

# **University Occupational & Environmental Safety Program Manual**

**LOUISIANA STATE UNIVERSITY  
AT ALEXANDRIA**



**Revised  
June, 2021**

## **PREFACE**

Louisiana State University at Alexandria is committed to providing a safe work and learning environment. Employees and students have a right to know about health and safety hazards associated with their work and academic studies. This Safety Handbook is designed to provide pertinent health and safety information so that employees and students can make knowledgeable decisions about any personal risks associated with employment or educational procedures.

Subject-specific information is available in the University Occupational and Environmental Safety Program Manual. When safety concerns arise, students are encouraged to contact their instructors. Employees should contact the immediate supervisor, Division Head, Building Supervisor and/or Safety & Risk Manager. It is important that supervisors, employees, and students know their rights and responsibilities in maintaining a safe work/learning environment.

# UNIVERSITY OCCUPATIONAL AND ENVIRONMENTAL SAFETY POLICY

## **PURPOSE**

To establish a comprehensive occupational and environmental safety policy that facilitates the protection of life and property by providing a campus work and learning environment that is free of recognized hazards that are causing or are likely to cause injury, illness or property damage.

To set forth safety and environmental responsibilities, to provide support for safety rules and procedures, and to establish activities/programs which are necessary for the successful implementation of the University's occupational and environmental safety program.

## **GENERAL POLICY**

The University has a strong commitment to the health and safety of all employees, students, and visitors at LSUA. In keeping with this commitment, the University Occupational and Environmental Safety Policy is as follows:

1. In the interest of providing the safest environment possible for employees, students and visitors, University activities will be conducted in accordance with applicable safety codes, and by all governmental safety and environmental standards and other similar agencies during the **design, construction, operation and maintenance** of University facilities, even though in some cases these standards may not be legally binding on the University because it is a State institution. Guidelines of the State Office of Risk Management will form the foundation for the University Safety Program.
2. Safety and environmental rules and procedures in the University Safety Manual are very important to our safety program, and shall be vigorously enforced by supervision, using disciplinary action where appropriate. In addition to enforcement activities, supervisors are responsible for planning and assigning work that is within the training, capability, and skills of the workers.
3. Critical program elements such as periodic safety inspections, safety training, accident investigations, and safety meetings shall be implemented for all work groups as outlined in the Occupational and Environmental Safety Program Manual.
4. Recognizing that proper training is critical to employee safety, the University will provide safety and skills training to achieve a highly skilled and safe work force.
5. Each and every employee is responsible for his/her own safety, and for promoting the safety of their co-workers. Employees are encouraged to report all safety concerns related to facilities or procedures. Failure to follow appropriate safety standards may result in disciplinary action, up to and including termination of employment.
6. Vice Chancellors, Directors, and Division/Department Heads shall implement the program in their areas of administrative responsibility and shall be accountable through their respective administrative channels for the control of accidents and hazardous exposures in the work environment.
7. The Safety & Risk Manager is the principal provider/coordinator of all University safety and environmental requirements. This includes providing resources for the identification, evaluation, and control of hazardous situations; developing and issuing rules and procedures; consulting with employees and management; and providing safety training, hazardous waste disposal, and occupational safety and health exposure evaluations.
8. The University Safety Committee shall provide recommendations to the administration that will enhance the University Occupational and Environmental Safety Program.

**Dr. PAUL COREIL**

**6/11/21**

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Chancellor

Date

## **GENERAL SAFETY RULES FOR THE LSUA CAMPUS**

The following are the most commonly used safety rules for state facilities. Rules may be modified and added in order to fit the needs of our campus.

1. No smoking in University facilities.
2. Horseplay and fighting will not be tolerated in the workplace.
3. Before beginning work, notify your supervisor of any permanent or temporary impairment that may reduce your ability to perform in a safe manner.
4. Operate equipment only if you are trained and authorized.
5. Immediately report any recognized potentially unsafe condition or act to your supervisor.
6. Immediately report accidents, near misses, and property damage to a supervisor regardless of severity.
7. Immediately report any smoke, sure or unusual odors to your supervisor.
8. Use proper lifting techniques. For objects exceeding 50 pounds in weight, the immediate supervisor must determine specific methods for safe lifting.
9. If your work creates a potential slip or trip hazard, correct the hazard immediately or use safety tape to tag the area before leaving it unattended. Special attention should be paid to electrical cords that stretch across walkways.
10. Fasten restraint belts before starting any motor vehicle.
11. Obey all driver safety instructions.
12. Comply with all traffic signs, signals, markers, and persons designated to direct traffic.
13. Adhere to departmental rules regarding first aid, evacuation routes, and fire department notification.
14. Adhere to departmental rules and procedures specific to departmental operations.
15. Assist and cooperate with all safety investigations and inspections and assist in implementing safety procedures as requested.
16. Adhere to any state, local, or campus policies on infection control procedures.

Violations of these safety rules can result in employee disciplinary action, including possible termination of employment.

# **INCIDENT RESPONSE & EMERGENCY PREPAREDNESS PLAN**

## **Purpose**

The purpose of this plan is to establish policies and procedures regarding LSUA's response to natural and human-made disasters and other emergencies and continuity of operations and recovery. This emergency plan shall in all cases place primary emphasis on the protection of human life and all reasonable efforts shall be made to protect and preserve LSUA property. Recognizing the different types of emergencies that occur with little or no prior warning, it is the intent of this policy to provide flexibility in determining and implementing emergency responses that are both effective and appropriate. The plan elements were derived after reviewing a variety of plans from other institutions of higher education and the FEMA, CDC, NIMS, and GOHSEP guidelines. The plan must be reviewed annually. The plan will be updated as changes in staff, occupy, or building configurations occur.

### **Examples of different types of emergencies:**

1. Natural disasters (floods, hurricanes, tornadoes, ice storms)
2. Human-made crises (fire, explosion, train or vehicle accident involving hazardous materials, terrorism, active shooters, bomb threats, and any other proximity threats)

## **Emergency Operations/Response Plan**

The **Incident Command System** defines responsibilities for carrying out specific actions at projected times and places in an emergency, crisis, or disaster.

An **Incident Command Post** will become the base of operations for the Command Staff.

On campus:

- Primary Incident Command Post – Chancellor's Conference Room
- Secondary Incident Command Post – University Police Department

Off campus:

- Primary Incident Command Post – Alexandria Museum of Art, 2<sup>nd</sup> Floor

## Responsibilities

### **A. Chancellor**

- a. The Chancellor or his representative will evaluate the threat and order any or all of the following:
  - i. Establish the Command Staff at its designated location.
  - ii. Call 911 and report the threat. (Provide only the basic information needed to generate a response from fire/law enforcement agencies; you do not want to inadvertently release sensitive information on the radio that can be heard on scanners throughout Central Louisiana.)
  - iii. Order evaluation or lock down of the campus or one or more campus buildings.

### **B. Command Staff**

- a. The primary functions of the Command Staff will be:
  - i. To determine immediately the nature and severity of the emergency.
  - ii. To develop a plan of action with regard to safety of individuals and procedures necessary to correct the problem.
  - iii. To issue appropriate orders to execute the plan.
  - iv. To issue appropriate information to people on campus and to the media.
- b. Upon notification of an emergency/threat, the Command Staff will immediately meet in the Incident Command Post, or other location if necessary, to evaluate the situation and decide on a course of action.
- c. The Chancellor or his representative will determine all actions to be taken during the emergency. Other members of the Command Staff, including civil law enforcement agencies and fire departments, will serve to provide advice and assistance.
  - i. If circumstances deem that the university needs to be immediately evacuated and closed, notification will be made by the Chancellor's Office or designee.
  - ii. If total evacuation of the campus is necessary, faculty, staff, and students will, upon notification, immediately evacuate to the designated areas. The building supervisors at each location will be responsible for relaying all future communications from the Command Staff.
  - iii. If evacuation of only a portion of the campus is needed, that area will be immediately cordoned off to prevent unauthorized entry.
  - iv. If the decision to lock down a building or the entire campus is made, all occupants should shelter in place immediately, which would include locking doors and staying clear of windows.
- d. A written log will be kept of all Command Staff actions.

### **C. Personnel/Building Supervisors**

- a. When notified, building supervisors are responsible for the total evacuation or lockdown of their respective buildings to their designated areas. The building supervisors should be familiar with their building, maintain a copy of the building floor plan, location of the crash bar key, and a copy of this plan, and keep the

- material updated as needed. In addition, the building supervisor should keep the Campus Safety Officer aware of any changes in order to keep this plan current.
- b. After evacuation, building supervisors should request building occupants stay together.
  - c. Each evacuation site will have multiple building supervisors present. Some individuals may also be asked to leave to communicate with the Incident Command Post. One building supervisor must remain at the evacuation site.
  - d. During any incident, any faculty member in class at the time of the evacuation will assist the building supervisors by being responsible for keeping members of that class together and not letting any student leave the area. During lock down, the faculty member in a class at that time must immediately lock the door and advise students to stay away from all windows.
  - e. Building supervisors, assisted by any faculty members present, will assist in any relocation necessary and directed by the Incident Command Post. They may also, when called upon, assist in the search of their respective buildings.
  - f. When evacuated, all doors should be left unlocked, and all mission critical and personal possessions (purses, books, etc.) should be taken from the building.
  - g. Campus buildings, the individuals responsible (Building Supervisors, in order), and the areas to be checked are listed at the end of this plan. On campus assigned evacuation areas are listed also. A campus map with locations marked is attached.

#### **D. Facility Services**

- a. Upon notification of an emergency, Facility Services personnel will take the following actions:
  - i. All custodians on campus will be notified to report to the Facility Services Building and await directions from the command staff.
  - ii. Plant personnel and maintenance repair personnel will be on standby at designated key points for campus gas, electric, and water systems. This includes, but may not be limited to, the central plant, the water well house, and the main gas valve.

#### **E. University Police**

- a. Upon activation of this plan, University Police will report to the Command Staff for specific instructions. Generally, however, University Police will:
  - i. Meet arriving police/fire personnel and direct the senior individual of each separate agency to the Command Staff.
  - ii. Briefly outline for response teams any special instructions initially decided by the Command Staff.
  - iii. Act as liaison between response agencies and Command Staff.

## Types of Events

### **Active Shooter**

Quickly determine the most reasonable way to protect your own life. Call 9-1-1 when possible to do so safely.

#### Run

1. If possible, getting away from the shooter is the top priority. If you are inside the building and you are confident you know the shooter's location and have a clear path to an exit, evacuate immediately.
2. Leave your belongings behind and get away.
3. Help others escape, if possible.

#### Hide

1. Get out of the shooter's view and stay very quiet. This includes silencing electronic devices.
2. Lock and block doors and windows, close blinds, and turn off lights.
3. Don't hide in groups. Spread out along walls.
4. If possible, quietly communicate with law enforcement, including your location, as well as a description of the shooter, including type of weapon, last location observed, and direction of travel.
5. Stay in place until law enforcement gives the all clear.
6. Your hiding place should be out of the shooter's view and provide protection if shots are fired in your direction.

#### Fight

1. Fight is an absolute last resort.
2. Commit to your actions and act as aggressively as possible against the shooter.
3. Recruit others to ambush the shooter with makeshift weapons like chairs, fire extinguishers, etc.
4. Throw items and improvise weapons to distract and disarm the shooter.

### **Bomb Threats/Terrorism**

1. Anyone answering a call that turns out to be a chemical, biological, bomb, or other threat should pay close attention to the caller. Make accurate notes of what was said. Inform the caller that calls of this nature must be taken at the Chancellor's Office (318-473-6444). Either transfer the call to that number or ask the caller to call back at that number. Once the caller hangs up, the person answering the call should immediately notify the Office of the Chancellor. After notifying the Office of the Chancellor, complete the attached form and provide it to that Office.
2. **The individual who answered the call should speak to no one concerning the call before and after reporting to the Office of the Chancellor.**

### **Fire**

1. Fire Department notification is the responsibility of the Chancellor or his designee. The Operating Engineer on duty will shut down natural gas and electricity to the affected areas.



The Office of the Chancellor (ext. 6444), the Physical Plant (ext. 6475), and the Safety & Risk Manager (ext. 6489) should be notified of the location and severity of any fire.

2. Any person can report a fire that is a danger to life or property. If an individual personally reports a fire to the Fire Department, the Office of the Chancellor must be notified immediately of actions taken.
3. Know evacuation areas. They are appended to this plan.
4. Prepare yourself and students to evacuate the building if necessary.
5. Fire drills are conducted at least once per year in academic buildings and once a month in all residential buildings. These drills are held unannounced to staff, faculty, or students. Information of each building evacuation is recorded on LSUA's Fire Drill Report and kept by the Campus Safety Officer.
6. Fire extinguishers are inspected and certified by an outside contractor once a year.
7. **Elevator Fire Service Keys** are the responsibility of the University Police. These keys are available in case of an emergency by calling the University Police (318-473-6427). The responding Fire Department also has a copy of these keys.

### **Natural Gas Leak**

1. Anyone discovering a gas leak on campus should immediately contact Facility Services. The Director of the Utility Plant will determine concentrations of gas and the source of the leak. If necessary, certain areas and buildings will be evacuated immediately using the emergency evacuation plan.
2. Director of the Utility Plant or his/her designee will shut off building gas valve or shut off a certain affected area of campus.
3. NO ONE is to operate any electrical switches of other sources of ignitions. It may be necessary to cut power to the buildings affected.
4. Director of the Utility Plant will arrange for repair of the leaks and notify the appropriate gas supplier of the situation.
5. Facility Services personnel will ventilate the building if necessary. Evacuated personnel will be allowed to return to work after the leak has been addressed and the building ventilated.
6. Director of Utility Plant will maintain a report of what occurred and the steps taken to correct the problem.

### **Tornadoes, Hurricanes, Floods, and Other Natural Disasters**

#### Before

1. Test the emergency messaging system once a semester.
2. Daily/weekly weather briefings for emergency personnel.
3. Make plans for NWS to speak on campus once a year.
4. Be aware of the threat to your residence and work area and the route in between.
5. Know evacuation routes. They are appended to this plan.

#### During

1. Monitor local radio/TV broadcasts and emergency notification applications for weather watches and warnings.
2. Adhere to travel warnings.
3. If warnings are issued, disseminate appropriately through mass information system.
4. Prepare yourself and students to evacuate the building if necessary.
5. Follow advice presented in University announcements.
6. If a tornado warning is issued, take shelter immediately. Building Supervisors will be asked to lockdown buildings until the weather has passed.
7. In the event that a lock down or “shelter-in-place” is called, immediately lock all doors and turn off all lights and remain there until further notice is given.
8. Report critical weather information to Rapides EM and NWS.
9. Any pertinent weather observations should be reported to NWS by the Campus Safety Officer or any on-duty Police Officer by calling 337-477-5285.
10. Remain calm.

#### After

1. If damage is found, report to NWS with a guess as to the initial cause.
2. Only enter disaster areas if it is essential.
3. Do not bring lanterns, torches, or lighted cigarettes into buildings that have been flooded or damaged because of the possibility of leaking gas lines or flammable materials.
4. Do not attempt to turn on lights in a building that may have a leaking gas line, as the spark may ignite the gas.
5. Do not touch fallen or damaged electric wires.
6. Immediately leave the area upon discovering a leaking gas line.

### **Proximity Threats**

These occur near location and cause damage to life and property. May require need for evacuation. Examples include:

#### Railroad, interstate, and water vessel disasters

1. Obtain emergency response procedures from local municipality.
2. Once notified, determine if voluntary or mandatory evacuation is required.
3. Use applicable emergency response procedures as per local municipality.

#### Local chemical or plant disasters

1. Contact local municipal government.
2. Once notified, determine if voluntary or mandatory evacuation is required.
3. Vertical, upwind, or downwind evacuation should be determined by type of incident.
4. Shut down heating, ventilation, and air conditioning (HVAC) system if sheltering in place and the situation allows.
5. Follow emergency action plan.
6. In the event that a lock down or “shelter-in-place” is called, immediately lock all doors and turn off all lights and remain there until further notification is given.

#### Aircraft disasters

1. Federal, state, and local authorities will assist once notification is received.

2. Follow emergency action plan.

### **Civil Disturbances**

Civil disturbances are generally riots and demonstrations, marches, and groups that have become riotous or a threatening individual.

1. Restrict both employee and visitor movement in your area.
2. Prepare for evacuation, relocation, or lock down.
3. Secure your area (lock doors, safes, files, vital records, etc.).
4. Notify your local law enforcement immediately and then the Office of the Chancellor or your supervisor.
5. In the event that a lock down or “shelter-in-place” is called, immediately lock all doors and turn off all lights and remain in place until further notice is given.

### **Organizational Structure**

The **Command Staff** sets objectives and priorities and has overall responsibility for the outcome of incident or event. The Incident Commander has the ultimate authority assisted by the vice chancellors, Campus Safety Officer, law enforcement, Information Officer, and liaison as needed.

#### **Command Staff**

- Incident Commander: Chancellor
- Vice Chancellor for Academic Affairs
- Vice Chancellor for Finance & Administration
- Vice Chancellor for Enrollment and Student Engagement
- Safety Officer: Safety & Risk Manager
- Law Enforcement: University Police Chief
- Information Officer: Director of Media Relations
- Liaison Officer: Senior Executive Assistant to the Chancellor

At the discretion of the incident commander or the command staff, the inclusion of **additional members** of the campus community may be necessary to develop strategy, plan to accomplish objectives, and provide resources and services to meet the needs of the incident. These members might include:

- LSU Ag Central Regional Director
- Registrar
- Director of Residential Life
- Director of Procurement Services
- Director of Financial Aid
- Executive Director of Facility Services
- Director of Auxiliary Services
- Director of IET
- Academic Deans and Department Heads

- Building Supervisors

Provisions for **Unified Command** will follow National Incident Management System (N.I.M.S.) criteria where incidents involve jurisdictions from off campus.

### **Critical Communications Plan**

The Director of Media Relations at the direction of the Incident Commander and LSUA Chancellor shall be responsible for all communications during the crisis. These include campus communications as well as public announcements. A "Press Desk" shall be established in the Incident Command Post (ICP) to facilitate press briefings.

Evacuation/Lock Down Communication:

If a decision is made by the Command Staff to evacuate or lock down a campus or building, communication to this effect will occur:

1. Telephone calls to building supervisors; voice mail alerts.
2. RAVE text messages
3. Campus-wide emails
4. LSUA website banner notification
5. 9-1-1 center
6. Radio notification to custodians, plant personnel
7. LSUE notification (students, staff, faculty)
8. University Country Day Academy
9. AMOA notification
10. Allied Health Center notification
11. Change voice mail on main line

### **Internal Communications Systems:**

#### **Current capabilities**

- Immediate message posting on LSUA website
- Voice messages to all LSUA phone voice mailboxes
- Email notification to all LSUA email accounts
- PA system (external)
- Posting on course management system (Moodle) homepage
- Satellite communications system
- Text messaging to registered cell phones

#### **External Communications Systems:**

- Public television
- Public radio
- Cable television
- Newspaper

## Responsibilities

- Overall Responsibility Liz Johnson
- Campus-Wide Email Chad Gauthier/Deron Thaxton
- Emergency Text Message Jason Normand/Chad Gauthier/  
Deron Thaxton
- Website / Moodle Takeyra Wagner/Jason Normand
- PA System Police officer on duty
- Police Unit PA System Police chief/officer on duty
- Campus-Wide Voice Mails Jason Normand/Josh Ducote
- Notify Rapides Parish 911 Police chief/officer on duty

## **Key Staff**

### **Command Staff:**

- Incident Commander: Chancellor
- Safety Officer: Safety & Risk Manager
- Law Enforcement: University Police Chief
- Information Officer: Strategic Communications
- Liaison Officer: Assistant to Chancellor

Dr. Paul Coreil  
Chad Gauthier  
Donald Collins  
Nathanial Parrish  
Laura Fowler

### **Planning Section:**

- Vice Chancellor for Academic Affairs/Provost
- Vice Chancellor for Finance and Administration
- Vice Chancellor for Student Engagement
- Registrar

Dr. John Rowan  
Deron Thaxton  
Dr. Abbey Bain  
Jerri Weston

### **Operations Section:**

- Procurement Services & Property Management
- Financial Aid
- Facility Services
- IET Services
- Academic Deans

Mary Lemoine  
Jeff Massey  
Kevin Vercher  
Jason Normand  
Dr. Haywood Joiner  
Dr. Randall Dupont  
Elizabeth Beard  
Dr. Nathan Ponder  
Dr. Mary Treuting  
(as needed)

- Building Supervisors

### **Logistics Section:**

- Food Service
- Oaks Housing
- Facility Services Supervisors
  
- Library
- Accounting/Bursar
- Budget
- Additional Faculty & Staff

Jeb Joubert  
Michael Corson  
Greg Bonnette  
James Mitchell  
Michelle Riggs  
Zach McLendon  
Lisa Smith  
(as needed)

## **Specific Building Information**

*See evacuation map appended to this document*

### **1. Coughlin Hall**

#### First Floor

Kimberly King                      Ext. 6459  
Martha McMillan                  Ext. 4462  
Cathy Cormier                      Ext. 4464

Nursing Suite  
Auditorium  
Faculty Offices  
Faculty Lounge  
Lobby  
Restrooms  
Conference Room  
First Aid Room

### **Evacuation Area E1**

#### Second Floor

Rhonda Gaspard                  Ext. 6463  
Sandra Gremillion                Ext. 6466  
Liz Simons                          Ext. 4453

Nursing Labs  
Computer Labs  
Classrooms  
Offices  
Restrooms  
Lobby  
Stairwells (3)

### **2. Science Building**

Nathan Sammons                  Ext. 6416  
Jamie Holmes                      Ext. 6431  
Christof Stumpf                    Ext. 6434

#### First Floor

Science Office  
Faculty Offices  
Auditorium  
Classroom  
Labs  
Restrooms  
Patio Area

### **Evacuation Area E3**

#### Second Floor

Faculty Offices  
Classrooms  
Labs  
Chemical Storage  
Stairwells (3)

### **3. Abrams Hall**

Mary Lemoine                      Ext. 6537  
Deron Thaxton                      Ext. 6409  
Chad Gauthier                      Ext. 6489

Chancellor's Suite  
Student Aid and Scholarships  
Enrollment & Admissions  
Registrar's Office

### **Evacuation Area E2**

Accounting Services  
Finance & Administrative Services  
Procurement Services  
Restrooms

### **4. Oakland Hall**

### **Evacuation Area E1**

Dana Lyles                      Ext. 0132

First Floor

Office Suite  
Classrooms  
Faculty Offices  
Restrooms  
Breezeway

**5. Chambers Hall**

Ashley Nelson                  Ext. 6414  
Rafael Romero                      Ext. 6544  
Randall Dupont                      Ext. 4489

Business Administration Office  
Classrooms  
Faculty Offices  
Break Room

**6. Fitness Center**

Bob Austin                      Ext. 6467  
Kolby Carter                      Ext. 6408

First Floor

Locker Rooms  
Faculty Offices  
Break Room  
Training Room  
Pool Area  
Gym

**7. Bolton Library**

Michelle Riggs                      Ext. 2960  
Rusty Gaspard                      Ext. 6443  
Michael Waller                      Ext. 0102

First Floor

Library Office  
Circulation  
Restrooms  
Faculty/Staff Offices  
Rare Books Room

**8. Student Center**

Catherine Kent                      Ext. 2604  
Katie Cooley                      Ext. 4492

Second Floor

Classrooms  
Faculty Offices  
Restrooms  
Stairwells (2)

**Evacuation Area E1**

Student Study Room  
Computer Labs  
LSUE Offices  
Restrooms

**Evacuation Area E3**

Second Floor

Weight Room  
Cardio Room  
Classrooms  
Restrooms  
Stairwells (2)

**Evacuation Area E3**

Second Floor

Archives  
Stairwells  
Faculty/Staff Offices  
Study Rooms  
Restrooms

**Evacuation Area E2**



First Floor (West)

Computer Lab  
Bookstore  
Art Gallery  
Bookstore Warehouse

Second Floor (West)

Student Engagement  
Testing Center  
Staff Offices  
Conference Room  
Restroom

Jeb Joubert                    Ext. 0115  
Judy Lacombe                Ext. 6430

First Floor (Main)

Food Service Area  
Cafeteria  
Brumfield-Caffey Annex  
Sentry Room  
Lobby  
Mailroom  
Middleton Room  
Live Oaks Room  
Restrooms  
Kitchen  
Student Government Offices

Second Floor (Main)

Bayou Robert Room  
Game Room  
                         Restrooms  
Stairwells  
Offices

**9. Avoyelles Hall/Golf Course**

Julie Gill                      Ext. 4456  
Melissa Parks                Ext. 6454

**Evacuation Area E3**

Offices  
Classrooms  
Clubhouse  
Restrooms

Cart Shed  
Restrooms  
Restaurant

**10. Facility Services**

Kevin Vercher                Ext. 6429  
Candy Davis                  Ext. 6475

**Evacuation Area E5**

Administrative Offices  
Shop  
Restrooms

                         Breakroom  
Warehouses  
Storage Buildings

**11. Foundation & Alumni House**

Lynn Eddlemon                Ext. 2917

**Evacuation Area E5**

Offices

Restroom

**12. Children's Center**

**Evacuation Area E2**

Danette Cormier 318-473-6482

Classrooms  
Offices  
Restrooms

Playgrounds  
Kitchen

**13. Weldon "Bo" Nipper (Technology Center)**

**Evacuation Area E2**

Ethan Lipsey Ext. 2973  
Jason Normand Ext. 4442  
Takeyra Wagner Ext. 4446

Computer Labs  
Restrooms  
Kitchen

Offices  
Server Room  
Lounge

**14. Baptist Collegiate Ministries**

**Evacuation Area E2**

Jamey Gilliland 318-226-6950

Kitchen  
Main Room

Office  
Restrooms

**15. Catholic Student Organization**

**Evacuation Area E2**

Lynn Ray Ext. 6496

Kitchen  
Main Room  
Restrooms

Office  
Chapel

**16. Utility Plant**

**Evacuation Area E3**

Greg Bonnette 337-831-3646

First Floor  
Offices  
Plant Area

Second Floor  
Storage Room  
Stairwell

**17. The Oaks**

**Evacuation Area E2**

Michael Courson Ext. 2616  
RA on Duty Ext. 2614

First Floor  
Offices  
Lobby

Game Rooms  
Storage Room  
Laundry

First, Second & Third Floors for Residence Halls

Common Areas  
Bathrooms

Bedrooms  
Breezeways

**18. Alexandria Museum of Art**

**Per Downtown Plan**

Catherine Pears                      318-443-3459  
Front Desk                              318-443-3458

**19. Allied Health Education Center**

**Per Downtown Plan**

LaKeshia Williams    Ext. 6495  
Hayley Edwards                      Ext. 4441

**20. Mulder Hall**

**Evacuation Area E4**

First Floor

Mona Wallace                      Ext. 6446  
Eamon Halpin                      Ext. 2603  
John Rowan                          Ext. 6446

Black Box Area  
Classrooms  
Stairwells (2)  
Back Hallway  
Concession/Ticket Rooms

Paint Room  
Kiln Room  
Offices  
Ceramics Room  
Font Hallway

Second Floor

Gerard Dumancas    Ext. 4436  
Purujit Gurjar                      Ext. 2969  
Jessica Ringo                          Ext. 6517

Classrooms  
Restrooms  
Conference Room

Stairwells (2)  
Black Box 2<sup>nd</sup> Floor  
Computer Lab

Third Floor

Eric Alai                                      Ext. 4469  
Melissa LaBorde                      Ext. 6536  
Holly Wilson                              Ext. 6581

MAPS Suite  
HIPS Suite  
Conference Room  
Restrooms

AEH Suite  
Education Suite  
Faculty Offices  
Stairwells (2)

**21. Soccer House**

**Evacuation Area E5**

Michael Poropat      Ext. 5971

Locker Rooms  
Concession Stands

**22. University Police Department**

**Evacuation Area E5**

Donald Collins              Ext. 6427

Offices  
Common Areas

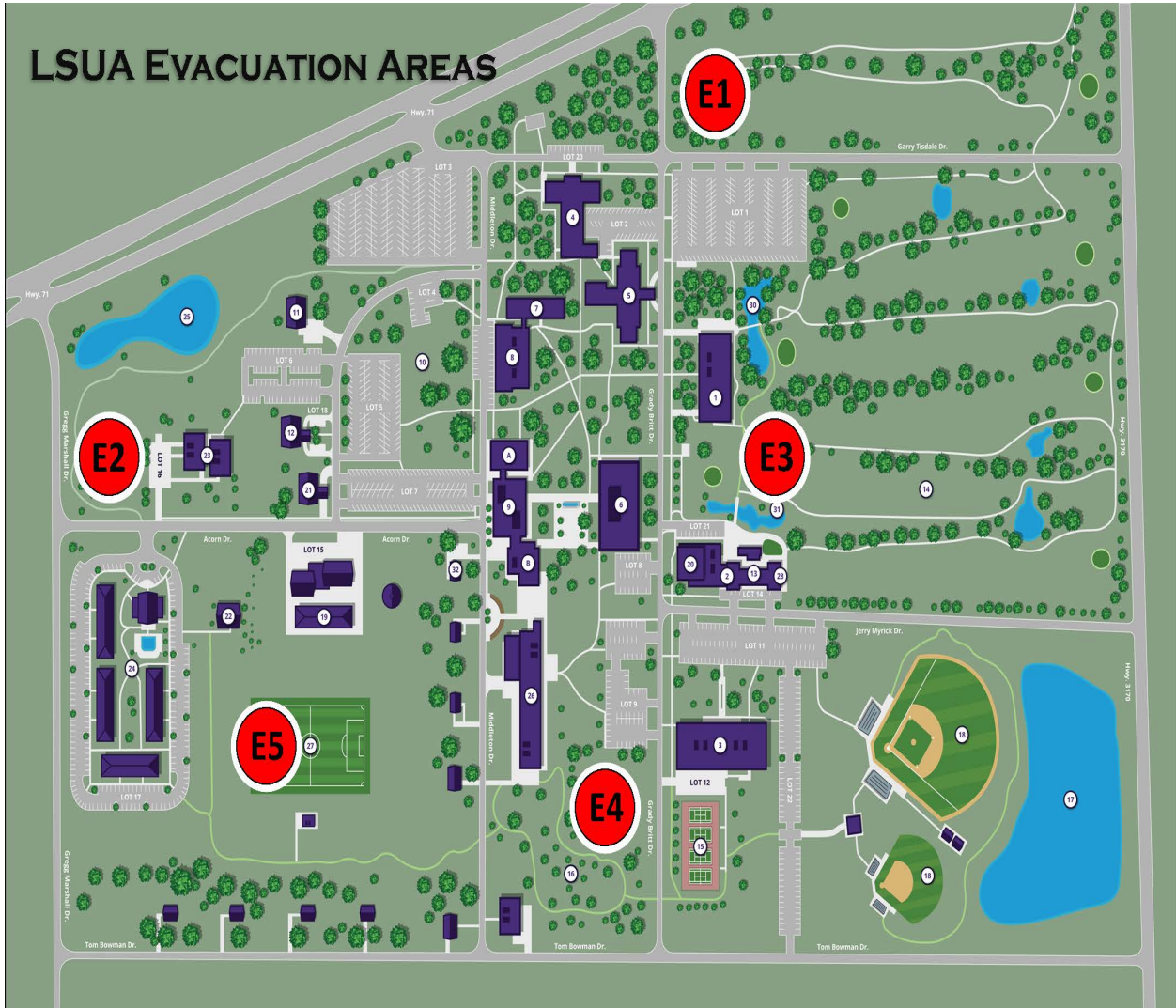
**23. Epps House**

**Evacuation Area E5**

Staff                      Ext. 2971

Common Areas  
Front Porch

# Evacuation Map



# **LAB SAFETY & CHEMICAL HYGIENE PLAN**

## **1. PURPOSE AND SCOPE**

The purpose of this Plan is to describe the safe and proper use, handling practices, and procedures to be followed by personnel working in University laboratories necessary to protect them from potential health and physical hazards presented by chemicals used in the workplace, and to keep chemical exposures below specified limits. The laboratory safety requirements apply to all faculty, staff, and students engaged in the laboratory use of hazardous chemicals. While the Plan establishes work practices to promote safety in the laboratory, each individual has the first responsibility for ensuring that good health and safety practices are implemented in the laboratory.

## **2. GENERAL PRINCIPLES**

The Chemical Hygiene Plan is a written program which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting personnel from the health hazards presented by hazardous chemicals. The major objectives of the plan are described in Appendix A of the OSHA Laboratory Standard based on the National Research Council's publication "Prudent Practices in the Laboratory".

- A. Control all chemical exposures as necessary to protect worker health. General precautions for handling similar groups of laboratory chemicals may be adopted, rather than specific guidelines for particular chemicals. Skin contact with all chemicals should be avoided as a cardinal rule.
- B. Avoid underestimation of risk - Even for substances of no known significant hazard, exposure should be minimized; for work with substances which present special hazards, special precautions should be taken. One should assume that any mixture will be more toxic than its most toxic component and that all substances of unknown toxicity are toxic.
- C. Provide adequate ventilation - The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by use of hoods and other ventilation devices.
- D. Institute a chemical hygiene program - A mandatory chemical hygiene program designed to control exposures is necessary; and should be a regular, continuing effort; not merely a standby or short term activity. Its recommendations should be followed in academic research and teaching laboratories, as well as by full-time laboratory personnel.
- E. Control chemical exposures below the PELs, TLVs - The Permissible Exposure Limits of OSHA and the Threshold Limit Values of the American Conference of Governmental Industrial Hygienists should not be exceeded.

## **3. GENERAL PROGRAM MANAGEMENT**

Each individual is responsible for complying with all LSUA, state, and federal rules, regulations, and required procedures; and is held accountable for their actions. If a PI/Supervisor does not take appropriate action to address problems noted during inspection or audits, he or she may be subject to compliance and enforcement action. Issues of non-compliance will be taken to the Department Head and Vice Chancellor for action. Deliberate failure to comply which results in serious jeopardy to personnel safety and health or the environment may result in loss of laboratory privileges.

- A. Vice Chancellors, Directors, Department Chairs, and Laboratory Supervisors/Coordinators are responsible for maintaining safe operations in their labs on a daily basis. Specific responsibilities include:
  - i. Ensure the Chemical Hygiene Plan is written and followed in their areas.
  - ii. Assure that adequate safety resources are available to laboratory personnel.
- B. The Campus Safety Officer and Science Laboratory Coordinator (unfilled position as of 10/30/2014) are responsible for providing overall coordination for the Chemical Hygiene Plan (CHP). Specific responsibilities of the Campus Safety Officer and Science Laboratory Coordinator include:

- i. Provide initial training for managers, supervisors, and safety coordinators concerning requirements of the program and their responsibilities.
  - ii. Provide guidance for the preparation of procedures, chemical inventories, and training programs required by the CHP.
  - iii. Ensure routine inspections are conducted in the laboratory areas.
- C. The Chemical Hygiene Representative (CHR) is a chemistry faculty member who is qualified by training or experience, to provide technical guidance for the continuing implementation of the CHP. Specific responsibilities of the CHO include:
- i. Work with administrators and other personnel to develop and implement appropriate chemical hygiene policies and practices.
  - ii. Monitor procurement, use, and disposal of chemicals used in the lab.
  - iii. Maintain current knowledge concerning the legal requirements of regulated substances in the laboratory.
  - iv. Seek ways to improve the CHP.
  - v. Help project directors develop precautions and adequate facilities.
  - vi. Participate in investigation of serious accidents involving hazardous chemicals.
- D. Faculty and Principle Investigators are responsible for maintaining safe operations in their labs on a daily basis. Specific responsibilities include:
- i. Be familiar with this Chemical Hygiene Plan and ensure that all work is conducted in accordance with requirements of this Plan. They should contact the CHO for advice and assistance regarding this Plan and implementing the provisions of this Plan when needed.
  - ii. Provide written standard operating procedures for specific laboratory procedures.
  - iii. Ensure worker or student training at the time of initial assignment to the area, whenever a new hazard is introduced to the area or when reassigned to an area using new or different materials and/or processes.
  - iv. Provide appropriate personal protective equipment and require its proper use and maintenance.
  - v. Ensure an inventory is completed for all chemicals used in their work areas and the information is added to the chemical inventory database.
  - vi. Review and understand MSDSs on materials used by personnel under their direct supervision and inform personnel as new MSDSs become available.
  - vii. Ensure MSDS files are available in the work area and are readily accessible to personnel.
  - viii. Ensure that personnel requests for MSDSs and other materials are promptly handled, requesting any necessary information or help from the Science Laboratory Coordinator.
  - ix. Ensure that all containers of hazardous materials are labeled with chemical name or trade name.
  - x. Prepare a hazard analysis to identify each hazard, and to assure that protective equipment, procedures and emergency response plans are adequate for each hazard, and for the maximum credible emergency event.
  - xi. Plan for accidents and ensure that appropriate supplies are in place and procedures are established for responding to an accident, including cleaning up chemical spills.
  - xii. Monitor the safety performance of the staff to ensure that the required safety equipment, practices and techniques are understood and are being employed and ensure that action is taken to correct work practices that may lead to chemical exposures or releases.
  - xiii. Report all accidents involving an employee's or a student's chemical exposure or involving a chemical spill that may constitute a danger of environmental contamination to the Supervisor, the Science Laboratory Coordinator, and the Campus Safety Officer. If the spill is significant, also notify LSUA Police immediately.
  - xiv. Investigate all chemical accidents and near misses to determine the cause and take appropriate corrective action to prevent similar accidents. Contact the CHR, the Science Laboratory Coordinator, or the Campus Safety Officer, when needed, for assistance with investigations, assessment, and recommendations for corrective action.
- E. Employees, staff, students, and visitors working with or around hazardous chemicals in a laboratory responsibilities include the following:
- i. Follow LSUA's chemical hygiene procedures and all safety and health standards and rules.
  - ii. Understand and follow all standard operating procedures.
  - iii. Develop good personal hygiene habits.
  - iv. Report all hazardous conditions to the supervisor.
  - v. Wear or use prescribed protective equipment.

- vi. Refrain from operating equipment without proper training or equipment that has safety defects.
- vii. Complete LSU online Chemical Safety Training (Faculty) and apply the principles learned. Read and apply (Students) Laboratory Safety guidelines.
- viii. Understand the hazards of chemicals used and the signs and symptoms of excessive exposure.
- ix. If an emergency occurs related to an experiment, provide emergency response personnel with information about the conditions that caused the emergency and the existing situation in the laboratory.

#### **4. LABORATORY AND CHEMICAL SECURITY**

The Chemical Facility Anti-Terrorism Standards (6 CFR Part 27) and the efforts of the Department of Homeland Security (DHS) has increased the awareness of laboratory and chemical security. DHS has defined specific chemicals as "high risk" and has initiated controls on these chemicals if a facility exceeds a trigger amount. LSUA has several of these compounds in levels below the trigger level. While LSUA is not required to comply with the formal DHS requirements, it is important to be aware of the need for increased laboratory security. To minimize the theft and improper use of hazardous chemicals including toxic and corrosive substances the following actions should be taken.

- A. Complete a chemical inventory of your laboratory and maintain the inventory in the chemical inventory data base. Note particularly hazardous substances and particular security risks.
- B. Close and lock laboratory doors when no one is present.
- C. Do not leave hazardous materials unattended at any time when not secured.
- D. Areas where biological agents, radioactive material or particularly hazardous chemicals are stored should be kept secure when not in use.
- E. Restrict access to the laboratory to authorized personnel only and become familiar with these people.
- F. Report any missing inventory to chemistry faculty, Department Head, or the Campus Safety Officer.
- G. Prohibit the use of lab space, materials and equipment without the knowledge and approval of the chemistry faculty.

#### **5. BASIC RULES AND PROCEDURES FOR WORKING WITH CHEMICALS**

General Rules are fundamental safety precautions which should be familiar to all lab users and followed at all times

##### **A. Introduction to Standard Operating Procedures**

The OSHA Lab Standard identifies eight "elements" that must be included in a Chemical Hygiene Plan. The first of these is Standard Operating Procedures (SOPs) "relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals. [29 CFR 1910.1450 (e)(3)(i)]." This is especially important if your lab operations include the routine use of particularly hazardous substances, i.e., "select carcinogens," reproductive toxins, and substances which have a high degree of acute toxicity [29 CFR 1910.1450 (e)(3)(viii)].

A standard operating procedure (SOP) is a written set of instructions or guidelines that detail the uniform procedures to be followed routinely, and safety precautions to take when carrying out a particular experiment or procedure. The development and implementation of standard operating procedures for critical activities is a core component of promoting excellence in a laboratory and for ensuring a safe, healthy, and environmentally sound workplace. For these reasons, the development of SOPs is an essential administrative tool to be used in the laboratory and is a tool that is required by the OSHA Laboratory Standard.

Each lab needs to have Standard Operating Procedures that are clear, concise, and useful to lab personnel for training and safety purposes. SOP's may be developed according to a process or procedure, to classes of hazardous chemicals, individual hazardous chemicals, or any other reasonable approach that address health and safety concerns of an experimental protocol. SOP's need to be written that address specific processes of the lab. A copy of all SOP's developed must be located in the laboratory spaces and be available to all people in the laboratory. However there are some basic SOP's that are generally applicable to all labs. These general safety procedures are



designed to ensure basic levels of personnel health and safety in the laboratory, for routine and common practices, uses, and chemicals.

Teaching laboratories may use laboratory textbooks as their SOP's as long as students are following experiments in the textbook. If the student is asked to perform experiments outside of the textbook, the instructor must provide the student with the proper SOPs.

## B. Basic Information Sources for Handling of Chemicals

Prior to working with chemicals, there are certain steps that must be taken to understand the hazards of the work using chemicals. The primary chemical safety information sources for assessing the hazards of chemical use are Material Safety Data Sheets (MSDSs) and Chemical Container Labels.

### i. Material Safety Data Sheets (MSDSs)

Under the OSHA Hazard Communications Standard (29CFR 1910.1200), all personnel working with hazardous materials must have access to MSDS, and be trained in the safe handling of the material. MSDSs are documents, prepared by chemical manufacturers, which provide information about the chemical's physical and chemical hazards and recommended exposure limits, and list the means for controlling those hazards. MSDSs also provide information about first aid, emergency procedures, and waste disposal. MSDS should be reviewed before beginning work with a chemical to determine proper use and safety precautions.

OSHA has ruled that electronic access to MSDSs is an acceptable alternative to maintaining paper files. Each lab, department, or work group has the option to maintain a hard copy MSDS binder or file. As a minimum, each should maintain an inventory of hazardous materials names and suppliers and methods to access the MSDS. Please contact the Science Laboratory Coordinator if you need assistance in interpreting MSDS information.

### ii. Chemical Container Labels

Chemical container labels are a good resource for information on chemical hazards. All containers of hazardous chemicals must have labels attached. Labels on purchased chemicals must include:

1. The common name of the chemical;
2. The name, address and telephone number of the company responsible for the product;
3. Appropriate hazard warnings.

The warning may be a single word (e.g. Danger, Caution, Warning) or may identify the primary hazard both physical (e.g. water reactive, flammable, or explosive) and health (e.g. carcinogen, corrosive or irritant).

Most labels provide additional safety information to help personnel protect themselves from the substance. This information may include protective measures and/or protective clothing to be used, first aid instructions, storage information and emergency procedures.

Laboratory personnel are responsible for:

1. Inspecting incoming containers to be sure that labels are attached and are in good condition and contain the information outlined above.
2. Reading the container label each time a newly purchased chemical is used. It is possible that the manufacturer may have added new hazard information or reformulated the product since the last purchase.
3. Ensuring that chemical container labels are not removed or defaced, except when containers are empty.
4. Labeling any secondary containers used in the laboratory, to prevent unknown chemicals or inadvertent reaction. Secondary container labels must include chemical name, date prepared, name of preparer, and hazard warning.
5. Verifying that chemical waste containers have complete and accurate chemical waste labels. Chemical waste labels must include container size, the words "HAZARDOUS CHEMICAL WASTE", name of instructor or PI, phone number, a description of how it was generated (example: Waste Chem 1301 Experiment 11), Primary DOT Class, Secondary DOT Classes, Ingredients and an approximate content range, and DOT Hazard associated with each ingredient.

### C. Accidents and Spills.

All personnel should know the emergency procedures, "Response to Chemical Spills and Accidents."

- i. Eye contact: promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention.
- ii. Ingestion: Consult MSDS.
- iii. Skin contact: Flush area and remove contaminated clothing. Consult MSDS.
- iv. Clean-up: Promptly clean up spills using appropriate protective apparel and equipment and proper disposal.
- v. All significant accidents should be carefully analyzed with the assistance of the Campus Safety Officer and/or the Science Laboratory Coordinator and the results distributed to those who might benefit.

#### Response to Chemical Spills and Releases

Chemical spills and releases vary considerably in significance. If it is possible for the person involved to clean up the spill or stop the release safely, then it is appropriate for the person to do so. The following steps should be followed to respond to chemical spills and releases which cannot be controlled or cleaned up by lab personnel or workers at the scene:

1. Notify Supervisor and determine the level of severity
2. Supervisor will determine whether or not to call 911 first, then call the Science Laboratory Coordinator (473-6517) and Campus Police (5555 or 473- 6427). Obtain MSDS and make available to emergency response personnel
3. Protect yourself and others from exposure to chemicals and vapors
4. Control ignition sources if flammables are involved, i.e. electrical switches, open flames, etc.
5. Begin evacuation if necessary to preserve health and safety
6. Follow directions from 911 Personnel, Science Laboratory Coordinator and Campus Police

The level of severity is determined from the following:

LEVEL 1: Minor spill in work or lab area controlled and cleaned up by workers or lab personnel. No response by Science Laboratory Coordinator or University Police

LEVEL 2: Moderate spill which causes work area personnel to be unable to control and/or clean up. Such may include accidents where large areas in the work area are impacted by debris or chemicals. Science Laboratory Coordinator or area Supervisor will control activities with assistance from Campus Police and perform gross cleanup. Where injuries are involved, Rapides Parish EMS will be called by Campus Police if needed. (refer to NOTE under Level 3 if a serious injury is involved.)

LEVEL 3: Large spill which is not a threat to the public and is contained or limited to the campus. Such spill may require evacuation of buildings under the direction of LSUA Police. Rapides Parish Hazmat will be called to assist or take control where there is need for analytical assistance, site assessment and/or manpower. Hazmat will assume role of Incident Commander with assistance from Campus Safety Officer, Science Laboratory Coordinator, and University supervision/faculty.

NOTE: The Louisiana State Police Right to Know Unit and the Rapides Parish Hazmat Unit will be contacted if there is a hazardous materials release with:

- a. an injury with hospitalization, or a fatality, or
- b. a fire or explosion which potentially threatens off site personnel, or
- c. a release of a hazardous material in an amount which exceeds the reportable quantity (check with Science Laboratory Coordinator for quantities), and which may get offsite.

LEVEL 4: An event where a major portion of the campus is affected, or the spill is a threat to

the neighboring community or environment. In this event, Rapides Parish Hazmat and State Police will be notified to assume incident commander status and coordinate activities of all concerned. Such an event would include train derailment, tanker truck accident, pipeline rupture, plane crash, major fire involving hazardous materials, etc. All other agencies will follow the guidance of the State Police.

NOTE: Containers of chemicals or chemical mixtures that may be unstable or sensitive to movement may have to be handled as a bomb. In such cases, the Campus Safety Officer and Science Laboratory Coordinator will work through University Police to have the Alexandria Police Bomb Squad or Louisiana State Police Bomb Squad respond.

#### Response to Accidents Involving Injuries

The following steps should be followed to respond to injuries resulting from accidents:

1. Determine the extent of the injury to decide the best mode of response. Avoid further injury to the victim or to oneself.
2. If the injury will require medical treatment other than first aid, call 5555 or 473-6427 immediately, providing directions to university police and indicating whether or not chemicals or other agents are involved.
3. Render first aid at the scene for minor injuries. More serious injuries will require treatment by the Campus Safety Officer or Emergency Room at a local hospital.
4. Assist emergency personnel upon arrival, directing them to the scene.
5. Secure the scene for an accident investigation by the Campus Safety Officer or the supervisor.
6. Complete paperwork on accident as required.

#### D. Avoidance of Routine Exposure.

Each laboratory employee with the training, education and resources provided by supervision, shall develop and implement work habits consistent with this CHP to minimize personal and co-worker exposure to the chemicals in the laboratory. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to all chemicals shall be minimized.

General precautions which shall be followed for the handling and use of all chemicals include:

- i. Skin contact with all chemicals shall be avoided.
- ii. All personnel shall wash all areas of exposed skin prior to leaving the laboratory.
- iii. Mouth suction for pipetting or starting a siphon is prohibited.
- iv. Eating, drinking, smoking, gum chewing, or application of cosmetics in areas where laboratory chemicals are present shall be prohibited.
- v. Storage, handling and consumption of food or beverages shall not occur in chemical storage areas or refrigerators. Glassware and utensils used for laboratory operations shall not be used for food or drink consumption or preparation.

#### E. Laboratory Equipment and Glassware.

Each employee shall keep the work area clean and uncluttered. At the completion of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.

In addition, the following procedures shall apply to the use of laboratory equipment:

- i. All laboratory equipment shall be used only for its intended purpose.
- ii. All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in an appropriately labeled broken glass container constructed with corrugated cardboard or other puncture-resistant material.
- iii. All evacuated glass apparatus shall be shielded to contain chemicals and glass fragment
- iv. All laboratory equipment shall be inspected by the user on a periodic basis for safety defects, and replaced or repaired as necessary.

#### F. Laboratory Apparel

A key factor in laboratory safety is the use of personal protection equipment.

- i. Safety glasses meeting ANSI Z87.1 are required for personnel and visitors in laboratories so designated, and will be worn at all time when in the laboratory. Glasses do not provide protection from chemical splashes.
- ii. Chemical goggles and a full face shield (if necessary) shall be worn during chemical transfer and handling operations as procedures dictate.
- iii. Sandals, open toed shoes, and bare feet should be prohibited.
- iv. Lab coats provide adequate body protection for most operations in the laboratory. Laboratory coats will be laundered on a periodic basis (at least monthly). Laboratory coats shall be removed immediately upon discovery of significant contamination.
- v. Appropriate chemical-resistant gloves shall be worn at all times when there may be skin contact with chemicals. The degradation and permeation characteristics of the glove material selected must be appropriate for protection from the hazardous chemical being handled. The Science Laboratory Coordinator or Area Supervisor will provide glove selection information as required. Gloves are to be removed before leaving the work area. Care should be taken not to contaminate working area where gloves are not required by working in the area with gloves.
- vi. Thermal-resistant gloves shall be worn for operations involving the handling of heated materials and cryogenic fluids. Thermal-resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.
- vii. Respirator usage shall comply with LSUA's Respiratory Protection Program. If the faculty or principle investigator feels that respirators are needed, the Chemical Hygiene Officer or Campus Safety Officer should be contacted for an exposure assessment. Voluntary use of respirators is encouraged where relief from nuisance odors or dust is desirable. A copy of OSHA's statement, "Information for Personnel Using Respirators When Not Required Under the Standard," must be given to those individuals using respirators voluntarily.

#### G. Basic Safety Equipment

Every laboratory must have basic safety equipment.

- i. Spill control kits should be on hand to clean up small spills.
- ii. Safety shields should be used where applicable for protection against explosion and splash hazards. Line of sight protection is desirable.
- iii. Fire extinguishers must be available in all laboratories and all personnel shall be trained in their use annually.
- iv. Safety showers are to be available in all laboratories where chemicals are handled. Every laboratory worker should know where the showers are and be trained in its use.
- v. Eyewash fountains must be available in the laboratories to provide a continuous soft stream of water for 15 minutes. The fountains should be located close to the safety showers so that the eyes can be washed while the body is showered if necessary.

#### H. Personal Work Practices

All personnel shall be alert for unsafe practice and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must correct unsafe practices and/or conditions promptly.

- i. Long hair and loose-fitting clothing shall be confined close to the body to avoid being caught in moving machine/equipment parts.
- ii. Use only those chemicals appropriate for the ventilation system.
- iii. Avoid unnecessary exposure to all chemicals by any route.
- iv. Do not smell or taste any chemicals
- v. Avoid working alone in the laboratory. When working alone in the laboratory arrange for periodic checks by personnel in adjacent laboratories.
- vi. Avoid practical jokes or other behavior which might confuse, startle, or distract another worker.
- vii. Wash areas of exposed skin well before leaving the laboratory.
- viii. Keep work area clean and uncluttered, with chemicals and equipment being properly stored. Clean up the work area on completion of an operation or at the end of each day.
- ix. Plan your work. Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before beginning any new operation.

- x. Use engineering controls. Use the hood for operations which might result in the release of toxic chemical vapors or dust. See section on engineering controls.

#### I. General Laboratory Use Policy

Laboratories are usually shared areas and it is the responsibility of all lab personnel to be aware of the activities in the lab.

- i. Sole Occupancy of Building. Under normal circumstances, work should not be done in the laboratory when the only person in the building is the laboratory person performing the work. If necessary, special arrangements need to be made to ensure periodic checks on that person.
- ii. Hazardous Operations. All hazardous operations are to be performed during a time when at least two people are present in the laboratory. At no time shall a laboratory person, while working alone in the laboratory, perform work which is considered hazardous. The determination of hazardous operations shall be made by the laboratory supervisor and/or CHR.
- iii. New Procedures or Chemicals. Prior to the use of new procedures or chemicals, a review of potential hazards created must be undertaken within the department. The review should also be completed when there is a substantial change in the amount of chemicals used or a change in the equipment used in the procedure.
- iv. Unattended Operations. When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:
  - a. The laboratory supervisor will review work procedures to ensure the safe completion of the operation.
  - b. An appropriate sign will be posted at all entrances to the laboratory.
  - c. The overhead lights in the laboratory will be left on.
  - d. Precautions shall be made for the interruption of utility services during the unattended operation (loss of water pressure, electricity, etc.).
  - e. Containment will be provided in the event of unexpected hazardous material releases.
  - f. Tubing for running water must be in good condition and secured at connections by clamps or wire.

#### J. Special Procedures for Highly Hazardous Substances.

Special precautions shall be taken when performing laboratory work with any of the following chemical categories: carcinogens, reproductive toxins, substances that have a high degree of acute toxicity, or chemicals whose toxic properties are unknown.

- i. Allow only those persons specifically trained to work with highly hazardous chemicals to work with those chemicals. Designated Area - A hood, glove box, portion of a laboratory, or an entire laboratory must be designated for high hazard use.
- ii. Designated areas shall be posted and their boundaries clearly marked. Posting shall include the identification of the highly hazardous chemicals used in the area. Access to the laboratory should be restricted during high hazard chemical use by the laboratory supervisor.
- iii. Suitable gloves and long sleeves shall be worn during use of high hazardous chemicals.
- iv. Use the smallest amount of chemical that is consistent with the requirements of the work.
- v. Use high-efficiency particulate air (HEPA) filters or high-efficiency scrubber systems to protect vacuum lines and pumps.
- vi. Decontaminate a designated area when work is completed.

### 6. IDENTIFICATION AND CLASSIFICATION OF HAZARDOUS CHEMICALS

Determine the specific chemicals you are working with and the type of hazard they present. Many of the substances encountered in the laboratory are known to be toxic or corrosive, or both. Compounds that are explosive and/or are highly flammable pose another significant type of hazard. New and untested substances that may be hazardous are also frequently encountered. Thus, it is essential that all laboratory personnel understand the types of toxicity, recognize the routes of exposure, and are familiar

with the major hazard classes of chemicals. The most important single generalization regarding toxicity in chemical research is to treat all compounds as potentially harmful, especially new and unfamiliar materials, and work with them under conditions to minimize exposure by skin contact and inhalation.

The OSHA Laboratory Standard defines a hazardous chemical as "a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed personnel. The term 'health hazard' includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes, or mucous membranes". Highly flammable and explosive substances comprise a category of hazardous chemicals.

The major classes of hazardous and particularly hazardous chemicals and their related health and safety risks are discussed in further detail below.

#### A. Carcinogen

Carcinogens are chemical or physical agents that cause cancer. Carcinogens are defined as known or suspected carcinogens in the latest edition of the National Toxicology Program's "Carcinogens Summary". Generally they are chronically toxic substances which cause damage after repeated or long-duration exposure. Their effects may only become evident after a long latency period and are particularly insidious because they may have no immediate apparent harmful effects. For a large number of compounds there is limited evidence of carcinogenicity to animals from studies involving experimental animals. Certain select carcinogens are classified as "particularly hazardous substances" because there is evidence from human studies that exposure can cause cancer. These compounds should be handled using the general procedures for work with hazardous substances.

