclosed as completely as possible. The chuck will be tightened securely with the key provided. The key will not be left in the chuck. The work will be firmly clamped and a center punch used to score the material before the drilling operation is started. If the work should slip from the clamp, no attempt will be made to stop it with the hands.
  4. Circular metal saws should be equipped with a hood guard that automatically adjusts itself to the thickness of the stock being cut.
  5. Band saws will have upper and lower wheels completely enclosed with sheet metal or heavy small-mesh screen. The portion of the saw blade between the upper saw guide and the upper saw blade wheel must be completely enclosed with a sliding fixture attached to the guide.
  6. Mechanical power and foot and hand power squaring shears will be provided with a guard which will prevent the hands of the operator from entering the zone traveled by the knives of the shears while they are in motion. This guard may be a fixed barrier, set not more than three-eighths inch above the table or a self-adjusting barrier with a limit of three-eighths inch above the table, but that will automatically rise to the thickness of the material. Automatic clamps of "hold-downs" on squaring shears, when cutouts are filled in with plastic or screen, will be acceptable as a guard. Hydraulic or pneumatic hold-downs will be guarded by U shaped guards coming down to not less than three-eighths inch of the table or other equivalent method.

### **POWER TRANSMISSION EQUIPMENT**

1. Guards will be of proper design and will be adequately secured in place. Guards will enclose or otherwise guard the power transmission equipment to protect the employee against exposure to the dangerous moving parts.
2. Where a guard or enclosure is within 2 inches of moving parts, openings through the guard will be small enough to prevent the passage of any object one-half inch in diameter.
  - a. Where a guard or enclosure is within 4 inches of moving parts, openings through the guard will be of such size as will preclude the passage of any object greater than one-half inch in diameter.

- b. Where a guard is located between 4 inches and 15 inches from moving parts, the maximum opening will be of such size as will preclude the passage of any object greater than 2 inches in diameter.
  - c. Standard railing guards will be placed not less than 15 inches nor more than 20 inches from any moving parts provided.
  - d. The use of nylon mesh or materials of equivalent strength with holes not exceeding 1/2 inch to modify an existing substandard fan guard is acceptable, provided the combination of the two provides adequate protection and the mesh cannot be pushed into the danger zone during normal use.
3. Any part of a belt and pulley drive, involving the use of flat, crowned or flanged pulleys, which is 7 feet or less above the floor or working level will be guarded. **Exceptions:** fan belt drives on motor vehicles used primarily for the transportation of men and materials and internal combustion engine fan belt drives guarded by side screens extending to the shoulder of the engine block.
4. All exposed parts of shafting seven feet or less above floor or other working level will be guarded. Transmission shafting under benches will also be guarded.
5. Any exposed part of a flywheel or other dangerous moving power transmission equipment 7 feet or less above the floor or working level will be guarded.
6. All gears and sprockets wherever located (except as provided for in "c") will be guarded by any one of the following methods:
- a. By complete enclosure.
  - b. With a standard shield guard surrounding the gears or sprockets at least 7 feet high and extending at least 6 inches above the mesh point of the gears or the contact point of the chain and sprocket.
  - c. Gears and sprockets in inaccessible locations need not be guarded as provided for in (a) and (b) provided they are equipped with extension lubricant fittings or systems which may be serviced from an accessible location which is at least 2 feet from the mesh point of the gears, or contact point of the chain and sprocket.
7. Where oiling or greasing must be done, openings with hinged or sliding covers will be provided. Where machines or machine parts must be lubricated while in motion, the lubricant fittings will be located at least 24 inches from the dangerous moving parts unless such parts are guarded and the fittings are piped outside the guard.

## **WOODWORKING EQUIPMENT**

1. Circular hand-fed rip and cross-cut table saws will be guarded by a hood which will completely enclose that portion of the saw above the material being cut. The hood and mounting will be arranged so that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut. All exposed parts of the saw blade under the table will be guarded. Each hand-fed circular rip and crosscut saw will be furnished with a spreader. Each top-mount circular rip saw will be provided with anti-kickback fingers or dogs.
2. A hood or guard will be used that will cover a self-feed circular rip saw to at least the depth of the teeth. The hood or guard need not rest upon the table nor upon the material being cut, but will extend to within one-half inch of the stock being worked. The feed rolls or star wheels will be enclosed by a cover coming down to within one-half inch of the stock being worked. A spreader will be provided except where a roller wheel is provided on the back of the saw. Every self-feed circular rip saw will be equipped with an anti-kickback device installed on the in-feed side.
3. Swing saws will be provided with a hood that will completely enclose the upper half of the saw, the arbor ends and the point of operation at all positions of the saw. Its hoods will be so designed that it will automatically cover the lower portion of the blade, so that when the saw is returned to the back of the table, the hood will rise on top of the fence; and when the saw is moved forward, the hood will drop on top of and remain in contact with the table or material being cut. Each saw will be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel. Limit stops will be provided to prevent the saw from swinging beyond the front or back edges of the table. A latch or equivalent device should be provided to catch and retain the saw at the rear of the table and to prevent its rebounding.
4. The upper hood of a radial saw will completely enclose the upper portion of the blade down to a point that will include the end of the saw arbor. The sides of the lower exposed portion of the blade will be guarded to full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with stock being cut. When radial saws are used for ripping, a spreader and non-kickback fingers will be provided. An adjustable stop will be provided to prevent the forward travel of the blade beyond the front end of the table. There shall be a device that will return the saw automatically to the back of the table when released.
5. All portions of the saw blade will be enclosed or guarded on band saws except the working portion of the blade between the bottom of the guide rolls and the table. The outside periphery of the enclosure will be solid. The sides of the band wheels will be either enclosed by solid material or wire mesh or perforated metal.

6. Jointers will be equipped with cylindrical cutting heads. A suitable guard that will automatically adjust itself to cover that portion of the cutting head not protected by material in process will be used. The exposed portion of the cutting head at the rear of the fence will be covered and, where knives are exposed beneath the table, they will be guarded. A safety pusher device of suitable design will be provided and used.
7. Knife heads of wood shapers and cutting heads of other machines, not automatically fed, will be guarded or templates, jigs or fixtures which will enable the part to be processed without exposing the operator's hands to the danger zone will be used. Double-spindle shapers will be provided with a spindle starting and stopping device for each spindle. Single cutter knives in shaper heads will not be used. Knives will balance each other by weight and will be so mounted in the head as to revolve at full speed without dangerous vibration. Knife heads of woodworking machines, which are automatically fed, such as stickers, planers, molders and matchers, when exposed to contact, will be guarded. The feed rolls will be enclosed, except that part as may be necessary to feed stock.
8. Sanding machines will be guarded as below:
  - a. Feed rolls of self-feed machines will be protected with a guard to prevent the hands of the operator from coming into contact with the in-running rolls at any point.
  - b. Disk sanders will have the exhaust hood or other guard so arranged as to enclose the revolving disk, except for that portion of the disk above the table.
  - c. Belt sanders will be provided with guards at each nip point where the sanding belt runs on to a pulley. The unused run of the sanding belt shall be guarded against accidental contact.

## *SECTION II*

### *CHAPTER 18 - MATERIAL HANDLING EQUIPMENT*

#### **GENERAL**

1. Whenever equipment is used to elevate employees for work positioning, a safe work platform having sufficient space to accommodate the employees and material being elevated, but having not less than 24 inches by 24 inches working space, will be used. The platform will be equipped with 42-inch guardrails with mid-rails on all open or exposed sides, and 4-inch toe-boards will be installed if work is performed 4 feet or more above other workmen or passageways. Where the nature of the work prohibits the use of guardrails, a safety harness with a lanyard not more than 4 feet in length will be used.

Operating rules whenever elevating personnel:

- a. Use a securely attached safety platform.
  - b. Make sure the lifting mechanism is operating smoothly.
  - c. Place mast vertical and never tilt forward or rearward when elevated.
  - d. Place truck in neutral and set parking brake.
  - e. Lift and lower smoothly and with caution.
  - f. Watch for overhead obstructions.
  - g. Keep hands and feet clear of controls other than those in use.
  - h. Never travel with personnel on the work platform other than to make minor movements for final positioning of the platform.
2. Every dock plate will be constructed and maintained with strength sufficient to support the load carried thereon. Dock plates will be secured in position when spanning the space between the dock and the vehicle. When dock plates are secured in position, the end edges of the plate will be in substantial contact with the dock and with the vehicle bed in such a manner as to prevent rocking, or sliding.
  3. Pallets will be constructed and maintained with strength adequate for the loads being handled. Unsafe and defective parts will be repaired or replaced.

4. Cargo, materials or equipment found sufficiently broken or damaged as to afford a hazard will be immediately repaired or will be set aside at a safe distance away from the working area so that it can be repaired.
5. Mobile equipment will be refueled only at locations specifically designated for that purpose.

### **AERIAL LIFTS**

This section applies to aerial devices used to elevate personnel to job sites above ground.

1. Aerial baskets or platforms will not be allowed to rest on or against any structure when workmen are on the platform or in the basket while in an elevated position.
2. Lift controls will be tested in accordance with the manufacturers' recommendations or instructions each day of use prior to use to determine that such controls are in safe working condition.
3. Only authorized persons will operate an aerial lift.
4. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift will not be permitted.
5. Employees will always stand firmly on the floor of the basket and will not sit or climb on the edge of the basket or use planks, ladders or other devices as a working position.
6. Boom and basket load limits specified by the manufacturer will not be exceeded.
7. The braking systems will be set and when outriggers are used, they will be positioned on pads or a solid surface. Wheel chocks will be installed before using an aerial lift on an incline provided they can be safely installed. All outriggers will be equipped with individual locks at the outriggers.
8. The insulated portion of an aerial lift will not be altered in any manner that might reduce its insulating value.
9. An aerial lift will not be moved when the boom is elevated in a working position with men in the basket.
10. Lower level controls will not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.
11. Each aerial lift will display a permanent plate showing:
  - a. Make, model and manufacturer's serial number.
  - b. Rated capacity.

- c. Platform height.
  - d. Maximum recommended operating pressure of hydraulic.
  - e. Caution or restrictions of operation.
  - f. Operating instructions.
  - g. Manufacturer's rated line voltage.
12. Preventive maintenance programs will be established. Any unsafe conditions disclosed by the inspection will be corrected promptly. Only designated persons will do adjustments and repairs.

### **CABLES, CHAINS AND ROPES**

1. The safe working load recommended by the manufacturer for specific identifiable cables will be followed; provided that a safety factor of not less than five (5) is maintained. The following also apply to cables:
- a. Protruding ends of strands in splices will be covered or blunted.
  - b. Where "U" bolt wire rope clips are used to form eyes, the "U" bolt will be applied so that the "U" section is in contact with the dead end of the rope.
  - c. Wire ropes will not be secured by knots.
  - d. An eye splice made in any wire rope will have not less than three full tucks.
  - e. Except for eye splices in the ends of the wires, each wire rope used in hoisting or lowering shall consist of one continuous piece without knot or splice.
2. The following applies to all chains:
- a. All chains, including end fastenings, will be given a visual inspection before being used on the job. A thorough inspection of all chains in use will be made every three months.
  - b. Each chain will bear an identification of the month in which it was thoroughly inspected.
  - c. The thorough inspection will include inspection for wear, defective welds, deformation and increase in length or stretch.
  - d. Chain slings will be removed from service when, due to strength, the increase in length of a measured section exceeds five (5) percent and when a link is bent, twisted, or otherwise damaged.
  - e. All repairs to chains will be made under qualified supervision. Links or portions of the chain found to be defective will be replaced by links

having proper dimensions and made of material similar to that of the chain.

