



nees @UCLA Safety Handbook



Revision History

Revision #	Date	Description
0	9/20/2004	
1	1/9/2009	-Add recommended sections per Risk Consultants Inc. Evaluation -Add reference to UCLA EH&S and Cal/OSHA websites in the IIPP section -Add revision history
2	4/9/2009	-Add a detailed Accident Analysis section -Add OSHA Action Plan section with link to UCLA EH&S -Forklift and Blood Borne Pathogens sections were expanded and links to UCLA EH&S were added
3	7/31/2010	-Modify title page -Review contents & reaffirm (no changes)
4	7/31/2012	-Modify title page -Review contents & reaffirm (no changes)

Management Commitment Statement

Safety and health at *nees@UCLA* must be a part of every activity. Without question, it is every employee's responsibility at all levels.

We will maintain a safety and health program conforming to the best practices of organizations of this type. To be successful, such a program must embody the proper attitudes toward injury and illness prevention on the part of department heads, principals, supervisors and employees. It also requires cooperation in all safety and health matters, not only between management and employees, but also between employees and their co-workers. Only through such a cooperative effort can an effective safety and health program be established and preserved.

The safety and health of every employee is a high priority. Management accepts responsibility for providing a safe working environment and employees are expected to take responsibility for performing work in accordance with safe standards and practices. Safety and health will only be achieved through teamwork. Everyone must join together in promoting safety and health and taking every reasonable measure to assure safe working conditions in the company.



Robert Nigbor
Co-PI and NEES@UCLA Operations Manager

7/31/2012

Date

This Safety Handbook was developed for the training of:

Students, faculty, staff and/or visitors using the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) facility at the University of California, Los Angeles (*nees@UCLA*).

This handbook is intended to be a supplement to the UCLA EH&S Handbook for Employees and the School of Engineering and Applied Science (SEAS) Laboratory Safety Manual and Chemical Hygiene Plan (available at the *nees@UCLA* website). Note that prior to engaging in any activities involving *nees@UCLA* resources, UCLA personnel must complete a safety training certification course given by UCLA SEAS in addition to review of this Safety Handbook.

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1. Introduction

The University of California, Los Angeles requires all university personnel including faculty, staff, students and visitors to follow safe working procedures. The UCLA Office of Environmental, Health and Safety (EH&S) is the department principally responsible for assisting in the implementation of University workplace health and safety principles and policies. EH&S responsibilities include:

- Accident Prevention
- Asbestos Management
- Biological Safety
- Education and Training
- Emergency Preparedness
- Environmental Health
- Fire and Life Safety
- Hazardous Materials Management
- Industrial Hygiene
- Occupational Safety
- Radiation Safety

All *nees@UCLA* personnel are required to comply with UCLA EH&S policies and standards. In addition to the policies and regulations set forth by UCLA EH&S, the *nees@UCLA* Safety Training Manual has been developed to ensure a safe and healthful work environment for each employee (including student and contract employees) and visitors while performing field experimental activities. The *nees@UCLA* Safety Training Manual is intended to establish a framework for identifying and mitigating workplace hazards, while addressing legal requirements for a formal, written Injury and Illness Prevention Program.

2. Responsibilities

nees@UCLA Operations Manager

The Operations Manager has the primary authority and responsibility to develop and ensure implementation of a safety plan to ensure the health and safety of the faculty, staff, students, and other visitors to the *nees@UCLA* Site. This is accomplished by performing the following tasks:

- Analyze work procedures to identify potential hazards and then implement measures to eliminate or control those hazards.
- Communicate work place hazards and safety policies to employees and visitors.
- Establish and enforce safe operating procedures for job tasks.
- Ensure that Material Safety Data Sheets (MSDS) are present for chemicals used in the department.
- Provide proper safety equipment and personal protective equipment to employees.
- Report work-related fires, accidents, injuries, near accidents, illnesses, property damage, and unusual occurrences to both EH&S and the Office of Insurance & Risk Management.
- Encourage prompt reporting of health and safety problems without fear of reprisal.
- Ensure that employees are trained in proper waste disposal procedures.
- Ensure that the Safety Committee is aware of all accidents which have occurred, and all hazards which have been observed since the last meeting
- Serve as a liaison with EH&S and other campus safety resources on issues the department cannot resolve
- Maintain copies of Safety Committee minutes and other safety-related records
- Review self-audits conducted by a PI, supervisor, lab or shop manager, designated research student, designated staff member, or a safety officer using the *nees@UCLA* Safety Self-Audit Checklist on an annual basis to assess both compliance with, and effectiveness of the *nees@UCLA* Safety Plan.

nees@UCLA Safety Officers

The *nees@UCLA* Safety Officers will consist of the Site Operations Manager and the project supervisor assigned to each project. All Safety Officers, including the Site Operations Manager and any project supervisors will have the ongoing responsibility to assess compliance with applicable regulations and campus policies, to evaluate reports of unsafe conditions, and to coordinate any necessary corrective actions. In addition, the Site Operations Manager will have the responsibility to maintain and update an Injury and Illness Prevention Program (IIPP). All the Safety Officers will meet periodically with the Principal Investigators, support technical staff, and student employees.

Unsafe conditions that cannot be immediately corrected by an employee, or his/her supervisor, should be reported to the Site Operations Manager.

Timely correction of workplace hazards will be tracked by the Site Operations Manager, which will receive and review reports of unsafe conditions, workplace inspection reports, and injury reports. Specifically, the Site Operations Manager will:

- Review the results of periodic, scheduled workplace inspections to identify any needed safety procedures or programs and to track specific corrective actions
- Review supervisors' investigations of accidents and injuries to ensure that all causes have been identified and corrected
- Where appropriate, submit suggestions for avoiding future incidents
- Review alleged hazardous conditions to determine necessary corrective actions, and assign responsible parties and correction deadlines
- When necessary, conduct its own investigation of accidents and/or alleged hazards to assist in establishing corrective actions, or seek the advice of University staff (EH&S).
- Conduct a periodic accident analysis. The accident analysis should include all injuries, property damage incidents, environmental incidents and near misses. The intent of an accident analysis is to search for accident trends, and when such trends are identified, appropriate corrective action should be taken.
- Provide periodic emergency preparedness training to staff members and periodic practice and disaster drills.

All Students, Faculty, Staff, Visitors and Guests

Every employee, student, or other person authorized to conduct *nees@UCLA* activities is responsible for complying with all applicable health and safety regulations, UC policies, and established work practices. This includes but is not limited to:

- Use common sense and good judgment at all times.
- Read and comply with all safety procedures.
- Inform your supervisor of workplace hazards.
- Attend established education and training sessions and comply with health and safety directions.
- Ask your supervisor whenever you have a concern about an unknown or hazardous situation.
- Conduct only those activities that your supervisor has approved; use UCLA facilities, equipment and tools only for the purpose for which they were designed.
- Follow safe operating procedures associated with your job tasks.
- Use proper personal protective equipment
- Know emergency plans and procedures for your work area.
- Analyze work procedures to identify hazards; ensure measures are implemented to eliminate or control those hazards.
- Use appropriate personal protective equipment as determined by your supervisor.
- Report unsafe conditions and potential hazards to your supervisor without fear of reprisal. These include malfunctioning equipment and work-related fires, accidents, incidents, injuries, illnesses, and property damage.

