



SAFETY MANUAL

Overview

It is the policy of Laredo College to provide a safe and healthy working and learning environment for all faculty, students, employees, visitors, and contract employees.

This manual has been prepared by the Office of Safety and Risk Management in an effort to prevent injuries, illnesses, and death from work related causes and to minimize losses of material resources and interruptions from accidental occurrences. It is directed toward the control of all types of hazards encountered in the performance of official duties.

The purpose of the Safety Manual is to provide employees with general guidelines for implementing a high-quality safety program. It is not an exhaustive source document but rather an approach to safety.

The manual brings together information that will assist employees and supervisors to carry out their responsibility in ensuring a safe environment at Laredo College.

All personnel should become familiar with the information contained in this manual and should conduct their operations accordingly.

Record of Changes and Annual Review

According to the dates below, this Safety Manual has been reviewed and/or updated. This Record of Changes and Annual Review identifies only significant changes made to this Laredo College Safety Manual as part of the review process. If no significant changes were made, the phrase “Annual Review Conducted” has been placed in the Summary of Significant Changes and Annual Review column.

Change Number	Date of Change	Name of Person and Title	Summary of Significant Changes and Annual Review
1	May 2024	Casandra Salinas, Safety & Risk Manager	Development of the Safety Manual
2	June 2024	Dr. Arreazola, VP of Compliance & Risk Management	Review Conducted
3	June 2024	Selinda Martinez, Natural Science Department Chair	Review Conducted
4	June 2024	Alfredo Garcia, Automotive Department Chair	Review Conducted
5	July 2024	Jose Tijerina, Interim Director of Plant Operations and Maintenance	Review Conducted
6	July 2024	Dr. Alfonso Hinojosa, Engineering, Design, and Construction Management Technology Director	Review Conducted
7			Approved and Adopted

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1. Introduction

1.1. The Office of Safety and Risk Management

The Office of Safety and Risk Management is responsible for managing safety and health programs for Laredo College. The overall objective is to maximize the safety and health of employees, students and visitors.

Programs and services provided by the Office of Safety and Risk Management include the following:

- Develop policies and/or protocols concerning safety, health and environmental,
- Disseminate information concerning safety regulations, policies, and protocols,
- Submit reports and other required documentation to pertinent state and federal agencies,
- Assist with emergency preparedness planning for major disasters and coordinate plans with stakeholders,
- Evaluate facilities to maintain safe work environments,
- Ensure safety equipment such as fire extinguishers and fume hoods are inspected/tested,
- Report results of evaluations, tests, etc., along with recommended corrective measures to appropriate personnel for action,
- Ensure proper disposal of hazardous waste,
- Participate in safety committees,
- Review construction plans for compliance with codes and standards,
- Evaluate injury reports for accident trends and perform investigations as appropriate,
- Maintain a library of reliant safety trainings and nationally recognized codes and standards, and
- Maintain Safety Data Sheets (SDS) as an information resource on hazardous materials.

1.2. Administration

The Laredo College Administration is responsible for the following:

- Providing resources required for a safe work environment,
- Reviewing and approving health and safety policies and protocols,
- Making “working safely” a condition of employment, and
- Reporting accidents/incidents, and unsafe practices or conditions.

1.3. Directors, Department Heads and Supervisors

Directors, Department Heads and Supervisors are responsible for the following:

- Promoting safety and loss prevention,
- Eliminating or controlling occupational hazards,
- Periodically conducting safety and loss control evaluations,
- Ensuring that employees are adequately trained in safety policies and protocols,
- Ensuring that employees are provided with appropriate personal protective clothing and equipment for safe job performance,
- Perform accident/incident investigations, as necessary, and
- Reporting accidents/incidents, and unsafe practices or conditions.

1.4. Faculty, Staff and Students

Faculty, staff, and students are responsible for the following:

- Performing their duties/assignments in the safest prescribed manner,
- Reporting accidents/incidents, and unsafe practices or conditions, and
- Complying with health and safety policies and protocols.

2. General Safety

2.1. Accident Reporting

An accident is an unplanned occurrence that may result in damage to people, property, equipment, or the environment. When accidents are reported promptly, injured employees, students, and visitors receive timely medical care and unsafe conditions receive prompt corrective action. Safety and Risk Management investigates accidents to identify trends, determine the effectiveness of current safety practices and prevent future accidents.

2.1.1. Reporting Injury/Illness

Report all workplace injury and illness to your supervisor immediately.

Supervisor will advise Safety and Risk Management or Campus Police, as appropriate.

In order to efficiently document and process a workplace injury or illness, completion of the [Incident Report and the Workers Compensation First Report of Injury](#) must be filed within 24 hours.

2.1.2. Reporting Hazards

Report all hazards to the Office of Safety and Risk Management (i.e., unsafe conditions, potentially hazardous situations, slip and trip hazards). Safety and Risk Management will then coordinate with appropriate offices.

To report a hazard, click [here](#).

2.2. Americans with Disabilities Act (ADA)

Within the standards required by the ADA, Laredo College makes reasonable accommodations for persons with disabilities so that they may more fully participate in programs and the benefits of employment. Safety is an important consideration in providing accommodations.

Elevators, automated door openers, lifts, ramps, etc., facilitate access. Sometimes this equipment becomes damaged or does not function properly. Please promptly notify supervisor who will contact Physical Plant for equipment repair.

Handicap parking, sidewalks, wheelchair ramps, and building entrance areas may become blocked or congested with illegally parked bicycles, vehicles, or campus construction. Please contact Campus Police to report bicycle or vehicle related safety concerns.

Many classrooms are equipped with wheelchair accessible desks or tables, sometimes with chairs that can be removed or replaced as needed. Wheelchairs or removable chairs that block aisles and exits create an unacceptable hazard. Please report instances to the person presenting the class.

Braille signage assists persons with visual disabilities locate elevators, stairs, exits, classrooms, laboratories, restrooms, etc. The absence of signage could pose a safety issue if a person is not able to locate a specific area, e.g., an emergency exit, or inadvertently enters an inappropriate area. Notify Safety and Risk Management.

Building evacuation plans should incorporate procedures for assisting persons with mobility disabilities or impairments to safely vacate the facility. The procedures should be communicated among the personnel in the building assigned with emergency response duties. Contact Safety and Risk Management or Campus Police for advice in emergency preparedness.

2.3. Asbestos

Asbestos is a mineral fiber that causes cancer and various respiratory illnesses. Older buildings constructed prior to 1980 may contain asbestos. Asbestos is commonly found in older appliances, insulation, shingles, siding, putties, and caulking. Generally, it is not a problem unless the material that contains it crumbles or flakes.

The Texas Asbestos Health Protection Rules do not require building owners to conduct inspections and identify all asbestos locations. Inspections are required, however, prior to renovation or dismantling activities.

2.3.1. Prior to performing work

Contact Safety and Risk Management prior to performing work on campus that will disturb building fixtures, walls, or ceiling (e.g., installing computer cables in the ceiling). Safety and Risk Management will help ensure that the work does not affect asbestos containing materials. Do not handle asbestos or suspected asbestos or try to remove it yourself.

Safety and Risk Management will handle contracts for consultation and/or abatement.

2.4. Lead Paint

According to the Centers for Disease Control, lead poisoning is a leading environmental health risk. Lead accumulation in a person's system may lead to fatigue, sudden behavioral change, abdominal pain, anorexia, chronic headaches, joint aches, depression, anemia, impotence, and severe fetal damage in unborn infants.

Assume buildings that were constructed or painted prior to 1978 may contain lead paint. Because common sources of lead exposure include ingestion (lead paint) or inhalation (lead-containing dust), it is important to identify all areas that contain lead paint. If lead paint flakes or chips, it must be encapsulated or removed by qualified persons.

2.4.1. Prior to performing work

Contact Safety and Risk Management prior to performing work on campus. Safety and Risk Management will contract lead testing services before renovation on older buildings.

Contact Safety and Risk Management if you have any questions about lead paint hazards.

2.5. Transportation Management

All employees who are assigned to duties that require the operation of a vehicle or a slow moving, which includes a gator, mule, golf cart or similar vehicle for College District business must be deemed eligible by the Texas Department of Public Safety. This includes driving a College District vehicle or operating a rented or personal vehicle for the purpose of conducting College District business. Employees must hold a valid driver's license appropriate for the vehicle to be driven. A driver of a commercial motor vehicle must have a commercial driver's license. Laredo College Safety and Risk Management Office manages the approved driver list. Driver eligibility will be reviewed annually.

While driving on College District business, employees are required to abide by all applicable laws, rules, regulations, ordinances, policies, and procedures. Employees driving on College District business are prohibited from texting and using other electronic devices that require both visual and manual attention while the vehicle is in motion.

Employees are responsible for any penalties and fines resulting from the violation of applicable laws, rules, or regulations related to the operation of a vehicle on College District business. Employees are subject to disciplinary action for violation of laws or policies related to the operation of a vehicle on College District business, including but not limited to, remedial training, suspension of driving privileges, or termination of employment.

The driver shall ensure that the number of passengers does not exceed the designed capacity of the vehicle and that each passenger is secured by a safety belt, if provided.

A driver shall not drive for more than four consecutive hours without taking a 15-minute break or relief from driving.

The Board shall authorize travel to foreign countries, except Mexico, by majority vote. The College President shall authorize travel out-of-state and to Mexico. College District executive officers shall authorize in-state travel.

2.6. Lifting

All employees must use proper lifting techniques to avoid injury when lifting heavy objects. In general, employees should seek assistance when lifting objects that weigh 50 pounds or more. Determine if you need assistance, a dolly, back support belt, or other tool to safely lift an object.

The back supports the weight of the entire upper body. When you lift objects or move heavy loads, your back has to support even more weight. If you exceed your body's natural limits, your back cannot support both your body and the extra load. The excess, unsupported pressure is transferred to the lower back, where injury is imminent. By using the muscles in your arms and legs and exercising proper lifting techniques, you can move loads safely and protect your back from possible injury.

When lifting heavy objects, follow these steps:

2.6.1. Size Up the Load

Always assess the object before lifting. Make sure the load is stable and balanced. Carefully and slowly put force against the object to determine its weight. If its too heavy, get help.

2.6.2. Plan the Job

Plan a route that is free of tripping and slipping hazards. Ensure that the planned route allows for easy travel. Know where the object will be unloaded and plan for rest stops if necessary. Think through the lift - lift the load in your mind. Face the object you are about to lift and, if possible, face the direction you want to go. Do not twist your body.

2.6.3. Establish Base of Support

Make sure you have firm footing. Keep your feet at least shoulder-width apart. A staggered stance, with one foot slightly behind the other, often helps provide a firm base of support.

2.6.4. Bend your knees

Bend at your knees, not at your waist. Bend down as far as necessary using your legs and not your back.

2.6.5. Get a good grip

Grip the load firmly, using more than just your fingers.

2.6.6. Keep the load close

Keep the load close to your body. The closer it is to your spine, the less force it exerts on your back. Maintain the natural inward curve of your lower back. Keep your back upright. Whether you are lifting or putting down a load, do not add the weight of your body to the load. Grasp the object with your palm, not just your fingers.

2.6.7. Lift with your legs

Lift with your legs to allow your body's powerful leg muscles to do the work. Flex your knees and hips. Avoid bending at the waist.

2.6.8. Pivot, don't twist

Don't twist your body when moving objects that have already been lifted. Pivot your feet and turn your entire body in that direction of movement.

2.7. Slips and Falls

Employees should always follow good housekeeping practices and pay attention to their environment to avoid slips and falls. In addition, employees should follow these guidelines:

- Turn on office lights,

- Avoid horseplay,
- Avoid unnecessary haste,
- Use ladders or step-stools to reach high places,
- Remove items that may pose a potential slipping hazard,
- Clean up spills as soon as they occur,
- Never obstruct your view when walking,
- Do not wear clothing that is too long or shoes that have slippery heels or soles,
- No sandals,
- Hold the handrail when using stairs,
- Be careful when walking on wet surfaces or when entering a building while wearing wet shoes,
- Report uneven surfaces,

2.8. Smoking

To promote a safe, healthful, and pleasant environment for employees, students, and visitors, Laredo College has instituted a smoke-free policy.

All district facilities, buildings, and vehicles, regardless of location, are entirely smoke-free. This includes all foyers, entryways, classrooms, restrooms, offices, athletic facilities (indoor and outdoor), eating areas, and district-owned/leased housing.

2.9. Housekeeping

Good housekeeping skills are essential for personal safety. Laredo College employees are responsible for reducing potential hazards and keeping their work areas safe and clutter-free. Good housekeeping guidelines include keeping aisles and stairways free from clutter, cleaning spills, minimizing combustibles in workplace and storage areas, and keeping all exits free from obstructions.

Maintain clear and unobstructed access to emergency equipment, such as fire extinguishers, pull stations, eye wash units, showers, etc.

2.10. Indoor Air Quality

Indoor air quality refers to the condition of air within an enclosed workplace. The indoor environment of any building is based on several factors including location, climate, building design, construction techniques, building occupant load, and contaminants.

Outside sources for indoor air contaminants include pollen, dust, mold, industrial pollutants, vehicle exhaust, and unsanitary debris near outdoor air intake vents. Other outdoor agents, such as underground storage tanks or landfills, may also affect indoor air quality.

Indoor contaminants include dust, dirt or microbial growth in ventilation systems, emissions from office equipment, and fumes or odors from any source.

Laredo College follows guidelines for new building ventilation systems and air quality control; however, employees are also responsible for the quality of their indoor air. Because indoor air often contains a variety of contaminants at levels far below most exposure standards, it is difficult to link specific health problems with known pollutants. Employees must minimize all contaminants to reduce the low-level pollutant mixtures that commonly cause health problems.

The following practices will help ensure optimum indoor air quality:

- Report leaks, drips and or unusual odors
- Keep laboratory doors closed,
- Do not block air ducts to control the temperature in your office,

- Keep chemicals properly stored in designated areas, and
- Air plug-in are prohibited.

2.11. Appropriate Attire

Appropriate attire plays a pivotal role in safeguarding employees and minimizing risks. Whether it's protective gear for construction workers, fire-resistant clothing for industrial settings, or chemical-resistant suits for laboratory personnel, safety attire serves several critical purposes. Open toe shoes, such as sandals are discouraged due to the lack of proper foot protection.

3. Office Safety

A large percentage of workplace accidents and injuries occur in office buildings. Common causes of office accidents include the following:

- Slipping, tripping, and falling hazards,
- Cutting and pinching hazards,
- Improper lifting and handling techniques,
- Unobservant and inattentive employees,
- Improper office layout and arrangement, and
- Horseplay.

3.1. Housekeeping Practices

Many office accidents are caused by poor housekeeping practices. By keeping the office floor both neat and clean, you can eliminate most slipping, tripping, and falling hazards. Other good housekeeping practices include the following:

- Ensure that office lighting is adequate and available and report burned out light bulbs,
- Ensure that electrical cords and phone cords do not cross walkways or otherwise pose a tripping hazard,
- Report or repair tripping hazards such as defective tiles, boards, or carpet immediately,
- Keep area clear of unnecessary clutter,
- Clean spills and pick up fallen debris immediately,
- Keep office equipment, facilities, and machines in good condition, and
- Store items in an approved storage space while ensuring that boxes aren't placed too high or too tight

3.2. Hazardous Materials

Hazardous chemicals and materials should not be stored in the general office. Hazardous materials include, but are not limited to, the following:

- Carcinogens,
- Combustibles,
- Flammables,
- Gas cylinders,
- Irritants,
- Oxidizers, and
- Reactives.

3.3. Cuts and Punctures

Cuts and punctures happen when people use everyday office supplies without exercising care. Follow these guidelines to help reduce the chance for cuts and punctures:

- Use caution when handling kitchen knives, scissors, staplers, letter openers, paper cutters and box openers,
- Avoid picking up broken glass with your bare hands, and
- Place used blades or broken glass in a rigid container, such as a box, before disposing in a wastebasket.

3.4. Slips, Trips and Falls

As outlined in the General Safety chapter of this manual, the easiest way to avoid slips and falls is to pay attention to your surroundings and to avoid running or rushing. To ensure safety for others in the office follow these guidelines:

- Arrange office furnishings in a manner that provides unobstructed areas for movement,
- Keep stairs, steps, flooring, and carpeting well maintained,
- Clearly mark any difference in floor level that could cause an accident,
- Secure throw rugs and mats to prevent slipping hazards,
- Do not place wastebaskets or other objects in walkways, and
- Always pay attention and be aware of your surroundings.