#### B. Toxic and Highly Toxic Agents

Acute Toxicity Chemicals are any substance for which the LD50 data described in the applicable MSDS (or other literature source) causes the substance to be classified as a level 3 or 4 health hazard according to the HMIS system. It is important to note that the above classification does not take into consideration chronic toxicity (carcinogenicity and reproductive toxicity). Also, note that LD50 values vary significantly between different species, and the human toxicity for a substance may be greater or less than that measured in test animals. OSHA considers substances that are either toxic or highly toxic, as defined above, to be particularly hazardous substances. In evaluating the hazards associated with work with toxic substances, it is important to note that a number of factors influence the response of individuals to exposure to toxic compounds. For example, people are rarely exposed to a single biologically active substance. With this point in mind, it is noteworthy that one toxin can influence the effect of a second. This underscores the importance of maintaining good laboratory practices at all times, and with all chemicals.

#### C. Compounds with a High Degree of Acute Toxicity

Compounds that have a high degree of acute toxicity comprise a third category of particularly hazardous substances as defined by the OSHA Laboratory Standard. Acutely toxic agents include certain corrosive compounds, irritants, sensitizers (allergens), hepatotoxins, nephrotoxins, and neurotoxins, agents that act on the hematopoietic systems and agents which damage the lungs, skins, eyes, or mucous membranes. Substances that have a high degree of acute toxicity are interpreted by OSHA as being substances that "may be fatal or cause damage to target organs as the result of a single exposure or exposures of short duration".

#### D. Reproductive and Developmental Toxins

Reproductive toxins can affect the reproductive health of both male and female personnel and students if proper procedures and controls are not used. For women, exposure to reproductive toxins during pregnancy can cause adverse effects on the fetus; these effects include embryo lethality (death of the fertilized egg, embryo or fetus), malformations (teratogenic effects), and postnatal functional defects. Examples of embryotoxins include thalidomide and certain antibiotics such as tetracycline. Women of childbearing potential should note that embryotoxins have the greatest impact during the first trimester of pregnancy. Because a woman often does not know that she is pregnant during this period of high susceptibility, special caution is advised when working with all chemicals, especially those rapidly absorbed through the skin (e.g., formamide). Pregnant women and women intending to become pregnant should consult with their laboratory supervisor and the Science Laboratory Coordinator or Campus Safety Officer before working with substances

that are suspected to be reproductive toxins.

F. Corrosive Substances

Corrosive substances cause destruction of, or alterations in, living tissue by chemical action at the site of contact. Major classes of corrosive substances include strong acids (e.g., sulfuric, nitric, hydrochloric, and hydrofluoric acids), strong bases (sodium hydroxide, potassium hydroxide, and ammonium hydroxide), dehydrating agents (sulfuric acid, sodium hydroxide, phosphorus pentoxide, and calcium oxide), and oxidizing agents (hydrogen peroxide, chlorine, and bromine). Symptoms of exposure for inhalation include a burning sensation, coughing, wheezing, laryngitis, shortness of breath, nausea, and vomiting. For eyes, symptoms include pain, blood shot eyes, tearing, and blurring of vision. For skin, symptoms may include reddening, pain, inflammation, bleeding, blistering and burns. As a physical hazard, corrosive substances may corrode materials they come in contact with and may be highly reactive with other substances. It is important to review information regarding materials they corrode, and their reactivity with other substances, as well as information on health effects.

G. Irritants

Irritants are defined as non-corrosive chemicals that cause reversible inflammatory effects on living tissue by chemical action at the site of contact. A wide variety of organic and inorganic compounds, including many chemicals that are in a powder or crystalline form, are irritants and consequently, skin contact with all laboratory chemicals should always be avoided.

H. Sensitizers

A sensitizer (allergen) is a substance that causes exposed people to develop an allergic reaction in normal tissue after repeated exposure to the substance. Examples of allergens include diazomethane, chromium, nickel, formaldehyde, isocyanates, arylhydrazines, benzylic and allylic halides, and many phenol derivatives.

I. Flammable and Explosive Substances

A number of highly flammable substances are in common use in campus laboratories. Explosive substances are materials that decompose under conditions of mechanical shock, elevated temperature, or chemical action, with the release of large volumes of gases and heat. Some materials, such as peroxide formers, may not be explosive, but may form explosive substances over time.

J. Hazardous Substances with Toxic Effects on Specific Organs

Substances included in this category include (a) hepatotoxins (substances that produce liver damage such as nitrosamines and carbon tetrachloride); (b) nephrotoxins (agents causing damage to the kidneys such as certain halogenated hydrocarbons); (c) neurotoxins (substances which produce their primary toxic effects on the nervous system such as mercury, acrylamide, and carbon disulfide); (d) agents which act on the hematopoietic system (such as carbon monoxide and cyanides which decrease hemoglobin function and deprive the body tissues of oxygen); and (e) agents which damage lung tissue such as asbestos and silica.

## 7. HOUSEKEEPING

Only trained and qualified personnel shall be allowed to work in a laboratory at LSUA. Each laboratory worker is directly responsible for the cleanliness of his or her workspace, and jointly responsible for common areas of the laboratory. Laboratory management shall insist on the maintenance of housekeeping standards. Supervisors are responsible for ensuring that personnel are trained to work safely in a laboratory. All laboratory personnel are responsible for reading and understanding this procedure.

The following procedures apply to housekeeping standards of the laboratory:

- A. A cleaning routine should be established for the work area with daily and weekly cleaning schedules in addition to a thorough cleaning once a month.
- B. Keep the area as clean as the work allows. Work surfaces should be kept as clean as possible, with only those items needed for the immediate project on that surface.
- C. Clean all working surfaces at the end of each day.

- D. All apparatus(s) shall be thoroughly cleaned and returned to storage upon completion of usage.
- E. Keep floors clean and free of tripping hazards.
- F. Chemical containers shall be clean, properly labeled and returned to storage upon completion of usage. Labels shall face front. Store flammable liquids in a flammable liquids cabinet. Do not store acids above shoulder height or in unprotected metal cabinets. Store water reactive materials away from water sources, such as sprinkler systems and sinks.
- G. When storing items on shelves, the top of the items should be greater than 18" from the ceiling to ensure adequate coverage by sprinkler heads in the event of a fire.
- H. Shelves should be equipped with doors or lips to prevent items from falling.
- I. Keep an adequately stocked spill kit in the work area. Clean up all small spills immediately. Know what to do in the event of a hazardous material spill and take appropriate action immediately.
- J. Do not let stored items project beyond the front of shelves or counter tops. Restrain material stored near aisles, when necessary, to prevent them from falling. Always restrain compressed gas cylinders.
- K. Keep stairways, hallways, passageways/aisles and access to emergency exits dry and free of obstruction.
- L. Store items so they do not block access to the fire extinguisher(s), safety equipment, electric panel boxes, or other emergency items such as an eyewash or safety shower.
- M. Do not allow combustible material such as paper, cardboard boxes, or pallets to accumulate. Do not place these materials in hallways. Set up a process for immediate disposal or filing of items.
- N. Do not let materials accumulate. Ensure materials, chemicals, and equipment that are no longer needed, are disposed of properly or turned in as excess. Know how to manage laboratory wastes properly.
- O. Do not let materials accumulate in laboratory hoods. The safety of this workspace and the ventilation provided is compromised when excessive chemicals and equipment are kept in this space.
- P. Ensure that proper collection containers for biohazards, sharps, and paper trash are placed near the point of use and are adequate of size.
- Q. Do not over fill collection receptacles.
- R. Ensure that all wastes that are not general refuse (e.g., radioactive, chemical, and biohazardous wastes) are prominently labeled and that custodial staff are trained not to remove these materials from the lab.
- S. Faculty and principle investigators should informally conduct housekeeping and chemical hygiene inspections continually.

## **8. LABORATORY INSPECTIONS AND AUDITS, COMPLIANCE AND ENFORCEMENT**

LSUA has implemented a framework for conducting laboratory/work space inspections and audits to determine laboratory/work space-specific compliance with environment, health, and safety policies, laws, and regulations. The inspections examine a broad spectrum of areas including postings, documentation and training, safety equipment, laboratory/shop protocol, and waste handling. The purpose of the inspection and audit system is to assist LSUA and laboratories/work areas in maintaining a safe work and study environment, ensuring compliance with regulations, identifying the locations where training or retraining is needed, and to fulfill LSUA's commitment to environment, health and safety stewardship.

### **A. Internal Inspections**

The purpose of lab inspections is to promote laboratory safety awareness. Several different laboratory inspection forms are available depending on the type of lab. Inspections are required to be completed in the spring and fall semesters.

- i. Class A Basic Science Research and Teaching Labs
- ii. Class C Basic Science Research and Teaching Labs
- iii. Class C Engineering Research and Teaching Labs
- iv. Level 1 Biosafety Research and Teaching Labs
- v. Level 2 Biosafety Research and Teaching Labs

### **B. Formal Audit**

- i. The Campus Safety Officer (or designee) in conjunction with the respective departmental management will prepare an internal audit schedule. This schedule will be based on the nature of the laboratory activities. The results from previous audits and the available resources to



perform the auditing. Those activities that have higher importance or increased hazards, and those activities that have had non-conformance problems in previous audits will be priorities in the scheduling of audits.

- ii. The goal of this program is to audit all teaching and research laboratories on a three year cycle. All the laboratories under the direction of a principle investigator will be audited as a single unit.
- iii. The Campus Safety Officer will select a trained and qualified auditor(s) to conduct each audit.
- iv. The lead auditor shall be responsible for notifying the auditee and scheduling the audit. The auditee (or a suitable designee) is required to participate in the audit as a team member. A formal notification of the audit which includes a meeting time, tentative agenda, and time frame for the audit will be sent to the auditee and copied to their respective management.
- v. While conducting the audit, the auditors will utilize an Audit Report Form and a Laboratory Safety audit checklist to record the outcome of the audit
- vi. Upon completion of the audit, the auditors (with the approval of the Campus Safety Officer) determine any non-conformances. Any outstanding issues will be shared with the auditee and their respective management. After a suitable time frame to correct outstanding issues, the area can be reviewed by the lead auditor so that corrective actions can be documented.
- vii. The lead auditor is responsible for completing a final audit report. This report will include all relevant issues and their corrections. The final report will be issued to the Campus Safety Officer and copied to departmental management. Upon review of the final report, the Campus Safety Officer can certify that the laboratory is in compliance with the applicable standards.

#### C. Compliance and Enforcement

Each individual is responsible for complying with all LSUA, state, and federal rules, regulations, and required procedures; and is held accountable for their actions. If a PI/Supervisor does not take appropriate action to address problems noted during inspection or audits, he or she may be subject to compliance and enforcement action. Issues of non-compliance will be taken to the Department Head and respective Vice Chancellor for recommendations regarding disciplinary action. Deliberate failure to comply that result in serious jeopardy to personnel safety and health or the environment may result in loss of laboratory privileges.

### 9. CHEMICAL PROCUREMENT, DISTRIBUTION, AND STORAGE

#### A. Procurement.

- i. Before a substance is received, information on proper handling, storage, and disposal should be known to those who will be involved.
- ii. No container should be accepted without an adequate identifying label.
- iii. All substances should be received in a central location.
- iv. LSUA has implemented an internet based chemical inventory system. It is the responsibility of each lab or work area to maintain the inventory by adding compounds upon receipt and deleting compound when gone. This enables the Campus Safety Officer to provide support to the organization and emergency personnel in the event of an emergency. The system also promotes waste reduction by identifying excess chemicals for other departments prior to purchase.

#### B. Stockrooms/storerooms.

- i. Toxic substances should be segregated in a well-defined area with local exhaust ventilation.
- ii. Chemicals which are highly toxic or other chemicals whose containers have been opened should be in unbreakable secondary containers.
- iii. Stored chemicals should be examined periodically (at least annually) for replacement, deterioration, and container integrity.
- iv. Stockrooms/storerooms should not be used as preparation or repackaging areas, should be open during normal working hours, and should be controlled by one person or card-swipe access.

#### C. Distribution.

- i. When chemicals are hand carried, the container should be placed in an outside container.
- ii. Freight-only elevators should be used if possible.

#### D. Laboratory storage.

- i. Amounts permitted should be as small as practical.
- ii. Storage on bench tops and hoods is inadvisable. If hoods are used for storage, they must be labeled as such and not used for experiments.
- iii. Exposure to heat or direct sunlight should be avoided.
- iv. Periodic inventories should be conducted, with the items being discarded or returned to the storeroom/stockroom.
- v. All labels shall face front.

## **10. ENVIRONMENTAL MONITORING.**

In the event of concern about the performance of a hood, when a new hood is put into service, or there is reason to suspect exposure to laboratory personnel, contact the Science Laboratory Coordinator to arrange for monitoring and sampling. This may be desirable when highly toxic or very volatile toxic chemicals are used or stored regularly.

## **11. RECORDS**

Accident reports for any safety related incident are to be completed by the Campus Safety Officer. These records are kept on file for a minimum of three years.

## **12. SIGNS AND LABELS**

- A. Prominent signs and labels of the following types should be posted:
  - i. Emergency telephone numbers of emergency personnel/facilities, supervisors, and laboratory personnel.
  - ii. Locations signs for safety showers, eyewash stations, other safety and first aid equipment, exits and areas where food and beverage consumption and storage are permitted.
  - iii. Warning at areas or equipment where special or unusual hazards exist.
- B. All chemical containers (including waste receptacles) are to be labeled.
  - i. Labeling is important for safe management of chemicals, preventing accidental misuse, inadvertent mixing of incompatible chemicals, and facilitating proper chemical storage. Proper labeling helps assure quick response in the event of an accident, such as a chemical spill or chemical exposure incident. Finally, proper labeling prevents the high costs associated with disposal of "unknown" chemicals.
  - ii. All containers of chemicals being used or generated in LSUA research and teaching laboratories must be labeled sufficiently to indicate contents of the container. On original containers, the label should not be removed or defaced in any way until the container is emptied of its original contents. Incoming containers should be inspected to make sure the label is in good condition. It is also advisable to put a date on new chemicals when they are received in the lab, and to put a date on containers of chemicals generated in the lab and the initials of the responsible person.
  - iii. Abbreviations or other acronyms may be used to label containers of chemicals generated in the lab, as long as all personnel working in the lab understand the meaning of the label or know the location of information, such as a lab notebook, or log sheet that contains the code associated with content information. In addition, small containers, such as vials and test tubes, can be labeled as a group by labeling the outer container (e.g., rack or box). Alternatively, a placard can be used to label the storage location for small containers (e.g., shelf, refrigerator, etc.).
  - iv. Containers of practically non-toxic and relatively harmless chemicals must also be labeled with content information, including containers such as squirt bottles containing water.

## **13. INFORMATION AND TRAINING PROGRAM**

- A. Training Organization. In order to provide specific and effective information to all laboratory users in a timely manner, training for the CHP will employ the "train the trainer" system. The Science Laboratory Coordinator will provide information and training for managers, supervisors, and safety coordinators for each area. The safety coordinator and lab supervisor of each area will then be responsible for implementing and customizing training for their laboratory users.
- B. Training Timing and Frequency.

Information and training shall be provided to laboratory personnel on the following basis:

  - i. Initially, all laboratory personnel shall complete a training program.

- ii. Individuals who are assigned to use new hazardous chemicals and/or new laboratory work procedures must have their training upgraded.
- iii. New personnel shall complete a training program.
- iv. All personnel shall be provided with updated information on an annual basis.

C. Training Components.

This training shall include methods of detecting the presence of hazardous chemicals, physical and health hazards of chemicals in the lab, and measure personnel can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan and shall include:

- i. The contents of the Chemical Hygiene Plan.
- ii. The location and availability of the Chemical Hygiene Plan.
- iii. The permissible exposure limits for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory.
- iv. The physical and health hazards of chemicals in the work area.
- v. Signs and symptoms associated with exposure to the chemicals present in the laboratory.
- vi. Location, availability, and how to use reference material on chemical hygiene including Material Safety Data Sheets.
- vii. The criteria for selection and use of personal protective equipment and the limits of its protection.
- viii. Emergency procedures and the location of emergency equipment

D. Training Documentation.

The PI and lab supervisors are responsible for documenting personnel training. Departments will maintain records of training provided by their instructors.

## 14. WASTE DISPOSAL PROGRAM

All chemicals shall be disposed of in accordance with the LSUA Hazardous Waste Disposal Program, the details of which can be found in the LSUA Safety Manual.

The hazardous chemical waste program is designed to provide a simple and convenient way for disposal of chemical waste.

- A. Do not dispose of hazardous waste in the trash, down drains, or evaporate in fume hoods.
- B. Provide a secondary container for waste collection containers.
- C. Keep waste containers closed at all times except when adding or removing waste. Do not leave funnels in containers.
- D. Label all chemical containers with the name of their contents. Include your name, phone number, and department on the label.
- E. Segregate containers by hazardous class. (i.e. Flammable, Corrosive, Reactive, etc.) Do not mix waste streams.
- F. Position containers so that waste labels are visible.
- G. Maintain ten percent free space in waste containers to allow for expansion.
- H. Attend and document annual training for all persons generating hazardous wastes.
- I. Conduct weekly inspections of hazardous waste collection area and maintain an inspection log.
- J. Maintain emergency equipment (eyewash, showers, etc.) and know what to do in the event of a chemical spill, fire, or explosion.
- K. Post the name and phone numbers for responsible persons to contact 24-hours a day in case of an emergency.
- L. Do not store waste longer than it can be safely stored.

## 15. ENGINEERING CONTROLS

A. Intent.

The engineering controls installed in the laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be realized.

B. Modification.

No modification of engineering controls will occur unless testing indicates that worker protection will

continue to be adequate.

C. Improper Function.

Improper function of engineering controls must be reported to Facility Services, Science Laboratory Coordinator and Campus Safety Officer immediately. The system shall be taken out of service until proper repairs have been executed.

D. Usage

i. Laboratory Fume Hoods.

The laboratory hoods shall be utilized for all chemical procedures which might result in release of hazardous chemical vapors or dust. As a general rule, the hood shall be used for all chemical procedures involving substances which are appreciably volatile and have a permissible exposure limit (PEL) less than 100ppm or are flammable materials. The following work practices shall apply to the use of hoods:

- a. Confirm adequate hood ventilation performance prior to opening chemical containers inside the hood. An inward flow of air can be confirmed by holding a thin strip of tissue at the face of the hood and observing the movement of the paper.
- b. Keep the sash of the hood at or below the indicated maximum operating height except when adjustments within the hood are being made. At these times, maintain the sash height as low as possible.
- c. Storage of chemicals and equipment inside the hood shall be kept to a minimum.
- d. Minimize interference with the inward flow of air into the hood.
- e. Locate apparatus toward the rear of the hood to prevent vapors from escaping.
- f. Leave the hood operating when it is not in active use if hazardous chemicals are contained inside the hood or if it is uncertain whether adequate general laboratory ventilation will be maintained when the hood is non-operational.
- g. The hood shall not be used as a means of disposal for volatile chemicals.
- h. The ventilation system shall be inspected annually and calibrated as needed. The hood face velocity shall be at least 80-85 feet per minute. A record of each inspection shall be maintained by the Chemical Hygiene Officer.

ii. Gloves Boxes and Isolation Rooms. The exhaust air from a glove box or isolation room will pass through scrubbers or other treatment before release into the regular exhaust system.

iii. Flammable Storage Cabinets. Cabinets designed for the safe storage of flammable chemicals can only do so if used and maintained properly. Cabinets are generally made of double-walled construction and are made of 18 gage steel. The doors are two inches above the base of the cabinet is liquid proof to that point. Two vents are provided on opposite side of the cabinet and are equipped with flame-arrester screens. Always read the manufacturer's information and follow prudent safety practices such as:

- a. Store only compatible materials inside the cabinet.
- b. Store chemicals of similar vapor density together when using mechanical ventilation (e.g., heavier than air vapors are vented through the bottom vent and lighter than air vapors through the top vent).
- c. Do not store paper or cardboard inside cabinets with the chemicals.
- d. Do not overload the cabinet.

# **HAZARD COMMUNICATION & CHEMICAL SAFETY PROGRAM**

## **I. GENERAL**

The purpose of the Hazard Communication & Chemical Safety Program is to ensure LSUA employees are effectively informed of potential and existing chemical hazards. Hazardous materials are found in several departments and agencies on campus. This policy assigns responsibilities and provides guidance to comply with applicable ORM Hazard Communication operational and training requirements.

## **II. RESPONSIBILITIES**

### **A. Safety & Risk Manager**

- Overall responsibility for implementation and oversight of the Hazard Communication/Chemical Safety Plan
- Maintain a current list of the type and location of all hazardous material on campus
- Ensure all employees with potential exposure to hazardous material receive appropriate initial and recurrent training.
- Conduct periodic safety and compliance reviews at departmental level
- Coordinate disposal of hazardous materials

### **B. Department Heads / Deans / Directors**

Department Heads/Deans/ Directors who have employees working in areas where hazardous chemicals are stored, handled or used are responsible for:

- Monitoring procurement, storage, use, and proper disposal of hazardous chemicals within their department.
- Creating and maintaining an inventory of all hazardous chemicals. A current copy of this inventory will be provided to the Safety & Risk Manager.
- Ensuring that all hazardous chemicals/products are properly labeled, and that these labels are not removed or defaced.
- Maintaining copies of Safety Data Sheets (SDSs) for each hazardous chemical in the workplace, and ensuring they are readily accessible to employees when they are in their work areas.
- Informing employees of any operations in their work area where hazardous chemicals are present and the location and availability of the written hazard communication program, the inventory, and material safety data sheets.
- Providing employees with training regarding hazards or practices specific to their work area at the time of their assignment and whenever a new hazard is introduced into their work area.
- Determining the required personal protective equipment (PPE) for the procedures and materials in use in their area.
- Ensuring that the proper personal protective equipment (PPE) is available in good condition and that the employees are trained and encouraged in its use.
- Developing safe procedures for work in their area, as well as written procedures for emergencies and evacuations, and train employees in those procedures.
- Providing adequate storage cabinets for hazardous materials.
- Ensuring that laboratory hoods are maintained and calibrated.

### **C. All Other Employees**

Employees are responsible for:

- Planning and conducting each operation according to the LSUA Hazard Communication Program.
- Maintaining area in good order.
- Using the required personal protective equipment.
- Immediately reporting any exposures, injuries, or problems to a supervisor and the

Campus Safety Director.

- Reviewing SDSs prior to using a substance for the first time, and reviewing it periodically thereafter.

### **III. HAZARDOUS CHEMICAL INVENTORY**

The supervisor or designee is required to maintain a list of all hazardous chemicals known to be present in each work area (e.g. maintenance shop, section, etc.) and update the list as necessary.

The inventory must identify:

- Each hazardous chemical by the primary name on the label,
- The manufacturer or distributor of the chemical, and
- Chemical abstract number (CAS).

The inventory must:

- Be kept in the work area in a suitable format, on a log sheet, or in a computer.
- List all hazardous chemicals found in the work area for which the supervisor is responsible including, but not limited to:
  - Laboratory chemicals, janitorial supplies, compressed gases, cleaning products,
  - Materials found in the maintenance departments (such as lubricating oils, solvents, etc.)

### **IV. LABELING REQUIREMENTS**

The supervisor or designee shall ensure that all hazardous chemicals are properly labeled. Labels shall list:

- At least the chemical identity,
- Appropriate hazard warnings, and
- The name and address of the manufacturer, importer or other responsible party.

Portable containers of working solutions of hazardous chemicals shall be labeled appropriately unless they are intended for immediate (during a day's work-shift) use by the employee who prepared it. The contents of all vessels (containing chemicals or products such as cleaning solutions) shall be identified by name on the container.

Chemicals stored in bulk quantities, pipelines, and storage tanks are required to be adequately labeled. Storage tanks or drums may be labeled collectively rather than labeling individual containers if they are not removed from the labeled area and if the hazards are the same. It is the responsibility of the department or area supervisor ordering and using these bulk chemicals to ensure adequate labeling.

Container labeling shall provide an immediate visual warning about the specific harm that may result from exposure to the chemical. If the manufacturer or supplier has adequately labeled the original container, transferring the information on that label to a secondary workplace container is appropriate. In many cases, the chemical manufacturer or supplier may cooperate by providing additional labels, upon request, with a chemical shipment.

In the event that the department needs to create labels, durable printed labels will be available in blank form with chemical names and an assortment of hazard symbols, which may be affixed to the basic label. Personnel responsible for container labeling shall correct any outdated hazard warnings with the updated information as soon as they learn of any hazard characteristic changes.

### **V. SAFETY DATA SHEETS (SDS)**

Department heads will be responsible for implementation and maintenance of a departmental system to insure availability of SDS for every hazardous material in their areas of responsibility. SDS will be readily available in the workplace and reviewed periodically for currency. New and significant health/safety information will be given to affected employees. Supervisors will insure that personnel preparing to use a hazardous substance for the first time review the SDS.

When more than one material safety data sheet is present for a hazardous chemical from the same

manufacturer the one with the most current date shall be kept and all others discarded.

## **VI. EMPLOYEE TRAINING AND INFORMATION**

Employees will be provided information and training at time of their initial assignment and whenever a new hazard is introduced into their work area. Department heads will designate a qualified instructor to conduct this training. Documentation of this training will be maintained at the department level. The minimum requirements for initial training are as follows:

- An overview of the requirements in the LSUA Hazardous Materials Program.
- Chemicals present in workplace operations
- Location of the written Hazardous Control Plan
- Physical and health effects of the hazardous materials listed on the department inventory
- Methods and techniques to determine the presence/release of hazardous materials in the work area
- How to read and understand labels and SDS
- Contingency plans for any exposures or accidents
- Required PPE and its proper use
- Location of SDS file and hazardous chemicals inventory.
- How to lessen or prevent exposure through use of proper work practices

## **VII. NON-ROUTINE TASKS**

Before any non-routine task is performed, employees shall be advised by their supervisor of any special precautions to follow including:

- Specific chemical names and hazards expected to be encountered
- Required PPE and safety measures
- Emergency procedures

## **VIII. CONTRACTORS**

Department Heads will be responsible for providing the following information to contractors working in their area:

- Hazardous material to which they may be exposed
- Recommended measures to lessen potential exposure
- Location of all SDS
- Emergency procedures

The Director of Facilities Services will be responsible contacting external contractors prior to the start of work in order to gather and disseminate information on chemical hazards the contractor may be bringing on campus.

## **IX. HANDLING, STORING, & DISPOSING OF HAZARDOUS MATERIALS**

Each chemical will be handled, stored, & disposed of in accordance with the specific SDS. If there is any question, the SDS should be the primary source of information. The Safety & Risk Manager is overall responsible for the coordination of Hazardous Chemical pickup on the campus.

## **EMERGENCY FIRST AID PROCEDURES**

**Emergency** is defined as an unexpected, serious occurrence resulting in injury or illness, requiring immediate attention. To care for such emergencies, an Emergency Response Team, chaired by a designated "Emergency Response Person In-Charge," is appointed by the Chancellor. This Response Team includes individuals from the faculty, administration and staff. Each member is certified as HeartSaver AED/Healthcare Provider through the American Heart Association. They will be appointed to rotating terms to assure that there are experienced people on the team at all times.

The following general procedures should be followed:

1. For any medical emergency on campus, **911** should be called. The **911** operator will contact Campus Police at that time. All LSUA campus police officers are certified in the HeartSaver/AED class by the American Heart Association. The "Emergency Response Person In-Charge," or in his/her absence a member of the Emergency Response Team, should be called to the scene after the **911** call is placed.
2. AEDs are housed in the Health Center, University Police vehicles (which respond to all medical emergencies), and throughout campus. AEDs are monitored and if there are any problems found, they should be immediately reported to the Safety & Risk Manager.
3. The LSUA Health Center is located in Coughlin Hall and should be utilized for non-emergent medical situations.
4. Following any emergency, a report should be immediately submitted to the Safety & Risk Manager, who will then be responsible for contacting family members, and completing the report for filing and future reference.
5. All employees shall report any injury to the appropriate personnel (immediate supervisor, the Safety & Risk Manager etc.) as soon as possible, at least before the end of the day. On non-emergent injuries, The Safety & Risk Manager will be called to evaluate and treat the injury and the employee will be returned to work. If further medical evaluation or treatment is needed, the employee will be transported to a local medical facility. The immediate supervisor shall be required to complete the first section of an Accident/Incident Report (DA2000) and the last section will be completed by the Safety & Risk Manager after investigation. Human Resources is notified of the situation at this time and will receive the completed DA2000. The information from the DA2000 is used by the Human Resources Director to input the claim electronically. The DA 2000 is kept by Human Resources to be reviewed if needed by the ORM Loss Prevention Officer or LSUA Safety & Risk Manager. If the employee will have loss time, the employee will provide the agency with the treating physician's diagnosis and the length of time he or she is expected to be unable to work.
6. In the event of an injury to a student or visitor, the same procedures should be followed and a DA 3000 will be completed by the Safety & Risk Manager.
7. Any medical emergencies occurring at any site away from our main campus are to call 911 first. The Safety & Risk Manager should then be notified as soon as time permits.



## **BLOOD BORNE PATHOGEN EXPOSURE CONTROL PLAN**

On December 6, 1991, the Occupational Safety and Health Administration (OSHA) issued its final regulation on Occupational Exposure to Bloodborne Pathogens (29 CFR 1910.1030). The OSHA standard was subsequently updated in January 2001 (effective April 18, 2001) with a new title: *“Occupational Exposure to Bloodborne Pathogens; Needlesticks and Other Sharps Injuries, Final Rule”* (the “Standard”). OSHA determined that employees face a significant health risk as the result of occupational exposure to blood and other potentially infectious materials because they may contain bloodborne pathogens. The agency concluded that these hazards could be minimized or eliminated by using a combination of engineering and work practice controls, personal protective clothing and equipment, training, medical surveillance, hepatitis B vaccinations, signs and labels, and other provisions.

The purpose of this program is to reduce or eliminate occupational exposure to blood and other potentially infectious materials and to establish the appropriate response to a situation on campus requiring the administration of first aid for all employees, students, and visitors of Louisiana State University at Alexandria.

All bodily fluids will be considered infectious regardless of the perceived status of the source individual. Procedures for providing first aid and decontaminating/sanitizing contaminated areas will duplicate those developed and used by the health industry. This exposure control plan can minimize or eliminate exposure through the use of protective equipment, training, clean up procedures and medical protocol involving post exposure evaluation.

### **Examples of Blood Borne Diseases:**

HIV: Human Immunodeficiency Virus causes AIDS  
Hepatitis B and C  
Syphilis  
Malaria

### **Preventive Measures –Universal Precautions**

**Use universal precautions at all times: TREAT ALL BLOOD AND BODY FLUIDS AS THEY ARE POTENTIALLY INFECTIOUS.**

1. Gloves shall be worn when contact with bodily fluids can reasonably be expected.
2. Gloves should be changed after each occurrence.
3. Hand washing with soap and water is mandatory after each occurrence.
4. Hand cleaner and antiseptic towlettes may also be used.
5. Wear personal protective equipment (PPE) (examples: latex gloves, safety glasses, goggles, face shields, aprons, boots) whenever blood or body fluids are present.
6. Utilize engineering techniques (examples: tongs, recognized work practices,

specialized equipment) whenever possible.

7. Contaminated sharp objects must not be bent, broken, or recapped by hand.

8. All contaminated sharps must be disposed of in a rigid, leak proof, puncture resistant container. The sharps container must be located as close as practical to the use area and identified as biohazardous.

### **Decontamination Procedures**

1. Call a professional for proper decontamination and disposal.
2. "Spill Kits" are maintained at each building and either require employees to follow the manufacturer's instructions that are provided with the kits or train employees on their use and disposal.

#### **The following are the general guidelines for decontamination:**

- . After an accident, the contaminated area must be cleaned with the proper recommended decontamination solution
- . Cleaning equipment must be properly decontaminated
- . Wear required PPE
- . Restrict access to the area
- . Use disposable supplies whenever possible and dispose of properly

**Disposal: Disposal of all regulated waste shall be in accordance with applicable federal, state, and local regulations.**

All waste with the possibility of contamination of BBP shall be placed in containers that are closeable, constructed to contain all contents and prevent leakage of fluids during handling, storage, transportation or shipping. The waste must be labeled or color-coded prior to removal to prevent spillage or protrusion of contents during handling, storage, transportation or shipping.

### **Post-exposure Procedures**

- . Wash hands with antibacterial soap after contact
  - . Flush eyes and face with fresh water for several minutes after contact
- Immediately notify supervisor, who will contact the University Police and the Campus Safety/Loss Prevention Officer.

### **Other Exposure Hazards**

- . Cleaning surfaces contaminated with blood, vomit, feces
- . ALWAYS wear gloves and protective apron or clothing
- . Be alert for sharp objects, broken glassware, used syringes in trash
- . Do not pick up broken glass – use brush or broom & dustpan
- . Dispose of glass, sharp objects safely
- . Laundry – bloody or contaminated linens or sharp objects

**TRAINING: The training schedule shall be contingent upon the level of exposure to BBP:**

**High Risk: Kitchen staff, police officers, custodial worker, plumbers, child care employees, lab technicians, and public safety workers.**

Workers with high risk of occupational exposure shall receive training within three months of being hired and at least once per year afterwards. The training must be given during working hours and at no cost to the employee and training records shall be maintained for five years.

**Low Risk: General office staff, classroom personnel, faculty**

All employees shall participate in a training program within 12 months of employment. If there are no BBP events, the training shall be required every five years thereafter. If an agency's unit experiences a BBP event, the employees of that unit shall be required to retrain within the following 60 days. Low risk employees will be trained online.

**Work Practice Controls**

When there is a potential for occupational exposure, the department shall provide and ensure use, at no cost to the employee, appropriate Personal Protective Equipment (PPE). Each employee in the high risk category shall have immediate access to an unexpired, complete spill kit. Supervisors are responsible for maintaining the kits in accordance with departmental procedures. Warning labels must be affixed to containers of regulated waste, or any that contain potentially infectious material.

**Responsibilities**

The areas of responsibility listed below are pertinent to the implementation of the Exposure Control Plan at LSUA:

Vice-Chancellors, Directors, and Division/Department Heads are to ensure compliance with the provisions of this plan by all employees within their areas who have a potential for occupational exposure. This includes providing a copy of this exposure control plan to employees, enforcing compliance with this plan, ensuring new employees are properly trained if they are at risk of exposure, ensuring that those employees attend an annual training session, and performing follow-up procedures for all exposure incidents.

Employees are to perform tasks and procedures in a manner that minimizes or eliminates employee exposure and perform duties as established in this exposure control plan and as trained. At-risk employees are to attend the bloodborne pathogens training sessions and annual retraining sessions. Employees are to report exposure incidents to their immediate supervisor as soon as possible.

**Methods of Compliance**

**1. General**

“Universal precautions” or “infection control” is the practice of assuming that anything that could be potentially infectious *is* infectious, such that all such samples/fluids are treated with the same regard. Universal precautions are observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between infected and non-infected body fluid types is difficult or impossible, all body fluids are considered potentially infectious materials.

## 2. Engineering Controls

Engineering controls are to be used to eliminate or minimize employee exposure for each task within the work area. Where occupational exposure remains after institution of these controls and work practice controls, personal protective equipment is used. Engineering controls are used where there is a reasonable likelihood of occupational exposure. Engineering controls, when possible to implement, are the preferred control measures over work practice controls and personal protective equipment.

LSUA utilizes the following types of engineering controls to reduce the possibility of exposure:

- sharps puncture proof containers
- medical waste containers with locking lids
- retractable lancets
- handwashing facilities
- eye wash stations
- ventilating laboratory hoods
- autoclaves

## 3. Work Practice Controls

- Gloves will be worn when administering hygienic care and when handling all body substances.
- Wash hands each time prior to all patient contact and immediately after.
- Following contact with blood or other potentially infectious materials, hands and any other skin will be washed with soap and water. Mucous membranes (mouth, nose, and eyes) are flushed with water. If soap and water are not available, the employee will be provided with antiseptic towelettes or hand cleaner that can be used as an interim measure.
- Contaminated needles and other contaminated sharps are not to be bent, sheared or broken.
- Recapping needles by hand is prohibited.
- Eating, drinking, smoking, applying cosmetics or lip balm is prohibited in areas where there is a likelihood of occupational exposure.
- Food and drink are prohibited in lab or work areas, (i.e., refrigerators, freezers, shelves, cabinets, and on counter tops or bench tops where blood or other potentially infectious materials are present).
- Ambu or resuscitation bags shall be used in administering CPR. An oral airway with a protective face shield should be used if an ambu bag is unavailable.
- Sharp items are handled with extraordinary care to prevent accidental injuries.
- For convenience, small medical waste containers containing a biohazard bag are located at each station in the Clinical Lab. These containers are emptied into a larger medical waste container once reaching full capacity.
- Mouth pipetting/suctioning is prohibited
- All procedures involving blood or other potentially infectious materials are performed in a manner that minimizes splashing, spraying, spattering, and generation of droplets of these substances.
- Specimens taken from test kits and blood samples are labeled immediately with a biohazard sticker and placed in a container that prevents leakage. These kits and samples are stored in a refrigerator in the Clinical Lab.
- Follow department procedures for specific tasks to minimize exposure.

#### **4. Personal Protective Equipment**

Use of proper personal protective equipment is required. Personal protective equipment is provided by LSUA at no cost to an employee with a potential occupational exposure to blood or potentially infectious material. This equipment may include:

- gloves
- gowns
- face shields/masks
- goggles
- ambu or resuscitation bags
- shoe covers
- plastic shields

#### **5. Housekeeping & Decontamination**

- Bloodborne Pathogen clean up kits are available for custodial personnel to address significant bodily fluid spills. These kits are kept in each of the custodian closets in each building. This kit includes the following: absorbent powder, protective exam gloves, protective face shield, shoe covers, apron, isolation mask, scoops/scrapers, absorbent towel, antiseptic towelettes, red biohazard bags with twist ties, and spray disinfectant.
- Glass and chemical clean up kits are available for such spills.
- Properly dispose of materials, using sharps containers or red biohazard labeled bags. (Contaminated laundry which is handled using universal precautions does not need to be labeled).
- Clothing contaminated with unknown blood should be discarded and not reused.
- When a spill has occurred, wear personal protective equipment (gloves, goggles, etc.) and treat with a 1:10 dilution of household bleach (i.e., a 10% solution). Allow to stand for at least 10-15 minutes prior to clean up or disposal. In the event that the area around a broken glass clean-up is contaminated, then the area is to be flooded with the bleach solution *prior to* clean up.
- Contaminated sharps are discarded immediately or as soon as feasible in covered, puncture-resistant, leak proof, labeled containers. When sharps containers and medical waste containers reach full capacity ( $\frac{3}{4}$  full), American 3CI--a medical waste disposal company, disposes of the containers. All containers are appropriately labeled indicating contents.
- Non-contaminated laundry, such as a lab coat, is washed by the individual--all other contaminated laundry is disposed of in a medical waste container.
- Contaminated glassware is put into biohazard bags which are placed in the medical waste containers for disposal.

#### **6. Hepatitis B Post-Exposure Evaluation/Follow-up**

All medical evaluations and procedures including the post-exposure evaluation and follow-up are made

available at no cost to the employee.

**a. Post-Exposure Evaluation and Follow-up**

Employees with an exposure incident are to report the incident to their immediate supervisor and the Safety & Risk Manager. The Safety & Risk Manager will make arrangements for a confidential medical evaluation and follow-up. For all exposure incidents, the route(s) of exposure and the circumstances under which the exposure incident occurred (to include details of the use or non-use of engineering controls, work practice controls or PPE) are documented. The source individual is identified and documented, unless identification is not feasible or prohibited by state or local law.

After consent is obtained, the source individual's blood is tested for HBV and HIV status. If the exposed employee gives consent, a baseline blood sample is collected immediately following the incident with subsequent periodic samples taken at a later date. When the source individual is known to be infected with HBV or HIV, testing of the source individual is not needed.

Results of the source individual's testing will be made available to the exposed employee and the employee will be informed of laws/regulations regarding the privacy rights of the source individual. The results of the source individual's blood test and employee's blood test are confidential and will be known only to the exposure nurse/physician and the exposed employee. Counseling and other features of post exposure evaluation will be offered whether or not the employee elects to have baseline HIV/HBV serological testing.

The healthcare professional evaluating an employee after an exposure incident will be provided with a copy of the bloodborne pathogen regulation, a description of the exposed person's duties as they relate to the incident, documentation of the route(s) of exposure and the circumstances concerning it, results of the source individual's blood testing, if available, and all medical records relevant to the appropriate treatment including vaccination status.

**b. Healthcare Professional's Written Opinion**

The attending healthcare professional will forward a written opinion to the Safety & Risk Manager within 15 days of the completion of the evaluation. The written opinion will be limited to whether HBV vaccination or booster is indicated for the employee and if the employee received such treatment.

The written opinion for post-exposure evaluation and follow-up will be limited to the following:

- (1) the employee has been informed of the results of the evaluation, and/or
- (2) the employee has been informed of the medical status and to whether conditions will require further evaluation or treatment.

All other findings or diagnoses will remain confidential and will not be included in the written report.

## **7. Communication of Hazards to Employees**

### **a. Information and Training**

Supervisors are to ensure that employees with occupational exposure to bloodborne pathogens participate in a training program. Employees are to complete training at the time of initial assignment to tasks where occupational exposure may take place and at least annually thereafter. Training aids utilized by LSUA include videotapes and written materials.

### **b. Labels and Signs**

There are labeling requirements for specimens and samples, the equipment used to store and process the samples, medical waste, containers, etc. All bottles, containers, tubes, etc. in the Clinical Lab are labeled with contents, date, and initials of person who filled the container.

## **8. Recordkeeping**

### **a. Training Records**

Training records are kept by the Safety & Risk Manager. All training sessions are documented in writing. The training record includes:

- dates of training sessions
- contents of training sessions
- names of persons conducting training
- names of all persons attending training sessions

### **b. Medical Records**

Confidential medical records for some individuals with occupational exposure are kept by the Human Resource Department and/or The Safety & Risk Manager. The medical records may include:

- employee's name, address, telephone number and social security number
- any medical records related to the employee's ability to receive vaccinations
- health history, allergies and immunizations
- results of examinations, medical testing, post-exposure evaluation and follow-up procedures.

## **Common Sense Rules**

- . Wash hands & remove protective clothing before eating, drinking, smoking, handling contact lenses, applying lip balm or cosmetics
- . Keep hands away from eyes, nose, mouth while cleaning
- . Frequent hand washing is best defense against spreading infection

## Summary

- . Protect yourself on and off the job; know the facts
  - . Practice good personal hygiene
  - . Follow work rules, use gloves and protective clothing
  - . Wash your hands often, after work or exposure
- \*Keep areas clean – report problems immediately to supervisors

## Terms and Definitions

Blood - Human blood, human blood components (plasma, platelets, and serosanguineous fluids), and products made from human blood (immune globulins, albumin, and factors 8 and 9).

Bloodborne Pathogens - Pathogenic microorganisms that are present in human blood or other potentially infectious material and can infect and cause disease in persons exposed to blood containing the pathogen.  
These pathogens include but are not limited to human immunodeficiency virus (HIV) and hepatitis B virus (HBV).

Contaminated - The presence or reasonably anticipated presence of blood or other potentially infectious materials on any item or surface.

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

Employee - Any permanent or temporary employee, graduate or undergraduate student that receives a university paycheck and could potentially be exposed to bloodborne pathogens in the course of their work.

Engineering Controls - Controls (e.g. sharps with engineered sharp injury protection, needleless systems, use of sharps disposal containers) that isolate or remove the bloodborne pathogens hazard from the workplace.

Exposure Incident - A specific eye, mouth, other mucous membrane, non-intact skin (skin with dermatitis, hangnails, cuts, abrasions, chafing, acne, etc.) or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Handwashing Facilities - A facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.

Occupational Exposure - Reasonably anticipated contact with blood or other potentially infectious materials as well as incidents of needlesticks that may result from the performance of an employee's duties.

Other Potentially Infectious Materials (OPIM) – (1) The following human body fluids other than blood: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures and HIV- or



HBV-containing culture medium or other solutions; and blood, organs or other tissues from experimental animals infected with HIV or HBV.

Parenteral – The piercing of mucous membranes or the skin through such occurrences as human bites, needlesticks, cuts and abrasions.

Personal Protective Equipment - Specialized clothing or equipment worn by an employee for protection against a hazard.

Regulated Waste - Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; pathological and microbiological wastes containing blood or other potentially infectious materials.

Source Individual – An individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee.

Sterilize - The use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

Universal Precautions - An approach to infection control in which all human blood and certain human body fluids are treated as if they are infected with HIV, HBV and other bloodborne pathogens.

Work Practice Controls - Controls that reduce the likelihood of exposure by altering the manner in which a task is performed.

## **SAFETY AND ENVIRONMENTAL RESPONSIBILITIES**

### A. Chancellor

As chief administrator, the Chancellor is responsible for overall direction of the campus safety and environmental program. The chancellor is responsible for establishing policies, assuring that implementation of the policies are facilitated through appropriated resources, and that rules and procedures therein are adhered to by all university personnel and students. The chancellor may delegate certain safety and environmental responsibilities to appropriate levels within the university community.

### B. Vice-Chancellors, Deans/Division/Department Heads

As key administrative elements in the organization of the campus community, Vice-Chancellors and Deans/Division/Department Heads implement safety and environmental programs within their respective organizations and assure that implementation and enforcement is in place for all such programs. Other responsibilities include:

1. Provide for the conduct of periodic self-inspections in their areas of responsibility utilizing the appropriate inspection form.
2. Provide for the immediate investigation of all accidents resulting in personal injury to personnel for whom they are responsible and submit a report of the findings, utilizing the "DA 2000 and DA 3000" form.
3. Cooperate with the University Safety Committee when called upon to do so.

### C. Other Supervisors

As the key figures in the safety and occupational program, the immediate supervisors shall carry out instructions from their superiors and assure that safety and environmental procedures are followed in everyday operations on campus. The following responsibilities are also required:

1. Have a working knowledge of all safety principles and safety rules applicable to their area of responsibility.
2. Conduct periodic self-inspections of their area of responsibility and submit appropriate inspection reports.
3. Investigate all accidents or incidents that could have resulted in injury and/or property damage to determine cause and prevent recurrence.
4. Promote good housekeeping and proper safety performance.
5. Insure that students/employees are schooled in the proper use and maintenance of supplied safety equipment, including personal protective equipment and supplied with same.

6. Insure that the proper tools and equipment are selected for the job and are used correctly.
7. Develop efficient material handling procedures to facilitate safe lifting, carrying, and storage of same.

D. All Employees, Students and Visitors

1. Obey safety and environmental rules and regulations
2. Report to appropriate authorities any unsafe conditions and procedures.
3. Refrain from actions which could cause injury or damage to property due to their lack of training, their condition, or the condition of the equipment.
4. Look out for their coworkers and others to warn/stop actions on their part which could cause injury or property damage.

E. Safety & Risk Manager

1. Directs the implementation of the University Occupational and Environmental Safety Program.
2. Develops and/or makes recommendations for safety/environmental policies as needed.
3. Serves as Chairman of the University Safety Committee.
4. Serves as the coordinator for federal, state, and local agencies regarding occupational and environmental safety matters.
5. Serves as the coordinator for insurance carriers regarding occupational and environmental safety matters.
6. Make safety/environmental inspections when deemed necessary by virtue of accident frequency and/or obvious hazards.
7. Coordinates, along with Facility Services, Fire Marshal interface for the campus.
8. Coordinates the campus safety and environmental training program.
9. Participates as a member of the Emergency Response Team.

F. University Safety Committee

The University Safety Committee shall assist the Safety & Risk Manager in reviewing safety problems, developing means and methods for resolving the problems and in developing the necessary procedures for placing the acceptable means into effect. Specifically, the Safety Committee shall:

1. Assist in developing safety education/training programs designed to create and maintain an interest in job safety.
2. Review reports of serious accidents or fires.
3. Provide suggestions and recommendations to correct hazardous conditions and/or unsafe work practices.

4. Recommend those changes to existing practices or new practices to maximize protection for campus safety and environment.
5. Recommend physical or structural alterations required to eliminate or control hazards.
6. Assist Building Supervisors with quarterly Building Inspections.

## **STANDARDS**

Presently, political subdivisions are not included in the Occupational Safety and Health Act of 1970. Consequently, LSUA does not labor under the Act's requirements (with the possible exception of federally funded research or grant programs).

OSHA standards incorporate by reference other standards adopted by standards-producing organizations. It is, therefore, reasonable for LSUA to endorse those standards applicable to its operations. Some standards-producing organizations that are of considerable importance to us include:

1. American Chemical Society (ACS)
2. American Conference of Governmental Industrial Hygiene (ACGIH)
3. American National Standards Institute (ANSI)
4. American Society of Agriculture Engineers (ASAE)
5. American Society of Mechanical Engineers (ASME)
6. American Society of Safety Engineers (ASSE)
7. American Welding Society (AWS)
8. Compressed Gas Association (CGA)
9. Environmental Protection Agency (EPA)
10. National Fire Protection Association (NFPA)
11. National Institute for Occupational Safety and Health (NIOSH)
12. Southern Building Code (SBC)

However, LSUA is required to comply with local regulations promulgated and enforced by such agencies as the State Fire Marshal Office and the Department of Environmental Quality (DEQ).

A good case could probably be made of the over-regulation of society generally, and academia specifically; however, in view of the never-ending stream of new products, processes, and procedures placed before us, what is the alternative to assuring a safe and healthy environment in which to live, work, and study?

With that in mind, we have judiciously tried to apply generally accepted safety standards as set forth in our safety program.

# **LOUISIANA BUILDING CODE FOR STATE OWNED BUILDINGS**

Any new construction, alteration, addition, or renovation plans for state buildings shall be endorsed by and follow rules and regulations promulgated by Facility Planning and Control.

Additionally, the plans shall be reviewed by the Office of the State Fire Marshal to assure compliance with the National Fire Protection Association Life Safety Code 101 among other codes, local or otherwise.

In order to evaluate the state of an existing building, the Building Supervisor shall inspect, or have inspected, the building on a quarterly basis using inspection report forms available. A copy of the inspection report shall be filed with the Safety & Risk Manager.

Areas of considerable concern include exits and means of egress, panic hardware, locking or obstructing exits and passageways, exit signs and exit ways, fire alarms, fire extinguishers, emergency lightings, sprinkler systems, housekeeping and evacuation diagrams.

## **EXITS AND MEANS OF EGRESS**

Exits shall be so located and exit access shall be so arranged that exits are readily accessible at all times. Where exits are not immediately accessible from an open floor area, safe and continuous passageway, aisles or corridors shall be maintained leading directly to every exit and shall be so arranged as to provide convenient access for each occupant to at least two exits by separate ways of travel.

In no case shall access to an exit be through kitchens, storerooms, restrooms, closets, or similar spaces or other rooms subject to locking.

Ways of exit access and the doors to the exits to which they lead shall be clearly recognizable. Hangings of draperies shall not be placed over exit doors or otherwise located so as to conceal or obscure any exit. Mirrors shall not be placed on exit doors. Mirrors shall not be placed so as to confuse the direction of exit.

## **PANIC HARDWARE FOR REQUIRED EXITS**

Panic hardware is required in some instances by code, and consists of a door latching assembly device which releases the latch upon the application of a force in the direction of exit travel. Only approved panic hardware shall be used.

Required panic hardware shall not be equipped with any locking or dogging device, set screw, or other arrangement which can be used to prevent the release of the latch when pressure is applied to the release bar.

## **LOCKING OR OBSTRUCTING EXITS AND PASSAGEWAYS**

A door shall be so arranged as to be readily opened by the occupant to provide egress at all times when the building is occupied. A latch or other fastening device on a door shall be provided with a knob, handle, panic bar, or other simple type of releasing device; the method of operation shall be obvious even in darkness.

The minimum width of any corridor shall normally be 44 inches in the clear. (Passageways, door, and exits shall be free from obstruction.) IT IS STRICTLY PROHIBITED TO CHAIN AN EXIT DOOR CLOSED IF A BUILDING IS OCCUPIED.

## EXIT SIGNS

Every required sign designating an exit of way of exit access shall be so located and of such size, distinctive color, and design as to be readily visible and shall provide contrast with decorations, furnishings, or equipment which impair visibility of an exit sign. There shall not be any brightly illuminated sign, display, or objects in or near the line of vision to the required exit sign of such a character as to detract attention from the exit sign.

Every exit sign shall be suitable illuminated by a reliable light source. Externally and internally, illuminated signs shall be visible in the normal and emergency lighting mode.

A sign reading “**EXIT**” or similar designation with an arrow indicating the direction of the nearest approved exit shall be placed in every location where the direction of travel to reach the nearest exit is not immediately apparent.

## EMERGENCY LIGHTING

Illumination of means of egress shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use. Artificial lighting shall be employed at such places and for such periods of time required to maintain the illumination. For the purposes of this requirement, exit access hall include only designated stairs, aisles, corridors, ramps, escalators, and passageway leading to an exit.

## FIRE ALARMS

Activation of the protective system shall occur by any or all of the following means but not limited thereto:

- Manual fire alarm initiation
- Automatic heat detection
- Automatic smoke detection
- Extinguishing system operations

Each manual fire alarm station on a system shall be accessible, unobstructed, visible, and of the same general type.

The general evacuation alarm shall operate throughout the entire building.

Audible alarm indicating devices shall be of such character and so distributed as to be effectively heard above the ambient noise level obtained under normal conditions of occupancy.

The fire alarm and heat/smoke detection system shall be tested periodically and the results of the test recorded.

## PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers shall be chosen for the class of fire expected. Class of fire refers to the nature of the fuel involved as follows:

Class A—Fires involving ordinary combustible materials such as wood, cloth, rubber, and many plastics.

Class B—Fires involving flammable or combustible liquids, flammable gases, and similar materials.

Class C—Fires involving electrical energy.

Class D—Fires involving certain combustible metals such as magnesium, titanium, sodium, potassium, etc.

NOTE: The fire class shall be designated on the extinguisher itself.

Extinguishers mounted in cabinets, wall recesses, or brackets shall be placed in such a manner that the operating instructions shall face outward. Extinguishers shall not be obstructed or obscured from view, and cabinets housing extinguishers shall not be locked.

Extinguishers shall be periodically checked and/or maintained, tagged and dated. In general, fire extinguishers must be mounted such that travel distance to an extinguisher does not exceed 75 feet.

#### STORAGE OF FLAMMABLES IN STATE BUILDINGS

Storage of flammable material shall be made in fireproof containers. State buildings and public places of assembly shall be regularly policed to clean up and place in fireproof containers all flammable materials. All places of storage shall be arranged and maintained in such a manner that exit from said places and access to said places for the purpose of firefighting is not in any way impeded.

NOTE: Gasoline, paint, or other flammable liquids shall *not* be stored under stairwells or in halls, aisles, corridors, or passageways.

#### EVACUATION DIAGRAMS

Evacuation diagrams shall be placed on each floor on bulletin boards or areas where persons gather.

Diagrams shall indicate where those individuals are and the safest and most direct route out of the building.

## **BUILDING INSPECTION PROCESS**

1. Locate each component of each category listed within your area of authority, according to the current building Inspection sheet. (Listing this information may help facilitate future Inspections).
2. Identify from the categories listed those items that require regular inspection. Consider the hazards; results of the loss of item use; parts and components likely to develop unsafe conditions; heat; misuse; abuse; theft; etc.
3. Use the appropriate word to describe hazard or condition found; i.e. "broken," "loose," "missing," "holes," etc. Give a more precise description of the unsafe condition when called for. Give a quantitative description when called for.
4. List: (1) the general area, (2) specific item(s) and location(s), (3) hazard or unsafe condition.  
Examples: Emergency Light – Mulder Hall - Unit vandalized.