- Warn co-workers about defective equipment and other hazards.
- Ensure that environmental, health and safety obligations are carried out by everyone working in their operations.
- Participate in required inspection and monitoring programs.
- Consult Material Safety Sheets for the chemicals that you use.
- Ensure that proper hazardous waste disposal procedures are followed.

As an employee, you are entitled to employment in as safe a workplace as is reasonably achievable. As an employee who is covered by Cal/OSHA, you also have the right to:

- Receive general training in safe work practices and specific training with regard to hazards unique to the job assignment.
- Be given training in potential health hazards of materials and chemicals to which you may be exposed.
- Refuse to perform work that would violate the Labor Code, or any occupational safety and health standard or order whereby such violation would create a real and apparent hazard to your health or safety.
- Observe any monitoring or measuring of harmful substances in the workplace.
- Know the potential hazards associated with your work and work area as well as the control measures being used to protect you from those hazards.
- Report potential hazards without fear of reprisal or punishment.

UCLA EH&S

UCLA EH&S has overall responsibility for laboratory safety at UCLA facilities, including Cal/OSHA compliance. Management and staff should refer any Cal/OSHA issues directly to EH&S.

Safety Rules Enforcement

The purpose of this policy is to provide guidance for the enforcement of safety rules and regulations in effect at *nees@UCLA*. These rules and regulations follow federal rules and regulations governing workplace safety, state rules and regulations governing workplace safety, and UCLA policies and procedures governing working place safety.

Nees@UCLA expects all faculty and staff to abide by established workplace safety rules and regulations. Members of the *nees@UCLA* community are expected to conduct themselves with due care at all times, and to abide by established workplace safety rules and regulations. It is the responsibility of all members of the *nees@UCLA* community to enforce safety rules and regulations.

Violation of safety rules and regulations is a serious offense and may endanger the life of the violator and the lives of others. Employees and supervisors will be held accountable for violations and action may be taken which includes, but is not limited to:

1. Written and/or (documented) verbal warnings for minor violations.
2. Evaluation of the need for (re)training.
3. Further action for flagrant or repeated violations.

Questions regarding potential hazards in your *nees@UCLA*-related work environment should be directed in the stated order:

1. Supervisor
2. Site Operations Manager
3. EH&S Hotline at (310) 825-9797.

OSHA Action Plan

California Occupational Safety and Health Act (Cal/OSHA) safety inspections are made by the California Division of Industrial Safety without advance notice. Insofar as it is possible, inspections must be conducted in a manner compatible with University operations.

NEES@UCLA staff should immediately contact the NEES@UCLA Manager or PI if contacted by Cal/OSHA personnel. If neither Manager nor PI are available, staff member should contact EH&S for instructions at x55689. NEES@UCLA staff should not respond to Cal/OSHA questions or requests directly.

The UCLA EH&S response procedure for a Cal /OSHA safety inspection can be found at the following link:

<http://www.adminvc.ucla.edu/appm/public/820-1.htm>

3. Injury and Illness Prevention Program (IIPP)

UCLA is obligated to follow safety standards promulgated under the California Occupational Safety and Health Act (Cal/OSHA) to protect the health and safety of workers. Accordingly, rules, rights and responsibilities presented in this handbook are based on Cal/OSHA standards, other federal, state and local regulations, and sound safety practices. Additional information can be found on the UCLA Environmental Health and Safety website at www.ehs.ucla.edu and the Cal/OSHA website at www.dir.ca.gov/dosh.

3.1 General Safety

Housekeeping and general caution are key factors in avoiding accidents such as slips, trips and falls. To prevent injury, several general rules should be followed:

- Two man rule. Never work on a project site alone. The *nees@UCLA* Site strictly requires a minimum of two personnel during the installation, maintenance or operation of any equipment.
- Unless special written authorization is obtained from the Site Operations Manager, the *nees@UCLA* equipment and facilities can not be used after regular hours. Such authorization is valid only if the Principal Investigator of the particular project is present with his/her research assistants at all times during the period of authorization.
- When possible, keep floors clear of debris and spilled liquids.
- Keep designated walkways and doorways clear, unobstructed and free of electrical cords, boxes, and other equipment.
- Use proper step stools or ladders, not chairs, when climbing to reach high items.
- Use proper harnesses when working in an area with risk of falling a large distance (e.g. roofs, balconies).
- Properly store and handle any potentially hazardous chemicals.

3.2 Accident Analysis

Supervisors will investigate all accidents, injuries, occupational illnesses, and near-miss incidents to identify causal factors or hazards. Appropriate repairs or procedural changes will be implemented promptly by supervisors and followed up to mitigate identified hazards.

Reporting Requirements

Serious occupational injuries, illnesses or exposures to hazardous substances, as defined by Cal/OSHA, must be reported to EH&S no later than 8 hours after they become known to the supervisors. Serious injuries include permanent disfigurement or hospitalization for greater than 24 hours. Supervisors should call the UCLA Injury Reporting Hotline immediately after notification at 310-825-9797. Supervisors will need to state the name of the injured employee, a

brief summary of the incident, the injuries obtained by the employee, and a number where the reporting supervisor can be reached. EH&S will contact Cal/OSHA if necessary. An accident investigation will be conducted by EH&S in conjunction with a representative from the injured employee's department.

Investigation Process

Supervisors must complete and retain the Accident Investigation Form, or equivalent, for all accidents. For near-miss incidents, conduct the investigation and retain copies of field notes. The root cause should be determined in each accident investigation. All completed accident investigation forms with the supervisor's signature should be turned into the Department Safety Coordinator to retain for 5 years.

Filing the Proper Paper Work

To ensure timely filing of Workers' Compensation claims, employees must notify supervisors immediately of an injury. The Supervisor must then complete their respective portions of the UCLA DWC-1 Employee claim form for Workers' Compensation Benefits. Forms are available from the Office of Insurance and Risk Management and the EH&S website at <http://www.ehs.ucla.edu/pub/IIPP%20Manual.pdf> . These forms is for internal use and do not need to be sent to EH&S.

Safety Meetings

Managers and supervisors will provide time at regular staff meetings to review safety topics. Safety meetings are intended to: show employees and students the importance of completing a task safely, to discuss newly identified hazards or accidents, to analyze historical accident trends to predict and prevent future accidents. Status reports will be given on safety inspections, hazard mitigation projects, accident investigation results, and previous employee suggestions. Attendance and topics of discussion should be recorded.

3.3 Protective Equipment

The use of appropriate protective equipment is required in all situations. All such equipment must conform to EH&S standards. Training in the use of the equipment should be given prior to the assignment.

Hardhats. Hardhats must be worn at all times in the laboratory and in the field when hazards due to falling objects are present.