3.5. Preventing Stress

To reduce stress and prevent fatigue, it is important to stretch your arms, neck, and legs often if you do the same type of work for long periods of time.

3.5.1. Head and Neck Stretch

Slowly turn your head to the left, and hold it for three seconds. Slowly turn your head to the right, and hold it for three seconds. Drop your chin gently towards your chest, and then tilt it back as far as you can. Repeat these steps five to ten times.

3.5.2. Shoulder Roll

Roll your shoulders forward and then backward using a circular motion. Repeat in each direction five to ten times.

3.5.3. Upper Back Stretch

Grasp one arm below the elbow and pull gently towards the other shoulder. Hold this position for five seconds and then repeat with the other arm.

3.5.4. Wrist Wave

With your arms extended in front of you, raise and lower your hands several times.

3.5.5. Finger Stretch

Make fists with your hands and hold tight for one second, then spread your fingers wide for five seconds.

3.6. Equipment and Furniture Safety

Common office machines may require special safety consideration. If there is ever any question of how to properly use a piece of equipment or furniture, always refer to the manufacturer's guidelines for further instruction. If you notice a piece of equipment is damaged or working improperly, un-plug the machine, do not use the damaged equipment, and refer to manufacturer's guidelines. All equipment should only be repaired by a certified repair person.

Additional office equipment that may require safety consideration includes furniture such as file cabinets and shelves, desks, and chairs.

3.6.1. File Cabinets

Follow these safety guidelines for file cabinets:

- Ensure that file cabinet drawers cannot easily be pulled clear of the cabinet,
- Do not block ventilation grates with file cabinets,

- Open only one drawer at a time to keep the cabinet from toppling,
- Close drawers when they are not in use,
- Do not place heavy objects on top of cabinets,
- Close drawers slowly using the handle to avoid pinched fingers, and
- Keep the bottom drawer full to help stabilize the entire cabinet.

3.6.2. Shelves

Follow these safety guidelines for shelves:

- Secure shelves by attaching them to the floor or wall,
- Place heavy objects on the bottom shelves to help keep the entire structure more stable,
- Ensure that there is at least 18 inches between the top shelf items and the ceiling to allow ceiling sprinklers to function properly if a fire occurs,
- Do not block ventilation grates with shelves, and
- Never climb on shelves.

3.6.3. Desk

Follow these safety guidelines for office desks:

- Keep desks in good condition,
- Ensure that desks do not block exits or passageways,
- Ensure that glass-top desks do not have sharp edges,
- Ensure that desks with spring-loaded tables function properly,
- Ensure that desk cables are in good working conditions,
- Do not climb on desks,
- Keep desk drawers closed when not in use, and
- Repair or report any desk damage that could be hazardous.

3.6.4. Chairs

Follow these Safety guidelines for office chairs:

- Do not lean back in office chairs, particularly swivel chairs with rollers,
- Do not climb on any office chair,
- Office desk chairs should have adjustable back supports and seat height,
- Take care when sitting in a chair with rollers,
- Do not roll chairs over electrical cords, and
- Repair or report any chair damage that could be hazardous.

3.6.5. Ladders and Stepstools

Always use an approved ladder or stool to reach any item above your extended arm height. Never use a makeshift device, such as a chair, desktop, file cabinet, bookshelf, or box, as a substitute for a ladder.

Follow these guidelines when using ladders:

- Do not load a ladder above its intended weight capacity,
- Place ladders on slip-free surfaces even if they have slip-resistant feet,
- Secure the ladder if a slip-free surface is not available,
- Secure a ladder if its location could cause an accident,
- Keep areas around ladders clean and free of debris,
- Do not use a ladder in front of a door unless the door is locked and barricaded.

3.7. Work Station Arrangement

With the extensive use of computers and other automated desk devices in the workplace, employees must take special care to ensure proper work station arrangement. For the purpose of this manual, a work station consists of the equipment and furniture associated with a typical desk job (i.e., desk, chair, and computer components).

In recent years, computer screens or Video Display Terminals (VDTs) have received much attention concerning non-ionizing radiation levels. Tests prove, however, that VDTs do not emit harmful levels of radiation. Improper work station arrangement combined with repetitive motion, however, may contribute to visual and musculoskeletal fatigue.

Cumulative trauma disorders, such as carpal tunnel syndrome may result from the stress of repetitive motion. Therefore, it is very important to arrange your work station properly. Ergonomic surveys/reviews of the work station arrangement can be requested from Human Resources.

3.8. Equipment Arrangement

By properly arranging your equipment, you can also help reduce the harmful effects of repetitive motion. Follow these guidelines for arranging office equipment:

- **Lighting:** Lighting around computer work stations should illuminate the work area without obscuring the VDT or causing glare. Position computer screens, draperies, blinds, and pictures to reduce glare during work hours.
- **VDT Screen:** VDT images should be clear and well- defined. Adjust the screen's brightness, contrast and display size to meet your needs.
- **Keyboards:** Position computer keyboards so that the angle between the forearm and upper arm is between 80 and 120 degrees. Place the keyboard in an area that is accessible and comfortable.
- **Wrist Support:** Use wrist supports made of padded material. The support should allow you to type without bending your wrists.
- **Document Holders:** Keep documents at approximately the same height and distance from your face as the VDT screen.
- **Telephones:** Neck tension is a common problem caused by holding the telephone between the head and neck. Use a headset or speakerphone if you use the telephone for extended periods of time.

Contact Safety and Risk Management if you have any questions regarding your work station arrangement.

3.9. Desk Work Habits

Proper desk work habits are important to your comfort and safety. To reduce the painful effects of repetitive motion, follow these guidelines when working with computers:

- Use proper sitting posture. Keep your back against the back of a supportive chair and your feet on the floor. Adjust the chair height and use a footrest if your feet do not reach the floor comfortably.
- Keep your chair close to your desk. Don't hunch over your work.
- To reach something off to one side, turn your whole body rather than twisting at the waist.
- Don't sit for long periods without getting up and walking around periodically.
- When using the telephone, don't cradle it in your neck. Telephone operators and other heavy telephone users should consider using a headset.

3.10. Fire and Life Safety

Fire and life safety at Laredo College is governed by federal, state and local, standards including System Regulations and District Rules and Districts Standard Administrative Procedures. Ultimate jurisdiction for fire safety lies with the Texas State Fire Marshal and with the local Authority Having Jurisdiction (AHJ) as designated by the President of Laredo College. The President has designated the Director of Safety & Risk to be responsible for the day to day fire

prevention, inspection, and program oversight. However, each and every individual, whether faculty, staff, student, or visitor on our campus shares a role in fire safety. For more information, refer to the Fire and Life Safety section.

4. General Shop Safety

The hazards associated with shop work require special safety considerations. Whether you work in a metal shop, wood shop, automotive shop, glass shop, or electrical shop, the potential hazards for personal injury are numerous. This chapter highlights essential safety information for working in a Laredo College shop.

4.1. Job Safety

Before beginning work in a shop, be sure you are authorized to perform the work to be done and inspect your tools and equipment. If a procedure is potentially hazardous to others in the area, warn fellow workers accordingly. Use warning signs or barriers, as necessary. Notify your supervisor if you notice any unsafe conditions such as the following:

- Defective tools or equipment,
- Improperly guarded machines,
- Oil, gas, or other leaks, and
- Any other condition that you feel may jeopardize you or your co-worker's safety.

Inform other employees if you see an unsafe work practice; however, be careful not to distract a person who is working with power tools.

Safety and Risk Management periodically inspects all Laredo College shops. Refer any questions regarding shop safety to Safety and Risk Management.

4.2. Personal Protection

There are several measures you must take to protect yourself from shop hazards. For example, do not wear loose fitting clothing, neckties, jewelry and long loose hair when working around machinery. If you must wear a long-sleeved shirt, be sure the sleeves are rolled down and buttoned. Snug fitting clothes and closed toe shoes are essential safety equipment in the shop.

4.2.1. Safety Glasses

Always wear safety glasses with side shields when working with shop equipment. Additional protection using goggles or face shields may be necessary for the following types of work:

- Grinding, chipping, sandblasting,
- Welding, and
- Glass working.

4.2.2. Hard Hats

Wear approved hard hats whenever there is a chance of objects falling from above.

4.2.3. Gloves

In addition, wear suitable gloves for the job at hand when working with the following:

- Scrap metal or wood,
- Sharp-edged stock, and
- Unfinished lumber.

Refer to the Personal Protective Equipment chapter in this manual for more information.

4.3. Hand Tools

Hand tools are non-powered tools. They include axes, wrenches, hammers, chisels, screw drivers, and other hand-operated mechanisms. Even though hand tool injuries tend to be less severe than power tool injuries, hand tool injuries are more common. Because people take everyday hand tools for granted, they forget to follow simple precautions for safety. The most common hand tool accidents are caused by the following:

- Failure to use the right tool,
- Failure to use a tool correctly,
- Failure to keep edged tools sharp,
- Failure to replace or repair a defective tool, and
- Failure to store tools safely.

Use the right tool to complete the job safely. Follow these guidelines for general hand tool safety:

- Wear safety glasses whenever you hammer or cut, especially when working with surfaces that chip or splinter.
- Do not use a screwdriver as a chisel.
- Do not use a chisel as a screwdriver.
- Do not use a knife as a screwdriver.
- Never carry a screwdriver or chisel in your pocket. If you fall, the tool could cause a serious injury. Instead, use a tool belt holder or tool box.
- Replace loose, splintered, or cracked handles.
- Loose hammer, axe, or maul heads can fly off defective handles.
- Use the proper wrench to tighten or loosen nuts.
- When using a chisel, always chip or cut away from yourself. Use a soft-headed hammer or mallet to strike a wooden chisel handle. A metal hammer or mallet may cause the handle to split.
- Do not use a wrench if the jaws are sprung.
- Do not use impact tools, such as chisels, wedges, or drift pins, if their heads are mushroom shaped. The heads may shatter upon impact.
- Direct saw blades, knives, and other tools away from aisle areas and other employees.
- Keep knives and scissors sharp. Dull tools are more dangerous than sharp tools.
- Iron or steel hand tools may cause sparks and be hazardous around flammable substances. Use spark-resistant tools made from brass, plastic, aluminum, or wood when working around flammable hazards.

Improper tool storage is responsible for many shop accidents. Follow these guidelines to ensure proper tool storage:

- Have a specific place for each tool.
- Do not place unguarded cutting tools in a drawer. Many hand injuries are caused by rummaging through drawers that contain a jumbled assortment of sharp-edged tools.
- Store knives or chisels in their scabbards.
- Hang saws with the blades away from someone's reach.
- Provide sturdy hooks to hang most tools on.
- Rack heavy tools, such as axes and sledges, with the heavy end down.

4.4. Power Tools

Power tools can be extremely dangerous if they are used improperly. Each year, thousands of people are injured or killed by power tool accidents. Common accidents associated with power tools include abrasions, cuts, lacerations, amputations, burns, electrocution, and broken bones. These accidents are often caused by the following:

- Touching the cutting, drilling, or grinding components

- Getting caught in moving parts
- Suffering electrical shock due to improper grounding, equipment defects, or operator misuse
- Being struck by particles that normally eject during operation
- Touching hot tools or work pieces
- Falling in the work area
- Being struck by falling tools

When working around power tools, you must wear personal protective equipment and avoid wearing loose clothing or jewelry that could catch in moving machinery. In addition to general shop guidelines, follow these guidelines for working with power tools:

- Use the correct tool for the job.
- Select the correct bit, blade, cutter, or grinder wheel for the material at hand. This precaution will reduce the chance for an accident and improve the quality of your work.
- Keep all guards in place. Cover exposed belts, pulleys, gears, and shafts that could cause injury.
- Always operate tools at the correct speed for the job at hand. Working too slowly can cause an accident just as easily as working too fast.
- Watch your work when operating power tools. Stop working if something distracts you.
- Do not rely on strength to perform an operation. The correct tool, blade, and method should not require excessive strength. If undue force is necessary, you may be using the wrong tool or have a dull blade.
- Before clearing jams or blockages on power tools, disconnect from power source. Do not use your hand to clear jams or blockages, use an appropriate tool.
- Never reach over equipment while it is running.
- Never disable or tamper with safety releases or other automatic switches.
- When the chance for operator injury is great, use a push stick to move material through a machine.
- Disconnect power tools before performing maintenance or changing components.
- Keep a firm grip on portable power tools. These tools tend to "get away" from operators and can be difficult to control.
- Remove chuck keys or adjusting tools prior to operation.
- Keep bystanders away from moving machinery.
- Do not operate power tools when you are sick, fatigued, or taking strong medication.
- When possible, secure work pieces with a clamp or vise to free the hands and minimize the chance of injury. Use a jig for pieces that are unstable or do not lie flat.
- Inspect wiring and mechanisms before operating.
- All machinery repairs must be completed by a certified repair person.

4.5. Guards

Moving machine parts must be safeguarded to protect operators from serious injury. Belts, gears, shafts, pulleys, fly wheels, chains, and other moving parts must be guarded if there is a chance they could injure an employee. Hazardous areas that must be guarded include the following:

- Point of operation
- Area where the machine either cuts, bends, molds, or forms the material
- Pinch/nip point: Area where moving machine parts can trap, pinch, or crush body parts
- Sharp edges
- Stored potential energy

There are three types of barrier guards that protect people from moving machinery. They consist of the following:

- Fixed guards
- Interlocked guards
- Adjustable guards

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

4.6. Drill Press

Follow these safety guidelines when using drill presses:

- Securely fasten work materials to prevent spinning. Never use your hands to secure work materials.
- Use a center punch to score the material before drilling.
- Run the drill at the correct speed. Forcing or feeding too fast can break drill bits.
- Never attempt to loosen the chuck unless the power is off.
- Lower the spindle before removing a chuck.
- Never use a regular auger bit in a drill press.
- Frequently back the drill out of deep cuts to clean and cool the bit.

4.7. Grinder

Follow these safety guidelines when working with grinders:

- Ensure that no combustible or flammable materials are nearby that could be ignited by sparks from the grinder wheel.
- Ensure that a guard covers at least 270 degrees of the grinding wheel on bench-mounted machines.
- Place the grinder tool rest 1/8 inch from the wheel and slightly above the center line.
- Allow the grinder to reach full speed before stepping into the grinding position. Faulty wheels usually break at the start of an operation.
- Unless otherwise designed, grind on the face of the wheel.
- Use a vise-grip plier or clamp to hold small pieces.
- Slowly move work pieces across the face of wheel in a uniform manner. This will keep the wheel sound.
- Do not grind non-ferrous materials.
- Periodically check grinder wheels for soundness.
- Suspend the wheel on a string and tap it. If the wheel rings, it is probably sound.
- Replace wheels that are badly worn or cracked.
- Never use a wheel that has been dropped or received a heavy blow, even if there is no apparent damage.
- Before using a new wheel, let it run a few seconds at full speed to make sure it is balanced.

4.8. Nail/Air Gun

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

- Ensure that pneumatic tools which shoot nails, rivets, or staples are equipped with a device that keeps fasteners from ejecting unless the muzzle is pressed against a firm surface.
- Never point a tool at items you do not want to fasten.
- Keep your finger off the trigger until you are ready to begin work. Most pneumatic tools have a hair-trigger that requires little pressure to activate the gun.
- Treat air hoses with the same care as an electrical cord.

- Do not drive fasteners into hard, brittle surfaces or areas where the fastener may pass through the material and protrude on the other side.

4.9. Sander

Follow these safety guidelines for working with circular and belt sanders:

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

4.10. Saw

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

Follow these safety guidelines for working with band saws:

- Set the blade evenly with the proper amount of tension.
- Keep your hands on either side of the cut line. Never reach across the cut line for any reason.
- Do not stand to the right of the band saw.
- Be sure the radius of your cutting area is not too small for the saw blade.
- If you hear a rhythmic click, check the saw blade for cracks.

Follow these safety guidelines for working with circular saws:

- Do not raise the saw any higher than absolutely necessary.
- Fasten a clearance block to the fence when cutting off short pieces.
- Never attempt to clear away scraps with your fingers
- Do not cut thin tubular materials with a circular saw.
- Ensure that the fence is not in the cut line of the saw.
- Take care when working with warped or twisted lumber.