## INSPECTION CATEGORIES

1. FIRE PROTECTION
  - Extinguishing Equipment
  - Standpipes, Hoses
  - Exits, Stairs, and Signs
  - Evacuation Plans
  - Sprinkler Systems
  - Manual Alarms
  - Emergency Lights
  - Heat/Smoke Detection System
  - Fire Doors
  - Fire Escapes, Handicap Ramps
  - Hydrants
2. HANDICAP EXTENSIONS
  - Visual Alarms
  - Audible Alarms
  - Restrooms
  - Fountains
3. ELECTRICAL EQUIPMENT
  - Bonding
  - Grounding
  - Plugs
  - Cords
  - Extension Cords and Multiple Receptacles
  - Connectors
  
  - Switches
  - Outlets
  - Fuse Boxes
4. BUILDINGS AND STRUCTURES
  - Floor Surfaces
  - Grounds
  - Windows
  - Stairs
  - Roofs/Drains
  - Walls and Partitions
5. HOUSEKEEPING
  - Aisles, Stairs, and Floors
  - Storage and Piling of Materials
  - Janitors' Closets
6. ENVIRONMENTAL CONDITIONS
  - Dusts and Sprays
  - Vapors and Fumes
  - General Illumination
7. FIRST AID
  - Kits
  - Stretchers and Fire Blankets
  - Emergency Showers
  - Eye Wash Stations
8. MISCELLANEOUS
  - Acids and Caustics
  - New Processes, Chemicals, and Solvents
  - Combustible Decorations
  - Emergency Phone Numbers

## GUIDE TO BUILDING INSPECTION

The categories below correspond to those listed on the Building Inspection Report. Items to be inspected within each category are listed separately, along with guidelines for inspecting each.

### 1. **FIRE PROTECTION**

Extinguishing Equipment (fire extinguishers)

Guages shall read "charged"

Mounted with top edge no more than 5' above floor

Proper kind for location

Standpipes, Hoses

Hoses present in all boxes

Condition of hoses

Exits, Stairs, and Signs

Panic hardware gives easily

Exit access blocked by storage or other

Exit door blocked, locked, chained, broken

Exit discharge area blocked

Railings secure

Storage under stairwells

Slippery stair tread surfaces

Exit lights illuminated

Emergency exit signs correspond with emergency exits

All emergency exits lead to the outside

All emergency exit doors swing in direction of exit

Evacuation Plans

Plans posted

Sprinkler Systems

Full, partial, none

Heads broken off, leaking

Sufficient vertical clearance for sprinkler activation (18")

Manual Alarms

Broken, vandalized, missing

Emergency Lights

Battery pack operable (push button to test)

Power generator

Heat/Smoke Detection System

Heat/smoke detectors broken, missing

## **FIRE PROTECTION (continued)**

### Fire Doors

Stairway doors properly self-closing  
Secured in "open" position  
Wedged open

### Fire Escapes, Handicap Ramps

Ramp surfaces and hand rails adequate  
Fire escapes and handicapped routes free and clear  
Fire escape surfaces, handrails, securing adequate

### Hydrants

Condition of surrounding ground, i.e. eroded, flooded, etc.  
Easily visible and accessible

## **2. HANDICAP EXTENSIONS**

### Visual Alarms

### Audible Alarms

### Restrooms

### Fountains

## **3. ELECTRICAL EQUIPMENT**

### Grounding

Metal drums properly grounded to earth  
Electrical installation grounded to earth

### Plugs

Electrical equipment so designed has 3 prongs intact and utilized  
Double insulated where indicated by cord tag; has appropriate housing (plastic)

### Cords

Condition of cord and area where cord meets plug  
Secured to floor in aisles

### Extension Cords and Multiple Receptacles

Circumstances prompting extension cords and locations of same  
Circumstances prompting multiple receptacles and locations of same  
Condition

## **ELECTRICAL EQUIPMENT (continued)**

Connectors	Condition
Switches	Condition
Outlets	Condition Location
Fuse Boxes	Labeled Door closes properly No fuse "substitutions"

## **4. BUILDINGS AND STRUCTURES**

Floor Surfaces	Loose/broken tiles Always damp/wet Uneven surface Slippery
Grounds	Broken/uneven pavement Holes in ground Ground protrusions (metal rods, etc.) Drainage Storm drains clogged
Windows	Operate easily Designated fire windows unblocked; path clear Panels broken/out
Stairs	Condition of treads Landings used as storage
Roofs/Drains	Roof in need of repair; repairs scheduled Drains clogged Drain pipes broken off or cracked
Walls and Partitions	Interfere with emergency exits or exit access Need to be reflected on posted evacuation plans

**5. HOUSEKEEPING**

Aisles, Stairs, and Floors

Storage/debris, etc. in aisles, under or on stairs  
Water/grease/oil on floors

Storage and Piling of Materials

Flammable and combustibles properly stored  
Chemicals stockpiled  
Stacked material in danger of falling/being overloaded

Janitors' Closets

Chemical storage overload  
Junk accumulation  
Oily/greasy rags

**6. ENVIRONMENTAL CONDITIONS**

Dusts and Sprays

Airborne dust or mist from an operation  
Concentration  
Exact location

Vapors and Fumes

Cause (probable or actual)  
Exact location  
Area ventilation

General Illumination

Fixtures/bulbs missing or broken  
Lighting appears adequate

**7. FIRST AID**

Kits

Availability

Emergency Showers

Availability

Eye Wash Stations

Availability

**8. MISCELLANEOUS**

Combustible Decorations

Plastics & paperware, trees, etc., used in decorating (i.e. Christmas)  
Check decorative lighting locations

# **ADMINISTRATIVE ELEMENTS**

## **A. WORK ORDER/HAZARD CONTROL**

The Executive Director of Facility Services is responsible for LSUA's Work Order System/Hazard Control Policy. Identified hazards shall be corrected or made safe in the most expedient method available at the time. Reporting of hazards by all members of the university community, including visitors shall be encouraged. Where a hazard has been identified, a means of tracking the corrective action to completion shall be employed.

Hazards reported to Facility Services are tracked through the work order process. They are treated with appropriate priority to assure that the hazards are corrected in a timely manner. Any workplace hazard can be reported by either calling 473-6475, or emailing [candyd@lsua.edu](mailto:candyd@lsua.edu). The information is immediately entered into LSUA's work order system.

Hazards reported to others in the administration shall result in an active response to check out the report hazard, and to follow up with corrective action within the means of the recipient of the report. Where the recipient cannot correct the hazard, the information shall be forwarded to Facility Services or to the Safety & Risk Manager where action shall be initiated and tracking employed to assure the condition is corrected. Any hazards not corrected within 30 days are forwarded to the ORM Loss Prevention Unit. Copies shall be made to the ORM Loss Prevention Unit upon request.

Where temporary measures must be taken to guard against the hazardous condition, the person receiving the report should assure that these measures are taken, or request Facility Services to follow up on the report to get these protective measures in place. LSUA Police should be notified in any emergency hazardous situation or in the event immediate assistance is required to control access to hazardous locations by others.

Building inspections are conducted on a quarterly basis. Any deficiencies found in quarterly building inspections or inspections done by the State Fire Marshal are also immediately entered into LSUA's work order system.

LSU Alexandria Facility Services utilizes MicroMain XM, a complete computerized maintenance management system. This system is used to address issues of both preventive and routine maintenance.

Routine maintenance is any unscheduled task that arises on campus. Work orders for routine maintenance are created as they are needed. Each are assigned a priority number and completed according to this number.

Preventive maintenance is scheduled tasks that are completed on a daily, monthly, bi-monthly, quarterly, semi-annual, and annual basis. On the last day of each month, tasks are scheduled for the next month. MicroMain XM keeps track of which tasks are to be scheduled for the month. Once the tasks are scheduled, work orders are created for each one and the work is then completed. The frequency of tasks can be altered if deemed necessary. New tasks are easily added at any time.

Work order requests are sent to the Facility Services office. The request is reviewed and prioritized by office personnel. A work order is made and assigned based on the priority given. Each work order is issued a number that can be used for tracking by MicroMain XM. The status of each work order is displayed when the work order number is entered into the MicroMain XM database. If a work order has to remain open for an extended period of time, the person that reported the problem should be notified. Once a work order is completed it is closed out in the system. This is done by entering all time used for all labor assigned to that particular work order.

MicroMain XM stores the records on all completed work orders. A copy is kept in the work order files in Facility Services.

All employees shall be informed on the work order/hazard communication procedures for reporting problems during the initial employee orientation and annually thereafter.

## **B. SAFETY MEETINGS**

Safety meetings on a regular basis can be effective accident prevention tools. Meetings are appropriate prior to and after the start of a new process/procedure—particularly if such process/procedure deals with hazardous materials and/or equipment. All campus wide safety meetings are the responsibility of the Safety & Risk Manager. Documentation for campus wide safety meetings are kept for a minimum of 3 years by the Safety & Risk Manager. Campus wide safety rules are reviewed annually at the Safety Committee meeting.

Safety meetings should be on topics that are safety related, and have effect on the group involved. They should provide for input from attendees with notes taken on suggestions. Ideally, meetings for Facility Services employees should be held on a monthly basis with a presentation on a particular subject followed by adequate discussion. It is generally accepted that short, to-the-point meetings are best; it does not preclude that meetings directed toward a complex process/procedure cannot be considerably longer. Additionally, safety training is presented to any employee upon a new assignment, task, or position with different/additional safety responsibilities or whose safety performance is unsatisfactory.

Safety meetings for faculty, academic units, and other administrative units shall be held on a quarterly or semester frequency. Ideally, Campus wide safety meetings will be conducted at the Faculty/Staff workshops that are held at the beginning of each spring and fall semester. The workshops are mandatory and each employee is required to sign an attendance sheet. During the second and fourth quarter of each year, information regarding safety will be communicated to all LSUA employees in the form of handbooks and/or “Quarterly Safety Tip” emails. Each employee will acknowledge they read the material by forwarding a read receipt to the Safety & Risk Manager.

## **C. INCIDENT AND ACCIDENT REPORTS**

***Any incident or accident should be immediately reported to Campus Police and the Safety & Risk Manager. An incident/accident reporting form will be completed for each incident/accident that occurs whether or not it requires medical expense or lost time.***

ORM DA 2000 is to be used as the basic form for reporting the incidents and accidents of employees. This report is mandatory; it is required by the State and serves as the link between LSUA and The Office of Risk Management.

All employee incidents/accidents are investigated and the DA 2000 is completed by the Safety & Risk Manager. The Assistant Vice Chancellor for Finance and Administrative Services serves as a back-up investigator if the Safety & Risk Manager is unavailable.

The completed DA 2000 should be immediately sent to the Human Resources Management Office with a copy of the LSUA Emergency Response Report. Any employee incident or accident is entered into the STARS system by the Director of Human Resources. The Director of Human Resources also serves as a final reviewer for completeness and accuracy. The DA 2000 should be signed and dated by the final reviewer. All DA 2000s are kept on file for a minimum of 3 years.

ORM DA 2041 is to be used when the incident or accident is involving operating a motor vehicle. This applies to both a university owned or leased vehicle and all personal vehicles while on state business. The Safety & Risk Manager shall be immediately notified of the incident or accident. The Safety & Risk Manager will notify the Office of Risk Management by either fax or email and shall also keep copies of both forms. The DA 2041 form is due within 48 hours after the accident. It is either faxed to ORM at 225-342-4470 or emailed to [DA2041-ORM@la.gov](mailto:DA2041-ORM@la.gov). Copies of the current DA 2041 should be kept in all university vehicles.

If a third party contacts LSUA on a state auto claim, they should be instructed to call the ORM office at 1-225-342-6031.

ORM DA 3000 shall be completed by the Safety & Risk Manager in the event any visitor is injured on the Campus or in a University building. The Assistant Vice Chancellor for Finance and Administrative Services serves as a back-up investigator if the Safety & Risk Manager is unavailable. The Director of Human Resources also serves as a final reviewer for completeness and accuracy. The Safety & Risk Manager will keep completed DA 3000s on file for a minimum of 3 years.

LSUA POLICE REPORTS are made for incidents such as fire, explosions, chemical spills, and other similar incidents where property damages are involved. Copies of these reports are forwarded to the Safety & Risk Manager. They provide notifications and information that can be used in accident investigations.

VERBAL REPORTS are provided to various safety and environmental groups, such as the LSUA Police, Campus Safety Committee Members and Safety & Risk Manager.

## **D. ACCIDENT INVESTIGATIONS**

An **accident** is defined as "an unplanned event(s) that caused personal injury or property damage." An **incident** is defined as "an unplanned event(s) that could have caused personal injury or property damage." All incidents/accidents, including those occurring to non-employees, should be reported to the campus police and the Safety & Risk Manager no later than the end of the work day and then be investigated by personnel responsible for the area in which the incident/accident occurred and the Safety & Risk Manager.

### **Incident/ Accident Reporting Form (DA2000-WC Only; DA3000-GL Only)**

Incidents/accidents do not just happen; they are caused. The Incident/Accident Reporting Forms are used to assist in determining the causes and procedures to prevent the recurrence of similar incidents.

***All spaces on the forms shall be completed. Notations such as N/A (not applicable) are not acceptable.***

These forms are available online in the Loss Prevention portion of the ORM website. They appear under the section called "Forms Available." To access the Loss Prevention portion of the ORM website use the following address: <http://www.doa.la.gov/orm/lpforms.htm>. These forms are also available on the LSUA website.



**NOTE:** When an accident involves an injury that results in employee medical expenses or workers' compensation related loss the HRM Office shall also complete the Employer's Report of Injury/Illness, (LDOL-WC-1007) **in a timely manner**. This form is also known as the DA1973 (E1) and is available on-line at: <http://doa.louisiana.gov/orm/formsCR.htm>

**AFTER ACQUIRING NECESSARY MEDICAL AID FOR INJURED PERSONS**, the supervisor and Safety & Risk Manager should follow these steps in investigating the accident.

1. If possible, ask the person or persons involved to describe what happened. Do not assign blame or fault; just get the facts.
2. Secure the accident scene; Survey the accident scene for information. Gather information; if a camera is available, document the scene with photographs as necessary. Assemble and secure any objects that may have contributed to the incident/accident.
3. Determine if there were any witnesses to the incident/accident and get their written description of the incident/accident.
4. Take whatever steps are necessary to prevent recurrences until the condition can be permanently corrected.
5. Once the Safety & Risk Manager completes the Incident/Accident Reporting Form (DA2000), it should be immediately forward to the Director of Human Resources for review and inputted into STARS. JSAs are used to investigate incidents and accidents if in currently used.

## **E. JOB SAFETY ANALYSIS**

**When to Perform a Job Safety Analysis-** A job safety analysis shall be performed on all jobs that have resulted in an incident/accident trend, death, or a change in a job procedure/equipment.

### **Job Safety Analysis Procedures**

**Step 1: Select the Job-** In selecting jobs to be analyzed and in establishing the order of analysis, the following factors should be considered. They are listed in order of importance.

1. Occurrence of Injuries: Jobs that have produced an incident or accident trend, or death, during the past three years shall be analyzed.
2. Frequency of Accidents: Jobs that repeatedly produce accidents (trends) are candidates for a job safety analysis. The greater the number of accidents associated with the job, the greater its priority for a job safety analysis. Subsequent injuries indicate that preventive action taken prior to their occurrence was not successful.
3. Potential Severity: Some jobs may not have a history of accidents but may have the potential for severe injury or property damage. The greater the potential severity, the greater its priority is for a job safety analysis.
4. New Jobs or a Change in a Job: New operations created by changes in equipment or processes obviously have no history of accidents, but their accident potential should be fully

appreciated. A job safety analysis shall be made on every new job with potential hazards. Analysis should not be delayed until an accident or incident occurs.

5. Death: Any accident that caused the death of an employee shall have a job safety analysis made as part of the investigation.

**Step 2: Perform the Analysis-** The Safety & Risk Manager/Loss Prevention Officer or any supervisor responsible for the task shall perform the job safety analysis using the Job Safety Analysis Worksheet (JSA-1-00). Operator manuals from the manufactures of machines can be used as JSA's. The supervisor or Safety & Risk Manager shall conduct the job safety analysis with the help of employees who regularly perform the task. The job being analyzed shall be broken down into a sequence of steps that describe the process in detail. Avoid two common errors:

1. Making the breakdown too detailed so that an unnecessarily large number of steps result; or
2. Making the job breakdown so general that the basic steps are not distinguishable.

***As a rule, the job safety analysis should contain less than 12 steps. If more steps are needed, the job should be broken into separate tasks.***

Job safety analysis involves the following steps:

1. Selecting a qualified person to perform the analysis.
2. Briefing the employee demonstrating the task on the purpose of the analysis.
3. Observing the performance of the job, and breaking it into basic steps.
4. Recording and describing each step in the breakdown.
5. Reviewing the breakdown and description with the person who performed the task.

Select an experienced, capable, and cooperative person who is willing to share ideas. They should be familiar with the purpose and method of a job safety analysis. Sometimes it is difficult for someone who is intimately familiar with a job to describe it in detail; therefore, reviewing a completed job safety analysis before conducting one may help illustrate the terminology and procedure to be followed.

Review the breakdown and analysis with the person who performed the job to ensure agreement of the sequence and description of the steps. Variations of routine procedure should be analyzed also.

The wording for each step should begin with an action word such as "remove," "open," or "lift."

**Step 3: Identify Hazards-** Hazards associated with each step are identified. To ensure a thorough analysis, answer the following questions about each step of the operation:

1. Is there a danger of striking against, being struck by, or otherwise making injurious contact with an object?
2. Can the employee be caught in, by, or between the objects?

3. Is there a potential for a slip or trip? Can someone fall on the same level or to another?
4. Can employees strain themselves by pushing, pulling, lifting, bending, or twisting?
5. Is the environment hazardous to one's health (toxic gas, vapor, mist, fumes, dust, heat, or radiation)?

Using the Job Safety Analysis Form (JSA-1-00), document hazards associated with each step. Check with the employee who performed the job and others experienced in performing the job for additional ideas. A reliable list may be developed through observation and discussion.

**Step 4: Develop Solutions-** The final step in job safety analysis is to develop a safe, efficient job procedure to prevent accidents. The principal solutions for minimizing hazards that are identified in the analysis are as follows:

1. Find a new way to do the job. To find an entirely new way to perform a task, determine the goal of the operation and analyze the various ways of reaching this goal. Select the safest method. Consider work saving tools and equipment.
2. Change the physical conditions that create the hazard. If a new way to perform the job cannot be developed, change the physical conditions (such as tools, materials, equipment, layout, location) to eliminate or control the hazard.
3. Change the work procedure to eliminate the hazard. Investigate changes in the job procedure that would enable employees to perform the task without being exposed to the hazard.
4. Reduce the frequency of its performance. Often a repair or service job has to be repeated frequently because of another condition that needs correction. This is particularly true in maintenance and material handling. To reduce the frequency of a repetitive job, eliminate the condition or practice that results in excessive repairs or service. If the condition cannot be eliminated, attempt to minimize the effect of the condition.

Reducing the number of times a job is performed contributes to safer operations only because the frequency of exposure to the hazard is reduced. It is, of course, preferable to eliminate hazards and prevent exposure by changing physical conditions or revising the job procedure or both.

In developing solutions, general precautions such as "be alert," "use caution," or "be careful" are useless. Solutions shall precisely state what to do and how to do it. For example, "make certain the wrench does not slip or cause loss of balance" does not tell how to prevent the wrench from slipping. A good recommendation explains both "what" and "how." For example, "set wrench jaws securely on the bolt. Test its grip by exerting slight pressure on it. Brace yourself against something immovable, or take a solid stance with feet wide apart, before exerting slow steady pressure." This recommendation reduces the possibility of a loss of balance if the wrench slips.

If a job or process is changed dramatically, it should be discussed with all personnel involved to determine the possible consequences of the changes. Such discussions check the accuracy of the job safety analysis and involve personnel in an effort to reduce job hazards.

**Step 5: Conduct a Follow-up Analysis-** No less than once per month, each supervisor should observe employees as they perform at least one job for which a job safety analysis has been developed. The purpose of these observations is to determine whether or not the employees are doing the jobs in accordance with the safety procedures developed. The supervisor should review the job safety analysis before doing the follow-up review to reinforce the proper procedures that are to be followed.

**Step 6: Use of the Job Safety Analysis-** The job safety analysis provides a learning opportunity for the supervisor and employee. Copies of the job safety analysis should be distributed to all

employees who perform that job. The supervisor should explain the analysis to the employees and, if necessary, provide additional training.

New employees or employees asked to perform new tasks must be trained to use the safe and efficient procedures developed in the job safety analysis. New employees should be taught the correct method to perform a task before dangerous habits develop, to recognize the hazards associated with each job step, and to use the necessary precautions to avoid injury or accidents.

Jobs that are performed infrequently require additional effort to minimize accident potential. Pre-job instruction addressing the points listed on the job safety analysis, will serve as a refresher to employees who may have forgotten some of the hazards in performing the task and the proper procedure to be used to avoid these hazards.

Finally, the job safety analysis is an incident/accident investigation tool. When incidents/accidents occur involving a job for which a job safety analysis has been performed, the analysis should be reviewed to determine if proper procedures were followed or if the procedures should be revised. When available, owner's and operator's manuals can be used in place of JSAs.

**Step 7: Record Keeping-** Job safety analysis forms should be maintained in the department creating the documents and should be readily accessible to all employees. An index naming the task, date the job safety analysis was completed, and date the analysis was revised should be maintained. If manuals are used as JSA's, they must be kept in the department office and be accessible to all employees.

## **F. SAFETY AND HEALTH INSPECTIONS AND REPORTS**

### **1. Safety and Health Inspections**

a. Building inspection forms must be completed by Facility Services personnel along with the Safety & Risk Manager quarterly in each work unit following a general building and safety inspection. Building inspection forms are kept on file at Facility Services for a minimum of 3 years and shall be made available to the Loss Prevention Officer, agency head, and the Office of Risk Management's Loss Prevention Unit upon request.

b. Inspections performed by individual laboratory and/or shop instructors/supervisors in their specific area of responsibility should be performed at least once per semester. Laboratory and shop supervisors should be constantly on the lookout for safety rules and unsafe workplace conditions.

c. Inspections made by Facility Services personnel include fire extinguishers, fire alarms, sprinkler systems, smoke/heat detection systems, emergency lights, and door closing systems. The inspection frequencies vary, depending on regulatory requirements.

d. Inspections by outside agencies such as DEQ, ORM, or the Office of the State Fire Marshal are conducted at their discretion, or upon request from individuals inside and outside of the university. All records are kept at Facility Services for a minimum of 3 years.

e. Elevator Inspections and Certificates are kept on file at Facility Services. Each elevator has posted information on where certificates are kept.

*NOTE: Inspectors who, in the normal course of inspection, find empty extinguishers, leaking sprinkler heads/valves, broke smoke/heat detectors, etc., shall report same to Facility Services as soon as possible to be entered into the work order system for repair or replacement.*

# USE OF COLOR

## Interiors and Equipment

Perception and visibility are improved by the use of suitable colors on walls, ceilings, floors, and equipment. The light reflecting qualities of surfaces contribute to fuller utilization of available light, and properly chosen colors help eliminate sharp contrasts in brightness in the worker's field of vision, thus contributing to good vision.

White ceilings give maximum brightness. If floors and equipment are rather dark, reflecting 25-40% of the light, then upper walls should have a reflectance of 50-60%.

By judicious use of color, an interior can be made attractive, and thus have a good psychological effect on employees. Light shades are appropriate for most parts of a plant. Green and blue tints give a cool effect and are psychologically valuable where temperatures are relatively high. A soft blue-green color is commonly used on walls. Ivory and cream are warm colors. Rose shades are suitable for female rest rooms, while blue is preferred by men. Light gray is effective for machinery; parts at the point of operation should be painted orange to highlight any dangerous parts.

## Color-Coding

Color is used extensively for safety purposes. While never intended as a substitute for good safety measures and the use of mechanical safeguards, standard colors are used to identify specific hazards. Standards have been developed and are given in American National Standard Z53.1, "Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment." In summary, they are as follows:

RED identifies fire protection equipment, danger, and emergency stops on machines.

YELLOW is the standard color for (a) marking hazards that may result in accidents from slipping, falling, striking against, etc.; (b) flammable liquid storage cabinets; (c) a band on red safety cans; (d) materials handling equipment such as lift trucks and gantry cranes; and e) radiation hazard areas or containers (with purple). Black stripes or "checkerboard" patterns are often used with yellow.

GREEN designates the location of first aid and safety equipment (other than firefighting equipment). (Also, see "BLUE" below.)

BLACK AND WHITE and combinations of these in stripes or checks are used for housekeeping and traffic markings. They are also permitted as contrast colors.

ORANGE is the standard color for highlighting dangerous parts of machines or energized equipment such as exposed edges of cutting devices and the inside of (a) movable guards and enclosure doors, and (b) transmission guards.

BLUE is used on informational signs and bulletin boards not of a safety nature. (If of a safety nature, use green.) Also has railroad uses.

REDDISH-PURPLE identifies radiation hazards; check Nuclear Regulatory Commission (NRC) regulations.

The piping in a plant may carry harmless, valuable, or dangerous contents; therefore, it is highly desirable to identify different piping systems. The American National Standard A13.1, "Scheme for

Identification of Piping Systems," specifies standard colors for identifying pipelines and describes methods of applying these colors to the lines. The contents of pipelines are classified as such:

Fire Protection--Red  
Dangerous--Yellow  
Safe--Green  
Protective Materials--Bright Blue (i.e., inert gases)

The proper color may be applied to the entire length of the pipe or in bands 8-10" (20-25 cm) wide near valves, pumps and at repeated intervals along the line. The name of the specific material is stenciled in black at readily visible locations such as valves and pumps.

Piping less than 3/4" in diameter is identified by enamel-on-metal tags.

The code also recommends highly resistant colored substances for use where acids and other chemicals may affect paints.

## **PLUMBING**

Plumbers are subjected to many safety hazards; especially when working in the University environment.

Plumbing involves facing those exposures most trades are subjected to, plus the additional dangers associated with the removal/repair of science laboratory equipment.

Before dismantling such equipment as lab sinks, drains, pipes, fume hoods, glove boxes, etc., the plumber shall exercise great care.

A check with the professor or researcher in charge shall be made to try to ascertain what the equipment has generally been used for.

Example: If a fume hood which has been used mostly for work involving perchloric acid is to be repaired or removed, a complete wash down, inside and outside, is crucial to doing the job safely. A copious amount of water is the best practical prevention available to combat perchloric acid.

Sinks and pipes might contain residual acids which need neutralizing; again, a check with the professor or researcher in charge is vital to safely completing the job.

Through circumstances beyond his/her control, a plumber is sometimes required to perform a task without benefit of information relative to safety. In the event this happens, the Office of Campus Safety shall be contacted.

Additionally, plumbers shall consult the following items in the manual for other safety rules that could offer protection:

SAFE USE OF HAND AND PORTABLE POWER TOOLS  
ELECTRICAL SAFETY  
EQUIPMENT LOCKOUT PROCEDURES  
SAFETY IN WELDING AND CUTTING OPERATIONS  
PROPER USE OF LADDERS  
THE EMERGENCY RESPONSE UNIT  
ASBESTOS PLANS  
MATERIALS HANDLING  
PERSONAL PROTECTION PROGRAM

# **SAFETY IN WELDING AND CUTTING OPERATIONS**

## General

Before starting welding operations outside shop areas, see Item, Hot Work Cutting/Welding Permit.

## Protective Clothing and Equipment

1. Protective clothing and equipment shall be suitable for the type of work to be performed, kept in good repair, and kept free of oil and grease.
2. Sleeves shall be kept buttoned at the wrist.
3. Collars shall be kept buttoned.
4. Fire resistant gauntlet gloves, aprons of leather or asbestos, and leggings shall be used as protection against radiated heat or sparks.
5. Front pockets on overalls and aprons, and cuffs on pants shall be eliminated.
6. Capes or shoulder covers made of leather or other flame and heat-resistant material shall be worn during overhead welding or cutting operations. Leather skull caps worn under helmet provide protection against head burns. When working in a confined space or an overhead location, ear plugs shall be worn or the ears covered with wire screen protectors.
7. Hard hats or other types of head protectors shall be used where there is exposure to falling objects.
8. Low cut shoes shall not be worn unless the ankles are covered with protective leggings.
9. Employees required to wear respirators shall keep them clean and sterilized. When not in use, such equipment shall be stored in closed containers.
10. The air line to supplied-air respirators shall be provided with a filter which will remove pipe scale, water, oil, mist, and noxious vapors. It shall also be equipped with a pressure reducing valve to prevent the supplied-air pressure from exceeding 25Psi.
11. Shock from electric arc welding can and does kill. Insulating mats of sufficient size shall be used when sitting on the same metal which is being welded. Rubber gloves shall be worn under welding gloves when welding in wet or damp locations, or when the operator is perspiring excessively.
12. After a welding job is completed, the material shall be chalkmarked "HOT," or a warning sign shall be posted to caution other employees.

## Eye Protection

1. Goggles, helmets, hand shields, or other suitable eye protection having the proper lens shade for the work being done shall be worn during all welding or cutting operations. (See attached tables.)
2. Goggles, helmets, and hand shields shall be checked frequently. Equipment with light leaks shall not be worn, as radiation burns will result. Cracked, broken, or loose filter plates must be replaced immediately.

3. Protective colored flash goggles with side shields shall be worn under a hood for protection against harmful rays, flying chips, and sparks when an arc is struck prematurely before the helmet is lowered. The lenses shall be No. 1 or No. 3 shade. Inert gas metal-arc welding by nearby welders requires goggles under the helmet with lens shade as per table.  
NOTE: Momentary observation of an arc without protective lenses can cause a retinal burn, which, in turn, may result in a permanent dark area in the field of vision.
4. When arc welding operations are performed in an area that is not enclosed or isolated, workers or other persons near the welding area (generally within 75' of the arc) shall wear appropriate goggles.
5. Flash shields shall be carried on portable welding carts as standard equipment and shall be used when necessary.

#### Work in Confined Spaces

1. All confined spaces such as tanks, boilers, and compartments shall be ventilated when welding operations are being performed within. When impracticable to provide such ventilation, supplied-air respirators shall be used.
2. When welding, cutting, or burning is performed in confined spaces, the cylinders shall be left outside. When welding operations are interrupted for coffee breaks, lunch, or at the end of the day, the cylinder valves shall be closed to prevent gas leaks into the confined space as this may cause oxygen depletion or an explosion hazard. Before re-entry, the tank atmosphere shall be checked for signs that oxygen depletion, flammable gases, or toxic vapors are not present.
3. In confined spaces where the means of exit is a manhole or other small opening, a means for quickly removing workers in an emergency should be provided, such as a life belt and life line. An attendant shall be stationed outside the exit at times while work is in progress. See Item, "Work In Confined Spaces."

#### Ventilation

1. Mechanical ventilation shall be used as a precaution against breathing welding fumes and dust. When this is not provided, a metal frame respirator or supplied air respirator shall be used.
2. When welding on brass, bronze, galvanized iron, or cadmium plated metals, adequate ventilation shall be provided to carry off vapors. Metals containing or coated with lead, cadmium, zinc, mercury, beryllium, and similar materials produce toxic fumes when welded or cut; the latter evolving into deadly phosgene gas. Chlorinated solvent vapors <200' from inert gas metal-arc welding shall be shielded from the arc.
3. For local exhaust suction devices to be effective, the exhaust hood entrance shall be within 9" of the weld or cut.

#### Fire Prevention

1. When practicable, the object to be welded shall be moved to a safe location designated for welding. If the object to be welded cannot be moved to a safe location, all movable fire hazards in the vicinity shall be taken to a safe place.
2. Welding and cutting operations shall not be done in rooms, compartments, or confined places containing flammable vapors or dusts, nor on containers that have held flammable liquids or gases until all fire and explosion hazards have been eliminated. This is in accordance with recommendations of the American Welding Society, "Standard A6.0--Welding and Cutting



Containers Which Have Held Combustibles.” For petroleum storage tanks, the recommendations of the American Petroleum Institute contained in their Manual No. RP2015, “Cleaning Petroleum Storage Tanks,” shall be followed. Also see Section, “Recycling of Used Steel Drums and Containers.”

3. Welding and cutting operations shall be performed only in areas that have been freed of fire hazards.
4. Welding shall not be performed on the outside or inside of tanks that contain flammable liquids until all explosion or fire hazards have been removed.
5. Before starting welding or cutting operations on tanks or similar surfaces, an inspection shall be made to see that no combustible material is present on either side of the surface.
6. Approved fire extinguishing equipment in good operating condition shall be kept close to all welding or cutting operations.
7. Sheet metal guards, asbestos blankets, or other similar protection shall be used to prevent sparks (which can travel up to 35') from falling on wooden floors, partitions, or on flammable materials that cannot be moved. A fire watcher with fire extinguishing equipment shall be in attendance where combustible materials may be ignited by welding sparks. After the job is done careful inspection of these areas shall be made to ascertain that no sparks are left in flammable materials. The watcher shall be assigned to inspect the area for at least a half hour after work has been completed.
8. To prevent explosions, welding or other burning torches shall not be taken into confined spaces until pressures have been regulated and unless they are to be used immediately. Remove torches as soon as the work is finished.
9. When required, welding permits shall be made available for review by interested parties.

#### Gas Welding and Cutting

##### Storage, Handling, and Use of Cylinders:

1. Special care shall be used in the identification and selection of cylinders to insure that the proper type of gas is used. Identification shall be made from the cylinder tag instead of depending on the cylinder color code.
2. Cylinders shall be handled carefully. They shall not be dropped or jarred.
3. The loading and storage platform shall be used for outdoor storage of cylinders so that they can be transferred between delivery trucks and the platform without being dropped or jarred. Full and empty cylinders of each type of gas shall be stored separately.
4. Cylinders shall be stored so that they will not be knocked over or damaged by falling objects, passing vehicles, or persons.
5. Cylinders shall not be stored near radiators, stoves, or any other sources of heat.
6. Oxygen cylinders shall be stored 20' away from fuel gas cylinders and combustible materials, or if closer, separated by a non-combustible barrier (at least 5' high) with a fire resistance rating of one-half hour.
7. All cylinder storage rooms shall be well ventilated.
8. Unless other suitable provisions have been made to prevent cylinders from upsetting during

use, they shall be securely tied to a substantial stationary object.

9. Cylinder valves shall be closed and valve protection caps replaced before cylinders are moved or placed into storage.
10. Special cylinder carts shall be used for moving cylinders.
11. All cylinders shall be placed in an upright position whether in use or in storage. This prevents fuel gas liquids in LP-Gas or MAPP Gas (Methylacetylene-Propadiene) cylinders or acetone liquid in acetylene cylinders from being discharged through the regulator.
12. Cylinders shall be used in the order they are received from the supplier. When empty, their valves shall be closed, caps replaced, and the cylinders marked "MT Storage" to indicate that they are empty. Also see Section, "Handling, Using, and Storage of Compressed Gas Cylinders."
13. Cylinders shall not be permitted to come in contact with electrical wires.
14. Cylinders shall be placed in locations where they will not come in contact with sparks or flames from welding or cutting work.
15. When cylinders are to be hoisted or lowered by derrick, they shall be securely placed on a suitably designed carrier or platform and attached to the derrick hook by means of a choker sling. Cylinders shall not be lifted by their valve or caps. Electric magnets shall never be used.
16. Oxygen or acetylene cylinders shall be used only when equipped with proper regulators or reducing valves.
17. Regulators or automatic reducing valves shall be used only with the gas for which they are intended and at pressures for which they are intended.
18. While acetylene cylinders are in use, the valve key wrench shall be kept in place. It shall be removed after closing the valve.
19. The fusible safety plug on acetylene cylinders shall not be tampered with.
20. Warm water, never a flame or boiling water, shall be used to remove ice from around the outlet valve of an acetylene cylinder.
21. Leaking acetylene cylinders shall not be placed in service. When uncontrollable leaks are present, the cylinder shall be moved to a well ventilated open area, and the valve shall be opened slightly to permit the acetylene to escape slowly. Warning signs shall be displayed to keep persons with cigarettes or other sources of ignition at a safe distance.
22. The tops of acetylene cylinders shall be kept free of tools or other objects.
23. Fuel gas and acetylene cylinders shall be stored and used valve end up.
24. Fuel gas cylinders shall not be used as a substitute for compressed air, as a source of pressure, nor used for ventilation or dusting operations.
25. Oxygen cylinders shall not be stored near highly combustible material, especially oil and grease, or near reserve stocks of carbide and acetylene or other fuel-gas cylinders, or near any other substance likely to cause or accelerate fire, or in an acetylene generator compartment.

26. Acetylene shall not be used at a pressure >15psi.

#### Hose Lines and Connections

1. Only hose in good condition shall be used. At regular intervals, examine pressurized hose while it is immersed in water to detect leaks.
2. Only hose designated to be used with a specific gas shall be used. In general, hoses can be identified by their color: red=fuel gas, green=oxygen, and black=inert gas.
3. Hose shall be protected from damage by trucks, falling objects, sharp edges, sparks, slag, and open flame.
4. Hose shall be placed so that it will not create a tripping hazard. Excess hose shall be coiled to prevent kinks and tangles.
5. Standard oxygen hose or regulator outlet connections have right-hand threads; fuel gas connections have left-hand threads with a grooved hex on the nut or shank. Connections shall never be forced.
6. Oil or grease shall not be used in making up connections.
7. Tape shall not be used to repair hose. Hose may be spliced using standard brass fittings (not copper tubing) and ferrules or hose clamps designed for this purpose.
8. Welders shall not stand in front of the gauges on the regulator when opening the discharge valve of the tank. Sudden pressure may destroy the gauge, blowing out the glass and parts.

#### Torches

1. Torches shall not be lighted by sparklighters, pilot lights, or matches. Torches shall not be relighted from hot work, especially when operating in a small confined space--if gases do not light instantly, ignition could be violent.
2. Purge oxygen and fuel gas lines individually to remove air and other contaminants before using each day. Do not purge in a confined space.
3. When torches are changed or welding is discontinued for longer than five minutes, all cylinder valves shall be closed.
4. A clear, unobstructed space shall be maintained between the work and the cylinders so that pressure reducing regulators can be reached quickly in an emergency.
5. If a flashback occurs because of combustible gas mixtures burning inside the tip, torch or hose, faulty equipment or misuse is generally the cause. In an oxy-fuel torch, when hissing or squealing is heard, flame has passed the mixer and the torch and cylinder valves shall be shut off and the area vacated for about five minutes. If the torch, regulator, and cylinder are cool, inspect the torch and regulator for inner damage. Discard the hose unless it will pass a pressure test—the greater of either 300psi or twice the operating pressure.

#### Electric Arc Welding

##### Equipment and Cables:

1. Before starting operations, all electrical connections shall be checked to determine that they are securely made and firmly attached to the work.

2. Work leads shall be kept as short as possible.
3. Equipment shall be examined frequently to determine that all electrical connections and insulations on holders and cables are in good condition. Loose cable connections may overheat or arc and cause a fire.
4. Be careful not to connect, the equipment ground lead of single phase units to the 3rd wire (hot) of a 3-phase power source.
5. Line cords with 3-prong plugs shall be connected to a grounded switch box or a grounded mating receptacle respectively. Three-prong plugs with a broken ground prong shall not be used.
6. Safety devices such as circuit breakers and interlocks shall not be shunted out or disconnected. Power sources or line fuses shall be locked out or removed when equipment is being installed, inspected, or serviced.
7. Report any missing enclosures or defects in the motor or generator to your supervisor.
8. Terminals of the welding generator shall not contact the frame of the welder. This produces an electrical ground.
9. Only electrode holders designed to safely handle the maximum rated current required shall be used.
10. Electrode holders that are not fully insulated shall be replaced. Holders with protruding screws shall not be used.
11. Electrodes shall be removed from the holder when not in use.
12. An arc shall not be stricken on a gas cylinder or any pressure vessel as it may seriously weaken the vessel.
13. Only welding cables that are completely insulated, flexible, and of proper size for the maximum current requirements of the work shall be used. Cables shall be regularly inspected for cracks, wear, or damage and repair or replace if necessary.
14. Lengths of cable shall be connected by fully insulated lock-type connectors having a capacity equal to that of the cable.
15. Cable lugs shall be soldered to the cable and shall be securely fastened to give full electrical contact.
16. The exposed metal parts of lugs shall be completely covered with rubber tape and protected with friction tape. Exposed parts of electrical units shall have insulating covers in place before the power is turned on.
17. Proper electrical contact shall exist at all joints when a building structure or pipeline is used temporarily as a ground-return circuit.
18. When a structure or pipe is continuously used as a ground for the machine, all joints shall be electrically bonded to establish a good ground.
19. Pipe containing gases, flammable liquids, or conduits carrying electrical conductors shall not be used as a ground-return circuit.

20. Welders shall make every effort to keep welding cables dry, grease and oil-free, and protected from sparks or hot metal.
21. Cables shall be supported from overhead when practical.
22. Cables laid on the floor or ground shall be protected so they will not be damaged or cause a tripping hazard.
23. Welding cables shall not be located close to other power supply cables or other high-tension leads.
24. When discontinuing work, the power supply switch in the equipment shall be opened and the unit disconnected from the source of power.
25. Welding rods shall be stored in the container on the welding machine; not thrown on floors or staging.
26. Welding shall never take place in damp areas without insulation to protect workers against electrical shock. Dry duckboard or a mat shall be used if necessary.
27. Gas or diesel electric generators shall have the exhaust gases vented to the outside to avoid the toxic effects of carbon monoxide and other gaseous byproducts.

NOTE: The hazards connected with atomic hydrogen and heli-arc welding are essentially the same as described herein for arc welding.

#### Spot Welding

The use of this type of welding presents certain hazards inherent to the nature of spot welding equipment.

1. Prior to spot welding, the material is usually cleaned in a caustic or slightly acid bath. Employees performing these wash operations shall be protected from splashing liquid.
2. Under no circumstances shall the operator of a spot welding machine adjust the contactors. This shall be done by a trained electrician.
3. In hand spot welding installations, eye protection shall be required to protect the operator from the spattering metal.
4. Operators shall exercise extreme care when cleaning the tips of the contactors to prevent having their fingers crushed between tips.
5. Welding of materials such as stainless and high carbon steels causes excessive spattering of metal. Operators shall be cautioned to protect against the possible penetration of the metal into the tips of the fingers. See Item, "Hot Work Permits."

## **FILTER LENS SHADE NUMBERS FOR PROTECTION AGAINST RADIANT ENERGY**

<u>Gas Welding Operation</u>	<u>Shade Number</u>
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1"	3 or 4
Medium cutting, 1" to 6"	4 or 5
Heavy cutting, over 6"	5 or 6
Gas welding (light), up to 1/8"	4 or 5
Gas welding (medium), 1/8" to 1/2"	5 or 6
Gas welding (heavy), over 1/2"	6 or 8
<u>Electric Arc Welding Operation</u>	<u>Shade Number</u>
Shielded metal-arc welding 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	11
Gas-shielded arc welding (ferrous) 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	12
Shielded metal-arc welding 3/16, 7/32, 1/4 inch diameter electrodes	12
5/16, 3/8 inch diameter electrodes	14
Atomic hydrogen welding	10 - 14
Carbon-arc welding	14

# **HANDLING, USING, AND STORING OP COMPRESSED GAS CYLINDERS**

NOTE: Also see SAFETY IN WELDING AND CUTTING OPERATIONS

## **Handling Cylinders**

1. Only cylinders approved for use in interstate commerce for transportation of compressed gases shall be accepted.
2. Numbers or marks stamped on cylinders shall not be removed or changed.
3. Because of their shape, smooth surface, and weight, cylinders are difficult to carry by hand. Cylinders may be rolled on their bottom edge but never dragged. Cylinders weighing more than 40 pounds (18.2 kg total) shall be transported on a hand motorized truck and suitably secured to keep them from falling.
4. Cylinders shall be protected from cuts or scratches.
5. Compressed gas cylinders shall not be lifted with an electro magnet. Where cylinders must be handled by a crane or derrick as on construction jobs, they shall be carried in a cradle or suitable platform and extreme care shall be taken to see that they are not dropped or bumped. Slings shall not be used.
6. Cylinders shall not be dropped or be allowed to strike each other violently.
7. Cylinders shall not be used for rollers, supports, or any purpose other than to contain gas.
8. Safety devices in valves or on cylinders shall not be tampered with.
9. When in doubt about the proper handling of a compressed gas cylinder or its contents, the supplier of the gas shall be consulted.
10. When empty cylinders are to be returned to vendor, they shall be marked EMPTY or NT with chalk. Close the valves and replace the valve protection caps if the cylinders are designed to accept caps.
11. Cylinders to be transported shall be loaded to allow as little movement as possible. Secure them to prevent violent contact or upsetting.
12. Cylinders shall always be considered full and shall be handled carefully. Accidents have resulted when containers under partial pressure were thought to be empty.
13. The fusible safety plugs on acetylene cylinders melt at about the boiling point of water. If an outlet becomes frozen or clogged with ice, it shall be thawed with warm (not boiling) water applied to the valve only. A flame shall never be used.

## **Using Cylinders**

1. Cylinders, particularly those containing liquefied gases and acetylene, shall be used in a secured upright position to prevent them from being accidentally knocked over.
2. Unless the cylinder valve is protected by a recess in the head, the metal cap shall be kept in place to protect the valve when the cylinder is not connected for use. A blow on an unprotected valve might cause high pressure gas to escape.
3. The threads on a regulator or union shall correspond to those on the cylinder valve outlet.

Connections that do not fit shall not be forced.

4. Cylinder valves shall be opened slowly. Cylinders without handwheel valves shall be opened with a spindle key, special wrench, or other tool provided or approved by the gas supplier.
5. Cylinders of compressed gas shall not be used without a pressure-reducing regulator attached to the cylinder valve except where cylinders are attached to a manifold--in which case the regulator shall be attached to the manifold header.
6. Before making connection to a cylinder valve outlet, the valve shall be "cracked" for an instant to clear the opening of particles of dust or dirt. The valve and opening shall always be pointed away from the body and not toward anyone else. Fuel gas cylinder valves shall not be cracked near other welding work, sparks, open flames, or other possible sources of ignition.
7. Regulators and pressure gauges shall be used only with gases for which they are designed and intended. Make no attempt to repair or alter cylinders, valves, or attachments. This shall be done by the manufacturer.
8. Unless the cylinder valve has first been closed tightly, no attempt shall be made to stop a leak between the cylinder and the regulator by tightening the union nut.
9. Fuel gas cylinders in which leaks occur shall be taken out of use immediately and handled as follows:
  - a. The valve shall be closed and the cylinder taken outdoors well away from any ignition source. The cylinder shall be properly tagged and the supplier notified.

A regulator attached to the valve may be used temporarily to stop a leak through the valve seat.

- b. If the leak occurs at a fuse plug or other safety device, the cylinder shall be taken outdoors well away from any ignition source, the cylinder valve opened slightly, and permit the fuel gas permitted to escape slowly. The cylinder shall be plainly tagged. NO SMOKING or IGNITION SOURCE signs shall be POSTED. A responsible person shall stay in the area until the cylinder is depressurized to make sure that no fire occurs. The supplier shall be promptly notified and follow his instructions for returning the cylinder.
10. Sparks, molten metal, electric currents, excessive heat, or flames shall not be permitted to come in contact with the cylinder or attachments.
11. Oil or grease shall never be used as a lubricant on valves or attachments of oxygen cylinders. Oxygen cylinders and fittings shall be kept away from oil and grease such cylinders or apparatus shall not be handled with oily hands, gloves, or clothing.
12. Never use oxygen as a substitute for compressed air in pneumatic tools, in oil pre—heating burners, to start internal combustion engines, or to dust clothing. It shall be used only for the purpose for which it is intended.
13. Cylinders shall never be brought into tanks or unventilated rooms or other closed quarters.
14. Cylinders shall not be filled except with the consent of the owner and then only in accordance with DOT (or other applicable) regulations. No attempt to mix gases in a compressed gas cylinder or to use it for purposes other than those intended by the supplier shall be made.
15. Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and the gas released from the regulator.



### Storing Cylinders

1. Cylinders shall be stored in a safe, dry, well-ventilated place prepared and reserved for the purpose.
2. Cylinders shall not be stored near elevators, gangways, stairwells, or other places where they can be knocked down or damaged.
3. Oxygen cylinders shall not be stored within 20' (6m) of gas cylinders or highly combustible materials.

If closer, cylinders shall be separated by a fire-resistive partition at least 5' (1.6 m) having a fire resistive rating of at least 1/2 hour.

4. Acetylene and liquefied fuel gas cylinders shall be stored with the valve end up. If storage areas are within 100' (30.5 m) distance of each other and not protected by automatic sprinklers, the total capacity of acetylene cylinders stored and used inside the building shall be limited to 2000 ft<sup>3</sup> (57 m<sup>3</sup>) of gas, exclusive of cylinders in use or connected for use. Quantities exceeding this total shall be stored in a special room built in accordance with the specifications of NFPA 51, "Oxygen-Fuel Gas Systems for Welding and Cutting," either in a separate building or outdoors.
5. Acetylene storage rooms and buildings shall be well ventilated. Open flames shall be prohibited. Storage rooms shall have no other occupancy.
6. Cylinders shall be stored on a level, fire resistive floor.
7. To prevent rusting, cylinders stored in the open shall be protected from contact with the ground and against weather extremes such as ice and snow accumulations in winter and continuous direct rays of the sun in the summer.
8. Cylinders are not designed for temperatures in excess of 130°F (54°C). Accordingly, they shall not be stored near sources of heat such as radiators or furnaces, or near highly flammable substances like gasoline, oil or volatile liquids.
9. Cylinder storage shall be planned so that cylinders will be used in the order in which they are received from the supplier.
10. Empty and full cylinders shall be stored separately with empty cylinders plainly identified as such so as to avoid confusion. Cylinders having held the same contents shall be grouped together.
11. A flame or electric arc shall never be permitted to contact any part of a compressed gas cylinder.
12. Storage rooms for cylinders containing flammable gases shall be well ventilated to prevent the accumulation of explosive concentrations of gas; no source of ignition shall be permitted; smoking shall be prohibited; wiring shall be in conduit; electric lights shall be in fixed position, enclosed in glass or other transparent material to prevent gas from contacting lighted sockets or lamps, and they shall be equipped with guards to prevent breakage; electric switches shall be located outside the room.

## PAINTING

Painters are subjected to many safety hazards and exposures including: fire, poisoning, falls, eye injury, strains, and dermatitis.

### A. Fire

After use, cans of paint, thinners, or lacquers shall be closed. This is particularly important when working inside a building or other enclosed area where a heat source or sparks could be present or when moving paints, thinners, or lacquers in a truck or van.

All rags or towels soaked with paint, thinners, or lacquers shall be disposed of in approved containers after each shift. All paints, thinners, or lacquers shall be returned to the shop. Stock shall be kept in appropriate cabinets or bins. The shop shall be kept clean and as free as possible of flammable materials. The shop shall be equipped with at least one 2 C Class B or ABC fire extinguisher. NO SMOKING signs shall be posted in the shop.

### B. Poisoning

Employees using a spray painter shall be protected from harmful mists as a result of overspray. Protection shall meet at least NIOSH/MSHA approved dual cartridge respirator requirements. There are a number of disposable face masks meeting the above requirements. Such protection is vital due to the possible effects of oil and/or lead based or other harmful mists from paints, thinners, and lacquers that could damage the respiratory system. It is also important that a spray paint booth maintain sufficient air velocity to carry overspray and fumes away from the operator's face. Good maintenance and housekeeping of the system is a must for proper operation. (Air ducts shall be kept open, fan belts tight, and paint accumulations removed.) Also see TABLE OF RESPIRATORS.

### C. Eye Injury

When introduced into the eye, paints, thinners, lacquers, or other solvents could produce painful and dangerous results. Painters painting overhead shall wear appropriate eye protection to prevent paint or other materials from dropping into the eyes. When surfaces are prepared for painting by wire brushing, sanding, or scraping, eye protection shall be used. Also see EYE AND FACE PROTECTION CHART.

### D. Falls

See LADDERS AND SCAFFOLDS.

NOTE: It is permissible for painters to use metal ladders, provided the work does not involve removing electrical appliances and/or working around energized equipment or lines.)

### E. Strains

Ladders are heavy and odd-shaped; they present quite a challenge to move, lift, or position. Large ladders shall be handled by two persons to prevent possible strain.

### F. Dermatitis

Some individuals are susceptible to dermatitis, an inflammation of the skin (usually the hands, arms, or neck) caused by paints, thinners, or lacquers. To help prevent dermatitis, employees shall wear long sleeves, gloves, and keep the top button of their shirt buttoned while painting. Painters shall give consideration to wearing a hat when working. Also see HAND PROTECTION.

# **SAFETY RULES FOR WOODWORKING MACHINES**

## **General**

1. All machines shall be constructed and maintained so that they are free of excessive noise and harmful vibration.
2. All machines, except portable or mobile ones, shall be level and shall be securely fastened to the floor or other suitable foundation.
3. Small units shall be secured to benches or stands of adequate strength and design.
4. Tools shall be used only on machines for which they were designed.
5. All safety devices shall be regularly checked for proper adjustment.
6. Machines shall be securely locked and tagged out before cleaning.
7. Loose clothing, long hair, jewelry, and gloves shall not be worn around rotating parts of machinery.
8. Adjustments shall not be made while machines are running.
9. All metal framework on electrically driven machines shall be grounded and shall comply with the National Electrical Code (NFPA-70) and applicable local codes.
10. All machines shall have a cutoff device within reach of the normal operating position.
11. Power controls and operating controls shall be located within easy reach and away from a hazardous area. They shall be positioned so the operator can remain at the regular work location.
12. Each operating control shall be protected against unexpected or accidental activation.
13. There shall be ample marked work space around each machine.

## **Housekeeping**

1. Good housekeeping shall be maintained to prevent buildup of dust, chips, sawdust, and scraps.
2. The working surface of machines shall be kept clear of scrap and waste materials.

## **Guards**

1. All belts, shafts, gears, and other moving parts shall be fully enclosed or be grounded in accordance with American National Standard B15.1, "Safety Standards for Mechanical Power Transmission Apparatus".

NOTE: See MACHINE SAFEGUARDING REQUIREMENTS for more information.

## **Illumination**

1. The machines and the adjacent stock areas shall be adequately illuminated.

General work areas - 50 foot-candles;

Fine work - 100 or more foot-candles.

There should be no shadows or reflected glare.

NOTE: See ILLUMINATION FOR OCCUPATIONAL TASKS for more information.

### Inspection

1. Machines shall be inspected before each use. Areas of inspection include operating controls, safety control, power drives and sharpness of cutting edges, and other parts to be used.
2. Cutting edges and tools shall be kept sharp at all times. They shall also be properly adjusted and secured.
3. All shops and machines shall be inspected on a regular basis. See INSPECTION SCHEDULES AND REPORTS for information on frequencies and inspection forms to use.

### Personal Protective Equipment

1. Individuals in the work area shall wear eye protection times
2. All workers shall wear close-fitting apparel and avoid loose clothing, neck ties, gloves, and jewelry.
3. Hair nets or caps shall be worn over long hair to keep it away from moving parts. Beards shall be kept trimmed close to the face.
4. Safety shoes shall be worn when handling heavy material or when there is potential for foot injury.

NOTE: See PERSONAL PROTECTIVE EQUIPMENT for more information.

### Code References for Woodworking Machines

1. OSHA 1910.213.
2. American National Standard 01.1 and 0.1.a, "Safety Requirements for Woodworking Machinery".

## **GUIDE TO WOODWORKING**

### Table Saw

1. Feed with body to side of stock.
2. Adjust blade to appropriate height.
3. Use guard with splitter and anti-kickback fingers.
4. Keep stock firm against fence.
5. When crosscutting, remove ripfence.
6. Make sure blade is guarded by approved guard.

### Circular Saw

1. Make sure blade is guarded by approved guard.
2. Make sure stock does not bind.
3. Use correct type blade. See "Circular Saw Blade" chart this section.
4. Keep blade tight in arbor.

5. Make sure work is firmly supported.
6. Make sure there are no obstructions to work.
7. Use manufacturer's recommended speed for materials being cut.

#### Radial Arm Saw

1. Rip sawing--direction of (cut) feed and anti-kick fingers.
2. Use blade guards.
3. Pull for cross cuts except 3" - 4" thickness.
4. Make sure end plates on track-arm tight.
5. Clamp handles tight.
6. Make sure material tight to fence.
7. Return cutter to rear of track.

#### Band Saw

1. Feed with body to side of stock.
2. Guard height shall allow 1/2" clearance of material.
3. A band saw should have a tension control device to indicate proper blade tension.
4. Release cuts before long curves.
5. Stop machine to remove scrap or pull out incomplete cut.

#### Jointer/Planer

1. Make sure knife projection which extend beyond this body of the head is not more than 1/3".
2. Use long length stock.
3. Use sharp cutters.
4. Do not pass hands over cutters.
5. Use push stick for small stock.
6. Guard should adjust itself to the moving stock (swinging guard).