Eye and face protection. Protective equipment such as safety glasses, goggles or masks is required for anyone working in areas where an operation could cause injury to the face or eyes. Eye protection is mandatory when operating any of the *nees@UCLA* shakers or drilling equipment.

Respiratory protection. Respiratory equipment may be applicable in certain conditions. In such situations, the UCLA Respiratory Protection Program should be consulted, and all users must

receive specialized training and medical approval prior to use.

Hearing protection. High noise areas should be evaluated to determine the typical noise levels. If the average noise exposure is above 90 decibels, the personnel must be included in the Hearing Conservation Program. Employees included in this program must wear hearing protection, undergo periodic hearing evaluations, and receive training on avoidance of hearing damage.

Safety shoes. Steel-toe shoes may be required for certain designated areas or job tasks. **Safety**

Harness. Harness must be worn in situations where elevations hazards exist.

3.4 Identifying Workplace Hazards

Regular, periodic workplace safety inspections should be conducted throughout the duration of the project. The inspections should be noted, and copies of this documentation should be maintained by the *nees@UCLA* Site Operations Manager for at least one year. Generally, the *nees@UCLA* Site Operations Manager will be responsible for identification and correction of hazards that their staff and/or students face and should ensure that work areas they exercise control over are inspected at least annually. Supervisors should check for safe work practices with each visit to the workplace and should provide immediate verbal feedback where hazards are observed.

A "Report of Unsafe Condition" Form 1 should be filled out when a referral is made to the Safety Committee as a result of a condition discovered during an inspection for which the responsible supervisor could not determine an immediate remedy.

3.5 Communicating Workplace Hazards

Supervisors are responsible for communicating with all workers about safety and health issues in a form readily understandable by all workers. All personnel are encouraged to communicate safety concerns to their supervisor without fear of reprisal.

The Safety Committee is another resource for communication regarding health and safety issues for employees. Any member of the *nees@UCLA* Safety Committee can be contacted directly to discuss safety concerns.

Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) provide information on the potential hazards of products or chemicals. Hard copies of MSDSs for the chemicals used should be stored at the project site. If an MSDS is found to be missing, a new one can be obtained by faxing a written request to the manufacturer. A copy of this request should be kept until the MSDS arrives.

MSDSs are also available over the Internet from a variety of sources. They can be obtained by accessing the EH&S web page (<http://www.ehs.ucla.edu>) and clicking on

“MSDS.” For further information, contact EH&S for a fact sheet explaining how to use MSDSs. Videos and training on how to read and understand the information presented on an MSDS are also available from EH&S.

Equipment Operating Manuals

All equipment is to be operated in accordance with the manufacturer’s instructions, as specified in the equipment’s operating manual. Copies of operating manuals must be kept with each piece of equipment in the NEES facility. Each person intending to use any equipment in the NEES facility must attend a safety training session. No equipment can be operated without specific authorization based on evidence of past training (e.g. valid operator’s certification) or training provided on site.

3.6 Correcting Workplace Hazards

Hazards discovered either as a result of a scheduled periodic inspection or during normal operations must be corrected by the supervisor in control of the work area, or by cooperation with the *nees@UCLA* Site Operations Manager. Supervisors of affected employees are expected to correct unsafe conditions as quickly as possible after discovery of a hazard, based on the severity of the hazard.

Specific procedures that can be used to correct hazards include but are not limited to the following:

- Tagging unsafe equipment “Do Not Use Until Repaired,” and providing a list of alternatives for employees to use until the item is repaired
- Stopping unsafe work practices and providing retraining on proper procedures before work resumes
- Reinforcing and explaining the need for proper personal protective equipment and ensuring its availability
- Barricading areas that have chemical spills or other hazards and reporting the hazardous conditions to a supervisor

Supervisors should use the "Hazard Correction Report" to document corrective actions, including projected and actual completion dates. If necessary, supervisors can seek assistance in developing appropriate corrective actions by submitting a "Report of Unsafe Condition" to the Safety Committee. If deemed necessary by the Safety Committee, campus resources such as EH&S or the UCLA Police Department can be contacted to implement safety measures.

If an imminent hazard exists, work in the area should cease, and the appropriate supervisor must be contacted immediately along with the *nees@UCLA* Site Operations Manager. If the hazard cannot be immediately corrected without endangering employees or property, all personnel need to be removed from the area except those qualified and needed to correct the condition. These qualified individuals will be equipped with necessary safeguards before addressing the situation.

3.7 Job Hazard Analysis Plan

Where appropriate, a formal Job Hazard Analysis (JHA) should be done. However, personal protective equipment should always be used to protect workers from hazards, with or without formal JHA.

The Job Hazards Analysis process consists of:

1. Identifying Workers for whom a JHA will be completed;
2. Identifying the scope of the Work to which the JHA will apply;
3. Collecting Work-related data to enable identification of tasks, hazards, and controls making up the work;
4. Preparing a Hazards Profile consisting of the tasks, hazards and controls;
5. Holding a JHA Development Work Session between the Worker and Safety Officer to discuss, modify (if necessary) and validate the Hazards Profile.

3.8 Lock Out/Tag Out

It is Laboratory policy to prevent the unintended or unexpected startup or release of hazardous energy during servicing, maintenance, or modification activities. No employee shall install, service, remove, or perform maintenance on any equipment or machinery that may involve an energy hazard, until that equipment has been de-energized, locked, tagged and verified to be in a zero energy state.

LOTO is required whenever service, maintenance, or modification is being performed on equipment or apparatus in which the unexpected energization or start-up of the equipment, or the release of stored energy, could cause injury to people or damage to equipment

It is important that the following LOTO principles are strictly adhered to:

- All sources of hazardous energy must be shut off and secured.
- LOTO must be performed at each identified hazardous energy control point by each LOTO-Authorized Employee who works on the equipment.
- Each LOTO-Authorized Employee must personally witness or verify the absence of hazardous energy, or assure that the verification has been performed.

3.9 Gas Cylinders

Combustible Materials Separation. Cylinder storage and use locations must be kept clear of all weeds, grass, brush, and trash, as well as any other combustible materials, for a minimum

distance of 5 m (15 ft) from all cylinders. **Exception:** an approved noncombustible barrier, cabinet, or hood may be used instead

Cylinder Transportation. Only standard DOT cylinders will be used for transporting compressed gas.

Personnel who are trained to use compressed gases may use standard cylinder carts to transport cylinders within buildings and between adjoining buildings. Carts are preferred, but cylinders weighing 11 kg (25 lb) or less may be hand-carried. Valve-protection caps and plugs must be in place during movement of cylinders. Lecture bottles and other cylinders without protective caps must be transported in standard shipping crates, or an equivalent container.

Gas cylinders must be transported between non-adjoining buildings by a person properly trained, licensed, and equipped to transport gas cylinders.