Follow these guidelines when working with a radial arm saw:

- Push the saw blade against the stop before turning on the power.
- Never place one piece of wood on top of another when using this saw. The top piece may kick over.
- This saw pulls itself into wooden materials. It may be necessary to hold the saw back to prevent it from choking.
- Never leave the saw hanging over the end of the arm.

Follow these guidelines when working with table saws:

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

4.11. Spray Paint Booth

When working with paint or painting equipment, it is important to have adequate ventilation and to avoid flames or other sources of ignition. Because most paints, varnishes, and thinners are flammable, spray paint jobs should be conducted in a well-ventilated enclosure such as a spray paint booth. Spray paint booths minimize toxic vapors and flammable fumes while providing adequate ventilation. Always wear personal protective equipment when working with paint. In addition, clean the booths, filters and ventilation ducts frequently to avoid heavy accumulations of paint, dust, and pigment.

4.12. Welding

Proper selection of personal protective equipment is very important when welding. Make sure your welding helmet visor is dark enough to provide adequate protection. Wear fireproof apron and gloves.

There are three types of welders:

- AC welders: These welders are used for standard welding procedures; AC welders are powered by an electrical cord.
- DC welders: These are portable welders that are commonly used in manholes. DC welders have their own power supply.
- Wire-feed welders: These welders use inert gas for light metal work (e.g., stainless steel, aluminum, etc.).

Common hazards associated with welding include the following:

- Electrocutation
- Burns
- UV radiation exposure
- Oxygen depletion
- Sparking

Follow these specific guidelines for safe welding operations:

- Make sure the welding area has a non-reflective, noncombustible surface.
- Ensure that adequate ventilation and exhaust are available.
- Be aware of electrocution hazards, particularly in damp conditions. Be sure that electrical cords are properly grounded. It is advisable for cords to pull down from an overhead pulley.

4.13. Cutting

Gas welding and cutting tools are often powered by oxygen or acetylene gas cylinders. These tanks require special safety precautions to prevent explosions and serious injuries. Follow the safety guidelines below, and refer to the Laboratory Safety chapter in this manual for more information on gas cylinders safety:

- Ensure that acetylene/oxygen systems are equipped with flame or flashback arrestors attached to the regulators.
- Store acetylene bottles upright and secured.
- Keep cylinder fittings and hoses free from oil and grease.
- Repair or replace defective hoses by splicing. Do not use tape.
- Do not tamper or attempt to repair cylinders, valves, or regulators.
- Do not interchange regulators or pressure gauges with other gas cylinders.
- Carefully purge hoses and torches before connecting a cylinder.
- Set acetylene pressure at or below 15 psig. Always use the minimum acceptable flow rate.
- Never use a match to light a torch. Use an approved lighter.

5. Art Studio Safety

The art supplies and chemicals associated with graphic media are often hazardous. Depending on the type of art supplies used, artists can develop the same types of occupational diseases as industrial workers. Studies show that people who work with hazardous graphic media chemicals improperly can develop a variety of ailments.

5.1. Personal Protective Equipment

Always follow these guidelines when working in an art studio:

- Face and Eye Protection: Use safety goggles or face shields to protect against splashes.
- Respiratory Protection: Wear masks or respirators when working with volatile organic compounds (VOCs) or spray paints.
- Hand Protection: Use chemical-resistant gloves.
- Body Protection: Wear coveralls or aprons made of non-sparking materials like cotton.
-

5.2. Safe Handling Practices

Always follow these guidelines when working in an art studio:

- Training: Provide regular training sessions on the safe handling of paints and solvents. Include information on the potential health hazards and emergency procedures.
- Supervision: Professors should supervise students to ensure compliance with safety protocols. Serve as role models by following all safety practices.

5.3. Emergency Procedures

Always follow these guidelines when working in an art studio:

- Spill Response: Have spill kits readily available. Train everyone on how to use them.
- First Aid: Ensure that first aid kits are accessible and stocked. Train students and staff on basic first aid procedures.
- Emergency Contacts: Post emergency contact numbers and procedures in visible locations.

5.4. General Safety Practices

- No Eating or Drinking: Prohibit eating, drinking, or smoking in the studio to prevent contamination⁵.
- Cleanliness: Maintain a clean workspace. Regularly clean surfaces and tools to prevent buildup of hazardous materials.
- Incident Reporting: Report all accidents, near misses, and potential chemical exposures to the studio manager or safety officer.

6. Laboratory Safety

Laboratory safety incorporates safety principles from a variety of areas, including fire and life safety, chemical safety, biological safety and radiation safety. The hazards encountered in a laboratory touch every field in safety and may be similar, although potentially greater in quantity or severity, to hazards encountered in the average home or work place.

Laboratory safety is overseen by Safety and Risk Management and the Natural Sciences Department. This groups work to ensure that safe practices are utilized and that state, national, and international safety standards or requirements are followed. This is accomplished through conducting laboratory inspections, testing of chemical fume hoods and other safety equipment, and providing general laboratory safety training.

This document contains information on the different hazards that may be found in laboratories - including chemical hazards, physical hazards, biological hazards and radiological hazards - and how to minimize the risks associated with those hazards. This manual also provides information on training requirements for laboratory personnel, how to protect oneself when working in a laboratory, and how to plan for an emergency situation in the laboratory.

6.1. Biological Safety

Biological safety, also known as biosafety, is an important part of clinical and laboratory activities that provides a structured approach to minimizing infectious, chemical, and physical risks in clinical and laboratory settings by implementing control mitigation strategies.

Guidance documents, requirements, and training sessions are offered and should be consulted when employees work with or have the potential to come in contact with biohazardous materials.

Biohazardous materials are potentially hazardous biological agents and include the following:

- Etiologic agents which may cause disease in humans, animals or plants (including bacterial, fungal, parasitic, rickettsia, viral, and prion disease agents)
- Human body fluids or tissues (e.g. bloodborne pathogens) including human cell culture (primary or continuous)
- Agents and molecules involved with recombinant DNA biotechnology and genetic manipulation (including recombinant / transgenic agents including plants, animals, as well as pathogenic and non-pathogenic microorganism (eukaryotic and prokaryotic)
- Animals infected with zoonoses
- Items contaminated with etiologic agents or human body fluids or tissues.

Always follow these guidelines when working with biohazardous materials:

- Never store food or drink or personal items in the laboratory. Eating, drinking, chewing gum, smoking, mobile phone use, putting on contact lenses or applying cosmetics are strictly forbidden in the laboratory.
- Never put anything in your mouth while inside the laboratory.
- Thoroughly wash your hands (if water and soap are not available, use a hand sanitizer with at least 60% alcohol content), after handling any biological material, before leaving the laboratory or any time contamination is known or suspected on your hands.
- Ensure that open flames or heat sources are never placed near flammable supplies and are never left unattended.
- Ensure that waterproof coverings are placed over any cuts or broken skin prior to entering the laboratory.
- Ensure that supplies of laboratory equipment and consumables, including reagents, PPE and disinfectants, are sufficient and appropriate for the activities being performed.
- Ensure that supplies are stored appropriately (according to storage instructions) and safely to reduce the chance of accidents and incidents such as spills, trips or falls.
- Ensure proper labelling of all biological agents, chemical and radioactive materials.
- Avoid removing documents from the laboratory to other areas. If unavoidable, written documents can be protected from contamination using barriers (such as plastic coverings), so that they can be cleaned and decontaminated before being removed from the laboratory

6.2. Chemical Safety

Chemical Safety is inherently linked to other safety issues including engineering controls, laboratory procedures, personal protective equipment, electrical safety, fire safety, and hazardous waste disposal. Many chemicals have properties that make them hazardous: they can represent physical hazards (fire, explosion) and/or health hazards (toxicity, chemical burns, and dangerous fumes). However, there are many ways to work with chemicals which can both reduce the probability of an accident and minimize the consequences should an accident occur.

6.3. Hazard Communication

An integral part of hazard communication is hazards identification. Everyone who works with hazardous chemicals should know how to read and interpret hazard information. Signs, labels, placards, and symbols alert employees to the known hazards in a particular location.

The National Fire Protection Association (NFPA) uses a scale of 0 – 4 to rate each hazard, with 0 indicating “no hazard” and 4 indicating the most extreme hazard.

Many chemicals fall under more than one hazard class. Extra care should be taken when handling or storing chemicals with multiple hazards.

Other labeling systems may also be used. For instance, the Department of Transportation (DOT) has a labeling system for the shipment of hazardous materials. Examples of DOT placards are shown within the text of this chapter.

6.4. Chemical Safety

Always follow these guidelines when working with chemicals:

- Assume that any unfamiliar chemical is hazardous and treat it as such.
- Know all the hazards of the chemicals with which you work. For example, perchloric acid is a corrosive, an oxidizer, and a reactive. Benzene is an irritant that is also flammable, toxic, and carcinogenic.
- Never underestimate the potential hazard of any chemical or combination of chemicals. Consider any mixture or reaction product to be at least as hazardous as – if not more hazardous than – its most hazardous component.
- Never use any substance that is not properly labeled. It may not be what you think it is!
- Date all chemicals when they are received and again when they are opened.
- Follow all chemical safety instructions, such as those listed in Safety Data Sheets or on chemical container labels, precisely.
- Minimize your exposure to any chemical, regardless of its hazard rating, and avoid repeated exposure.
- Use personal protective equipment (PPE), as appropriate for that chemical.
- Use the buddy system when working with hazardous chemicals. Don't work in the laboratory alone.

6.5. Safety Data Sheets

Before using any chemical, read the appropriate Safety Data Sheet (SDS). An SDS is a document that details information about chemicals and along with the container label is a good source of information for chemical safety. It provides the following information:

- Identity of the chemical
- The manufacturer's name and address
- Hazardous ingredients
- Exposure limits
- Physical characteristics
- Routes of Entry
- Emergency and first-aid procedures
- Proper leak, spill, and disposal techniques
- Proper storage and handling procedures and other special provisions

Each person working with chemicals should have access to the SDS for all chemicals they use. “Access” may be:

- A current hard copy kept in a work area file or binder.
- An electronic copy.

6.6. Safe Handling Guidelines

Employees should treat all chemicals and equipment with caution and respect. When working with chemicals, remember to do the following:

- Wear appropriate personal protective equipment (PPE) for the chemical hazard.
- Remove and use only the amount of chemicals needed for the immediate job at hand.
- Properly seal, label, and store chemicals in appropriate containers. Keep the containers clearly marked and in a well-ventilated area.
- Segregate and store chemicals by their hazard class.
- Check stored chemicals for deterioration and for damage to the containers.
- Learn how to dispose of chemicals safely and legally. Follow Laredo College waste disposal requirements.
- Clean up spills and leaks immediately.
- Develop a Plan of Action for how to respond in an emergency. Review this plan regularly to be familiar with it.
- Do not store chemicals near heat, in sunlight, or near substances which might initiate a dangerous reaction.
- When transporting chemicals between the work area and other areas, use secondary containment (such as a tray, rack, cart or rubber carrier) to protect against spills, leaks or container breakage. Always use a secondary container when transporting hazardous or highly odorous chemicals on an elevator.
- Never pour any chemicals down the sink. Use proper hazardous waste disposal procedures for all excess or unused chemicals.

6.7. Chemical Storage

Proper chemical storage is as important to safety as proper chemical handling. Often, seemingly logical storage ideas, such as placing chemicals in alphabetical order, may cause incompatible chemicals to be stored together.

Follow these guidelines for safe chemical storage:

- Read chemical labels and the SDS for specific storage instructions.
- Store chemicals in a well-ventilated area; however, do not store chemicals in a fume hood.
- Date all chemicals when they are received and again when they are opened.
- Maintain an inventory of all chemicals in storage. A copy of the inventory should be maintained at a location outside of the laboratory.
- Return chemical containers to their proper storage location after use.
- Store glass chemical containers so that they are unlikely to be broken. Glass containers should never be stored directly on the floor.
- Store all hazardous liquid chemicals below eye level of the shortest person working in the laboratory.
- Never store hazardous chemicals in a public area or corridor. Hazardous chemicals must be kept in a secured area.

6.7.1. Separating Hazardous Chemicals

In addition to the guidelines above, there are storage requirements for separating hazardous chemicals. Follow these guidelines to ensure that hazardous chemicals are stored safely:

- Group chemicals according to their hazard category (i.e., corrosives, flammables, toxins, etc.), not alphabetically, and separated by some sort of physical barrier. An alphabetical storage system may place incompatible chemicals next to each other.
- Separate acids from bases and inorganic acids or bases from organic acids or bases. Store these chemicals near floor level.
- Isolate perchloric acid from all other chemicals and from organic materials. Do not store perchloric acid on a wooden shelf or spill paper.

- Separate highly toxic chemicals and carcinogens from all other chemicals. This storage location should have a warning label and should be locked.
- Time-sensitive chemicals, such as those that form peroxides, should not be kept longer than twelve months from purchase or six months after opening. If stratification of liquids, precipitate formation, and/or change in color or texture is noted, contact Safety and Risk Management immediately.
- Picric acid must be stored under a layer of liquid, as picric crystals are highly explosive. If picric acid dries out (forming yellow crystals), do not touch the container! Contact Safety and Risk Management immediately!
- If flammables need to be chilled, store them in a laboratory-safe refrigerator, not in a standard (household style) refrigerator.
- Chemicals may be stored in the cabinets underneath a chemical fume hood provided the cabinetry is designed for that use.
- Cabinetry designed for flammable storage vents into the fume hood exhaust duct.
- Cabinetry designed for corrosives storage vents directly into the fume hood. Flammable chemicals should never be stored in this type of cabinets!
- Some cabinetry is only designed for general storage or with a drying rack. These cabinets are not meant to be used for hazardous chemical storage.
- Flammables should be stored in a well-ventilated area and large quantities in a flammable storage cabinet.

6.8. Personal Hygiene When Working with Chemicals

Good personal hygiene will help minimize exposure to hazardous chemicals. When working with chemicals, follow these guidelines:

- Wash hands frequently and before leaving the laboratory. Also, wash hands before eating, drinking, smoking or applying makeup.
- Wear appropriate personal protective equipment (PPE). Always wear protective gloves when handling any hazardous chemicals.
- Remove PPE before leaving the laboratory and before washing hands.
- Remove contaminated clothing immediately. Do not use the clothing again until it has been properly decontaminated.
- Follow any special precautions for the chemicals in use.
- Do not eat, drink, smoke or apply makeup around chemicals.
- Tie back long hair when working in a laboratory or around hazardous chemicals.
- Do not keep food, beverages, or food and beverage containers anywhere near chemicals or in laboratories where chemicals are in use.
- Do not use laboratory equipment, including laboratory refrigerators/freezers, to store or serve food or drinks.
- Do not wash food and beverage utensils in a laboratory sink.
- Do not sniff or taste chemicals.
- Do not touch door knobs, telephones, computer keyboards, etc. with contaminated gloves.

6.9. Corrosives

Corrosive chemicals destroy or damage living tissue by direct contact. Some acids, bases, dehydrating agents, oxidizing agents, and organics are corrosives. Examples of the different types of corrosive chemicals are listed below:

- Acidic corrosives
 - o Inorganic Acids
 - o Organic Acids

- Alkaline, or basic, corrosives:
 - o Sodium hydroxide
 - o Potassium hydroxide
- Corrosive dehydrating agents:
 - o Phosphorous pentoxide
 - o Calcium oxide
- Corrosive oxidizing agents:
 - o Halogen gases
 - o Hydrogen peroxide (concentrated)
 - o Perchloric acid
- Organic corrosive:
 - o Butylamine

6.9.1. Health Consequences

Extreme caution should be taken when handling corrosive chemicals, or severe injury may result.

- Concentrated acids can cause painful and sometimes severe burns.
- Inorganic hydroxides can cause serious damage to skin tissues because a protective protein layer does not form. Even a dilute solution such as sodium or potassium hydroxide can attack skin by reacting with the fat tissues and forming a soapy, slick film.
- At first, skin contact with phenol may not be painful, but the exposed area may turn white due to the severe burn. Systemic poisoning may also result from dermal exposure.
- Skin contact with low concentrations of hydrofluoric acid (HF) may not cause pain immediately but can still cause tissue damage if not treated properly. Higher concentrations of HF (50% or greater) can cause immediate, painful damage to tissues.

