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Fall Protection Program

1.0 INTRODUCTION

1.1 Policy

It is the policy of the University of California, San Diego (UCSD) to ensure safe and healthy working, teaching, learning, research, patient care, student living and entertainment environments for faculty, staff, students and visitors. Implicit in this policy is a requirement to provide all individuals with pertinent information about fall hazards.

1.2 Purpose

The Fall Protection Program was developed to provide UCSD employees with the necessary information to identify work situations that require the use of fall protection, the proper use of fall protection equipment, and the required documentation of this information. This helps to ensure the safety and health of all employees at UCSD.

1.3 Scope

The Fall Protection Program is to protect employees from fall hazards and potential fall hazards that are likely to be encountered in the course of work duties. The UCSD Fall Protection Program includes information regarding work accessories designed to protect employees from fall hazards.

NOTE: The Fall Protection Program should not be used as a substitute for engineering, safe work practices, and/or administrative controls to protect employees from fall hazards.

2.0 RESPONSIBILITIES

2.1 Department Heads

- Designate supervisors/project managers who will be responsible for the preparation and implementation of a Fall Protection Safety Plan for every project that requires fall protection.
- Provide administrative and financial support for the program within each department.
- Ensure the Fall Protection Program is maintained within the department.
- For extremely hazardous areas, hire a contractor who specializes in fall-protected work.

2.2 Supervisors/Project Managers

- Implement a Fall Protection Safety Plan for each job that requires fall protection.
- Identify and designate employees for the program, conduct a hazard fall analysis, describe fall protection system to be used, document equipment inspections, describe a rescue plan and get approval signatures.
- Conduct hazard assessments and ensure that employees are informed, trained, and provided with the appropriate fall protection equipment.
- Supervisors should be familiar with the applicable state and federal safety regulations, safety consensus standards (CCR T8 Article 24), UCSD policies and prudent safety practices to protect themselves and their fellow employees.
- Ensure the equipment provided is adequate to protect employees from fall hazards.
- Prohibit employees from providing their own fall protection equipment.
2.3 Employees

- Comply with this program and any further safety recommendations provided by supervisors and/or EH&S regarding the Fall Protection Program.
- Conduct assigned tasks in a safe manner and properly wear and use all fall protection equipment.
- Report any unsafe or unhealthy work conditions and job related injuries or illnesses to the supervisor immediately.
- Inspect all fall protection equipment being utilized by the employee prior to use.
- Refrain from bringing or wearing any personally owned fall protection equipment, ensure the equipment issued is adequate protection from hazards in the workplace and is in proper working condition.
- Two authorized workers must be present whenever fall restraint or fall arrest equipment is to be used.

2.4 Department of Environment, Health and Safety (EH&S)

- Provide technical information and assist departments in implementing an effective Fall Protection Program.
- Provide training for the Fall Protection Program, assist managers and supervisors as needed.
- Review and revise the Fall Protection Program for compliance with applicable regulations on an as needed basis.
- Recommend appropriate engineering controls, administrative controls and personal protective equipment when requested.

3.0 FALL PROTECTION LOCATIONS

Fall protection is required wherever the potential to fall 4' or more in General Industry and 6' for Construction activities exists. UCSD has identified at minimum the following places concerning fall protection:

- Flat and low sloped roof locations, when within 6' of the roof edge or during roof repair/maintenance (4:12 pitch or less)
- Exterior and interior equipment platforms, catwalks, antennas/towers, etc.
- Exterior and interior fixed ladders above 20'
- Mezzanine and balcony edges
- Open excavations, pits, vaults, tanks, manholes or other potential confined spaces
- Tasks requiring use of scissor, bucket trucks or other articulating man lifts
- Tasks requiring employees to work outside the vertical rails of ladders (i.e., painting, stairwell light bulb replacement)
- Scaffolding erection – 7.5' in height or greater
- Elevator car, hardware and shaft inspections
- Gym or Theater mezzanine/catwalk areas: Whenever an employee must step outside the catwalk, additional fall protection (i.e., body harness, self-retracting lifeline or rope grab system) must be used.