Cylinder Position. Gas cylinders must be stored in a (valve end up) upright position, which includes conditions where the cylinder is inclined as much as 45 degrees from the vertical. Exceptions include cylinders designed for use in a horizontal position, and cylinders with non-liquefied compressed gas that have a water volume less than 5 L (0.18 cf or 1.3 gal).

Cylinder Securing. Gas cylinders must be secured to prevent falling due to accidental contact, vibration, or earthquakes. Cylinders must be secured in one of the following ways:

- By a noncombustible, two-point restraint system (e.g., chains) that secures the cylinder at the top and bottom one-third portions. **Exception:** cylinders less than 1 m (3 ft) tall require only one restraining point.
- By a noncombustible rack, framework, cabinet, approved strapping device, secured cylinder cart, or other assembly that prevents the cylinder from falling.

Cylinder Valves, Caps, and Plugs. Gas cylinders designed to have valve-protection caps and valve-outlet caps and plugs must have these devices in place. **Exception:** when the cylinder is in use or being serviced.

Gas cylinder valves must have a handwheel, spindle key, or other approved control handle on the valve stem while the cylinder is in use. Cylinder valves should be opened slowly. Cylinder valves seat in both the closed and open position and are likely to leak unless left in the fully open or fully closed position.

Unauthorized Cylinder Modification or Use. All labels, markings, and tags provided on the gas cylinder by the manufacturer must be maintained in good condition. Gas cylinder parts must not be modified, tampered with, obstructed, removed, repaired, or painted by the gas user.

Empty Cylinders. Gas cylinders should be left with residual pressure (i.e., typically 200 kPa or 30 psi) to prevent contamination of cylinder contents. Cylinders considered to be empty should be handled with the same precautions as cylinders filled with gas because so-called “empty” cylinders still contain residual gas and pressure. Empty gas cylinders must be labeled “Empty.”

Cylinder Changing. Two people must be present during hazardous gas purge and cylinder change procedures. Reconnected gas fittings must be checked for leaks using a leak-detection fluid or other approved method.

Cylinder Temperature Control. Gas cylinders should be stored in the shade and must not be exposed to temperatures exceeding 50°C (125°F).

3.10 Elevated Work Locations

It is *nees@UCLA* policy to ensure that the equipment and structural provisions for accessing and working at elevated levels and for overhead movement of materials meet the best industry safety standards and comply with DOE, general industry safety orders (OSHA), and (for construction applications) Cal/OSHA regulations.

Ladders. Safety hazards in the use of ladders can be substantially reduced by observing certain basic safety precautions as noted below:

- Painters' stepladders longer than 3.7 m (12 ft) must not be used.
- Wood ladders must not be painted.
- Ladders must be stored to prevent weathering, blistering, or cracking.
- All metal ladders must be legibly marked with signs reading "Caution - Do not use around electrical equipment."
- Portable straight and extension ladders must be equipped with slip-resistant shoes.
- Straight or extension ladders must be placed against a support at an angle such that the distance from the ladder base to the base of the support is one-fourth the working length of the ladder.
- Lash straight or extension ladders when used for access to high places.
- Face ladders when ascending or descending.
- Do not use a ladder as a scaffold.
- Do not place a ladder in front of a doorway, unless the door is blocked open, locked, or guarded.
- Do not place ladders on boxes or unstable bases to obtain additional height.

- Do not climb higher than the second step from the top of a ladder.
- Ladders with broken rungs or missing steps must not be used.
- Inspect all ladders before use.
- Report any defective ladders to your supervisor.
- Supervisors must ensure that any ladder reported as defective or unsafe is removed from service.
- The use of a safety harness and lanyards is recommended when working higher than 8 ft. on a ladder or other high place.

3.11 Trenching and Shoring

The following rules apply to all Trenching and Shoring Activities.

- Appropriate barricades, fences, protected walkways and signs must be provided to protect the public.
- Examine the trench or excavation before entry.
- An access ladder or other safe access must be provided.
- Ensure all equipment and materials are in good, working condition.
- Workers must be protected from cave-ins by either an adequate sloping system or an adequate support or protective system.
- Stairs or ladders must be provided when workers enter excavations over 4 feet deep.
- A means of exiting the trench must be provided every 25 feet.
- Workers must stay away from any equipment loading or unloading material.
- Excavated or other material must be retained 2 feet or more from the edge of the excavation.
- Workers must wear all required personal protective equipment including hardhats, safety footwear, gloves, eye protection, hearing protection, and fall protection devices, as needed.
- Additional shoring and bracing must be provided when excavations or trenches are located adjacent to previously backfilled excavations or where excavations are subjected to vibrations from railroad or highway traffic, operation of machinery, or other sources.
- Discourage surface crossing of trenches.
- Protect employees from loads or objects falling from lifting or excavating equipment.
- Keep rocks, soil, equipment, and other materials from falling into the trench.
- Prevent water accumulation whenever possible.
- Keep excavations and trenches open the minimum amount of time needed to complete work tasks.
- Evaluate the excavation and trenching operation at the conclusion of the work activity.

3.12 Fork Lift

Operation of forklifts and other powered industrial trucks is restricted to trained personnel who have completed the required training.

A training program consists of the following elements and materials:

- a. Operating instructions, warnings and precautions for type of truck
 - b. Similarities and differences to automobiles
 - c. Control and instrumentation location and use
 - d. Engine or motor operation
 - e. Steering and maneuvering
 - f. Visibility
 - g. Fork and attachment limitations and use
 - h. Vehicle capacity
 - i. Vehicle stability
 - j. Vehicle inspection and maintenance
 - k. Refueling or charging batteries
 - l. Operating limitations
 - m. Other operating instructions, warnings or precautions listed in the operator's manual
2. Workplace-Related Topics
- a. Surface conditions where truck is used
 - b. Load composition and stability
 - c. Load stacking, unstacking and transport
 - d. Pedestrian traffic
 - e. Narrow aisle and restricted area operation
 - f. Operation in hazardous locations
 - g. Ramp and sloped surface operation
 - h. Unique or potentially hazardous conditions

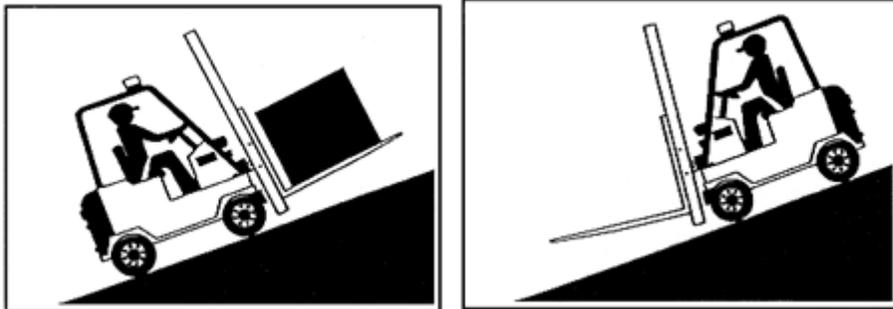
i. Operating the vehicle in closed environments

Note: Because powered industrial trucks are manufactured by different companies with various models available, the training must be specific to the operating characteristics of the specific powered industrial truck the employee will be using.