6.9.2. Safe Handling

To ensure safe handling of corrosives, the following special handling procedures should be used:

- Always store corrosives properly. Segregate acids from bases and inorganics from organics. Refer to the Chemical Storage section of this chapter for more information.
- Always wear a laboratory coat, gloves and chemical splash goggles when working with corrosives. Wear other personal protective equipment, as appropriate.
- To dilute acids, carefully add the acid to the water, not the water to the acid. This will minimize any reaction.
- Corrosives, especially inorganic bases (e.g., sodium hydroxide), may be very slippery; handle these chemicals with care and clean any spills, leaks, splashes, or dribbles immediately.
- Work in a chemical fume hood when handling fuming acids or volatile irritants (e.g., ammonium hydroxide).
- A continuous flow eye wash station should be in every work area where corrosives are present. An emergency shower should also be within 55 feet of the area.

6.9.3. Corrosive Example: Perchloric Acid

Perchloric acid is a corrosive oxidizer that can be dangerously reactive. At elevated temperatures, it is a strong oxidizing agent and a strong dehydrating reagent. Perchloric acid reacts violently with organic materials. When combined with combustible material, heated perchloric acid may cause a fire or explosion. Cold perchloric acid at less than 70% concentration is not a very strong oxidizer, but its oxidizing strength increases significantly at concentrations higher than 70%. Anhydrous perchloric acid (>85%) is very unstable and can decompose spontaneously and violently.

When using perchloric acid, remember the following:

- Be thoroughly familiar with the special hazards associated with perchloric acid before using it.
- If possible, purchase 60% perchloric acid instead of a more concentrated grade.
- Always wear rubber gloves and chemical splash goggles while using perchloric acid. Consider also wearing a face shield and rubber apron if splashing is likely.
- Store perchloric acid inside secondary containment (such as a Pyrex dish) and segregated from all other chemicals and organic materials. Do not store bottles of perchloric acid in wooden cabinets or on spill paper.

Heated digestions with perchloric acid require a special fume hood with a wash-down system. A perchloric acid fume hood should also be used when handling highly concentrated (greater than 70%) perchloric acid.

6.10. Flammables

A flammable chemical is any solid, liquid, vapor, or gas that ignites easily and burns rapidly in air. Consult the appropriate MSDS before beginning work with flammables.

6.10.1. Flashpoint, Boiling Point, Ignition Temperature, and Class

- Flammable chemicals are classified according to flashpoint, boiling point, fire point, and auto-ignition temperature.
- Flash Point (FP) is the lowest temperature at which a flammable liquid's vapor burns when ignited.
- Boiling Point (BP) is the temperature at which the vapor pressure of a liquid is equal to the atmospheric pressure under which the liquid vaporizes. Flammable liquids with low BPs generally present special fire hazards.
- Fire Point is the temperature at which the flammable liquid will burn.
- Auto-ignition Temperature is the lowest temperature at which a substance will ignite without an ignition source.

Flammable liquids are classified according to how easily they burn.

6.10.2. Conditions for a Fire

Improper use of flammable liquids can cause a fire. The following conditions must exist for a fire to occur:

- Flammable material (i.e., fuel) must be present in sufficient concentration to support a fire.
- Oxygen or an oxidizer must be present.
- An ignition source (i.e., heat, spark, etc.) must be present.

When working with flammables, always take care to minimize vapors which act as fuel.

6.10.3. Safe Handling

- Handle flammable chemicals in areas free from ignition sources.
- Never heat flammable chemicals with an open flame. Use a water bath, oil bath, heating mantle, hot air bath, hot plate, etc. Such equipment should be intrinsically safe, with no open sparking mechanisms.

When using an oil bath, make sure the temperature is kept below the oil flash point.

- Use ground straps when transferring flammable chemicals between metal containers to avoid generating static sparks.
- Work in an area with good general ventilation and use a fume hood when there is a possibility of dangerous vapors. Ventilation will help reduce dangerous vapor concentrations, thus minimizing this fire hazard.

- Restrict the amount of stored flammables in the laboratory, and minimize the amount of flammables present in a work area.

The NFPA has established formal limits on the total amounts of flammable liquids that may be stored or used in laboratories. (NFPA 30 and 45)

6.11. Solvents

Organic solvents are often the most hazardous chemicals in the work place. Solvents such as ether, alcohols, and toluene, for example, are highly volatile and flammable.

Perchlorinated solvents, such as carbon tetrachloride (CCl₄), are non-flammable. But most hydrogen-containing chlorinated solvents, such as chloroform, are flammable. When exposed to heat or flame, chlorinated solvents may produce carbon monoxide, chlorine, phosgene, or other highly toxic gases.

Always use volatile and flammable solvents in an area with good ventilation or preferably in a fume hood. Never use ether or other highly flammable solvents in a room with open flames or other ignition sources present, including non-intrinsically safe fixtures.

6.11.1. Solvent Exposure Hazards

Health hazards associated with solvents include exposure by the following routes:

- Inhalation of a solvent may cause bronchial irritation, dizziness, central nervous system depression, nausea, headache, coma, or death. Prolonged exposure to excessive concentrations of solvent vapors may cause liver or kidney damage. The consumption of alcoholic beverages can enhance these effects.
- Skin contact with solvents may lead to defatting, drying, and skin irritation.
- Ingestion of a solvent may cause severe toxicological effects. Seek medical attention immediately.

The odor threshold for the following chemicals exceeds acceptable exposure limits. Therefore, if you can smell it, you may be overexposed – increase ventilation immediately! Examples of such solvents are:

- Chloroform
- Benzene
- Carbon tetrachloride
- Methylene chloride

Do not depend on your sense of smell alone to know when hazardous vapors are present. The odor of some chemicals is so strong that they can be detected at levels far below hazardous concentrations (e.g., xylene).

Some solvents (e.g., benzene) are known or suspected carcinogens.

6.11.2. Reducing Solvent Exposure

To decrease the effects of solvent exposure, substitute hazardous solvents with less toxic or hazardous solvents whenever possible. For example, use hexane instead of diethyl ether, benzene or a chlorinated solvent.

6.11.3. Solvent Example: DMSO

Dimethyl sulfoxide (DMSO) is unique because it is a good solvent with many water-soluble as well as lipid-soluble materials. Due to these properties, dimethyl sulfoxide is rapidly absorbed and distributed throughout the body.

DMSO can facilitate absorption of other chemicals – such as grease, oils, cosmetics – that may contact the skin.

- While DMSO alone has low toxicity, when combined with other, more toxic chemicals it can cause the more toxic chemical to be absorbed more readily through the skin.
- Some medications, such as liniment, also contain DMSO.

While relatively stable at room temperature, DMSO can react violently to other chemicals when heated.

Wear impervious clothing and personal protective equipment (laboratory coat, gloves, etc.) to prevent skin exposure. Use chemical splash goggles and/or a face shield if splashing may occur.

6.12. Toxins and Irritants

The toxicity of a chemical refers to its ability to damage an organ system (kidneys, liver), disrupt a biochemical process (e.g., the blood-forming process) or disrupt cell function at some site remote from the site of contact. Any substance, even water, can be harmful to living things under the right conditions.

The biological effects – whether beneficial, indifferent or toxic – of all chemicals are dependent on a number of factors, including:

- Dose (the amount of chemical to which one is exposed)
- Duration of exposure (both length of time and frequency)
- Route of entry:
 - Ingestion
 - Absorption through the skin
 - Inhalation
 - Injection

Inhalation and dermal absorption are the most common methods of chemical exposure in the workplace.

- Individual response and history
- One's exposure to other chemicals
- Mixing the toxin with other chemicals

The most important factor in toxicity is the dose-time relationship. In general, the more toxin to which an individual is exposed, and the longer they are exposed to it, the stronger their physiological response will be. However, an individual's response can also depend on several other factors, including:

- Health
- Gender
- Genetic predisposition
- An individual's exposure to other chemicals
- Previous sensitization

When a person becomes sensitized to a chemical, each subsequent exposure may often produce a stronger response than the previous exposure.

- Chemical mixtures

Combining a toxic chemical with another chemical can increase the toxic effect of either or both chemicals.

6.12.1. General Safe Handling Guidelines

- Read the appropriate SDS.
- Be familiar with the chemical's exposure limits.
- Use a chemical fume hood.

- Always wear appropriate PPE.
- Never eat, drink, or use tobacco products around toxins or store them near any hazardous chemicals.
- Avoid touching your face or other exposed skin with contaminated gloves or other contaminated materials.
- Store toxic gases in a gas exhaust cabinet.

6.12.2. Acute Toxins vs. Chronic Toxins

The dose-time relationship forms the basis for distinguishing between acute toxicity and chronic toxicity.

The acute toxicity of a chemical is its ability to inflict bodily damage from a single exposure. A sudden, high-level exposure to an acute toxin can result in an emergency situation, such as a severe injury or even death.

Examples of acute toxins include the following:

- Hydrogen cyanide,
- Hydrogen sulfide,
- Nitrogen dioxide,
- Ricin,
- Organophosphate pesticides, and
- Arsenic.

Do not work alone when handling acute toxins. Use a fume hood to ensure proper ventilation, or wear appropriate respiratory protection if a fume hood is not available.

Chronic toxicity refers to a chemical's ability to inflict systemic damage as a result of repeated exposures, over a prolonged time period, to relatively low levels of the chemical. Such prolonged exposure may cause severe injury. Examples of chronic toxins include the following:

- Mercury
- Lead
- Formaldehyde

Some chemicals are extremely toxic and are known primarily as acute toxins. Some are known primarily as chronic toxins. Others can cause either acute or chronic effects.

The toxic effects of chemicals can range from mild and reversible (e.g. a headache from a single episode of inhaling the vapors of petroleum naphtha that disappears when the victim gets fresh air) to serious and irreversible (liver or kidney damage from excessive exposures to chlorinated solvents). The toxic effects from chemical exposure depend on the severity of the exposures. Greater exposure and repeated exposure generally lead to more severe effects.

6.13. Reactives and Explosives

Reactive chemicals may be sensitive to either friction or shock, or they may react in the presence of air, water, light, heat, or other chemicals. Some reactive chemicals are inherently unstable and may quickly decompose on their own, releasing energy in the process. Others form toxic gases when reacting. Explosive chemicals decompose or burn very rapidly when subjected to shock or ignition. Reactive and explosive chemicals produce large amounts of heat and gas when triggered, and thus are extremely dangerous. Follow these guidelines when handling and storing reactive and explosive chemicals:

- Read the appropriate SDS and other pertinent fact sheets on the chemical. Be familiar with chemical specific handling and storage requirements.

- Follow standard operating procedures to have a Plan of Action established for how to handle emergency situations.
- Isolate the chemical from whatever causes a reaction.
 - o Store reactives separate from other chemicals.
 - o Store reactives in a cool/dry area.
 - o Keep reactive chemicals out of sunlight and away from heat sources.
- Know where emergency equipment is located and how to use it

6.13.1. Chemical Waste Disposal

Chemical waste must be disposed of as hazardous waste. For information on chemical waste disposal, contact the Safety and Risk Management.

6.13.2. Transporting Hazardous Materials

The U.S. Department of Transportation (DOT) and the International Air Transportation Association (IATA) regulates the shipment of hazardous materials. Anyone who packages, receives, unpacks, signs for, or transports hazardous chemicals must be trained and certified in Hazardous Materials Transportation. Warehouse personnel, shipping and receiving clerks, truck drivers, and other employees who pack or unpack hazardous materials must receive this training as well. Contact Safety and Risk Management for more information on shipping and receiving hazardous chemicals.

7. Electrical Safety

The danger of injury through electrical shock is possible whenever electrical power is present. When a person's body completes a circuit and thus connects a power source with the ground, an electrical burn or injury is imminent. Most fatal injuries result from high-voltage exposure; however, people can sustain severe injuries from low voltage power if it has a high current flow. Electrical safety is important in every work environment.

Unqualified employees are employees who are not trained to work on exposed live parts and must be trained in and familiar with safety related work practices. A qualified employee are employees that are trained on avoiding the hazards of working on or exposed to live parts. Only qualified employees are authorized to work on or near exposed live parts.

The following sections cover circuit breaker loads, electrical grounding, electrical safety guidelines, and electrical emergency response.

Follow these guidelines for general electrical safety:

- Be familiar with the electrical hazards associated with your workplace.
- Unplug electrical equipment before repairing or servicing it.
- If a prong breaks off inside an outlet, do not attempt to remove it yourself. Call Physical Plant for assistance.
- Ensure that outlets are firmly mounted. Report loose outlets to Physical Plant.
- Report all electrical problems, including tripped breakers, broken switches, and flickering lights to Physical Plant.
- All appliances used in Laredo College buildings must be UL (Underwriter Laboratories) or FM (Factory Mutual) labeled.
- Do not use an appliance that sparks, smokes, or becomes excessively hot, unless the appliance is specifically designed to exhibit these characteristics.
- Portable electrical heaters are discouraged. If approved by a supervisor, they must be placed to avoid causing a trip hazard and must be kept away from combustible material. Never leave a heater unattended. Unplug the heater at the end of the day or when not in use.

- Keep electrical equipment away from water, unless the appliance is specifically designed for use around water, such as a wet-dry shop vacuum.
- Use ground-fault circuit interrupters (GFCIs) whenever possible.
- Be aware of overhead power lines when working with tall equipment (e.g., grain augers, cranes, sailboats, etc.).

7.1. Electrical Plugs and Cords

Follow these guidelines for electrical plug and cord safety:

- Do not remove the prongs of an electrical plug. If plug prongs are missing, loose, or bent, replace the entire plug or the cord and plug.
- Do not use an adapter or extension cord to defeat a standard grounding device.
- Use extension cords only when necessary and only on a temporary basis. Do not use extension cords in place of permanent wiring. Request new outlets if your work requires equipment in an area without an outlet.
- Use extension cords that are the correct size or rating for the equipment in use. The diameter of the extension cord should be the same or greater than the cord of the equipment in use.
- Do not run electrical cords above ceiling tiles or through walls.
- Keep electrical cords away from areas where they may be pinched and areas where they may pose a tripping or fire hazard (e.g., doorways, walkways, under carpet, etc.)
- Avoid plugging more than one appliance in each outlet.
- Discard damaged cords, cords that become hot, or cords with exposed wiring.
- Never unplug an appliance by pulling on the cord; pull on the plug.
- Always unplug and secure an extension cord when not in use.
- Never plug appliances to an extension cord.

7.2. Circuit Breaker Loads

Most office and laboratory locations have 20 amp circuit breakers that serve two or more outlets. These breakers can handle most office equipment; however, the widespread use of personal computers and associated hardware can create an electrical overload. To determine your current electrical load, follow these steps:

- Check office/laboratory equipment for a manufacturer's rating label that indicates total watts or amps. Take special care to check appliances that use electricity to generate heat.
- Convert the watts rating to amps:
- Amps = Watts ÷ Voltage (typically 120 Volts)
- Total the amps for each circuit.

If the total equals more than 15 amps per 20-amp circuit, you may be overloading the circuit. Move enough equipment to a different circuit to reduce the circuit load; otherwise, have Physical Plant inspect the circuit wiring.

7.3. Electrical Grounding

Proper electrical grounding can help prevent electrical injury. Most electrical equipment is grounded with either a three-prong plug or a two-prong plug and insulation. Because a grounding system may be defective without your knowledge, use a GFCI to ensure electrical safety. GFCIs are required in moist or potentially damp environments, near water sources, etc. Contact Physical Plant for assistance if a GFCI may be needed.

7.4. Electrical Panels

Electrical panels or breaker boxes require special safety considerations, including the following:

- Know where your panel box is located.
- Do not tape circuit switches to keep a breaker from tripping.

- Ensure that breaker circuits are accurately labeled within panel boxes.
- Ensure that panel box doors are securely attached.
- Do not block panel boxes. There should be at least 30 inches wide and 36 inches deep of clear space around of a panel box.
- Make sure there are no missing pop-outs on the electrical panel.

Report tripped breakers and refer any electrical questions to Physical Plant.

7.5. Lockout/Tagout

Lockout is the process of preventing the flow of energy from a power source to a piece of equipment and keeping it from operating. Lockout is accomplished is by installing a lockout device at the power source, so that equipment powered by that source can not be operated. A lockout device is a lock, block, or chain that keeps the switch, valve, or lever in the off position.