- f. A load will not be lifted with a chain having a kink or knot in it. Chains are not to be shortened by bolting, wiring, or knotting.
3. The manufacturer's recommendations will be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks.
4. Safe working loads of manila rope and rope slings are determined by size of rope and angle of sling. Higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

Where synthetic fiber ropes are substituted for manila ropes of less than three (3) inches circumference, the substitute will be of equal size. In making such a substitution it will be ascertained that the inherent characteristics of the synthetic fiber are suitable for the intended service of the rope.

Rope which shows evidence of wear or deterioration will be carefully examined and will not be used if there is a question of its withstanding the rated safe work load.

### **FORK LIFTS**

1. All name plates and model number, type designation and load capacity markings on forklifts will be maintained in a legible condition.
2. Major modifications and structural changes to fork lifts that affect the capacity and safe handling of the vehicles will not be performed by the user without prior written approval from the manufacturer unless the modification is designed, manufactured and installed in accordance with recognized good engineering principles. The capacity, operation and maintenance instruction plates will be changed accordingly.
3. Every forklift will be fitted with an overhead guard unless the following conditions are met:
  - a. The vertical movement of the lifting mechanism is restricted to a maximum elevation of 72", or the truck will operate in an area where the bottom of the top tiered load is not higher than 72" and the top is not more than 120" from the ground when tiered.
  - b. The operator is protected from all overhead hazards other than falling loads.



4. Only forklifts approved for the exposure may be operated in atmospheres containing hazardous quantities of combustible vapors and dusts.
5. When forklifts operate in areas where general lighting is less than 2 foot-candles per square foot, directional lighting will be provided on the truck.
6. Electric hand and hand/rider trucks will have the steering tongue so installed that the brakes will be applied and the current to the drive motor will be cut off when the handle is within 15N of a vertical or horizontal position.
7. When overhead protection is required, forklifts will have overhead guards of strength adequate to support impact test loads as specified by ANSI Standard B56.1-1969.

Guards that are of a design, which has been so tested, will be identified by a metal tag permanently attached to the canopy in a position where it may be easily read from the ground. This tag will be clearly marked with the impact test load, expressed in foot-pounds, to which guards of the same design have been tested.

Guards will be constructed in a manner that does not interfere with good visibility, but openings in the top should not exceed 6 inches in one of the 2 dimensions, width or length. Guards will be large enough to extend over the operator under all normal circumstances of operation.

Fork lifts operated by seated operators will have not less than 39 inches of clear vertical space from the point of maximum depression of the operator's seat to the underside of the guard. Lift trucks operated by standing operators will have not less than 74 inches of clear vertical space between the platform and the underside of the guard.

8. The rated lifting capacity of all fork lifts will be displayed at all times on the vehicle in such a manner that it is readily visible to the operator.
9. Every forklift will be equipped with:
  - a. Brakes or other effective devices adequate to bring them to a complete stop while fully loaded.
  - b. A parking brake or other effective device to prevent the vehicle moving when unattended.

## **HOISTS**

1. The safe working load of the overhead hoist, as determined by the manufacturer, will be indicated on the hoist. This safe working load will not be exceeded.
2. The supporting structure to which the hoist is attached will have a safe working load equal to that of the hoist.
3. The support will be arranged so as to provide for free movement of the hoist and will not restrict the hoist from lining itself up with the load.
4. The hoist will be installed only in locations that will permit the operator to stand clear of the load at all times.
5. Air hoists will be connected to an air supply of sufficient capacity and pressure to safely operate the hoist. All air hoses supplying air will be positively connected to prevent their becoming disconnected during use.

## **OPERATOR RULES AND TRAINING**

Every employee using forklifts, haulage vehicles, aerial lifts or other such specialized material handling equipment will fully comply with the requirements of this section. Copies of these requirements will be posted at places frequented by employee operators. They shall also be provided to each operator at the time of initial assignment and once each year.

1. Only drivers authorized by the employer and fully trained in the safe operations of these vehicles will be permitted to operate them.
2. Drivers will check the vehicle at least once per shift, and if found to be unsafe, the matter will be reported immediately. The vehicle will not be put in service again until it has been made safe. Attention will be given to the proper functioning of tires, horn, lights, battery, controller, brakes, steering mechanism and the lift system.
3. Vehicles will not exceed the authorized or safe speed, always maintaining a safe distance from other vehicles.
4. No riders will be permitted on vehicles unless provided with adequate riding facilities.
5. Stunt driving and horseplay are prohibited.
6. Loaded vehicles will not be moved until the load is safe and secure.

7. When leaving a vehicle unattended, the power will be shut off, brakes set, and the lift mechanism left in the down position. When left on an incline, the wheel will be blocked.
8. Operators will look in the direction of travel and will not move a vehicle until certain that all persons are in the clear.
9. Vehicles will not be operated on floors, sidewalk doors or platforms that will not safely support the loaded vehicle.
10. The following additional rules will apply to forklifts:
  - a. Employees will not ride on the forks of lift trucks.
  - b. The forks will always be carried as low as possible, consistent with safe operation.
  - c. Extreme care will be used when tilting loads.
  - d. Employees will not be allowed to stand or work under the elevated portion of any industrial truck, loaded or empty, unless effectively blocked to prevent it from falling.
  - e. The width of one tire on the forklift shall be the minimum distance maintained from the edge of any elevated dock or platform.
11. The following additional rules apply to grass cutting tractors:
  - a. Where possible, avoid operating the tractor near ditches, embankments and holes.
  - b. Reduce speed when turning, crossing slopes and on rough, slick, or muddy surfaces.
  - c. Stay off slopes too steep for safe operation.
  - d. Watch where you are going.
  - e. Do not permit others to ride.
  - f. Operate the tractor smoothly--no jerky turns, starts, or stops.
  - g. When tractor is stopped, set brakes securely and use park lock if available.

## *SECTION II*

### *CHAPTER 19 - PERSONAL PROTECTIVE EQUIPMENT*

#### **GENERAL**

1. Protective equipment for eyes, hearing, face, head and extremities, protective clothing, respirators, and protective barriers will be provided and used wherever it is necessary to protect workers from the potential chemical or physical hazards which may be present in their workplace. This equipment prevents worker injury by preventing the absorption or inhalation of chemical hazards and physical contact with physical, radiological or chemical hazards.
2. Where employees provide their own protective equipment, the department will be responsible to assure its adequacy, including proper maintenance and sanitation of such equipment.
3. Protective equipment will meet the following minimum requirements:
  - a. Provide adequate protection against the hazard(s) for which they were designed to prevent exposure.
  - b. Reasonably comfortable when worn under the designated conditions.
  - c. Will fit snugly, comfortably, and not interfere with the movements of the worker. Safety equipment worn too tight will not protect the worker for the hazard(s).
  - d. Made of durable materials.
  - e. Capable of being cleaned and disinfected.
4. Personal protective equipment will comply with the American National Standards Institute, Bureau of Standards, National Institute of Occupational Safety and Health (NIOSH) or other recognized authorities. This applies to all safety equipment covered in this Manual.
5. Protective devices will be maintained in a sanitary and reliable condition at all times. Safety devices, including protective clothing worn by employees, will not be interchanged between employees until properly cleaned. Where it has been determined that ordinary cleaning will not remove the risk of infection, additional precautionary measures may be required.

## **BODY**

1. Body protection may be required for employees whose work exposes parts of their body, not otherwise protected as required by other sections of this chapter, to hazardous substances or objects.
2. Clothing and protective clothing appropriate for the work being done will be worn at all times. This may include laboratory coats, raincoats, aprons, full jump suits, bright reflective vests, etc.
3. Clothing saturated or impregnated with flammable liquids, corrosive substances, irritants, asbestos or oxidizing agents will be removed and not worn until properly cleaned.

## **HEARING**

1. Wherever it is not feasible to reduce the noise levels or duration of exposure to those specified in Chapter 11, ear protection devices would be provided by the University and worn by employees.
2. All supervisors whose employees are engaged in hazardous noise operations or who work in hazardous noise areas, will be responsible for insuring workers wear approved hearing protection devices (ear plugs or muffs).
3. Each employee must wear appropriate hearing protection whenever exposed to hazardous noise or working in a designated hazardous noise area. Workers can estimate a hazardous noise area if they find it difficult to hear a loud voice at a distance of 1 foot.
4. Ear muff-type hearing protection devices are generally recommended. However, earplugs may be worn if fitted by competent persons. Risk Management Services can provide assistance in this area.
5. Disposable earplugs may be worn if the worker is not normally assigned to a hazardous noise area. Temporary earplugs may be obtained from several sources. Plain cotton rolled into a ball is not acceptable hearing protection.
6. Hearing protection devices should be washed and inspected on a periodic basis. Earplugs can be washed using any dish soap and water and allowing them to dry before use or storing. If earplugs are not cleaned properly, they may cause ear infections or medical problems. The rubber seals on earmuffs should be inspected periodically to insure they are pliable and clean. The hard part of the earmuff and rubber components can be cleaned in the same manner as the plugs.  
**REMEMBER TO DRY THE PLUGS AND MUFFS BEFORE USE OR STORAGE.**

## EYE AND FACE

1. Employees and students working in locations where eye hazards are present due to flying particles, hazardous substances, or injurious light rays, that are inherent in their working environment will be provided with eye protection. This eye protection may be in the form of goggles, face shields, or shields/screens.
2. The University will provide eye and face protection for employees. Students may be required to provide their own eye protective devices if not available from the University. Both the employee and student will wear eye protection in eye hazardous areas.
3. All campus visitors who enter eye hazardous areas will be provided with proper eye protection for their visit only.
4. Face and eye protective devices will be cleaned on a periodic basis (weekly) and inspected to insure equipment is in good repair. Devices in need of repair will not be used until defects are corrected.
5. Protection will be taken against radiant energy when welding, burring or cutting. The use of welding type filter lenses will conform to the following shade specifications:

### Arc Welding:

over 400 amps -	Shade 14
200-400 amps -	Shade 12
75-200 amps -	Shade 10
30-75 amps -	Shade 8
up to 30 amps -	Shade 6

### Welding & cutting:

Heavy -	Shade 8
Medium -	Shade 6
Light -	Shade 5/4
Light brazing -	Shade 5/4

6. Full face shields, chemical splash goggles, or hoods with shields will be worn when exposed to or handling caustics, acids, or cryogenic liquids.
7. In laboratories it may at times be necessary to perform demonstrations involving potentially hazardous operations so that students may observe certain reactions. Transparent shields or barricades may be used for this purpose. However, even if a shield or barricade is utilized, the demonstrator and students are at an increased risk, and must therefore wear adequate personal protective equipment; i.e. eye and face protection and/or aprons.

8. The wearing of contact lens increases the wearer's chance of injury. This is due to the fact that contact lenses retain the chemical in the wearer's eye for a longer period of time. Therefore, the wearing of contact lenses is not recommended in eye hazardous areas. If contact wearers decide to wear their contacts, they must wear eye goggles, not safety glasses.

### **FOOT**

1. Appropriate foot protection will be required for employees who are exposed to foot injuries from hot, corrosive, poisonous substances, falling objects, crushing or penetrating actions, which may cause injuries, or who are required to work in abnormally wet locations.
2. Footwear that is defective or inappropriate, to the extent that its use creates the possibility of injury, will not be worn.
3. Full coverage type safety, work or dress shoes must be worn in all shops, laboratories and other areas that are designated as foot hazardous areas. Open type, high heel, soft leather or canvas shoes will not be worn in these areas.