#### Wood Shaper

1. The stock should be clamped securely in place.
2. Use correct guard.
3. Feed into knives--do not back off.
4. No feeding between fence and cutter.
5. Collar and starting pin work for irregular work-stock of sufficient weight.
6. Make sure fence opening is only enough to clear cutters.
7. Use stock as guard by shaping the underside of stock.
8. Make sure spindle nut is tight.
9. Shape only pieces 10" or longer.

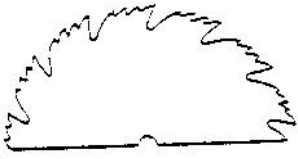
#### Sander

1. Keep hand from abrasive surface.
2. Adequate exhaust system available.
3. Belt or disk in good condition.
4. Sand on downward side of disk.

#### Lathe

1. Stock without defects; glued joints dry. (When using V-Belt, power should be off when changing speeds.)
2. Make sure tool rest is close to stock.
3. Hold tools firmly in both hands.
4. Remove tool rest when sanding or polishing.

## CIRCULAR SAW BLADES FOR CUTTING WOOD



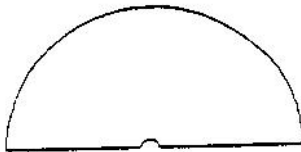
**HOLLOW GROUND PLANER BLADES** are for precision cross cutting, mitering, and rip ping on all woods, plywood, and laminates where the smoothest of cuts are desired.



**MASTER COMBINATIO BLADES** are used for use on all woods, plywood, and wood base materials, such as fiberboard and chipboard. This type blade is better for cross cut and mitering than for ripping in solid woods. The teeth are set, and deep gullets are provided for cool and free sawing.



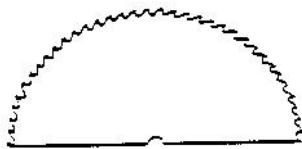
**RIP BLADES** are primarily intended for rip cuts in solid woods. The teeth are set and deep gullets are provided for cool and free cutting.



**PLYWOOD BLADES** are fine tooth cross cut type blades intended for cross cutting of all woods, plywood, veneers, and chipboard. It is especially recommended for cutting plywood where minimum of splintering is desired. The teeth are set and sharpened to give a smooth but free-cutting blade.



**CHISEL TOOTH COMBINATION BLADES** are all-purpose blades for fast cutting of all wood where the best of finish is not required. Ideal for use in cutting of heavy rough timbers, in framing of buildings, etc. It crosscuts, rips, and miters equally well.

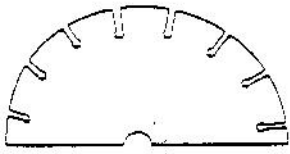


**CABINET COMBINATION BLADES** are for general cabinet and trim work in solid wood. It will cross cut, rip, and miter hard and soft wood to give good accurate cuts for moldings, trim, cabinet work.



**STANDARD COMBINATION BLADES** are used for all hard and soft wood for crosscut, rip, or miter cut. It is especially recommended for use on power miter boxes and for accurate molding and framing work.

## METAL-CUTTING BLADES



NONFERROUS METAL CUTTING BLADES are for cutting brass, aluminum, copper, zinc, lead, bronze, etc. Blades are taper—ground and need no set. Use wax or lubricant on the blades, for best results.



STEEL SLICER BLADES are for cutting thin steel and sheet iron up to 3/32-inch (2.4 mm) thickness. Not for use on nonferrous metals, wood, or plastic. This blade will give off sparks when cutting steel because it cuts by friction. Always keep sawdust chips free of machine to prevent fires.



FLOORING BLADES are tungsten carbide-tipped blades especially designed for rough cutting where occasional nails, metal lathe, etc. will be cut. It is especially recommended for the professional carpenter or installer of air conditioning or heating ducts where it is necessary to cut through old walls and floors. Always wear safety goggles when cutting metal.

## MACHINE SAFEGUARDING REQUIREMENTS

### Flywheels

1. All parts of flywheels which are 7' or less above the floor or working platform shall be guarded.
2. Screens shall be placed in front of all flywheel spokes to protect against accidental contact by pipe, bars, rods, and similar materials.
3. Flywheel pits shall be surrounded with a standard railing and a toeboard not less than 6" high

with standard railing, toe- board, and spoke guard showing.

### Machine Guards

1. Where guard or enclosure is within 2" of moving parts, openings through the guard shall not be  $>3/8"$ .
2. If guards are  $>4"$  and less than  $<15"$  from moving parts, then the largest opening shall not be  $>2"$ . Where slatted guards are used, the opening shall not be  $>1"$ .
3. Inclined belt guards shall be installed so that the vertical clearance between the lower run of the belt and the floor shall not be  $<7'$  at any point outside of the guard.
4. Any panel in a guard exceeding 6 ft or 42" in either dimension shall be supported by an additional frame member.
5. A standard railing placed not  $<15"$  nor  $>20"$  from a flywheel, is acceptable; but a railing shall not be used where other types of guards are specifically required such as guards for gears, sprockets, and V-belts.
6. When frequent oiling must be done inside the guard, openings with hinged or sliding self-closing covers shall be provided. All points not readily accessible shall have oil fed tubes or grease gun connections outside the guard if lubricant is to be added while machinery is in motion.
7. Self-lubricating bearings are recommended.

### Gears, Sprockets, Friction Drives

1. All gears or sprockets shall be completely enclosed or shall be guarded with side flanges extending inward beyond the roots of the teeth.
2. All spokes on open web gears, sprockets, or friction drives shall be guarded to prevent accidental contact.
3. The contact points of all friction drives must be enclosed.

### Belt, Chain or Rope Drives

1. Single or multiple V-belts, located 7' or less from the floor or working platform shall be completely enclosed.
2. Belt, chain, or rope drives 7' or less above the floor or platform shall be guarded. The guard shall extend to at least 15" above the belt or to a height of 7'; however, where both runs of a horizontal belt are 42" or less from the floor, the belt shall be fully enclosed.
3. Overhead horizontal drives with a lower run of 7' or less from the floor or platform shall be guarded on the bottom and sides to a height of not  $<7'$ , or 15" above the lower run.
4. Horizontal flat belts and chain or rope drives, regardless of height above the floor or platform, shall be guarded for the entire length if located over passageways or workplaces. The guards shall follow the line of the pulley to the ceiling or to the nearest wall, thus enclosing the belt effectively. Where this is impractical, the guard shall enclose the top and bottom runs of the belt and the faces of the pulleys. The guards shall be of sufficient strength to restrain broken belts or drives.



### Shafting

1. All horizontal shafting 7' or less from the floor, working platforms, or runways shall be guarded.
2. All vertical or inclined shafting 7' or less from the floor, working platforms, or runways shall be guarded.
3. Shafting under benches or tables shall (1) be completely enclosed, or (2) be guarded by a trough which shall extend at least 2" above or below the shafting; open space is not to exceed 6" below the table or above the floor, or (3) be protected with a rigid guard from the underside of the bench to 2" below the bottom line of shafting.
4. Projecting shaft ends lower than 7' from the ceiling or story base shall either be cut off smooth within one-half the diameter of the shaft or shall be guarded by a non-rotating guard.
5. Unused keyways shall be filled, covered, or guarded.

### Belt Conveyors

1. Means for stopping the motor or engine shall be provided at the operator's station and also at the motor or engine.
2. Conveyor systems shall be equipped with an audible warning system to be sounded immediately before starting up the conveyor.
3. Emergency stop switches shall be arranged so that the conveyor cannot be started again until the actuating loop switch has been reset to running or "ON" position.
4. All conveyors passing over occupied locations shall be guarded so as to prevent material from falling.
5. All belt conveyor head, tail, tension, and dip take-up pulleys shall be guarded to cover the entire sides of the pulleys and along the run of the belt a sufficient distance so that a person cannot reach behind the guard and become caught in the nip point between the belt and pulley.

NOTE: See attached DRAWINGS:

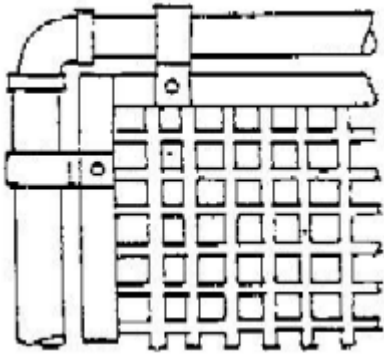
Typical Examples of Guard Construction

Totally Enclosed Guard, Split, and Hinged for Either Top or Side Opening

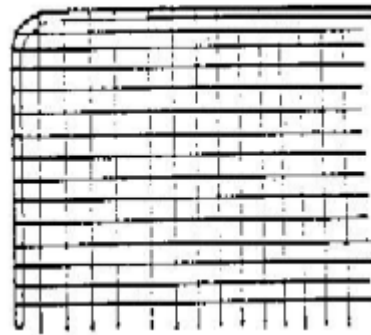
Combination Belt and Pulley Guard

Shafting Guards

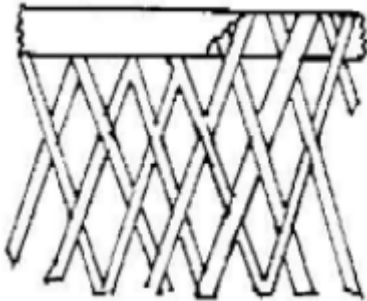
## TYPICAL EXAMPLES OF GUARD CONSTRUCTION



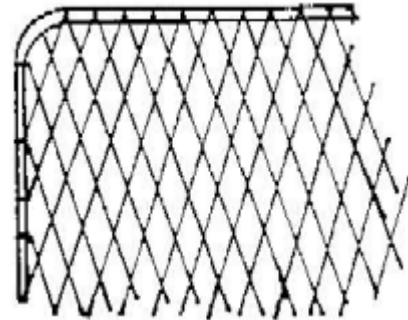
Iron Pipe Guard with wire cloth filler.



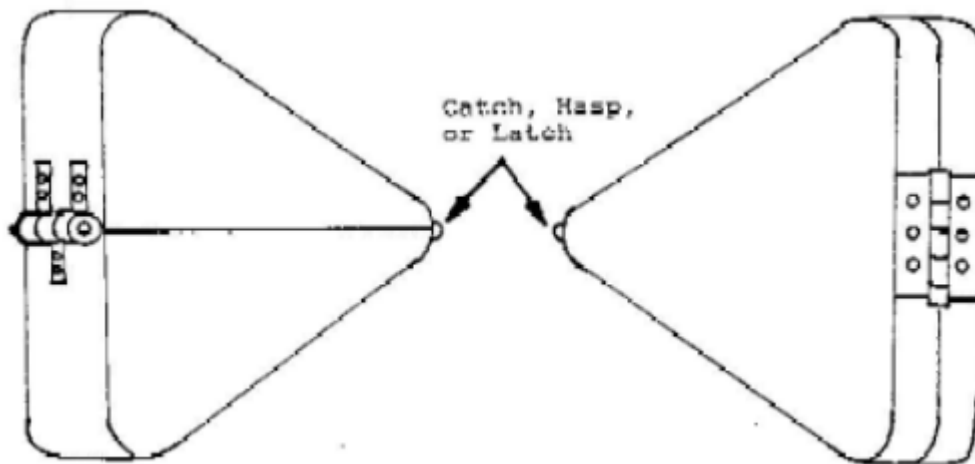
Wire Mesh in " round rod frames.



Protection of rough edges--Sheet Metal  
No. 24 or heavier.

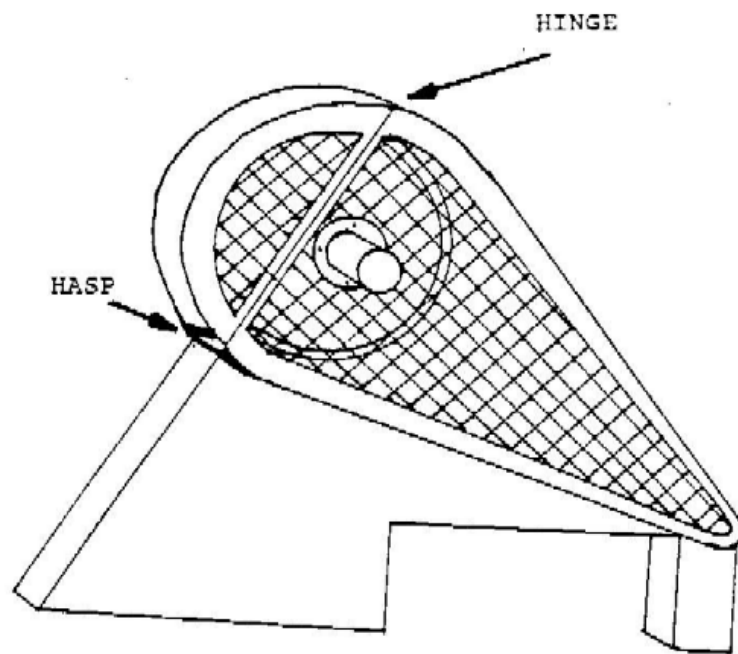


Expanded Metal in " round rod frames.

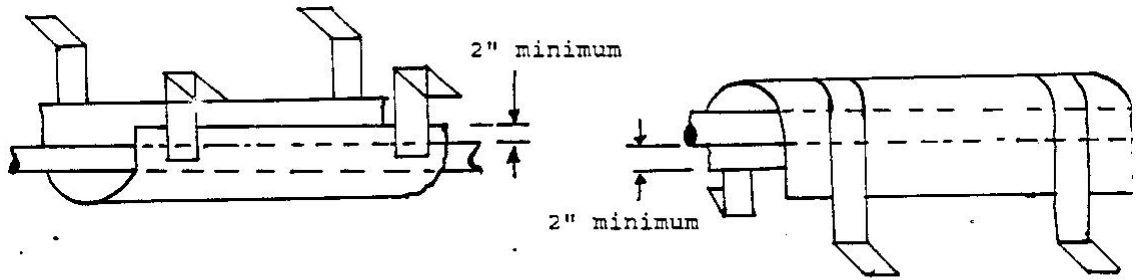


Totally Enclosed Guard, split and hinged for either top or side opening.

**COMBINATION BELT AND PULLEY GUARD**

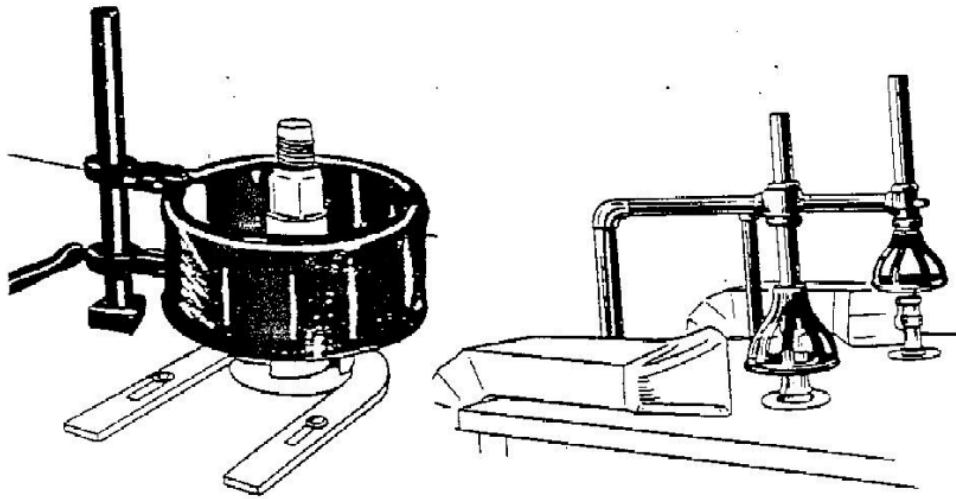


## SHAFTING GUARDS

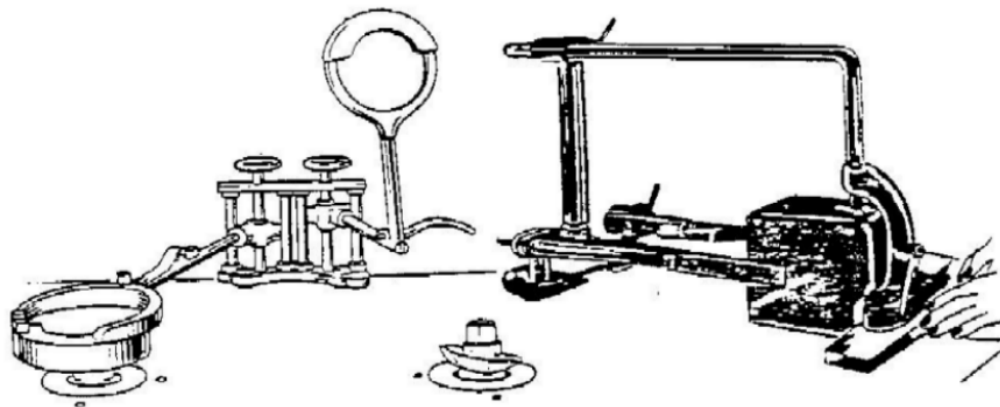


6" minimum below  
table or above  
floor.

## GUARDING CUTTING ACTIONS BY BARRIER GUARDS

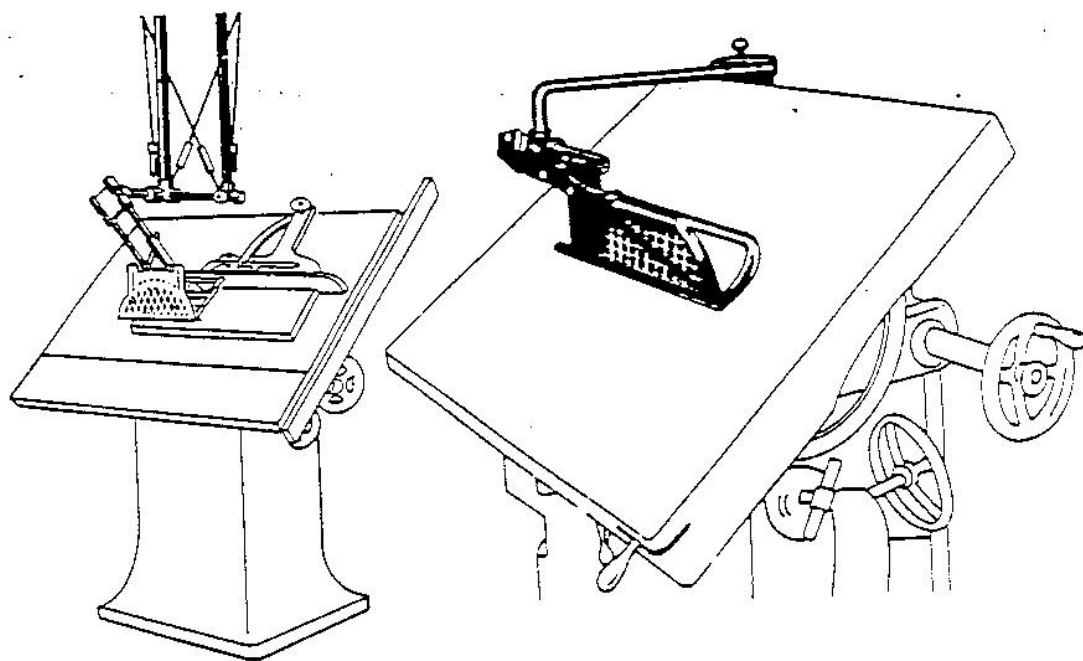


The cutting of each wood shaper should be enclosed by an adjustable guard so designed as to keep the operator's hand away from the cutting edge. Patterns or jigs for holding stock while shaping are also desirable.



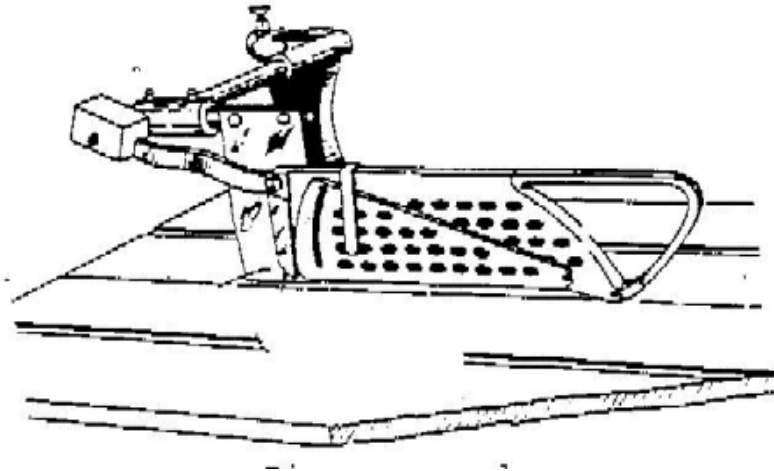
Shaper guards.

**GUARDING CUTTING ACTIONS BY ENCLOSURE GUARDS**

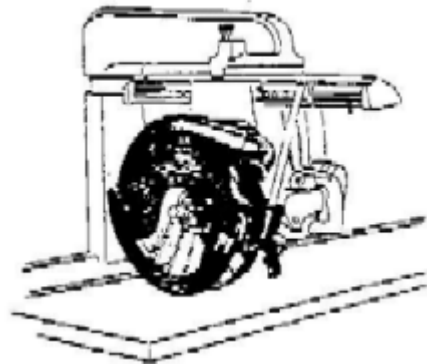
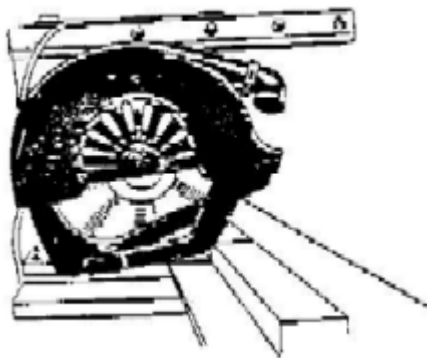


Tilting table saw guard.

Circular saws should be provided with a hood that covers the saw at all times to the depth of the teeth. Hood should adjust itself automatically to thickness of, and remain in contact with, material being cut. A spreader and anti-kickback device should be provided. The exposed part of the saw underneath the table should be guarded.

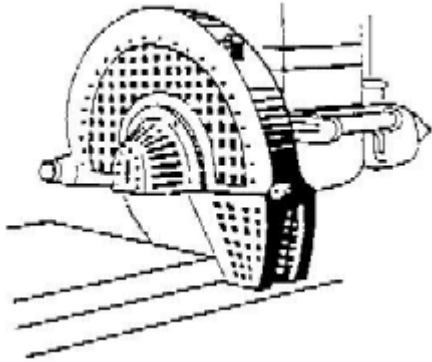


Rip saw guard.

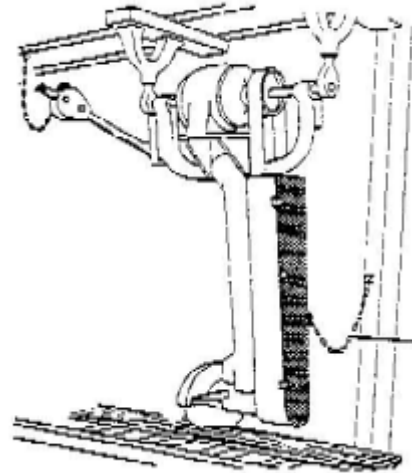


Radial saw.

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



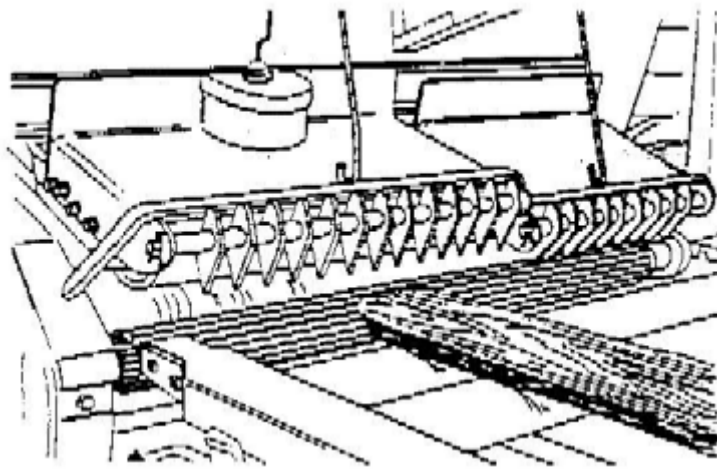
Swing saw hood.



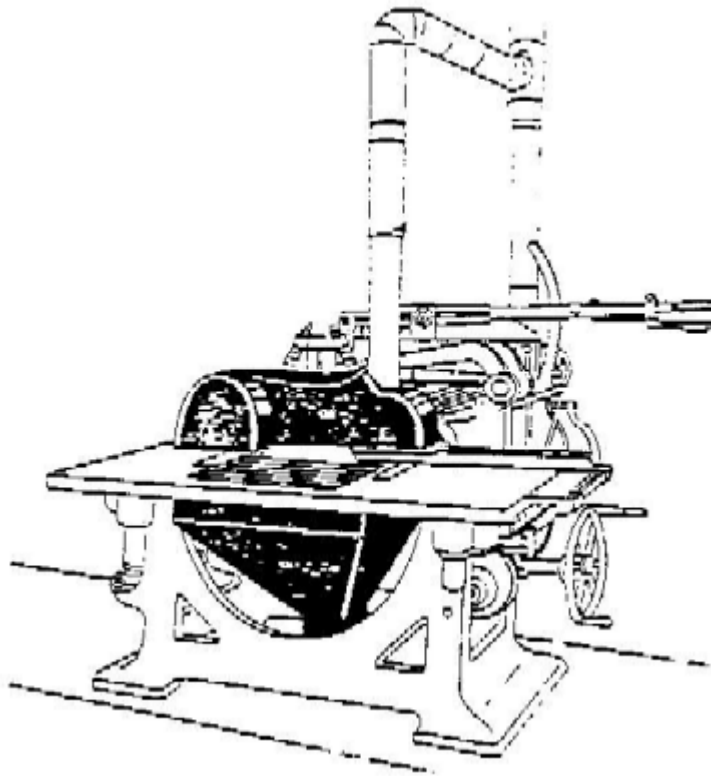
Swing saw.

In addition to the hood enclosing the blade, the swing should be provided with a limit chain or other device to limit forward travel and a device to automatically return the head to starting position. Hood should enclose saw.

### **GUARDING CUTTING ACTIONS WITH ENCLOSURE GUARDS**



The saws of the edger should be enclosed and there should be pressure rolls on both the feed and take-off sides. Non-kickback teeth should be provided on at least the feed side of the saws. All belts, pulleys, and gears should be enclosed.



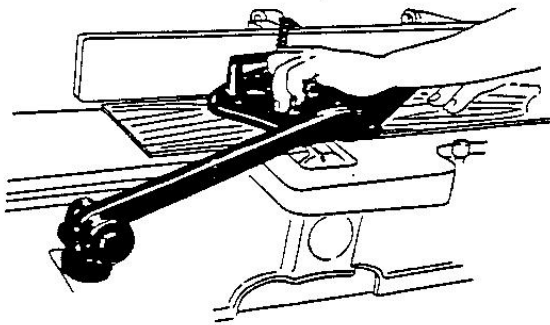
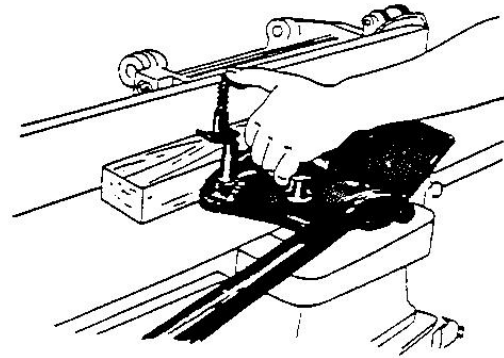
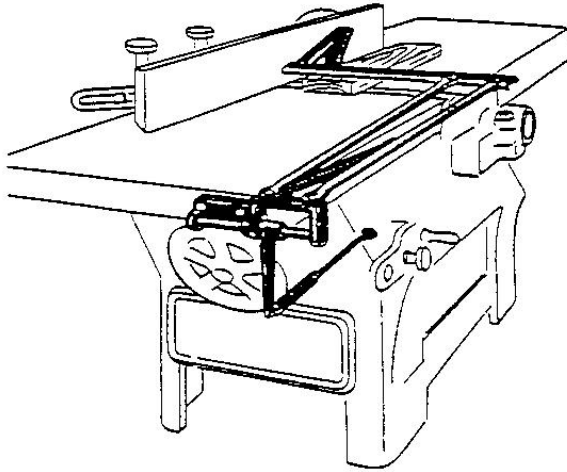
Self feed rip saw.

Saw and feed rolls should be completely enclosed.

#### **GUARDING CUTTING ACTIONS BY BARRIER GUARDS**

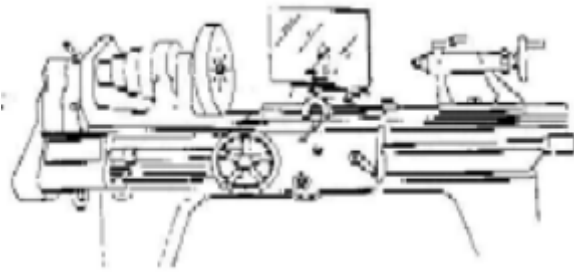
Jointer guards should automatically adjust themselves to cover all sections of the head on the working side of the fence or gage and should remain in contact with the material at all times. The section of the cutting head back of the fence or gage should also be guarded.



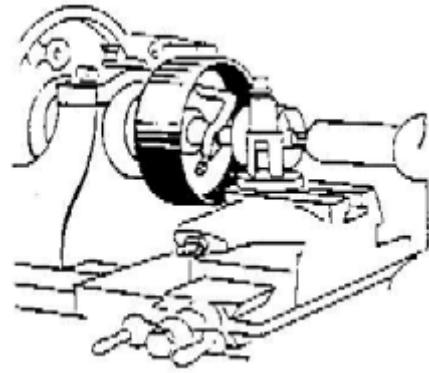


Jointer guards.

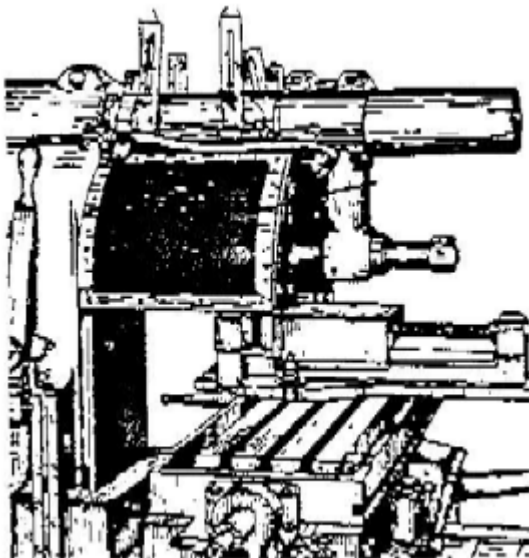
Lathes.



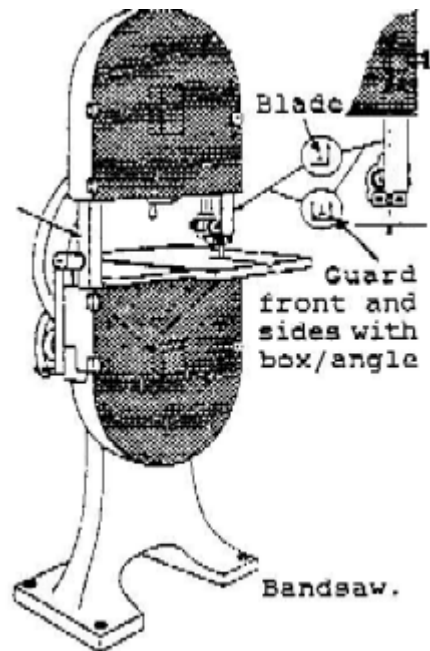
A clear plastic shield held in place by a magnet will protect against flying particles.



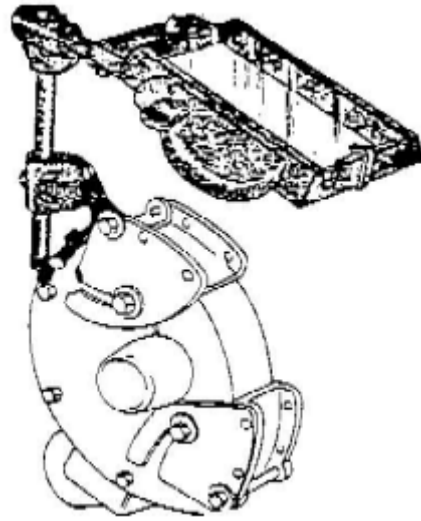
A metal bank around the face plate prevents contact with the lathe dog.



Milling machine. Mesh guard over cutter to protect against contact and flying particles.

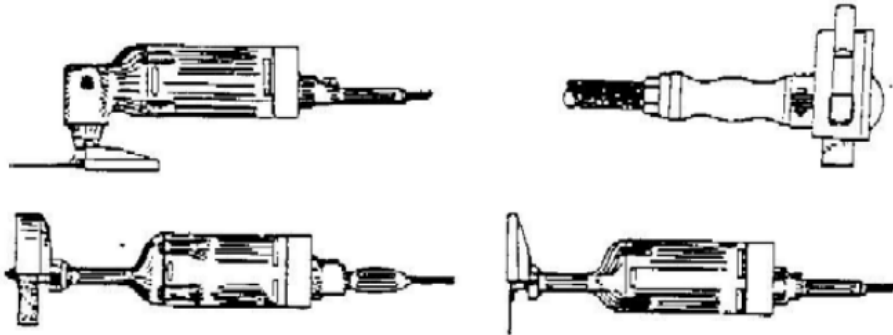


Band or band resaw wheels should be completely enclosed and all portions of the blade should be guarded, except that portion between the guide rolls and the table.



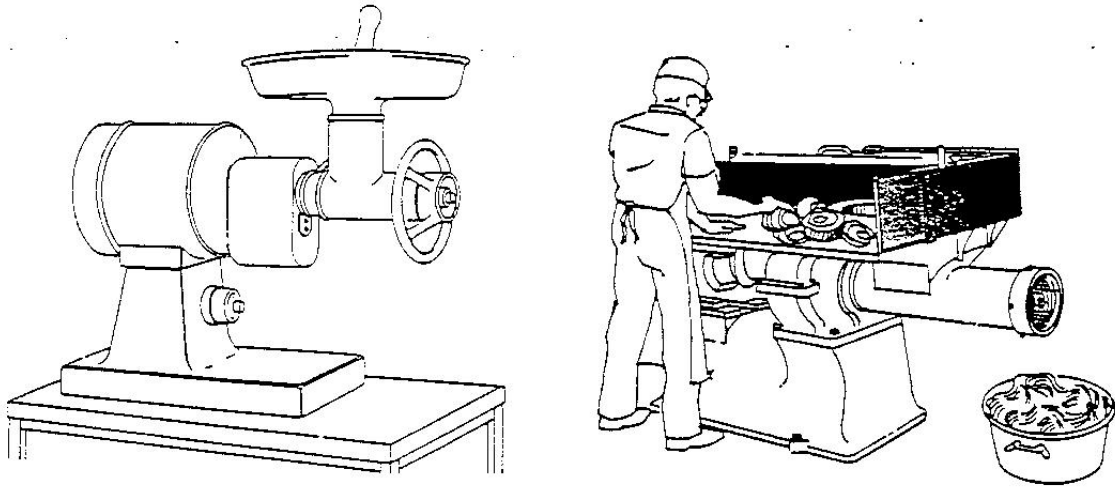
Abrasive wheel guard.

Guard should be strong enough to withstand the shock of a bursting wheel and be adjustable to the wear of the wheel, tempered or laminated glass with protective glass on the underside should be used. Work rests should be kept adjusted close to the wheel with a maximum distance of " .



Portable abrasive wheel should also be guarded by as complete an enclosure as practical.

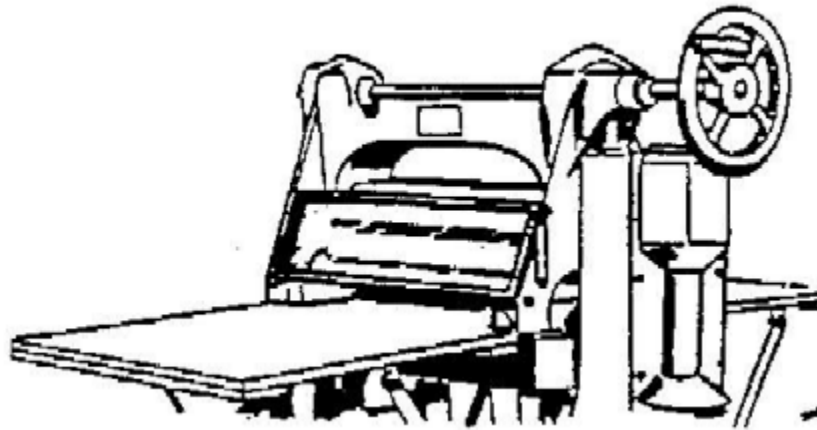
## GUARDING CUTTING ACTIONS BY POSITION



Food grinders.

Hopper of such size and neck so small that operator's fingers cannot come in contact with the worm.

Distance from front of hopper to opening over worm is such that operator cannot reach into the worm.



The roll feed of the candy cutter is guarded by an adjustable barrier.

## **PROPER USE OF LADDERS**

NOTE: Adapted from Physical Plant Operating Instructions Manual Introduction  
Because of the potential for personal injury and property damage due to the improper use and handling of ladders, there is a need to communicate safe handling procedures for handling this equipment.

### A. Responsibilities

#### 1. Supervision

Supervisors are responsible for having all employees under their supervision who use ladders read and understand this and any other safety policies/procedures pertaining to ladders.

#### 2. Employees

Employees are responsible for reading, understanding, and complying with this instruction. Employees are also responsible for asking questions of their supervisors if they do not understand this instruction. Any employee who is aware of any safety problem is responsible for correcting the problem or reporting it to a higher authority. Violation of any safety policy, procedure, or instruction may result in disciplinary action.

### B. Ladders (General)

The following practices shall be promoted to avoid mishaps:

1. The base of each ladder shall be set firm and level on the floor or ground.
2. Walkways for access to and from ladders, as well as areas at the base and top, shall be kept clear of ice, mud, materials, equipment, or debris. Ladder rungs or steps shall be free of ice or mud.
3. Ladders shall not be used as support for scaffolds. While ladder jack scaffolds are acceptable under certain federal regulation, they are for light duty use only.
4. Ladders shall be long enough so that workers can perform their functions without climbing higher than the third step from the top. Refer to Figure L-1 for proper signage.
5. Never use two ladders spliced together.
6. Manufactured ladders used on floors or other set surfaces shall be equipped with safety feet.
7. A ladder shall never be set up in a driveway or in front of a door where the swing of the worker stationed at the foot of the ladder to keep the ladder from being struck.
8. When using a ladder in a walkway, barricade the work area.
9. Workers shall face the ladder and use both hands when ascending or descending. Tools and materials shall be raised and lowered by hand lines or other means; they shall not be carried by the worker except via use of a tool belt, etc.
10. Workers shall never attempt to move a ladder while they are on it and they shall avoid overreaching. Both actions can cause a ladder to fall.
11. The length of straight manufactured ladders shall not exceed 30' for a single ladder or 60' for an extension ladder.

12. The length of job-made ladders shall not exceed 24' for a double cleat ladder or 30' for a single cleat ladder. Refer to attached, "Ladders Made on the Job," for more information.

C. Step Ladders

Step ladders shall be used only in a fully opened position with spreader bars locked. The top two steps shall never be used for standing purposes. Refer to Figure Li for proper signage.

D. Straight Ladders/Extension Ladders

Straight ladders and extension ladders (except fixed ladders) shall be placed so that the base of the ladder is horizontally approximately 1/4 the distance from the base to the upper point of support away from the base of the wall or structure. Refer to Figure 2.

E. Wood Ladders

Standard manufactured ladders shall be of proper size and construction, well cared for, and unpainted. While they shall not be painted, a clear coat of shellac or varnish on a ladder shall protect the wood but not cover up defects. They shall be discarded when cracked or split.

Job-built ladders shall be made of good stock, free from knots, and according to accepted standards. The cleats shall be recessed into the side rails, or filler blocks shall be attached to the side rails between the cleats. The cleats shall be secured with three (3) nails at each end. When cracked or split, the ladder shall be destroyed and discarded. Refer to attached "Ladder Made on the Job" for more information.

F. Metal Ladders

Metal ladders shall not be used when working on electric circuits. Refer to Figure L-3 for proper signage.

G. When working above second floor level:

1. When a scaffold or mechanical lift is available and appropriate for the work, do not use a ladder.
2. When working from a ladder, the base of the ladder shall be stabilized by sandbags or an employee shall stabilize the ladder by holding it. When sandbags are used, two fifty pound sandbags shall be placed behind each leg of the ladder to brace it from slipping backwards.
3. Ladders shall be fastened securely to a stable support at the tip, if possible, with a rope of sufficient strength to prevent side to side movement. Refer to Figure L-2.
4. The employee shall wear a safety belt or harness when there is a safe place to anchor it. The line used to connect the belt/harness to a stable support of a building shall have a maximum length of 5'.

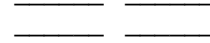
Ladder Checklist

Use the attached "Ladder Inspection Checklist" when inspecting ladders.

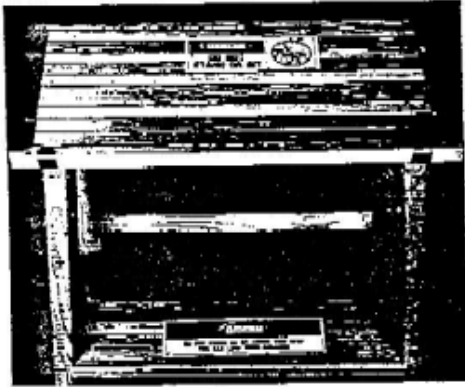
## LADDER INSPECTION CHECKLIST

	Needs Repair	Condition O.K.
<u>General</u>		
Loose steps or rungs (considered loose if they can be moved at all with the hand)	_____	_____
Loose nails, screws, bolts, or other metal parts	_____	_____
Cracked, split, or broken uprights, braces, steps, or rungs	_____	_____
Slivers on uprights, rungs, or steps	_____	_____
Damaged or worn non-slip bases	_____	_____
 <u>Stepladders</u>		
Wobbly (from side strain)	_____	_____
Loose or bent hinge spreaders	_____	_____
Stop on hinge spreaders broken	_____	_____
Broken, split, or worn steps	_____	_____
 <u>Extension Ladders</u>		
Loose, broken, or missing extension locks	_____	_____
Defective locks that do not seat properly when the ladder is extended	_____	_____
Deterioration of rope, from exposure to acid or other destructive agents	_____	_____
 <u>Trolley Ladders</u>		
Worn or missing tires	_____	_____
Wheels that bind	_____	_____
Floor wheel brackets broken or loose	_____	_____
Floor wheels and brackets missing	_____	_____
Ladder and rail stops broken, loose, or missing	_____	_____
Rail supports broken or section of rail missing	_____	_____
Trolley wheels out of adjustment	_____	_____
 <u>Trestle Ladders</u>		
Loose hinges	_____	_____
Wobbly	_____	_____
Loose or bent hinge spreaders	_____	_____
Stop on hinge spreader broken	_____	_____
Center section guide for extension out of alignment	_____	_____
Defective locks for extension	_____	_____
 <u>Sectional Ladders</u>		
Worn or loose metal parts	_____	_____
Wobbly	_____	_____
 <u>Fixed Ladders</u>		
Loose, worn or damaged rungs or side rails	_____	_____
Damaged or corroded parts of cage	_____	_____
Corroded bolts and rivet heads on inside of metal stacks	_____	_____
Damaged or corroded handrails or brackets on platforms	_____	_____
Weakened or damaged rungs on brick or concrete slabs	_____	_____
Base of ladder obstructed	_____	_____
 <u>Fire Ladders</u>		
Markings illegible	_____	_____

Improperly stored  
Storage obstructed

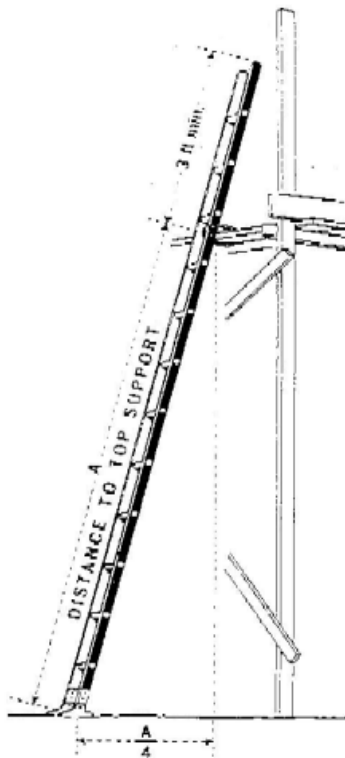


## LADDERS



L-1: Signage indicating top two steps shall not be used for standing or sitting.

L-2: Caution sign for metal ladders.



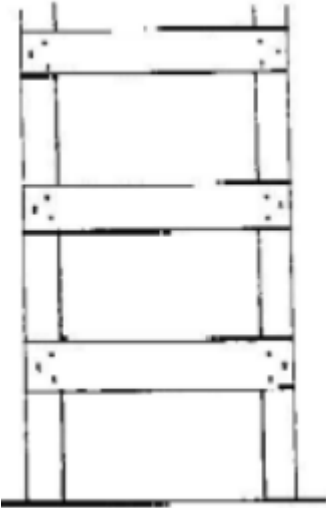
L-3: Safe procedure in setting up a ladder. The base shall be  $\frac{1}{4}$  the ladder length from the vertical plane of the top support. Where the rails extend above the top landing, ladder length to the top support is only considered.



## LADDERS MADE ON THE JOB

Manufactured ladders (“code” ladders) shall comply with the state and federal safety codes and standards. Metal or other conductive ladders shall be prohibited where the ladder or a worker using the ladder might come within 4’ of electrical wiring or equipment. Ladders placed where they could be moved or knocked over shall be protected by barriers or guards.

### Light Trades Ladders

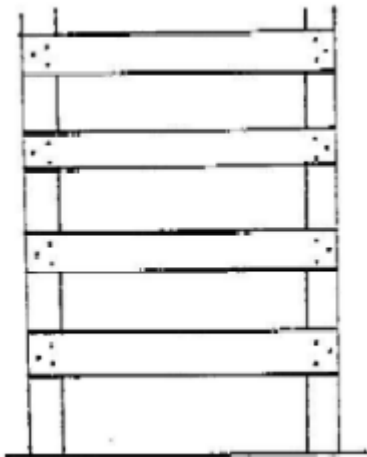


Requirements for:

<u>Length (feet)</u>	<u>Rails (inches)</u>	<u>Rungs (inches)</u>
up to 12	2 x 3	1 x 3
12-20	2 x 4	1 x 3
20-26	2 x 6	1 x 4

Maximum Single Cleat  
Maximum length – 30 feet  
Width at top - 15” minimum,  
20” maximum.

### Mason’s or Hodcarriers Ladders



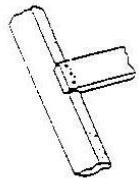
Requirements for:

<u>Length (feet)</u>	<u>Rails (inches)</u>	<u>Rungs (inches)</u>
10-12	2 x 4	1 x 3
12-16	2 x 4	1 x 3
16-20	2 x 6	1 x 4

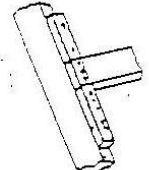
Maximum length – 20 feet  
Width at top - 17” minimum.

**Approved Construction**

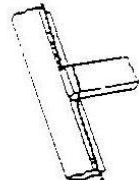
**Not Approved**



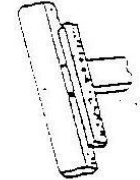
Dapped cleat



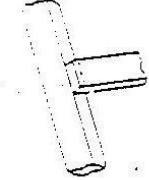
Blocked cleat



Wired cleat



1" X 2" strip over cleat

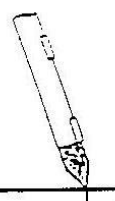


Cleat flush

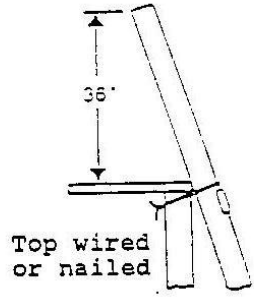
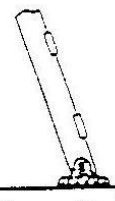
**Secured Ladders**



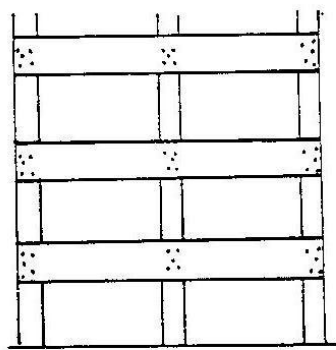
Nailed



Non-slip feet

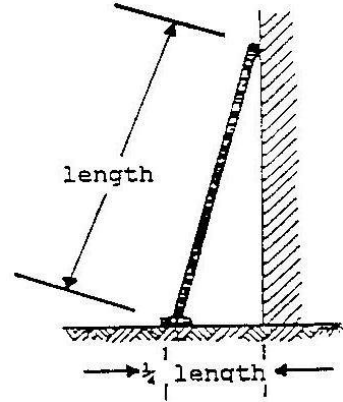


36"  
Top wired or nailed



**Double Cleat Ladder**

Maximum length - 24 feet  
 Rails - 2" X 6" minimum  
 Rungs - 1" X 4" minimum



Recommended safe angle for portable ladders.

From: Safety Engineering Standards, U.S. Insurance Group.

## SCAFFOLDS

A scaffold is a temporary, elevated working platform for supporting employees and materials.

### General Requirements

1. The footings or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose bricks, or concrete blocks shall not be used to support scaffolds or planks (OSHA 1926.451(2)).
2. A scaffold shall support four times its maximum load (employees and material).
3. Scaffold planking shall be of scaffold grade or equivalent with a maximum width of 2" X 10". Planking shall extend over the end supports not less than 6" nor more than 12".
4. Scaffolds 10' or more off the ground require the use of guardrails and toeboards.
  - a. Toeboards shall be a minimum of 4" in height.
  - b. Guardrails shall be 2" X 4". Toprail height shall be 42" with a centered midrail. Guardrail supports (minimum of 2" X 4") shall be at maximum intervals of 8'.
  - c. Midrails shall be 1" X 6" or wider, centered between the guardrail and toeboard. The midrail shall be nailed to the inside of the support post.
5. If the scaffold is erected in an area where workers or other persons will pass under it, a screen of #18 gauge U.S. standard wire of 1/2" mesh or equivalent shall be erected between the toeboard and toprail of the guardrail.
6. A safe access ladder shall be provided to all scaffolds.
7. Overhead protection shall be provided for scaffold workers when overhead hazards exist.
8. The use of lean-to-scaffolds or shore scaffolds is prohibited.
9. When suspended scaffolds (or equivalent) are to be used, the Office of Campus Safety should be contacted for consultation.
10. Damaged scaffolding or components shall be replaced before the scaffold is used.
11. All rented scaffolds shall be examined thoroughly for condition of the scaffold (structural damage) and lack of or non-matching components (no guardrails, toeboards, etc.).
12. For wooden-pole, portable, tubular, horse, outrigger, etc., type scaffold requirements, refer to OSHA 1926.451(a) through .451(y) and the attached Requirements for Various Scaffolds Safety Engineering Standards, U.S. Insurance Group.

### Scaffold Checklist

Use the attached "Stationary Scaffold Safety Check List" when inspecting stationary scaffolds.

### Platforms and Stairways

For platform and stairway requirements, see "Platforms and Stairways" and "Runs and Risers for

Stairs" attachments.

Floor and Wall Openings

Temporary, emergency, or permanent floor and wall openings shall be protected by a top rail, intermediate rail, and toeboard (if required) when there is danger of an employee or material falling to a lower level. Refer to attached "Floor, Roof, Wall, and Elevator Openings" for standard rail requirements.

**PLANKING**

Only lumber inspected and graded as scaffold planking shall be used.

Planks shall overlap by at least 12". They shall extend 6" to 12" beyond the center of the supports. Planks shall be secured to the scaffold.

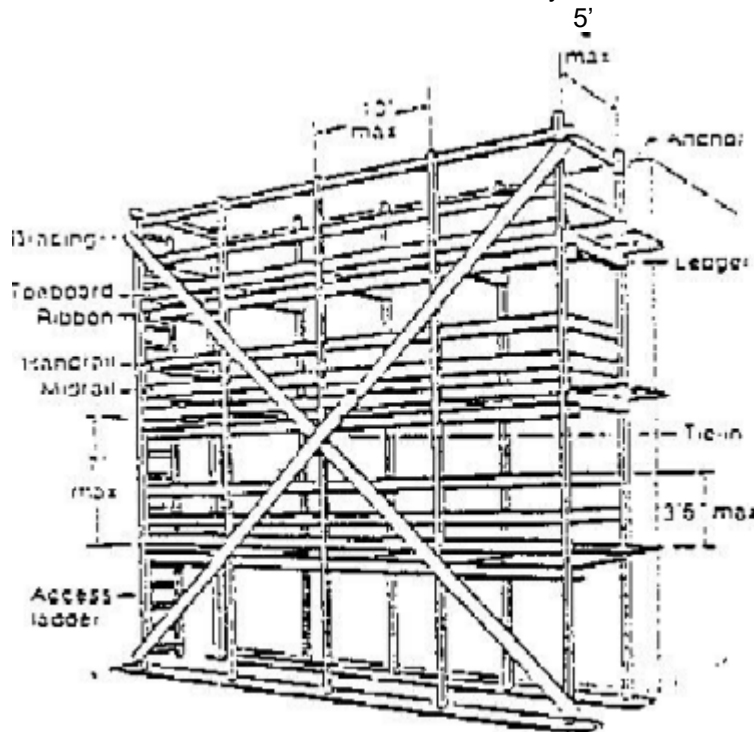
The working surface of a scaffold shall be no less than 20" wide. If the scaffold base is more than 30" wide, additional planking shall be used.

Planking 2" x 10"	Full thickness Undressed Lumber			Nominal* Thickness Lumber	
	25	50	75	25	50
Working load (p.s.f.)	25	50	75	25	50
Permissible span (ft.)	10	8	6	8	6
*Nominal thickness lumber not recommended for heavy duty use. Footblocks and Sills, Ties and Braces: Same as for heavy trades' scaffolds.					

## LIGHT TRADES WOODEN-POLE SCAFFOLDS

For scaffolds up to 20' high, uprights shall be made of 2" X 4" or heavier lumber and spaced no more than 3' apart at right angles to the wall, and no more than 10' center-to-center parallel to the wall. For scaffolds over 20' high, at least 3" X 4" uprights shall be planked with 2" scaffold-grade planking in good condition.

Light trades wooden-pole scaffolds are suitable for carpenters, lathers, shinglers, painters, sheet—metal workers and other workers who do not use heavy tools or store heavy materials on scaffolds.



Minimum Size and Maximum Spacing of Members for Light Trades' Wooden Pole Scaffolds

Uniformly distributed load	Not to exceed 25 p.s.i.
Maximum height	20 ft.
Poles or uprights	2 x 4 in.
Pole spacing (longitudinal)	10 ft. maximum
Pole spacing (transverse)	6 ft. maximum
Ledgers	(2) 1 x 6 in.
Bearers to 3 ft. span	2 x 4 in.
Bearers to 10 ft. span	2 x 6 or 3 x 4 in.
Planking	2 x 10 in.
Vertical spacing of horizontal members	7 ft.
Bracing, horizontal and diagonal	1 x 6 in.
Tie-ins	1 x 4 in.
Toeboards	4-in, high maximum, 2 x 4 in.
Handrails and midrails	2 x 4 in.
Ribbons	1 x 6 in.
Anchors	No. 12 double-wrapped wire or stronger

All members except planking are used on edge.

Use spacer blocks when necessary.

From: Safety Engineering Standards, U.S. Insurance Group.

## HEAVY TRADES WOODEN-POLE SCAFFOLDS

Heavy trades wooden-pole scaffolds are recommended for use by bricklayers, stone masons, concrete workers and other workers who use heavy equipment or store heavy material on scaffolds.

Open sides and ends of intermediate working levels 7½' or more above the grade shall be guarded with a 2" X 4" top rail nailed to the uprights so that the top edge is 42" to 45" above the platform. Midrails of at least 2" X 4" lumber shall be provided.