**NOTE:** Fall protection is not required if an employee is on a low slope roof (less than 4:12 pitch) for an inspection/observation only and does not come within 6' of a leading edge, skylight, open roof access hatch or other floor openings that present a fall hazard.
4.0 TYPES OF FALL PROTECTION SYSTEMS

Listed below are the different types of fall protection systems:

- Articulating man lift provided with a restraint system and body harness attached to an anchor point below the waist (preferably at the floor level)
- Guard rail with a mid rail, toe board and top rail
- Personal fall arrest systems
  - Anchor points (rated at 5000 lbs. per person)
  - Body harness
  - Connectors/Carabineers (self-locking snap hooks)
  - Energy (shock) absorber
  - Restraint line or lanyard
  - Retractable lanyard
  - Rope grabs
- Engineered lifelines
- Safety monitoring systems
- Safety nets
- Warning lines

**NOTE:** The appropriate fall protection will be determined by the job to be performed.

4.1 Controlled Access Zone

The controlled access zone must be defined by a control line or by any other means that restricts access where leading edge and other operations are taking place. When control lines are used, they must be erected no less than 6', or more than 25' from the unprotected or leading edge. The control line must extend along the entire length and be approximately parallel to the unprotected or leading edge. The control line must be connected on each side to a guard rail system or wall. Control lines must consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

- Each line must be flagged or otherwise clearly marked at no more than 6' intervals with high-visibility material.
- Each line must be rigged and supported in such a way that its lowest point (including sag) is no less than 39" from the walking/working surface and its highest point no more than 45" from the walking/working surface.
- Each line must have a minimum breaking strength of 200 lbs.
- On floors and roofs where guard rail systems are in place, but need to be removed to allow leading edge work to take place, only that portion of the guard rail necessary to accomplish that day's work shall be removed.

For additional Controlled Access Zone specific requirements please see CCR Title 8 1671.2 and Article 24.

4.2 Engineering Controls

The best way to prevent an exposure is to eliminate the hazard. This should always be the first option for selection whenever possible (light bulb changing telescoping arm, changing valve relocate at ground level, etc.). Utilize a contractor in extremely hazardous areas.
4.3 Engineered Lifeline (Horizontal & Vertical Lifeline)

Lifeline systems must be designed and approved by an engineer or qualified person (see glossary of terms) have appropriate anchorages, strength of line designed to hold the number of individuals connected to it, line strength to aid in the arrest of a fall, and durability to hold a fallen employee suspended until a rescue can occur.

- Verify on suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline are capable of locking in both directions.
- Verify horizontal lifelines are 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 2.
- Verify anchor points, lanyards and vertical lifelines have a minimum breaking strength of 5,000 lbs. per employee.
- Verify when vertical lifelines are used, each employee is attached to a separate lifeline.
- During the construction or inspection of elevator shafts, two employees may be attached to the same lifeline in the hoist way, provided that all of the following conditions are met:
  - Both employees are working atop a false car that is equipped with guard rails.
  - The strength of the lifeline is 10,000 lbs. (5,000 lbs. per employee).
  - All other criteria specified in this paragraph for lifelines have been met.
- Verify lifelines are protected against being cut or abraded.
- Verify self-retracting lifelines and lanyards that automatically limit free fall distance to 2' or less are capable of sustaining a minimum tensile load of 3,000 lbs. applied to the device with the lifeline or lanyard in the fully extended position.
- Verify self-retracting lifelines and lanyards that do not limit free fall distance to 2' or less rip stitch lanyards, and tearing and deforming lanyards are capable of sustaining a minimum tensile load of 5,000 lbs. applied to the device with the lifeline or lanyard in the fully extended position.
- Verify ropes and straps (webbing) used in lanyards, lifelines, and strength components of body harnesses are made from synthetic fibers.

4.4 Guard rails

Mid rails
Mid rails must be installed halfway between the top edge of the guard rail (top rail) system and the walking/working surface when there is no wall or parapet at least 21" high. The mid rails must be capable of withstanding, without failure, a force of at least 150 lbs. applied in any downward or outward direction at any point along the mid rail.