### **HANDS**

1. Protection for the hands may be required for employees and students whose work involves unusual and excessive exposure to cuts, burns, cold, heat or corrosive, irritating, allergenic or other harmful substances. The University will provide all such required hand protection.
2. The department will exercise great care in the supervision of employees with relation to the wearing of gloves when working around machinery. The wearing of gloves by a machine operator is not advisable since the gloves may become entangled in moving parts. Drivers when operating equipment where the worker requires protection from vibration may wear gloves.
3. Employees performing industrial work should equip themselves with general-purpose gloves for hand protection against various hazards. Cotton or fabric gloves are suitable for protection against dirt, slivers, chafing or abrasions. Leather gloves are more effective in resisting moderate heat, chips and rough objects. Special purpose gloves such as chrome-tanned leather gloves for welders, rubber, chemical-resistant gloves, etc., should also be considered.
4. Generally, the recommended glove types for chemicals are: vinyl plastic, natural latex and neoprene. Consult the manufacturer's specifications of gloves, as each glove is not satisfactory for all chemicals.

## **HEAD**

1. Employees working in areas where there is a possible danger of head injury from impact, falling or flying objects or electrical shock and burns, will be protected by protective helmets.
2. Helmets for protection against impact and penetration of falling and flying objects will meet guideline in ANSI Standard, Industrial Head Protection. Helmets for protection against electrical shock will meet applicable ANSI standards.

## **LIFELINES, SAFETY BELTS AND NETS**

1. Approved safety belts and lifelines will be worn by employees who work in excess of 15 feet from the ground or floor and no other protective device is available to prevent falls. The anchor end of the lifeline will be secured no lower than the worker's waist and at a horizontal distance not to exceed six (6) feet from the worker. Where the waist level connection is not possible, connections at worker's foot level may be permitted, provided adequate risk control procedures are followed. Lifelines will be secured to a substantial member of the structure or to securely rigged lines, using a positive-descent control device.
2. If worker's duties require horizontal movement, rigging will be used so that the attached lifeline will slide along with him.
3. Lifelines and safety belts will only be used for employee safety. Any lifeline or safety belt used in an actual emergency will be removed from service and never used as a lifeline again.
4. Lifelines will be capable of supporting a minimum dead weight of 5400 pounds.
5. Lifelines subject to excessive fraying or rock damage will be protected and have a wire rope center.
6. All safety belt and lifeline hardware will be dropforged steel, or equivalent.
7. Where the work elevation is 25 feet or more above the floor or ground and when the use of safety belts and lifelines are impractical, safety nets may be used.



# **RESPIRATORY PROTECTION**

## **Introduction**

A respirator is a personal protective device used to protect the wearer from inhalation of harmful levels of airborne contaminants. The use of respirators is acceptable only when engineering or work practice controls (e.g., local exhaust ventilation) are inadequate or not feasible, or while these controls are being designed or constructed. Respirators must be carefully selected, properly fitted, regularly inspected and cleaned, and repaired when broken. Wearers must be medically evaluated for respirator use and trained in the appropriate use, care, maintenance and limitations of respiratory protective devices. Work area environments must be periodically evaluated to determine the appropriate level of respiratory protection necessary.

## **Applicable Regulations**

29 CFR 1910.134 - OSHA Respiratory Protection

NOTE: More specific respiratory protection requirements may be contained within substance-specific or operation-specific regulations (e.g., asbestos or lead standards)

## **Summary of Requirements**

- Respirator users are to be evaluated by a physician to determine if they are physically able to perform work while using a respirator.
- Respirators shall be selected based upon the contaminant hazards presented to the wearer.
- Respirators are to be approved by the National Institute for Occupational Safety and Health (NIOSH) for the contaminant(s) and situation(s) to which the wearer will be exposed.
- All negative pressure respirators shall be fit-tested at least annually (semi-annually if required by more restrictive substance-specific standards, i.e., asbestos, lead), and shall be fit-checked by the wearer before each use.
- Respirators shall be maintained and repaired in accordance with manufacturers' specifications. Storage shall be appropriate to protect against damage caused by dust, sunlight, temperature extremes, moisture, chemicals, and physical/malformation conditions.
- Compressed air used for supplied air respirators shall comply with the air quality requirements for Grade D Breathable Air described in CGA Commodity Specification G-7.1-1989.
- The respiratory Protection Program shall be reviewed annually with modifications implemented as necessary.

## **Training**

Training shall be provided to all users of respiratory protective equipment to include:

- Selection of respirators;
- Inspection, maintenance, storage and cleaning of respirators;
- Respirator limitations and emergency procedures;
- Methods of donning, adjusting and fit-checking (hands-on);
- Respiratory hazards.

## **Record keeping**

Written records shall be maintained for training, fit-testing, medical examinations and work area surveillance (monitoring) for at least 30 years following termination of employment for any individual wearing a respirator.

## **Written Program**

A written program describing the selection and proper use of respirators shall be available in the facility.

## **University Resources**

Risk Management Services (X2109)

(Training, fit-testing, work area surveillance, respirator selection)

## *SECTION II*

### *CHAPTER 20 - SANITATION*

#### **FOOD SANITATION**

1. Food and drink for human consumption must not be stored or consumed in an area where there is possibility of contamination by toxic material or other substance injurious to health. Labs or shops are examples of such areas.
2. All student and other recognized organizations selling food to the public on campus are required to meet the applicable standard of this section and such other rules established by the University.
3. All campus food handling operations selling to the public are subject to inspection and enforcement by the Risk Management Services Office (RMS).
4. All food will be from sources approved or considered satisfactory by the health authority, and will be clean, wholesome, free from spoilage, free from adulteration and misbranding and safe for human consumption.
5. The floor surfaces in all rooms in which food for sale is stored or prepared, will be of such construction and material as to be easily cleaned. They will be smooth, in good repair and kept clean. The walls and ceilings of all kitchens will be of light-colored, smooth, washable material and kept clean.
6. All restaurants will be so equipped, maintained and operated as to control the entrance, harborage and breeding of vermin, including flies. When flies or other vermin are present, effective control measures will be instituted for their control or elimination.
7. Ventilation will be provided for dissipation of disagreeable odors and condensation in all rooms of a restaurant where food or beverages are prepared, stored or served. At or above all cooking equipment such as griddles, ovens and deep-fat fryers, mechanical ventilation is required.
8. Hot and cold running water under pressure will be provided in all areas in which food is prepared or utensils are washed. The water supply will be adequate and of a safe, sanitary quality from an approved source.
9. Toilet facilities will be provided convenient to the employees of the premises.
10. Hand washing facilities, in good repair and clean, will be provided for employees within or adjacent to toilet rooms and within food preparation areas and will be equipped with hot and cold running water. Hand washing detergent or soap and sanitary towels or hot-air blower will be provided at hand washing facilities in

- permanently installed dispensing devices. Common towels are prohibited. Legible bilingual signs will be posted in each toilet room and over each hand washing sink reminding employees to wash their hands before returning to work.
11. All restaurants will have adequate facilities for the cleaning and sanitizing of all multiuse utensils.
  12. All multiuse eating and drinking utensils will be washed in hot water with an effective detergent until thoroughly clean and then immersed for at least one-half minute (30 seconds) in clean hot water, minimum temperature of 170° F, or immersed in a solution containing a bactericidal chemical approved for this use. The final rinse temperature for mechanical washing units will be 180° F.
  13. All food waste and rubbish containing food waste, which is kept inside the dining facilities prior to disposal, will be kept in tight, non-absorbent containers covered with tight fitting lids.
  14. All food or beverage will be prepared, stored, displayed, dispensed, placed, and served in such a fashion so that it is protected from dust, flies, vermin, unnecessary handling or other contamination. Food that is transported from a restaurant or commissary where it has been prepared to any different site will be protected from contamination in transit.
  15. Displays of unpacked foods, arranged for self-service to the public, will be effectively shielded so as to intercept a direct line between the customer's mouth and the food being displayed.
  16. All readily perishable food or beverage, capable of supporting rapid and progressive growth of microorganisms, which can cause food infections or food intoxications, which are intended to be help prior to processing, or are to be reused on the premises, will be maintained at or below a temperature of 41 F. All food stored for reuse will be marked with the date and time of storage and reused within a reasonable period of time. Prepared meats will be cooked to an internal temperature of 165 degrees or higher.
  17. All readily perishable food or beverages, when being maintained hot for serving or while being served hot, will be kept in devices that maintain the temperature of all portions of the food or beverage above 140° F.
  18. No article of food or beverage, which has been previously served to any person or returned from any table, shall be used in the preparation of other food or beverages for human consumption.
  19. No live animal will be kept or allowed in any room where food or beverage is prepared, stored, kept or served. This does not apply to dogs being used by the blind.

20. Vending machines, which dispense food or beverage, will be kept in a sanitary condition at all times. Food items will be packaged or stored in protective containers.
21. All persons preparing, serving or handling food will wear clean, washable other garments or other clean uniforms and will keep their hands clean at all times while engaged in handling food, beverage or utensils. All such persons will wash their hands and arms with soap or detergent and warm water before commencing work, after using toilet facilities, before returning to work and at such times as necessary to prevent contamination of food. Wearing of fingernail polish will not be allowed for food handlers. To prevent harborage of bacteria, food handlers will be allowed to wear only one ring.
22. All such persons will wear hairnets, caps, headbands, or other suitable coverings to confine their hair when reasonably required to prevent the contamination of foods, beverages or utensils. Whenever practical, persons serving food will use tongs or other implements rather than their hands.

### **INSECT, RODENT AND VERMIN CONTROL**

1. Every enclosed area on campus will be constructed, equipped and maintained in such a manner as to prevent the entrance or harborage of insects, rodents and vermin of any kind.
2. Effective measures intended to minimize the presence of rodents, flies, cockroaches, and other insects on the premises shall be utilized. The premises shall be kept in such condition as to prevent the harborage or feeding of insects or rodents.
3. Openings to the outside shall be effectively protected against the entrance of rodents. Outside openings shall be protected against the entrance of insects by tight fitting, self-closing doors, closed windows, screening, controlled air currents or other means. Screen doors shall be self-closing, and screens for windows, doors, skylights, transoms, intake and exhaust air ducts, and other openings to the outside shall be tight fitting and free of breaks. Screening material shall not be less than 16 mesh to the inch.
4. Whenever necessary to control insects, rodents, or vermin, fumigation or spraying of insecticide will be performed by certified pesticide handlers. Preparation of areas needing treatment will be done prior to any spraying or fumigation of insecticides.

## **RESTROOMS**

1. Restrooms, separate for each sex, will be provided at all locations at which workers are regularly employed.
2. The requirements of this section do not apply to mobile crews provided employees at these locations have immediately available transportation to nearby facilities.
3. Restroom facilities will be kept clean, maintained in good working order and will be accessible at all times.
4. Each restroom will be equipped with an adequate number of toilet facilities meeting the following requirements: NOTE--occupational laws contain specific requirements on the number of facilities needed per employee.
  - a. Each toilet will occupy a separate compartment, which will be equipped with a door and door latch. The door and the partitions between fixtures will be sufficient to assure privacy.
  - b. An adequate supply of toilet paper with holder will be provided for every water closet.
  - c. Every toilet will have a hinged open-front type seat made of substantial material having a nonabsorbent finish.
  - d. Toilet room floors will have a smooth, hard, nonabsorbent surface that extends upward onto the walls at least five inches.
5. Each restroom will contain an adequate number of washing facilities for maintaining personal cleanliness. These facilities will be reasonable accessible, in a sanitary condition, and be maintained in good working order. Restroom washing facilities will be equipped as described below:
  - a. Each washing facility will be provided with hot and cold running water, or with tepid running water, and with suitable cleansing agents.
  - b. Clean, individual hand towels, or sectioned towels, of paper or warm-air blowers, will be provided. Warm-air blowers will provide warm air at a minimum temperature of 90 F.
  - c. Receptacles will be provided for the disposal of used paper towels.