Platforms shall be within 14" of the structure wall. They shall be at least 20" wide and constructed of planks at least 2" X 10" laid close together. Planks that are butt-ended (not over lapped) shall be nailed together to supporting ledgers of 2" X 6" or heavier material. If the planks are not nailed, they shall overlap the ledgers at each end by at least 6". No plank shall overlap an unsupported end of another plank.

The scaffold shall be rigidly tied to the structure with double-wrapped No. 12 wire or a stronger binding used in combination with spacer blocks between inside uprights and the structure. Ties shall connect to inside uprights, and be spaced no more than 15' apart, horizontally and vertically. There shall be at least one row of ties.

Shore scaffolds, lean-to scaffolds, boxes, barrels, loose tile, loose brick, loose blocks, or other unstable objects shall never be used unless they are bolted through a wall, welded to a tank, or securely hooked over the top of a supporting wall.

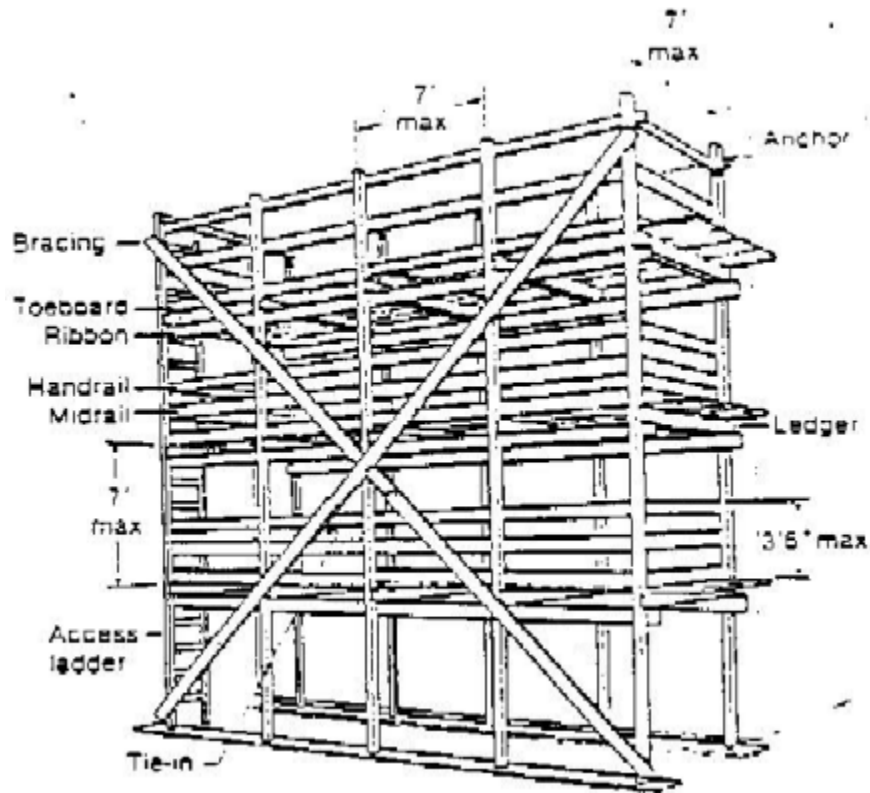
Scaffolds that shall support buggies loaded with concrete need to be strong enough at every point on girders, ledgers, beams, and planking to bear the load.

Material at least 2" X 6" shall be used for footblocks and sills. Sills shall be continuous when uprights rest on sidewalks or other pavement.

If material on a platform is piled higher than the toeboard, one or more intermediate backrails shall be added between handrail and toeboard. One-half inch wire rope or an equivalent shall be used.

For heavy trades wooden-pole scaffolds more than 20' high, 4" X 6" uprights shall be used.

## HEAVY TRADES WOODEN-POLE SCAFFOLDS



### Minimum Size and Maximum Spacing of Members for Heavy Duty Wooden Pole Scaffolds

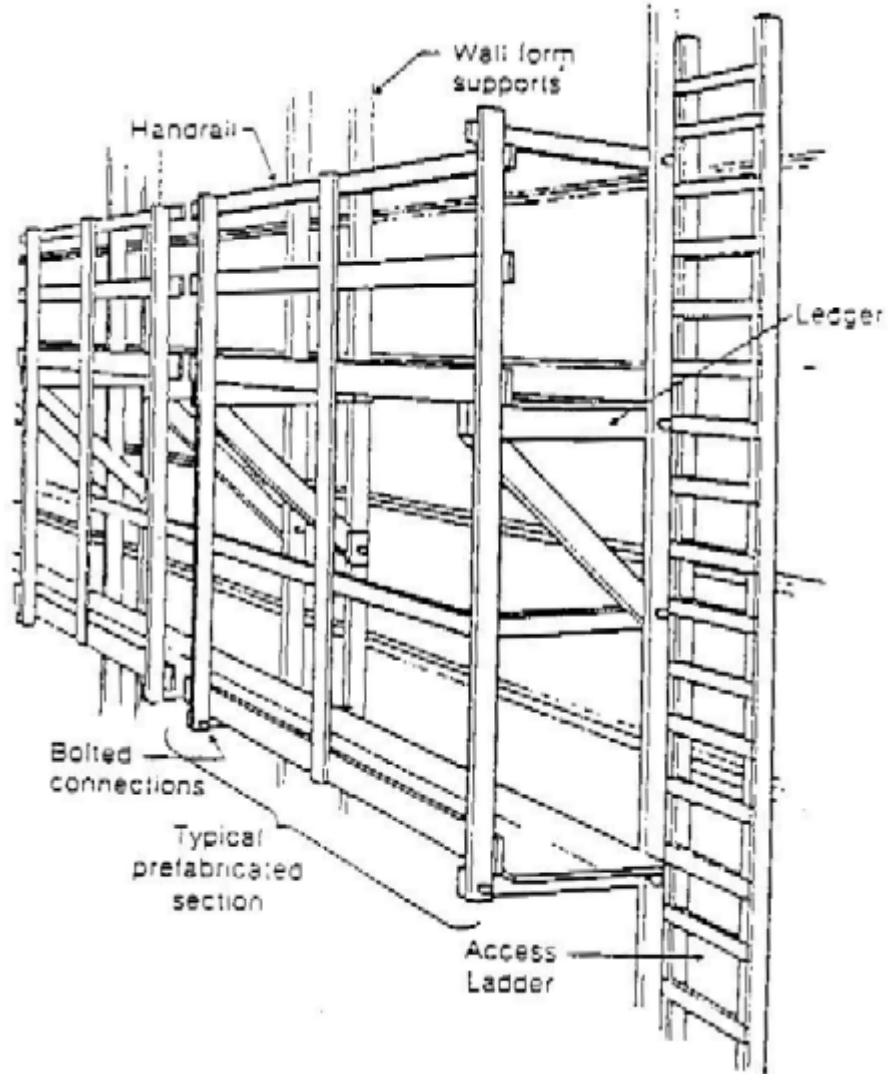
Uniformly distributed load	Not to exceed 75 p.s.i.
Maximum height	20 ft.
Poles or uprights	4 x 4 in.
Pole spacing (longitudinal)	7 ft.
Pole spacing (transverse)	7 ft.
Ledgers	(2) 1 x 6 in. or (1) 2 x 6 in.
Vertical spacing of horizontal members	7 ft.
Planking	2 x 10 in.
Bearers	2 x 10 in. (rough)
Bracing, horizontal and diagonal	1 x 6 in.
Tie-ins	1 x 4 in.
Toeboards	6-in, high minimum, 1 x 6 in.
Handrails and midrails	2 x 4 in.
Cross bracing	1 x 6 in. or larger
Ribbons	1 x 6 in.
Anchors	No. 12 double-wrapped wire or stronger

All members except planking are used on edge.  
Use spacer blocks when necessary.

From: Safety Engineering Standards, U.S. Insurance Group.

## WOODEN BRACKETS SCAFFOLDS

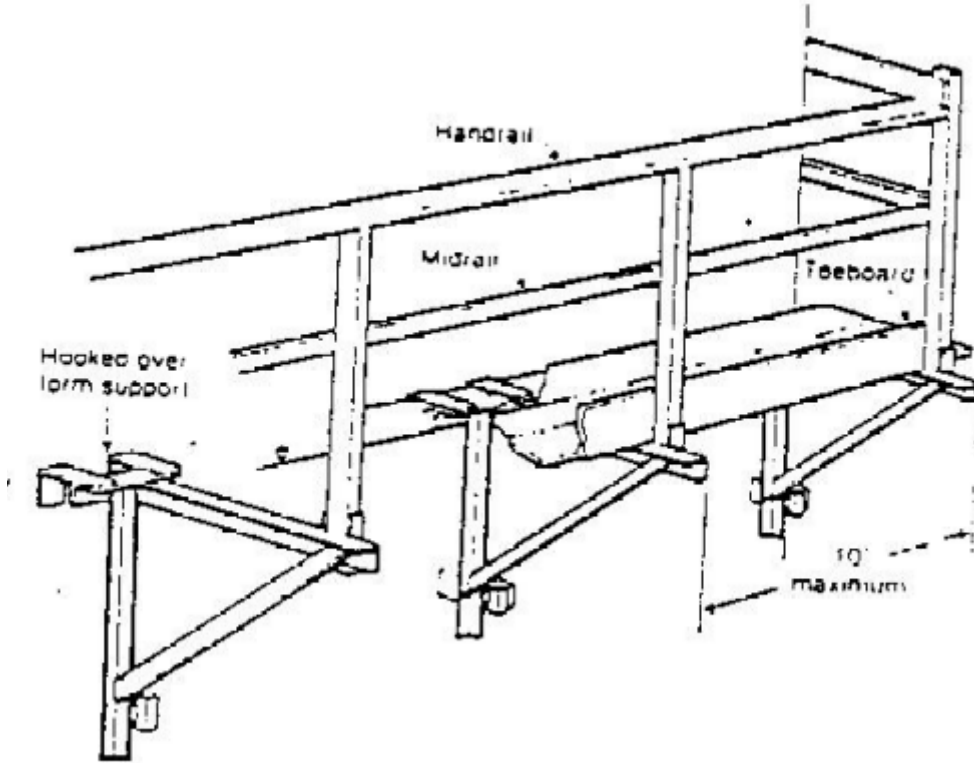
Bracket scaffolds can be prefabricated for attachment to wall forms at various positions, or they can be made permanent parts of movable form panels. Follow construction specifications for light or heavy trade scaffolds.



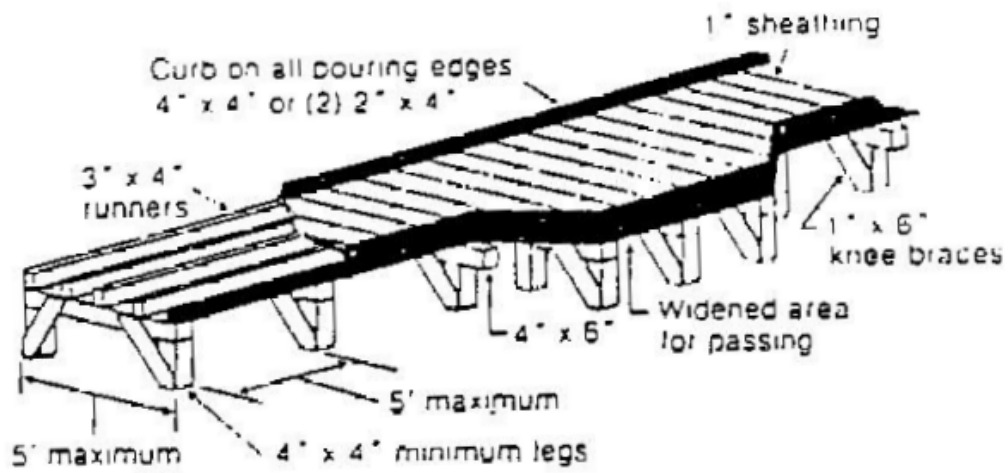


### METAL BRACKETS SCAFFOLDS (WALER JACK)

Brackets shall not be used on walers held by wire ties unless there are at least three ties fairly close to each jack. Bolted walers are preferred where brackets are used.



### RAMP FOR MOTOR-DRIVEN CONCRETE BUGGIES



### LIGHT-DUTY METAL SCAFFOLDS

Metal scaffolds need to be built to support all live, dead, and wind loads they are likely to be subjected to.

Material used in metal scaffolds shall be of standard manufacture to meet strength, size and weight specifications. Never use material that is broken, structurally weak, or deteriorated.

All scaffold legs shall rest on base plates. Each base plate needs support adequate to sustain the load and prevent horizontal movement. When the scaffold is resting on earth or other such material, each base plate shall rest on the equivalent of a 2" X 10" X 10" wooden block. A 1" X 10" X 10" piece of exterior-grade plywood may be used as a base.

All scaffolds shall be plumbed and leveled as erection proceeds. Braces shall not be forced to fit; it is better to level the scaffold until a proper fit is easy.

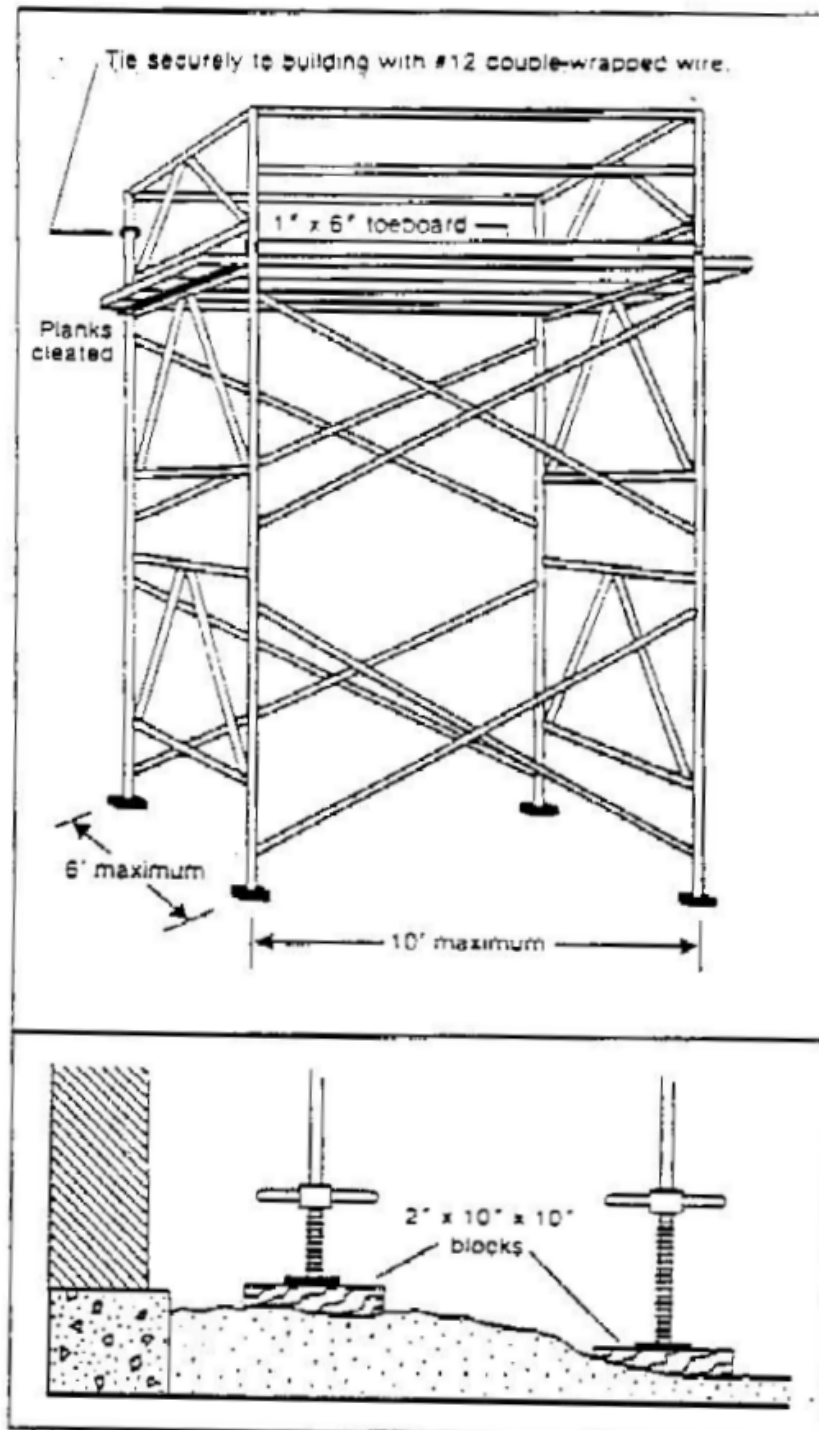
Adjusting screws shall be used instead of blocking to level scaffolds on uneven grades. Not more than 12" of adjusting screw thread shall be exposed.

Metal scaffolds shall be tied securely to buildings or other structures with durable no. 12 wire or the equivalent. Ties shall be placed no more than 26' apart, vertically and horizontally.

Railings are suggested for all open sides and ends of work platforms more than 7½' high. Platform planks shall be 2" X 10" or wider and long enough to overlap the ledgers at each end by at least 6".

Workers shall use ladders, not scaffold cross-braces, to climb scaffolds.

## SET METAL SCAFFOLDING

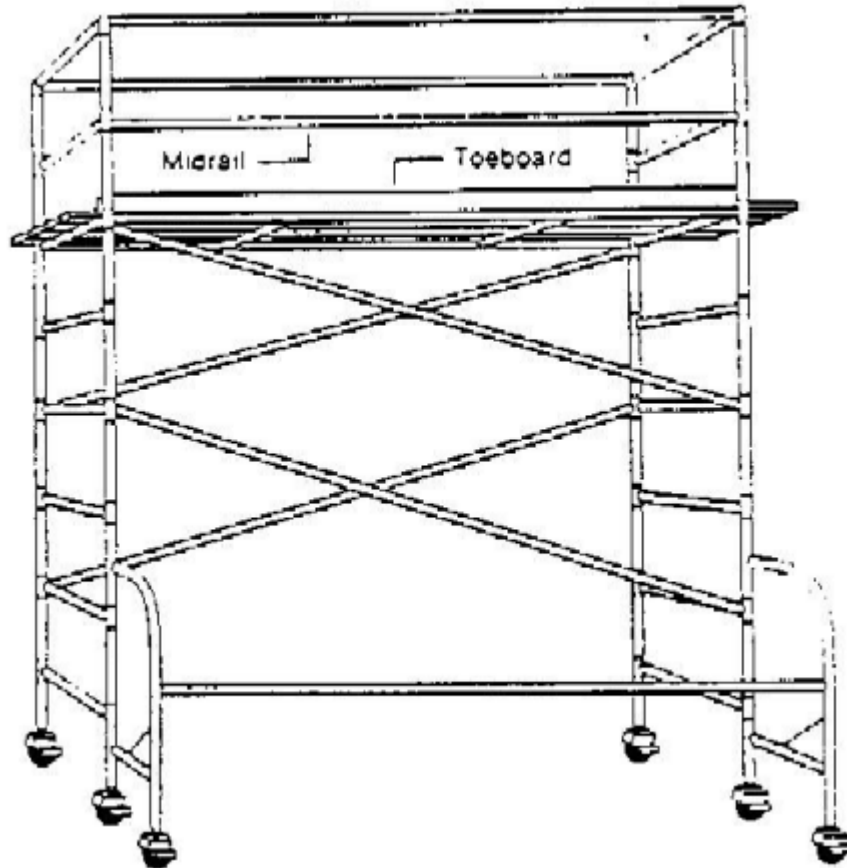


## ROLLING METAL SCAFFOLDS

Rolling scaffolds, when securely tied or guyed, shall be at least one-third as wide at the bottom as they are high.

Screwjacks shall extend into scaffold legs for at least one-third of their length. In no case shall more than 12" of thread be exposed.

The uprights or legs of rolling scaffolds more than 24' high shall be braced according to the manufacturer's specifications.



Wheels or casters of rolling scaffolds shall have effective locking devices and shall be kept locked when workers are climbing or working on the scaffold. At least two of the four wheels or casters shall swivel. All wheels and casters shall support at least four times the maximum intended load.

Joints of metal scaffolds, including caster joints, shall have positive-locking pins, bolts, or equivalent fasteners.

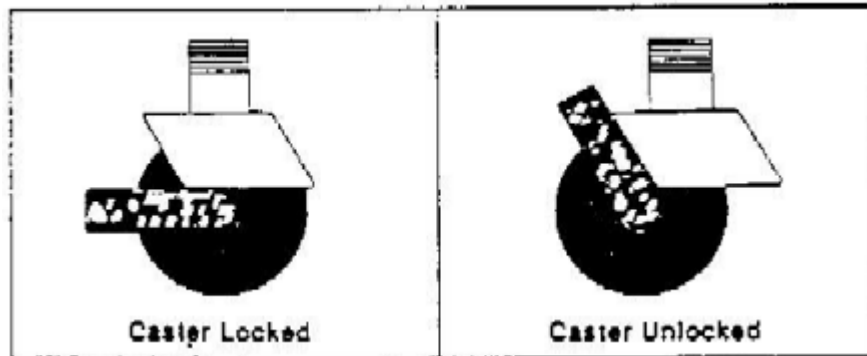
Platform planks on rolling scaffolds shall not project more than 18" beyond the support at the edges of the scaffolds. Planks can be prevented from slipping by nailing dents of 1" material on the undersides of projecting ends, or by some equally effective means. Platforms shall be tightly planked to the full width of the scaffold except for necessary openings.

Workers shall not place platform planks on guard rails to climb higher. Workers may ride on rolling scaffolds moved by others if the floor or surface is within 30" of level and free of pits, holes, or obstructions, and if the smallest dimension of the scaffold's base is at least one-half its height.

If outriggers are used, they shall be installed on both sides of the staging.

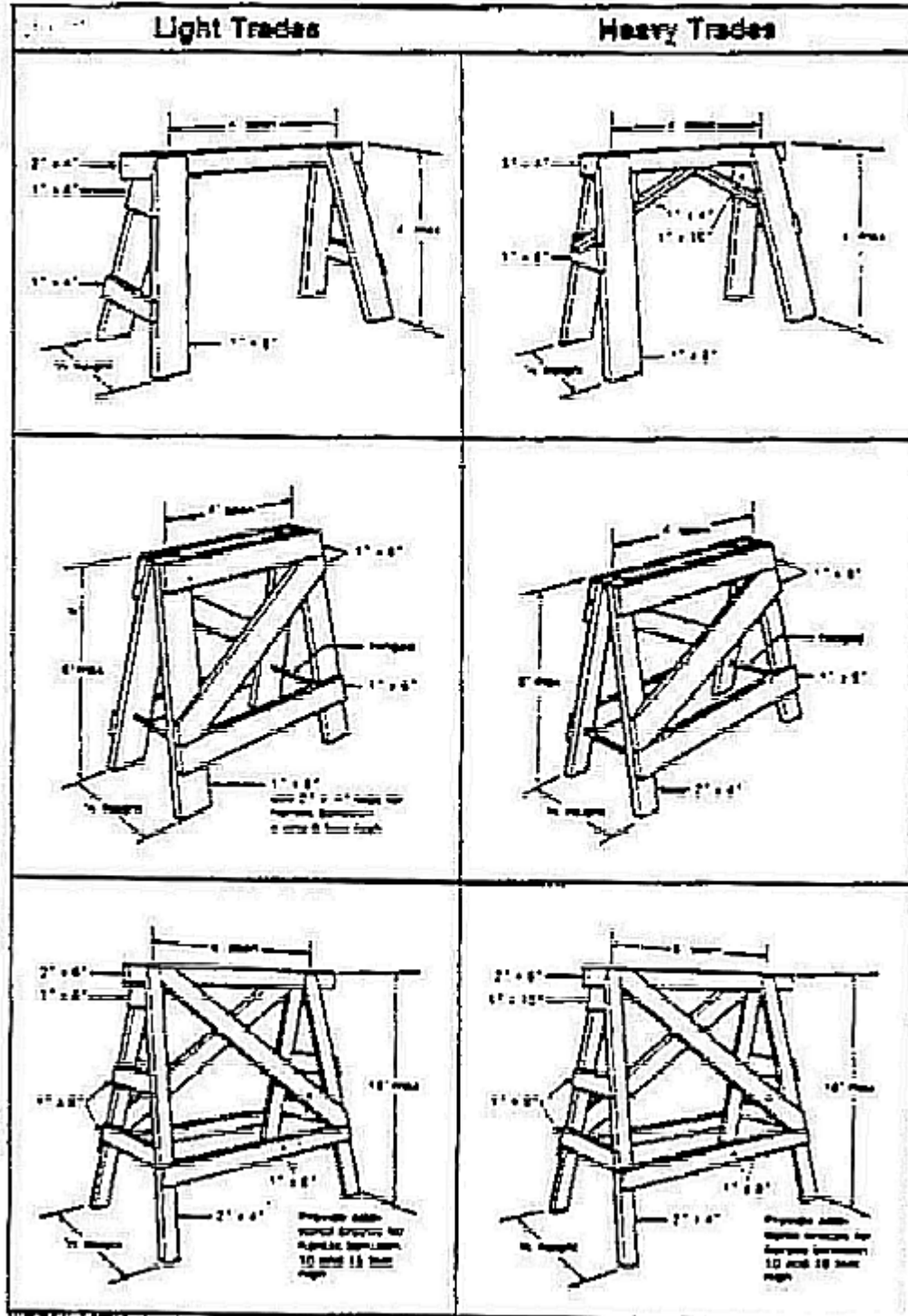
Ladders or stairways shall provide access to all platforms and rolling scaffolds. Ladder rails shall extend at least 36" above the platform unless other suitable handrails are provided. If stairs are used, rails shall be put on both sides.

Ladders or other unstable objects shall not be put on top of rolling scaffolds to climb higher. Aluminum scaffolding shall have a greater base-to-height ratio. Except when the scaffold is being moved, casters shall be locked as illustrated below.

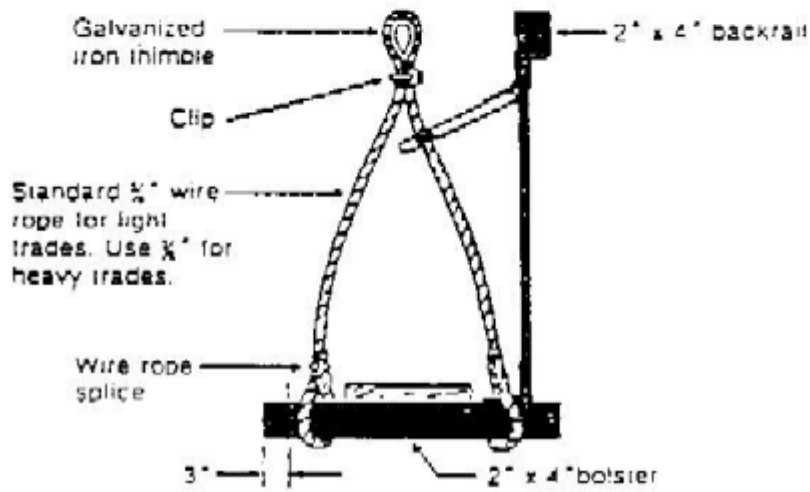
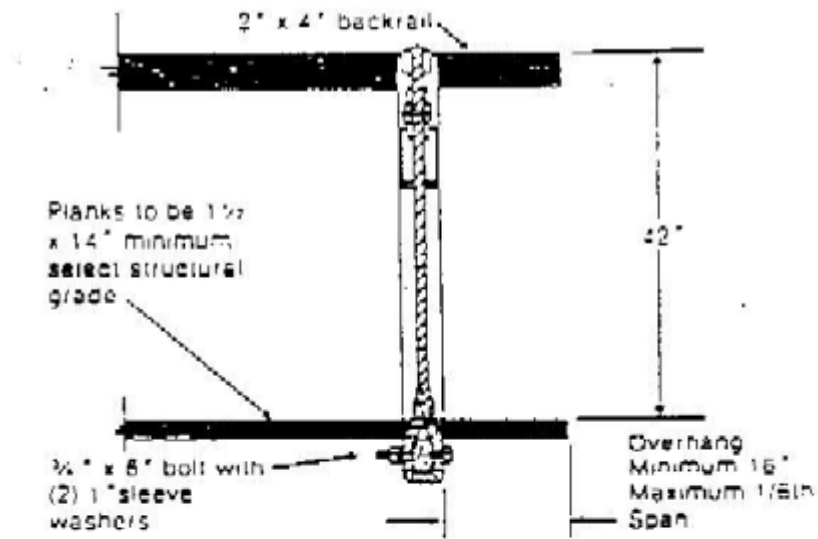


## HORSE SCAFFOLDS

Top horizontal ledgers for light trades scaffolds between 4' and 8' in span shall be made of 2" X 6" lumber. Proportionately heavier material shall be used for spans exceeding 8'. Horses more than 16' high, or tiers of horses with a total height of more than 16', shall not be used to support scaffold platforms.

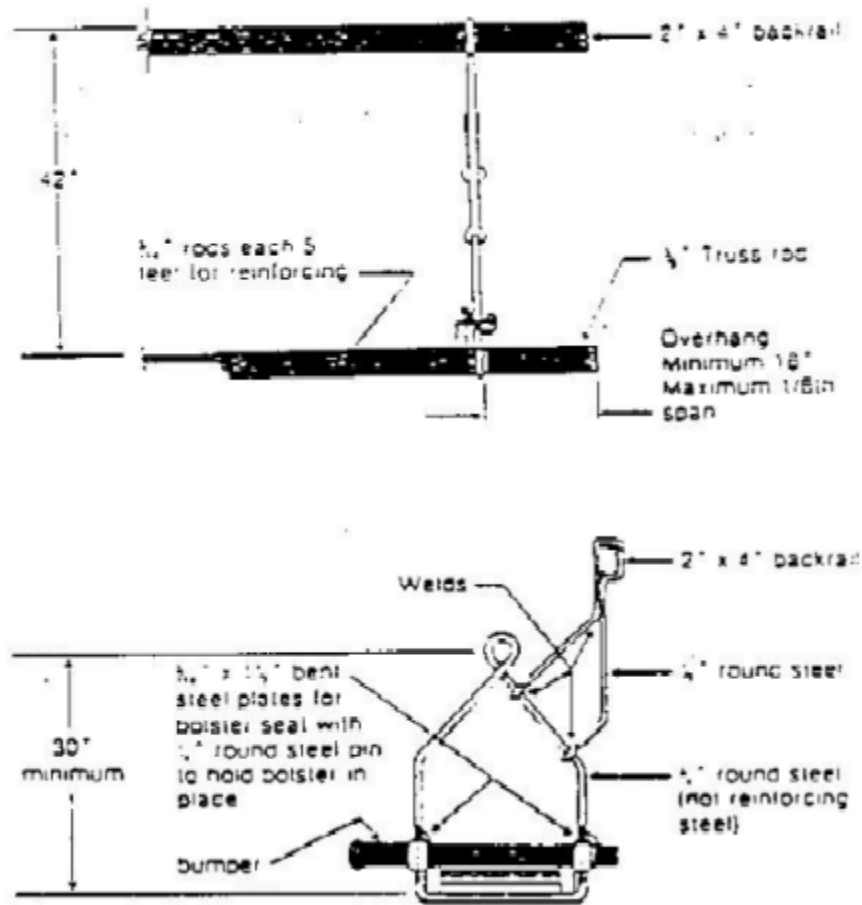


## SUSPENDED SCAFFOLDS



Approved safety belt and lifeline required for each employee on suspended scaffold.

## SUSPENDED LADDER SCAFFOLDS



Approved safety belt and lifeline required for each employee on suspended scaffold.

## STAGE LADDERS

Length (ft.)	Minimum Cross Section of Rails (inches)	Minimum Cross Section of Rungs	
		Round	Oblong
Up to 16	1 x 4 1/2	1	3/4 x 1
10 to 16	1 x 5 may be tapered to 4	1	3/4 x 1
20 to 24	1 x 5 1/2 may be tapered to 4	1	3/4 x 1

Maximum length 24'.  
 Minimum distance between ladder rails 14".  
 NOTE: When ladders are constructed with truss rods, the above rails may be reduced in size.



## HEAVY TRADES SUSPENDED SCAFFOLDS

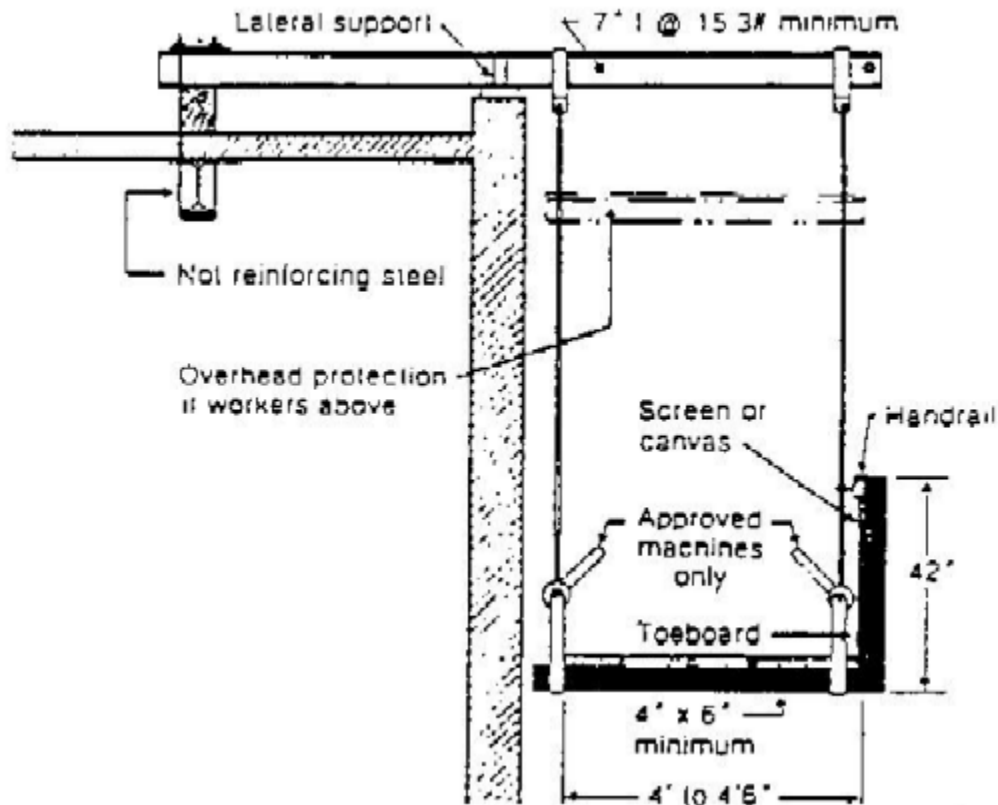
Heavy trades suspended scaffolds shall have thrustouts equal or greater in length to a standard 7", 15.3 pound steel I-beam that is at least 15' long. Bolsters and thrustouts shall be no more than 8' apart.

The platform shall be suspended by wire ropes capable of supporting at least six times the intended load. The ropes can be secured to the thrustout, to each end of the bolster, or to the hoisting machines.

The scaffold shall be able to sustain a working load of 50 pounds per square foot. Platforms shall be 2" thick and at least 4' wide; 2" X 4" handrails and midrails shall be provided and toeboards added, if needed.

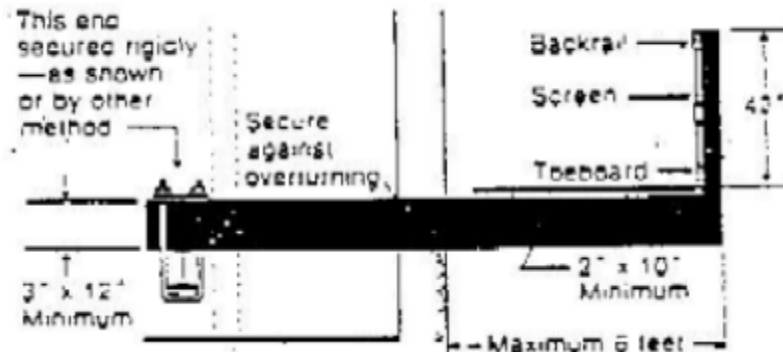
If material on the platform is piled higher than the toeboard, one or more intermediate backrails shall be added and 1/2" wire mesh or the equivalent shall be put between the top rail and the toeboard.

Suspended scaffolds shall be and tested as often as necessary inspected daily before being used for good maintenance.



Limit Plank Spans to 8 Feet

## HEAVY TRADES AND MASONS' OUTRIGGER SCAFFOLDS



Limit spans to 7'6". For multiple scaffolds, use at least 3 x 16" outriggers.

## NEEDLE BEAM PLATFORM

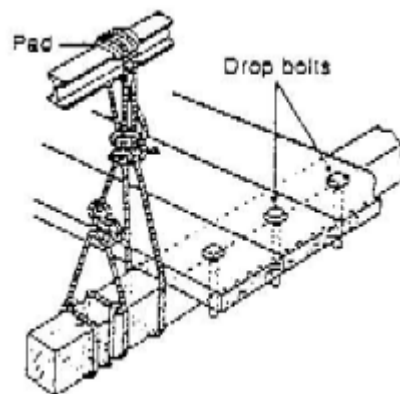
Needle beams shall be at least 4" X 6" in cross-section, and made from one piece of material without splices or laminated joints. Needle beam platforms shall have a safety factor of 4 or more. Beams shall not be painted to hide the grain.

Needle beams shall be supported with 1¼" manila rope (or the equivalent) which is free from flaws, deterioration, chemical damage, or other imperfections.

The rope shall be attached to the needle beam by a scaffold hitch at least 1' from the end of the beam. Planks for needle beam platforms shall be at least 2" X 10", and no more than 10' long. Cleats or drop bolts can be used to keep planks from moving horizontally.

Platforms used for riveting and similar work shall be at least 36" wide outdoors and 30 inches wide indoors.

All employees working on needle beam scaffolds shall wear safety belts and lifelines tied to the structure.



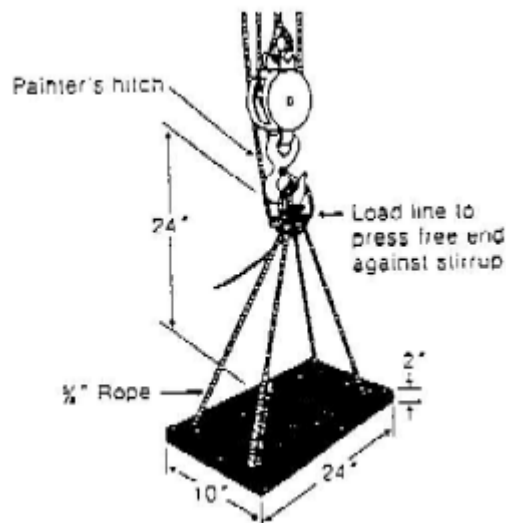
## BOATSWAIN'S CHAIR

Employers shall permit a worker to use a boatswain's chair only after adequate training, and only if the worker is wearing a safety belt and life line.

Barricades or an attendant are recommended to keep the area beneath a suspended boatswain's chair clear of workers, pedestrians and vehicles. Warning signs also shall be posted. Thimble and splice shall be used to attach the rope to the block. Properly sized blocks and rope equivalent in strength to at least " of first-grade manila shall be used.

Rope slings shall be used to suspend the chair from its four corners. The seat shall be at least 24" X 10" and made of soft wood 2" thick (1" if oak or ash) or the equivalent. A chair with fiber rope shall not be used to support a worker who is welding or using a burning torch, sandblasting equipment or chemicals.

A boatswain's chair shall be able to support at least four times the heaviest load intended for it.



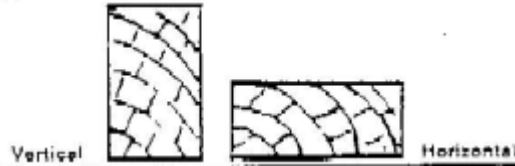
### SAFE LOADS FOR TIMBER PLANKS

Douglas Fir "Structural Planks" Especially Suited for Scaffolds							
Plank Span in feet	Actual Size in Inches						
	1 1/8 x	1 1/8 x	1 1/8 x	1 1/8 x	2 1/8 x	2 1/8 x	2 1/8 x
	7 1/2	9 1/2	11 1/2	13 1/2	9 1/2	11 1/2	13 1/2
4	522	662	800	940	1,730	2,092	2,456
6	348	441	534	626	1,150	1,395	1,637
8	262	330	400	470	865	1,046	1,230
10		264	320	376	692	837	982
12			267	313	576	697	819
14					494	598	702
16						523	614
18							545
Surfaced Lumber graded for 1900 psi Bending Stress							
Suggested Maximum Loads in Pounds Concentrated at Center of Span							
Douglas Fir "Selected Lumber" For Ordinary Scaffold Plank Service							
Plank Span in feet	Actual Size in Inches						
	1 1/8 x	1 1/8 x	1 1/8 x	1 1/8 x	2 1/8 x	2 1/8 x	2 1/8 x
	7 1/2	9 1/2	11 1/2	13 1/2	9 1/2	11 1/2	13 1/2
4	413	523	633	743	1,360	1,645	1,936
6	275	349	422	495	910	1,097	1,290
8	206	261	316	371	682	823	968
10		209	253	297	546	658	774
12			211	247	454	549	645
14					390	470	553
16						411	484
18							430
Surfaced Lumber graded for 1500 psi Bending Stress							
Suggested Maximum Loads in Pounds Concentrated at Center of Span							

### WOODEN COLUMNS

Square Columns--Unbraced/Rough Lumber--Not Surfaced							
Length in feet	Size of Column cross section in inches						
	4	6	8	10	12	14	16
	x 4	x 6	x 8	x 10	x 12	x 14	x 16
5	15.300	36.000	64.000	100.000	144.000	196.000	256.000
6	14.600	35.400	64.000	100.000	144.000	196.000	256.000
7	13.500	34.900	63.400	100.000	144.000	196.000	256.000
8	11.800	34.100	62.900	100.000	144.000	196.000	256.000
9	9.600	33.000	62.300	98.900	144.000	196.000	256.000
10	7.800	31.500	61.500	98.400	144.000	196.000	256.000
11	6.400	29.400	60.200	97.600	142.400	196.000	256.000
12	5.400	26.700	58.700	96.700	141.700	194.200	256.000
14		20.100	54.300	93.800	139.600	192.800	253.700
16		15.400	47.400	89.400	136.600	190.700	251.900
18			38.400	83.100	132.200	187.300	249.300
20			31.100	74.200	126.100	183.000	246.000
Suggested Maximum Loads in Pounds--1000 Pounds per Square inch Douglas Fir							

### SAFE LOADS FOR TIMBER BEAMS



Stress Grade Douglas Fir 500 pounds per square inch							
Beam Span in feet	Size in inches						
	4 x 4	4 x 6 Hor.	4 x 6 Vert.	6 x 6	6 x 8 Hor.	6 x 8 Vert.	8 x 8
4	990	1,530	2,280	3,460	4,710	6,400	8,540
6	660	1,000	1,520	2,310	3,140	4,290	5,870
8	500	750	1,140	1,730	2,360	3,220	4,400
10	390	600	910	1,380	1,880	2,580	3,520
12	330	500	760	1,150	1,570	2,150	2,930
14	280	430	650	990	1,340	1,840	2,510
16		370	570	860	1,170	1,610	2,200
18		330	510	770	1,040	1,430	1,950
20			455	690	940	1,290	1,750
24			380	570	780	1,070	1,400

Beam Span in feet	Size in inches					
	8 x 12 Vert.	8 x 14 Vert.	8 x 16 Vert.	10 x 10	10 x 12	10 x 14
4	12,820	14,920	17,070	13,330	16,000	18,660
6	12,820	14,920	17,070	11,900	16,000	18,660
8	10,330	14,260	17,070	8,930	13,080	18,020
10	8,270	11,400	15,020	7,140	10,470	14,420
12	6,890	9,500	12,510	5,950	8,720	12,020
14	5,910	8,150	10,700	5,100	7,480	10,300
16	5,170	7,120	9,390	4,470	6,540	9,020
18	4,590	6,330	8,340	3,970	5,820	8,010
20	4,130	5,700	7,500	3,570	5,230	7,210
24	3,440	4,750	6,260	2,970	4,360	6,010

Loads are in pounds concentrated at center of span.

Reduce listed loads to allow for beam heights.

The loads given are for dressed beams which are slightly smaller than normal size listed.

## STATIONARY SCAFFOLD SAFETY CHECK LIST

PROJECT: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 CONTRACTOR: \_\_\_\_\_  
 DATE OF INSPECTION: \_\_\_\_\_ INSPECTOR: \_\_\_\_\_

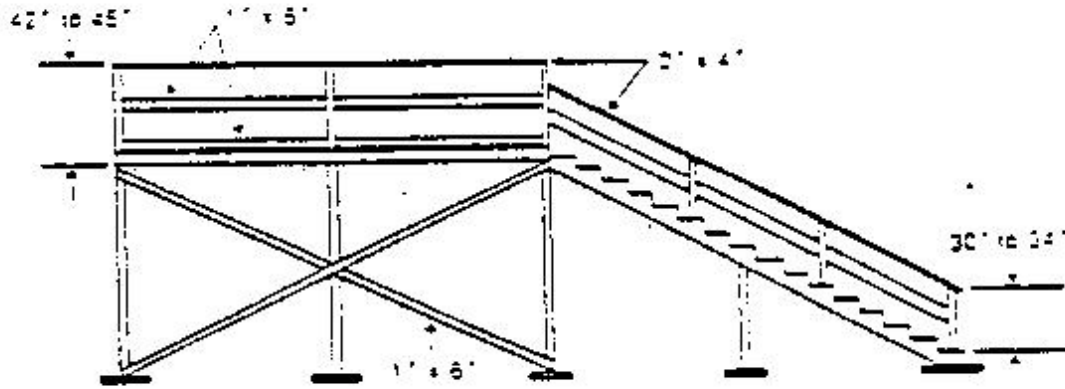
	<u>Yes</u>	<u>No</u>	<u>Action/Comments</u>
1. Are scaffold components and planking in safe condition for use and is plank graded for scaffold use?	_____	_____	
2. Is the frame spacing and sill size capable of carrying intended loadings?	_____	_____	
3. Have competent persons been in charge of erection of scaffold?	_____	_____	
4. Are sills properly placed and adequate size?	_____	_____	
5. Have screw jacks been used to level and plumb scaffold instead of unstable objects such as concrete blocks, loose bricks, etc.?	_____	_____	
6. Are base plates and/or screw jacks in firm contact with sills and frame?	_____	_____	
7. Is scaffold level and plumb?	_____	_____	
8. Are all scaffold legs braced with braces properly attached?	_____	_____	
9. Is guard railing in place on all open sides and ends above 10' (4' in height if less than 45")?	_____	_____	
10. Has proper access been provided?	_____	_____	
11. Has overhead protection or wire screening been provided where necessary?	_____	_____	
12. Has scaffold been tied to structure at least every 30' in length and 26' in height?	_____	_____	
13. Have free standing towers been guyed or tied every 26' in height?	_____	_____	
14. Have brackets and accessories been properly placed:			
Brackets?	_____	_____	
Putlogs?	_____	_____	
Tube & Clamp?	_____	_____	
All nuts & bolts tightened?	_____	_____	

	<u>Yes</u>	<u>No</u>	<u>Action/Comments</u>
15. Is scaffold free of makeshift devices or ladders to increase height?	_____	_____	
16. Are working level plat forms fully planked between guard rails?	_____	_____	
17. Does plank have minimum 12" overlap and extend 6" beyond supports?	_____	_____	
18. Are toeboards installed properly?	_____	_____	
19. Have hazardous conditions been provided for:			
Power lines?	_____	_____	
Wind loading?	_____	_____	
Possible wash out of footings?	_____	_____	
Uplift and overturning moments due to placement of brackets, putlogs, or other causes?	_____	_____	
20. Have personnel been instructed in the safe use of the equipment?	_____	_____	

Additional Comments:



## PLATFORMS AND STAIRWAYS



Handrails shall be made of 2" X 4 or 1" X 4" material, nailed at right angles.

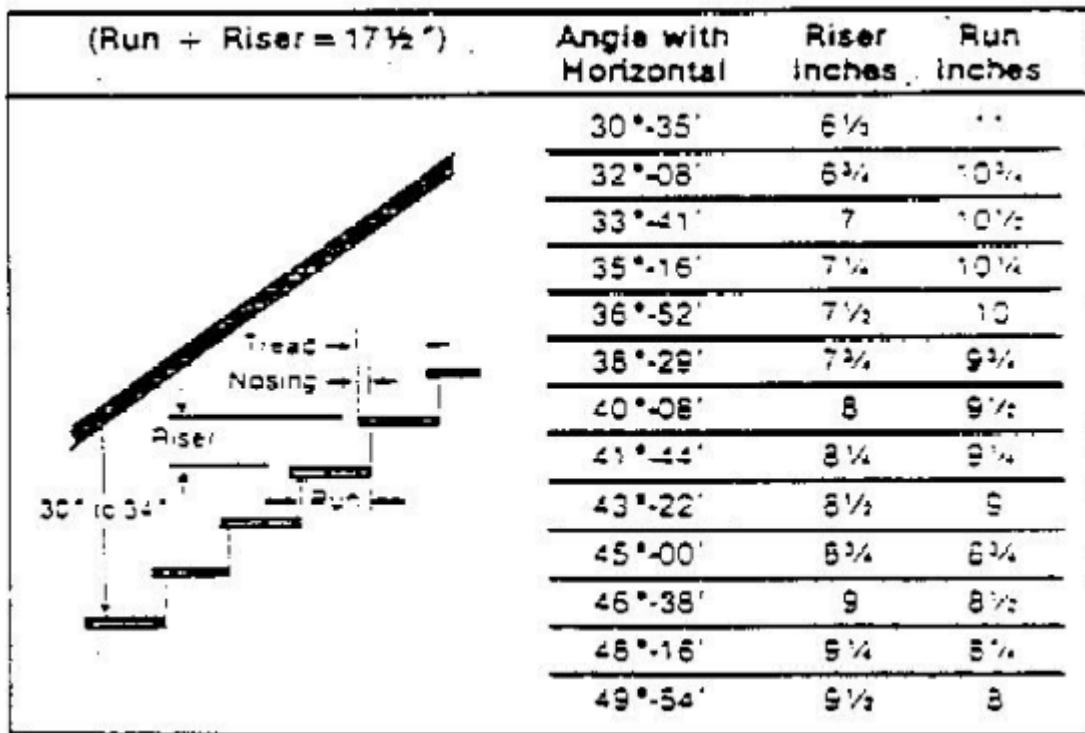
Platform handrails shall be at least 42" and not more than 45" above the platform.

Stairway handrails shall be 30" to 40" above the nose of the tread. Posts shall be 2" X 4" or heavier, and spaced not more than 8' apart.

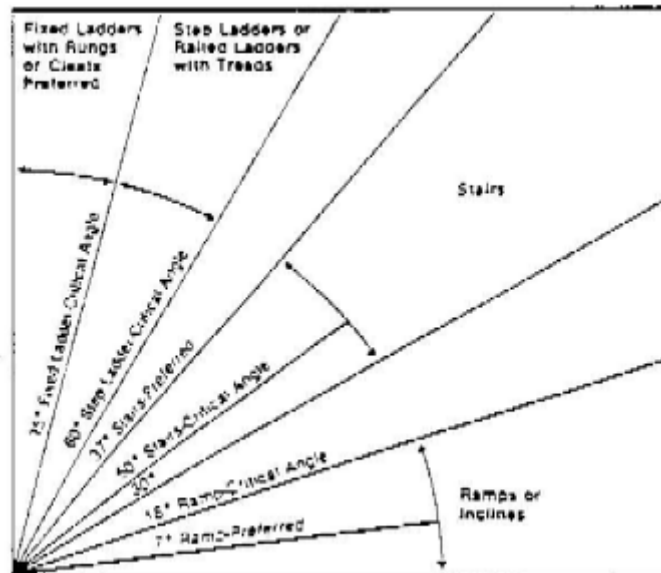
Midrails shall be at least 1" X 6". They shall be spaced midway between platform and top rail on platforms, and midway between the nose of the tread and the top rail on stairs. Midrails shall be nailed to the insides of posts.

Toeboards at least 1" X 6" shall be placed along the floor of the platform and nailed to the insides of posts.

### RUNS AND RISERS FOR STAIRS



### SAFE ANGLES FOR LADDERS, STAIRS AND RAMPS



## FLOOR, ROOF, WALL, AND ELEVATOR OPENINGS

If sheathing or any other surface provides passageways to any side of a floor or roof opening that a worker or material might fall through, the opening shall be covered with planks or other material strong enough to support any load placed on it, or fenced on all sides with standard guard railings. The cover shall be secured to prevent accidental removal or displacement. A pressure sensitive sign or equivalent shall be posted on this protective covering with letters at least 1." high, reading "Floor (Roof) Opening. Do Not Remove." Openings in concrete forms need similar safeguards.

If any part of a runway or scaffold platform is directly above or adjacent to a floor or roof opening, the entire opening shall be covered with planking or railings, with toeboards on the runway or scaffold.

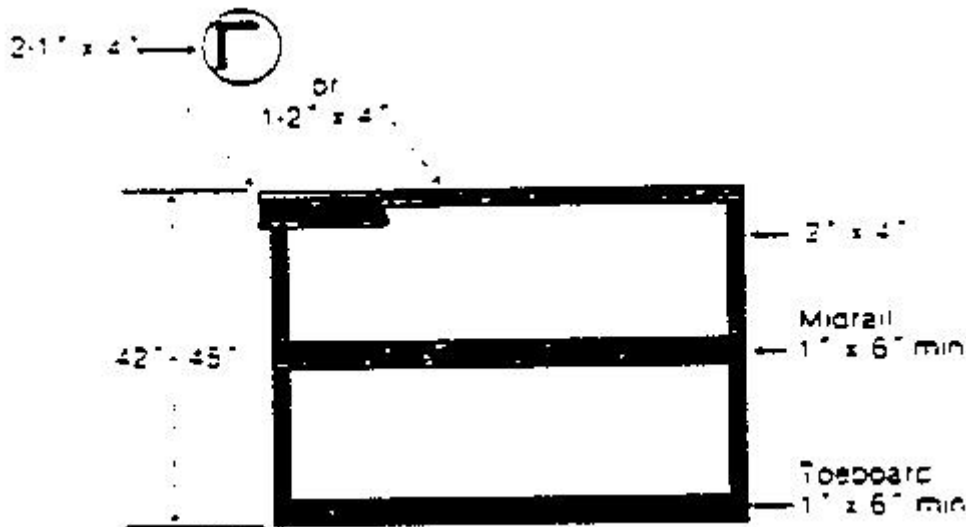
All temporary protection shall be left in place until permanent protection has been provided or the hazard has been eliminated.

Ladder-way openings in floors and platforms shall be guarded by standard railings and toeboards on all sides.

Elevator shafts shall be guarded on all open sides with standard railings and toeboards.

Overhead protection shall be provided when employees are in the shaft while other employees are working above them.

Standard Rail



Posts to be placed not over 8' apart. Pipe or angle iron may be substituted for wood. Minimum inside diameter for pipe 1". Minimum size for angle iron 1 1/2" x 1 1/2" x 3/16".

NOTE: All drawings and corresponding information obtained from: Safety Engineering Standards, U.S. Insurance Group.

## **SAFE USE OF HAND AND PORTABLE POWER TOOLS**

### Screwdrivers

A screwdriver is the most commonly used and abused tool. The practice of using screwdrivers as punches, wedges, pinch bars, or pry bars shall be discouraged as this practice dulls blades and causes employee injury.

Screwdriver tips shall be selected to fit the screw. Sharp-edged bits will not slip as easily as ones that are dull. Redress tips to original shape and keep them clean.

Always hold work in a vise or lay it on a flat surface to lessen the chance of injury if the screwdriver should slip.

When working near electrical equipment, screwdrivers shall be equipped with insulated handles (some also come with insulated blades). Current shall be cut off.

### Hammers

Wooden handles shall be straight grained and free of splinters or splinters. Once split, handles shall be replaced. Make sure handles are tightly wedged.

1. Never strike a hammer with another hammer.
2. Discard any hammer that shows chips, dents, etc. Redressing is not recommended.
3. Safety glasses shall be worn while using a hammer or any other striking tool.
4. Never use a common nail hammer to strike other metal objects such as cold chisels.

### Punches

Never use a punch with a mushroomed struck face or with a dull, chipped, or deformed point. Punches that are bent, cracked, or chipped shall be discarded. Safety glasses shall be worn while using a punch.