Toe boards
Toe boards must be a minimum of 3 ½" in vertical height from their top edge to the level of the walking/working surface and no more than ¼" clearance above said surface. They must be solid or have openings not over 1" in greatest dimension. Toe boards must be capable of withstanding, without failure, a force of at least 50 lbs. applied in any downward or outward direction at any point along the toe board.
Fall Protection Program

Top rails
Top rails must be at 42” ± 3” high and withstand 200 lbs. of force in any outward or inward direction. When conditions warrant, the height of the top edge may exceed 45”. Guard rails made only from steel, wood, and/or wire rope is acceptable. If wire rope is used for top rails, it must be flagged at no more than 6’ intervals with high visibility material. Guard rail systems must comply with the current Cal/OSHA standards. Based on job location or requirements, guard rails may be placed in or around the following areas:

- Elevated openings
- Open excavations or pits
- On leading edges of roofs or mezzanines

4.5 Personal Fall Protection Systems
Any person (employee, contractor or otherwise) on any project that will be required to wear a personal fall arrest or restraint system will follow these guidelines:

- Use a body harness at all times; body belts are not an acceptable part of a personal fall arrest system.
- Use shock absorbing lanyards or self-retractable lifelines (SRL’s) to keep impact forces to a minimum on the body.
- Use nylon rope or nylon straps with locking snap hooks for restraints.
- Lanyards must have self-locking snap hooks.
- Inspect all personal fall arrest equipment before each use. Any components which are deteriorated, bent, damaged, impacted, and/or show excessive wear must immediately be removed from service.
- The maximum free fall distance is not to exceed 6’.
- The following factors can affect total fall distance:
  - Deployment of shock absorber (max. 42”)
  - Length of connecting means (i.e. lanyard length, use of carabiners, snap hooks)
  - Movement/deflection in the lifeline
  - Position and height of anchorage relative to work platform/area (always keep anchor points above the head whenever possible)
  - Position of attachment and D-ring slide on the body harness
  - Initial position of worker before free fall occurs (e.g., sitting, standing)

(See Cal/OSHA CCR T8 1669-1672 Article 24 http://www.dir.ca.gov/Title8/sb4a24.html and CCR T8 3299 Appendix A-D http://www.dir.ca.gov/Title8/3299.html for additional specific requirements.)

Calculating Total Fall Distance
Total fall distance (TFD) is defined as the sum of Freefall Distance (FFD), Deceleration Distance (DD), Harness Effects (HEFF), Vertical Elongation (VEL) and Safety Factor (SF). To calculate total fall distance use the following equation: TFD = FFD+DD+HEFF+VEL+SF. Include a safety factor of 2 feet. See figure 1.
Allow the minimum calculated clearances necessary above the ground, equipment, or other obstruction at the end of the fall from the fall arrest point.

4.6 Positioning Device System

Positioning device is a body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning. The following is required for positioning device use:

- Rigged so an employee cannot free fall more than 2'.
- Secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 lbs., whichever is greater.
- Connectors must be drop forged, pressed or formed steel, or made of equivalent materials.
- Connectors must have a corrosion resistant finish. All surfaces and edges must be smooth to prevent damage to interfacing parts of this system.
- Connecting assemblies must have a minimum tensile strength of 5,000 lbs.
- D-rings and snap hooks and carabiners must be proof-tested to a minimum tensile load of 3,600 lbs. without cracking, breaking, or taking permanent deformation.
- Locking type snap hooks must be sized to be compatible with the member to whom they are connected to prevent unintentional disengagement of the snap hook. Unless the snap hook is a locking type and designed for the following connections, snap hooks shall not be engaged:
  - Directly to webbing, rope or wire rope
  - To each other
  - To a D-ring to which another snap hook or other connector is attached
  - To a horizontal lifeline
  - To any object that is incompatibly shaped or dimensioned in relation to the snap hook so that unintentional disengagement does not occur by the connected object being able to depress the snap hook keeper and release itself.
- Positioning device systems must be inspected prior to each use for wear, damage, and other deterioration. Defective components must be removed from service.
- Body harnesses, and components must be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.
For additional information regarding Positioning Device Systems requirements, please see CCR Title 8 1670 and Article 24 http://www.dir.ca.gov/Title8/1670.html.

4.7 Safety Nets
Safety nets must be installed as close as possible under the walking/working surface on which employees are working, but no more than 30' below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net must be unobstructed.

(For additional Safety Net Information please see CCR Title 8 1671 and Article 24 http://www.dir.ca.gov/Title8/1671.html.)