Tagout is accomplished by placing a tag on the power source. The tag acks like a warning not to restore energy – it is not a physical restraint. Tags must clearly state: Do Not Operate or the like, and must be applied by hand.

Both locks and tags must be strong enough to prevent unauthorized removal and withstand various environmental conditions.

Only authorized personnel are to secure lockout/tag-out device. Authorized personnel include managers, shop supervisors, area maintenance supervisors. Notification will be provided to affected employees/building occupants that a lockout is required and the reason therefore.

7.5.1. Machine or Equipment Shutdown

If the equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.). Disconnect switches should never be pulled while under load, because of the possibility of arcing or even explosion. Personnel knowledgeable of equipment operation should be involved with shut down or re-start procedures.

7.5.2. Machine or Equipment Isolation

Operate the switch, valve, or other energy-isolating device so that the energy source(s) (electrical, mechanical, hydraulic, etc.) is (are) disconnected or isolated from the equipment. Stored energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc., must also be dissipated, disconnected, or restrained by methods such as grounding, repositioning, blocking, bleeding- down, etc. Pulling a fuse is not a substitute for locking out. A pulled fuse is no guarantee the circuit is dead, and even if it were dead, there's nothing to stop someone from inadvertently replacing the fuse.

Intermittently operating equipment such as pumps, blowers, fans, and compressors may seem harmless when dormant. Don't assume that because equipment isn't functioning, it will stay that way.

7.5.3. Application of Lockout/Tag-out

Lockout and tag the energy isolating device with an assigned individual lock, even though someone may have locked the control before you. You will not be protected unless you put your own padlock on it. For some equipment it may be necessary to construct attachments to which locks can be applied. An example is a common hasp to cover an operating button. Tags shall be attached to the energy isolating device(s) and to the normal operating control and shall be attached in such a manner as to preclude operation.

7.5.4. Verification of Isolation

After ensuring that no personnel can be exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.

If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the maintenance or repair is completed, or until the possibility of such accumulation no longer exists.

Return operating controls to neutral position after the test. A check of system activation (e.g. use of voltage indicator for electrical circuits) should be used to assure isolation.

The equipment is now locked out.

7.5.5. Release from Lockout/Tag-out

Before lockout or tag-out devices are removed and energy is restored to the machine or equipment, inspect the work area to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

Check work area to ensure that all employees are in the clear. Notify affected employees that lockout/tag-out devices have been removed.

The employee who applied the device shall remove each lockout/tag-out device from each energy-isolating device. The energy isolating devices may be opened or closed, to restore energy to equipment.

Contact authorized personnel when energy is restored and return lockout/tag-out device. (Proper Documentation Required)

7.5.6. Lockout/Tag-out Interruption (Testing Equipment)

In situations where the energy isolating device(s) is lockout/tagged and there is a need for testing or positioning of the equipment/process, the following sequence shall apply:

- Make sure to Clear equipment and/or process of tools and materials.
- Make sure all personnel are clear of danger.
- Remove the control of locks/tags according to established procedure.
- Proceed with test, etc.
- De-energize all systems and re-lockout / re-tag-out the controls to continue the work.

7.5.7. Procedures Involving More Than One Person

In the preceding steps, if more than one individual is required to lock out equipment, each shall place a personal lock and tag on the group lockout device when he/she begins work, and shall remove those devices when he/she stops working on the machine or equipment. The supervisor, with the knowledge of the crew, may lock out equipment for the whole crew. In such cases, it shall be the responsibility of the supervisor to carry out all steps of the lockout procedure and inform the crew when it is safe to work on the equipment. Additionally, the supervisor shall not remove a crew lock until it has been verified that all individuals are clear.

7.5.8. Conditions for Lockout/Tagout by Authorized Personnel

Only the owner of the device shall remove lockout/tag-out devices.

Exceptions to the conditions of removal:

- Owner incapacitated by illness or injury then his/her supervisor shall remove the lockout/tag-out device.

- Owner is no longer employed by Laredo College, and then his/her supervisor shall remove the lockout/tag-out device.
- If Authorized Personnel determines that circumstances warrant removal of a lockout/tag-out device, every effort must be made to contact the owner of the device. After the above conditions have been met the Authorized Personnel may remove device.

7.6. High Voltage

In addition to the guidelines associated with general electrical safety and lockout/tagout procedures, there are more stringent safety requirements for high voltage procedures.

The following list provides high-voltage safety tips.

- Ensure that only authorized employees work around high voltage equipment.
- Label entrances with a High Voltage sign.
- Ensure that terminal voltage ratings can withstand surges caused by electrical faults or switching transients.
- Be careful around output circuits even when the input power is off. Parallel power sources and energy storage devices can still be dangerous.
- Be careful when working with power supplies that serve more than one area.
- Before working in a high voltage area, inspect the power supply and check all protective devices.
- Do not work alone near high voltage.
- Label equipment to identify power sources. Label input power sources to identify connected power supply loads.
- Attach emergency shutdown instructions and phone numbers to equipment that is remotely controlled or unattended while energized.
- Before entering a power supply or associated equipment enclosure to work on hazardous energy sources, complete the following:
 - De-energize the equipment.
 - Open and lockout the main input power circuit breaker.
 - Check for auxiliary power circuits that could still be energized.
 - Inspect automatic shorting devices for proper operation.
 - Short the power supply with grounding hooks.

7.7. Minimum Clear Working Space

Federal and state regulations requires a minimum clearance of 36 inches around the perimeter of an electrical panels.

8. Construction Safety

Construction work can be particularly hazardous. Personal protective equipment, fire safety, electrical safety, confined space entry, emergency preparedness, biological safety, chemical safety, hazardous waste disposal, vehicle safety and other precautions are essential for safe construction work. Follow these guidelines when visiting or working at construction sites:

- Do not walk, stand, or work under suspended loads. If you raise a load, be sure to crib, block, or otherwise secure the load as soon as possible.
- Avoid placing unusual strain on equipment or materials.
- Be prepared for unexpected hazards.
- Know your surroundings on construction sites.
- Watch out for heavy moving equipment.
- Be alert!

8.1. Barrier and Guards

Laredo College employees must use barriers and guards as necessary to protect employees, students, contractors, and visitors from physical hazards. If you suspect a hazard is not sufficiently protected, notify the attending workers or Safety and Risk Management immediately.

Barriers, guards, and warning signs are required to ensure safety against existing hazards.

8.1.1. Types of Barrier and Guards

Standard types of barriers and guards include the following:

- Guardrails and handholds
- Perimeter fencing
- Tape
- Toe boards
- Cones
- Other physical barriers and solid separators (dust barriers, hazard barriers, temporary walkways, etc.)

Signs that state DANGER, WARNING, CAUTION or Construction Area are also important when barriers or guards are necessary. Remember to make and place signs that are legible, visible, and brief.

8.1.2. Areas that Need Barrier or Guards

Any area that poses a physical threat to workers and/or pedestrians requires barriers or guards. Areas that typically require permanent or temporary protection include the following:

- Stairways
- Hatches
- Chutes
- Open Manholes
- Elevated platforms
- Areas with moving machinery
- Excavation sites
- Construction sites
- Temporary wall or floor openings
- Open ground trenches.

8.1.3. Using Barriers and Guards

The following list provides guidelines for using barriers and guards:

- When necessary, reroute pedestrian and vehicular traffic to completely avoid a construction site.
- Guard any permanent ground opening into which a person could fall with a guardrail, load-bearing cover, or other physical barrier.
- Ensure that temporary floor openings, such as pits and open manholes, are guarded by secure, removable guardrails. If guardrails are not available, have someone guard the opening.
- Ensure that all stairways, ladderways, hatchways, or chute floor openings have handrails or hinged covers.
- Ensure that enclosed stairways with four or more steps have at least one railing, and that open stairways with four or more steps have two railings.
- Ensure that all platforms and walkways that are elevated or located next to moving machinery are equipped with handrails, guardrails, and toe boards.

- Barricade any wall openings through which a person or tools could fall. Use gates, doors, guardrails, or other physical barriers to block the opening.
- Mark and guard any excavation that is deeper than 12 inches.
- Mark and/or guard potholes and sidewalk damage as appropriate.
- Protect smoke detectors with some type of cover when construction work is ongoing, such as dust or fume producing activities, may affect and discharge smoke detectors. Remove protectors immediately at the end completed construction or activity or at the end of each day if applicable.

8.2. Forklifts

Only authorized individuals may operate forklifts. Operators must successfully complete training and an evaluation of their skills to be considered authorized. An evaluation of each operator's performance must be done at least every three years. The following list provides general safety guidelines:

- Do not allow secondary riders. Do not raise people on a forklift.
- Always wear your safety belt.
- Never leave keys in an unattended forklift.
- Do not speed.
- Drive up and back down ramps with caution.
- Do not walk, stand, or work under the elevated portion of a forklift (even if it is not loaded).
- Ensure that the forklift has an overhead barrier to protect the operator from falling objects.

In addition, follow these guidelines for safe forklift operation:

- Always work within the capacity limits of your forklift. Consult with the manufacturer before modifying the operation or capacity limits of a forklift.
- Do not operate a forklift in areas with hazardous concentrations of acetylene, butadiene, hydrogen, ethylene, or diethyl ether, or other explosive environment.
- Never lift a load while moving. Wait until you are completely stopped before raising the mast.
- Be sure the top load sits squarely on the stack. An uneven load could topple.
- Travel with loads slightly tilted back to provide stability.
- Travel with loads at the proper height. A stable clearance height is usually 4 to 6 inches at the tips and 2 inches at the heels of fork blades.
- Lift stacked loads in the same manner as loads on the floor.
- When preparing to leave the forklift unattended, lower the mast, neutralize the controls, shut the power off, set the brakes and remove keys. The forklift is "unattended" when the operator is more than 25 feet away or the forklift is out of view.
- When ascending or descending a grade in excess of 10 percent, drive the forklift with the load upgrade.
- If you cannot see over a load, drive in reverse. Do not try to look around a load and drive forward.

8.3. Backhoes

Only authorized employees may operate backhoes and front-end loaders. The following list offers general safety guidelines for both types of machinery:

- Always operate at a safe speed.
- Travel with the bucket low to the ground.
- Always lower the bucket before servicing the equipment or leaving the loader unattended.
- Use a rigid-type coupler when towing loads.
- Always check with the utility company before digging.

- Be extremely careful when operating near banks and slopes.
- When cutting a bank, be careful not to cause a cave-in. Do not drive on an overhang.

8.4. Hoists

Only authorized employees may use hoists to move heavy objects and equipment.

The following are general guidelines for working with hoists:

- Never walk, stand, or work beneath a hoist.
- Isolate hoisting area with barriers, guards, and signs, as appropriate.
- Never exceed the capacity limits of your hoist.
- Wear gloves and other personal protective equipment, as appropriate, when working with hoists and cables.
- Ensure that hoists are inspected regularly before each use.
- Ensure that hoists are inspected annually by a certified inspector.
- Always hold tension on the cable when reeling it in or out.
- When the work is complete, always rig the hoist down and secure it.
- When the load block or hook is at floor level or its lowest point of travel, ensure that at least two turns of rope remain on the drum.
- Be prepared to stop operations immediately if signaled by the safety watch or another person.

8.4.1. Picking Up Loads with Hoists

Do not hoist loads when any portion of the hoisting equipment or suspended load can come within 10 feet of high-voltage electrical lines or equipment. If you need to hoist near high-voltage electrical lines or equipment, obtain clearance from your supervisor first.

8.4.2. Inspecting Hoists

Hoists should be inspected daily. If there is any question about the working condition of a hoist, do not use it. Hoist inspectors should note the following:

- The hooks on all blocks, including snatch blocks, must have properly working safety latches.
- All hooks on hoisting equipment should be free of cracks and damage.
- The maximum load capacity for the hoist must be noted on the equipment.
- Cables and wiring should be intact and free of damage.

8.5. Excavation and Trenching

29 CFR 1926.651 "Excavation Requirements" Controls the trenching and excavation requirements for construction (excluding tunnels). It provides requirements for employee entrance, working environment, and egress to/from open surface trenches and excavations. Any excavation and/or trenching requires a competent person and an operator.

8.5.1. Pre-Excavation Requirements

The estimated location of utility installations such as sewer, telephone, fuel, electric, water lines, or other underground installations that reasonably may be encountered during excavation work shall be determined prior to opening an excavation. Utility companies or utility locator should be contacted to precisely locate such utilities.

8.5.2. Excavation may proceed with CAUTION if:

- Utility Company/Locator cannot be located or contacted
- Utility Company/Locator cannot locate utility

8.5.3. Excavation Opening Requirements

When excavating operations approach the location of underground utilities, the exact location shall be determined by safe and acceptable means.

While excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.

8.5.4. Employee Protection

Employees exposed to public vehicular traffic shall be provided with and wear vest or other suitable garments marked with high visibility materials.

No employee shall be permitted underneath loads handled by digging or lifting equipment.

When mobile equipment is operated near excavation; barricades, hand and mechanical signals, or stop logs shall be used to protect employees in excavations.

8.5.5. Hazardous Atmospheres

Excavations of greater than 4' depth that are located in or near hazardous materials, liquids, or gases shall be tested for the presence of hazardous atmospheres prior to employee entry.

An atmosphere shall be considered hazardous if the level of atmospheric contaminants exceeds 20% of the PEL. Excavation of greater 4' depth shall be regularly tested for oxygen deficiency (less than 19.5% oxygen). Ventilation and respiratory protection shall be provided where hazardous atmospheres are encountered.

8.5.6. Stability of Adjacent Structures

Excavations near structures or buildings shall be protected by shoring or other means to assure stability of the affected structure. Diversion ditches, dikes, or other suitable means shall be provided to prevent surface water intrusion where natural drainage has been interrupted. Excavations near foundation footings, sidewalks, pavement, or other appurtenant structures shall be protected by underpinning or other suitable means to maintain stability.

9. Personal Protective Equipment

Personal Protective Equipment (PPE) includes all clothing and work accessories designed to protect employees from workplace hazards. Protective equipment should not replace engineering, administrative, or procedural controls for safety – it should be used in conjunction with these controls. Employees must wear protective equipment as required and when instructed by a supervisor.

Personal protective equipment that is used to prevent exposure or contamination should always be removed before coming in contact with other individuals or going in or near elevators, break rooms, classrooms, bathrooms, etc. Do not launder personal protective equipment at home.

9.1. Arm and Hand Protection

Arms and hands are vulnerable to cuts, abrasions, temperature extremes, burns, bruises, electrical shock, chemical spills, and amputation. The following forms of hand protection are available for employees:

- Disposable exam gloves
- Rubber gloves
- Nitrile gloves
- Neoprene gloves
- Leather gloves
- Non-asbestos heat-resistant gloves

- Metal-mesh gloves for meat cutters
- Cotton gloves
- Kevlar or Dyneema gloves for cut resistance

Always wear the appropriate hand and arm protection. For arm protection, wear a long-sleeved shirt, a laboratory coat, chemical-resistant sleeves, or gauntlet-length gloves.

Follow these guidelines to ensure arm and hand safety:

- Inspect and test new gloves for defects.
- Always wash your hands before and after using gloves. Wash chemical- protective gloves with soap and water before removing them.
- Do not wear loose fitting gloves near moving machinery; the gloves may become caught.
- Do not wear gloves with metal parts near electrical equipment.

IMPORTANT: Gloves are easily contaminated. Avoid touching surfaces such as telephones, door knobs, etc. when wearing gloves.

9.2. Body Protection

Hazards that threaten the torso tend to threaten the entire body. A variety of protective clothing, including laboratory coats, long pants, rubber aprons, coveralls, and disposable body suits are available for specific work conditions.

- Rubber, neoprene, and plastic clothing protect employees from most acids and chemical splashes.
- Laboratory coats and coveralls protect employees and everyday clothing from contamination.
- Welding aprons provide protection from sparks.

Do not launder contaminated chemically, biologically, or radiologically protective clothing at home or in any facilities outside of the district.