### Chisels

Choose a chisel only large enough for the job so the blade is used, rather than only the point or corner. Never use chisels with dull blades--the sharper the tool, the better the performance. Chisels that are bent, cracked, or chipped shall be discarded. Re dress cutting edge or struck end to original contour as needed. When chipping or shearing with a cold chisel, the tool shall be held at an angle that permits one level of the cutting edge to be flat against the shearing plane.

### Hacksaws

Hacksaws shall be adjusted and tightened in the frame to prevent buckling and breaking, but shall not be tight enough to break off the pins that support the blade. Install blade with teeth pointing forward.

Pressure shall be applied on the forward stroke only. Lift the saw slightly, pulling back lightly in the cut to protect the teeth. Do not bend and twist the blade. Never continue an old cut with a new blade.

### Files

Select the right file for the job, making sure that it has a secure handle.

Files shall be cleaned only with file-cleaning cards; never by striking. Never use a file as a pry or

hammer, as chipping and breaking could result in user injury.  
Grasp the file firmly in one hand and use the thumb and forefinger of the other to guide the point.

### Axes and Hatchets

The cutting edges are designed for cutting wood and equally soft metal. Never strike against metal, stone, or concrete.

Never use an axe or hatchet as a wedge or maul, never strike with the sides, and never use them with loose or damaged handles.

Proper axe grip for a right-handed person is to have the left hand about 3" from the end of the handle and the right hand about 3/4 of the way up.

Sharp, well-honed axes and hatchets are much safer to use because "glancing" is minimized.

Safety glasses and safety shoes shall be worn and clear swinging checked before using axes and hatchets. Axes and hatchets shall be carried with the covers on.

### Knives

Knives cause more disabling injuries than any other hand tool. The hazards are that the hands may slip from the handle onto the blade or that the knife may strike the body or the free hand. Use knives with handle guards if possible. Knives shall be kept sharp and in their holders, cabinets, or sheaths when not in use; the cutting stroke shall be away from the body.

Do not wipe dirty or oily knives on clothing. To clean, the blade shall be wiped with a towel or cloth with the sharp edge turned away from the wiping hand. Horseplay of any kind (throwing, "fencing," etc.) shall be prohibited.

### Crowbars

Use the proper kind and size for the job. Never use makeshifts such as pieces of pipe, as they may slip and cause injury. Crowbars shall have a point or toe of such shape that it will grip the object to be moved and a heel to act as a pivot or fulcrum. A block of wood under the heel may prevent slippage and help reduce injuries.

### Shovels

Shovel edges shall be kept trimmed and handles checked for splinters and cracks. Workers shall wear safety shoes with sturdy soles. They shall have feet well separated to get good balance and spring in the knees. The leg muscle will take much of the load. To reduce the chance of injury, the ball of the foot (not the arch) shall be used to press the shovel into the ground or other material.

Dipping the shovel in water or greasing or waxing the shovel will prevent some materials from sticking.

When not in use, hang up shovels, stand them against the wall, or keep them in racks or boxes.

### Box and Socket Wrenches

The use of box and socket wrenches is indicated where a heavy pull is necessary and safety is a consideration. Box and socket wrenches completely encircle the nut, bolt or fitting and grip it at all corners as opposed to two corners gripped by an open end wrench. They will not slip off laterally, and they eliminate the dangers of sprung jaws.

Never overload the capacity of a wrench by using a pipe extension on the handle or strike the handle of a wrench with a hammer. Hammer abuse weakens the metal of a wrench and causes the tool to break. Special heavy duty wrenches are available with handles as long as 3'. Where possible, special penetrating oil shall be used to first loosen tight nuts.

#### Electric Saws

Electric saws shall be equipped with guards above and below the face plate. The lower guard shall be checked frequently to be sure it operates freely and encloses the teeth completely when not cutting. Circular saws shall not be crowded into the work. The motor shall be started and stopped outside the work. At the beginning and end of the stroke or when the teeth are exposed, the operator shall use extra care to keep the body out of the line-of-cut. Saws shall be equipped with "dead man" controls or a trigger switch that shuts off the power when pressure is released.

#### Portable Grinder

Grinding wheels shall be guarded as completely as possible. They shall never be used at greater than their rated speed. To do so may result in the wheel breaking apart due to excessive centrifugal force. Guards shall be adjustable so the operator will be inclined to make the adjustments rather than remove the guard. However, the guard shall be easily removable to facilitate replacement of the wheel. In addition to mechanical guarding, the operator shall wear safety glasses at all times.

Care shall be exercised to protect the grinder from damage.

Since part of the wheel is exposed, it is important the employee hold the wheel so it does not touch his clothes or body.

#### Air Hoses

Workers shall be warned against disconnecting the air hose from the tool and using it to clean machines or remove dust from clothing. Air used for cleaning shall not exceed 30 psi and workers shall wear safety glasses at all times when using air hoses. Brushing or vacuuming equipment is recommended for removing dust from clothing.

Air shall be shut off before attempting to disconnect the air hose from the air line. Any air pressure inside the line shall be released before disconnecting.

## **ELECTRICAL SAFETY/HIGH VOLTAGE**

#### Electric Codes

The National Electric Code, NFPA 70-1984, and ANSI C1-1971 are the nationally adopted requirements for safeguarding of any persons and buildings and their contents from hazards arising from the use of electricity. The code contains basic minimum provisions considered necessary for safety. All electricians shall be familiar with these requirements.

#### Use of Electrically Powered Equipment and Tools

1. All electrically powered equipment or hand tools, except double insulated hand tools, shall be grounded.
2. Portable hand tools and electrically powered equipment shall be used with a ground fault circuit interrupter (GFCI) or an assured equipment grounding program (AEGP) (see "Ground Fault Circuit Protection" this section) shall be in effect.

3. Electrical equipment shall be disconnected or the current otherwise interrupted while it is being adjusted or repaired.
4. Permanent wiring shall be put in conduits.
5. All breakers, motors, and appliance disconnects shall be labeled.
6. Framing of electrical motors shall grounded.
7. Outlets, switching, junction boxes, etc., shall be covered.
8. Exposed noncurrent-carrying metal parts of fixed equipment that may become energized under abnormal conditions shall be grounded when in wet or damp locations; if electrical contact with metal, if operated in excess of 150 volts to ground, or in a hazardous location (see "Hazardous Locations" this section).

NOTE: Consider all exposed wires "hot" until verified otherwise.

#### Ground Fault Circuit Protection

When using extension cords, portable electrically powered hand tools, appliances, or other electrically powered equipment outdoors or in an area under construction, they shall be of the 3-wire type (except double insulated tools) and shall be connected to a GFCI or an AEGP shall be in effect.

The GFCI does not have to be used if the receptacles being used are part of a building's permanent wiring. The GFCI trips a circuit when current leakage occurs.

The AEGP requires regular inspections of all tools, cords, and electric devices. Appropriate documentation shall be maintained. Components of an AEGP are:

1. A written description of the program including specific procedures.
2. Qualified employees appointed to run the program. More than one person shall be appointed.
3. All equipment, cords, etc., to be used shall be inspected for external defects each day. All defective equipment shall be tagged out until repairs are made. All defects, repairs, inspections, etc., shall be documented.

#### Extension Cords

1. Cords shall not be hung over nails, bolts, or sharp edges.
2. Cords shall not be laid in aisles unless protected from damage; they shall be so placed so as to not create a tripping hazard.
3. Cords shall not be used as a substitute for fixed wiring.
4. Cords shall not be run through holes in walls, ceiling, floors, doors, windows, or hung from light fixtures or attached to building surfaces.

#### Hazardous Locations

Standard electrical apparatus cannot be used in locations where flammable gases, vapors, dusts, and other easily ignitable materials are present.

Before electrical equipment and its associated wiring is selected for a hazardous location, the

exact nature of the flammable materials present should be determined.

The National Electric Code, NFPA-70, Articles 500-503, shall be consulted before any use or installation of electrical equipment and associated wiring is selected. Listed below is a guideline for classifying hazardous locations. This guideline shall not be used as a substitute for NFPA-70, Article 500-503.

## **GUIDELINES FOR CLASSIFYING HAZARDOUS AREAS**

### Determining the Need For Classification

A need for classification is indicated by an affirmative answer to any of the following questions.

#### Class I

Are flammable liquids, vapors, or gases likely to be present?

Are liquids having flash points at or above 100 F likely to be handled, processed, or stored at temperatures above their flash points?

#### Class II

Are combustible dusts likely to be present?

Are combustible dusts likely to ignite as a result of storage, handling, or other causes?

#### Class III

Are easily ignitable fibers or flyings present, but not likely to be in suspension in the air in sufficient quantities to produce an ignitable mixture in the atmosphere?

### Assignment of Classification

Classification is determined as indicated by an affirmative answer to any question.

#### Class I - Division 1

Is a flammable mixture likely to be present under normal operating conditions?

Is a flammable mixture likely to be present frequently because of repair, maintenance, or leaks?

Would a failure of process, storage, handling, or other equipment be likely to cause an electrical failure coinciding with the release of flammable gas or liquid?

Is the flammable liquid, vapor, or gas piping system in an inadequately ventilated location, and does the piping system contain valves, meters, or screwed or flanged fittings that are likely to leak?

Is the zone below the surrounding elevation or grade such that flammable liquids or vapors may accumulate?

#### Class II – Division 1

Is combustible dust likely to exist in suspension in air, under normal operations conditions, in sufficient quantities to produce explosive or ignitable mixtures?

Is combustible dust likely to exist in suspension in the air, because of maintenance or repair operations, in sufficient quantities to cause explosive or ignitable mixtures?

Would failure of equipment be likely to cause an electrical system failure coinciding with the release of combustible dust in the air?

Is combustible dust of an electrically conductive nature likely to be present?

#### Class III – Division 1

Are easily ignitable fibers or materials producing combustible flyings handled, manufactured, or used?



Class I – Division 2

Is the flammable liquid, vapor, or gas piping system in an inadequately ventilated location, but not likely to leak?

Is the flammable liquid, vapor, or gas handled in an adequately ventilated location, and can the flammable substance escape only in the course of some abnormality such as failure of a gasket packing?

Is the location adjacent to a Division 1 location, or can the flammable substance be conducted to the location through trenches, pipes, or ducts?

If positive mechanical ventilation is used, could failure or improper operation of ventilating equipment permit mixtures to build up to flammable concentrations?

Class II – Division 2

Is the combustible dust likely to exist in suspension in air only under abnormal conditions, but can accumulations of dust be ignited by heat developed by electrical equipment, or by arcs, sparks, or burning materials expelled from electrical equipment?

Are dangerous concentrations of ignitable dusts normally prevented by reliable dust-control equipment such as fans or filters?

Class III – Division 2

Are easily ignitable fibers or flyings only handled and stored, and not processed?

Is the location adjacent to a Class III, Division 1 location?

Wet Locations

A switch or circuit breaker in a wet location or outside of a building shall be enclosed in a weatherproof enclosure.

In damp or wet locations, cabinets and cutout boxes of the surface type shall be weatherproof, be so placed or so equipped so as to prevent moisture or water from entering and accumulating within the cabinet or cutout box, and shall be mounted so there is at least 1/4" space between the enclosure and the wall or other supporting surface. It is recommended that boxes of nonconductive material be used with nonmetallic-sheathed cable.

In locations where walls are frequently washed or where there are surfaces of absorbent materials such as damp paper or wood, the entire wiring system, including all boxes, fittings, conduits, and cables used, shall be mounted so that there is at least 1/4" air space between it and the wall or supporting surface.

Lock Out/Tag Out Procedures

Refer to "Equipment Lockout Procedures" section.

This procedure shall be used whenever the need for de-energizing electrical or mechanical equipment (to include fume hoods and other scientific equipment) arises.

Transportation or Movement of Equipment or Materials

Vehicles, equipment, or materials shall not be placed closer to any high-voltage lines than the minimum clearances specified below.

**Recommended Clearances From Energized High Voltage Conductors (While In Transit)**

Voltage (Phase to Phase)

Minimum Clearance (Feet)

750 - 50,000	6
50,000 - 345,000	10
345,000 - 750,000	16
750,000 - 1,000,000	20

### Inspection and Repair

1. Periodic inspections, essential to the maintenance of power tools, shall be performed.
2. Employees shall be instructed and trained to inspect tools and recognize and report defects.
3. All defective equipment shall be taken out of service and tagged or locked out until repairs or maintenance is completed.
4. Employees shall not be allowed to make make-shi repairs.
5. Power tools shall be cleaned with a recommended n flammable and non-toxic cleaner. Air drying shall be used in place of blow drying with compressed air.

## **EQUIPMENT MANAGEMENT & LOCKOUT PROCEDURES**

**PURPOSE:** The goal of LSU-Alexandria’s equipment management program is to ultimately decrease repairs to equipment by increasing the efficiency in managing the scheduled equipment maintenance. LSUA is committed to a continuing, aggressive program for maintenance of mechanical and electrical equipment in its facilities.

### **GENERAL POLICY**

#### A. Responsibilities

LSUA has implemented a viable equipment management program using computer based software. This program shall be made available and accessible to all maintenance or other designated personnel.

The program shall include designating personnel who are responsible for specific maintenance areas. Policies outline the roles and responsibilities of managers, supervisors and employees within the maintenance program.

#### B. Specific Inventory

A specific inventory of all mechanical and electrical equipment in the program has been established including the name of the equipment, location, model number and serial number. This is a “living” document. Equipment may be added, deleted and/or modified at any time as equipment and its needs change.

The inventory is part of the computer based program.

C. Preventive Maintenance Procedures

LSUA has developed preventive maintenance procedures for each piece of mechanical and electrical equipment included in the program. These procedures are included on each work order that is generated through the computer based program. These procedures include but are not limited to the following:

- Tasks to be completed
- Trade skills needed to accomplish the task
- Estimated time required to complete task

LSUA maintenance contracts electronics, all confined spaces, chillers, cooling towers and boilers. The contract specifies the work to be performed and a copy of the contract shall be available for review

D. Preventive Maintenance Schedule

LSUA has developed a preventive maintenance schedule(s) for each piece of equipment included in the program. LSUA has used the suggested manufacturer's preventive maintenance (PM) on its equipment and ORM's suggested schedules to develop its maintenance schedules.

E. Testing Procedures

LSUA has contracted with Storer for testing procedures for each piece of equipment that requires testing. LSUA conducts semi-annual testing on its chillers using oil analysis and Eddie current test. The electrical equipment is subjected to periodic infrared sensor temperature checks. The frequency of these test are included in the maintenance schedule. LSUA follows the suggested manufacturer's testing procedures on its equipment and some of ORM's suggested tests and schedules.

F. Documentation

All documentation is kept at Facility Services. The documentation provides LSUA with an equipment history and the following shall be included, if applicable:

- What work was performed on the equipment
- Who performed the work
- How long did it take to perform
- What replacement parts were used and their costs
- Whether the work was billed to a tenant
- If the agency is using a contractor to perform preventive maintenance, repairs, testing, etc. the agency shall require the contractor to provide clear, concise documentation of the work performed
- Date work was performed/completed

The Facility Services office shall forward a summary report of all preventative maintenance to the campus Loss Prevention Coordinator annually.

G. Training

LSUA shall provide documented training for all employees trained in areas related to the program, whether formal or on-the-job training, to include training

on:

- The written Equipment Management Program
- The Operation of equipment included in the program
- The preventive maintenance of the equipment included in the program
- The testing procedures for equipment and the operation of testing equipment
- The safety precautions to be aware of when performing the preventive maintenance as well as the PPE needed before starting the procedure

Documentation of training shall be forwarded to the Loss Prevention Coordinator annually.

### **Communication and Organization**

The Safety & Risk Manager shall cite maintenance program deficiencies during their inspections at state facilities. These deficiencies, along with any recommendations for corrective action, shall be reported in writing to the Office of Risk Management. All correspondence shall then be forwarded to LSUA for a response to and/or corrective action plans addressing the recommendations. LSUA will provide all relevant documentation to the ORM Loss Prevention Officer upon request and will administer a timely response and facilitate all corrective actions plans that are mutually agreed upon.

### **Audits and Record Keeping**

Records will be maintained for the life of the equipment on all program equipment including, but not limited to: preventive maintenance schedules, testing results, repair documents, replacement documents and all completed service documents. The documentation may be listed on the work order comments if using a computer based maintenance management program designed specifically for maintenance management such as work orders, inventory, preventive maintenance and time management. Loss prevention audits shall be conducted on the program every three years. Recertification/compliance reviews shall be conducted in subsequent years.

### **Lockout / Tagout Program**

This procedure is to cover locking out, tagging out, or otherwise preventing the operation of electrical or mechanical equipment, fume hoods, and other scientific equipment from operating.

In this procedure, when the term “lock” is used, it is intended to cover any means of prevention required to prohibit equipment operation. It covers the use of padlocks, tags, or other physical restriction of equipment such as racking-out of switchgear or blocking fan blades.

Procedure

1. Alert operator of intention to lock out or perform work on equipment.
2. Before starting work, make sure equipment cannot be set into motion without your activation.
3. Attach proper lockout device, signed and dated.
4. If additional operations shall be performed on the same equipment, those shall also use lockout/tagout procedures.

NOTE: When more than one craft is working on the same equipment, it is recommended that a multiple locking device be used.

5. When your work is completed, remove your tag/lock. Only the person attaching the tag/lock shall remove it.
6. Equipment shall not be operated until all work is completed and the last tag/lock is removed.
7. Transfer of lock out tag out procedure for shift work employees: The first shift employee shall remove his lock and tag and the second employee will replace with their own lock and tag and document.

NOTE: For scientific equipment, a lockout tag/lock shall be affixed by the person in charge and be removed only after a technician or service person has rendered such equipment safe and operable.

### Training

1. All employees that will use LSUA's lock-out/tag-out system (Authorized Employees) will be trained initially and every re-trained annually.
2. All other employees of LSUA (Affected Employees) will receive training during orientation and every 3 years thereafter.

### Contractors

Any contractor that performs any maintenance or repair on any equipment at Louisiana State University at Alexandria must utilize their own lock-out/tag-out program.



**DO NOT REMOVE THIS TAG**

**TO DO SO WITHOUT  
AUTHORITY WILL MEAN  
IMMEDIATE DISCHARGE.**

**IT IS HERE FOR A PURPOSE**

**SEE OTHER SIDE.**

STONEHOUSE SIGNS, Inc., Denver, Colo.---Accident Prevention Sign & Tag  
TAG NO. 47

**Working ON  
MACHINES  
DO NOT START**



Signed by \_\_\_\_\_

Date \_\_\_\_\_

## **RE-USING STEEL DRUMS AND CONTAINERS**

A steel drum and/or container shall not be re-used until it has been rinsed three to four times with water unless it will be refilled with a compatible substance. A steel drum and/or container having contained a water-reactive substance shall not be rinsed out with water under any circumstances. The Office of Campus Safety shall be contacted if a suitable rinse cannot be found.

Under no circumstances shall the top, bottom, or side of a steel drum and/or container having contained a flammable or toxic substance be removed with a cutting torch.

## **MATERIAL HANDLING**

Material handling is done by every person in every department on campus. It is done as either his/her sole duty or as part of his/her regular duties. Material handling can either be done by hand or with mechanical help (fork lift, hoist, hand trucks, etc.).

The following are general safety rules and requirements regarding material handling and material handling equipment regularly used on campus.

### **A. LIFTING BY HAND**

Lifting and carrying can be done without injury by using the following criteria:

#### **1. Personal Protection**

NOTE: Minor office material lifting is exempt from Personal Protection section of "Lifting By Hand."

- a. Hand protection shall be used when lifting; however, gloves or loose clothing shall not be worn around moving equipment.
  - (1) Leather gloves and aprons shall be worn when handling rough or sharp objects.
  - (2) Chemical gloves, splash suits, and eye protection shall be worn when handling chemicals of any nature (corrosives, flammables, etc.).
- b. Eye protection shall be worn at all times.
- c. Warehousing, trades, and other occupations involving lifting of heavy objects shall wear steel-toed shoes and/or shin guards.

#### **2. Body Condition**

How much should you lift? Lifting capacity depends on body condition; that is, flexibility and strength, and physical make-up. To help your condition, build up your strength by a regular exercise program and stretch your body before doing any lifting.

#### **3. Sizing Up The Load Questions to ask:**

- a. Is it too big for you to handle?
- b. What about the shape? Is it irregular, square, rectangular, etc.?
- c. Can you get a firm, comfortable grip?
- d. How many loads are there and where are they going?

#### 4. Lifting It Right

There are six steps to proper lifting:

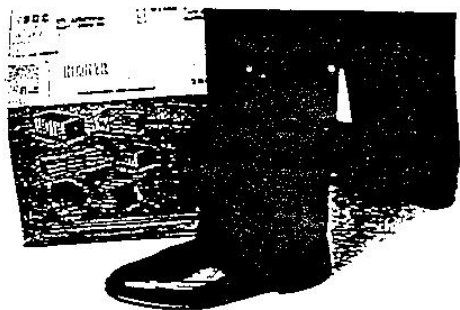
- a. Keep feet parted--one alongside the object and one behind the object. Comfortably spread feet give greater stability; the rear foot is in position for the upward thrust of the lift.
- b. Keep back straight, nearly vertical. Use the sit-down position to do so, but remember that "straight" does not mean absolutely "vertical". A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the guts that can cause hernia.
- c. Tuck in chin so the neck and head continue the straight back line and keep spine straight and firm.
- d. Grasp the object with the whole hand. The palm grip is one of the, most important elements of correct lifting. The fingers and hand are extended around the object to be lifted. Use the full palm; fingers alone have very little power. Wearing gloves is recommended.
- e. Tuck elbows and arms in and hold load close to body. When the arms are held away from the body, they lose much of their strength and power. Keeping the arms tucked in also helps keep body weight centered. See attached diagrams.
- f. Keep body weight directly over feet. This provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot.

NOTE: Taken from The National Safety Council "Accident Prevention Manual".



## SIX STEPS TO PROPER LIFTING

1. Correct position of feet.



2. Straight back and knees.



3. Chin in.



4. Correct grasp.



5. Load held close to the body  
(for lifting and carrying)



6. Correct use of body weight.



When setting the load down, the same six proper lifting steps shall be used in reverse.

To place an object on a bench or table, the worker shall first set it on edge and push it far enough onto the support to be sure it will not fall. The object shall be released gradually as it is set down. It shall be moved in place by pushing with the hands and body from in front of the object. This method prevents fingers from being pinched. It is especially important that an object placed on a bench or other support be securely positioned so that it will not fall, tip over, or roll off. Supports shall be correctly placed and strong enough to carry the load. Heavy objects like lathe chucks, dies, and other jigs and fixtures shall be stored at approximately waist height.

To raise an object above shoulder height, the worker shall lift it first to waist height. He/she shall rest the edge of the object on a ledge, stand, or hip. He/she shall then shift hand position so the object can be boosted after the knees are bent. The knees shall be straightened out as the object is lifted.

To change direction, the worker shall lift the object to the carrying position and turn the entire body including the feet. He/she shall avoid twisting the body. In repetitive work, the person and the material both shall be positioned to prevent twisting of the body when moving the material.

## 5. Team Lifting

- a. When two or more people carry one object, they shall adjust the load so that it rides level.
- b. When long sections of material (pipe, lumber) are carried, the load shall be carried on the same shoulder and both persons shall walk in step.
- c. When team lifting, one person shall be designated to give the signal when to lift.

## 6. Handling of Specific Shapes

### a. Barrels and drums

- (1) It is recommended that a hand truck or other type of material handling equipment be used for lifting and transporting barrels and/or drums.
- (2) If it is necessary to roll a barrel or drum, the worker shall push against the sides with both hands. To change directions, the drum or barrel shall be stopped, the direction changed by grabbing the upper and lower rim seams, and movement started.
- (3) When uprighting a full drum, the six steps to safe lifting shall be adhered to.

### b. Long Objects (Pipe, Lumber, Barsteel, etc.)

There are two schools of thought on this. The method chosen shall be determined by the obstructions to be encountered.

- (1) The item shall be carried on the shoulders with the front end held as high as possible to avoid striking other employees—especially when going around corners.
- (2) The item shall be carried on the shoulders with the front end low so it does not catch overhead objects.

### c. Compressed gas cylinders

- (1) Compressed gas cylinders may be rolled on the bottom edge for short distances. They shall never be dragged.
- (2) Because of their shape, smooth surface, and weight, cylinders are difficult to carry by hand. Cylinders weighing more than 40 pounds total shall be transported on a hand or motorized truck, suitably secured to keep them from falling.

## 7. Items to remember when lifting by hand:

- a. Avoid twisting while turning with a load.
- b. Watch for narrow places when moving materials.
- c. Avoid high reaching and lifting. A suitable ladder or platform shall be used to get up to load.
- d. Do not jump with a load.
- e. Do not catch or throw loads.
- f. Check the materials to be lifted for nails, splinters, rough strapping, or other things that might injure hands.
- g. Ascertain good visibility--especially on stairs.

## B. HANDTRUCKS

### 1. General

- a. Keep truck under control at all times.
- b. Trucks shall be stored in designated areas--not in aisles.
- c. Housekeeping--all aisles and loading areas shall be kept clear.
- d. Always move the truck at a safe speed. Do not run.
- e. Loads shall be packed securely; avoid overhanging.
- f. No riders or horseplay.
- g. Hands shall be kept inside to protect them in narrow areas if the truck does not have knuckle guards or handles.

### 2. One Axle Handtrucks

- a. Keep the center of gravity of the load as low as possible. Place heavy objects below higher objects.
- b. Place the load so it is carried by the axle, not the handles.
- c. Load only to a height that will allow a clear view ahead.
- d. When lifting from a horizontal position, have a straight back and lift with the legs. The load shall be put down the same way.
- e. Let the truck carry the load. The operator shall balance and push only.
- f. Never walk backwards with a handtruck.
- g. For extremely bulky or pressurized items, such as gas cylinders, strap or chain the item to the truck. Valve caps shall be on valves.
- h. Always move the truck at a safe speed. Do not run.

### 3. Two Axle Trucks

NOTE: Many one axle handtruck rules apply here also.

- a. Load evenly to prevent tipping.
- b. Push. Do not pull.
- c. The truck shall not be loaded so high that the operator cannot see where in the direction of travel. If the load is high, two persons are needed; one to push and one to guide.
- d. Truck contents shall be arranged so they will not fall if accidentally bumped.
- e. When entering elevators or tight areas, enter with the load forward. Make sure load is bound to truck.

## C. SOME REQUIREMENTS FOR HEAVY CONSTRUCTION EQUIPMENT (Rollers,

Compactors, Front-end Loaders, Bulldozers, Trucks, etc.)

1. General

- a. All vehicles of these types shall have a suitable horn available which is tested before the vehicle is used.
- b. Operators shall wear seat belts at all times when machinery is in operation.
- c. All controls (brakes, steering, etc.) shall be tested each shift before the vehicle is used.
- d. No riders shall be allowed on machines unless the machine is designed to carry riders.
- e. Blades, buckets, and shovels on earth-moving machines shall be lowered to the ground when the equipment is parked or unattended.
- f. All earth-moving equipment shall have a roll-over protection structure (ROPS) and seat belts.
- g. Trucks that are loaded by a crane, power shovel, loader, or similar equipment shall have a cab shield and/or canopy strong enough to protect the operator from shifting or falling materials. Operators shall be out of the vehicles while they are being loaded. Brakes shall be set.
- h. All trucks, excluding pickup trucks and earth-moving equipment, shall have an audible warning device that sounds automatically when they are backing up. The sound shall be able to be heard at least 200' away.
- i. Smoking during vehicle refueling is prohibited.
- j. All vehicles shall be operated in a safe manner. Earth-moving equipment shall not exceed 15 mph.
- k. All vehicles shall be inspected before each use and thoroughly on a regular basis.

E. FORK TRUCKS

Fork trucks are used to carry, push, pull, lift, stack, and tier materials.

1. Training

Only trained and authorized operators shall be permitted to operate a powered industrial truck.

2. Guarding

- a. Hazardous moving parts such as chain and sprocket drives and exposed gears shall be guarded to protect the operator in his normal operating position.
- b. All fork trucks shall have an overhead guard in accordance with ANSI B 56.1.
- c. Exposed tires shall have guards that will stop particles from being thrown at the operator.
- d. Hydraulically-driven lifting systems shall have a relief valve installed and suitable stops shall be provided to prevent travel over of the carriage.
- e. A load backrest extension shall always be used when the type of load presents a hazard to the operator. The top of a load shall not exceed the height of the backrest.

3. Loading

- a. If the material being handled is obstructing the view, the operator is required to travel backwards. The operator shall face the direction of travel at all times.
- b. Only loads within the rated capacity of the truck shall be handled. No counter weights shall be allowed. A nameplate showing the weight of the truck and its rated capacity shall be located in plain view of the truck.
- c. Backwards tilt shall be used to stabilize the load.
- d. Loads shall be checked for overloading and for loose material before making the lift.
- e. Extreme care shall be taken when handling long items, i.e., bar stock and lumber.

- f. The load shall never be driven in an upward position, nor raised or lowered while moving.
- g. Forks shall be locked to the carriage, and the fork extension designed so as to prevent unintentional lifting of the toe or displacement of the fork extension.
- h. Bridge plates and dock boards shall be strong enough to support the intended load. They shall also have side boards, anti-slip surfaces, and be secured to the dock.
- i. Chocks shall be used on truck wheels when unloading. See attached diagram.

#### 4. Inspections

All fork trucks shall be inspected before each use and thoroughly on a regular basis.

#### 5. Miscellaneous

- a. Powered industrial trucks shall be equipped with horns.
- b. Steering wheel knobs are prohibited.
- c. All trucks shall be equipped with an ABC fire extinguisher.
- d. Fork trucks shall not be used on upper level floors unless the floors are designed for that load capacity.
- e. Diesel or gasoline fork trucks shall be used in adequately vented areas only.
- f. Never give rides on a fork truck unless the truck is designed for it.

#### 6. General Operating Requirements

- a. No excessive speed or reckless driving.
- b. When the operator will be farther than 25' from the truck, the forks shall be down, motor cut off, and emergency brake applied.
- c. No one shall be allowed to pass under the elevated portion of any truck--loaded or empty.
- d. The operator shall come to a stop at blind corners and before passing through doorways.
- e. Extreme caution shall be taken when operating on turns, ramps, grades, or inclines.
- f. Reverse control shall never be used for braking.
- g. Always drive with the load pointing upgrade unless a bulky load permits poor visibility.
- h. Trucks shall not be used for any purpose other than the one for which they were designed, i.e., bumping skids, pushing piles of material out of the way, using forks as a hoist, etc.
- i. Trucks shall ascend or descend grades slowly. When ascending or descending grades in excess of 10%, loaded trucks should be driven with the load upgrade. Unloaded trucks should be operated on all grades with the load-engaging means downgrade.
- j. When standard forks are used to pick up round objects such as rolls or drums, care shall be taken to see that the tips do not damage the load or push it against workers.
- k. Operators of lift trucks shall not move improperly loaded skids or pallets, broken pallets, or loads too heavy for the truck.

NOTE: Using a lift truck as an elevator for employees shall only be done if the work platform is securely seated on the forks, fastened to the vertical face, and provided with handrails and toeboards. The truck shall also have an overhead guard for the operator's protection. The operator shall not leave the controls while the truck is being used as a man lift.

## F. HOISTS

### 1. General

Hoists are used to raise, lower, and transport heavy loads for limited distances.

- a. Hoists shall not be used to lift, support, or otherwise transport people unless designed for that purpose.
- b. The load capacity of each hoist shall be shown in conspicuous figures on the hoist body. Lifts shall not be made beyond the rated capacity of the hoist, slings, chains, ropes, straps, etc.
- c. All hoists shall have, safe operating procedures affixed to them.
- d. Hoists operating on rails, tracks, or trolleys shall have positive stops or limiting devices on the equipment, rails, tracks, or trolleys to prevent overrunning of safe limits.
- e. Pick up loads only when they are directly under the hoist.
- f. Unless they are grounded, rope-operated electric hoists shall have non-conducting control cords.
- g. Control cords shall be clearly marked "hoist" or "lower" or a similar combination.
- h. The block shall not be lowered below the point where less than two full wraps of rope remain on the hoisting drum.
- i. When lifting and moving material, the area should be clear. No one shall be allowed to walk under the load.
- j. No load shall be left suspended without an operator at the controls.
- k. When not in use, the hoist shall be lifted in the upward position.

## 2. Inspections

- a. Hoists shall be inspected before each use. Regularly scheduled detailed inspections shall pay special attention to load hooks, ropes, brakes, limit switches, wear damage, and railstops.
- b. During inspection and/or repair, the power shall be disconnected. A warning sign stating such shall be posted.

## G. AERIAL BASKETS

1. Aerial baskets shall be of the proper design and construction for the intended work.
2. The design limits of the equipment must be thoroughly understood and the baskets operated within the limits of their capabilities.
3. Daily inspections are necessary to uncover defects before they become serious in nature. (Note and report holes in the basket.)
4. All maintenance, both preventive and corrective, shall be performed by qualified personnel.
5. It is not safe to assume that an operator familiar with one type of aerial basket or equipment can operate other types.
6. Adequate clearances shall be observed. The ability to judge distances is essential.
7. Sufficient rubber protective equipment is as necessary in working from aerial baskets as in working from a pole.
8. When jobs involving both "bare-hand" work from a basket and work from a structure are performed, coordination and teamwork between the two methods is of primary importance.
9. Job briefing and follow-up on training are essential for safe operation.

## H. HAND SIGNALS

Following are basic hand signals that all operators and riggers of cranes, hoists, boom trucks, aerial baskets, etc., shall use.

## HAND SIGNALS



Use Main Hoist Tap fist on head, then use regular signals.



Use Whip Line (auxillary hoist) Tap elbow with one hand, then use regular signals.



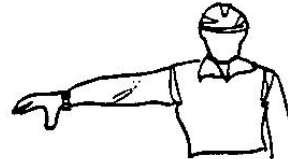
Dog Everything Clasp hands in front of body.



Raise Boom and Lower Load With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.



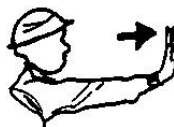
Lower Boom and Raise Load With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.



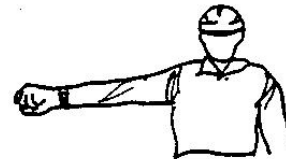
Open Clamshell Bucket Arm extended, open hand slowly.



Travel (both tracks, crawler cranes only) Use both fists in front of body, making a circular motion about each other to indicate the direction of travel - forward or backward.



Bridge Travel Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



Close Clamshell Bucket Arm extended, close hand slowly.



**Extend Boom** (telescoping booms) Both fists in front of body with thumbs pointing outward.



**Retract Boom** (telescoping booms) Both fists in front of body with thumbs pointing toward each other.



**Stop** Arm extended down, wrist bent with palm down and open.



**Trolley Travel** Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.



**Multiple Trolleys** Hold up one finger for block marked "1," and two fingers for block marked "2." Regular signals follow.



**Emergency Stop** Arm extended down, palm down and open, swing hand back and forth.

## I. SLINGS

### 1. Materials Used

- a. The type of sling to be used is determined by the load to be lifted.
- b. Fiber rope is particularly suitable for the handling of loads that may be damaged by contact with metal slings. Fiber rope is generally made from manila, sisal, benequen, nylon (2.5 x breaking strength & 4 x elasticity of manila), polyester, and polypropylene (special applications). Manila and nylon ropes give the best uniform strength and service.
- c. Wire rope is used widely instead of fiber rope because:
  - (1) It has a greater strength and durability under severe working conditions.
  - (2) Its physical characteristics do not change when used in varying environments.
  - (3) It has controlled and predictable stretch characteristics.
  - (4) Where mechanical type loop endings are employed or where swayed or pressed on terminations are used.

NOTE: See attached diagrams, "Manila Rope Knots" and "Wire Rope Connections."
- d. Chain slings are used when a high resistance to abrasion and corrosive substances is needed. Chain slings are generally made from alloy steels such as stainless steel, monel metal, bronze, etc.
- e. Web slings are used when lifting loads in need of surface protection; used on tubular, nonferrous, ceramic, painted, polished, highly machined, and other products with a fine or delicate surface.
- f. Two types of web slings:
  - (1) synthetic web--nylon or polyester
  - (2) metal mesh web--alloy steel = sharp edges, concrete, high temperature



## 2. Rated Capacity

- a. As the sling is used, factors such as abrasion, nicking, distortion, corrosion, and other factors affect the load rating.
- b. Slings can be used at various angles, but stress increases rapidly with the angle of lift. All slings shall be ordered with this in mind.

NOTE: Most slings have catalogs and rating tables for load rating worked out--consult them.

- c. Each sling shall bear a tag indicating its rated load capacity. Rated capacity is based on newly manufactured slings.
- d. Allowances shall be made when hitches are used.
- e. If loads having sharp edges or corners are to be lifted, pads or saddles shall be used to protect the ropes and chains.

NOTE: See attached diagram, "Rated Capacity."

## 3. Inspection

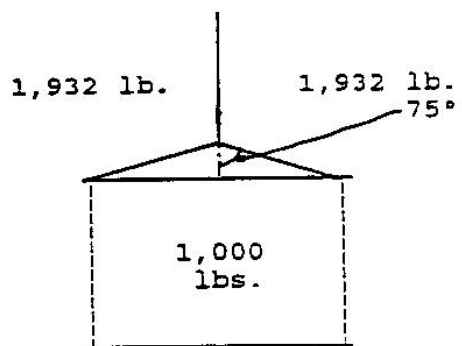
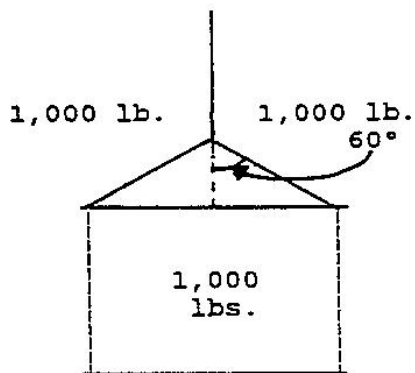
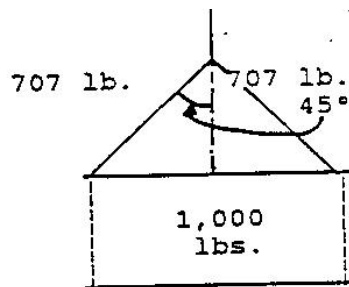
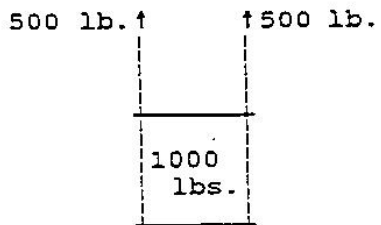
- a. Slings shall be checked daily by trained employees.
- b. Any damaged or suspected damaged slings shall be removed immediately from service and made unusable.
- c. Fiber ropes shall be inspected every 30 days and more often if used in critical applications. Rope shall be examined over the length of the rope for wear, abrasions, powdered fibers between strands, variations in size or roundness of strands, dislocation, and rotting.
- d. Wire rope shall be inspected when installed, weekly during use, and regularly by a trained inspector. Wear of crown wires, broken wires, kinking, high strands, corrosion, loose wires, nicking, and lubrication shall be checked. (See attached wire rope wear and damage chart.) Experience and judgment of all factors, combined with the length of time in service and the tonnage hoisted by the rope, determines when it should be discarded.
- e. Chain slings shall be inspected daily by personnel using the chain and semiannually or more often by persons qualified by experience or training. A link-by-link inspection shall be made to detect bent links, cracks in welded areas, transverse nicks and gouges, corrosion pits and elongation (stretching by overloading).

NOTE: See attached, "Wire Rope Wear and Damage."

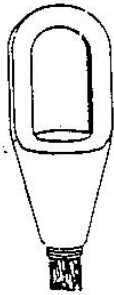
- f. Web slings shall be inspected by the user it each time they is used. Also, periodic inspections shall be made by a person experienced in the inspection of web slings. Web slings shall be checked for abrasive wear, cuts, tears, snags, punctures, etc.

NOTE: See following diagram, "Maximum Allowable Wear at Any Point of Link."

RATED CAPACITY



## WIRE ROPE CONNECTIONS



Sockets Zinc Type  
--properly attached  
100%



Wedge Sockets  
70%



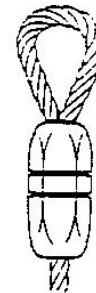
Clips - Crosby type  
80%



Knot and Clip (con-  
tractors knot) 50%



Plate Clamp Three  
bolt type -- 80%



Smooth Clamp -- 80%



Spliced Eye and Thimble  
 $\frac{1}{2}$ " and smaller 100%  
 $\frac{3}{4}$ " to  $\frac{1}{2}$ " 95%  
 $\frac{7}{8}$ " to 1" 88%  
 $1\frac{1}{4}$ " to  $1\frac{1}{2}$ " 82%  
 $1\frac{3}{4}$ " to 2" 75%  
 $2\frac{1}{2}$ " and larger 70%

Percentages shown equal the connection's efficiency as compared to unaltered wire rope. For example, a smooth clamp on wire rope is 80% as strong as unaltered wire rope.

## WIRE ROPE KNOTS



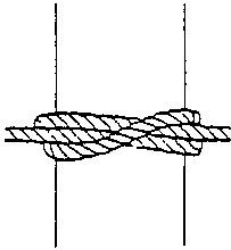
Square or Reef  
Knot 43%



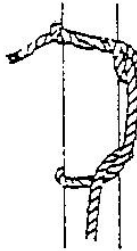
Bowline (outside)  
50%



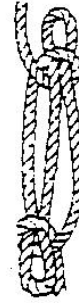
Bowline (inside)  
53%



Clove Hitch  
75%



Timber Hitch and  
Half Hitch 72%



Sheepshank  
35%



Short Splice  
85%



Long Splice  
68%



Eye Splice  
25%

Percentages shown equal the knot's efficiency as compared to unknotted new manila rope. For example, a clove hitch is 75% as strong as unknotted new manila rope.

## WIRE ROPE WEAR AND DAMAGE



A wire rope which has been kinked. A kink is caused by pulling down a loop in a slack line during improper handling, installation, or operation. Note the distortion of the strands and individual wires. Early rope failure will undoubtedly occur at this point.



Localized wear over an equalizing sheave. The danger of this type wear is that it is not visible during operation of the rope. This emphasizes the need of regular inspection of this portion of an operating rope.



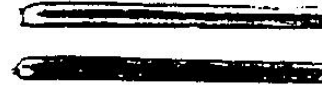
A typical failure of a rotary drill line with a poor cut-off practice. These wires have been subjected to excessive peening causing fatigue-type failures. A predetermined, regularly scheduled, cut-off practice will go far toward eliminating this type of break.



A single strand removed from a wire rope subjected to "strand nicking." This condition is the result of adjacent strands rubbing against one another and is usually caused by core failure due to continued operation of a rope under high tensile load. The ultimate result will be individual wire breaks in the valleys of the strands.



An example of a wire rope with high strand -- a condition in which one or two strands are worn before adjoining strands. This is caused by improper socketing or seizing, kinks, or dog legs. Picture A is a close-up of the concentration of wear and B shows how it recurs in every sixth strand (in a six-strand rope).



An illustration of a wire which has broken under tensile load in excess of its strength. It is typically recognized by the "cup and cone" appearance at the point of fracture. The necking down of the wire at the point of failure to form the cup and cone indicates that failure occurred while the wire retained its ductility.



A wire rope which has jumped a sheave. The rope itself is deformed into a "curl" as if around a round shaft. Close examination of the wires show two types of breaks -- normal tensile "cup and cone" breaks shear breaks which give the appearance of having been cut on an angle with a cold chisel.

THE WIRE ROPE

An illustration of a wire which shows a fatigue break. It is recognized by the bent squared off ends perpendicular to the wire. This break was produced by a torsion machine, which is used to measure the ductility. This break is similar to wire failures in the field caused by excessive bending.



A "bird cage." Caused by sudden release of tension and resultant rebound of rope from overloaded condition. These strands and wires will not return to their original positions.



A wire rope which has been subjected to repeated bending over sheaves under normal loads. This results in "fatigue" breaks in individual wires -- these breaks are square and usually in the crown of the strands.



An example of a wire rope that has provided maximum service and is ready for replacement.



A fatigue break in a cable tool drill line caused by a tight kink developed in the rope during operation.



An example of "fatigue" failure of a wire rope which has been subjected to heavy loads over small sheaves. The usual crown breaks are accompanied by breaks in the valleys of the strands -- these breaks are caused by "strand nicking" resulting from the heavy loads.



A close-up of a rope subjected to drum crushing. Note the distortion of the individual wires and displacement from their normal position. This is usually caused by the rope scrubbing on itself.

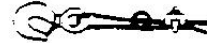
Chain Size (inches)	Maximum Allowable Wear (inches)
1/4	3/64
	5/64
1/2	7/64
	9/64
3/4	5/32
	11/64
1	3/16
1	7/32
1 1/4	1/4
1	9/32
1 1/2	5/16
1 3/4	11/32

**GOOD AND BAD RIGGING PRACTICES**

### Eye Splices



Good--Note use of thimble in eye splice.



Bad--Wire rope knot with clip. Efficiency:  $\leq 50\%$ .



Good--Use of thimble in eye splice.



Bad--Thimble should be used to increase strength of eye and reduce wear on rope.

### Use of Chokers



Good--No cutting action on running lines.

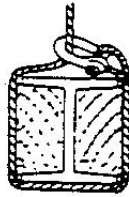


Bad--Because of cutting action of eye splice on running line.

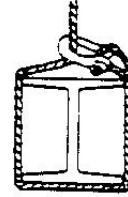


Bad--Bolt on running line can work loose.

### Hoisting Structural Steel



Good--Use space blocks and pad corners.



Bad--Can bend flanges and cut rope.



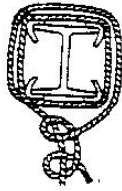
Good--Vertical lift on choker sling.



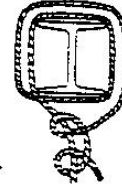
Bad--Lifting on eye bolts from an angle reduces safe loads as much as 90%.



**Suspended Needle Beams or Scaffolds**

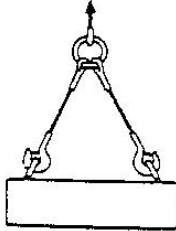


Good--Sharp corners padded.

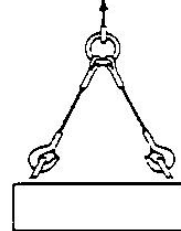


Bad--Steel can cut rope.

**Hook Slings**

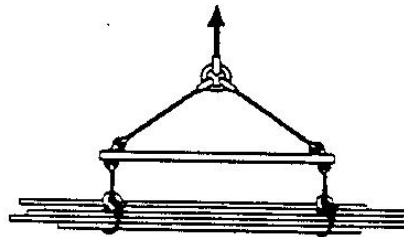


Good--Hooks are turned out.

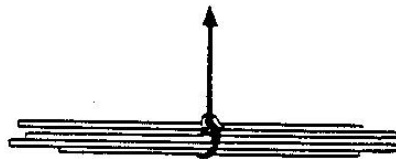


Bad--Hook openings should be turned out.

Double slings shall be used when hoisting two or more pieces of material over 12 feet long.



Right--Load over 12 feet long.



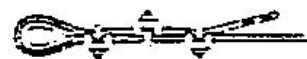
Wrong--Load over 12 feet long.

**APPLY WIRE ROPE CLIPS**

A correct method of attaching U-bolt wire rope clips to rope ends is shown in the illustration below. The base of the clip bears against the live end of the rope, while the "U" of the bolt presses against the dead end.



The Right Way to Clip Wire Rope



The Wrong Way to Clip Wire Rope

The clips are usually spaced about six rope diameters apart to give adequate holding power. Before ropes are placed under tension, the nuts on the clips shall be tightened. It is advisable to

tighten them again after the load is on the rope to take care of any reduction in the rope's diameter caused by the weight or tension of the load.

A wire rope thimble shall be used in the loop eye to prevent kinking when wire rope clips are used. The correct number of clips for safe application, and spacing distances, are shown in the table below.

Number of Clips and Spacing for Safe Application

Rope Diameter (in)	Approximate Weight (lbs)	Minimum No. Clips for Each Rope End	Spacing of Drop Forged Clips (in)
3/16	0.10	2	1 1/8
1/4	0.19	2	1 1/2
5/16	0.29	2	1 7/8
3/8	0.47	2	2 1/4
7/16	0.70	2	2 5/8
1/2	0.78	3	3
5/8	1.06	3	3 3/4
3/4	1.59	4	4 1/2
7/8	2.40	4	5 1/4
1	2.72	5	6
1 1/8	3.20	6	6 3/4
1 1/4	4.50	6	7 1/2
1 3/8	4.60	7	8 1/4
1 5/8	5.80	7	9
1 3/4	7.20	7	9 1/4
1 3/4	9.50	8	10 1/2
2	12.50	9	12
2 1/4	15.50	9	13 1/2
2 1/2	18.00	9	15

### SHACKLES

All shackle pins shall be straight and all pins of screw pin type shall be screwed in all the way. If width between the eyes is greater than listed below, the shackle has been overstrained and shall not be used.



Safe Load in Pounds --Drop Forged Steel, Weldless

Diameter of Pin (in)	Maximum Width Between Eyes (jn)	Safe Working Load (lbs)
1/4	3/8	560
3/8	9/16	1,400
1/2	11/16	2,700
5/8	13/16	3,600
3/4	1 1/16	5,600
7/8	1 1/4	7,800
1	1 1/2	10,400
1 1/8	1 5/8	13,200
1 1/4	1 7/8	16,000
1 3/8	2	20,000
1 1/2	2 1/8	24,000
1 5/8	2 1/4	28,000
1 3/4	2 3/4	32,000
2	2 3/4	36,000
2 1/4	3 1/4	46,000
2 1/2	4	56,000

**EYE HOOKS**

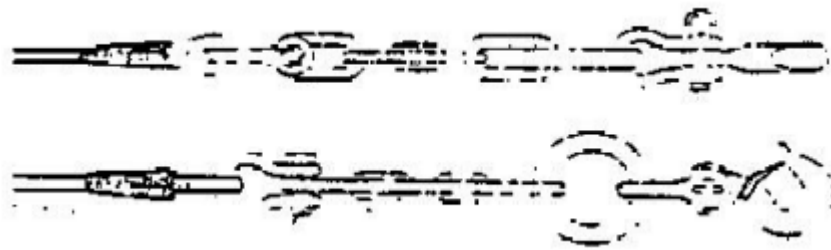


If the throat opening of any hook exceeds the dimension given below for the corresponding diameter of the eye, the hook has been overstrained and shall not be used.

Strength of Manufactured Eye Hooks -- Drop Forged Steel, Weldless

Inside Diameter of Eye (in)	Throat Opening	Safe Working Load (lbs)
3/4	1	1,000
7/8	1 1/16	1,200
1	1 3/16	1,400
1 1/8	1 1/14	2,400
1 1/4	1 3/8	3,400
1 3/8	1 1/2	4,100
1 1/2	1 3/4	5,000
1 5/8	2	6,000
1 3/4	2 1/16	8,000
2	2 1/4	9,400
2 3/8	2 1/2	11,000
2 3/4	3	13,600
3 1/8	3 3/8	16,000
3 1/2	4	22,000

**MATERIAL HANDLING GEAR**



**Recommended Minimum Sizes of Gear to be Used With Various Sizes of Rope**

Improved Plow Steel Wire Rope 6 Strand: 19 Wire Hemp Center		Round Pin or Screw Shackle Diameter of Pin (in)		New Wrought Iron Chain Diameter of Link Stock (in)
Diameter (in)	Safe Load (lbs)	Screw Pin	Round Pin	
1/2	4,300	3/4	5/8	3/8
9/16	5,400	3/4	3/4	9/16
5/8	6,600	7/8	3/4	5/8
3/4	9,400	1	7/8	3/4
7/8	12,800	1 1/8	1	7/8
1	16,000	1 1/4	1 1/8	1
1 1/8	21,200	1 1/2	1 3/8	1 1/8
1 1/4	26,000	1 5/8	1 1/2	1 1/4
1 3/8	31,400	1 3/4	1 5/8	1 3/8
1 1/2	37,000	2	2	1 1/2

Improved Plow Steel Wire Rope 6 Strand: 19 Wire Hemp Center		Steel Rings and Links Diameter			Dropped Forged Steel Hooks Diameter	
Diameter (in)	Safe Load (lbs)	Circle	Oblong	Triangle	Eye	Throat
1/2	4,300	1	9/16	3/4	1 1/2	1 3/8
9/16	5,400	1 1/4	5/8	7/8	1 1/8	1 1/2
5/8	6,600	1 1/4	3/4	7/8	1 1/2	1 3/4
3/4	9,400	1 1/2	1	1	1 3/4	2
7/8	12,800	1 3/4	1 1/8	1 1/4	2 3/8	2 1/2
1	16,000	2	1 1/4	1 1/2	2 3/4	3
1 1/8	21,200	2 1/4	1 1/8	1 3/4	3 1/8	3 1/8
1 1/4	26,000	2 1/4	1 1/2	1 3/4	3 1/2	4
1 3/8	31,400	2 1/2	1 3/4	2	3 1/2	4
1 1/2	37,000	2 3/4	1 3/4	2 1/4	4	4 1/2

## ILLUMINATION FOR OCCUPATIONAL TASKS

Glare, diffusion, direction, uniformity, brightness, color, and brightness ratios affect visibility and the ability to see easily, accurately, and quickly. Poor lighting is uncomfortable and possibly hazardous.

The desirable quantity of light for any particular installation depends primarily upon the work that is being done. As the illumination of the task is increased, the ease, speed, and accuracy of accomplishing it are also increased. Following are two tables of levels of illumination for industrial areas as recommended by the American National Standard A11.1 "Practice for Industrial Lighting."

Quantity of illumination is stated in foot-candles (1 foot candle equals approximately 10.8Lux) and is measured with a light meter. The Office of Campus Safety will measure this upon request.

### MAXIMUM LUMINANCE RATIOS

	Environmental Classification		
	A	B	C
Between task and adjacent darker surroundings	3 to 1	3 to 1	5 to 1
Between task and adjacent lighter surroundings	1 to 3	1 to 3	1 to 5
Between tasks and more remote darker surfaces	10 to 1	20 to 1	*
Between tasks and more remote lighter surfaces	1 to 10	1 to 20	*
Between luminaires (or windows, skylights, etc.) and surfaces adjacent to them	20 to 1	*	*
Anywhere within normal field of view	40 to 1	*	*

\*Brightness Ratio control not practical.

A -- Interior Areas where reflectances of entire space can be controlled in line with recommendations for optimum seeing conditions.

B -- Areas where reflectances of immediate work area can be controlled, but control of remote surroundings is limited.

C -- Areas (indoor and outdoor) where it is completely impractical to control reflectances and difficult to alter environmental conditions.

NOTE: From the normal view point, brightness ratios of areas of appreciable size in industrial areas shall not exceed those in the above table.

From: American National Standard A11.1-1973, Practice for Industrial Lighting, Illuminating Engineering Society.

## LEVELS OF ILLUMINATION RECOMMENDED FOR SAMPLE OCCUPATIONAL TASKS

Area	Foot—Candles
Assembly-rough, easy seeing	30
Assembly-medium	100
Building construction-general	10
Corridors	20
Drafting Rooms-detailed	200
Electrical equipment, testing	100
Elevators	20
Garages--repair areas	100
Garages--traffic areas	20
Inspection, ordinary	50
Inspection, highly difficult	200
Loading platforms	20
Machine shops--medium work	100
Materials--loading, trucking	20
Offices--general areas	100
Paint dipping, spraying	50
Service spaces--wash rooms, etc.	30
Sheet metal--presses, shears	50
Storage rooms--inactive	5
Storage rooms—active, medium	20
Welding-general	50
Woodworking--rough sawing	30

1 foot-candle = 10.76 lux.

From: A132.1-1973, Office Lighting.

## HOT ENVIRONMENTS

When the rate of heat transfer from the body by convection, radiation, and sweat evaporation is not adequate, then warming of the body occurs.

Excessive warming of the body can lead to heat stroke which can be fatal unless treated promptly and properly. Other consequences of heat stress include heat exhaustion, heat cramps, and a rash called "prickly heat."

All employees who work in hot environments shall be trained in the recognition of heat stress warning signs and the appropriate emergency treatments should symptoms occur.