6. Where showering is required:
  - a. Separate shower rooms with hot and cold water will be provided for males and females.
  - b. Liquid soap or other appropriate cleansing agents convenient to the shower will be provided. This does not include recreational/sporting facilities unless approved by that department.
  - c. All persons who use showers should be provided with individual clean towels (work related only).
7. Whenever employees are required to change from street clothes into protective clothing, change rooms equipped with storage facilities for street clothes and separate storage facilities for the protective clothing will be provided.

### **WASTE DISPOSAL**

1. Any receptacle used for solid or liquid waste or refuse will be constructed so that it does not leak and may be thoroughly cleaned and maintained in a sanitary condition. The number, size and locations of such receptacles will encourage their use and not result in overfilling.
2. Wastebaskets and waste containers must be constructed of easily cleanable, fire resistant type materials and will be kept in a sanitary condition.
3. All sweepings, solid or liquid waste and refuse; will be removed in such a manner as to avoid creating a menace to health and as often as necessary or appropriate to maintain the University in a sanitary condition.
4. Receptacles containing food waste will be emptied not less than once each working day and will be maintained in a clean and sanitary state. They will be provided with solid, tight-fitting covers unless sanitary conditions can be maintained without the use of covers.

### **WATER SUPPLY**

1. Potable water in adequate supply will be provided in all places of employment for drinking, washing and bathing.
2. All sources of drinking water will be maintained in a clean and sanitary condition. Drinking fountains and potable drinking dispensers will not be located in rooms with toilet facilities.
3. Drinking fountain surfaces that become wet during operation will be constructed of materials impervious to water and resistant to oxidation. The nozzle of the fountain will be located at an angle such that water returns to the bowl without

contacting the nozzle orifice. A guard will be provided prevent the user from coming in contact the nozzle. The drain from the bowl of the fountain will not have a direct physical connection with a waste pipe unless the drain contains a trap.

4. All water supplied to the University is purchased from the City of Denton and is tested on a regular basis by the City.
5. Non-potable water will not be used for drinking, washing, swimming, or bathing.



## *SECTION II*

### *CHAPTER 21 - SHOP SAFETY*

#### **SHOP SAFETY RULES**

1. Personnel will not be permitted to operate any machinery until they have been instructed as to the hazards and the proper operation of such equipment and the use of protective devices.
2. All floors will be kept in good repair and will be free from protruding nails, splinters, holes, unevenness and loose boards. Effective means to prevent employees from slipping on the floors will be provided.
3. Aisles will be of sufficient width to permit uncrowded and safe passage of personnel, trucks or material. Where practicable, it is recommended that lines be painted on the floor or some similar method used to mark aisles within a work area.
4. During all working periods each working area, operation, or process will be adequately lighted and harmful glare minimized.
5. Tools, machines, devices, or other equipment, which are hazardous because of defects or other conditions will not be used until they are repaired.
6. Areas around machines should be kept clear of obstructions and in non-slippery condition. All spilled oil or grease will be cleaned up immediately.
7. Do not clean chips from the surface of machines with compressed air or with hands; a brush or hook should be used. Where general cleaning of machines and equipment by compressed air is considered necessary or recommended by the manufacturer, the outlet pressure will be reduced to 10 psi or less by means of a regulator or pressure reducing control nozzle designed for this purpose.
8. Cleaning of one's clothes with compressed air is prohibited.
9. When using portable electrical equipment around machine tools, keep all electrical cords clear of moving parts.
10. Do not place hand tools on machines. Keep them in their assigned location.
11. Loose, flowing or torn clothing, gloves, neckties, long sleeves and rings or bracelets will not be worn around machinery such as band and circular saws, drill presses, grinders, jointers and planers, lathes and sanders. Snug-fitting clothing will be worn.

12. Goggles or face shields will be worn when grinding or when there is danger of flying particles.
13. Gloves are not to be worn around rotating machinery unless sharp or rough materials are being handled. If gloves are worn because of sharp or rough material, care should be exercised to prevent their being caught in the machinery.
14. All guards on machines are to be properly adjusted and in working order before starting the machine.
15. All gear and belt guards must be in place before machine is operated.
16. Machine guards must be kept in position at all times unless removal is authorized for repairs or cleaning.
17. Be sure all is clear before starting any machine.
18. Unless conditions make it impractical, no employee should be permitted to operate electric or mechanical equipment or machines in a building or room alone.
19. Dull, badly set, improperly filed or improperly tensioned saws; will be immediately removed from service. Signs of improperly adjusted or malfunctioning saws are material sticking, jamming or kicking back when it is fed into the saw. A saw which has gum from wood stuck to its blade will be cleaned immediately.
20. A push stick made of a narrow strip of wood or similar material with a notch cut in one end and shaped on the other end to provide a good hand grip will be used to push material through saws where there is a possibility of the operator's hand or fingers coming in contact with the blade of the saw.
21. A jig or fixture will be used when cutting or forming irregular pieces or oblique angles.
22. All projecting keys, setscrews and other projections in revolving parts will be made flush or guarded by a substantial metal cover as practicable.
23. All power saws will be guarded underneath and behind the table to prevent possible personal contact. Refer to Chapter 24 for specifics.
24. A mechanical or electrical power control will be provided on each machine that will make it possible for the operator to cut off the power from the machine being operated without leaving the operator's position.
25. Each activity whose operations create dust, shavings, chips, or slivers, will be equipped with an exhaust system either continuous or automatic in action, or

sufficient strength and capacity to remove such refuse from the points of operation and immediate vicinities of machine and workplace.

26. Do not repair, oil, or clean machinery while it is in motion or power is on. Only remote control lubrication will be accomplished under these conditions.
27. Do not use electrical equipment or machines with frayed or otherwise deteriorated insulation.
28. Electrically driven portable machinery as well as fixed electrical equipment will have the frame grounded.
29. Machines designed for a fixed location will be securely anchored to prevent walking or moving.
30. Foot protection (safety shoes) should be considered where there is a reasonable possibility of dropping heavy objects. Footwear that is defective or inappropriate to the extent that ordinary use creates possibility of foot injury (open toed sandals or tennis shoes) will not be worn in shop areas.
31. Do not attempt to remove foreign objects from the eye or body; obtain proper medical treatment.
32. In case of injury, no matter how slight, report it to your supervisor.

### **BAND SAW SAFETY PROCEDURES**

1. Adjustable guards should be kept as close over the point of operation as the work permits.
2. When a band breaks, shut off the machine and stand clear until the machine has stopped.
3. Never stop a machine by pushing material against the band.
4. Cracked saw blades should not be used. A "click" as the blade passes through the work denotes a cracked blade.
5. Refer to manufacturer's recommendations for procedures on changing the blades and further safety precautions.
6. Wear eye and hearing protection.

## **CIRCULAR SAW SAFETY PROCEDURES**

1. Stand to one side. Do not stand directly in line with work being fed through the saw.
2. A rip saw will not be used for cross cutting nor will a crosscut saw be used for ripping.
3. Check the saw blade to determine if it is in good condition. This means sharp, unbroken, free from cracks and the proper saw for the job.
4. Never reach over the saw to obtain material from the other side.
5. Never oil the saw or change the gauge while the machine is running.
6. When shutting off power, never stop the saw quickly by thrusting a piece of wood against it. Be sure the saw has stopped before leaving it.
7. A pusher stick will be used whenever the size or shape of the material requires the hands to be near the saw blade.
8. The appropriate guards must be kept in place at all times.
9. Speed of Saw: The peripheral speed of circular saws will not exceed 12,000 feet per minute unless the saw has been manufactured for a higher speed and is so marked.
10. Wear eye and hearing protection.

## **DRILL PRESS SAFETY PROCEDURES**

1. When drilling, tapping or reaming material, see that it is securely fastened by blocks or clamps so that it cannot spin. In no case should the operator rely on his hand to secure the material from turning.
2. When tightening drill or drill chuck be sure to remove release key before starting the machine.
3. Run the drill only at the correct speed. Forcing or feeding too fast may cause broken drills and result in serious injury.
4. An operator should never attempt to loosen the chuck of a tapered shank drill unless the power is turned off.
5. When chucks are being removed from the spindle, they should be lowered close to the table so that the chuck will not fall.

6. Never use the hands to remove drillings from the work.
7. Wear eye protection.

### **GRINDING SAFETY PROCEDURES**

1. All abrasive-wheel machinery will be equipped with protection hoods, which will be of such design and construction as to effectively protect the user from flying fragments of a bursting wheel insofar as the operation will permit.
2. Wear a face shield, safety goggles or cover goggles when grinding.
3. Grinding wheels will be equipped with tool rests which are set not more than one-eighth inch from the wheel.
4. The side of an emery wheel will not be used for grinding unless it is a special type wheel for that purpose.
5. Stand to one side when starting up a machine and do not exert great pressure on the wheel until it has had time to warm up.
6. Report to your supervisor immediately any broken, cracked, or otherwise defective wheel.
7. New wheels are to be mounted only by an experienced person.
8. Never use a wheel that has been dropped or has received a heavy blow, even though there is no apparent damage. The wheel may be weakened to a point where it may fly apart.
9. An abrasive wheel will not be operated at a speed in excess of the speed recommended by the manufacturer of the wheel.
10. Wear hearing protection.

### **JOINTER AND PLANER SAFETY PROCEDURES**

1. Stand to one side. Do not stand directly in line with work being fed through the machine.
2. When pieces shorter than 18 inches are machined, a tractor feed or safety pusher stick of suitable design will be used.
3. Do not take too heavy a cut, as this will cause kickback.
4. Wear eye and hearing protection.

## **LATHE SAFETY PROCEDURES**

1. A chuck or faceplate should never be put on a lathe by power operation.
2. Make sure that all gear and belt guards are in place.
3. Keep hands off chuck rim when lathe is in motion.
4. Do not attempt to adjust a tool while the lathe is running.
5. Never apply a wrench to revolving work or parts.
6. Always use a brush to remove chips--never the hands.
7. After adjusting the chuck remove the chuck wrench immediately.
8. Wear eye and hearing protection.

## **SANDER SAFETY PROCEDURES**

1. Belt sanders shall have both pulleys and the unused run of the sanding belt enclosed. Rim guards will be acceptable for pulleys with smooth disc wheels provided that on-running nip points are guarded. Guards may be hinged to permit sanding on the pulley.
2. Disc sanders will have the periphery and back of revolving disc guarded, and the space between revolving disc and edge of table will not be greater than one-quarter inch.
3. Do not push the work against the sander surface with excessive force as this may cause it to be thrown.
4. Wear eye and hearing protection.

## **KILN SAFETY PROCEDURES**

1. Metal pouring is a particularly hazardous operation due to the possible presence of impurities in the molds, ladles, pouring troughs or the metal itself which could cause "splattering."
2. Ceramic kiln brick and other ceramic objects hold heat for a long time without visual effect. Always handle them while wearing gloves.
3. Individuals operating metal melting furnaces or kilns must be provided with and required to wear approved eye shields, protective gloves and aprons. Bare flesh should not be exposed during the pouring or removal of heated items.