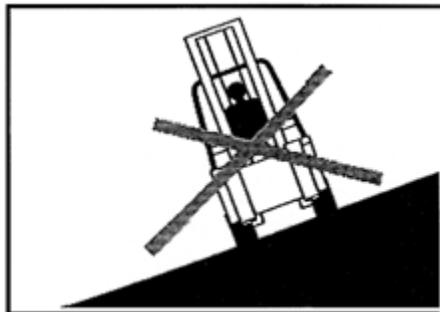
For information regarding fork lift certification policies and training classes contact the UCLA EH&S Hotline at (310) 825-9797.

The following rules apply to all use of forklifts and other Powered Industrial Trucks (PITs) at the Lab:

- Do not operate any forklift or PIT unless you have operator training.
- Do not operate any forklift or PIT until a daily inspection has been performed.
- Estimate the weight of the rated load to assure that you do not exceed the rated load capacity of PITs.
- Always ensure the load is against the backrest.
- Follow all safety rules regarding speed, parking, loading, unloading, and moving loads. Operators should use extreme caution when operating on ramps, grades, or inclines.
- Always drive an unloaded forklift with the forks on the downhill side.
Drive down forward and back up.



- Never turn a forklift sideways on a ramp.



- Check the floor loading limit before a PIT enters an area. The floor must safely support the forklift, the load, and all materials that are already in the area.

- Drive material-moving equipment forward going up a ramp and backward going down a ramp. **Note: *Pallet jacks should not be used on ramps***, unless the load is securely strapped to the pallet **and** the pallet is strapped to the pallet jack platform.
- Never allow traffic or personnel to pass under a raised load, nor allow a load to pass over personnel or traffic.
- Do not allow passengers to be carried on any PIT unless it is specifically equipped by the manufacturer to carry passengers.
- Never leave an elevated load unattended. Lower the forks to the floor, set the brake, and turn off the PIT before leaving the PIT unattended.
- Keep traffic lanes and loading areas clear and appropriately marked.
- Store materials in work rooms or designated storage areas only. Do not use hallways, fan lofts, or boiler and equipment rooms as storage areas.
- Do not allow exits, passageways, or access to equipment to become obstructed by either stored materials or materials and equipment in use.
- Arrange stored materials safely to prevent tipping, falling, collapsing, rolling, spreading, or any other unsafe motion.
- Modifications of PITs and addition of equipment to PITs may only be performed by the PIT manufacturer or by qualified PIT mechanics with the approval of the manufacturer.
- Do not use front-end attachments other than factory-installed attachments; make sure that the truck is equipped with a plate that identifies the attachments, shows the approximate weight of the truck with attachments, and shows the lifting capacity of the truck with attachments at maximum lift elevation with the load laterally centered.
- All forklift trucks must carry fire extinguishers, usually 2-1/2lbs ABC, regardless of their location classification.
- Only trained operators shall replace LPG tanks on forklift trucks or charge batteries. Battery **changing** may be performed only by trained and authorized PIT service personnel

3.13 Manual Lifting

Manual material handling involves lifting, lowering, and carrying objects. If ergonomics principles are ignored, stresses on the muscles, joints, and disks in the back can eventually lead to or aggravate a work related musculoskeletal disorder (WRMSD). For objects that are too heavy or bulky for safe manual handling by employees, mechanical lifting devices must be used for lifting and moving.

Best Practices for Lifting

1. Assess the situation.

- How far will you have to carry the load? Is the path clear?

- Once the load is lifted, will it block your view?
- Can the load be broken down into smaller parts?
- Should you wear gloves to get a better grip?

2. Size up the load.

- Test the weight by lifting or sliding one corner. If it is too heavy or awkward, **STOP!**
- Can you use a mechanical lift or hand truck?
- Can you lift the load safely, or is it a two- or more person lift? If you doubt you can lift the load safely, ask for help.

3. Use good lifting techniques.

- Get close to the load with your feet shoulder-width apart.
- Get a good handhold, and pull the load close to you
- Bend at your knees and hips, keep the inward curve in your back, and lift with your legs.
- If you need to lean forward, support your upper body weight with one hand.

Shown in Figures 3.12a,b: Improved work practices and work layouts that can help reduce risk for work related injuries.

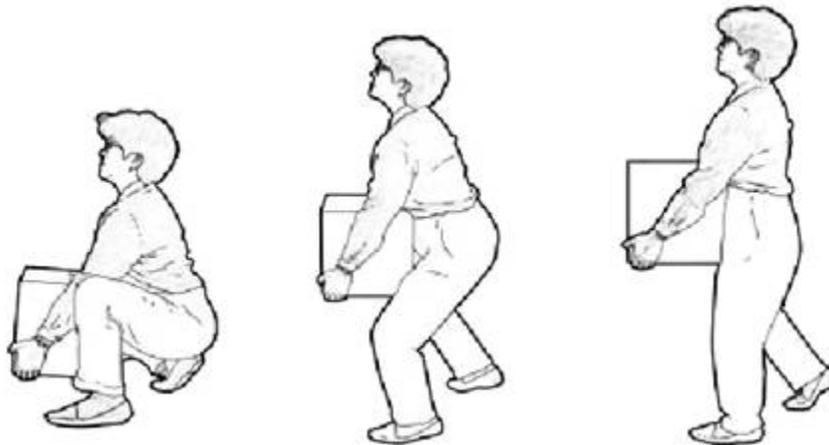


Fig. 3.12a Bend the knees and hips instead of the low back.

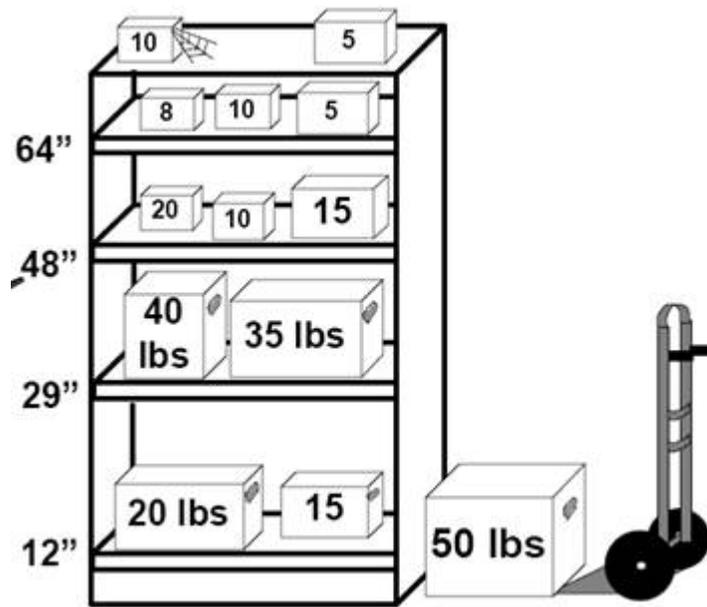


Fig. 3.12b Store heavier loads between knee and shoulder height. Very heavy loads (50 lbs. or more) should be stored where they won't have to be manually lifted. Lighter and less frequently moved items should be placed on higher shelves.