### Symptoms

1. Heat Cramps--Painful intermittent spasms of the voluntary muscles following hard physical work in a hot environment. Cramps usually occur after sweating and often begin at the end of a work shift.
2. Heat Exhaustion--Profuse sweating, weakness, rapid pulse, dizziness, nausea, and headache. The skin is cool and some times pale and clammy with sweat. Body temperature is normal or subnormal. Nausea, vomiting, and unconsciousness may occur.
3. Heat Stroke--Sweating is diminished or absent. The skin is hot, dry, and flushed. Increased body temperature, which if uncontrolled, may lead to delirium, convulsions, coma, and even death. Medical care is urgently needed.

### Evaluation and Control

1. Measurement of the Environment

A dry-bulb, a natural wet-bulb, a globe thermometer, and a stand are required instruments for the simplest and most suitable technique to measure the environmental factors.

The Office of Campus Safety uses these instruments, along with work load tables and Wet-Bulb Globe Temperature values to calculate an index which is used to compare to Permissible Heat Exposure Threshold Limit Values to determine the worker's exposure.

2. Prevention Measures

Prevention measures fall into three categories: engineering, administrative, and use of personal protective equipment.

- a. Engineering methods--mechanical procedures used to reduce the stress of hot environments, i.e., increasing general ventilation, use of local exhaust, cooling fans, shielding, isolation, relocation, redesign or substitution of equipment and/or processes.
- b. Administrative methods--work practice controls used to limit duration of heat stress or rest areas for rapid body cooling such as acclimatization to heat, a work-rest regimen, distribution of work load, and doing hot work in the coolest part of the day.
- c. Personal protective equipment--used only when a person must remain in a hot environment long enough to cause unacceptably high heat strain without protection. This varies in the amount and type of clothing, from short--sleeved cottons to body cooling suits.

NOTE: All these methods of prevention shall incorporate increased high electrolyte fluid and water intake. If an evaluation is necessary, contact Campus Safety.

## **HEAT-RELATED DISORDERS**

It is important for the employer to provide training in the symptoms and effects of heat stress and heat stroke. It is also important to stress the importance of drinking fluids and maintaining proper electrolyte levels.

### HEAT EXHAUSTION

Symptoms: Fatigue; weakness; profuse sweating; normal temperature; pale clammy skin; headache; cramps; vomiting; fainting.

Treatment:

1. Medical Alert
2. Remove worker from hot area
3. Have worker lie down and raise feet
4. Apply cool, wet cloths
5. Loosen or remove clothing
6. Allow small sips of water or electrolyte beverage if victim is not vomiting, then encourage victim to drink as much as possible
7. Instruct victim to stay out of heat for the remainder of the day

Prevention:

1. Take frequent breaks
2. Increase fluid intake
3. Allow workers to become acclimatized to heat

Causes:

1. High air temperature
2. High humidity
3. Low air movement
4. Hard work
5. Not enough breaks
6. Insufficient fluid intake
7. Full body clothing
8. Workers not acclimated to heat

### HEAT STROKE

Symptoms: Dizziness; nausea; severe headache; hot and dry skin; confusion; collapse; delirium; coma; death.

Treatment:

1. Medical emergency alert--life-threatening situation
2. Remove worker from hot area
3. Remove clothing
4. Have victim lay down
5. Cool body by any means available--cold water, chemical cooling ice packs, ice rubbed vigorously over body
6. Do not give stimulants



7. Give cold drinks if patient can cooperate
8. Transport victim immediately to nearest medical facility

Causes:

1. High air temperature
2. High humidity
3. Low air movement
4. Hard work
5. Not enough breaks
6. Insufficient fluid intake
7. Full body clothing
8. Not acclimatized

Telephone numbers of physicians, hospitals, or ambulances shall be conspicuously posted. Before beginning the project, provisions shall be made for prompt medical attention in case of serious injury.

Personnel trained in basic first-aid shall always be on the project.

For prompt transport of an injured person to a physician or hospital, provide proper equipment or available telephone with emergency phone numbers.

When air line respiratory protection is used, it is important that the outside monitor be familiar with the system and any problems associated with breathing air. Carbon monoxide poisoning is perhaps the most important of these problems.

## **EXCAVATIONS, TRENCHING, AND SHORING**

All excavations over 5' deep shall be sloped, shored, sheeted, braced, or otherwise supported. When soil conditions are unstable, excavations more shallow than 5' shall be sloped, supported, or shored.

### Methods of Excavations, Trenching and Shoring

1. One method is to slope the sides of the cut to the "angle of repose". This varies with different types of soil and shall be determined on each individual project. (See ANGLE OF REPOSE FOR SLOPING SIDES OF EXCAVATIONS.)
2. A second method of support is shoring, i.e., sheeting, tightly placed timber shores, bracing, trench jacks, piles or other materials installed in a manner strong enough to resist the pressure surrounding the excavation. (See SHORING SYSTEMS FOR TRENCHES.)
3. A third method is to use a trench box. A trench box is a pre fabricated movable trench shield, composed of steel plates welded to a heavy steel frame. (See TRENCH SHIELD.)

### Factors for Adequate Protection

1. Soil Structure

Carefully identify soil structure. Wet soil, sandy soil, or areas that have been backfilled are relatively unstable and need strong support.

2. Weather Conditions

Changing weather conditions shall be taken into consideration. Excess rain water loosens the soil and increases the pressure of the shoring system.

3. Superimposed Loads

Heavy equipment and materials such as pipes or timbers shall be kept as far back from the excavation as possible. If this cannot be done, these added pressures are to be taken into consideration.

4. Any additional vibration, in the surrounding area shall be taken into consideration.

Installation

1. Support systems shall be installed starting at the top and working to the bottom. Care shall be taken to place cross beams or trench jacks in true horizontal position and to space them vertically at appropriate intervals. Braces shall be secured to prevent sliding, falling, or kickouts. (See TRENCH JACKS IN TRUE HORIZONTAL POSITION AND SPACED VERTICALLY.)
2. All material used shall be in good condition.
3. Shoring shall closely follow excavation work.
4. Unstable excavation bottoms below the water line shall be guarded. (See EXCAVATION BOTTOM BELOW WATER LINE.) Adequate drainage is required to prevent surface water from entering the excavation.
5. Barricades shall be placed around all excavated openings. Signage stating "DANGER: EXCAVATION" shall be placed around the opening.
6. When employees are in a trench of 4' or more, a ladder or steps shall be provided and located for quick exit. There shall not be more than 25' lateral travel to ladder or steps.
7. Ladders used in excavations shall be in good condition, secured, and they shall extend 3' above the excavation.

Removing the Material

After the trench has been cleared, workers shall remove the shoring from the bottom up taking care to release jacks or braces slowly. In unstable soil, ropes shall be used to pull out the jacks or braces from above.

Inspection

Shoring shall be inspected daily by a competent person.

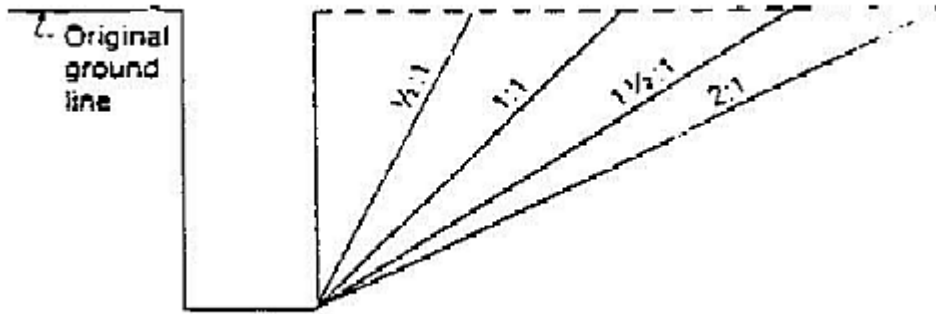
NOTE: See attached for load-bearing value of soil, size of cross braces, and size of spacing of members of trench shoring.

**ANGLE OF REPONSE FOR SLOPING SIDES OF EXCAVATIONS**

Angle (Ratio)	Kind of Earth
---------------	---------------

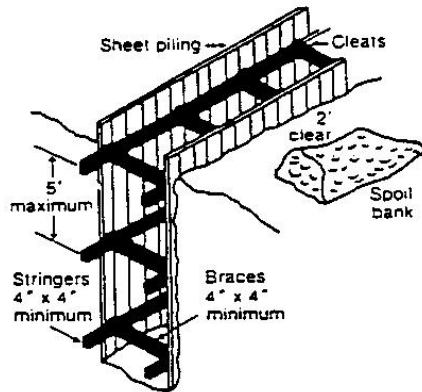
90°	Solid rock, shale or cemented sand and gravels.
63° (1/2:1)	Compacted angular gravels.
45° (1:1)	Recommended slopes for average soils.
33° (1)	Compacted sharp sand.
26° (2:1)	Well—rounded loose sand.

NOTE: Clays, silts, loams, or non-homogenous soils require shoring and bracing. The presence of ground water requires special treatment.

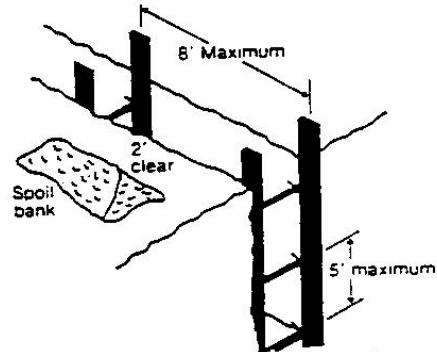


## SHORING SYSTEMS FOR TRENCHES

### Trenches in Running Material

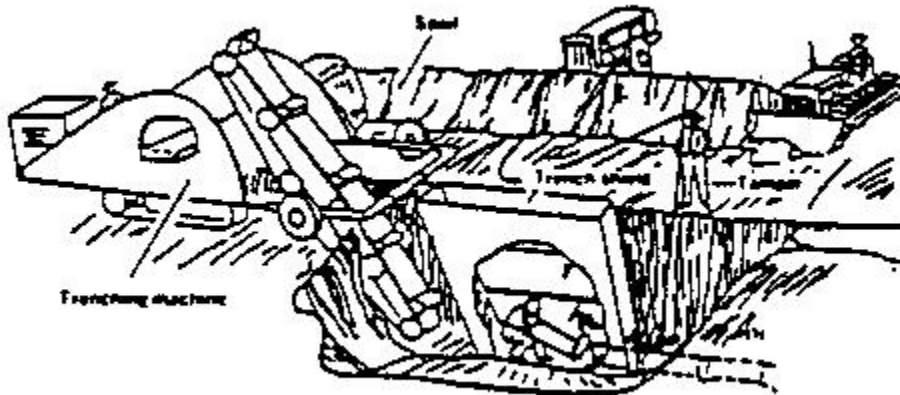


### Trenches in Hard Compact Material (5' or more in depth)



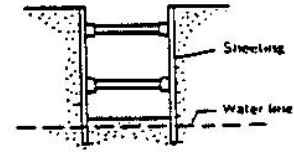
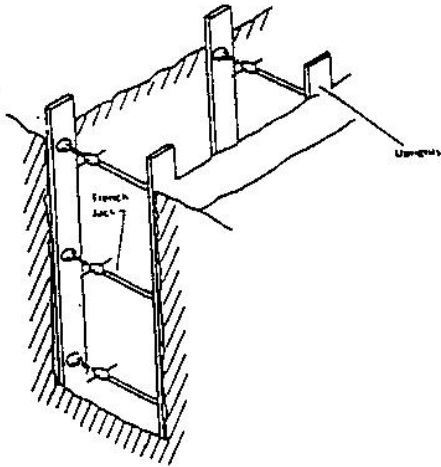
Bracing: Screw jacks or timbers spaced never greater than 5' on center (one brace required for each 4' of trench depth--never fewer than two braces).

## TRENCH SHIELD



TRENCH JACKS IN TRUE HORIZONTAL AND SPACED VERTICALLY SHOULD BE DRIVEN BELOW BOTTOM. SHEETING SHOULD BE DRIVEN BELOW BOTTOM.

EXCAVATION BOTTOM POSITION BELOW WATER LINE; SHEETING



### TRENCH SHORING TABLE - BEARING VALUE OF SOIL

Shores and similar members that rest on earth usually require foot blocks or sills to distribute the load. If the load-bearing capacity of the soil is unknown, the table below may help in determining the size of the sill.

Tons Allowable (per square ft.)	Soil Type and Condition
1	Soft clay
2	Wet clay
2	Sand and clay, mixed in layers
3	Fine dry sand
4	Hard dry clay
4	Coarse compact dry sand

### TRENCH SHORING -- SIZE OF CROSS BRACES

Minimum Requirements		Size of Cross Braces (inches)			
Depth of Trench	Kind or Condition of Earth	Width of Trenches			
		Up to 3 ft.	3 to 6 ft.	6 to 9 ft.	9 to 12 ft.
5 to 10 feet	Hard, Compact	2 x 6	4 x 4	4 x 6	6 x 6
	Likely to Crack	2 x 6	4 x 4	4 x 6	6 x 6
	Soft, sandy or filled	4 x 4	4 x 6	6 x 6	6 x 8
	Hydrostatic Pressure	4 x 4	4 x 6	6 x 6	6 x 8
10 to 15 feet	Hard	4 x 4	4 x 6	6 x 6	6 x 8
	Likely to Crack	4 x 4	4 x 6	6 x 6	6 x 8
	Soft, sandy or filled	4 x 6	6 x 6	6 x 8	8 x 8
	Hydrostatic Pressure	4 x 6	6 x 6	6 x 8	8 x 8
15 to 20 feet	All kinds or conditions	4 x 12	6 x 8	8 x 8	8 x 10
Over 20 feet	All kinds or conditions	4 x 12	6 x 8	8 x 10	10 x 10

Maximum spacing of members is 4' vertically and 6' horizontally for all trenches more than 5'

deep.

Trench jacks may be used in lieu of, or in combination with, cross braces.

Shoring is not required in solid rock, hard shale, or hard slag.

Where desirable, steel piling and bracing of equal strength may be substituted for wood.

**TRENCH SHORING -- SIZE AND SPACE OF MEMBERS**

Minimum Requirements		Size and Space of Members (inches)			
Depth of Trench	Kind or Condition of Earth	Upright		Stringers	
		Min. Size	Max. Size	Min. Size	Max. Size
5 to 10 feet	Hard, Compact Likely to Crack	3 x 4 or 2 x 6	72 (6')	---	---
		3 x 4 or 2 x 6	36 (3')	4 x 6	48 (4')
	3 x 4 or 2 x 6	Close Sheating	4 x 6	48	
	3 x 4 or 2 x 6	Close Sheating	6 x 8	48	
10 to 15 feet	Hard Likely to Crack	3 x 4 or 2 x 6	48 (4')	4 x 6	48
		3 x 4 or 2 x 6	24 (2')	4 x 6	48
	3 x 4 or 2 x 6	Close Sheating	4 x 6	48	
	3 x 6	Close Sheating	8 x 10	48	
15 to 20 feet	All kinds or conditions	4 x 6	Close Sheating	4 x 12	48
Over 20 feet	All kinds or conditions	3 x 6	Close Sheating	6 x 8	48

Maximum spacing of members is 4' vertically and 6' horizontally for all trenches more than 5' deep.

Shoring is not required in solid rock, hard shale, or hard slag.

Where desirable, steel piling and bracing of equal strength may be substituted for wood.

## **CONFINED SPACES**

"Confined space" means a space that:

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

Currently LSUA contracts out all confined space work. No employee of LSUA is allowed to enter any of the designated confined spaces at any time. Proper signage is affixed to all areas that have been considered confined spaces.

## **GROUNDS MAINTENANCE**

Prevention of accidents and injuries from tools and machines used in grounds maintenance requires that equipment be chosen for a specific purpose and that it be used and maintained properly. Fuel and chemicals shall be stored and used properly. Workers shall be thoroughly trained and shall wear proper clothing and use protective equipment as required. (See "Personal Protective Equipment.")

It is important that maintenance workers be able to recognize poisonous vines, shrubs, fruits, and insects. (See "Poison Ivy and Oak".) They shall avoid contact with poison oak and ivy and permanently destroy all poisonous growths. They shall guard against insects and infections, and scrub hands thoroughly after working outdoors. All cuts and scratches received outdoors shall be treated with proper antiseptic covering. All foreign matter such as glass, metal, and wire shall be removed from the grounds to be maintained. Gloves, sturdy shoes, and appropriate garments for protection shall be worn at all times.

### Hand Tools:

See "Safe Use of Hand and Portable Power Tools."

### Gasoline Powered Equipment

The following points shall be followed when handling gasoline:

1. Gasoline shall never be used for cleaning floors, tools, clothes, or hands. Gasoline is to be used in engines as a source of fuel only.
2. Gasoline shall only be stored in approved closed containers. Never use an open container, glass, or other breakable container.

3. Pouring gasoline from one container to another may generate a charge of static electricity. A metal-to-metal contact shall be maintained.
4. Gasoline spills shall be cleaned up immediately to prevent accumulation of vapors. Do not allow electrical switches to be turned on until the gasoline vapors have dispersed. Electrical devices that start automatically such as cold water fountains may have to be shut off at the main switch if the main switch can be pulled safely.
5. If gasoline is spilled on a person, the saturated clothing shall be removed immediately and the person kept away from sources of ignition. The affected area of the skin shall be washed with soap and water to avoid a skin rash or irritation. If the eyes are involved, they shall be flushed with water and get the person to a doctor.
6. Gasoline tanks or equipment parts that are likely to contain gasoline shall be drained or dismantled only out-of-doors or in a well-ventilated area free from sources of ignition.
7. Smoking shall be allowed in approved areas only. Smoking shall not be allowed in fueling areas, fuel system servicing areas, maintenance areas, bulk fuel delivery areas, etc.
8. Gasoline shall not be dispensed into a fuel tank while the engine is running or the motor is hot.
9. Equipment with fuel in the tank shall not be stored inside a building where vapors could reach an open flame or spark. Allow the engine to cool before storing in any enclosure.
10. Never run an engine indoors.

#### Lawn Trimmers:

Edgers and trimmers shall be treated with the same caution as mowers because they, too, have a heavy metal cutting blade that can throw debris or cut a finger.

Guards shall be kept in place and in working order. Keep the blades sharp. Do not put hands near the working area unless the machine is turned off and unplugged.

Nylon-cord weed trimmers cannot hurt as seriously as metal-blade trimmers-edgers, but getting hit by the line can sting. The operator shall disconnect the power cord when adjusting the cutter cord length or changing the reel, applying the same precautions as with any electrical appliance. Care shall be taken in wet areas and the cord checked periodically for cracks or breaks in the insulation.

Gasoline-powered mowers and tractors shall meet American National Standard B71.1, "Safety Specifications for Power Lawn Mowers, Lawn and Garden Tractors, and Lawn Tractors". Snow throwers shall meet ANSI B71.3, "Safety Specifications for Snow Throwers".

#### Power Lawn Mowers:

Before starting, supervisors shall make sure the operator is well trained in using the mower. If it is the first time the mower will be used that season, the operator shall review the instruction manual. Before starting to mow, the operator shall pick up rocks, glass, tree branches and twigs, and any other objects that could become lethal missiles if thrown out by the mower blade and observe the location of fixed objects such as pipes, lawn sprinkler heads, and curbs that could damage the mower or break off and become missiles. Any wheel height adjustment shall be made prior to starting the mower; disconnect the spark plug wire when cleaning, repairing, or inspecting the mower. Unauthorized persons shall not be allowed to be in the mowing area. The operator shall



make a quick inspection for loose nuts and bolts, check the engine oil level (if the mower has a separate oil reservoir), and fill the fuel tank before starting. Using a vented can with a flex spout. The operator shall wear work shoes and safety glasses. A brimmed hat, long pants and a long-sleeved shirt will protect against sunburn.

The operator shall be instructed to mow in daylight or good artificial light and to push the mower forward as much as possible because feet can be injured when pulling a mower backward. When mowing on a slope or terrace, a series of horizontal passes along the incline shall be used. If the operator pushes up the incline, he/she runs the risk of having the mower drift back onto his/her foot. If he pushes down, he/she could lose his footing and fall into the mower.

The mower shall not be used when the grass is wet and slippery. If the grass is damp or high, cut at a slower speed, if possible, and set the cutting height higher than for dry grass; otherwise, the discharge chute may clog up.

Rotary blades can also pick up stones, pieces of wire, nails, or other objects hiding in the grass, and throw them out of the discharge chute at high speeds. Guards shall be in place every time the catcher is not used.

The operator shall shut off the engine and make certain that the blade has stopped completely before taking off the grass catcher to empty it, attempting to free obstructions from the discharge chute, adjusting the cutting height or performing any operation requiring him/her to put his/her hands or feet near the blade.

#### Riding Mowers:

Suggested safe practices for riding mowers include the following:

1. The operator shall be fully instructed in handling riding mowers. He/she shall know the controls, know how to stop the machine quickly, and shall read the owner's manual-- especially at the beginning of each mowing season.
2. The work area shall be cleared of objects that might be picked up and thrown. Fixed objects that might damage the mower shall be identified. All areas cannot be reached by a riding mower; some corners or sharp slopes will have to be mowed by a power mower. When planning landscaping, leave enough space around new plantings for easy mower access and allow for future growth.
3. Disengage all attachment clutches and shift into neutral before attempting to start the engine (motor). Disengage power to attachments and stop the engine before making any repairs or adjustments. Disengage the power to attachments when transporting them or when they are not in use. All possible precautions shall be taken when leaving the vehicle unattended such as disengaging the power takeoff, lowering the attachments, shifting into neutral, setting the parking brake, stopping the engine, and removing the ignition key.
4. When mowing, the operator shall stay alert for holes in the terrain and for other hidden hazards. Do not start or stop suddenly when going uphill or downhill. Mow up and down the face of steep slopes; never mow across as the wheelbase is longer than the tread so the unit is more stable that way. Reduce speed on slopes and on sharp turns to prevent tipping or loss of control. Extreme caution shall be used when changing direction, especially on slopes. Do not back up without looking to make certain it is safe to do so. Watch for traffic when crossing or near roadways. When using attachments, direct discharge of materials away from anything that could be hurt or damaged by it.
5. Maintain vehicle and attachments in good operating condition and keep safety devices in place. Keep all nuts, bolts, and screws tight, and make sure the equipment is in safe working

condition; check especially blade mounting bolts. If the vehicle or its attachments strike a solid object, stop and inspect for damage; the damage shall be repaired before restarting and operating the equipment. The engine governor settings shall not be changes; the engine shall not be over speeded; discharge guards shall always be in the down position.

#### Garden Tractors:

1. Garden tractors shall have safeguards for all moving parts to reduce the hazard of contacting belts, chains, pulleys, and gears.
2. Garden tractors shall have a throttle, gears, and brakes that are accessible and can be operated smoothly with minimum effort.
3. Safety instructions shall be provided with the garden tractor. There shall be warning labels on the machine itself.
4. The operator shall read the owner's manual and shall reread its recommendations before each use of the garden tractor.
5. Never allow children or unauthorized persons, to operate the tractor and keep them away from these areas during operation.
6. The operator shall wear sturdy, rough-soled work shoes, and close-fitting slacks and shirts to avoid entanglement in the moving parts. He/she shall never operate a garden tractor in bare feet, sandals, or sneakers.
7. The machine shall be turned off and the spark plug wire disconnected when the machine is to be adjusted.
8. The operator shall always drive up and down the slopes--rather than across when using a garden tractor on a hill for greater stability. (This instruction is different than that for power lawnmowers.)
9. Garden tractors shall be started outdoors, not in a garage where carbon monoxide gas can collect.
10. No smoking shall be allowed near the garden tractor or gasoline storage can.
11. Unauthorized persons shall be kept away from the machines and the fuel.
12. All loose or broken parts, especially blades shall be tightened or replaced.
13. Get expert servicing regularly; it may prevent serious injuries.
14. Bypass starting of tractors shall not be allowed. (See Section, "Bypass Starting of Tractors.")

#### Pesticides:

Insecticides, herbicides, fungicides, disinfectants, rodenticides, and animal repellents are all pesticides. The safe use of pesticides is everyone's responsibility. The user, however, has the major responsibility which begins the day a pesticide is selected and purchased and continues until the empty container has been disposed of properly.

All labels shall include a list of what the product will control, directions on how to apply the pesticide, a warning of potential hazards, and safety measures to follow.

Before using any pesticide poison, read the label carefully. The label states the hazards involved, antidotes, and first aid instructions. Those poisons that have DANGER-POISON on the label are highly toxic. If inhaled, eaten, or allowed to frequently remain on skin, they could kill. Poisons that have WARNING on the label are moderately toxic and can be quite hazardous. Poisons that have CAUTION on the label have low toxicity, but could cause harm if the poison is eaten or grossly misused. Label instructions for mixing, handling, and applying shall be followed. BE SURE--DO NOT GUESS.

1. Application: Any restricted-use pesticide used around a plant shall be applied by a certified handler according to law (Public Law 92.516).

The least toxic pesticide shall be used for the job in order to reduce hazards.

Only enough pesticide to last one season shall be purchased. This cuts down on storage and disposal problems. The following precautions shall be observed:

- a. Use pesticide poisons only for the purposes stated on the label.
  - b. Keep pesticide poisons in the original labeled container. Check for leaks or container damage.
  - c. Mix pesticide poisons carefully (outdoors if possible), keep off skin, and avoid breathing dust or vapors. Use protective clothing and equipment including respirators for toxic chemicals. See "Personal Protective Equipment."
  - d. Set aside a special set of mixing tools (measuring spoons and a graduated measuring cup) for use with sprays and dusts only. Keep them with the chemicals.
  - e. Avoid spilling. Set aside a level shelf or bench in a well-ventilated area, preferably outside, for mixing chemicals. A level, uncluttered surface helps avoid spills. If chemicals do spill, wash hands at once with soap and water. Then hose down the mixing area and contact the Office of Campus Safety.
  - f. Never smoke or eat while spraying or dusting.
  - g. Someone shall always be "in attendance" when pesticides are being used.
  - h. During application, stay out of the spray drift. Avoid outside application on a windy day.
  - i. If pesticide poison gets on skin or clothing, immediately remove clothing and take an all-over bath or shower; be sure to shampoo and use plenty of soap and water. Wash clothing before reuse and contact Campus Safety.
  - j. When finished, wash immediately with soap and water. Do not smoke, eat, or drink without washing first.
  - k. Never allow unauthorized personnel around treated areas or pesticide poison mixing, storage, and disposal area.
2. Safe Storage:
    - a. Pesticide poisons shall be stored in a well-ventilated, locked area or building. Packages that are likely to be damaged by dampness shall be kept off the floor.
    - b. Poisons shall be kept in tightly closed, original containers. The label gives information needed in case of accidents. Do not store pesticides in other containers.
    - c. Do not store clothing, respirators, lunches, cigarettes, or drinks with pesticide poisons. They may pick up poisonous vapors or dusts or soak up spilled poisons.
    - d. Keep soap and plenty of water handy. Seconds count when washing poisons from the skin.
  3. Disposal: Dispose of pesticides through the LSUA Hazardous Waste Program only. See "Hazardous Waste Program."

Emergency Information:

If an emergency occurs, additional advice and information on antidotes for specific pesticides may be obtained from the Student Health Center or a local hospital. Telephone numbers shall be

conspicuously posted.

Poison Ivy and Poison Oak:

All maintenance workers shall be trained to recognize poison ivy and poison oak.

1. Poison Ivy grows as a vine up to 50' long or as a small plant. The leaves of this plant always grow in groups of three. The leaves of poison ivy are green in late spring and summer; reddish in the early spring, late summer, and fall.
2. Poison Oak is most commonly a bush, although it sometimes grows as a vine up to 30' long. The leaves always grow in groups of three and are green in late spring and summer; reddish in early spring, late summer, and fall.

Exposure to poison ivy or oak can be acute (short-term) or chronic (long-term). Acute exposure is received by touching the plant, swallowing parts of the plant, or inhaling smoke of the burning plant. Local signs and symptoms begin 12 hours to 7 days after exposure. Chronic exposure (repeated exposure) increases the severity of the symptoms which could lead to severe poisoning.

Symptoms include itching, swelling, blister formation, oozing, and crusting. Generalized signs and symptoms include fluid accumulation, weakness, malaise, and fever.

Prevention:

1. Employees shall be able to recognize these poisonous plants and know how to avoid them.
2. If exposure is possible, heavy clothes and leather gloves shall be used.
3. Upon exposure, the employee shall wash thoroughly with soap and water, and remove all contaminated clothing for washing.

NOTE: Ingesting of poisonous plants does not help achieve immunity.

Treatment:

Upon exposure, the employee shall wash thoroughly with soap and water and be brought to the Student Health Center for evaluation.

# **FOOD PREPARATION, DINING AREAS, AND STORAGE**

## **Sanitation**

Levels of sanitation shall conform to all state and local health codes.

## **Lifting**

1. Place heavy stock on lower shelves.
2. Use handcarts for heavy objects.
3. Use proper lifting procedures when lifting. See "Material Handling."
4. Do not overload garbage cans.
5. Do not overload handtrucks. Keep load balanced. Allow for clear view when moving loaded handtrucks. Keep load trimmed so it will pass through aisles and doorways easily.
6. For forklift use, see "Fork Trucks."

## **Handtools**

1. When using knives, cut downward and away from hand. Knives shall be returned to storage after use.
2. Do not catch falling knives, sharp tools, or glass objects.
3. When cleaning blades, wipe away from sharp edges. Use patience and proper care.
4. Use proper tools for opening merchandise.
5. All knives and cutting tools shall be kept sharp.
6. Knives and cutting tools shall be stored with blades protected and placed so that they do not protrude into walkways, working areas, and aisles.
7. Obey all warning tags and signs.
8. See "Safe Use of Hand and Portable Power Tools."

## **Electrically Operated Food Processing Equipment**

1. Machine guards shall be kept in place at all times. Avoid using hands.
2. Pay attention at all times.
3. Turn machine off after each job or when not in use.
4. When cleaning, repairing, or moving machines, they shall be locked out. See "Trades Safety, Equipment Lock Out Procedure".
5. All warning tags and signs shall be obeyed.
6. See "Trades Safety, Safety Rules for Control of Hand and Portable Power Tools."

## **Slips and Spills**

1. Prevent slips by cleaning up spills immediately.
2. Do not overload carts, trays, counters, or yourself.
3. Extra care shall be taken when serving.
4. Use caution on and around wet floors; take shorter steps, and do not hurry.
5. Slip resistant shoes shall be worn at all times.
6. Cover full food trays when moving from location to location.
7. Areas which are constantly wet shall have a non-slick surface.
8. Broken, worn, and defective mats are to be replaced or repaired immediately.

## **Fire Protection**

1. Clean grease screens, filters, and greasy areas regularly.
2. Obey all fire prevention signs and posters.
3. Maintain automatic extinguishment systems on a regular basis.

4. All fire extinguishers shall be inspected regularly.
5. All fire extinguishers shall be field-tested and ready for operation.
6. Learn location of fire extinguishers.
7. Keep aisles and areas around fire extinguishers and other fire protection equipment clear at all times.

#### Housekeeping

1. Keep cooking and working areas clear and clean.
2. Never let pot handles overhang stove or counters.
3. Place food carts close to walls and away from corridors, corners, or doorways.
4. Detergents and insecticides shall be properly marked and stored away from food.
5. Aisles and stairways shall be kept clean and unobstructed.
6. Broken, worn, and defective mats are to be replaced or repaired immediately.

#### Hot Areas and Pots

1. Use potholders when moving hot pots or suspected hot pots.
2. Shield face and arms when lifting pot lids or reaching near steam tables.
3. When moving large, hot loads, get help; use potholders or gloves, clear space for load, and warn others.
4. Avoid placing hands or arms into the oven baking chamber.
5. Before emptying hot grease, be sure container to receive grease is absolutely dry (free of water).

#### Electrical

1. Report any defective electrical and/or mechanical equipment to your supervisor.
2. All electrical equipment shall conform with the National Electric Code.
3. See "Trades Safety, Electrical Safety."

#### Clothing and Personal Protection

1. Do not wear loose clothing or accessories (neckties, loose or open sleeves, cuffed pants, open jackets, broken shoe soles, high heels, jewelry, etc.) that can get caught in moving machinery.
2. Long hair shall be kept in hair nets.
3. Eye protection shall be worn when there is a possibility of injury from caustic cleaning materials, flying particles, hot grease spatters, chips, etc.
4. Appropriate hearing protection shall be worn when exposed to noise levels in excess of 90 dB.
5. When handling caustic cleaning materials, employees shall wear gloves which are impervious to such materials. The gloves shall be long enough to protect the forearms.
6. Non-skid shoes shall be worn in all areas of restaurants and bars where floors may become wet or greasy.
7. Leather hand gloves shall be used when loading or unloading supplies having sharp or rough surfaces.
8. See "Personal Protection Equipment."

#### Oil and Gas Fire Ovens

1. Before lighting an oven, check the following:
  - a. If oven is cold, see that it is thoroughly ventilated to remove any accumulation of gas.
  - b. Be sure pilot light shows a strong blue flame before turning on any of the main valves.
  - c. See that all flues are open.
  - d. Follow manufacturer's instructions carefully.
2. All gas pipes shall be identified.

### Gas Cylinders

See "Handling, Using, and Storage of Compressed Gas Cylinders."

### Cooling Fans

All fans less than 7' from the floor shall be protected by guards with openings no larger than 1/2".

### Accident Reporting

1. Report any and all accidents immediately to your supervisor.
2. Supervisors are then responsible for contacting the Safety & Risk Manager to handle the investigation.

### General

1. All warning tags and signs shall be obeyed.
2. All injuries shall be reported to your supervisor.
3. Always work at a safe speed.
4. No practical jokes or horseplay shall be tolerated.
5. A first aid kit shall be made available.
6. All steam, gas, and water pipes shall be identified.

# CUSTODIAL SAFETY

## General

1. Use fresh cleaning supplies or sanitary disposal supplies. Wash hands often.
2. Obey all hazard warning signs. If there are any questions, ask the supervisor first.
3. Never reach into or pack down trash with bare hands.
4. Don't let trash pile up. Empty it regularly.
5. Keep storage places neat and equipment clean.
6. Any equipment showing signs of electrical trouble shall be removed from use, then reported immediately to the supervisor.
7. Keep machine guards in place. When work requires, wear protective equipment.
8. Don't risk it. If repairing--unplug, use lock out tag out procedures.
9. To unplug: grip at plug (do not yank on cord), dry hands before handling electrical equipment.
10. Prevent falls. Keep cords and vacuum hoses out of the way.
11. Report "booby traps" (ripped carpets, loose, missing, or broken tiles) in flooring.
12. Move equipment slowly. Park equipment away from doorways or corners.
13. Do not block aisles, stairs, and exits.

## Cleaning

1. Alkaline cleaners shall not be used on terrazzo.
2. Mild alkaline cleaners may be used on asphalt tile.
3. Oils are unsuitable for rubber tile. When applied to wood floors, the fire hazard increases.
4. To keep floor clean, safe, and sanitary, the recommendations of the flooring manufacturer shall be followed. Procedures shall be standardized and detailed.
5. In general, the routine maintenance procedure for linoleum, marble, terrazzo, asphalt tile, and other types of flooring is to clean the floors with a soft floor brush or vacuum cleaner. When necessary, damp-mop with clean, cold water.
6. Floor shall be cleaned one section at a time. If traffic in the area is heavy, that section shall be roped off. When soap is used, any soapy film shall be removed by thorough rinsing to avoid a slippery condition.
7. Ordinary wash for polishing wood, tile, and similar floor surfaces is unsuitable because of its inherently slippery nature.
8. Soft floors such as asphalt, vinyl, and linoleum shall be cleaned four times a year. Hard floors such as concrete and terrazzo shall be cleaned and sealed once a year.
9. Slippery materials spilled on floors shall be cleaned promptly. Clean all spills as soon as possible.
10. To remove grease and oils, the area can be covered with slaked lime to a depth of 1/4" (5mm). After two or three hours, the lime is then removed with a scraper or stiff brush. Various sand commercial cleaners can also be used.
11. Protection shall be used when handling strong chemicals. Wear gloves if using steel wool.
12. Ventilate area if painting, spraying insecticide, or using toxic cleaners. Do not mix ammonia and chlorine products.
13. Avoid leaving floor too wet, using too much wax, and not buffing enough.

## Aisles

Aisles shall be kept clear at all times.

## Fire Protection

See "Building Safety, Louisiana Building Code for State Owned Buildings."

## Ladders



See “Proper Use of Ladders” and “Personal Protection Equipment, Eye, Face, and Hand Protection.”

## **Personal Protective Equipment Policy**

### **Introduction**

The purpose of the Personal Protective Equipment Policy is to protect the employees of Louisiana State University at Alexandria from exposure to work place hazards and the risk of injury through the use of personal protective equipment (PPE). PPE is not a substitute for more effective control methods and its use will be considered only when other means of protection against hazards are not adequate or feasible. It will be used in conjunction with other controls unless no other means of hazard control exist.

Personal protective equipment will be provided, used, and maintained when it has been determined that its use is required to ensure the safety and health of our employees and that such use will lessen the likelihood of occupational injury and/or illness.

This section addresses general PPE requirements, including eye and face, head, foot and leg, hand and arm, body (torso) protection, respiratory protection, and protection from drowning.

The Louisiana State University at Alexandria Personal Protective Equipment Policies includes:

- Responsibilities of supervisors and employees
- Hazard assessment and PPE selection
- Employee training
- Cleaning and Maintenance of PPE
- PPE Disciplinary Policy

### **Responsibilities**

#### **Safety & Risk Manager**

The Safety & Risk Manager is responsible for the development, implementation, and administration of Louisiana State University at Alexandria’s PPE policies. This involves

- Conducting workplace hazard assessments to determine the presence of hazards which necessitate the use of PPE.

Selecting and purchasing PPE.

Reviewing, updating, and conducting PPE hazard assessments whenever

- a job changes
- new equipment is used
- there has been an accident
- a supervisor or employee requests it
- or at least every year

Maintaining records on hazard assessments.

Maintaining records on PPE assignments and training.

Providing training, guidance, and assistance to supervisors and employees on the proper use, care, and cleaning of approved PPE.

Periodically re-evaluating the suitability of previously selected PPE.

Reviewing, updating, and evaluating the overall effectiveness of PPE use, training, and policies.

### **Maintenance Foreman / Custodial Supervisor / Utility Plant Superintendent**

The Maintenance Foreman, the Custodial Supervisor, and the Utility Plant Supervisor have the primary responsibility for implementing and enforcing PPE use and policies in their work area. This involves

- Providing appropriate PPE and making it available to employees.
- Ensuring that employees are trained on the proper use, care, and cleaning of PPE.
- Ensuring that PPE training certification and evaluation forms are signed and given to the Safety & Risk Manager.
- Ensuring that employees properly use and maintain their PPE, and follow Louisiana State University at Alexandria's PPE policies and rules.
- Notifying Louisiana State University at Alexandria's management and the Safety & Risk Manager when new hazards are introduced or when processes are added or changed.
- Ensuring that defective or damaged PPE is immediately disposed of and replaced.

### **Employees**

The PPE user is responsible for following the requirements of the PPE policies. This involves

- Properly wearing PPE as required.
- Attending required training sessions.
- Properly caring for, cleaning, maintaining, and inspecting PPE as required.
- Following Louisiana State University at Alexandria's PPE policies and rules.
- Informing the supervisor of the need to repair or replace PPE.

Employees who repeatedly disregard and do not follow PPE policies and rules will be disciplined according to the PPE Disciplinary Policy.

### **GENERAL PPE PROCEDURES**

## **Hazard Assessment for PPE**

The Safety & Risk Manager in conjunction with the Maintenance Foreman, Utility Plant Superintendent, and the Custodial Supervisor will conduct a walk-through survey of each work area to identify sources of work hazards. Each survey will be documented using the Hazard Assessment Certification Form, which identifies the work area surveyed, the person conducting the survey, findings of potential hazards, and date of the survey. The Administrative Assistant of Facility Services will keep these forms in her office on file.

The Safety & Risk Manager will conduct, review, and update the hazard assessment for PPE whenever

- a job changes
- new equipment or process is installed
- there has been an accident
- whenever a supervisor or employee requests it
- or at least every year

Any new PPE requirements that are developed will be added to Louisiana State University at Alexandria's written loss prevention program.

## **Selection of PPE**

Once the hazards of a workplace have been identified, the Safety & Risk Manager in conjunction with the Maintenance Foreman, the Utility Plant Supervisor, and/or the Custodial Supervisor will determine if the hazards can first be eliminated or reduced by methods other than PPE, i.e., methods that do not rely on employee behavior, such as engineering controls.

If such methods are not adequate or feasible, then Maintenance Foreman, the Utility Plant Supervisor, and/or the Custodial Supervisor will determine the suitability of the PPE presently available; and as necessary, will select new or additional equipment which ensures a level of protection greater than the minimum required to protect our employees from the hazards. Care will be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards will be recommended for purchase.

All personal protective clothing and equipment will be of safe design and construction for the work to be performed and will be maintained in a sanitary and reliable condition. Only those items of protective clothing and equipment that meet NIOSH or ANSI (American National Standards Institute) standards will be procured or accepted for use. Newly purchased PPE must conform to the updated ANSI standards which have been incorporated into the PPE regulations, as follows:

- Eye and Face Protection ANSI Z87.1-1989
- Head Protection ANSI Z89.1-1986
- Foot Protection ANSI Z41.1-1991
- Hand Protection (There are no ANSI standards for gloves, however, selection must be based on the performance characteristics of the glove in relation to the tasks to be performed.)

Affected employees whose jobs require the use of PPE will be informed of the PPE selection and will be provided PPE by Louisiana State University at Alexandria at no charge. Careful consideration will be given to the comfort and proper fit of PPE in order to ensure that the right size is selected and that it will be used.

## Training

Any worker required to wear PPE will receive training in the proper use, maintenance, and disposal of PPE before being allowed to perform work requiring the use of PPE. Periodic retraining will be offered to PPE users as needed. The training will include, but not necessarily be limited to, the following subjects:

- When PPE is necessary to be worn
- What PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- The limitations of the PPE
- The proper care, maintenance, useful life, and disposal of the PPE

After the training, the employees will demonstrate that they understand how to use PPE properly, or they will be retrained.

Training of each employee will be documented using the Louisiana State University at Alexandria Safety Meeting/Training Form and kept on file. The document certifies that the employee has received and understood the required training on the specific PPE he/she will be using. A copy of the completed training form should be forwarded to The Safety & Risk Manager.

## Retraining

The need for retraining will be indicated when

- an employee's work habits or knowledge indicates a lack of the necessary understanding, motivation, and skills required to use the PPE (i.e., uses PPE improperly)
- new equipment is installed
- changes in the work place make previous training out-of-date
- changes in the types of PPE to be used make previous training out-of-date

## Cleaning and Maintenance of PPE

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

Employees must inspect, clean, and maintain their PPE according to the manufacturers' instructions before and after each use. Supervisors are responsible for ensuring that users properly maintain their PPE in good condition.

Personal protective equipment must not be shared between employees until it has been properly cleaned and sanitized. PPE will be distributed for individual use whenever possible.

If employees provide their own PPE, make sure that it is adequate for the work place hazards, and that it is maintained in a clean and reliable condition.

Defective or damaged PPE will not be used and will be immediately discarded and replaced.

**NOTE:** *Defective equipment can be worse than no PPE at all. Employees would avoid a hazardous situation if they knew they were not protected; but they would get closer to the hazard if they erroneously believed they were protected, and therefore would be at greater risk.*

It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

## **SPECIFIC PPE PROCEDURES**

This section applies to employees, students, or visitors on campus construed to be in need of personal protective equipment by virtue of their exposure to hazards in the working, teaching, or research environment.

Protective equipment, including personal protective equipment for eyes, face, hands and extremities; protective clothing; respirator devices; and protective shields and barriers, shall be used and maintained in sanitary and reliable condition whenever it is necessary by reason of hazards of process or environment, chemical hazards, radiological hazards, biological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact. (1. OSHA 1910.132(a).)

Under no circumstances shall a person knowingly be subjected to a hazardous condition without appropriate personal protective equipment.

Persons who are exposed to hazards requiring personal protective equipment shall be properly instructed in the use of such equipment by the individual in charge of the activity or his/her designee.

It is the responsibility of the individual in charge of the activity to assure that safety practices are adhered to.

If those individuals required to wear personal protective equipment fail to do so, they will be subject to disciplinary action.

## **EYE PROTECTION**

### **General**

Persons working in or studying occupations such as painting, carpentry, construction, labor, landscape, general maintenance, metal trades, chemistry, other sciences and engineering, or any work/study activity which involves hazards such as flying objects, dust and/or vapors, hot metals, chemicals, or light radiation shall be required to wear approved safety eyewear/goggles at all times while exposed.

Custodial workers shall be required to wear approved safety eyewear/goggles when cleaning bathroom appliances or mopping floors with caustic or abrasive cleaners.

Food service personnel must wear approved eyewear/goggles when there is a possibility of eye injury from caustic materials, hot fat splatters, or associated hazards.

Management level employees, students, or visitors who make occasional visits to machine, welding, and carpentry shops, boiler rooms, equipment rooms, power houses, construction areas, chemistry labs, or other areas in which eye injury is a possibility shall wear approved eyewear.

### **Prescription Lens Wearers**

If required to wear eye protection, such persons shall wear an approved face shield, goggles that

fit over glasses, prescription glasses with protective optical lenses fitted with side shields, or goggles that incorporate prescription lenses.

### Contact Lens Wearers

Contact lenses shall never be considered as a substitute for eye protection; eye protection shall be worn over them. "Contact lens, of themselves, does not provide eye protection in the industrial sense and shall not be worn in a hazardous environment without appropriate covering safety eyewear." (ANSI Z87.1-1989).

### Approval and Selection

Eye protection shall meet the ANSI Z87.1-1989 standard and the eyewear shall indicate such on the lens or the frame.

Visitors shall be provided protective eyewear meeting ANSI Z87.1 protection factors for visitor's eyewear. Employees shall not substitute ANSI Z87.1 visitor's eyewear for other approved eyewear while on duty.

Refer to the attached "Selection Chart for Eye and Face Protection for Use in Industry, Schools, and Colleges" to determine appropriate eye and/or face protection.

### Fitting

Fitting shall be done by a department member knowledgeable of the procedure, or in case of prescription lenses, by an ophthalmic specialist.

### Purchase

Purchase of eye protection shall be made through an authorized department representative to assure compliance.

### Inspection and Maintenance

All eye and face protection shall be kept clean and inspected daily before each use. Badly scratched or damaged items are to be replaced immediately.

### Other

It is recommended that all employees required to wear eye and face protection shall have their own and be required to inspect and maintain them in accordance with this section.

## **FALL PROTECTION**

### Employees/Students Covered

Fall protection shall be utilized by those employees/students for the specific purpose of securing, suspending, or retrieving the employee/student in or from a hazardous work area, and/or when work exposes them to the risk of falling more than 15' whether outdoors or inside buildings.

### Approval and Selection

Fall protection and devices and equipment shall meet ANSI A 10.14, and employees/students

shall only be allowed to purchase or receive them through an authorized department representative to insure compliance.

Selection of fall protection shall be based on the attached, "Classification of Safety Belts, Harnesses, and Lanyards."

#### Fitting

The appropriate safety belt shall be chosen for the hazard. It shall be securely buckled and worn tightly enough to prevent any possibility of the wearer slipping out.

#### Inspection and Maintenance

Safety belts and associated equipment shall be inspected before each use. Every one to three months they shall be inspected by a trained inspector. Cut, worn, or damaged belts, lifelines, lanyards, etc., shall be discarded and replaced. Safety belts in service shall not be tested for maximum impact loading.

NOTE: After an accidental freefall, the safety belt and lanyard shall be discarded.

## **FOOT PROTECTION**

### Employees/Students Covered

For all non-office personnel, "Footwear such as sandals, open-toed shoes, platforms, high heels, cloth-bodied tennis shoes, or sneakers is not considered safe and is prohibited for use as a good work shoe. Well-built safety shoes, leather-bodied shoes, or boots in good condition with low heels and hard soles are to be used." (Physical Plant Operations Manual)

### Approval and Selection

Foot protection used shall meet ANSI Z41.1 "Men's Safety-Toe Footwear." Employees/students shall only be allowed to purchase or receive them through an authorized department representative to insure compliance.

Refer to the attached, "Foot Protection Classification and Protection Factors" to determine appropriate foot protection.

### Fitting

Each employee/student shall be individually fitted by someone skilled in the procedure.

### Inspection and Maintenance

All foot protection shall be kept reasonably clean and in good repair. Shoes shall be repaired or replaced periodically.

## **HAND PROTECTION**

### Employees/Students Covered

Hand protection shall be worn by employees when handling hot work, chemicals, electrical, material handling of rough and/or sharp items, doing landscaping work, welding, and "wherever it is necessary by reason of hazards of processes of environmental, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or " (OSHA 1910 Standards).

Hand protection shall not be worn while working on moving machinery such as drill saws, grinders, or other rotating and moving equipment that might catch the hand protection and pull the worker's hand into a hazardous area.

#### Approval and Selection

Hand protection used will meet the criteria for its particular use. Employees/students shall only be allowed to purchase or receive hand protection through an authorized department representative to insure compliance.

Refer to the attached, "Glove Materials" and "Chemical Resistance" charts to determine appropriate hand protection.

#### Fitting

Fitting shall be done by hazard and size of employee's hand.

#### Inspection and Maintenance

All hand protection shall be kept clean and inspected daily before each use. Badly worn or damaged items are to be replaced.

### **HEAD PROTECTION**

#### Employees/Students Covered

Employees/Students in areas such as painting, carpentry, construction, plumbing, labor, landscape, maintenance, metal trade, and any occupations that involve hazards from falling objects and/or overhead shall be covered.

#### Approval and Selection

Head protection used shall bear the ANSI Z89.1 or Z89.2 approval, manufacturer's name, and ANSI class designation (A, B, C, or D). Employees shall only be allowed to purchase or receive them through an authorized department representative to insure compliance. Refer to the attached, "Selection Chart for Head Protection for University Employees" to determine appropriate head protection.

#### Fitting

Each employee shall be individually fitted. The hard hat shall fit firmly by comfortably on the employee's head.

#### Inspection and Maintenance

Painting: If the hard hat is to be painted, the manufacturer shall be contacted to see if the paint will affect the properties of the hat.

Cleaning: Hard hats shall be washed every thirty days. If worn by more than one employee, it shall be washed daily.

Inspection: Before each wearing of the hard hat, it shall be checked for wear and damages, especially the suspension system.



## Other

Hard hats shall not be stored or carried on the rear window shelf of a vehicle. Sunlight and extreme heat can affect the degree of protection offered. Also, the hard hat can become a projectile in an accident.

## **HEARING PROTECTION**

### Employees/Students Covered

Hearing protection shall be worn by employees/students when noise exposure is above that of the 85dB (action level) when measured on the A-scale of the standard sound level meter at slow response.

### Approval and Selection

Personal hearing protection devices shall meet ANSI 53.19 and employees/students shall only be allowed to purchase or receive them through an authorized representative to insure compliance.

Selection of hearing protection shall take into consideration durability, ease of fit, noise calculations in area, and length of time to be worn.

There are many types of disposable and permanent hearing protection. Listed below are three:

1. Earmuffs: fluid or foam-filled cushions connected by a plastic or metal band that fits over the head. They reduce noise levels by 35-40dB depending on type and fit. In order for them to be effective, a perfect seal must be formed. Glasses, long side burns, and facial movements can reduce protection.
2. Ear Plugs: the most commonly used ear protection device. They come in many different shapes, sizes, and materials. Ear plugs can be purchased as disposables, preformed, or molded (professionally fitted). They reduce noise levels by 25 -30dB depending on type and fit. Cotton is ineffective as ear plugs.
3. Ear Caps: a cross between ear muffs and ear plugs--ear plugs connected to a plastic (usually) band which can be worn under the chin, over the top of the head, or behind the neck. They reduce noise levels by 25 - 35dB depending on type and fit.

NOTE: Combinations of ear plugs and ear muffs can reduce noise level by an additional 3 - 5dB depending on type and fit.

### Fitting

Preformed ear plugs have to be professionally fitted. All others are fitted according to need.

### Inspection and Maintenance

All ear protection, if not disposable, shall be inspected and cleaned before each use. All damaged ear protection shall be discarded and replaced. No unauthorized modifications shall be allowed.

## Other

Attached are three tables dealing with decibel values for typical sounds and various activities, as well as threshold limit values for continuous and intermittent noise.

“Sound Pressure and Decibel Values for Some Typical Sounds”  
“Typical Sound Levels Associated with Various Activities”  
“Threshold Limit Values for Noise”

Noise measurements shall be performed by the Office of Campus Safety personnel. Noise studies shall be authorized by the Office of Campus Safety.

## **PROTECTIVE CLOTHING**

### Employees/Students Covered

Protective clothing shall be worn by employees/students when the potential of an employee/student being exposed or coming in contact with harmful substance is evident. i.e., chemicals, high heat (radiant), dust, open flame, etc.

### Approval and Selection

There are many different standards for approval of protective clothing (ANSI, ASTN, CAL-OSHA, etc.). Protective clothing shall be selected for specified hazard, degree of protection, comfort, and ease of use.

Once the specific or multi-hazards have been identified, contact a reputable vendor or Campus Safety personnel for recommendation of proper protective clothing and/or equipment needed.

### Fitting

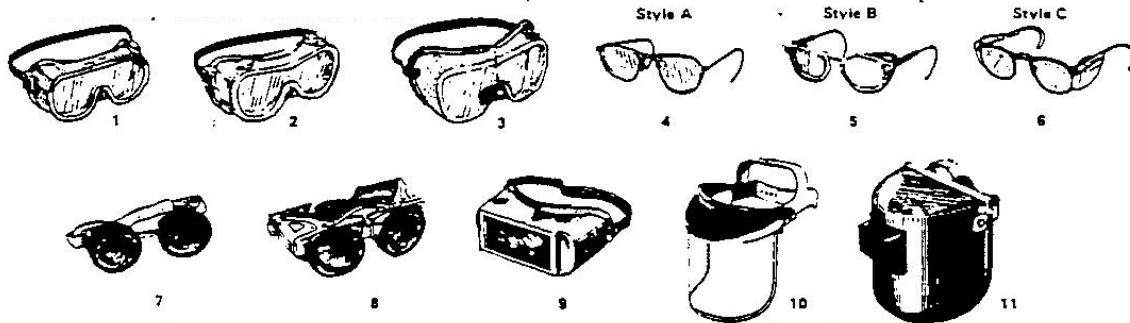
Protective clothing shall fit the wearer comfortably with a minimum of undo play.

### Inspection and Maintenance

Protective clothing shall be routinely cleaned unless disposable. Disposable clothing shall be disposed of after use. Damaged, torn, ripped, etc., clothing shall be replaced before use.

## **SELECTION CHART FOR EYE AND FACE PROTECTORS FOR USE IN INDUSTRY, SCHOOLS, AND COLLEGES**

This selection chart offers general recommendations only. Final selection of eye and face protective devices is the responsibility of management and safety specialists. (For laser protection, refer to American National Standard for Safe Use of Lasers, ANSI Z136.1-1976.)



1. GOGGLES--Flexible fitting, regular ventilation.
2. GOGGLES--Flexible fitting, hooded ventilation.
3. GOGGLES--Cushioned fitting, rigid body.
4. SPECTACLES\*--Without side shields.
5. SPECTACLES--Eyecup type side shields.
6. SPECTACLES--Semi-/Flat-fold side shields.
7. WELDING GOGGLES--Eyecup type, tinted lenses (illustrated).
- 7A. CHIPPING GOGGLES--Eyecup type, clear safety lenses (not illustrated).
8. WELDING GOGGLES--Coverspec type, tinted lenses (illustrated).
- 8A. CHIPPING GOGGLES--Coverspec type, clear safety lenses (not illustrated).
9. WELDING GOGGLES--Coverspec type, tinted plate lens.
10. FACE SHIELD--Plastic or mesh window (see caution note).
11. WELDING HELMET\*

\*Non spectacles are available for limited hazard use requiring only frontal protection.