## SECTION II

### CHAPTER 22 - SIGNS, LABELS, AND COLOR CODE

#### ACCIDENT PREVENTION SIGNS

1. Accident prevention signs are intended to indicate specific hazards of a nature that failure to designate them may lead to accidental injury or property damage. All signs shall conform to the requirements of this chapter and each sign will include the following:
  - a. An approved heading that indicates the relative hazard.
  - b. A statement of the type of hazard or what to do or not to do, in the area. Signs will be visible at all times when work is being performed, and will be removed or covered promptly when the hazard(s) no longer exist.
2. Danger signs are to be used only where an immediate hazard exists. They indicate that special precautions must be taken. A red upper panel with a black border and the word "DANGER" in white letters identifies danger signs. Examples are as follows:

DANGER - "HIGH VOLTAGE"  
DANGER - "NO SMOKING"  
DANGER - "KEEP OUT"

3. Caution signs are to be used only to warn against potential hazards or to caution against unsafe practices. They indicate possible hazards against which proper precautions should be taken. A black panel with the word "CAUTION" in yellow letters identifies caution signs. Examples are as follows:

CAUTION - "KEEP AISLES CLEAR"  
CAUTION - "EYE PROTECTION REQUIRED"

4. Safety instruction signs are to be used where there is a need for general instructions and suggestions relative to safety measures. They are identified by a green panel with a word such as "THINK" or "BE CAREFUL," etc. in white letters. Examples are as follows:

THINK - "REPORT UNSAFE CONDITION"  
BE CAREFUL - "WALK DON'T RUN"

5. Directional signs are for providing specific direction-type information. The standard color is black on white and the directional symbol should be dominant. Examples are as follows:

"THIS WAY OUT" - with arrow

"FIRE EXTINGUISHER" - with arrow

6. On radiation warning signs, the standard color of the background will be yellow, with the symbol and panel magenta. Any letters used against the yellow background will be magenta or black.
7. The biological hazard warning sign will be used to signify the presence of a biohazard. The primary symbol color should be fluorescent orange.
8. Blue will be the standard color for informational signs. It may be used as the background color for the complete sign or as a panel at the top of such types of "Notice" signs, which have a white background.
9. The slow-moving vehicle emblem consists of a fluorescent yellow-orange triangle with a dark red reflective border. The emblem is intended as a unique identification for, and it will be used only on, vehicles which by design move slowly (25 mph) or less) on the public roads.

### **ACCIDENT PREVENTION TAGS**

1. Tags are a temporary means of warning all concerned of a hazardous condition, defective equipment, radiation hazards, etc. The tags are not to be considered as a complete warning method, but should be used until a positive means can be employed to eliminate the hazard; for example, a "DO NOT START" tag on power equipment will be used for a few moments or a very short time until the switch in the system can be locked out; a "DEFECTIVE EQUIPMENT" tag will be placed on a damaged ladder and immediate arrangements made for the ladder to be taken out of service and sent for repair.
2. "DANGER" tags will be affixed to equipment that is being held out of service for repair or for equipment that poses an imminent or immediate hazard to the user. Before repair work is performed on equipment, a danger tag shall be attached and the equipment will be locked out of service.
3. "CAUTION" tags must be affixed to equipment that poses a potential hazard to the user. These tags are also used to warn against an unsafe practice.
4. "NOTICE" tags are to be utilized for conveying safety information or suggestions regarding equipment or conditions.
5. Other tags such as radiation or biological hazard will use the same symbols and colors as required on signs.
6. During routine inspections of campus areas, RMS personnel may affix red danger tags to equipment that is observed in a state of disrepair or is deemed imminently or potentially hazardous. A time limit may be established for correction. The tag may be removed by the department and forwarded by campus mail to the RMS



Office after corrections are made. Correction of deficiencies is the responsibility of the department head.

## **COLOR CODE FOR MARKING PHYSICAL HAZARDS**

1. **RED** will be the basic color for the identification of:
  - a. Fire protection equipment and apparatus.
  - b. Safety cans or other portable containers of flammable liquids.
  - c. Emergency stop buttons or electrical switches used for emergency stopping of machinery.
  - d. Danger signs.
2. **ORANGE** will be used as the basic color for designating dangerous parts of machines or energized equipment and to emphasize such hazards when enclosure doors are open or when gear or other guards around moving equipment are open or removed, exposing unguarded hazards.
3. **YELLOW** will be the basic color for designating caution and for marking physical hazards such as: striking against, tripping and "caught in between." Solid yellow and yellow and black stripes should be used interchangeably, using the combination that will attract the most attention in the particular environment.
4. **GREEN** will be used as the basic color for designating "safety" and the location of first aid equipment.
5. **BLUE** will be limited to warning against the starting, the use of or the movement of equipment under repair or being worked on.
6. **PURPLE** will be the basic color for designating radiation hazards.
7. **BLACK, WHITE** or a combination of these two will be the basic colors for the designation of marking traffic and housekeeping markings.

## **LABELING OF SUBSTANCES**

1. All containers containing a substance or mixture of substances will be labeled or marked with appropriate warning legend as defined in this section.
2. In labeling an injurious substance, the container label will bear either the chemical or common name (not trade name only), of the substance and a signal word such as "DANGER" or "WARNING." In addition, the label will define the hazard and list precautions, plus the target organs should be listed.

3. Labels will not be removed from containers if any of the substances or mixtures of substances named on the labels remain in the containers. Only those substances listed on the label of containers will be placed in the containers. Containers may be reused for other substances if the original label is removed and container properly rinsed to remove the original substance.
4. The National Fire Protection Associations (NFPA) "Hazard Identification System" is a precise way of labeling materials as to their hazardous properties. It is recommended that both containers and areas employ this label system. Contact Risk Management Services for information. The NFPA label system identifies the hazards of a material in terms of three principal categories, namely, "health," flammability," and "reactivity" (instability); this indicates the order of severity numerically by five divisions ranging from "four (4)," indicating a severe hazard, to "zero (0)," indicating no special hazard. A diamond shaped diagram divided into four diamond shaped diagrams presents this information. The "health" hazards are always to be shown by the diamond on the left (blue background or blue numerals). The "flammability" hazard is always to be shown by the diamond at the top (red background or red numerals). "Reactivity" hazards are always to be shown by the diamond on the right (yellow background or yellow numerals). The bottom diamond (white) will indicate specific types of hazard including acid, alkali, corrosive, oxidizer and "use no water."

### **PIPE MARKING**

1. Color bands containing a lettered legend of pipe contents will be installed on all campus piping systems used to transport hazardous substances such as gases, vapors, liquids, etc. Marking is to be done at points where confusion would introduce hazards to employees such as valves or outlets. The four colors to be used are as follows:
  - a. **YELLOW** - Dangerous materials such as high pressure steam.
  - b. **RED** - Fire protection equipment such as sprinkler water.
  - c. **BRIGHT BLUE** - Protective materials such as distilled water.
  - d. **GREEN** - Safe materials such as city water.

## *SECTION II*

### *CHAPTER 23 - STORAGE AND HOUSEKEEPING*

#### **HOUSEKEEPING**

Safety starts with housekeeping. A clean, neat and orderly work area is an important reflection of safe work habits and attitudes. Therefore, the following housekeeping rules will apply:

1. All places of employment and study will be kept clean and orderly and in a sanitary condition. The floor of each area will be maintained as clean and as dry as possible.
2. Any material spilled on the floor that could cause an accident must be cleaned up immediately.
3. During the course of work, all debris will be kept reasonably cleared from work areas, and all waste will be disposed of at intervals determined by the rate of the accumulation and the capacity of the container. Always use containers supplied for this purpose.

#### **GENERAL STORAGE RULES**

1. Material, wherever stored, will not create a hazard. It will be limited in height and will be piled, stacked or racked in a manner designed to prevent it from tipping, falling, collapsing, rolling or spreading. Racks, bins, planks, blocks and sheets, will be used where necessary to make the piles stable.
2. Heavy or awkward items should always be stored near the bottom of shelves or cabinets as falling heavy items are a potential hazard to personnel.
3. Do not allow equipment or storage to encroach within 30 inches (preferably 42") of all electrical panels. These panels contain the emergency switches for equipment and sometimes must be reached quickly.
4. Have Physical Plant secure storage shelving, cabinets and other items that may accidentally tip over or are subject to movement.

#### **INDOOR STORAGE**

1. Storage will not obstruct or adversely affect means of exit.
2. State fire laws do not allow the storage of materials that may generate heat or emit smoke in corridors and halls. For this reason, it is campus policy that there be no

- lockers, cabinets, refrigerators, storage materials or extension of office or laboratory facilities or functions into any corridor space of a campus building.
3. All materials will be stored, handled and piled with due regard to their fire characteristics.
  4. Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.
  5. Stacked materials will have a minimum clearance of thirty-six (36) inches between the top of the stack and the sprinkler system piping and deflectors.
  6. In buildings without installed sprinkler systems, the material stack height shall not exceed fifteen (15) feet.
  7. All stacks will have a minimum of thirty-six (36) inches clearance between the top of the stacks and joists, rafters or roof trusses.
  8. The maximum weight of materials stored on building floors or load carrying platforms, except those built directly on the ground, will not exceed their safe carrying capacity.
  9. In warehouse-type storage areas, the following rules apply:
    - a. Aisles and passageways for one-way fork lift traffic will be not less than the width of the widest vehicle or load plus 3 feet. For two-way forklift traffic the minimum aisle width will not be less than twice the width of the widest vehicles or loads plus 3 feet.
    - b. Lanes for aisles and passageways will be painted on the floor or a similar method employed to mark such areas.
    - c. Black, white or combination of these two will be the basic colors for the designation of traffic housekeeping markings.

### **LOOSE MATERIAL STORAGE**

1. Materials dumped against walls or partitions will not be stored to a height that will endanger the stability of such walls and partitions.
2. No employees will be permitted to work on or over loose material, until they have been instructed in the hazards involved and the precautions that must be taken to prevent employees being caught in caved-in material.
3. In withdrawing materials, no overhanging will be permitted to exist at any time.

## **OUTDOOR STORAGE**

1. Combustible materials will be piled with due regard to the stability of piles and in no case higher than 20 feet.
2. Driveways between and around combustible storage piles will be at least 15 feet wide and maintained free from accumulation of rubbish, equipment or other materials.
3. The entire storage site will be kept free from accumulation of unnecessary combustible materials. Weeds and grass shall be kept down and a regular procedure provided for the periodic cleanup of the entire area.
4. Storage material will be kept in orderly and regular piles. No combustible material will be stored outdoors within 10 feet of a building or structure.
5. Portable fire extinguishing equipment, suitable for the fire hazard involved, will be provided at convenient, conspicuously accessible locations in the storage yard area.

