

UC Irvine Environmental Health & Safety

SECTION:	TITLE: Working Safely at Heights	
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1. Program Description
2. Scope
3. Definitions
4. Responsibilities
5. Program Components
6. Reporting requirements
7. Training Requirements and Competency Assessment
8. Information and External References

1. Program Description

The purpose of this program is to specify work procedures and training for the safety of UC Irvine employees working at heights greater than six (6) feet. This would include work on elevated platforms, aerial lifts, scissor lifts, man lifts, scaffolds, portable ladders, and fixed ladders. This program will also address the requirements for fall protection or prevention when working at heights greater than six feet.

2. Scope

This program applies to all University employees who perform any duties on elevated work surfaces greater than six (6) feet above grade. Employees using devices to access elevated work areas are required to be trained and use safe work practices. (Section 7)

NOTE: *Exceptions to the scope of this program*

Employees may work without fall prevention:

- At the working sides of loading docks;
- At the exposed perimeters of theater stages;
- When climbing portable ladders up to 60 feet in length;
- When working on scaffolds up to 6 feet in height;
- When working on the edge of an excavation up to 6 feet in depth; or
- When the employee is on a low slope roof (slope less than 3:12 pitch or 14 degrees) for inspection or observation purposes only.

3. Definitions

Anchorage – A secure point of attachment for lifelines, lanyards, restraint systems, or deceleration (grabbing) devices.

Body Harness (or 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.

Competent Person - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Fall Arrest System - A system used to minimize the effect of a fall from a working level. It consists of an anchorage, connectors, and full-body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. Fall arrest systems are usually not necessary when proper fall restraint systems are in place.

Fall Prevention - Fall prevention systems are designed to "prevent" against the possibility of falling. For example, guardrails around the platform of a scissor lift aerial work platform constitute "prevention" according to ANSI standards.

Fall Restraint - A fall restraint system consists of a full-body harness and appropriate lanyard. When used properly, restraint systems are designed to physically prevent the employee from walking or falling off an elevated surface.

Guardrail - A barrier, 42 inches high with a mid-rail 21 inches high, erected to prevent personnel from falling from working levels more than 30 inches above the floor, ground, or other working areas of a building.

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 anchorage.

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). This serves as a means for connecting other components of a personal fall arrest system to anchorage.

Roof - Exterior surface on the top of a building.

Roof Tie-Backs - Eyebolts or other permanent devices installed at the roof level for the purpose of securing or tying back suspended scaffold hooks or clamps and safety lines.

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.

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.

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. Only locking snap hooks are permitted at UCI.

Toe Board - A low protective barrier that prevents material and equipment from falling to lower levels and which protects personnel from falling.

Tie-Off - A procedure of connecting directly or indirectly to an anchorage.

Unprotected Sides and Edges - Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway which is 6 feet (1.8 m) or more above a lower level where there is no wall or guardrail system at least 42 inches high, safety net system, or personal fall arrest system.

Vertical Lifeline - A vertically hanging flexible line that serves as a means for connecting other components of a personal fall arrest system to an anchorage.

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, and runways.

4. Responsibilities

DEPARTMENTS

Departments affected by this program include, but are not limited to:

- Facilities Management - Maintenance activities throughout campus buildings and grounds

- Telecommunications/Network Repair - Telecommunications and network installation and maintenance throughout the University
- Student Center - Preparation and coverage of events at the Student Center
- Student Housing - Maintenance activities throughout campus housing facilities and grounds
- School of the Arts, Production Department - Construction and dismantling of stage productions

MANAGERS AND SUPERVISORS

- Shall ensure that all requirements listed in the written program for working at heights are met
- Shall ensure that new and existing employees receive appropriate training for working at heights as applicable to their job duties
- Shall ensure that new and existing employees are provided with appropriate personal protective equipment as needed or specified in this program
- Shall identify areas requiring employees to work at heights and work with EH&S to establish safe procedures

EMPLOYEES

- Shall be trained prior to working at heights or using working at heights devices.
- Shall, when duties involve work activities at elevated locations, comply with all applicable rules of operations and accepted safety practices outlined within this written program
- Shall control fall hazards in their work area by maintaining good housekeeping and report conditions that may lead to slips, trips, and falls to the appropriate maintenance unit.