9.3. Hearing and Ear Protection

If you work in a high noise area, wear hearing protection. Most hearing protection devices have an assigned rating that indicates the amount of protection provided. Depending on your level of exposure, you may choose from the following devices:

- Disposable earplugs
- Reusable earplugs
- Headband plugs
- Sealed earmuffs

Earplugs may be better in hot, humid, or confined work areas. They may also be better for employees who wear other PPE, such as Safety glasses or hats. Earmuffs, on the other hand, may be better for employees who move in and out of noisy areas, because the muffs are easier to remove. Before resorting to hearing protection, attempt to control noise levels through engineering or operational changes.

To avoid contamination, follow these guidelines when using earplugs:

- Wash your hands before inserting earplugs.
- Replace disposable earplugs after each use.
- Clean reusable earplugs after each use.

9.4. Eye and Face Protection

Employees must wear protection if hazards exist that could cause eye or face injury. Eye and face protection should be used in conjunction with equipment guards, engineering controls, and safe practices.

Safety glasses are required in laboratories. Chemical goggles should be worn when handling chemical materials.

Always wear adequate eye and face protection when performing tasks such as grinding, buffing, welding, chipping, cutting, or pouring chemicals. Safety glasses with side shields provide protection against impact, but chemical safety goggles provide protection against impact, splashes, and hazardous atmospheres. Follow the below information regarding eye protection:

- If you wear prescription glasses, wear goggles or other safety protection over the glasses.
- Safety glasses with side-shields provide primary protection to eyes and are four times as resistant as prescription glasses to impact injuries.
- Goggles protect against impacts, sparks, dust, and irritating mist. Wear chemical splash goggles, not just safety glasses, when working with chemicals.
- A welding helmet protects from flash burn due to welding, soldering, or brazing, but does not provide primary eye protection; safety glasses or goggles should be worn with the helmet.
- A face shield is designed to protect the face from some splashes or projectiles, but does not eliminate exposure to vapors. A face shield should be worn with goggles or safety glasses.
- To reduce eyestrain from glare and outdoor sun exposure use safety glasses with UV protection to minimize the ultraviolet light exposure

9.5. Foot Protection

To protect feet and legs from falling objects, moving machinery, sharp objects, hot materials, chemicals, or slippery surfaces, employees should wear closed-toed shoes, boots, foot-guards, leggings, or safety shoes as appropriate. Safety shoes are designed to protect people from the most common causes of foot injuries – impact, compression, and puncture. Special foot protection is also available for protection against static electricity, sparks, live electricity, corrosive materials, and slipping.

Foot protection is particularly important in laboratory, agricultural, construction and custodial work.

Do not wear sandals, crocs, or open-toed shoes in laboratories, shops, food prep, food serving, or other potentially hazardous areas.

9.6. Head Protection

Accidents that cause head injuries are difficult to anticipate or control. If hazards exist that could cause head injury, employees should try to eliminate the hazards, but they should also wear head protection.

Safety hats protect the head from impact, penetration, and electrical shock. Head protection is necessary if you work where there is a risk of injury from moving, falling, or flying objects or if you work near high-voltage equipment.

Hard hats should be water resistant, flame resistant, and adjustable. Wear one of the following hard hats as appropriate for your work situation:

- Class G - General service, limited voltage (2,200 Volts) protection
- Class E - Utility service, high-voltage (20,000 Volts) protection
- Class C - Special service, no voltage protection

Follow these guidelines for head safety:

- Check the shell and suspension of your headwear for damage before each use. Look for cracks, dents, gouges, chalky appearance, and torn or broken suspension threads. Discard damaged hats or replace broken parts with replacements from the original manufacturer.
- Discard any hat that has been struck or dropped from a great height, even if there is no apparent damage.
- Do not wear a hard hat backwards, unless this is necessary to accommodate other protective equipment (e.g., welders face shield).
- Do not paint the plastic shell of a hard hat or alter it in any way.

9.7. – Respiratory Protection

Laredo College uses engineering, administrative, and procedural controls to protect people from dangerous atmospheres, including harmful mists, smoke, vapors, and oxygen- deficient atmospheres. When these controls cannot provide adequate protection against harmful atmospheres, respiratory protection is necessary.

Safety and Risk Management can provide training and fit testing for personnel who need respiratory protection.

9.7.1. Usage Requirements

People who use respiratory protection must be physically capable of using and wearing the equipment. In some cases, a physician must determine if an employee is healthy enough to use a respirator. In addition, all people required to wear respirators must be formally trained and instructed in proper equipment usage. This training should include instruction on common respiratory hazards and symptoms of exposure.

Before wearing a respirator, employees must be fit tested by Safety and Risk Management to ensure their respirator protection equipment is the proper size and fits appropriately. Fit testing must be done annually or more frequently based on substantial weight gain/loss or facial surgery. Only use respirators that are approved by National Institute for Occupational Safety and Health.

9.7.2. Selecting a Respirator

Safety and Risk Management will help departments to select the respirator. When selecting a respirator, consider the following factors:

- Type of hazards
- Identity and concentration of the contaminant
- Time constraints
- Activity of the person wearing the respirator
- Degree of protection provided by each type of respirator

Respirators are available in different sizes. Always fit test a respirator to select the correct size.

9.7.3. Using Respirators Safely

Your respirator is necessary to prevent the inhalation of particulates, gases, vapors, aerosols, or other contaminants. Be sure you have notified Safety and Risk Management of all hazardous chemicals or materials you will be working with to ensure you have been provided the best possible respiratory protection.

- It is important to remember the following:
- Only use the respirator you were approved to wear and that has been properly fit tested.
- You must be familiar with the respirator, its use and limitations, and how to properly maintain and care for your respirator.
- You may not have facial hair that interferes with the seal of a tight-fitting respirator. If you were fit tested without facial hair or with a minimal amount of facial hair, you must not wear your respirator with additional hair growth.

- You should contact Safety and Risk Management to be fit tested again if you have facial or dental surgery, significant weight gain or loss, facial scarring, or anything else that might affect the fit and seal of your respirator.
- You should be fit tested annually.

9.7.4. Safety Tips:

Inspect respirator before and after each use to ensure that all parts are present or attached and are functioning properly.

Rubber and plastic parts should be checked for signs of wear and tear (cracking, stiffness, etc.). If you identify any worn or weak parts, do not use the respirator.

Perform a positive pressure and negative pressure seal check every time you put on the respirator.

Positive pressure check: Cover the exhalation valve of the respirator with the palm of your hand. Exhale gently for about 10 seconds to build up a slight pressure. If air leaks out, the respirator is not sealing properly and should be repositioned before entering the hazardous area.

Negative pressure check: Cover the filter or cartridge openings of the respirator with the palms of your hands. Inhale gently and hold your breath for about 10 seconds. You should notice a slight suction. If the face piece does not collapse inward or you feel an air leak, the respirator is not sealing properly and should be repositioned before entering the hazardous area.

Leave the respiratory protection area if any of the following occur:

- If your respirator is damaged.
- If your breathing becomes difficult.
- If you become dizzy.
- If you detect a respirator failure (smell something you did not notice before, eyes begin to water, etc.).
- If you feel your seal has been broken (air getting in or out around your face piece).

DO NOT REMOVE OR REPOSITION YOUR MASK UNTIL YOU HAVE LEFT THE AREA.

9.7.5. Storage, Cleaning, and Care:

Store respirator in a clean, cool area (away from dust, sunlight, extreme temperatures, moisture, and chemicals).

Do not hang respirator by headband.

The respirator should be cleaned regularly with respirator wipes or a detergent solution. All parts should air dry or be wiped dry with a lint free cloth.

Clean and disinfect the respirator after each use if shared by more than one person (NOTE: respirators may be shared only by individuals who have been properly trained and fit tested for that respirator).

10. Fall Protection

This manual covers everyone except those inspecting, investigating, or assessing workplace conditions prior to the actual start of work or after all work has been completed.

This manual identifies areas or activities where fall protection is needed. These include, but are not limited to, ramps, runways, and other walkways, excavations, hoist areas, holes, formwork and reinforcing steel, leading edge work, unprotected side and edges, overhand bricklaying and related work, roofing work, precast concrete erection, wall

openings, residential construction, and other walking/working surfaces. The rule sets a uniform threshold height of 6 feet, thereby providing consistent protection. This means that employers must protect employees from fall hazards and falling objects whenever an affected employee is 6 feet or more above a lower level. Protection also must be provided for workers who are exposed to the hazard of falling into dangerous equipment.

10.1. Fall Protection Requirements

This manual prescribes the duty to provide fall protection, sets the criteria and practices for fall protection systems, and required training.

In the construction industry in the U.S., falls are the leading cause of worker fatalities. Each year, on average, between 150 and 200 workers are killed and more than 100,000 are injured as a result of falls at construction sites alone.

Standards for fall protection deal with both the human and equipment-related issues in protecting workers from fall hazards. Employers and employees are required to do the following:

- Where protection is required, select fall protection systems appropriate for given situations.
- Use proper construction and installation of safety systems.
- Supervise employees properly.
- Use safe work procedures.
- Train workers in the proper selection, use, and maintenance of fall protection systems.

10.2. General Fall Protection

Employers must assess the workplace to determine if the walking or working surfaces on which employees are to work have the strength and structural integrity to safely support the workers. Once the employer has determined that the surface is safe for the employees to work on, the employer must provide the proper fall protection for the fall hazard that is present. The employer must provide fall protection for employees, after identifying and evaluating fall hazards and providing specific training.

10.3. Controlled Access Zones

A controlled access zone is a work area designated and clearly marked in which certain types of work (such as overhand bricklaying) may take place without the use of conventional fall protection systems-guardrail, personal arrest or safety-net to protect the employees working in the zone. Controlled access zones are used to keep out workers other than those authorized to enter work areas from which guardrails have been removed. Where there are no guardrails, masons are the only workers allowed in controlled access zones. Controlled access zones, when created for leading edge work is taking place, must be defined by a control line or by any other means that restricts access. Control lines shall consist of ropes, wires, tapes or equivalent materials, and supporting stanchions, and must be:

- Flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material.
- Rigged and supported in such a way that the lowest point is not less than 39 inches from the walking/working surface and the highest point is not more than 45 inches (50 inches for overhand bricklaying) from the walking/working surface.
- Strong enough to sustain stress of not less than 200 pounds. Control lines shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.
- Control lines also must be connected on each side to a guardrail system or wall.

10.4. Guardrail Systems

If the employer chooses to use guardrail systems to protect workers from falls, the systems must meet the following criteria:

- Toprails and midrails of guardrail systems must be at least one-quarter inch nominal diameter; it must be flagged at not more than 6 feet intervals with high-visibility material, and must be inspected as frequently as necessary to ensure strength and stability. The top edge height of toprails or guardrails must be 42 inches plus or minus 3 inches above the walking/working level.
- When midrails are used, they must be installed at a height midway between the top edge of the guardrail system and the walking/working level and there shall be no openings in the guardrail system more than 19 inches.
- The guardrail system must be capable of withstanding a force of at least 200 pounds applied within 2 inches of the top edge in any outward or downward direction and must not deflect to a height less than 39 inches above the walking/working level.
- Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding a force of at least 150 pounds applied in any downward or outward direction at any point along the midrail or other member.
- When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section must be placed across the access opening between guardrail sections when hoisting operations are not taking place.
- At holes, guardrail systems must be set up on all unprotected sides or edges. When holes are used for the passage of materials, the hole shall not have more than two sides with removable guardrail sections.
- If guardrail systems are around holes that are used as access points (such as ladderways), gates must be used or the point of access must be offset to prevent accidental walking into the hole.
- If guardrails are used at unprotected sides or edges of ramps and runways, they must be erected on each unprotected side or edge.
- Around holes (including skylights) that are more than 6 feet above lower levels.
- Excavation of 6 feet or deeper shall be protected from falling and where walkways are provided to permit foot traffic to cross over excavations, guardrails are required on the walkway if the fall would be 6 feet or more to the lower level.

10.5. Personal Fall Protection Systems

This includes any of the following: an anchorage, connectors, and a full body harness and may include a deceleration device, lifeline, or suitable combinations. If a personal fall arrest system is used for fall protection, it must do the following:

- Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness;
- Be rigged so that an employee can neither free fall more than 6 feet nor contact any lower levels;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet.
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less.
- Personal fall protection systems must be inspected prior to each use for wear damage, and other deterioration. Defective components must be removed from service.
- Snaphooks shall be sized to be compatible with the member to whom they will be connected, or shall be a locking configuration.
- Horizontal lifelines shall be designed, installed, and used under the supervision of a qualified person, as part of a complete personal fall arrest system that maintains a Safety factor of at least two. Lifelines shall be protected against being cut or abraded.
- Full body harnesses are the only acceptable harness and must be used at all times on all personnel lifting equipment, including scissor lifts (NO BELT HARNESSSES ALLOWED).

10.6. Safe Monitoring Systems

When no other alternative fall protection has been implemented, the employer shall implement a safe monitoring system. Employers must appoint a competent person to monitor the safety of workers and the employer shall ensure that the safety monitor:

- Is competent in the recognition of fall hazards.
- Is capable of warning workers of fall hazard dangers and in detecting unsafe work practices.
- Is operating on the same walking/working surfaces of the workers and can see them.
- Is close enough to work operations to communicate orally with workers and has no other duties to distract from the monitoring function.

Mechanical equipment shall be used or stored in areas where safe monitoring systems are being used to monitor employees engaged in roofing operations of low-sloped roofs. No worker, other than one engaged in roofing work (on low-sloped roofs) or one covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safe monitoring system. All workers in a controlled access zone shall be instructed to promptly comply with fall hazard warnings issued by safe monitors.

10.7. Toeboards

When toeboards are used as protection from falling objects, they must be erected along the edges of the overhead walking or working surface for a distance sufficient to protect persons working below. Toeboards shall be capable of withstanding a force of at least 50 pounds applied in any downward outward direction at any point along the toeboard. Toeboards shall be a minimum of 3.5 inches tall from their top edge to the level of the walking/working surface, have no more than 0.25 inches clearance above the walking/working surface, and be solid or have openings no larger than 1 inch in size. Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening must be erected the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

10.8. Ramps, Runways and Other Walkways

Each employee using ramps, runways, and other walkways shall be protected by guardrails systems against falling 6 feet or more.

10.9. Steep Roofs

Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels shall be protected by either guardrail systems with toeboards, a safety net system, or a personal fall arrest system.

10.10. Wall Openings

Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface must be protected from falling by the use of either a guardrail system, a safety net system, or a personal fall arrest system.

10.11. Ladders

Ladders can make many tasks easier, but they are also a continual safety hazard. Even the best ladder is not safe unless you are trained and proficient in using ladders. Each year, many people suffer serious injuries from accidents involving ladders. Before you use a ladder, take a moment to think about doing it safely.

A secure, well-made ladder is necessary for safe ladder use. Ladders come in different styles, including step, straight, and extension. They also vary in construction and may consist of wood, aluminum, or fiberglass. Choose the correct type and size ladder for the job. All ladders sold within the U.S. are rated as follows:

- Type IA: Heavy-duty industrial ladder rated to hold up to 300 pounds.
- Type II: Medium-duty commercial ladder rated to hold up to 225 pounds.
- Type III: Light-duty household ladder rated to hold up to 200 pounds

Follow these guidelines for safe ladder usage:

- Always inspect a ladder before you climb it. Make sure the steps are sturdy and the locking mechanisms are in good working order.
- Carry ladders horizontally with the front end slightly higher than the back end.
- To open a stepladder, make sure the spreader is locked and the pail shelf is in position. To open an extension ladder, brace the bottom end and push the rungs or rails out.
- Place ladders on a solid, level surface to ensure safety.
- Watch for overhead obstructions and power-lines.
- To prevent ladders from sinking into soft ground, use a large board under the feet of the ladder.
- Position a straight or extension ladder so that the use of the ladder is one foot away from the vertical support for every four feet of working ladder height (e.g., if you are working with eight feet of ladder, place the base of the ladder two feet from the wall).
- Do not place the top of a ladder against a window or an uneven surface.
- Tie the top of a straight or extension ladder to supports.
- An extension ladder used for access to a roof must extend at least 3 feet beyond the support point.
- Use a wooden or plastic ladder if you must work near electrical sources.
- Do not place a ladder in front of a door unless you lock and barricade the door and post a warning sign on the opposite side of the door.
- Use common sense when climbing or working on ladders.
- Wear shoes with slip-resistant soles and make sure they are dry before climbing.
- Never allow more than one person on a ladder.
- To climb or descend a ladder, face the ladder and firmly grip the rails, not the rungs, with both hands.
- Keep your body between the rails at all times. Do not shift your weight to one side.
- Have somebody steady the ladder if it cannot be secured otherwise.
- Do not stand on the top four rungs of an extension ladder or the top two rungs of a step ladder.
- When working on a ladder, keep two feet and one hand on the ladder at all times.
- Do not stand on the bucket shelf of a ladder.
- When working on a ladder, carry small tools on a tool belt. Use a rope to raise and lower heavy tools.
- Never leave a raised or open ladder unattended.
- Store ladders away from heat and moisture. Destroy damaged or unsafe ladders.