## *SECTION II*

### *CHAPTER 24 - TOOLS, HAND AND PORTABLE POWERED*

#### **HAND TOOLS**

1. All hand tools will be maintained in a safe and operable condition. Worn or defective parts will be repaired or replaced before operating hand tools.
2. All tools will be restricted to the use for which they were designed for and used only by those employees qualified and authorized to use such tools.
3. Tools with split or defective handles or heads, worn parts or other defects that impair their strength or make them unsafe to use will be removed from service. Before reissue, these defective tools must be repaired.
4. Goggles are to be worn by persons using hand tools when there is a possibility of flying chips or other pieces of material injuring workers' eyes.
5. Listed below are requirements which hand tools must meet before workers use them:
  - a. Files and rasps will be equipped with a securely fitted, substantial handle.
  - b. The head on a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle will be chipped or broken.
  - c. Care will be taken to select a screwdriver of the proper size to fit the screw head. Screwdrivers with split or splintered handles will not be used. The point/blade of the screwdriver will be kept in the proper shape with a file or grinding wheel. Screwdrivers will not be used as punches, chisels or nail pullers.
  - d. Only wrenches in good condition will be used; a bent wrench, if straightened, has been weakened and will not be used. Also check for sprung jaws on adjustable wrenches. Always pull toward yourself, never push, since it is easier to brace against a backward pull than against a sudden lunge forward should the tool slip or break.
  - e. Pliers will be kept free from grease and oil and the teeth or cutting edges will be kept clean and sharp. The fulcrum pin, rivet or bolt will be snug but not tight.
  - f. Only saws that are sharp and properly set will be used. A crosscut saw will be used for cutting across the grain, ripsaw for cutting with the grain.

- g. Hack saw blades are to be properly adjusted in the frame to prevent buckling. The number of teeth per inch will be selected for the work. Pressure should be applied on the down stroke only.
- h. Wrecking bars and crowbars will be kept sharpened and free from burrs.
- i. Before shovels are used, they are to be inspected by the worker to insure the handle is strong and smooth, the grip is free from splinters and that the blade is smooth and sharp.

### **POWERED TOOLS**

1. Portable power tools will be kept cleaned, oiled and in good mechanical repair. They will be carefully inspected before use. The switches must operate properly and the cords must be clean and free from defects. The plug will be clean and sound.
2. All portable powered tools capable of receiving guards and/or designed to accommodate guards will be equipped with such guards. This is to prevent possible injury of the operator. The guards are a protective device; used to keep the worker from coming in contact with the moving parts of the tool.
3. All electric powered portable tools with exposed non-current-carrying metal parts of cord and plug connected equipment, which are liable to become energized shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed the equipment will be distinctively marked.
4. All hand-held powered tools of a hazardous nature such as circular saws and grinders having a blade/wheel diameter greater than 2 inches, chain saws, percussion tools, drills, tappers, fastener drivers, disc and belt sanders, reciprocating saws, saber, scroll and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools will be equipped with a constant pressure switch or control that will shut off the power when pressure is released from the switch. Other circular saws, chain saws and percussion tools may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on. All other less hazardous hand-held powered tools, such as routers, may be equipped with a positive "on-off" control.
5. Portable circular saws having a blade diameter over 2 inches, will be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work; and when withdrawn from the work, the guard will completely cover the saw to at least the depth of the teeth. The saw will not be used without a shoe or guide.

6. All pneumatic powered portable tools will be equipped with an automatic air shut-off valve that stops the tool when the operator's hand is removed from the control. Safety clips or retainers will be installed on pneumatic tools to prevent tools from being accidentally expelled from the barrel; or other effective means to prevent accidents from this source will be used.
7. Abrasive wheels with a diameter over 2 inches will be used only on machines equipped with safety guards. The guard will cover the spindle end, nut and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut and other flange are exposed.
8. All explosive-actuated fastening tools muzzle ends will have a protective shield or guard designed to confine any flying fragments or particles. The tool will be so designed that it cannot be fired unless it is equipped with a protective shield or guard. A department will not permit an employee to use a power-actuated tool until the employee has received training as recommended by the manufacturer.

### **POWER MOWERS**

1. General requirements:
  - a. Power mowers will be certified that they have been constructed in accordance with the provisions of ANSI B71.1-1972.
  - b. Power mowers will be maintained in a safe operating condition in accordance with the Owner's Manual.
  - c. An indicator of blade rotation will be provided on mowers that operate quietly.
  - d. The controls used for stopping, starting, speed control and attachment engagement will be clearly identified by a durable label.
  - e. The mower blade will be enclosed except on the bottom, and the enclosure will extend 1/8-inch minimum below the lowest cutting point of the blade.
  - f. The discharge opening(s) will be so placed or guarded so grass or debris will not discharge directly into the operator zone.
  - g. The word "CAUTION" or "DANGER" will be placed on the mower at or near each discharge opening.
  - h. The blade(s) will stop rotating within seven seconds after either declutching or shutting off drive power.
2. Operating requirements:



- a. Area to be cut should be examined for loose objects such as tin cans, pieces of wire, rocks or other objects. Serious injury can result from objects thrown by the rotating blade.
  - b. The engine will be cut off when filling with gas. No smoking is allowed during refilling operations.
  - c. Avoids slopes that are too steep for machine, whether a push mower or riding mower.
  - d. Suitable foot, eye and head protection should be worn when operating power mowers. The wearing of tennis shoes is not recommended. Metal toe guards worn over operator's shoes or safety toed shoes/boots are recommended to protect employees feet from injury.
3. Walk-behind mowers:
- a. The mower handle will be fastened to the mower so as to prevent unintentional uncoupling while in operation.
  - b. A mower with a rope starter will have a labeled designated area for stabilizing the mower when starting the engine.
  - c. A shutoff control device will be provided to stop operation of the engine. This device will require manual and intentional activation in order to restart the engine.
4. Riding rotary mowers:
- a. A disconnect device will be provided between the engine (motor) or power source and the blade(s).
  - b. When the wheel drive control is in an engaged position; a means will be provided to prevent the starting of the engine. Such means will not be required on units equipped with deadman controls.
  - c. A slip-resistant surface or other means will be provided to minimize the possibility of an operator's foot from slipping off the foot support or platform.
  - d. A brake pedal will be provided. For stopping, it will be foot-actuated and the direction of motion will be forward, downward or both.
  - e. Towed rotary mower attachments will have no front opening in the blade enclosure.

## *SECTION II*

### *CHAPTER 25 - VEHICLE OPERATIONS*

#### **GENERAL**

1. All operators of University equipment and vehicles are considered as representatives of the University and should extend every courtesy to both traffic and pedestrians.
2. Only those employees specifically authorized and who possess a valid Texas driver's license shall operate University-owned vehicles on University business.
3. The following rules apply to the operation of University vehicles.
  - a. Drivers shall be familiar with and obey all state motor vehicle laws that apply to them.
  - b. A driver shall not permit unauthorized persons to drive, operate, and ride in or on a University vehicle.
  - c. Seat belts will be worn at all times.
  - d. Employees shall not permit anyone to ride on the running boards, fenders or any part of any motorized equipment except on the seats or inside the body walls.
  - e. Employees shall not ride on loose materials or equipment carried on trucks, nor shall they ride on trailers or towed equipment, except when performing a specific job or function.
  - f. Employees will not jump on or off vehicles in motion.
  - g. Drivers shall keep a sharp lookout for persons on campus and for cyclists and be prepared for immediate stops.
  - h. No smoking is allowed in any University vehicle.
4. The following rules apply to University vehicle condition:
  - a. Windshields and windows shall be kept clear of anything that may obstruct the vision of the driver.
  - b. Brakes are to be tested by the driver at the start of each day. The driver shall report all defects and they shall be adjusted or repaired before the vehicle is put in operation.

- c. Lights and other signaling devices will be inspected daily. If they are found to be defective, they shall be repaired before the vehicle is placed in operation. No vehicle shall be operated at night unless equipped with properly working headlights, taillights and other necessary safety devices as required by law.
5. The following rules apply to University haulage vehicles:
    - a. Materials and equipment shall be loaded so they will not cause a hazard by shifting. Heavy equipment and materials shall be securely fastened.
    - b. Red flags during the day and red lights at night shall be attached to equipment or material that extends more than four (4) feet beyond the back of the vehicle. Red flags or approved clearance lights shall be attached to loads extending more than two (2) feet beyond the front of the vehicle.
    - c. Tools, materials or equipment shall not be permitted to extend beyond the permanent fixtures provided on the sides of the vehicle.
    - d. Trailers or equipment, while being towed, shall be securely coupled to the truck, and if necessary, joined by auxiliary chains or cable.
    - e. Trucks shall not be operated with tailgates hanging or dangling.
    - f. Vehicles will not be operated unless back-up signals are in operating order.
  6. In case of vehicle accidents:
    - a. Obtain medical aid for the injured (if necessary).
    - b. Call the University police for an investigation of the accident. If off campus, call the campus and local police.
    - c. Obtain vehicle accident forms from the Physical Plant and return the forms to the same department after completion.

### **BICYCLES AND MOPEDS**

The following regulations are incorporated into this manual because employees and students regularly operate bicycles and mopeds on campus walkways; and therefore accidents with pedestrians are quite possible.

1. Every person operating a bicycle on campus is subject to both the Texas Vehicle Code and the University's Traffic and Parking Regulations.
2. The University police enforce all laws and regulations.

3. Motorized bicycles shall not be operated under power on walkways.
4. Bicycle operators shall not exceed the posted speed limit of 20 mph on campus, nor exceed a speed which is unsafe for campus conditions, nor shall they operate their bicycles in a manner which endangers the safety of either persons or damage property.
5. Bicycle operators shall yield the right-of-way to pedestrians on campus.
6. When not in operation, bicycles must be parked in racks provided for that purpose.
7. Bicycles are not permitted in University buildings.

### **GARAGE SAFETY**

1. The following rules apply to the use and repair of vehicle batteries:
  - a. Battery charging installations shall be located in areas designated for that purpose.
  - b. When charging batteries, the vent caps shall be loose but left in place to prevent electrolyte spray.
  - c. Facilities for quick drenching of the eyes and body shall be provided within 25 feet of the battery area for emergency use.
  - d. When using jumper cables to start a second vehicle, follow these procedures to avoid either equipment damage or an explosion:
    - 1) Determine whether both vehicles are negatively grounded, (the negative terminal is connected to the engine block or frame), or positively grounded. It must also be determined that both batteries have the same voltage (6 or 12 volts). Do not mix these systems in any way, as damage will occur.
    - 2) When both vehicles are negatively grounded (usually the case), connect the ends of one cable to the positive terminal of each battery. Then connect one end of the other cable to the engine block of the car with the good battery. Finally connect the other end of this cable to the engine block of the car being started. Do not make this final connection to the negative terminal of the weak battery. Reverse this procedure to disconnect the batteries.
2. The following rules apply to the fueling of vehicles and equipment:

- a. No vehicle shall be refueled while the engine is running. Refueling shall be done in such a manner that likelihood of spillage is minimal. If a spill occurs it is to be washed away completely, or equivalent action taken to control vapors before restarting the engine. Fuel caps will be replaced before starting the engine.
- b. A gasoline pump is provided to refuel vehicles. A good metal-to-metal contact shall be kept between the fuel supply tank or nozzle of the supply hose and the fuel tank.
- c. Open lights, flames or sparking or arcing equipment except that which is an integral part of automotive equipment, will not be used near fuel storage tanks or internal combustion engine equipment during refueling operations.
- d. No smoking is permitted at or near refueling operations. Post a conspicuous sign in the refueling areas stating:

"NO SMOKING WITHIN 20 FEET"

3. The following apply to jacks and their use:
  - a. The rated load shall be legible and permanently marked on jacks by casting, stamping or other suitable means.
  - b. All jacks shall be designed so that their maximum safe extension cannot be exceeded.
  - c. In the absence of a firm foundation, the base of the jack shall be blocked. If there is a possibility of slippage of the cap, a block shall be placed in between the cap and the load.
  - d. Employees shall not enter the zone beneath a jack-supported load unless it has been effectively blocked or cribbed.
  - e. All jacks requiring cleaning and lubrication, such as screw jacks, shall be properly cleaned and lubricated at regular intervals. The manufacturer's lubricating instructions will be followed using only recommended lubricants.
4. The following rules apply to tire inflation:
  - a. Tire inflation will be accomplished by means of a clip-on chuck with a minimum 24-inch length hose to an in-line foot or hand valve and gauge.
  - b. Tire inflation control valves will automatically shut off the airflow when the operator releases the valve or be of the preset regulator type.