3.14 General Requirements for Crane Operation

The following rules apply to all use of cranes and hoists related to *nees@UCLA* activities.

Daily Inspection. Each crane or hoist must be inspected before use, during any given work shift.

Personal Protective Equipment. All personnel participating in lifts involving cranes or hoists must wear ANSI-approved safety shoes.

All personnel operating a crane or hoist, participating in the lift or within 15 feet of the vertical plane of the load, where the under carriage of the bridge is more than 12 feet from the ground, must wear ANSI-approved hard hats. Post or barricade the area as needed.

Sturdy work gloves must be worn when handling wire rope or loads with rough or sharp edges or splinters.

Suspended Loads. Follow these rules for suspended loads:

- Do not allow loads moved with any material-handling equipment to pass over any personnel.
- Select the load path to eliminate the possibility of injury to employees should the material-handling equipment fail.
- Do not work on suspended loads. Rest the load on adequate cribbing if it needs to be worked on.
- Never leave a suspended load unattended. Lower it to the floor or the working surface, or onto cribbing, and secure the material-handling equipment before leaving the load unattended.

3.15 Powered Platforms and Vehicle Mounted Work Platforms

Powered work platforms have a telescoping or extensible boom with a personnel platform attached.

Operating Conditions

Extensible boom work platforms must be operated under the following conditions:

- Two operators must be present at all times. One operator must be present on the work platform and the other stationed on the ground to assist in the operation and perform any emergency duties.
- All units must be inspected prior to each shift's use and must not be operated if found to be unsafe.
- All personnel occupying the work platform must wear an approved safety harness and lanyard properly attached to the equipment.
- Outriggers, if provided, must be used as recommended by the manufacturer.
- Unless recommended for such use by the manufacturer, no extensible boom work platforms are to be used on an inclined surface. No unit may be used on an incline over 5% or in winds over 25 mph.
- All units must have upper and lower control devices.
- Units equipped with outriggers must not be relocated while personnel are on the work platform in an elevated position and must not elevate personnel without the stability of outriggers.

Identification

The following must be displayed on all work platforms in a permanent manner:

- Special warnings, cautions, or restrictions necessary for safe operation.
- Make, model, and manufacturer's name and address.
- Rated work load capacity.

- Maximum platform height.
- Instructions to study operating manual.
- Chart, schematic, or scale showing capacities of all combinations in their operating positions and cautions or restrictions, or both, regarding operation of all alternate configurations or combinations of alternate configurations.

Inspections

- *Daily Inspection:* All units must be inspected prior to each shift's use. Inspections must include all items recommended by the manufacturer's manual.
- *Preventive Maintenance:* All units must receive preventive maintenance at intervals no longer than recommended in the manufacturer's manual.

3.16 Power Tools- Fixed and Portable

Inspection and Maintenance. Machine tools, machine equipment, and power tools should be routinely inspected to verify that they are not damaged, that the controls function as designed, and that all guarding and shields are securely installed and adjustable. Servicing, including cleaning, lubrication, preventive maintenance, and adjustment of machine equipment and machine tools can help prevent performance and safety problems. Only qualified technicians or qualified vendors are permitted to service equipment. Service equipment only when all electrical, hydraulic, compressed air, and stored energy sources are secured in accordance with the requirements of Section 3.7 (Lockout/Tagout)

General Safety Rules for Use/Maintenance of Power Tools, Machine Tools and Machine Equipment. The following general rules apply to the use and/or maintenance of machine tools and machine equipment, regardless of their location.

- Permit only qualified personnel who have necessary skills, through experience and/or training, to operate or maintain machine tools or machine equipment.
- Equip all machine tools, power tools, and machine equipment with all required guarding, and prohibit (lock and tag) their operation unless such guarding is in place and fully functional.
- Operate/maintain machine tools, and machine equipment in accordance with the manufacturer's requirements, and the requirements of this section.
- Anchor and electrically wire all machinery and machine equipment designed by the manufacturer to be stationary. Only qualified electricians are permitted to install and remove wiring for hardwired shop machinery and machine equipment. Machine tools and machine equipment designed to be electrically connected by cord and plug are not subject to this requirement.

- e. Permit only qualified personnel or vendors to repair or otherwise service machine tools or equipment.
- f. Only operate machine tools when a second person is within sight or earshot of the tool user. This is an essential requirement in the case of personnel who get caught in machinery or suffer traumatic injuries. The second person need not be qualified to operate the equipment but does need to know how to turn off the equipment and how to call for emergency assistance. This second person must also agree ahead of time to perform such duties should the need arise. Establish a check-in and check-out protocol.
- g. Ensure that all machine and tool guards are installed in place, in good working order, properly adjusted, and most importantly, used for their intended purpose. This includes the use of chip shields for any drilling or cutting operations.
- h. Wear (at a minimum) safety glasses with side shields while in the vicinity of operating machine tools. This applies both to workers and to visitors. Wear face shields or goggles as required by work authorization for specific operations.
- i. Wear substantial closed-toe footwear of sturdy construction, made of leather or other heavy, solvent-resistant material. Wear approved safety shoes when there is a risk of crushing or piercing. Prohibit personnel, including visitors, from entering the work area with sandals or open-toed shoes.
- j. Wear appropriate clothing.
- k. Wear hearing protection and/or respiratory protection as required by work authorization for operations that generate harmful noise, or airborne emissions. Contact the Industrial Hygiene Group for assistance in determining which operations require such protection.
- l. Do not use audio equipment that obstructs the ear canal (e.g., iPods) or cell phone Bluetooth headsets while operating machine or power tools. Such devices distract the operator and can prevent him or her from hearing sounds that could provide warning of an unusual operating condition or someone calling out for assistance.
- m. Prohibit personnel under the age of 18 from operating any machine or power tools.
- n. Tie back or otherwise secure long hair; cuff or roll up long sleeves, and remove or tape down loose jewelry when working with rotating machinery.
- o. Do not prepare or consume food or beverages in areas where hazardous materials (including oils, solvents, chemicals, cuttings, filings, and sawdust) are handled or generated. Designate a food and drink preparation/consumption area, if necessary, in an area that is kept free of hazardous materials at all times.
- p. Where applicable, secure and clamp down work pieces in work-holding devices and machines, preventing the work from being lifted or dislodged.
- q. Use appropriate push sticks or other approved methods as indicated in the work authorization to keep hands and fingers well away from moving or rotating cutters, blades, and other points of operation.
- r. Turn off the machine before using a brush or wooden dowel (not hands!) to remove chips from the machining area. Chips are not only very sharp but can be hot and can snag.

- s. Maintain good housekeeping. Work is not complete until cleanup is done. Debris, coolants, and lubricants put workers at risk of cuts or slipping, and can be a skin irritant. Clean up the work area with a broom, brush, and dustpan, and clean up all spills with absorbents and/or degreasers. Avoid using compressed air to blow chips off machinery. Not only is this a hazard to the eyes, it forces material into the precision inner workings of the machine and often distributes coolant, oil, and chips over a larger area. Clean up the machine and sweep the floor area of any remaining chips.