4.8 Warning Line System
Work on a flat roof greater than 50' wide (i.e., roof with less than 4/12 slope) can be completed by installing a warning line and using a safety monitor. If the roof is flat and less than 50' wide, a competent person safety monitor must be used. Warning lines must be:

- Erected at least 6' from the edge of the roof or openings
- Constructed of stationary posts made of wood, metal or comparable materials
- Have wire or nylon rope and “caution” tape strung from post to post and withstand a minimum of 16 lbs. of applied force
- Have a minimum breaking strength of 500lbs. and be equipped with warning line flags at intervals not to exceed 6ft.
- Guard the entire perimeter of the roof where work is being performed
- If an employee must access an area within 6’ of the roof’s edge another employee must monitor that individual and warn him/her of any dangers (this does not include exiting the roof via a ladder or fixed industrial ladder).
- If another employee is not available to act as a safety monitor, the individual must don a body harness and attach a fall restraint lanyard to an anchor point to prevent reaching the edge of the roof.

5.0 HOW TO SELECT A BODY HARNESS
Two ways to improve the use of fall protection equipment and devices is to:

1) Properly train the employee
2) Select the correct body harness

All harnesses are not the same. No matter how thorough the training, employees might leave the equipment behind if it isn't comfortable. Everything from harness construction to strap placement can be compared and contrasted. These elements make a difference in the comfort and safety the harness offers the user.

Donning a Harness
The ability to adjust a harness correctly is important. Some employees may prefer a body harness with stretchable webbing that allows them to flex and bend. Refer to the manufacturer's instructions for details on donning a body harness.
Fall Protection Program

How safe is that Safety Harness?

Most buyers expect a harness to meet specific safety standards, but surprisingly, some brands don’t meet the basic criteria. Before purchasing fall protection products obtain written proof from the manufacturer and ask the following questions:

- **Where are the products manufactured? Does the facility have ISO 9001 certification?**
  - ISO 9001 certification proves facilities meet strict international standards in quality assurance for design, development, production, installation, and service.

- **Do the products meet ANSI and CSA standards?**
  - Not all harnesses meet ANSI Z359.1, ANSI A10.14, CSA Z259, and CSA 259. In addition to product labeling, insist on written proof.

- **Does the fall protection manufacturer have a Statistical Process Control (SPC) program?**
  - Fall protection products are only as good as the quality of the raw materials/components.

- **Does the manufacturer participate in SEI or any other recognized third-party testing?**
  - Reputable manufacturers are often members of the Safety Equipment Institute (SEI), which provides independent testing programs for all fall protection products.

- **Does the manufacturer have qualified engineers designing/testing products in an in-house testing facility?**
  - Ask for documented results of the dynamic drop tests and static load tests.

Strapping Down Safety

Harness construction is anything but standard. Some harnesses are manufactured without a back strap. In the event of a fall, the employee may actually fall out of the back of the harness. Chest straps should be easy to adjust and must withstand a fall without tearing or breaking. Stronger straps and stitching ensure better fall protection.

Selection, Inspection and Maintenance

A harness should have hardware that's sturdy, but not oversized and awkward. The hardware should easily attach to connecting devices. Harness hardware poses a hazard if it has sharp edges. The edges can cut into harness webbing or can be positioned in such a way that they dig into the skin in the event of a fall. To protect workers from hardware injuries, the components must be appropriately manufactured and assembled. Hardware with exposed springs should be avoided. Exposed springs, especially on friction buckles, can be easily disabled or removed. Reliable hardware construction is an important feature because friction buckles that are not spring-loaded can easily begin to loosen once the harness has been adjusted to fit.

Avoiding Tangled Webs

Webbing may seem like an innocuous item that would be similar in all cases, but it varies drastically from brand to brand. Harness webbing should be composed of sturdy, tightly woven yarns so the webbing slides easily through the hardware. If webbing snags when it glides under hardware, it can result in cuts to the webbing. Once cut, the harness must be taken out of service. Examining the tensile strength of webbing is important. After abrasion tests some webbing begins to fray and pucker bringing the harness to the end of service. Stitching is just as important as the structure of the webbing. The stitching must not rip away during a fall. Harness webbing should resist the effects of sun, heat, and moisture for an extended period of time. If a harness is used in an electrical environment, it must also resist conductivity. If it is used in a
harsh chemical environment, the webbing must be able to resist exposure to degrading chemicals.