10.12. Scaffolding

When employees must conduct construction work above the ground and away from solid platforms, scaffolds may be appropriate. The following list provides guidelines for using small scaffolds. Larger scaffolds must be designed and erected in accordance with applicable standards.

Ensure that scaffold anchors are sound, rigid, and capable of supporting the maximum intended load without shifting.

Scaffolds and their components should be capable of supporting at least four times their maximum load.

- For freestanding, mobile scaffolds, the height should not exceed four times the minimum base dimension. If workers are riding the scaffolding, however, the base dimension should be at least one half the heights.
- Do not use unstable objects such as barrels, boxes, bricks, or blocks to support scaffolds or planks.
- Keep floors free of debris where mobile scaffolds are used.

- Lock scaffolds with wheels into position.
- Install guardrails, midrails, or toeboards on the open sides and ends of platforms that are more than 4 feet above the ground or floor level. Use lifelines for scaffolds that are more than 10 feet off the ground.
- Either overlap multiple planking and platforms by 12 inches or secure them to ensure stability.
- NOTE: Planks must extend over end supports between 6 and 18 inches.
- Secure scaffolds to permanent structures with anchor bolts or other means. Do not load scaffolds in excess of their maximum load limits. Repair damaged scaffolds immediately.
- Do not work on scaffolds in high winds or during storms.
- Remove ice or snow from scaffolds and apply sand to the wood before conducting work in winter weather.
- Do not allow tools, equipment, or other debris to accumulate on scaffolds. Dismantle and remove scaffolds when they are no longer needed. Do not use temporary scaffolding as a permanent installation.

11. Confined Space

Any individual entering into a confined space on LC property will do so in accordance with the procedures outlined by OSHA regulation 29 CFR 1910.146. The purpose is to identify, document, evaluate, and properly label all confined spaces on the Laredo College campus, and to allow only trained and authorized personnel to enter such spaces.

This manual also provides guidelines for all entries into confined spaces on Laredo College grounds and facilities, so that they can be accomplished in a safe and healthful manner.

11.1. Purpose

Confined spaces can present unique and very dangerous safety situations to those that must enter. By their definition, confined spaces can typically be difficult to enter and exit. Confined spaces can also contain atmospheric gases and other hazards that make them particularly hazardous for personnel entry.

Training, signage and safety equipment, will be provided, as appropriate; to be sure that employees are vigilant in their work in and around confined spaces and do not inadvertently or innocently enter into a confined space. The potential for serious injury is high, thus it is important that Laredo College employees who may enter any confined space, work with their department and Safety and Risk Management to ensure that all necessary safety precautions are considered and taken.

11.1.1. Definitions

A confined space is defined as a space with the existence of all of the following conditions:

- Large enough and so configured that an employee can bodily enter and perform assigned work. Has limited or restricted means for entry or exit.
- Is not designed for continuous employee occupancy.

A permit required confined space (PRCS) is a confined space the presents or has the potential for hazards related to:

- Atmospheric conditions (toxic, flammable, asphyxiating)
- Engulfment
- Configuration
- Any other recognized serious hazard

11.1.2. Locations:

Laredo College has undertaken the effort to identify and maintain a detailed listing that permanently identifies locations meeting the criteria for a confined space. In addition, Laredo College will identify and label Permit Required Confined Spaces (PRCS). Only appropriately trained individuals may enter PRCS.

11.1.3. Examples of a Confined Space

Some examples of confined spaces at Laredo College include manholes, boilers, tanks, vats, sewer pipelines, and vaults without existing general ventilation.

11.2. Training

All employees that participate or have duties in a confined space will receive training to ensure that each individual has the understanding, knowledge and skills necessary to safely perform activities in the confined space.

11.3. Working in a Confined Space

All work in a confined space must be performed in accordance with Occupational Safety and Health Administration standards. If you are unsure about whether you will be entering a confined space, you must STOP and contact your supervisor or Safety and Risk Management, before entering the area.

12. Fire and Life Safety

Fire and life safety at Laredo College is governed by federal, state and local, standards including System Regulations and District Rules and Districts Standard Administrative Procedures. Ultimate jurisdiction for fire safety lies with the Texas State Fire Marshal and with the local Authority Having Jurisdiction (AHJ) as designated by the President of Laredo College. The President has designated the Safety and Risk Manager for Fire and Life Safety in the Office of Safety and Risk Management to be the local AHJ and to be responsible for the day to day fire prevention, inspection, and program oversight. However, each and every individual, whether faculty, staff, student, or visitor on our campus shares a role in fire safety.

Laredo College is committed to providing a safe environment for building occupants and emergency response personnel. Laredo College involves numerous activities, programs, and procedures to help ensure that our campus is a safe place, which include fire prevention, fire suppression, emergency preparedness, preplanning, education, and response. The following information is provided as a general guideline for activities associated with fire and life safety.

12.1. Applicable Codes and Standards

The Texas State Fire Marshal's Office has adopted the National Fire Protection Association Life Safety Code® and all referenced codes and standards as the primary guide for fire and life safety. It is important to note that this code is not all inclusive, is not a building code, and that other codes and standards may also apply. Some of these include, but are not limited to:

- International Building Code,
- International Fire Code,
- International Mechanical Code,
- Americans with Disabilities Act, and
- Texas Accessibility Standards Act.

12.2. Appliance

An appliance can be defined as any instrument or piece of equipment or device designed for a particular use and powered by electricity. (i.e. computers, copy machines, refrigerators, freezers, space heaters etc.) Use the following guidelines when using appliances on campus.

- Always use appliances that are UL or FM labeled.
- Adequate space should be given around appliances to allow for air circulation.
- Clothes dryers should have the lint removed after each load and excess buildup of lint around the dryer should be cleaned regularly.
- Large appliances such as refrigerators and freezers should be plugged directly into wall outlets.
- Frequently inspect the electrical connection of appliances to ensure a good connection with the receptacle
- Frequently inspect the condition of appliances. If appliances begin to spark or produce an electrical smell, turn power off immediately and discontinue using the appliance.

12.3. Arson

If arson is suspected, no matter how small the incident, contact the Laredo College Campus Police or Safety and Risk Management. Do not alter the fire scene in any way, unless you are trying to extinguish a live fire. Laredo College Campus Police will investigate any possible arson.

12.4. Building Evacuations/Drills

To ensure that building occupants are prepared for an emergency evacuation, drills must be conducted on a regular basis. Evacuation drills may be used to vacate a building for several reasons such as fires, gas leaks, chemical spills, bomb threats or other similar emergencies and emphasis should be placed on orderly evacuation rather than on speed.

12.4.1. These drills should:

- Involve all occupants. Everyone should leave the building when the fire alarm sounds. Occupants should close (not lock) doors as they leave the work area, provided this does not violate security procedures. Items that require security may be placed in a locking file cabinet or desk drawer on the way out.
- Employees should check all rooms and close doors on their way out.
- All building occupants should gather in the preplanned meeting place.

Upon completion of the drill, an evaluation of the drill shall be conducted and filed with Safety and Risk Management to identify any areas for improvement and to document the drill.

12.5. Candles and Incense

Candles, incense burners, oil lamps or other personal items that have open flames or that smolder, are prohibited in work areas (individual or group), conference rooms, restrooms, etc. in all campus buildings. This restriction applies to such items regardless of whether the item has been lit.

12.6. Combustible Storage

One of the most common violations of general fire safety practices is that of improper or excessive storage of combustible material. By storing excess combustible materials improperly, employees not only increase the potential for having a fire, they increase the potential severity of a fire. To reduce the hazards associated with combustible storage, follow these guidelines:

- Eliminate excess combustible materials such as paper and cardboard.
- Never store combustible materials in hallways, stairwells, or mechanical rooms.
- When stacking combustible materials, leave at least 24" from the top of the storage to the ceiling.

12.7. Compressed Gas Cylinders

Compressed gas cylinders, in service or in storage, shall be adequately secured (chained) to prevent falling or being knocked over. Ropes, cords, rubber and other combustible material are not approved for this purpose. Compressed gas cylinders shall have their caps in place except when they are in use or are being serviced or filled.

12.8. Construction and Renovation

Safety and Risk Management serves the role of Authority Having Jurisdiction (AHJ) for all Laredo College owned property and any buildings or structures on that property. All proposed construction, structural changes, or changes in the use, or any change effecting egress from a space within a building on the Laredo College campus, regardless of facility ownership, must be reviewed and approved by the Safety and Risk Management and Physical Plant in order to address fire and life safety issues.

12.9. Decorations

When decorating your area, there are several things that you must be aware of:

- Never hang anything from fire sprinkler piping or heads
- Never obstruct fire alarm devices
- Any combustible decorations such as curtains or drapes must be of a fire-resistant material
- Never obstruct an exit or the visibility thereof
- Never staple or tack light strings
- Never hang anything from ceiling grid system or ceiling tiles
- Decorations should not be placed in exit corridors or stairways

12.10. Holiday Decorations

Holiday decorations are often fire hazards if not utilized properly. Follow these guidelines to improve fire Safety during the holidays:

- Live cut Christmas trees are prohibited in all district buildings
- Use an artificial tree that is fire resistant.
- Do not place holiday decorations where they may block emergency egress (e.g., stairways, corridors, near doors, etc.)
- Only use decorations that are fire retardant.
- Practice good housekeeping by minimizing paper and other combustible decorations.
- Avoid using extension cords. If you must use an extension cord, use a heavy gauge cord and place it in plain view. Make sure the cord does not pose a tripping hazard.
- Use FM or UL labeled electrical decorations.
- Do not light candles or use other decorations with open flames
- Turn off lights when the room is unoccupied.

12.11. Extension Cord and Power-Strip Use

Many times, it is necessary to use extension cords or power strips (surge protectors) to reach a work area or to provide additional outlets. It is important not to overload outlets, protect cords, and follow the manufacturer's recommendation. Additionally, the following guidelines should be used while utilizing these items:

- Extension cords are for temporary use (defined as an 8-hour work day or less)
- Unplug and properly store cords when not in use
- Install permanent code compliant wiring for long term use
- Extension cords or power strips must be plugged directly into a wall receptacle – no daisy chaining is permitted
- Extension cords should be used for portable equipment
- Extension cords and power strips should be examined regularly for damage and removed from service if damage is found
- Extension cords and power strips should be UL listed
- Extension cords shall not be run above ceiling or under carpet or other similar materials

12.12. Electrical Panel Access

A working space of not less than 30" wide (or width of equipment), 36" deep and 78" high shall be provided in front of electrical service equipment. No storage shall be permitted within this designated work space.

12.13. Emergency Access and Egress

Emergency access and egress are critical during an emergency situation such as a fire. During a fire, timing and quick response are essential to save lives and property. Effective emergency access ensures that fire trucks can reach a building in time to extinguish the fire. Unobstructed emergency egress ensures that building occupants can exit a building to safety.

Emergency access helps ensure that facilities and equipment remain available and unobstructed at all times to ensure effective fire detection, evacuation, suppression, and response. Emergency egress is defined as a continuous and unobstructed way to travel from any point in a public building to a public way. A means of egress may include horizontal and vertical travel routes, including intervening rooms, doors, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, courts, and yards.

12.13.1. Corridors, Stairways, and Exits

An exit corridor and/or stairway is a pedestrian pathway that allows direct access to the outside of a building and/or allows access to a building entrance and subsequent pathways to the outside of a building (i.e., an exit corridor is the quickest, easiest, and most direct pathway for leaving a building). Because exit corridors or passageways are the primary means of egress during an emergency, employees must follow the Safety guidelines outlined in this section.

Follow these guidelines to promote safe evacuation in corridors, stairways, and exits:

- Keep all means of egress clean, clutter-free, and unobstructed
- Do not place hazardous materials or equipment in areas that are used for evacuation
- Do not use corridors or stairways for storage or office/laboratory operations
- Do not place locks, chains, or other devices that can defeat or obstruct an exit without prior written permission from Safety and Risk Management.
- Corridors may not be used as an extension of the office or laboratory

12.14. Flammable and Combustible Liquids

Flammable Liquids are further classified as Class I, Class IA, IB and IC liquids. Combustible liquids are further classified as Class II, Class III, Class IIIA and Class IIIB liquids. You can identify if you are working with flammable or combustible materials by referencing the flash point on the product label or SDS sheet.

When working with these materials, precautions should be taken to prevent the ignition of flammable vapors by sources such as the following: open flames, hot surfaces, radiant heat, smoking, cutting and welding, sparks, static electricity. Make sure you are in a well ventilated and/or exhausted area to allow dangerous vapors to dissipate or escape the area. Only acceptable containers that meet the requirements set forth in the Flammable and Combustible Liquids Code published by the National Fire Protection Association (NFPA) should be used with flammable and combustible liquids. The allowable size of these containers is dependent upon the class of liquid and the container type and is specified in the Flammable and Combustible Liquids Code (NFPA 30). Flammable and combustible liquids should be stored inside a flammable liquid's storage cabinet with an aggregate amount of liquid stored in an individual storage cabinet not to exceed 120 gallons.

12.15. Fire Detection and Notification

Most occupied buildings on the Laredo College campus have automatic fire detection/notification systems installed in them. These systems are monitored at the Physical Plant and the Laredo College Campus Police Department. These

systems utilize several different types of detection devices including heat, flame, and smoke detectors, relays from suppression/extinguishing systems, and manual pull stations to activate the notification portion of the system.

12.15.1. Heat Detectors

Heat detectors respond to the converted energy in hot smoke and fire gases (i.e., heat). Heat detectors are normally located in laboratories, mechanical rooms, storage areas, break rooms, and areas that could produce high levels of dust, steam, or other airborne particles.

12.15.2. Smoke Detectors

Smoke detectors respond to the solid and liquid aerosols produced by a fire (i.e., smoke). Since smoke detectors cannot distinguish between smoke particles and other particles such as steam, building occupants must be aware of detector locations and be considerate when working around them. Smoke detectors are normally found in exit corridors, office areas, assembly areas, and sleeping areas.

12.15.3. Flame Detectors

Flame detectors respond to the presence of a flame. Flame detectors may be found in specific areas where a fire will develop rapidly and the hazard is greater than what is expected in normal locations within buildings such as chemical storage rooms. These devices are most commonly used in conjunction with a fire extinguishing system.

12.15.4. Manual Pull Stations

Manual pull stations, when activated, will initiate the buildings fire alarm notification system. Pull stations are generally located near exit stairways, near building exits, or in long corridors. Occupants should be familiar with the location of these devices should one need to initiate a building evacuation.

12.15.5. Building Notification

The building notification system may consist of horns, bells, speakers, strobes, or a combination of these devices. It is important to maintain a clear line of sight to any of these devices to ensure they can be seen and/or heard.

12.16. Fire Doors

Fire doors serve as a barrier to limit the spread of fire and restrict the movement of smoke. Unless these doors are held open and released by the building fire alarm system fire doors should remain closed at all times. Do not tamper with fire doors or block them with equipment, potted plants, furniture, etc.

Fire doors are normally located in stairwells, corridors, and other areas required by Fire Code. The door, door frame, locking mechanism, and closure are rated between 20 minutes and three hours. A fire door rating indicates how long the door assembly can withstand heat and a water hose stream. All fire doors will have a label affixed to the door indicating the manufacturer, rating, serial # of the door and other information. It is important to not remove, paint, or in any way damage or destroys the label.

For your Safety and to maintain the integrity of fire doors there are several important items to remember:

- Know which doors are fire doors and keep them closed to protect building occupants and exit paths from fire and smoke.
- Never block a fire door with a non-approved closure device such as a door stop, blocks of wood, or potted plant.
- For fire doors with approved closure devices, make sure that nothing around the door can impede the closure.
- Never alter a fire door or assembly in any way. Simple alterations such as changing a lock or installing a window can lessen or completely void the fire rating of the door.
- Doors to offices, laboratories, and classrooms help act as smoke barriers regardless of their fire rating. Keep these doors closed whenever the room is unoccupied.