ENVIRONMENTAL HEALTH AND SAFETY (EH&S)

- Shall provide assistance for departments and staff when selecting or working with fall protection equipment or systems
- Shall provide general oversight of this program and work with employees and supervisors on working safely at heights
- Shall assist managers and supervisors in the evaluation of additional elevated work locations for safety requirements in this program
- Shall conduct periodic audits of work areas at elevated locations or locations using elevating equipment
- Shall conduct training of University employees in working at heights and in the safe use of elevating personal platforms

CONTRACTORS

- Shall, when working on campus, comply with all applicable Cal/OSHA workplace safety regulations and have their own programs for working safely at heights

- Shall have safety programs available for review upon request by representatives of UC Irvine Environmental Health & Safety (EH&S).

5. Program Components

The following systems are covered by the University's program for working at heights:

- **Ladders** - Fixed, portable, temporary, or roll away type
- **Aerial Lifts** – Aerial lifts, bucket trucks, scissor lifts, man-lifts, forklift-mounted platforms, cherry pickers, etc.
- **Scaffolds** – Suspended, fixed, or portable scaffolding
- **Slips, Trips, and Falls** – Awareness of conditions to minimize slips, trips, and falls on walking/working surfaces

Elements of this program include:

FALL PREVENTION

Wherever practical, a safe working area must be provided by means of work platforms or scaffolds. Such work areas should be designed and configured to prevent falls. Fall prevention equipment may consist of the following:

- **Covers** - Covers are fastened over holes in the working surface to prevent falls.
- **Guardrails** - Standard guardrails consist of a top rail, located 38-42 inches above the floor and a mid-rail installed along drops of more than 30 inches. Work platforms and scaffolds must have complete floors and guardrails with safe access and egress provided. Toe boards may also be required if there are persons working or passing under the work platform. Guardrails must be rated to withstand 200 pounds of force applied in any outward or downward direction.

PERSONAL FALL RESTRAINT

A personal fall restraint system prevents a worker from being exposed to any fall. Personal fall restraint systems may use body belts or harnesses with anchor points capable of supporting four times the intended load. Personal fall restraint protection systems are rigged to allow the movement of employees only as far as the sides of the working level or working area. When a restraint system is used for fall protection from an aerial lift or a boom-type elevating work platform, the lanyard and anchorage must be configured so that the employee is prevented from falling any distance.

POSITIONING DEVICE

Positioning device systems consist of a full-body harness rigged to allow work on a vertical surface, such as a wall, with both hands free. Positioning devices shall be:

- Rigged such that an employee cannot free fall more than 2 feet.
- Inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.
- Have anchorage connectors capable of supporting two times the intended load or 3,000 pounds, whichever is greater.

PERSONAL FALL ARREST SYSTEM

In other situations, fall protection in the form of personal fall arrest systems must be used. This includes situations in which work is being carried out from an elevated work platform, aerial bucket truck, or boom lift. Fall arrest equipment must be rated at 5000 pounds to support the falling person, stop them from free falling more than 6 feet, limit the arresting force on the body to 1800 pounds, and bring them to a stop with a maximum deceleration distance of 3.5 feet.

Components of a personal fall arrest system include a full-body harness, lanyard, deceleration device, self-locking snap hooks, and an anchorage capable of supporting at least 5000 pounds. There must be a system for ensuring that Fall Protection equipment is:

- Tested and certified for use;
- Inspected by the user before use; and
- Destroyed following a fall or where inspection has shown evidence of excessive wear or mechanical malfunction.

USE OF PERSONAL FALL ARREST SYSTEMS

Employees who use personal fall arrest systems to control fall hazards in their work area shall be knowledgeable of the following:

- The application limits of the equipment;
- The proper hook-up, anchoring and tie-off techniques including determination of elongation and deceleration distance; and
- Methods of use, inspection, and storage of equipment.

Pre-Use Inspections

- Personal fall arrest components including harnesses and lanyards shall be inspected prior to each use for mildew, wear, damage, or other deterioration.
- Defective components shall be removed from service.

Semi-Annual Inspections

- A competent person shall inspect fall arrest systems including harnesses and lanyards at least semi-annually or according to manufacturer recommendations.
- The date of the most recent semi-annual inspection shall be recorded on the manufacturer's inspection tag that is permanently attached to the harness or lanyard.