**Inspecting for Wear**

In order to ensure a harness will perform its intended function—saving a life—it must be inspected prior to every use. All harnesses have a limited life cycle. The length of wearable life will vary depending on the amount of wear it receives and its use environment. For example, a harness worn indoors a couple of times a week, will have a much longer life than one worn outdoors every day. When inspecting your harness, a good rule of thumb is: Any Doubt, Remove it from Service.

**How Does It Work?**

Clear, easy to read instructions should accompany every harness. Ideally, the instructions will be in more than one language. All instructions should include explicit guidelines for usage, maintenance, and inspection.

**It Adds Up to Safety**

When purchasing a harness, make sure you are buying the correct harness for the appropriate application. Employees will more readily and properly wear a comfortable harness that easily adapts to lanyards and other connecting devices. The better the harness the more likely it will be worn which increases regulatory compliance and most importantly saves lives.

**6.0 DONNING A HARNESS: Steps that Could Save Your Life**

Harness styles vary. Always refer to the manufacturer's operation manual or instructions enclosed with your harness.

- Hold the harness by the back D-ring and shake to allow all straps to fall in place.
- If chest, leg, and/or waist straps are buckled, release the straps and unbuckle at this time.
- Slip the straps over shoulders so the D-ring is located in middle of the back between shoulder blades.
- Pull the leg strap between legs and connect to the opposite end and repeat with the second leg strap.
- For belted harnesses, connect the waist strap after the leg straps. The waist strap should be tight, but not binding.
- Connect the chest strap and position in the mid-chest area and tighten to keep the shoulder straps taut.
- After all straps have been buckled, tighten all buckles so the harness fits snugly but allows full range of movement.
- Pass excess strap through loop keepers.

**Mating Buckle**

- Pull the center bar buckle completely through the square link.
- Allow the center bar buckle to fall into place on top of the square link.
- Pull the loose end of the strap to tighten the adjustment of the harness.
- Slide keepers to hold any excess webbing.
Fall Protection Program

Tongue Buckle
- Insert the loose strap of webbing through the tongue buckle, placing the buckle tongue through the appropriate grommet.
- Push remaining webbing through the keeper to retain the loose end.

Friction Buckle
- Pass webbing under the buckle, over knurled bar, and back down between knurled bar and frame.
- Pull web end to tighten.

7.0 INSPECTION OF FALL PROTECTION SYSTEMS

The following component inspection criteria should be utilized to maintain all equipment in good working condition.

Note: Always refer to Equipment owner/operation manuals for specifics or additional requirements.

7.1 Articulating Man Lift
- Inspect before each use.
- Service equipment per manufacturer guidelines. Forklift, scissors lifts, and safety nets must be inspected at the beginning of each shift in use. Structural integrity of the forklift baskets must be checked per the same schedule.
- A competent person must complete an annual inspection of the forklift basket and documentation will be maintained for the life of the unit.

7.2 Body Harness

Visual inspection before each use is required. To maintain service life and high performance, harnesses should be formally inspected twice a year for wear, damage, or corrosion by a competent person. Those inspections must be documented. Replace equipment if any defective conditions exist.

Attaching Buckle
Attachments of buckles and D-rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles or D-rings.

D-Rings/Back Pads
Check D-rings for distortion, cracks, breaks, and rough or sharp edges. The D-ring should pivot freely. D-ring back pads should also be inspected for damage.

Friction and Mating Buckles
Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar.

Tongue Buckle
Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges.
Fall Protection Program

The Tongue/Grommets
The tongue receives heavy wear from repeated buckling and un-buckling. Inspect for loose, distorted, or broken grommets. Webbing should not have additional punched holes.

Webbing
Grasp the webbing with your hands 6 to 8 inches apart. Bend the webbing in an inverted "U" as shown. The resulting surface tension makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the webbing, inspecting both sides of each strap. Watch for frayed edges, broken fibers, pulled stitches, cuts, burns, and chemical damage.