- c. A tire restraining device, such as a cage, rack or other effective method shall be used while inflating tires mounted on split rims or having retaining rings. EXCEPTION: While the wheel assembly is mounted on a vehicle, tires may be inflated without a restraining device, provided that remote control inflation equipment is used and all persons stay out of the danger area.

### **TRANSPORTING EMPLOYEES AND STUDENTS**

1. Trucks, buses and other vehicles used regularly for the transportation of employees and students shall be constructed or accommodated for that purpose, and shall be equipped with adequate seats properly secured in place, and shall be protected on sides and ends to a height of 46 inches to prevent falls from the vehicle.
2. On every motor vehicle used for the transportation of employees the lamps, brakes, horn, mirrors, windshields, turn signals and other equipment affecting the safety of passengers shall be kept in good repair.
3. The number of passengers transported on vehicles covered by this section shall be limited to prevent crowding and shall never exceed a number which may endanger the safe handling of the vehicle or the safety of the passengers. The passenger carrying capacity of trucks and buses regularly used to transport employees shall be conspicuously marked on the outside of the vehicle near the door or entrance.
4. On every bus, conventional type or truck type, used for the transportation of passengers, every compartment with an enclosed seating capacity of seven or more shall be provided with an emergency exit remotely located from the normal means of entrance.

## *SECTION II*

### *CHAPTER 26 - WORKING SURFACES*

#### **FLOORS**

1. All working surfaces such as floors and corridor type areas shall be kept in good repair so that they may be kept clean and orderly. Grease, water or other slippery substances shall not be allowed to accumulate on these surfaces. If these substances are spilled on working surfaces, it will be cleaned up at once.
2. Tripping hazards are a major source of falls and therefore floors and other walking surfaces are to be kept as clear and unobstructed as possible.
3. Electrical wiring and cables must not cross aisles or work area floor space without approved type ramps or protection for the wiring. These precautions eliminate potential tripping hazards and prevent electrical hazards from broken wiring.
4. Mats and gratings or other non-slip materials shall be used in wet process areas and other locations where drainage is necessary.
5. Highly polished floors may present slipping hazards. To minimize this danger, only approved water emulsion wax of the non-slip type should be used following manufacturer's directions.
6. Carpeting shall be laid smoothly and loose or torn floor coverings repaired, replaced or removed promptly. Rugs not securely fastened to the floor shall have a rubberized non-slip backing or shall be laid over pads made of rubber or other non-slip material.
7. Permanent roadways, walkways and material storage areas in outside yards shall be maintained free of dangerous depressions, obstructions and debris.

#### **FLOOR OPENINGS**

1. Floor openings and floor holes into which a person can accidentally step or trip, shall be guarded by either a standard railing on all exposed sides or a cover of standard strength hinged in place. When the cover is not in place, a removable standard railing shall protect it.
2. Floor opening covers should be made of solid construction, but where there is no exposure to falling materials, grill or slatted covers with openings not over 1 inch in width may be used. Covers should have a non-slip surface and be set flush with the floor. If they cannot be set flush with the floor, they shall not project more than 1 inch above the floor level. They shall be painted or marked in such a way to warn people of the potential trip hazard.

3. Unused portions of service pits will be either covered or protected by guardrails. Moveable posts and chain rails or other guardrails that will provide equivalent protection may accomplish this.

## **LADDERS**

1. Straight ladders, step ladders, library type ladders, safety stools and other climbing equipment must be made available as necessary and be maintained in a safe operable condition. Personnel must not be permitted to climb onto cabinets and other furnishings to reach elevated storage items or to work with racks or equipment installed above benches.
2. Ladders that are broken, weak or with missing rungs will not be used until they are repaired. Every effort should be made to repair these ladders promptly or removed from the job sight.
3. Ladders will not be used for weights that exceed their recommended maximum weight capacity. Long ladders will be braced to prevent undue deflection (bending).
4. Portable ladders shall be erected at a pitch of 75 1/2 - degrees for maximum balance and strength. A simple rule for setting up a ladder at the proper angle is to place the base at a distance of 1/4 of the working length (the length along the ladder between the floor and the top support) of the ladder.
5. Unless suitable handholds are provided, the side rails of all ladders used to serve, as a platform shall extend at least 3 feet above the upper landing.
6. Ladders, other than stepladders, shall be secured against movement. The following ways are some suggested methods:
  - a. By fastening the feet rigidly to the floor.
  - b. By lashing or fastening the ladder at the top.
  - c. By installing safety shoes.
7. Ladders shall not be painted in such a manner as to hide the grain structure or defects. Ladders may be kept coated with a suitable transparent preservative material.
8. The latching of ladders together to increase the length of the ladder is prohibited.
9. Portable metal ladders shall not be used in the vicinity of electrical circuits, where they may come in contact with the circuits. Portable metal ladders shall be



- legibly marked with signs reading "CAUTION - DO NOT USE AROUND ELECTRICAL EQUIPMENT," or equivalent wording.
10. No one shall be permitted to stand and work on the top 3 rungs or cleats of a ladder unless there are members of the structure that provide a firm handhold or the worker is protected by a safety belt.
  11. Ladders shall not be placed in passageways, doorways, driveways, doorways or any location where they may be displaced by activities being conducted on any other work, unless protected by barricades or guards.
  12. Ladders should be stored in such a manner as to provide ease of access and to prevent accidents or injuries when withdrawing a ladder for use.
    - a. Wood ladders, when not in use, should be stored in a location where they will not be exposed to the elements, but where there is good ventilation.
    - b. Ladders stored in a horizontal position should be supported at a sufficient number of points to avoid sagging and warping.
  13. On stepladders, these rules apply:
    - a. Stepladders longer than 20 feet shall not be supplied.
    - b. Step spacing that is uniform shall be employed. It shall be not more than 12 inches.
    - c. A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in the open position shall be a component of each stepladder.
  14. When ascending or descending, the user should face the ladder.
  15. Ladders shall be inspected frequently and those that have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

## **ROOFS**

1. Storage of any kind shall not be permitted on roofs.
2. Guardrails shall be required at locations where there is a routine need for any employee to approach within 6 feet of the edge of the roof. When intermittent work is being done, life lines, safety belts or equivalent protection may be provided in lieu of guardrails.

3. Roof and ceiling trapdoors shall be constructed and maintained so that they can be easily opened and closed. Roof trapdoors shall be equipped with a light padlock especially approved for that purpose.
4. Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at any one area on the screen.

### **SCAFFOLDS**

1. Scaffolds shall be provided for all work that cannot be done safely by employees standing on permanent or solid construction (at least 20 inches wide), except where such work can be safely done from ladders.

Work of a limited nature and of short duration may be permitted when the permanent or solid construction is less than 20 inches in width and does not exceed 1 story or 15 feet in height.

2. Scaffolds may be constructed of wood or other suitable materials such as steel or aluminum members of known strength characteristics.
3. Scaffolds and their components shall be capable of supporting without failure at least 4 times the maximum intended load.
4. Scaffolds shall not be overloaded. Material shall not be allowed to accumulate to the extent that a scaffold is subjected to a load it is not designed to support.
5. The work level platform of scaffolds shall be made of wood, aluminum or plywood planking, steel or expanded metal, for the full width of the scaffold, except for necessary openings. Work platforms shall be secured in place. All planking shall be two-inch Douglas fir suitable for scaffold planks or equivalent.
6. Platform planks shall be of 2-inch by 10-inch or wider material and of such length that they overlap the ledgers at each end by at least 6 inches. A plank shall not overlap an unsupported end of another plank.
7. A climbing ladder or stairway shall be provided for proper access and egress to all scaffolds and so located that its use will not have a tendency to tip a scaffold. A landing platform shall be provided at intervals not exceed 30 feet.
8. All scaffold work levels 30 inches or higher above the ground or floor shall have guardrail protection that meets the requirements of Chapter 8.
9. All scaffold work levels six (6) feet or higher above the ground or floor shall have a toeboard at locations where persons are required to work or pass under the scaffold.

10. Unless recommended for such use by the manufacturer, no work platform shall be used on an inclined surface.
11. The maximum work level height for rolling scaffolds shall not exceed three (3) times the least base dimension directly below the platform. Where the unit does not meet this requirement, outrigger frames shall be employed to achieve this least base dimension, or provisions shall be made to guy or brace the unit against tipping. The minimum platform width for any work level shall not be less than 20 inches for mobile scaffolds.
12. Wheels or casters of rolling scaffolds shall be provided with an effective locking device and kept locked when workers are climbing or working on the scaffold. At least 2 of the 4 casters or wheels shall be a swivel type.
13. Employees may ride on rolling scaffolds moved by workers below if the following conditions exist:
  - a. The floor or surface is within 3° of level, and free from pits, holes or obstructions.
  - b. The minimum dimension of the scaffold base, when ready for rolling, is at least 1/2 of the height. Outriggers, if used, shall be installed on both sides of staging.
  - c. The wheels are equipped with rubber or similar resilient tires.

## *SECTION II*

### *CHAPTER 27 - MISCELLANEOUS OPERATIONS*

#### **CONFINED SPACES**

##### **Introduction**

Access to, and the control of 'confined spaces' must be properly organized to secure the health and safety of persons entering what could be an atmosphere unable to sustain human life. 'Confined Spaces' are defined by OSHA regulations, and include any space that:

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

Statistics show that the majority of incidents involving individual or multiple fatalities occur as a result of panic and ignorance, and this is certainly true for the hidden risk posed by 'Confined Spaces'. A most common occurrence is for a confined space hazard not to be recognized, an individual enters, say, a manhole and collapses due to the low oxygen atmosphere, and others similarly perish by entering to perform a rescue.

##### **Standards**

The Confined Spaces Regulations of OSHA 29 CFR 1910.146 set out the requirements for entry into 'confined spaces'. OSHA defines "Permit-required confined space (permit space, also known as a 'high-hazard confined space') as:

A 'confined space' that has one or more of the following characteristics:

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

Examples of a high-hazard confined space that would require a permit includes mixing tanks, tank pits, manholes, waste retention tanks and target chambers.

Low-hazard confined spaces do not require permit entry. Examples of low-hazard 'confined spaces' include pits or vaults that do not have actual or potential hazards, the crawl space of a building with limited means for entry and exit, and false ceiling plenums.

However, in the event of equipment failure, chemical usage, or other incident, a low-hazard confined space may become a high-hazard confined space requiring a permit. Examples are, use of cleaners, paints, solvents, compressed gas bottles, and welding equipment.

It is mandatory that a Confined Space Permit be obtained from the RMS office prior to entry of a confined space. RMS office can be reached at ext.2109 or by dialing 565-2109.

All such confined spaces must be clearly marked with a sign reading "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language.

### **Training**

The training for work in confined spaces needs to cover the requirement to assess and monitor the atmosphere, the selection of Personal Protective Equipment (PPE), such as breathing apparatus and compressed air hoods, and the use and care of that PPE. Additionally it should cover the techniques and methods that should be used to avoid accidents or to facilitate a speedy yet safe rescue operation.