3.17 Machine Guarding

It is the Safety Officers responsibility to ensure that machine tool and machine equipment guarding is adequate. Never remove factory-installed guards unless they are designed to be removed for a particular operation, and equivalent means of protection are used (e.g., table saw guards are removed for fence cuts; when appropriate, push sticks are used).

Guard all reasonably accessible points of operation, pinch and nip points, rotating parts, and flying chip or spark hazards that may expose an employee to injury. In general, guarding prevents inadvertent contact with these hazards. Guarding may be achieved by one or more methods, such as isolation, barriers, shields, devices, or distance.

While in operation, the nees@UCLA's eccentric mass shakers should be given a safe distance of at least 15 ft. and all appropriate PPE should be used.

nees@UCLA follows federal OSHA standards for machine guarding, which address specific requirements for many types of machine tools, machine equipment, and power tools.

Follow specific regulations when machine tools or equipment fall under 1910.213–219. Use an appropriate alternate standard (e.g., ANSI) when a specific OSHA regulation does not exist.

3.18 Welding

Policy Employees performing cutting and welding operations (commonly referred to as “hot work”), as well as their supervisors, are required to be suitably trained in the safe operation of the equipment used. Outside contractors and service personnel are expected to follow all OSHA requirements.

Purpose Potential health, safety, and property hazards result from the fumes, gases, sparks, hot metal and radiant energy produced during hot work. The purpose of this policy is to prevent any fires or injury that may result from hot work processes, and to comply with OSHA regulations (29 CFR 1910.Subpart Q; 29 CFR 1926 Subpart J; 29 CFR 1926.350-354).

Safety Requirements Prior to hot work being performed, several tasks must be completed. This

includes, but is not limited to: Isolating the HVAC system for interior work, posting the hot work permit in a highly visible area, identifying and removing any fire hazards in the work area, and covering sprinkler heads and smoke or heat detectors to prevent accidental triggering.

Proper personal protective equipment (PPE) must be in use while performing hot work. This includes welding helmets, gloves, jackets, etc.

General Arc Welding Safety:

- Before starting any arc welding operation, a complete inspection of the welder should be made.
- Read all warning labels and instructions manuals.
- Remove all potential fire hazards from the welding area.
- Always have a fire extinguisher ready for immediate use.
- Equip welding machines with power disconnect switches which can be shut off quickly.
- The power to the machine should be disconnected before making repairs.
- Proper grounding of welding machines is essential.
- Electrode holders should not be used if they have loose cable connections, defective jaws, or poor insulation.
- An arc should not be struck if someone without proper eye protection is nearby.

Personal Protective Equipment:

- Infrared radiation is a cause of retinal burning and cataracts. Protect your eyes and face with a welding helmet properly fitted and with the proper grade of filter plate.
- Protect your body from welding spatter and arc flash with protective clothing. Such as:
 - Woolen clothing
 - Flame-proof apron
 - Gloves
 - Properly fitted clothing that is not frayed or worn.
 - Shirts should have long sleeves.
 - Trousers should be straight-legged and covering shoes when arc welding.
 - Fire resistant cape or shoulder covers are needed for overhead work.
- Check protective clothing equipment before each use to make sure it is in good condition.
- Keep clothes free of grease and oil.

Proper Ventilation Be sure there is adequate ventilation available when welding in confined areas or where there are barriers to air movement. Natural drafts, fans and positioning of the head can help keep fumes away from the welder's face.

Ventilation is sufficient if:

- The room or welding area contains at least 10,000 cubic feet for each welder.
- The ceiling height is not less than 16 feet.

- Cross ventilation is not blocked by partitions, equipment, or other structural barriers.
- Welding is not done in a confined space.

**If these space requirements are not met then the area needs to be equipped with mechanical ventilating equipment that exhausts at least 2000 cfm of air for each welder, except where local exhaust hoods or booths, or air-line respirators are used.

Avoiding Electrical Shock

Electrical shock can kill. To prevent electrical shock:

- Use well insulated electrode holders and cables.
- Make sure welding cables are dry and free of grease and oil.
- Keep welding cables away from power supply cables.
- Wear dry hole-free gloves.
- Clothing should also be dry.
- Insulate the welder from the ground by using dry insulation, such as a rubber mat or dry wood.
- Ground frames of welding units.
- Never change electrodes with bare hands or wet gloves.

3.19 Heat Stress

Control of Heat Stress. Self-awareness is one of the key steps to reducing heat-related disorders. Employees and supervisors should terminate exposure to heat stress at the onset of the first symptoms. Supervisors should consider a worker's physical condition when determining heat stress conditions. Obesity, lack of conditioning, medical conditions, use of medications, pregnancy, and inadequate rest can increase susceptibility to heat stress even in indoor office environments. Additional industrial hygiene practices and administrative and engineering controls are listed below.

1. Wear lightweight, light colored, loose clothing that allows free movement of cool dry air over the skin's surface to allow the removal of heat from the body by evaporation. Evaporation of sweat from the skin is the body's predominant heat removal system.
2. Drink plenty of chilled hydrating fluids such as water or commercial hydrating fluids to prevent dehydration. Since thirst is not a sufficient indicator of fluid replacement, workers are encouraged to drink about 1 cup of cool water every 15 to 20 minutes during heat stress conditions.
3. To increase evaporation and cooling of the skin, use general ventilation or fans for spot cooling.
4. Work demands should be made lighter by taking frequent breaks in a cooler area, completing them over a longer time period, and setting the work pace with the least heat-tolerant worker in mind.

5. Heavy workloads should be scheduled during cooler times of the day (i.e., early morning).
6. Employees should report to Health Services if they feel they are suffering from the onset of a heat-related disorder. In emergency situations, call 911.

Immediate Response Actions for Heat Stroke:

- **Call 911 or campus emergency immediately.**
- The victim's body temperature must be lowered as quickly as possible. Applying damp, cool towels, or ice packs to armpits, elbows, wrists, or backs of knees may help.
- Stay with the victim until medical help arrives.

4. Disaster Preparedness

Planning ahead for disasters is critical for being able to recover safely and quickly. Understand and know the location and proper use of fire extinguishers, fire alarms, emergency exits, telephones, eyewash fountains and safety showers. It is the responsibility of the Site Operations Manager to provide for periodic training of staff members and periodic practice and drills.

Personnel should be prepared to respond safely to the following:

- Fire or evacuation alarm;
- Accidental spills or release of radioactive, chemical or other toxic materials;
- Injury of a co-worker;
- Earthquake; and
- Other natural or man-made disaster.

Fire. As a general rule, UCLA does not expect its employees to fight fires. Just sound the alarm – pull the fire alarm or call 911 – and get out of the building as quickly as possible and report to your group’s emergency assembly area. Do not re-enter the building until you have been notified by the authorities to do so.