Visual Indications of Damage to Webbing and Rope:
- **Chemical**
  - Chemical exposure may change fiber color usually appearing as brownish smearing or smudges. Transverse cracks may occur when bent over a mandrel. Loss of elasticity may also occur.
- **Heat**
  - In excessive heat, fibers become brittle and have a shriveled brownish appearance. The fibers will break when flexed and should not be used above 180° F.
- **Molten Metal or Flame**
  - Exposure to molten metal or flame may result in webbing strands fusing together, hard shiny spots, or make the fibers hard and brittle.
- **Paint and Solvents**
  - Paint that penetrates and dries restricts movement of the fibers.
  - Drying agents and solvents in some paints cause chemical damage.
- A competent person will complete a twice a year inspection of all harnesses and documentation will be maintained (see Appendix I).
- Storage will consist of hanging in an enclosed cabinet, to protect from damage.
- All harnesses that are involved in a fall must be destroyed.

**NOTE: UC San Diego does not approve harnesses that have Velcro for chest straps.**

7.3 Guard rails
- Temporary systems: Daily visual inspection must be completed by a competent person.
- Temporary systems: Weekly, a complete structural inspection must be completed by a competent person.
- Permanent systems: Annual structural inspections must be completed by a competent person.
- Future inspections must be based on conditions/controls present, requirements set by the manufacturer’s instructions or the registered Professional Engineer who designed the system.

7.4 Horizontal Lifelines
- Inspect before each use for structural integrity of line and anchors.
- A competent person must complete an annual inspection.

7.5 Lanyards/Shock Absorbing Lanyards
- A competent person must complete a twice a year inspection of all lanyards and documentation will be maintained (see Appendix II).
Fall Protection Program

- Storage must consist of hanging in an enclosed cabinet, to protect from damage.
- All lanyards that are involved in a fall must be destroyed.

7.6 Self-Retracting Lanyards/Lifelines
- Inspect before each use, as follows:
  - Visually inspect the body to ensure there is no physical damage.
  - Ensure all nuts and rivets are tight.
  - Ensure the entire length of the nylon strap/wire rope is free from any cuts, burns, abrasions, kinks, knots, broken stitches/strands, excessive wear and retracts freely.
  - Test the unit by pulling sharply on the lanyard/lifeline to verify the locking mechanism is operating correctly.
  - If the manufacturer requires, make certain the retractable lanyard is returned for scheduled annual inspections.
- A competent person must conduct monthly inspection of all self-retracting lanyards/lifelines and documentation will be maintained (see Appendix IV).
- Service per manufacturer specifications.
- Inspect for proper function after every fall.

7.7 Snap hooks
  Only locking snap hooks are permitted for use at UCSD.
- Inspect before each use.
  - Inspect snap hook for any hook and eye distortions.
  - Verify there are no cracks or pitted surfaces.
  - Verify the keeper latch is not bent, distorted, or obstructed.
  - Verify the keeper latch seats into the nose without binding.
  - Verify the keeper spring securely closes the keeper latch.
  - Test the locking mechanism to verify the keeper latch locks properly.
- A competent person must complete a twice a year inspection of all snap hooks and documentation must be maintained (see Appendix III).
- All snap hooks involved in a fall must be destroyed.

7.8 Tie-Off Adapters/Anchorages
- Inspect for integrity and attachment to solid surface.
- A competent person must complete an annual inspection of all tie-offs and anchorages and documentation must be maintained.
- All tie-offs and anchorages must be destroyed after a fall.

8.0 STORAGE & MAINTENANCE OF FALL PROTECTION EQUIPMENT
- Refrain from storing personal fall arrest equipment in the bottom of a toolbox, on the ground, or outdoors, exposed to the elements (i.e., sun, rain, snow).
- Hang equipment in a cool, dry location in a manner that retains its shape.
- Follow manufacturer recommendations for inspections.
- Clean with a mild, nonabrasive detergent and hang to dry.
- Refrain from force drying or using strong detergents when cleaning.
- Refrain from storing equipment near excessive heat, chemicals, moisture, or sunlight.
- Refrain from storing in an area with exposures to chemicals or corrosive elements.
Avoid dirt or other types of build-up on equipment.
- Refrain from using equipment for any purpose other than personal fall arrest.
- Remove equipment from service immediately if exposed to a fall.

9.0 RESCUE PROCEDURES

9.1 Rescue Methods/Options of Fallen Personnel

Prior to work activity where fall protection is necessary, rescue plans must be identified and discussed with all employees. The supervisor must develop the rescue plan(s). In the unlikely event that a fall arrest occurs on-site, personnel with the use of an articulating man lift or ladders, where feasible, will rescue all employees. Alternative rescue options are safety ladders and personal trauma straps. Additional assistance must be sought through the local emergency services or San Diego Fire Department.