### APPLICATIONS

<u>OPERATION</u>	<u>HAZARDS</u>	<u>PROTECTORS</u>
Acetylene-Burning Acetylene-Cutting Acetylene-Welding	Sparks, harmful rays, molten metal, flying particles	7, 8, 9
Chemical Handling	Splash, acid burns, fumes	2 (for severe exposure, add 10)
Chipping	Flying particles	1, 3, 4, 5, 6, 7A, 8A
Electric (Arc) Welding Welding	Sparks, intense rays, molten metal	11 (in combination of 4, 5, 6 in tinted lenses, advisable)
<u>OPERATION</u> Furnace Operations	<u>HAZARDS</u> Glare, heat, molten metal	<u>PROTECTORS</u> 7, 8, 9 (for severe exposure, add 10)
Grinding-Light	Flying particles	1, 3, 5, 6 (for severe exposure, add 10)
Grinding-Heavy	Flying particles	1, 3, 7A, 8A (for severe exposure, add 10)

Laboratory	Chemical splash, glass breakage	2 (10 when in combination with 5, 6)
Machining	Flying particles	1, 3, 5, 6 (for severe exposure, add 10)
Molten Metals	Heat, glare, sparks,	7, 8 (10 in combination with 5, 6, in tinted lenses)
Spot Welding	Flying particles sparks	1, 3, 4, 5, 6 (tinted lenses advisable; for severe exposure add 10)

**CAUTION:**

- Face shields alone do not provide adequate protection.
- Plastic lenses are advised for protection against molten metal splash.
- Contact lenses, of themselves, do not provide eye protection in the industrial sense and shall not be worn in a hazardous environment without appropriate covering safety eyewear.

**GLOVE MATERIALS**

**Features:**

**Benefits:**

Liquid Proof Styles

Butyl (cement*)	Highest resistance to permeation by most gases and water vapor.
Viton (cement*)	Exceptional performance when subjected to chlorinated and aromatic solvents, coupled with excellent resistance to permeation by many vapors.
Nitrile (latex*)	Superior puncture and abrasion resistance. Recommended as a general duty glove. Excellent resistance to the degrading effects of fats, petroleum products, and a wide array of chemicals.
Natural Rubber (cement*)	Excellent resistance to the degrading (cement*) effects of alcohols and caustics. Ideal for use in sand blasting.
PVC Coated	Excellent abrasion resistance in a liquid-proof glove. Also provides cushioning.

\*Cement and Latex refer to two basic manufacturing processes of unsupported liquid proof gloves. As a general rule, cement dip gloves exhibit greater resistance to liquid and vapor permeation than do Latex dipped gloves. Therefore, where a permeation barrier is required, a cement dip glove shall be selected.

**General Purpose: Fabrics and Coatings**

Worknit®	Combines the toughness of a nitrile coating with the softness
----------	---------------------------------------------------------------

and stretchy comfort of jersey.

Worknit HD™

Developed and designed to replace leather and/or heavy cotton gloves, the HD fabric has a heavier cotton liner than the regular Worknit. This glove is best used where a tough job requires a product which provides protection, excellent wear, comfort, and value.

### **Coated Machine Knits:**

- |                                                                                                      |                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Grip-N, Grip-N®<br>Hot Mill, Double<br>Grip-N®<br>(1) Reversibility<br>(2) N-tread PVC<br>coating | Unique, economical answer to the general purpose glove. Offers comfort and long wear. Four wearing surfaces instead of two. Superior grip and abrasion resistance. |
| B. Clean Grip™<br>(1) Reversible<br>(2) Large<br>Soft PVC Dots                                       |                                                                                                                                                                    |

Impregnated Wovens and Jerseys:

- |                                              |                                                                                                            |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------|
| A. Newtex                                    | Woven cloth for strength. Coating for abrasion resistance.                                                 |
| B. PVC Dotted Canton<br>Canton and<br>Jersey | The original coated glove. Cool, comfortable cotton, permanently "dotted" for longer wear and better grip. |

Uncoated Knit Fabrics                      100% cotton. They are cool, comfortable, and the lowest-priced  
Machine Knit (string glove)              glove on the market.

### **General Purpose: Leather**

- |                        |                                                                                                                                                                   |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Side Split Leather     | Superior combination of strength, thickness and suppleness in split cowhide leather. A minimum of flaws, scars, and weaknesses, provides longer wear and comfort. |
| Shoulder Split Leather | Provides cushioning and abrasion resistance in a more economical grade of leather.                                                                                |
| Grain Leather          | Better flexibility, finger dexterity and fit than split leather. Generally more comfortable, but less durable than split leather.                                 |

**Chemical** ▶  
(Breakthrough Time in Hours)

Glove	Acetaldehyde	Acetic Acid (5%)	Acetic Acid (50%)	Acetone	Acetonitrile	Ammonia (Hydroxide 25%)	Aspirin	Benzene	Bis(2) Acetate	Butyl Acetate	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Cyclohexane	Cyclohexanol	Cyclohexanone	Diethyl Phthalate	1,1,1 Trichloroethane	Diethyl Sebacate	Dimethyl Acrylate 10/11	Dioxane	Diethyl Sebacate	Diethyl Acrylate		
<b>VITON®</b> (Nora, 10 mil)	0 min.	NT	NT	NR	NT	NT	10 min.	5 hr.	NR	> 8 hr.	> 8 hr.	> 13 hr.	9.5 hr.	> 16 hr.	> 7 hr.	> 8 hr.	29 min.	> 8 hr.	6.9 hr.	7.7 hr.	8 hr.	23 min.	> 17 hr.	NR	
<b>BUTYL</b> (Nora, 17 mil)	9.5 hr.	NT	NT	> 17 hr.	> 8 hr.	NT	> 8 hr.	31 min.	1.9 hr.	1.7 hr.	7 min.	NR	NR	NR	1.1 hr.	> 11 hr.	> 16 hr.	> 16 hr.	2 hr.	2.3 hr.	2.7 hr.	8 hr.	23 min.	2.2 hr.	7.6 hr.
<b>SILVER SHIELD®</b> (Nora, 4 mil)	> 6 hr.	NT	NT	> 6 hr.	> 8 hr.	NT	> 8 hr.	> 8 hr.	> 8 hr.	> 8 hr.	> 8 hr.	10 min.	> 8 hr.	> 8 hr.	> 6 hr.	> 6 hr.	> 6 hr.	> 6 hr.	> 6 hr.	2 hr.	2.3 hr.	2.7 hr.	8 hr.	23 min.	> 6 hr.
<b>PVA™</b> (Ansell/Edmont)	NR	NR	NT	NR	60 min.	NR	90 min.	7 min.	ND	NT	ND	ND	ND	NT	5 hr.	NT	ND	NT	ND	NR	NR	NR	NT	ND	
<b>NEOPRENE</b> (Pioneer, 21 mil)	21 min.	NT	> 480 min.	12 min.	40 min.	> 480 min.	> 480 min.	16 min.	52 min.	NT	NT	31 min.	12 min.	NT	158 min.	NT	NT	NT	33 min.	NT	110 min.	28 min.	NT	34 min.	
<b>NITRILE</b> (Pioneer, 22 mil)	NT	118 min.	> 480 min.	NT	NT	> 480 min.	72 min.	27 min.	101 min.	NT	20 min.	341 min.	NT	NT	> 480 min.	NT	NT	NT	16 min.	NT	35 min.	NT	NT	NT	
<b>PVC</b> (Pioneer, 20 mil)	NT	85 min.	47 min.	< 1 min.	NT	> 480 min.	> 480 min.	2 min.	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	5 min.	NT	NT	
<b>NITRILE</b> (Nora, 11 mil)	4 min.	NT	NT	NR	3 min.	NT	1.1 hr.	NR	29 min.	NR	1 min.	3.4 hr.	4 min.	2.9 hr.	NR	> 16 hr.	NR	> 16 hr.	8 min.	2 hr.	1 min.	28 min.	NR	8 min.	
<b>NITRILE</b> (Ansell/Edmont, 22 mil)	NR	270 min.	NT	NR	30 min.	ND	NR	NR	75 min.	NT	30 min.	150 min.	NR	NR	NT	ND	NT	ND	NT	120 min.	NR	NR	NT	NR	

ND = None Detected      NT = Not Tested      > = Greater Than  
NR = Not Recommended      < = Less Than

	Ethylalcohol (10% in water)	Ethyl Alcohol	Ethyl Ether	Formaldehyde (17% in water)	n-Hexane	Hydrazine (10% in water)	Hydrochloric Acid (10%)	Hydrofluoric Acid	Methylamine (10% in water)	Methylene Chloride	MEX	Methylolacrylate	Nitrobenzene	Nitroethane	Nitropropane	Ortho-Nitrophenol (1% in X-toluene)	n-Pentane	Phenol (10% in water)	Phenyl Acetate	Sulfur Dioxide (10%)	Sulfuric Acid (10% in water)	Tetrahydrofuran	Toluene	Toluene Diisocyanate	1,1,1-Trichloroethane	Trichloroethylene	Vinyl Chloride	Xylene
NR	NT	12 min.	>16 hr.	>11 hr.	NR	NT	NT	>16 hr.	1 hr.	NR	1.9 hr.	>8 hr.	21 min.	>13 hr.	>8 hr.	>15 hr.	NR	NT	NT	>17 hr.	>16 hr.	>16 hr.	>15 hr.	7.4 hr.	4.4 hr.	>8 hr.		
>12 hr.	NT	8 min.	16 hr.	NR	>8 hr.	NT	NT	15 hr.	24 min.	>8 hr.	>16 hr.	>23 hr.	>8 hr.	NR	>20 hr.	2.7 hr.	NT	NT	NR	21 min.	>8 hr.	NR	18 min.	NR	NR	NR		
47 min.	NT	>6 hr.	>6 hr.	>8 hr.	>6 hr.	>6 hr.	>6 hr.	1.9 hr.	>8 hr.	>24 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>8 hr.	>24 hr.	
NT	NR	>360 min.	NR	ND	NR	NR	NR	NR	17 min.	30 min.	180 min.	>360 min.	>360 min.	7 min.	ND	30 min.	120 min.	NR	NR	NR	15 min.	ND	60 min.	30 min.	NT	NT	ND	
NT	>480 min.	18 min.	>480 min.	39 min.	>480 min.	>480 min.	>480 min.	NT	6 min.	22 min.	NT	60 min.	NT	NT	38 min.	>480 min.	NT	>480 min.	>480 min.	28 min.	14 min.	NT	27 min.	11 min.	NT	NT	2 min.	
NT	>480 min.	84 min.	>480 min.	>480 min.	>480 min.	>480 min.	134 min.	NT	NT	6 min.	NT	60 min.	NT	NT	NT	NT	NT	>480 min.	>480 min.	373 min.	28 min.	>480 min.	131 min.	9 min.	NT	NT	82 min.	
NT	20 min.	NT	>480 min.	NT	>480 min.	>480 min.	110 min.	NT	NT	1 min.	NT	NT	NT	NT	9 min.	32 min.	NT	>480 min.	>480 min.	NT	3 min.	>480 min.	NT	NT	NT	NT	4 min.	
1.1 hr.	NT	14 min.	>21 hr.	NT	>8 hr.	NR	NR	>8 hr.	4 min.	NR	48 min.	33 min.	16 min.	>13 hr.	NT	39 min.	17 min.	NT	NR	1.3 hr.	11 min.	3.7 hr.	41 min.	8 min.	5.7 hr.	NR		
NT	240 min.	120 min.	ND	ND	ND	ND	120 min.	ND	NR	NR	NR	NR	NR	ND	ND	NR	20 min.	ND	ND	NT	10 min.	NR	75 min.	NR	NT	75 min.		

ND = None Detected                      NT = Not Tested                      > = Greater Than  
 NR = Not Recommended                      < = Less Than

## SELECTION CHART FOR HEAD PROTECTION FOR UNIVERSITY EMPLOYEES

- Hard Hat:** A rigid head gear of varying materials used to protect the worker's head from impact, penetration, electrical shock, or a combination of these. -
- Composition:** Special plastics, fiberglass and plastics combination, cloth and resin, and aluminum alloy.
- Types:**
  - Type 1--Helmet (hard hat), full brim. Allows for complete protection of head, face, and

- back of neck.
- b. Type 2--Helmet (hard hat), brimless with beak. This type is most commonly used and can accommodate various types of face shields and ear protection.
4. Classes: There are four different voltage classes of head protection. University personnel covered under this section shall only be allowed to wear class A and B.
    - a. Class A--Limited voltage protection. Used by employees or students in general service (non-electrical) occupations, i.e., construction, landscape, etc.
    - b. Class B--High voltage protection. Used by employees in electrical occupations, i.e., electricians.
    - c. Class C--Metal helmets. Under no circumstances shall metal helmets be used by University employees or students.
    - d. Class D--Firefighters' helmet.
  5. Other Forms of Protective Head Gear:
    - a. Bump Hats--Shall not be used unless approved by the Office of Campus Safety.
    - b. Hair Protection--All employees/students with long hair or beards who work around chains, belts, or other machines with moving parts shall be required to wear protective hair coverings. Hair nets, bandannas, and turbans shall not be considered satisfactory. Contact local vendors for information on the type of protective hair coverings available. Those who work around sparks, hot metals, flames, etc., shall use flame-resistant protective hair coverings.

## **FOOT PROTECTION CLASSIFICATION AND PROTECTION FACTORS**

### Classification of Safety Shoes

1. Safety-toe Shoes: Steel toes and metal reinforced sole.  
Usage: Areas where heavy, protruding or falling objects presents a threat.
2. Conductive Shoes: Reduces the possibility of generating a spark.  
Usage: Areas where fire and explosive hazards exist.
3. Foundry Shoes: Contains no fasteners and is easily removed.  
Usage: Areas where exposure to splashes of molten metal is likely.
4. Explosive Operation Shoes: A shoe with non-conductive and grounding properties.  
Usage: Areas where explosive compounds are present when cleaning tanks with volatile hydrocarbons.
5. Electrical Hazard Shoes: A shoe which minimizes the hazard of conducting electricity (no metal in shoes).  
Usage: Areas where electrical hazards exist.

Listed below are seven types of shoe protection which are available. These shall be considered in determining the type or types of protection needed.

1. Toe Protection from Impact and Compression: Shoes for this type of protection shall meet the rated factors. These factors are rated as Class 30, Class 50, and Class 75. The following table indicates the characteristics of each class:



CLASS	IMPACT*		COMPRESSION	
	Weight (W) (pounds)	Height (H) (feet)	Impact Energy (E) (feet/(pounds))	(pounds)
75	50	1.5	75	2,500
50	50	1.0	50	1,750
30	50	0.6	30	1,000

\*Impact Energy (E) = Weight (W) x Height (H)

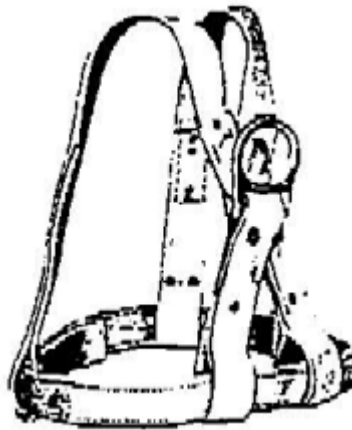
2. Metatarsal Protection: If the top of the foot or ankle is likely to be struck by a heavy object, a metatarsal guard is needed. This type of protection can be added to the shoe or may be built into the shoe. Metatarsal protection is classified MT30, MT50, and MT75 to correspond with the protective potential of toe protection.
3. Puncture Protection: The purpose of puncture resistance is to reduce the hazards of puncture wounds caused by sharp objects which could penetrate the sole of the footwear. Puncture resistant footwear shall have a rating designation of PR.
4. Sole Slip Resistance: The purpose of slip resistant footwear is simply to prevent injury due to failure of footwear to resist slipping on slippery surfaces. Most safety shoe manufacturers do not provide a slip resistance rating at this time. This rating is referred to as "Dynamic Coefficient of Adherence." For example:
  - 0.0 There is no grip at all between the two surfaces.
  - 0.15 Accepted as a minimum.
  - 0.20 Very good coefficient.
  - 0.30 Indicates an outstanding grip.
5. Electrical Hazard Protection: The purpose of this requirement is to reduce hazards due to contact with electrically energized parts. Electrical hazard shoes are not intended for use in explosive or hazardous locations in which conductive foot wear is required. Footwear with this protection may be rated as EH.
6. Conductive Protection: The purpose of this requirement is to protect against the hazards of static electricity buildup or to facilitate the equalization of electrical potential of personnel (lineman) and energized high voltage lines. Foot wear with this protection may be rated CD Type 1 or Type 2.
7. Upper Shoe Protection: The purpose of this requirement is protection from substances which may be harmful or hazardous penetrating the upper shoe covering and causing discomfort or injury to the foot. The rule of thumb here is that the upper shoe covering shall be able to resist whatever harmful substances the worker may spill or contaminate his/her shoes with.

## **CLASSIFICATION OF SAFETY BELTS AND HARNESSSES**

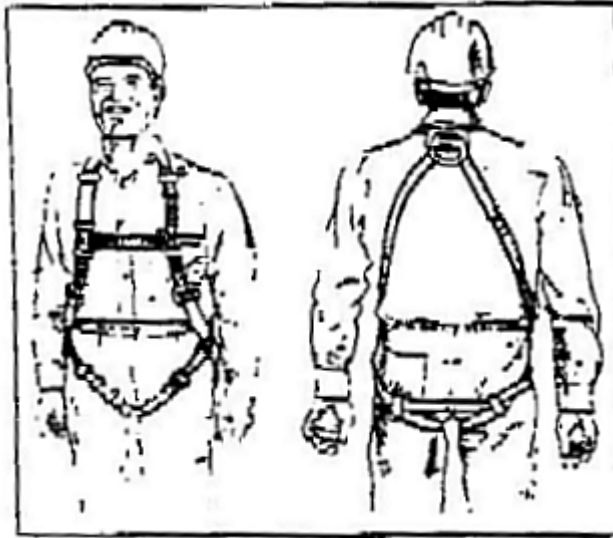
Class I: Body belt (work belts), used to restrain a person in a hazardous work position and to reduce the probability of falls.



Class II: Chest harness, used where there are only limited fall hazards (no vertical free-fall hazard) and for retrieval purposes, such as removal of a person from a tank, bin, or other enclosed place.



Class III: Body harness, used to arrest the most severe free-falls. This harness is ideal for workers on elevated sites. During a fall, it distributes the fall impact over the body.



**Class IV:** Suspension belts, independent work supports used to suspend or support the worker.

**Lifeline:** A horizontal line between two fixed anchorages.

Support capacity: 5400 lbs.

Line diameter: ½ inch.

**Personal Lifeline:** This system is usually a rope system that provides flexibility for worker freedom of movement yet will arrest a fall and help absorb the shock. These systems always have some type of belt or harness that is worn around the waist to which a lanyard or rope-grabbing device is attached.

**Lanyard:** A short piece of flexible line used to secure wearer of safety belt to a lifeline or dropline, or fixed anchorage.

Support capacity: 5400 lbs.

### **THRESHOLD LIMIT VALUES FOR NOISE**

Duration per Day (hrs)	Sound Level (dBA*)
16	80
8	85
4	90
2	95
1	100
½	105
¼	110
	115**

\* Sound level in decibels are measured on a sound level meter, conforming as a minimum to the requirements of the American National Standard Specification for Sound Level Meters, S1.4(1971) Type S2A, and set to use the A-weighted network with slow meter response.

\*\* No exposure to continuous or intermittent in excess of 115 dBA.

### **Impulsive or Impact**

It is recommended that exposure to impulsive or impact noise shall not exceed the limits listed in the table below. No exposures in excess of 140 decibels peak sound pressure level are

permitted. Impulsive or impact noise is considered to be those variations in noise levels that involve maxima at intervals of >1 per second. Where the intervals are <1 second, it should be considered continuous.

### **THRESHOLD LIMIT VALUES IMPULSIVE OR IMPACT NOISE**

Sound Level (dB*)	Permitted # of Impulses or Impacts per day
140	100
130	1,000
120	10,000

\*Decibels peak sound pressure level; re 20  $\mu$ Pa.

### **LEVELS OF SOME COMMON SOUNDS**

Sound Pressure, P N/m <sup>2</sup> (Pascal)	Sound Pressure Level, L <sub>p</sub> dB re 20 $\mu$ N/m <sup>2</sup> ( $\mu$ Pascal)	Sound Source
100,000 (1 bar)	194	Saturn rocket
20,000.0	180 170	
2,000.0	160 150	Ram jet Turbo jet
200.0	140 135 130	Threshold of pain Pipe organ
20.0	120 110	Riveter, chipper Punch press
2.0	100 90	Passing truck Factory
0.2	80 70	Noisy office
0.02	60 50	Conversational speech Private office
0.002	40 30	Average residence Recording studio
0.0002	20 10	Whisper Threshold of good hearing
0.00002	0	Threshold of excellent youthful

## **RESPIRATORY PROTECTIVE EQUIPMENT**

Toxic materials can enter the body in three ways: (1) through the gastrointestinal tract, (2) through the skin, and (3) through the lungs. The human respiratory system presents the quickest and most direct avenue of entry because of its association with the circulatory system and the constant need to oxygenate the tissue cells.

The following information provides background information on different types of respirators and the hazards associated with their use.

When respirators are to be used, the Office of Campus Safety shall be consulted before said use starts. All respirators used on the Louisiana State University campus shall be NIOSH/MSHA approved. No exceptions.

### Rules for the Respirator Program

1. If a respirator is required by an OSHA standard or due to overexposure to a contaminant in the workplace, all of the requirements of the respirator program must be met, including medical evaluation, fit testing, maintenance, and program management.
2. If a respirator is required by the organization (i.e., director, manager, supervisor, principle investigator), all of the requirements of the respirator program must be met, including medical evaluation, fit testing, maintenance, and program management.
3. If respirator use is voluntary, LSUA recommends having a medical evaluation, fit testing, and maintenance. Dust masks do not require a medical evaluation or fit testing.

Note: Voluntary respirator use applies if the employees are not exposed to hazardous agents above the permissible exposure limits, they are not emergency responders, or they are not required by the organization. Voluntary use of respirators is encouraged by Louisiana State University at Alexandria to prevent inhalation of small amounts of potentially harmful agents that are not considered to be at hazardous levels as defined by OSHA.

4. If a respirator is required use as a member of an emergency team, all of the requirements of the respirator program must be met, including medical evaluation, fit testing, maintenance, and program management.

### Rules for Maintenance, Care and Use of Respirators

(Does not apply to dust masks)

1. Change filter cartridges or dispose of respirator in accordance with breakthrough times recommended by the manufacturer.
2. Clean facepieces periodically to maintain hygienic conditions using the manufacturer's recommended cleaning product (or isopropyl alcohol, or suitable disinfectant). Emergency use respirators, respirators used by more than one person, and fit test respirators are to be cleaned after each use.
3. Perform field fit check before each use (see appendix for procedure).
4. Facial hair and glasses shall not interfere with respirator fit.

5. Inspect respirators before each use and replace if defective.
6. Store respirators to prevent contamination, moisture, or damage.

#### Classification of Respiratory Hazards

1. Oxygen deficiency
2. Gas and vapor contaminants
  - a. Immediately dangerous to life or health
  - b. Not immediately dangerous to life or health
3. Particulate contaminants (aerosols including dust, fog, fume, mist, smoke, and spray)
4. Combination of gas, vapor, and particulate contaminants
  - a. Immediately dangerous to life or health
  - b. Not immediately dangerous to life or health

#### Classification of Respiratory Protection Devices (Respirators)

Respiratory protection devices fall into three classes: (1) air purifying, (2) air supplied, and (3) self-contained breathing apparatus.

1. Air Purifying Devices (Respirators) remove contaminants from the atmosphere and can be used only in atmospheres containing sufficient oxygen to sustain life (at least 16 percent by volume at sea level) and within specified concentration limitations of the specific device. Various chemicals remove specific gases and vapors, and mechanical filters remove particulate matter. The useful life of an air purifying device is dependent upon the concentration of the contaminants, the breathing volume of the wearer, and the capacity of the air purifying medium.

The basic types of air purifying devices are:

- a. Mechanical filter respirators: provides respiratory protection against particulate matter such as non volatile dusts, mists, or metal fumes. Selection of the appropriate respirator is based on the type, toxicity, and particle size of the particulate matter. Specific types of mechanical filter respirators are approved under USBM Approval Schedule 21 and its revisions.
- b. Chemical cartridge respirators: provides respiratory protection against certain gases and vapors in concentrations not in excess of 0.1% (by volume). Specific types of chemical cartridge respirators are approved under USBM Approval Schedule 23 and its revisions.
- c. Combinations of chemical cartridge and mechanical filter respirators: provides respiratory protection where exposure is both gaseous and particulate.
- d. Gas masks: provides respiratory protection against certain specific gases and vapors in concentrations up to 2% (by volume) or as specified on the canister label and against particulate matter. Specific gas masks are approved USBM Approval Schedule 14 and its revisions.

NOTE: See chart "Color Coding for Air Purifying Respirators."

2. Air Supplied Respirators deliver air through a supply hose connected to the wearer's face

piece. These devices shall be used only in atmospheres not immediately dangerous to life or health, unless an auxiliary ingress or egress cylinder is incorporated into the system.

- a. Air line respirators are available with or without auxiliary ingress or egress cylinders. The air line respirator is connected to a suitable compressed air source (a purified air compressor and/or cylinder supply system) by a hose and air is delivered in sufficient volume to meet the wearer's breathing requirements.
  - b. All air supplied respirator systems shall meet OSHA 1910.134 criteria, and no air supplied system shall be used on the LSUA campus without approval from the Safety & Risk Manager.
3. Self-Contained Breathing Apparatus (SCBA) provides respiratory protection against toxic gases and oxygen deficient atmospheres. SCBA's are not for underwater use.

Most SCBA5 used on campus consists of a high-pressure air cylinder (15-20 minute air supply), a demand regulator connected by a high-pressure tube to the cylinder, a face piece and tube assembly with an exhalation valve or valves, and a method of mounting the apparatus on the body.

All users of SCBA's shall be trained in its use by a competent instructor.

For more information on training, monitoring, inspection, fit testing, maintenance, and repair requirements, contact the Office of Campus Safety.

**COLOR CODING FOR AIR PURIFYING RESPIRATORS**

Atmospheric Contaminants to be Protected Against	Colors Assigned*
Acid gases	White
Hydrocyanic acid gas	White with 1/2" <u>green</u> stripe completely around the canister near the bottom
Chlorine gas	White with 1/2" <u>yellow</u> stripe completely around the canister near the bottom
Organic vapors	Black
Ammonia gas	Green
Acid gases and ammonia gas	Green with 1/2" white stripe completely around the canister near the bottom
Carbon monoxide	Blue
Acid gases and organic vapors	Yellow
Atmospheric Contaminants to be Protected Against	Colors Assigned*
Hydrocyanic acid gas and chloropicrin vapor	Yellow with 1/2" <u>blue</u> stripe completely

	around the canister near the bottom
Acid gases, organic vapors, and ammonia gases	Brown
Radioactive materials, excepting tritium and noble gases	Purple (magenta)
Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors	Canister color for contaminant, as designated above, with ½" <u>gray</u> stripe completely around the canister near the top
All of the above atmospheric contaminants	Red with ½" <u>gray</u> stripe completely around the canister near the top

\*Gray shall not be assigned as the main color for a canister designed to remove acids or vapors.

NOTE: Orange shall be used as a complete body or stripe color to represent gases not included in this table. The user shall refer to the canister label to determine the degree of protection the canister will afford.

### **GUIDE SELECTION OF RESPIRATORS**

Hazard	Respirator
Oxygen Deficiency	Self-contained breathing apparatus. Hose mask with blower. Combination airline respirator with auxiliary self-contained air supply or an air-storage receiver alarm.
Gas and Vapor Contaminants: -Immediately dangerous to life or health (See Note 2)	Self-contained breathing apparatus. Hose mask with blower. Air-purifying, full face piece respirator with chemical canister (gas mask). Self-rescue mouthpiece respirator (for escape only). Combination airline respirator with auxiliary self-contained air supply or an air storage receiver with alarm.
-Not immediately dangerous to life or health	Airline respirator. Hose mask without blower. Air-purifying, half-mask or mouth piece respirator with chemical cartridge.
Particulate Contaminants: -Immediately dangerous to life or health (See Note 2)	Self-Contained breathing apparatus. Hose mask with blower. Air-purifying, full face piece respirator with appropriate filter. Self-rescue mouthpiece respirator (for escape only).



Hazard	Respirator
<p>-Not immediately dangerous to life or health</p>	<p>Combination airline respirator with auxiliary self-contained air supply or an air storage receiver with alarm.</p> <p>Air-purifying, half-mask or mouth piece respirator with filter pad or cartridge.</p> <p>Airline respirator.</p> <p>Airline abrasive-blasting respirator.</p> <p>Hose mask without blower.</p>
<p>Combination gas, vapor, and particulate contaminates</p> <p>-Immediately dangerous to life or health (see Note 2).</p>	<p>Self-contained breathing apparatus.</p> <p>Hose mask with blower.</p> <p>Air-purifying, full face piece respirator with chemical canister and appropriate filter (gas mask with filter).</p> <p>Self-rescue mouthpiece respirator (for escape only).</p> <p>Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.</p>
<p>-Not immediately dangerous to life or health</p>	<p>Airline respirator.</p> <p>Hose mask without blower.</p> <p>Air-purifying, half-mask or mouth piece respirator with chemical cartridge and appropriate filter.</p>

**(P.P.E.) Disciplinary Policy**

Louisiana State University at Alexandria believes that a safety and health Accident Prevention Program is unenforceable without some type of disciplinary policy. Our Agency believes that in order to maintain a safe and healthful workplace, the employees must be cognizant and aware of all Agency, State, and Federal safety and health regulations as they apply to the specific job duties required. The following disciplinary policy is in effect and will be applied to all P.P.E. Violations.

The following steps will be followed unless the seriousness of the violation would dictate going directly to Step 2 or Step 3.

1. A first time violation will be discussed orally between company supervision and the employee. This will be done as soon as possible.
2. A second time offense will be followed up in written form and a copy of this written documentation will be entered into the employee's personnel folder.
3. A third time violation will result in time off or possible termination, depending on the seriousness of the violation.

## FIRE EXTINGUISHERS

### Types of Fires:

Class A--Ordinary combustibles such as wood, paper, cloth, some rubbers, and plastics.

Class B--Flammable liquids such as gasoline, oils, grease, tars, lacquer, and oil-based paints.

Class C--Energized electrical equipment such as fuse boxes, electrical outlets, circuit breakers, wiring, appliances, and other machinery.

Class D--Combustible metals such as fires involving titanium, magnesium, lithium, potassium, or sodium.

### Types of Fire Extinguishers:

Fire extinguishers come in various shapes, sizes, colors, and types. They shall only be used on the type of fire they are rated for. Before an emergency arises, it is recommended that all employees/students read and understand the directions on the fire extinguisher(s) in their area.



A water extinguisher is designated by an "A" inside a green triangle on the label easily recognized by its silver container. This extinguisher is only to be used on A type fires. CAUTION: Do not use on electrical fires.



use

A CO<sub>2</sub> extinguisher is designated by a "B" in a red square and a "C" in a blue circle on the label and is easily recognized by the large black discharge horn. This type of extinguisher is only to be used on Class B and/or C type fires. CAUTION: Do not use in a confined space.



fires,

Multi-Purpose and Ordinary Dry Chemical extinguishers are designated by an "A" inside a green triangle, a "B" inside a red square, and a "C" inside a blue circle on label respectively. It is easily recognized by its red container and/or piggy back cartridge. This type of extinguisher is only to be used on Class B and/or C type

while multi-purpose dry chemical can also be used on Class A type fires.

CAUTION:

Respiratory irritant, if inhaled.



is

Halon 1211 extinguishers are labeled by the same designations as a multi-dry chemical extinguisher, "ABC." Halon is usually packaged in a red container similar to a dry chemical extinguisher, but it is usually not recognizable until label

not

read. This extinguisher is for use on Class A, B, and C type fires. CAUTION: Do not use in a confined space.

computer

NOTE: A Halon 1211 or CO<sub>2</sub> fire extinguisher is recommended for use in

water

rooms or in areas where electronic equipment is located. Dry chemical and extinguishers are not.



A Combustible Metal fire extinguisher is designated by a "D" inside a yellow star the label. This extinguisher is only for use on Class D type fires.

#### How to Use a Fire Extinguisher:

The method described below is a standard application for how to use a fire extinguisher; however, it is highly recommended that all employees/students read and understand the directions on the fire extinguisher(s) in their area. This method does not apply to all portable extinguishers.

To use extinguisher, remember P A S S.

Pull the pin. (Some may require pressing a puncture lever or releasing a lock hatch.)

Aim the extinguisher nozzle or cone at the base of the fire.

Squeeze or press the handle.

Sweep from side to side at the base of the fire until it appears to be out. With a water extinguisher, place your finger over the nozzle to create a mist. Stop the extinguisher, check the fire area, and (if necessary) continue your extinguishment efforts. Always back away from a fire so you will not be caught off guard.

# **VEHICLE OPERATION AND MAINTENANCE**

## **USE OF VEHICLE OCCUPANT RESTRAINT SYSTEM**

In accordance with the mandate by the Governor of the State of Louisiana in Executive Order No. EWE 85-6 and Systems Safety Policy SSP-18-85.

Each Louisiana State University at Alexandria employee who rides in a University vehicle or a privately owned vehicle on official travel status shall utilize the complete occupant restraint system provided in those vehicles.

For information on transporting of personnel in open bed trucks and trailers, see section by same heading.

It shall be the responsibility of each department head to take what actions they deem necessary to assure that employees utilize the occupant restraint system while on official travel status.

In the 1988 legislative session, a bill was passed on the use of occupant restraint systems. House bill No. 1158 requires that "Each driver of a passenger car, van, or truck having a gross weight of six thousand pounds or less...in this state shall have a safety belt properly fastened about his or her body at all times when the vehicle is in forward motion. The provisions of this section shall not apply to those cars, vans, or pickups manufactured prior to January 1, 1981.

The Office of Campus Safety recommends that all employees and their families wear vehicle occupant restraint system whenever they are in a vehicle, not because it is the law, but because it could save yours or a member of your family's life.

## **TRANSPORTING OF PERSONNEL IN OPEN BED TRUCKS AND TRAILERS**

1. All employees shall remain entirely within the confines of the sides and tailgates of open bed vehicles. No extending of arms or legs over, on, or through sideboards or tailgates. Employees shall be seated on fixed seating provided in the bed of the truck or on the bed itself.
2. Any truck which is moving cargo as well as individuals in the truck bed shall have all cargo forward of the passengers and securely fastened to the truck.

## **BY PASS STARTING OF TRACTORS\***

Bypass starting occurs when an operator "bypasses" the normal safety or starting system. One way is shorting across the starter terminals with a screwdriver. Another occurs is the neutral start switch is not functioning and the key or starter button is used to start the tractor from the ground. If the tractor is in gear when this is done, it will start and anyone in its path may be injured or killed.

This situation is even more serious if the tractor is equipped with the hydraulic clutch. These tractors, if bypass starter is in gear, will not move immediately but will lurch quickly after a brief delay when hydraulic pressure builds up.

The following safety rules shall be observed by all operators:

1. Never start a tractor by shorting across the starter terminals.

2. Keep your tractor's starting system in good working order so you can start it from the operator's station.
3. If the tractor has a neutral start switch and will start in gear with the key or starter button, something is wrong; it shall be fixed.
4. Never wire around or defeat the neutral start switch.
5. Always make sure the tractor is in park before getting off.
6. Never start the tractor from the ground.

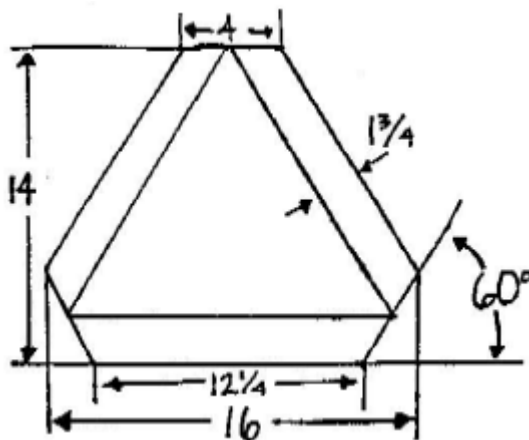
\*From a John Deere safety memo.

### SLOW MOVING VEHICLE SIGNS

All vehicles and/or trailers pulled by vehicles which are designed to move 25 mph or less and travel public and/or University roads shall have a slow moving vehicle emblem affixed to the rear of the vehicle as determined by ANSI B114.1-1971.

#### SLOW-MOVING VEHICLE EMBLEM:

NOTE: All dimensions are in inches.



Dark red reflective border.

Fluorescent yellow-orange triangle.

## Driver Safety Program/Fleet Vehicle Procedures

**PURPOSE:** To establish a policy for usage of personal vehicle or issuing state fleet vehicles to be used for business purposes. Monitoring and reservation requests will be handled by the Facility Services Department. A Fleet Vehicle is identified as a licensed vehicle owned, leased and/or rented by the State of Louisiana/LSU-Alexandria. Facility Services has been authorized by the Chancellor to monitor the vehicle reservation system and the Safety & Risk Manager has been authorized to sign as the Agency Head for all DA2054 forms.

### GENERAL POLICY

1. Keys for university vehicles can only be issued to authorized drivers. Authorized drivers are those faculty, staff, and student workers who have completed the "Authorization and Driving History" form (DA 2054), travel authorization, and driver's safety course. It is the responsibility of the employee to:

Completed Authorization and Driving History Form (DA 2054)

- Employee information and signature
- Supervisor signature
- Driver Safety Course completion information

Authorization is not complete until all forms have been completed, signed by a supervisor, **and** signed by the Chancellor or the Safety & Risk Manager.

The DA2054 and travel authorization form must be renewed each fiscal year. The driver's safety course must be re-taken every three years. When the form is complete it is routed to Facility Services who then reviews for completion of information and request an Official Driving Record (ODR) from the Office of Motor Vehicles. Once the ODR is received it is verified and routed to the Safety & Risk Manager for approval.

All required forms and driver's safety course information can be obtained by contacting the Facility Services office.

2. If a vehicle is reserved by a person who has not completed the authorization process, the reservation will be flagged in the motorpool schedule and is considered tentative until all forms have been completed, signed, and processed. Non-authorized drivers will be notified of their status when a vehicle request is made. The DA2054, travel authorization, and the safety course certification must be completed, signed, and submitted to Facility Services no less than five (5) days prior to the first day of the vehicle request. This provides adequate time for the Official Driving Record (ODR) to be obtained from the Department of Public Safety in order to complete the DA 2054. The ODR must be obtained before the forms can be signed by the Chancellor or his designee.

\*Authorization is not guaranteed if the DA 2054, travel authorization, and safety course certificate are received with less than five days left before the reservation date.

**\*The reservation will be cancelled and a \$25.00 fee charged to the reserving department if**

the “Authorization and Driving History” form, travel authorization, and safety course certificate have not been received by the day before the reservation date.

**\*A completed DA 2054 and Driver Safety Training certificate must be on file prior to driving for any university related business. This includes any state- or privately-owned vehicle and whether or not you request reimbursement.**

## **REGULATIONS**

High-risk drivers shall not be authorized to drive personal or state vehicles on state business from the date of discovery for a minimum of twelve (12) months. Annual ODR reports will be reviewed and will identify high risk drivers. High risk drivers and their supervisors will be notified when placed in the high-risk category. High risk drivers are defined as follows:

Having three or more convictions, guilty pleas, and/or “no contest” for moving violations within the previous 12 (twelve) month period or

Having a single conviction, guilty pleas, and/or “no contest” for operating a vehicle while intoxicated, hit and run driving, vehicular negligent injury, reckless operation of a vehicle, or similar violation within the previous twelve (12) month period.

Authorized drivers with recurring conviction/violations must attend refresher course within 90 days to continue to drive on state business.

## **CLAIMS REPORTING/ACCIDENT INVESTIGATION**

In the event of an accident while in a state-owned vehicle or in a personal vehicle on official state business, the following procedures will be followed:

Driver must notify their immediate supervisor and Facility Services and/or the Loss Prevention Coordinator/Safety & Risk Manager on the day of the accident. The employee will then complete the Louisiana State Driver’s Accident Report Form (DA 2041) and submit with a copy of the police report (if one is issued) to the Loss Prevention Coordinator/Safety & Risk Manager. The Loss Prevention Coordinator/Safety & Risk Manager will then review the DA 2041 and after investigating submit to the ORM Claim Unit within 48 hours of the accident.

Failure to report any vehicular accident may be cause for suspension of Driver Authorization. Depending upon the outcome of the investigation an employee may be placed into the high-risk category. In addition, any authorized driver must report receiving a traffic violation, whether on state or personal business, to their supervisor the next working day.

***Copies of the DA2041 can be found in the glove compartment of all state vehicles.***

## **ROUTINE VEHICLE MAINTENANCE/INSPECTION**

The Facility Services department will be responsible for maintaining all state-owned vehicles and performing monthly inspections and routine minor maintenance. Corrective action is immediately taken on any deficiencies found to prevent further damage or accidents. All inspection checklists and routine maintenance will be recorded and filed in the Facility Services Office.

## DRIVER TRAINING

Driver Safety Training is required of any State employee driving on university business or a State vehicle.

All authorized drivers shall successfully complete an ORM recognized defensive driving course within ninety (90) days of entering the program and shall complete a refresher course at least once every three years unless their class of license requires other additional training or testing. Drivers who have convictions on their motor vehicle records shall be required to retake a recognized driving course within ninety (90) days of notification of a conviction.

Driver Safety Training is online by accessing the LSUA website at:  
<http://budget.lsua.edu/safety/drivertraining/>

Go to <http://budget.lsua.edu/safety/drivertraining/>

Click on the link to On-line Safe Drivers Course Information

Click on the purple "defensivedriving" link.

A login box pops up. In the username box type: lsu\userid (i.e., lsu\jdoe).

The userid is your PAWS Logon ID.

In the password box, type your PAWS Password and click "OK".

A box saying "No LMS found! Running in offline mode." will come up. Click "OK".

A box may pop up asking do you want to display the nonsecure items? Click "yes". It may take a minute for the first page to load.

You should see a screen with this header:

## PROCEDURES FOR ISSUANCE OF FLEET VEHICLE

The vehicle reservation form can be accessed by accessing the faculty/staff page of the LSUA website ([www.lsua.edu](http://www.lsua.edu)). Use of the online reservation form is preferred over making a reservation over the phone.

The university has a limited number of motorpool vehicles available for use. In order to ensure everyone's needs are met the following policies will be followed:

1. Motorpool vehicles will be assigned based upon the number of passengers, destination, duration of the trip, and vehicle availability.

\*Vans are reserved for large groups (five or more passengers). They will be assigned to groups with less than five passengers only when there are no smaller cars available. Special consideration will be made when needed.

2. Vehicles are reserved on a first come, first served basis. If all vehicles are already reserved for a requested date, Facility Services will assist the requestor with renting a vehicle from Enterprise Rent-A-Car. Under these circumstances, the total cost of the rental will be charged to the requestor's department.

3. Cancellation of a reservation must be made as soon as it is known that the vehicle is no longer needed. Advance notice is preferred, but cancellations can be made as late as the morning of the reservation. Cancelled vehicles can be reassigned to another faculty/staff member.

**\*If a cancellation is not made and the vehicle is simply not picked up, the reserving department will be charged a \$25.00 fee.**



4. Keys are to be picked up at the time and date specified on the reservation. The online reservation form has been updated for a pickup time to be specified. If the pickup time must be changed (running late, date change, etc.), the Facility Services office must be contacted as soon as possible. A reasonable effort will be made to contact the person named on the reservation when the keys are not picked up on time. If this person can not be contacted, the reservation will be cancelled and the vehicle will go to the next person on the waiting list.

**\*A \$25.00 fee will be charged to the reserving department if Facility Services staff cancels a reservation under these circumstances.**

5. Vehicles are to be returned to the Motorpool parking lot at the time and date specified on the reservation. The online reservation form has been updated for a return time to be specified. The keys must be returned to the Facility Services office at this time as well. The vehicle is not officially returned until the keys are returned. This allows the vehicle to be readied for the next reservation which could be on the same day. If the return time must be changed (running late, date change, etc.), the Facility Services office must be contacted as soon as possible.

**\* A \$25.00 fee will be charged to the reserving department if the vehicle and keys are not returned at the specified time and the Facility Services office is not contacted.**

6. Roadside assistance is available through Paragon Motor Club if needed. The membership card and contact phone number are both located in the glove box.

Facility Services office hours are 7:00 am-4:00 pm Monday through Friday. Keys and mileage forms can be returned after office hours by dropping them in the mail slot located to the left of the front door at the Facility Services building. Use of this feature is encouraged. This allows for the vehicle to be checked back in and readied for the next driver as soon as possible.

Complete Authorization and Driving History Form (DA 2054), Travel Authorization form, and Driver's Safety Course. Send to Facility Services/Motorpool ASAP. Forms must be received no less than five (5) days prior to the first day of the vehicle reservation.

2. Completed Authorization and Driving History Form (DA 2054)
  - Employee information and signature
  - Supervisor signature
  - Driver Safety Course completion information

Send to Facility Services Motor Pool so they can obtain:

- Official Driving Record
- Chancellor/designee signature

3. Complete online vehicle reservation form (<http://auxiliary.lsua.edu/motorpool/reserve/>).
4. Pick-up keys at Facility Services at time/date specified on reservation to avoid \$25 fee.
5. Begin completing mileage log.
6. Turn in keys and log to Facility Services by specified date/time to avoid \$25 fee.

Note:

These steps do not include additional requirements if students or other individuals are riding in the State-owned vehicles

## **VEHICLE REPAIR AND MAINTENANCE SHOPS**

Safe vehicles, trucks, and autos (and other rolling stock) are a must for transportation of University personnel and materials.

Ironically, the maintenance and repair of motorized equipment can be almost as dangerous as the vehicles themselves unless the shop is run by a supervisor who takes an active interest in shop safety.

Items that bear considerable attention include but are not confined to the following:

Ventilation: The shop shall be equipped with a well maintained and workable ventilation system capable of exhausting carbon monoxide fumes to the outside.

Floor Fans: Floor fans, if used, shall be guarded front and back with a metal mesh guard with openings no more than ½”.

Tire Airing: Tires, particularly truck tires, with locking rims shall be inflated in a steel airing cage. Tires shall never be over-inflated. Defective locking rings shall be replaced. Rings shall be seated properly.

Locking Chains: If a tire must be mounted outside the shop, a chain shall be placed around the locking ring and locked.

Jacks: If a jack must be used to raise a vehicle, the raised vehicle shall be blocked up (blocks of metal stands). The jack shall be in good mechanical condition.

Battery Charger: Employees shall be furnished and required to use protective equipment (glasses, gloves and aprons) when charging batteries with acid. Floors shall be protected against electrical shock. Manufacturer's recommendations for charging rate shall be carefully followed to prevent buildup of potentially explosive quantities of oxygen and hydrogen. Metal tools, chains, etc., shall be kept well away from batteries to prevent possible short circuit which could result in burns and explosion.

Spark Plug Cleaners: Cleaners in good condition (sand blast), goggles, or face shield shall be available for mechanics.

Parts Cleaning: Dip tank with fusible link in cover shall be available for parts cleaning. Gasoline shall never be used as a cleaning solvent. Solvents with flash points higher than gasoline are readily available and shall be used for cleaning.

Hand Tools: See Section, "Safety Rules for Control of Hand and Portable Power Tools."

Chain hoist/Floor Crane: Chains and/or cable shall be inspected frequently for breaks or severely worn spots. Electrical controls shall operate smoothly and hoist or crane capacity shall be visible to operator. See "Hoist" section.

Bench Grinder: Bench grinder shall be securely fastened to stand or work bench to prevent "walking." Grinder wheel must be guarded, and spindle and nut shall be covered. Grinder work rest shall be adjusted to no more than 1/8" to wheel.

Air Pressure: Air pressure used for cleaning shall not exceed 30 psi at discharge nozzle.

Floors: Floors shall be free of oil and grease. Absorbent compound shall be available for covering oil and grease spots.

Work Benches: Work benches shall be neat and clear of removed parts and tools not in use.

Fire Protection: Shop shall be equipped with B-C type extinguishers; they shall be properly tagged and inspected. Approved safety cans shall be available for disposing of oily rags and towels.

## **GLOSSARY OF TERMS AND REFERENCES**

1. Accident: An unplanned, usually injurious or damaging event, which interrupts the completion of an activity and is invariably preceded by an unsafe act, an unsafe condition, or some combination of both.
  2. Accident Analysis: Involves reviewing accident reports to determine trends in accident occurrence and to apply remedial measures to reduce and/or eliminate these trends.
  3. Accident Investigation and Reporting: Accurately recording and assessing the conditions and action concerning an individual accident and the recording of these facts accurately and clearly to prevent the accident from recurring.
  4. Administration (Management): Chancellors, Vice Chancellors, Deans, Directors, Department Heads, and Supervisors.
  5. Asbestosis: A disease of the lungs caused by the inhalation of fine airborne fibers of asbestos.
  6. Auto-Ignition Temperatures: The lowest temperature at which a flammable gas, vapor, or air mixture will ignite from its own heat source or a contacted heated surface without the necessity of spark or flame. Vapors and gases will spontaneously ignite at a lower temperature in oxygen than in air and their auto-ignition temperature may be influenced by the presence of a catalytic substance.
  7. Boiling Point: The temperature at which the vapor pressure of a liquid equals atmospheric pressure.
  8. Building Coordinators: Individuals designated by appropriate University administrators who are responsible for safety, maintenance, and security of public areas of a specific building.
  9. Carcinogenic: Carcinogen--cancer producing.
  10. Combustible Liquids: Combustible liquids are those having a flashpoint at or above 140°F. They are known as Class III liquids. Class IIIA includes those having a flash point at or above 140°F but below 200°F. Class IIIB includes those having flash points at or above 200°F.
  11. Decibel (dB): A unit to express the ratio of two amounts of electric or acoustic signal power. The decibel is equal to ten times the logarithm of the signal power ratio as expressed by the following equation:  
$$n(\text{dB}) = 10 \log [(P_1)/(P_2)]$$
- NOTE: The standard sound level meter will register noise on three weighting networks (A, B, and C). A--less sensitive to low frequencies; B--intermediate range; C--flat response and used for everything above 85 dB.
12. Dermatitis: Inflammation of the skin from any cause. There are two general types of skin reaction--primary dermatitis and sensitization dermatitis.
  13. Exposure: Proximity to a condition which may produce injury, death, or damage from dusts, chemicals, high pressure explosives, etc.
  14. Hazard: That dangerous condition, potential or inherent, which can bring about an interruption or interference with the expected orderly progress of an activity.
  15. Industrial Hygiene: The science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses arising in or from work situations which may cause sickness, impaired health and well-being, or significant discomfort and inefficiency among workers or among the citizens of the community.
  16. Loss Time Injury: A work injury (which may result in death or disability) in which the injured person is unable to report for duty on his/her next regularly scheduled shift.
  17. Lower Explosive Limit (LEL): The minimum concentration of combustible gas or vapor in air of flammable liquids or gases below which propagation of flame does not occur on contact with a source of ignition.

18. Major Activity: A major administrative department of the University, i.e., Physical Plant, Food Services Department, Athletic Department, Police Department, etc.
19. Mechanical Hazards: Unsafe conditions involving machinery, equipment, tools, etc.
20. Mg/m<sup>3</sup>: Milligrams of contaminant per cubic meter of air.
21. Nip Point: The point of intersection or contact of two opposed circular surfaces, or a plane and a circular surface.
22. Nuclear Energy: The energy released in a nuclear reaction such as fission or fusion. Nuclear energy is popularly, though mistakenly, called atomic energy.
23. Occupational Illness: Any abnormal physical condition or disorder of an employee, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with his/her employment.
24. Occupational Injury: Any injury which results from a work connected accident or from exposure in the work environment.
25. Personal Protective Equipment: Any material or device worn to protect the worker from exposure to, or contact with, any harmful material or force.
26. Pinch Point: Any point at which it is possible to be caught between the moving parts of a machine, or between moving or stationary parts of a machine, or between the material and the moving parts of a machine.
27. Potential Hazard Analysis: Recording and appraising "near miss" occurrences which, except for lack of unusual skill and circumstances, might become accidents. Such appraisal should lead to developing measures to prevent potential accidents.
28. Proper Job Instruction (PJI): The instructing of an employee by presentation and demonstration in the performance of his/her tasks to insure safety and quality.
29. Radiation: The emission and propagation of energy in the form of waves through space or through a material medium. Usually refers to electromagnetic radiation such as gamma rays, ultraviolet rays, heat waves, etc.
30. Safety Education: The teaching of the need to use wisely and at appropriate times, the skills and habits developed through training.
31. Safety Inspection: Evaluation of structures, equipment, grounds, and program and personnel performance to eliminate hazardous conditions and correct unsafe behavior.
32. Safety Management: The planning, organizing, directing, and controlling the accident prevention effort at each level of management to include the lowest supervisory level, and employee and student levels.
33. Safety Promotion: Maintaining safety awareness through the use of mass communication, i.e., safety meetings, group discussion sessions, news releases, bulletin board notices, posters, safety drives, etc.
34. Safety Standards and Codes: Minimum specifications required to maintain safe equipment, procedures, and performance.
35. Safety Training: The process through which attitudes, knowledge, and skills, as they relate to safe practices, are developed.
36. Silica: Silicon Dioxide (SiO<sub>2</sub>) which occurs in nature as quartz, sand, flint, etc., and is used in the manufacture of glass, and ceramic products, and also is found in the sand used in foundry operations.
37. Supervisor: The person exercising direct supervision over an individual or group of employees in the performance of assigned jobs or work tasks. This applies also to professors in their relationship to students in their classes.

38. Threshold Limit Value (TLV): Referenced to airborne concentrations of substances and representing conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect.
39.  $\mu$ : The abbreviation of micron. ( $1 \mu = 1/10,000 \text{ cm} - 1/25,000 \text{ inch}$ )
40. Work Area Factors:
- a. Apparatus: An assemblage of instruments, machinery, material, etc., for a particular use.
  - b. Buildings and Structures: Anything built or constructed.
  - c. Conditions: Housekeeping, lighting, temperature, noise, fire protection, dust, sprays, gases, fumes.
  - d. Devices: Inventions or contrivances.
  - e. Equipment: Anything used or provided for any task such as tools, protective clothing, etc.
  - f. Machines: Any mechanical contrivance used in the performance of some kind of work.
  - g. Materials: Anything found in the work area such as chemicals, containers, raw stock, flammables, acids, explosives, etc.

## **REFERENCES**

1. National Fire Protection Association (NFPA), Life Safety Code 101
2. National Fire Protection Association (NFPA) Volume 1
3. American Chemical Society, Safety in Academic Chemistry Laboratories
4. David A. Pepitone, ed., Safe Storage of Laboratory Chemicals
5. Norman V. Steere, ed., Handbook of Laboratory Safety, 2nd edition
6. National Safety Council, Fundamentals of Industrial Hygiene
7. National Safety Council, Accident Prevention Manual for Industrial Operations, Engineering, and Technology
8. National Safety. Council, Accident Prevention Manual for Industrial Operations, Administration, and Programs
9. American Conference of Governmental Industrial Hygienists, Industrial Ventilation
10. CFR 29, Part 1900 (OSHA General Industry)
11. CFR 29, Part 1926 (OSHA Construction)
12. University of California, Irvine, Environmental Health and Safety Laboratory Manual
13. U.S. Insurance Group, Safety Engineering Standards

## **EVALUATION PROCEDURE FOR UPDATES ON THIS PLAN**

The Safety & Risk Manager will keep annual records of accidents and emergencies, near misses, safety violations, and any complaints or suggestions regarding campus safety. All completed DA 2000 forms will be kept by the Director of Human Resources.

The Safety & Risk Manager will compile data on distribution of safety materials, implementation of safety procedures, and display of appropriate safety signage in classrooms and laboratories.

There will be an annual survey of students, faculty, and staff to assess their perception of their exposure to campus safety information and of the safety of the campus. This survey will be part of a larger survey to gather information on satisfaction with various aspects of the campus. This survey will be conducted by the Office of Institutional Research. Survey data pertinent to campus safety will be given to the Safety & Risk Manager.

There will be unscheduled safety inspections throughout the campus. These inspections will be conducted by the Safety & Risk Manager or his/her designee. Documentation on the results of these inspections will be kept by the Safety & Risk Manager.

Periodic drills (e.g., fire drills) will be held to assess emergency response procedures. The Safety & Risk Manager will compile data on the response to these drills.

The Safety & Risk Manager will prepare annually a report of all data collected relative to assessment of campus safety. There will be an annual meeting of the campus safety committee to review these data and to propose changes in the campus safety plan and procedures accordingly. The committee will produce a report on how the assessment data were used to correct problems with campus safety.