- In addition, records shall be kept and maintained for the life of the equipment showing date of purchase, dates when attachments were renewed, and dates when the equipment was inspected and by whom.

Anchorage - Anchorage connectors must, where practical, be above the head of the worker and must ensure that in the event of a fall, the worker will neither swing nor touch the ground. Anchorage connectors used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached, or shall be designed, installed, and used as follows:

- As part of a complete personal fall arrest system which maintains a safety factor of at least two; and
- Under the supervision of a qualified person.

LADDERS

A person may climb or descend a ladder without fall protection provided that the ladder is properly supported, they are able to use both hands and feet maintaining three points of contact with the ladder at all times, face the ladder, and climb one step at a time.

SIGNS AND BARRICADES

Where overhead work is being conducted, signs must be posted notifying passersby that overhead work is taking place and barricades must be erected around the work area to protect others below from falling objects.

WARNING LINE SYSTEMS

Warning line systems are made up of lines or ropes installed around a work area on a roof. These act as a barrier to prevent those working on the roof from approaching its edges.

Employees will not be allowed to perform any duties which require the employee to get closer than six feet to an unprotected edge, platform, walkway, or utilize elevated equipment unless the employee is properly secured from falling.

Where it can be clearly demonstrated that the use of these systems is infeasible or creates a greater hazard, alternative working at heights measures may be implemented. Contact EH&S for assistance when selecting or working with fall protection equipment or systems.

INSPECTION OF ROOF TOP INSTALLATIONS

Cal/OSHA requires that all building owners of roof top exterior building maintenance installations have the components inspected at least every 12

months and maintained to ensure a safe environment for all workers performing tasks at height.

Roof anchorage certification:

- Is a 12-month inspection which includes a visual inspection of the building's engineered and permanently installed equipment.
- The 12-month inspection may be done by any "competent person" as defined by Cal/OSHA. (Campus Departments using roof anchors must have outside vendors perform 12 month inspections if they themselves do not have designated/qualified "competent persons").
- If there is no documentation that these inspections have been done within 12 months of the initial roof certification or of a previous 12-month inspection, a re-certification inspection conducted by an experienced inspection company, usually a structural engineering firm, may be required.

The roof certification evaluation process requires an on-site visit and inspection of all existing anchorage support systems including but not limited to:

- Proper location of lifeline and safety line anchorage
- Condition of protective coating on the assemblies and degree of any ferrous metal corrosion
- Engineered drawings including proper anchorage design, strength capacity, and structural safety

6. Reporting Requirements

Constant awareness of and respect for working at heights procedures and compliance with all applicable UCI safety rules is mandatory.

Representatives of EH&S are authorized to issue warnings to employees and stop unsafe work from continuing.

Supervisors may issue warnings and implement disciplinary actions in accordance with University Policy for failure to follow the guidelines of this program.

Employees shall report any safety concerns to their supervisor or EH&S.

7. Training Requirements and Competency Assessment

Employees must be trained prior to working at heights or using working at heights devices. All employees must attend Working at Heights training regardless of previous experience.

The training program provided by EH&S includes classroom instruction and operational training on specific fall hazards on campus. Training topics include:

- Awareness of how injuries can occur as the result of a simple trip or fall

- Recognizing potential fall hazards when working above the ground on scaffolds, ladders, or elevated work platforms
- Awareness of the equipment that is needed to stay safe when working above the ground
- Awareness of requirements for inspection, setup, and use of fall protection equipment such as body harnesses, lanyards, anchors, life lines, and rope grabs.
- Awareness of the requirements for guardrails

Employees shall be retrained under any of the following conditions:

- Changes in the workplace render previous training obsolete;
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete; or
- Inadequacies in an employee's knowledge of use of working at heights systems or equipment or observed behavior indicate that the employee has not retained the required training.

8. Information and External References

Title 8 California Code of Regulations, General Industry Safety Orders - [§3209](#), [§3210](#), [§3211](#), [§3212](#), [§3213](#), [§3214](#), [§3299](#)

American National Standards Institute (ANSI), Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components (ANSI Z359.1-1992 (R1999))