9.2 Communication

In the event of a fall, notify the following people as soon as possible.

- Fire Department and emergency medical services if necessary
- Rescue personnel (i.e., maintenance personnel, UCSD Police)
- Supervisor/Manager
- Occupational Safety Officer (EH&S Department)
- UC San Diego Risk Management Office

Note: Employees involved in a fall arrest or fall should be sent for a medical evaluation to determine the extent of injuries.

10.0 FALL INVESTIGATION

All falls will be investigated by the employee’s immediate supervisor, their department Manager and EH&S. The following documentation will be completed as part of the fall investigation:

- Interviews with staff and witnesses
- Employee injury/accident report
- Supervisor injury/accident report
- Corrective action outline/plan

11.0 PROGRAM EVALUATION

The Fall Protection Program will be evaluated periodically to ensure effectiveness. The following criteria will be used:

- Accident reports
- Number of accidents
- Management/staff compliance with program components
- Periodic on-site audits
- Staff feedback and interviews
12.0 CONTRACTORS

All outside contractors working in or on the premises of UCSD will be required to follow their own written Fall Protection Program and ensure that their program meets current code. Contractors are also expected to discuss Fall Protection strategies with all others involved in the work to ensure safe interactions with other exposed individuals.

13.0 TRAINING

Fall protection training is required for employees exposed to fall hazards. Training covers recognition of fall hazards and methods to minimize fall hazards. Training materials must be reviewed to verify each employee has been trained, as necessary, by a competent person qualified in the following areas:

- The nature of fall hazards in the work area
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used
- The use and operation of guard rail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protective measures to be used
- The role of each employee in the safety monitoring system when this system is used.
- The limitations on the use of mechanical equipment during the performance of roofing work on low sloped roofs
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection
- The role of employees in fall protection plans
- The requirements contained in applicable Cal/OSHA Standards
- Understanding and following all components of the Fall Protection Program and identifying the enforceable Cal/OSHA standards and ANSI Consensus standards that pertain to fall prevention/protection
- Employers must maintain a written certification record for employee training.
- The record must contain the following information:
  o The name or other identity of the employee trained.
  o The date(s) of the training, material covered.
  o The name of the person who conducted the training.

Note: Training coordinated with EH&S thru the UC Learning Center (UCLC) will meet these requirements.

Re-Training

If the supervisor has reason to believe that any designated employee who has been trained does not understand or possess the skill required by Cal/ OSHA standards, the employer must retrain that employee. Retraining is required in the following circumstances:

- Changes in the workplace Fall Protection Program render previous training obsolete.
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete.
- Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.
14.0 GLOSSARY OF TERMS

Aerial lift device: equipment such as powered platforms, vehicle-mounted elevated and rotating work platforms, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers and powered industrial truck platforms.

Anchor point: A secure point of attachment for lifelines, lanyards or deceleration (grabbing) devices.

Anchorage: A secured structure that can safely withstand forces exerted by fall protection or rescue equipment.

Authorized person: A person approved or assigned by the employer to perform specific tasks or duties (building maintenance, roof repair, etc.)

Body belt: A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration (grabbing) device. Body belts are prohibited for use at UCSD.

Body harness (full body harness): An interconnected set of straps that may be secured about a person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system, preferably at the shoulders and/or middle back.

Connector: A device that is used to connect parts of a personal fall arrest system together (i.e. D-rings, and snap hooks).

Competent person: A person who is capable of recognizing existing and predictable hazards and has the authority to take corrective action; A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof as well as in their application and use with related equipment. To be considered a competent person, a training class must be completed for general fall protection and an additional training class must be completed for scaffolds. To be considered a competent person for equipment inspections, the manufacturer's training guidelines and instructions shall be followed.

Deceleration device: Any mechanism, such as a rope; grabbing device, rip stitch lanyard, specially woven lanyard or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deceleration distance: The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

Designated area: A space which has a perimeter barrier erected to warn employees when they approach an unprotected side or edge, and serves also to designate an area where work may be performed without additional fall protection.