- A closed door is the best way to protect your path to Safety from the spread of smoke and fire.

12.17. Fire Extinguishers

Fire Extinguishers, when used properly, play a vital role in containing and/or extinguishing small fires. Portable fire extinguishers are designed to be used on small, contained fires, by properly trained individuals. Lives could be saved, and property damage reduced, when fire extinguishers are used correctly.

Know the location of the closest extinguisher. A quick response is crucial to effectively put out a fire. You should not have to travel any farther than 75 feet to get to an extinguisher. This distance may be reduced in labs and other high hazard areas.

There are five classifications for fires. These are:

- Class A: Fires involving ordinary combustibles, such as paper, wood, plastic, cloth, and trash.
- Class B: Fires that involve flammable or combustible liquids, such as gasoline, solvents, oil, paint, and thinners.
- Class C: Fires that involve energized electrical equipment or appliances.
- Class D: Fires involving flammable metals, such as magnesium and sodium.
- Class K: Fires that involve cooking media, such as vegetable oils.

There is no extinguisher that is designed to be used on all types of fires. It is important to know your fire extinguisher and its limitations.

Portable fire extinguishers are located throughout buildings across the campus. They are installed according to National Fire Protection Association codes and standards. Extinguishers are readily accessible in hallways, near exits, and in areas containing high fire hazards. Never block access to an extinguisher.

12.17.1. Using a Fire Extinguisher

To use a fire extinguisher, you must remember the PASS-word.

- P-Pull the ring-pin (held in place by a plastic seal) to “un- lock” the operating lever.
- A-Aim the nozzle at the base of the fire
- S-Squeeze the lever completely
- S-Sweep the extinguishing agent from side to side until the fire is extinguished

The normal operating distance of different extinguishers will vary considerably. A dry chemical extinguisher will have a discharge range of 8-10 feet, while a Carbon Dioxide extinguisher may only reach 5-6 feet.

Remember:

- Only attempt to extinguish small, contained fires
- Make sure you are properly trained, and capable of fighting the fire
- Be certain that you have the correct extinguisher for the type of fire
- Always keep a clear, unobstructed exit
- Never turn your back on a fire
- Fires may re-ignite, so be prepared

12.17.2. Training

Learn how to use a fire extinguisher before an emergency occurs. Safety and Risk Management provides hands on training in the use of portable fire extinguishers. Participants will learn about the different types of extinguishers, how to use each type, and will have the opportunity to extinguish a real fire. Make sure you have

the correct extinguisher for the type of fire to be extinguished. All extinguishers have a label that states what type of fire they can be used on and this will be explained to further assist occupants in selecting the proper type of extinguisher. For information or to register for a class, contact Safety and Risk Management.

12.18. Fire Hydrants

Fire hydrants are located throughout the campus and play a vital role in fire suppression operations. It is important to maintain a clear path to all hydrants and allow clear distances around hydrants to allow uninhibited operation should an emergency occur. It is also important that vehicles are not parked within 15 feet of fire hydrants or other fire Safety equipment.

12.19. Fire Lanes

A fire lane is an area designated for emergency personnel only. It allows them to gain access to building and/or fire protection systems. Parking in or blocking any fire lane is prohibited.

12.20. Fire and Life Safety Inspections

Fire and life Safety inspections are conducted at least annually in Laredo College facilities. The goal of these inspections is to help identify potentially unsafe practices and conditions in Laredo College facilities. These are not surprise inspections. Safety and Risk Management will notify administration prior to inspecting a facility. We want to work with building occupants to help ensure a fire safe environment in which to work. Some of the items that our inspectors will be looking for include but are not limited to:

- Access to the facility for emergency responders
- Means of egress and verifying that egress components are unobstructed and in working condition
- Electrical Safety (extension cords, power strips etc.)
- Storage of materials (24" from ceiling, 18" from sprinkler heads)
- General Housekeeping
- Presence of ignition sources

At the conclusion of the inspection a report is generated and sent back to the proper directors, supervisors or administrators to be disseminated to the building occupants for them to take necessary actions to remediate any inspection deficiencies.

12.21. Fire Prevention

Fire Safety is everyone's responsibility. In fact, you are your office's best fire inspector. The following section will provide ways you can help prevent fires.

Fire prevention starts with good housekeeping. Loose papers, trash and other combustible items such as cardboard boxes are a fuel source for fire. If these combustible items are stored neatly and properly the risk of fire can be greatly reduced. Here are some things to be mindful of when it comes to combustible items:

- Never store combustible items within 24 inches of the ceiling.
- If you have sprinkler heads in your building keep ALL storage at least 18 inches below the sprinkler heads.
- Keep combustible items away from electrical sources that may produce heat and/or sparks. (Outlets, multiple adapters, etc.)
- Keep quantities of combustible items to a minimum.
- Never store combustible items in an exit corridor or stair enclosure.
- Combustible items should not be stored in mechanical equipment rooms or electrical rooms.

12.22. Fire Reporting

If you discover a fire in a facility on campus you should locate and activate the nearest manual pull station (Pull stations should be located near building exits) to initiate a building evacuation. Call 4303 or 5303 from any campus phone or 911 if calling from a cell or off campus phone to report the fire and provide any information such as:

- Building Name
- Room Number
- Type of Fire
- Any injuries
- Any other information requested by the emergency operator

If you are trained in the proper use of portable fire extinguishers and are not in immediate danger you may attempt to extinguish the fire.

12.23. Fire Suppression

Laredo College uses various types of fire suppression equipment including portable fire extinguishers, water sprinklers, special gas extinguishing systems, cooking hood systems, and fire hose/standpipe systems. The following sections discuss each type of fire suppression equipment.

12.23.1. Sprinkler Systems

The purpose of a water sprinkler system is to contain and to minimize the spread of a fire, but is often successful in extinguishing fires. Sprinkler heads are normally activated by heat. Generally, if one is activated not all of the sprinklers in a building will discharge. Only in specialized sprinkler systems are they connected to smoke detectors or manual pull stations.

12.23.2. To Ensure That All Sprinklers are Effective in the Event of a Fire:

- Maintaining a minimum of 18 inches of clearance below the sprinkler head is required to any equipment or stored items.
- Do not hang drapes, curtains, tarps, etc. that will interfere with the spray pattern of the sprinkler.
- Never attach or hang anything from sprinkler piping or sprinkler heads
- Do not paint or damage sprinkler heads in any manner.

12.23.3. Fire Hoses and Standpipe Systems

A standpipe system is an arrangement of piping, valves, hose connections and allied equipment installed in a building or structure for the purpose of manually extinguishing a fire. Fire hose cabinets are located in several buildings near or in the exit stairwells and in corridors. Laredo College holds the stance that employees should only attempt to extinguish a fire with a portable fire extinguisher. Local fire department responders will use the standpipe system in the event of a fire in a building. Access to these systems should be maintained at all times and should not be blocked by any equipment, chairs, desks, etc.

12.24. Pyrotechnics/Open Flames

The use of consumer fireworks on campus is prohibited.

12.24.1. Smoking

All district facilities, buildings, and vehicles, regardless of location, must be entirely smoke-free. This includes all foyers, entryways, classrooms, restrooms, offices, athletic facilities (indoor and outdoor), eating areas, and district-owned/leased housing.

To promote a safe, healthy, and pleasant environment for employees, students, and visitors, Laredo College has instituted a smoke-free policy.

12.24.2. Space Heaters

Some general guidelines to remember when using space heaters are:

- Always use appliances that are UL or FM labeled.
- Space heaters must never be left on unattended, even if you are just going to step out for a moment. Space heater must be equipped with an automatic shut off feature.
- Space heaters should be unplugged when not in use.
- A minimum of 36" should be maintained from any combustible materials. Adequate space should be provided around space heaters to allow for air circulation.
- Space heater should be plugged directly into wall receptacles. Frequent inspections of electrical cords for damage and to ensure a tight connection of the cord into the receptacle
- If heater begins to spark or produce an electrical smell, turn power off immediately and discontinue using the appliance.

13. Ground Maintenance

Laredo College spends considerable time, effort, and money on grounds maintenance. From flower care, to lawn care, tree trimming, and leaf blowing, Laredo College employees are responsible for safely maintaining the grounds on campus. Gardening tools and mechanical lawn care devices, such as lawn mowers, power blowers, and chain saws, present special Safety concerns for grounds maintenance personnel.

Common landscaping accidents include the following:

- Cuts, lacerations, or amputations from whirling mower blades.
- Bruises or broken bones from flying projectiles.
- Burns from hot equipment parts
- Electrical shock from faulty grounding or defective electrical cords
- Back strain from improper equipment usage
- Slips, trips, and falls

Regardless of the type of landscape equipment you use, follow these basic guidelines to ensure optimum safety:

- Read the equipment owner's manual.
- Use the right equipment for the job at hand.
- Inspect the equipment before each use.
- Know how to control and stop the equipment quickly.

Wear personal protection equipment, as necessary:

- Eye protection
- Hearing protection
- Long pants
- Sturdy, close-toed shoes
- Work gloves
- High visibility Safety apparel

Apply sunscreen to exposed areas of skin.

Be careful to avoid fatigue and heat stress (refer to the General Safety chapter in this manual for more information):

- Drink plenty of water (5-7 oz. every 20 minutes)

- Take breaks

Do not operate powered equipment if you are tired, sick, or taking medication. Take special precautions when working with electrical equipment. If you are using an extension cord, take care not to accidentally cut it. Do not smoke around gas powered equipment. Allow hot equipment to cool before refueling. Make sure that all guards are in place and in good condition. Keep pedestrians and bystanders at least 30 feet away when using powered equipment. Follow manufacturer's instructions prior to conducting maintenance activities on any equipment.

13.1. Hand Tools

Although garden hand tools tend to be safer than powered equipment, common gardening tools, such as rakes, shovels, and hoes cause thousands of injuries each year. Follow these guidelines for using garden hand tools.

- Keep hand tools in good condition. Replace split or rotten handles. Keep blades sharp.
- Buy quality tools that fit your needs and your build. For example, if you are tall, choose tools with handles that are long enough to prevent you from stooping over your work.
- Never leave a rake, shovel, or hoe on the ground facing up. Foot injuries from exposed metal and head injuries from handles that pop up unexpectedly are the main hazards associated with these tools.

13.2. Riding Lawn Mowers

Follow these guidelines for riding lawn mower safety:

- Before starting the engine, make sure the transmission is out of gear and the mower blade clutch is disengaged.
- Never allow extra riders on the lawn mower.
- Slow down when turning and when working on slopes. Mow up and down slopes rather than across them.
- Always look behind you before backing.
- If you hit a large rock or stump, stop the mower and inspect the blades and shaft. Replace damaged blades.
- Never leave a running lawn mower unattended. Before leaving the seat, park the mower on a flat area, disengage the mower blades, and remove the ignition key.

13.3. Walk-Behind Mowers

Follow these guidelines for walk-behind mower safety:

- Wear sturdy shoes with good traction. Never wear open-toed shoes around walk-behind mowers.
- Do not bypass the safety device that stops the blade when the operator releases his/her grip on the handle.
- Mow across slopes rather than up and down slopes.
- Work slowly and patiently when mowing tall grass or tough weeds. Forcing the mower may cause repeated clogs and engine stalls.
- Never leave a running mower unattended. If you stop momentarily, cut the throttle to idle and make sure the mower will not roll away.

14. Emergency Management

Laredo College is subject to emergencies or disasters resulting from human-induced incidents or natural phenomena. Laredo College employs an "all hazards" approach as the standard for emergency management.

14.1. Phases of Emergency Management

14.1.1. Mitigation

Mitigation activities are those which eliminate or reduce the probability of a disaster occurring. Also included are those long-term activities, which lessen the undesirable effects of unavoidable hazards. Examples include

fire suppressions systems in campus buildings, testing of natural gas lines and construction of detention ponds to control storm water.

14.1.2. Preparedness

Preparedness activities serve to develop the response capabilities needed in the event an emergency should arise. Planning and training are among the activities conducted under this phase.

14.1.3. Response

Response is the actual provision of emergency services during a crisis. These activities help reduce casualties and damage, and speed recovery. Response activities include warning, fire, evacuation, rescue, and other similar operations.

14.1.4. Recovery/Business Continuity

Recovery/Business Continuity is both a short-term and long-term process. Short-term operations seek to restore, or maintain vital services to the District and provide the basic needs of employees, students, and visitors. Long-term recovery focuses on restoring the District to its normal pre-disaster, or an improved, state of affairs. The recovery/business continuity phase is also an opportune time to institute future mitigation measures, particularly those related to the recent emergency.

14.2. Roles and Responsibilities

14.2.1. Individual

Given that emergencies cannot always be avoided, our common first line of defense is our own initial actions (i.e., those things that we do before emergency responders arrive). These actions are:

14.2.2. Maintain situational awareness

At its core, situational awareness involves being aware of where you are and what is happening around you to understand how information, events, and your own actions will impact your safety and your ability to protect yourself, both now and in the near future.

14.2.3. Take actions to protect yourself

Based upon your assessment of the situation, use your best judgment to protect yourself and, if possible, others (e.g., evacuate or shelter-in-place).

14.2.4. Summon assistance

Call for help. (See Section 4, Summoning Emergency Services, below.)

14.2.5. Warn others

Once you are safely away from the danger, warn others of the hazard.

14.3. Laredo College

Laredo College, through the Safety and Risk Management and Campus Police Department, is responsible for maintaining the emergency management program ranging from:

- Maintaining the broad-based Laredo College Emergency Operations Plan, and associated plans;
- Maintaining the emergency exercise and training program;
- Maintaining public awareness on emergencies; and
- Coordinating District efforts with local and regional partners

14.4. Summoning Emergency Services

To summon emergency services, call 5303 from a campus phone or 911 from a non-campus phone (e.g., cell phone). You can also contact LCPD dispatch at (956) 721-5303. Remember to remain calm, notify others, and respond to the

emergency as appropriate. Do not attempt to handle any emergency situation in which you do not have training (e.g., firefighting, first aid, spill response, etc.).

Relay the following information to the emergency dispatcher:

- Your location – building name and area
- Nature of emergency
- If there are any injuries
- Your name and the phone number you are calling from

Remember to always:

- Answer the emergency dispatcher's questions
- Follow all directions given
- Do not hang up until told

Other Emergency Telephone Numbers

- Laredo College Campus Police – (956) 794-4303
- Safety and Risk Management – (956) 764-5984

14.5. Training Resources

As part of an educational institution, it is important to provide training and educational opportunities for all those interested in learning more about emergency preparedness. For additional information about specific trainings that can be provided to students, faculty, and staff, please contact Safety and Risk Management at (956) 764-5984.

14.6. Warning Systems

Laredo College has many warning systems on campus. Each warning system is just one “tool” in the campus “warning toolbox”. Any one warning system can be used, as well as any system can be used in conjunction with others. In combination Laredo College is able to provide timely warnings to the campus community for imminent threats to safety and security.

14.6.1. LC Alert

LC Alert is Laredo College's emergency warning system comprised, but not limited to, SMS (text message), email and on-campus cable television.

The following are brief descriptions of the types of warning systems utilized by the district:

14.6.1.1. Building Fire Alarm Systems

These warning systems are ideal to provide immediate warnings to individuals within a given building.

14.6.1.2. Bull Horns (Megaphones)

Megaphones are often utilized by fire departments and law enforcement to project a warning message quickly to people within a defined area.

14.6.1.3. Weather Radios

Weather radios provide timely warnings to a broad populous for weather (or potential) emergencies activated by the National Weather Service.

14.6.1.4. Email / Text Messaging

Members of Laredo College campus community may receive email and/or text message warnings through voluntary participation in this system.

14.6.1.5. Television / Radio

Television and radio broadcasts are ideal for broad distribution of an emergency message to the masses. The message distribution can be accomplished by working with the media or automated text crawlers for television.

14.6.1.6. Laredo College Website

Emergency messages will be posted on the Laredo College website containing more detailed emergency information that otherwise cannot be distributed by other warning systems.

14.6.1.7. Word of Mouth

The most effective warning system is by word of mouth, whether it is from district officials or people passing on the emergency warning to others.