Accidents. All accidents and near miss incidents must be reported immediately to the Facility Manager.

Electric shock. Do not touch persons rendered unconscious by electric shock unless you are sure that they are no longer in contact with the source of the electricity or that the power has been turned off.

Earthquake. During any earthquake, you should take cover immediately. After the quake, assess the situation and follow instructions given by the Facility Manager or other supervisor. If the earthquake is severe, you will be asked to evacuate the building. Wait for instructions before re-entering the building or before leaving the area.

5. First Aid

This section will familiarize you with guidelines for treatment of minor injuries and for the application of first-aid for more serious injuries in the period of time before professional medical staff are able to treat the injured person

5.1 Wounds

A wound is caused when a tissue in our body is torn or cut. Types of wounds:

- Incised wounds caused by sharp instruments. These wounds bleed extensively.
- Contused wounds caused by crushing. These wounds look bruised.
- Lacerated wounds caused by rough surfaces. These wounds bleed less.

Wounds pose two dangers, namely bleeding and infection.

5.1.1 Treating bleeding

- a. Press the sides of the wound together.
- b. Raise the injured part of the body above the heart (only if fracture is not suspected).
- c. With your palm, gently press a pad bigger than wound until bleeding reduces.
- d. If bleeding continues, add new pads without removing original pad.
- e. Bandage firmly but not too tightly.

5.1.2 Avoiding infection

- a. The first aid provider must wash own hands thoroughly with soap and water.
- b. External wounds should be cleaned thoroughly with potable water and should be dried with sterile gauze.
- c. Wound should be covered with sterile or dry sterile gauze and bandaged once bleeding is controlled
- d. Cotton should not be allowed to be in direct contact with wound.
- e. Antiseptic cream applied to a wound should not be mixed with water.

5.1.3 Blood Borne Pathogens

In the event human body fluids require clean up due to an injury, only trained personnel are allowed to clean up spills with approved clean up kits. If no trained personnel are present, secure the area and notify the University EH&S department for instructions.

You are responsible for keeping your immediate work area clean and sanitary. If you become aware of needs beyond general housekeeping, report your concern to your supervisor.

All equipment and working surfaces must be cleaned and decontaminated using sanitizing cleanser after contact with blood or OPIM.

If you get blood or other potentially infectious materials in your eyes, nose, mouth, or on broken skin:

- Immediately flood the exposed area with water and clean any wound with soap and water or a skin disinfectant if available.
- Report this immediately to your employer.
- Seek immediate medical attention at the UCLA Medical Center.

More information regarding UCLA policies for blood borne pathogens can be found at the following link: <http://www.dir.ca.gov/OSHSB/appbloodborne.html>

5.2 Burns and Scalds

Burns are caused when skin comes in contact with dry heat like fire/flames, hot metal, live wires, etc. Scalds are caused by moist heat like boiling water, steam, oil, tar, etc.

The degree of a burn is indicated by the degree of damage to the tissues. Degrees of burning are:

- First degree: the skin appears reddened.
- Second degree: Blisters are seen on the skin.
- Third degree: There is destruction of deeper tissues with scarring.

Dangers from burns include:

- Excessive loss of body fluids.
- Severe pain.
- Infection in affected area.
- After healing, they could leave scars and restrict movements.

5.2.1 Treating extensive burns

- a. Try to keep the patient calm.
- b. Do not remove adhering particles of charred skin.
- c. Cover the burnt area with a clean dressing and bandage.
- d. If hands are burnt, they should be placed above the level of victim's heart.
- e. If feet or legs are burnt, they should be elevated.
- f. If face is burnt, sit up the patient and observe for breathing difficulty. Maintain an open airway if respiratory problems develop.
- g. Do not open the blisters on victim's skin.
- h. Try and remove all rings, bangles, belt and boots from the victim's body immediately as it may be difficult later if the limbs begin to swell.
- i. If medical help can not reach the victim within an hour of the burn, and if the victim is conscious and not vomiting, try to feed a weak solution of salt, soda and water (approximately one teaspoon of salt and half teaspoon of baking soda per quart of water).

5.2.2 Treating minor burns

- a. Clean the affected area gently with water.
- b. Immerse the burnt area in cold water.
- c. Never apply cotton wool directly over burnt area.
- d. No greasy substance should be used over the affected area.

5.3 Fractures

Fracture is defined as complete or partial breakage of a bone. Types of fractures include:

- a. simple – broken ends of the bone do not cut open the skin
- b. compound – broken end of the bone may be in contact with open air.
- c. Complicated – an internal organ is broken in addition to the fracture bone.

Signs of fracture include:

- a. Severe pain at and/or around place of fracture.
- b. Swelling and tenderness over the area with partial discoloration.
- c. Inability to perform normal movements of the affected part.
- d. Deformity of the limb. The limb may also appear shorter.
- e. Crackling sound or unnatural movements.

5.3.1 Treatment for fractures

- a. Fractures generally occur with other injuries like wounds. Symptoms like heavy bleeding must receive priority for first-aid over a fracture.
- b. Patient should be handled gently avoiding all unnecessary movements.
- c. If broken ends of the bones are seen above the skin, the wound should neither be washed nor treated with antiseptics.
- d. The fractured area should not be handled unnecessarily.
- e. No attempt should be made to reduce the fracture or to bring the bones to normal position.
- f. The fracture area and joints on both sides of fracture should be immobilized by using bandages. It is essential that rescuer be familiar with the use of bandages.

5.4 Electrical injuries

When a body part comes in contact with a live electric wire or cable carrying a live current, the person receives an electric shock. The electric shock could be produced only when the electric current passes through human body, which is in contact with the earth. It passes more readily if the contacting body part is wet or moist. In wet conditions, even lower voltages could be dangerous.

Depending on the voltage and duration of contact, one or all of the following may occur.

- a. fatal stoppage of heart
- b. sudden stoppage of breathing due to paralysis of breathing muscles
- c. superficial or deep burns

5.4.1 Treating victims of electric shock

- a. The source of current should be switched off if the victim is in contact with the current. This must be done with rescuer standing on a dry piece of wooden board.
- b. Never use a knife or scissor to cut the current carrying wire.
- c. If the current is of very high voltage, arching may occur. The victim should be dragged using non-conductive material like a wooden stick, plank or dry nylon rope.
- d. If the victim is not breathing properly, artificial respiration should be given.
- e. If required, treat for burns.
- f. The victim should be transferred to a hospital as soon as possible. Even for mild electrical injuries, consultation with a doctor is desirable as some effects of electric shock materialize hours/days after the incident.

5.5 Contents of First-Aid Kit

The following basic items should be present in the first-aid box at all times.

- Latex gloves.
- Sterile dressing to stop bleeding.
- Cleansing agent/antibiotic towelettes to disinfect.
- Antibiotic ointment to prevent infection.
- Burn ointment to minimize risk of infection.
- Adhesive bandages in a variety of sizes.
- Eye wash solution.
- Thermometer