Fixed ladder: A ladder, including individual rung ladders that is permanently attached to a structure, building, or equipment; It does not include ship's stairs or manhole steps.

Free fall: The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance: The vertical displacement of the fall arrest attachment point on the employee’s body harness between the onset of the fall, and just before the system begins to apply force to arrest the fall. Free fall distance must not exceed 6'. This distance excludes deceleration distance and lifeline/lanyard elongation distance.
Fall Protection Program

Guard rail: A barrier erected to prevent personnel from falling to lower levels.

Guard rail System: A barrier erected to prevent employees from falling to lower levels. This system includes a top-rail, mid-rail and toe-board. All rails and supports must be able to withstand 200 lbs. applied in any direction.

Hole: A void or gap 2" or more in its least dimension in a floor, roof, or other walking/working surface.

Horizontal lifeline: A flexible line between two horizontal fixed anchorages to which a fall arrest device is connected.

Infeasible: Impossible to perform the construction work using a conventional fall protection system (i.e., guard rail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

Ladder: A device typically used to gain access to a different elevation consisting of two or more structural members crossed by rungs, steps, or cleats.

Lanyard: A flexible line of rope or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline or anchor point.

Leading edge: The edge of a floor, roof, or other walking/working surface, which changes location as additional floor, roof, etc., is placed or constructed. A leading edge is considered an unprotected side or edge when not under active construction.

Lifeline: A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Lower levels: Those areas or surfaces to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Low-slope roof: A roof with a slope of less than or equal to 4 in 12 (vertical to horizontal), with an approximate slope of 19.5° or less.

Mechanical equipment: All motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.

Opening: A gap or void 30" or more high and 18" or more wide in a wall or partition, through which personnel can fall to a lower level.

Positioning device system: A body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Personal fall arrest system: A system used to arrest (catch) an employee in a fall from a working level. It consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Qualified climber: A person who by virtue of physical capabilities, training, work experience and job assignment is authorized by the employer to routinely climb fixed ladders and step bolts on structures, such as towers and poles, which do not have ladder protection devices such as cages and rest platforms.

Qualified person: One with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project or product.
Restraint line: A device which is attached between the employee and an anchorage to prevent the employee from walking or falling off an elevated surface.

Roof: The exterior surface on the top of a building.

Roofing work: Hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work; does not include the construction of the roof deck.

Rope grab (grabbing device): A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

Safety monitoring system: A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards. All other fall protection systems must be deemed “infeasible” (through infeasibility study/review) to select and use a safety monitoring system.

Scaffold: Any temporary elevated or suspended platform, at its supporting structures, used for supporting employees or materials or both.

Self-retracting lifeline/lanyard: A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal movement and which, after onset of a fall, automatically locks the drum and arrests the fall (usually within two feet or less).

Standard railing: A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

Steep roof: A roof having a slope greater than 4 in 12 (vertical to horizontal). A steep roof is a roof with a slope greater than 19.5°.

Snap hook: A connector consisting of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released automatically closes to retain the object. Snap hooks must be self-closing with a self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection, thus preventing the opportunity for the object to “rollout” of the snap hook. Only locking snap hooks are permitted for use at UCSD.

Toeboard: A low protective barrier usually 4” or greater in height that prevents material and equipment from falling to lower levels.

Total fall distance: The maximum vertical change in distance from the bottom of an individual’s feet at the onset of a fall, to the position of the feet after the fall is arrested - including free fall distance and deceleration distance.

Tie-off: A procedure of connecting directly or indirectly to an anchorage point.

Unprotected sides and edges: Any side or edge (except at entrances to points of access) of an elevated walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guard rail system at least 39” high.

Vertical lifeline: A component consisting of a flexible line for connection to an anchor point at one end to hang vertically and that serves as a means for connecting other components of a personal fall arrest system to the anchor point. NOTE: When vertical Lifelines are used, each employee shall be attached to a separate lifeline.

Walking/working surface: Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, form work
and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

**Warning line system:** A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge; a barrier that designates an area in which work can be conducted without the use of guard rails, personal fall arrest systems, or safety nets to protect employees in the area. This will be utilized on any roof greater than 50" wide and in conjunction with a safety monitor only where the other forms of fall protection have been deemed infeasible to use.

**Work area:** The portion of a walking/working surface where job duties are being performed.