### **The Hazards**

Whatever the application, confined spaces share a wide variety of hazards. Access is usually limited, they are often poorly ventilated and contain gases or other harmful substances, and escape or rescue can be extremely difficult. Atmospheres that contain less than 21% oxygen can be life threatening, and can also lead to euphoria similar to intoxication. The oxygen content in an unventilated or poorly ventilated confined space may gradually diminish with time as the employee works, or the fumes, gases, or vapors given off naturally or during cleaning works may replace the oxygen, or be harmful in themselves. In many instances naturally occurring gases may build up and necessitate the use of explosion proof tools or PPE. The common everyday hazards must also not be forgotten, such as exhaustion, cramp, contact with irritants or harmful substances, tank residues, and the obvious dangers of falling.

No entry is permitted to any confined space if it is reasonably practicable to carry out the work from outside, but if access is absolutely necessary stringent precautions must be in place to set up a safe system of work, which includes as appropriate:

- Arrangements for a reserve in the event of an emergency (**in all cases**);
- The provision of air monitoring equipment;
- The provision of breathing apparatus;
- The provision of suitable personal protective equipment; and

- Action to reduce the risk of unfavorable conditions such as forced ventilation and the sealing-off of all possible sources of asphyxiates.

Unidentified confined spaces must be signed to prevent unauthorized access and locked if appropriate.

## **Summary**

Confined Spaces must not be entered into without the necessary training, personal protective equipment, a safe system of work, and a Confined Space Entry Permit from RMS. If in doubt the University Risk Management/Environmental Services office must be contacted prior to entry of any confined space.

## **SAFETY PROCEDURES:**

1. Testing for the presence of combustible or dangerous gases, oxygen deficiency or rich atmosphere shall be made with an instrument approved by Risk Management Services. This instrument will be used immediately prior to a worker entering a confined space and during the entire time a worker is in such a structure to insure a safe atmosphere. The test instrument or sampling probe shall be kept inside the confined space in the "ON" position and the instrument will be monitored at all times.
2. Confined spaces that contain or that have contained combustible gases or dangerous gases shall be thoroughly purged of these gases before entry.
3. Said confined spaces that have contained dangerous gases shall be tested with the instrument after the confined spaces have been cleared of gases and before entering without wearing approved respirators or breathing apparatus.
4. Whenever a test instrument sounds an alarm while employees are in a confined space, the employees shall immediately evacuate the space and begin purging operations.
5. Employees will not be permitted to enter or remain within a confined space until it is free of harmful concentrations of dangerous gases unless they wear approved respirators or breathing apparatus.
6. Employees will not be permitted to enter or remain within a confined space if the explosive levels are below the Lower Explosive Limit (LEL) or above the Upper Explosive Limit (UEL).
7. Employees assigned to work in or inspect a confined space that is or may be hazardous, will be informed of the potential hazard and trained in the use of all required safety equipment and procedures.

8. Before work is performed in a confined space, provisions shall be made for entering and exiting the area.
9. An approved safety belt (harness) with a life line attached shall be used by employees equipped with respiratory equipment as required within confined spaces; such safety belt and life line shall also be required when employees are not equipped with respiratory equipment, if the possibility exists that the confined space may become hazardous.
10. In all situations while employees are inside a confined space, at least one employee will stand by on the outside ready to give assistance in case of an emergency.
11. If entry is through a top opening, the safety belt will be of the harness type that suspends a person in an upright position, and it will have a safety line attached. The other end of the line will be secured outside the entry opening. In addition, if entry is through the top, at least two employees will stand by on the outside ready to give assistance in case of an emergency while the employees are inside.
12. Employees assigned to operate blowers (portable ventilation or exhaust units) will have not other duties while performing this task. (NOTE: The blowers should provide a minimum of 750 cubic feet per minute of air.)
13. When respiratory equipment is required because of the hazards present, there will be at least two workers on the job equipped with approved respiratory equipment.
14. Lines that may convey hazardous materials to the confined space in question will be disconnected or blocked to prevent such material from entering the confined space while the work is in progress.
15. While it is open, the confined space entrance will be identified or guarded by a worker.
16. While work is being performed inside a confined space, at least one person will be immediately available to administer artificial respiration.
17. Only wood or fiberglass extension ladders of at least six (6) feet in length shall be used in confined spaces.
18. In confined spaces subject to contamination by flammable or explosive liquids or gases, only intrinsically (explosive proof) lighting, electrical equipment and tools will be used.
19. Except in extreme emergencies involving imminent peril to life, employees shall not be permitted to work without respiratory equipment where the oxygen content of the air is less than 19.5%.

20. When atmospheric conditions are nauseating or where prolonged exposure would be harmful, all work in confined spaces shall be arranged in short periods.
21. All non-exempt University personnel and private contractors shall not be permitted to enter in a confined space unless their entrance has been authorized by Risk Management Services and issued a confined space entry permit.

### **SPRAY PAINTING**

1. Spray painting operations using flammable or combustible liquids should be separated from other areas by either construction having a fire resistance of at least 2 hours or by being in a separate building. Spray painting should be confined to properly constructed spray booths or rooms.
  - a. Spray painting may be performed outside safely if the following conditions are followed:
    - Painter remains upwind from object being painted
    - Painting operation being performed in an isolated area away from buildings, vehicles and people.
    - Painter wears proper eye protection and respirator if using spray gun and compressor.
    - Small, one-time operations only.
2. Spray booths will be constructed of steel, or masonry with interior surfaces smooth and continuous without edges and otherwise designed to prevent pocketing of residues and facilitate cleaning. Space within a spray booth having a frontal area greater than 9 square feet should be protected with an automatic sprinkler system or have a fire curtain or metal door at the outer edge of the booth opening.
3. Electrical equipment located within 20 feet of a spraying area shall be installed and maintained in accordance with the National Electrical Code.
4. All spraying areas will be kept free from accumulations of combustible residual deposits. If there are excessive accumulations of residue in booths, ducts, duct discharge points or other spraying areas, then all spraying operations should be discontinued until conditions are corrected.
10. All spraying areas shall be provided with mechanical ventilation adequate to dilute flammable vapors below the Lower Explosive Limit.

### **WELDING, CUTTING, AND BRAZING**



1. Welding and cutting are done on an ever-increasing variety of metals and metal coatings. Four primary hazards are associated with welding operations: ultraviolet and infrared light, oxides of nitrogen, ozone and metal fumes.
2. Before cutting or welding is permitted the area shall be inspected by the RMS individual responsible for authorizing cutting and welding operations. Cutting or welding will be permitted only in areas that are, or have been made, fire safe. Where objects to be welded or cut are not readily movable, all movable fire hazards in the vicinity shall be taken to a safe place.
3. Where objects to be welded or cut are not movable and where fire hazards cannot be removed, then guards shall be used to confine the heat, sparks and slag, and to protect the immovable fire hazards and nearby personnel.
4. Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. It may be necessary to assign additional personnel to guard against fire while the actual welding is being performed, and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists.
5. No welding, cutting or other hot work shall be performed on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are not flammable materials present which when subjected to heat, might produce flammable or toxic vapors.
6. Welding goggles or approved eye protection will be worn during all gas welding or cutting operations. Eye protection will also be worn during all brazing operations. Welding helmets will be worn during all arc-welding operations.
7. All welders should wear flameproof gauntlet gloves. Flameproof aprons may be desirable as protection against radiated heat and sparks. Cotton clothing, if used, should be chemically treated to reduce its combustibility. All clothing should be reasonably free from oil and grease.
8. Local exhaust systems will provide minimum air velocities in accordance with the latest Industrial Ventilation Manual, A Manual of Recommended Practice, published by the American Conference of Governmental Industrial Hygienists.
9. Respiratory protective equipment will be used when ventilation is not available or welders are welding on materials that may produce very toxic fumes as listed in paragraph 11.
10. Where workplace monitoring records clearly demonstrate that exposure levels are not exceeded, neither mechanical ventilation nor protective equipment is required.
11. Local exhaust ventilation will be used when potentially hazardous materials are used as base metals, fluxes, coatings, and plating or filler metals. These include, but are not limited to the following materials:

Beryllium  
Cadmium  
Chromium  
Fluorides  
Lead  
Mercury  
Zinc (galvanized metal)  
Inert-gas metal-arc welding or oxygen cutting of stainless steel

12. Where the work permits, the welder shall be enclosed with noncombustible screens having a low reflectivity finish. Booths and screens shall permit circulation of air at floor level. Workers or other persons adjacent to the welding areas shall be protected from the rays by noncombustible or flameproof screens or shields or shall be required to wear appropriate eye protection.
13. When operations are suspended for any substantial period of time, such as during lunch or overnight, all welding equipment will be shut off.
14. The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current.
15. All arc welding and cutting cables will be completely insulated, flexible, and capable of handling the maximum current requirements of the work in progress.
16. Mixtures of combustible gases and air are very explosive and will be carefully guarded against. No device or attachment facilitating or permitting mixture of air or oxygen with combustible gases prior to consumption, except at the burner or in a standard torch or blowpipe, will be allowed unless approved for the purpose.
17. Acetylene and liquefied fuel-gas cylinders will be placed with valve-end up whenever they are used. If a leak develops at the fusible plug or elsewhere on a cylinder, the cylinder will be moved well away from any source of ignition. Contact Risk Management Services for assistance in locating an isolated area to bleed the gases from the cylinder. Bleeding is to be performed by opening the cylinder valve slightly and allowing the gases to escape slowly. A person will remain at a safe distance away from the cylinder to warn people not to approach the cylinder and to insure no source of ignition comes within 100 yards of the cylinder. After the cylinder is empty, it will be plainly tagged as defective and in need of repair before refilling.
18. The primary hazard associated with silver soldering is the inhalation of cadmium fumes. Silver solder generally contains 18 to 20 percent cadmium that is emitted as a fume when silver solder is heated.

Silver soldering operations always should be conducted where local exhaust ventilation is available to remove the cadmium fumes and fluoride fumes, which may be emitted from the flux. Sometimes, if it is impractical or nearly impossible to provide exhaust ventilation, the worker should wear an approved respirator with a high efficiency particulate filter.

### **WINDOW CLEANING**

1. Employees will not be required nor permitted to clean any windows in any buildings from the outside or inside unless means are provided to enable such work to be done in a safe manner.
2. Window cleaning employees will be provided with safety equipment and devices, such as elevating platforms, rolling scaffolds, suspended scaffolds or extension ladders.
3. Window cleaning employees will be instructed in the proper use of all equipment provided to them, and will be supervised during the use of the equipment and safety devices to insure that safe working practices are followed.
4. All employees required to clean windows shall use safety devices as required by this manual.

## *PHONE NUMBERS*

### **MEDICAL EMERGENCIES**

Student Health Center - 565-2333  
Campus Police - 911

### **MAJOR CRIME/DEATH OF A STUDENT**

Campus Police, Emergency - 911  
Non-Emergency - 565-3000

### **DEMONSTRATION, CONFRONTATIONS, OR DISRUPTIVE AND THREATENING BEHAVIOR**

Campus Police - 565-3000

### **VIOLENT OR LIFE-THREATENING BEHAVIOR OR EVENTS (INCLUDING FIRE AND NATURAL DISASTERS)**

Campus Police - 911  
Risk Management Services - 565-2109

### **COUNSELING SERVICES**

Counseling & Testing - 565-2741  
Student Health Center - 565-2333  
Rape Crisis Assistance - 382-RAPE