

UC Berkeley Fall Protection Safety Program

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Quick Start

For basic information about Fall Protection Safety please review the [Fall Protection Safety FAQ/Fact Sheet](#).

Click here for the Fall Protection Safety Program [Table of Contents](#).

Description

In 2009, nationally there were fatal 520 falls, while in California there were 54 fatal falls of which 41 would have been prevented with adequate fall protection. Cal/OSHA has Fall Protection Safety regulations that ensure safe-work activities when the possibility of falling is present. The University of California, Berkeley (UCB) has developed this Fall Protection Safety Program to manage the safe [selection](#), [procurement](#), [use of and safe work practices](#), [inspection](#) and [record keeping](#) of all fall protection equipment (FPE). Included are guidelines for identification and correction of locations with fall hazards that endanger employees, students, and the public.

This [Fall Protection Safety Program](#) applies to any department on campus, at field stations, or on leased property where any type of activities could result in injuries from falls. [Roles and responsibilities](#) are detailed for [users of FPE](#) (including fulltime employees, contract employees and graduate students performing research related activities in field stations and remote research facilities) as well as those of [EH&S](#) in managing this program, and “[Owner Departments](#)” that purchase, maintain and manage an inventory of fall protection equipment, and train their personnel on its safe use and proper care.



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Purpose/Introduction

Falls present significant workplace hazards. The Federal Bureau of Labor Statistics states that in 2009, 608 people died from falls. That's 14% of the total workplace fatalities in the USA that year! In California, of the 54 falls that occurred that year, 41 could have been avoided by proper use of fall protection equipment (FPE).

The use of fall protection equipment (FPE) poses physical and physiological hazards that could result in permanent injury or death to the wearer when used incorrectly or without adequate preparation for rescue after a fall.

The University of California, Berkeley (UCB) developed this program to describe all aspects of secondary FPE use, inspection, personnel accountability for the condition and use of the equipment, safe work practices, training requirements, and record keeping.

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Applicability/Scope

There are two types of FPE, primary and secondary. Primary FPE refers to stationary objects that act as engineering controls for the prevention of falls. This includes guardrails, floors, ramps, platforms, and lifts or scaffolding. Secondary FPE refers to devices attached to structures whose sole use is for fall protection anchorages, and any devices used for fall protection that a user attaches to them (lanyards harnesses, elbow straps, etc.). This program primarily applies to secondary fall protection equipment worn by the FPE user and attached to structural anchor points.

This Program applies to any activities being conducted in elevated locations by University personnel where fall hazards that require wearing of FPE for protection are part of research/work activities. This includes contract employees and graduate students performing research related activities in field stations and remote research facilities.

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Roles/Responsibilities

Every User of Fall Protection Equipment (FPE)

FPE users are required to follow safe-work procedures as outlined in this program, to alert Owner Department management whenever they discover damaged equipment and to follow the safe work practices developed by their department concerning fall protection use. Toward this end, FPE users:

- Are trained on and apply the [“Fall Protection Equipment User’s Safe-work Rules”](#) for FPE equipment use
- Document the use of the Department’s Rescue Plan and when it applies to their work activities
- Always select, inspect, and use FPE in a safe manner
- Alert Owner-Department Management when FPE has any damage or weakness requiring repair/replacement
- Assess planned work to determine if FPE should be worn, and seek alternative access or work-methods to avoid the use of FPE whenever possible
- Refuse to do unsafe work using FPE. And, instead, use other methods of access such as a scaffold, lift pod or bucket truck and thus avoid the need to use FPE.

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Owner Department

The “Owner Department” is responsible to identify fall hazards/activities in their workplace and design into locations engineering controls such as guardrails, fall barriers, edge protection, etc., to prevent access to a fall hazard. Only when engineering controls cannot be used/implemented is FPE to be used to control fall hazards to personnel in a Department’s operations/facilities.

The department owning or exposing personnel to fall hazards is responsible for the selection of the proper FPE based upon a [hazard analysis](#) of work tasks. In addition, Owner Departments must provide [training](#) to their personnel who use the equipment, keep the records of training completed, and schedule semi-annual inspections of all FPE under their ownership/control.

Toward this end, the Department owning the FPE must:

- Assign a Fall Protection Program Administrator to manage the Program for the Department
- Assure work-tasks are evaluated for hazards and that work tasks requiring fall protection to be worn are identified

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- Provide alternative access when an FPE user determines use of FPE can be avoided by providing other means of access or workspace operations such as a scaffold, lift pod or bucket truck
- Establish a general Rescue Plan and include its adaptation to specific FPE use sites
- Notify EH&S when new equipment is purchased so that it can be inspected by a certified FPE inspector and added to the EH&S FPE inventory
- Schedule with EH&S a semi-annual inspection by a certified FPE inspector for all FPE in their control/ownership
- Render unusable and then dispose of any FPE that is in any way questionably safe as determined by a certified FPE inspector or the person using the equipment
- Provide training to all personnel using their FPE as required by the “Training” section of this Program
- Keep attendance records of all training

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EH&S

- Works with UCB Risk Management Department, Procurement Department, FPE manufacturers, and the Owner Department to determine proper FPE selection, use, stocking, and safe-work practices unique to the Owner Department’s work activities
- Performs and documents semi-annual inspections of FPE
- Maintains campus inventory data base of FPE and inspection records
- Provides training to assist Owner Departments in FPE Program compliance
- Maintains and updates this Program as need dictates, or as compliance codes change

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Definitions

Approved

Tested and approved by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratory (UL) or Gravitec.

Anchorage

A secure point of attachment for lifelines, lanyards or deceleration devices. May also be a “Bearer Bracket” or a “Roofing Bracket”.

Bearer Bracket

A bracket used in slope roof construction, having provisions for fastening it over the roof-ridge and being secured to some suitable object; also known as “Roofing Bracket”.

Body Belt

A simple or compound strap with means for securing it about the waist and for securing a lanyard to it. The use of a body belt for fall restraint/prevention is allowed, but it cannot be used for fall arrest.

Body Harness

Straps which may be secured about a person’s torso and buttocks in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Buckle

Any device for holding the body belt or body harness closed around the employee's body.

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Catenary Line

See “Lifeline”.

Carabineer

See “Snaphook”.

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 belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Guardrail

A barrier consisting of a top rail and a midrail secured to uprights and erected along the exposed sides and ends of platforms.

Handrail

A rail used to provide employees with a handhold for support.

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Hole

Any area in a floor or platform that is open to an area below but is smaller in size than an "opening" as defined by the Cal/OSHA Fall Protection codes.

Lanyard

A flexible line to secure a wearer of a safety belt or harness to a drop line, lifeline, or fixed anchorage.

Leading Edge

The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

Lifeline

Usually a horizontal steel-wire rope (i.e. Catenary line) located between two fixed anchorages and suspended above the work surface, to which the lanyard is secured

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either by tying off or by means of a suitable sliding connection. A lifeline may be vertical when used with a rope-grab attached by lanyard to a body harness.

Linemen's Body Belt

A leather or web (cotton or nylon) belt designed specifically for employees working on poles. It consists of a waist belt, generally cushioned, with a front buckle, two D rings for attaching safety straps and a multiple-looped strap for holding, rings, snaphooks, holsters and other tool holding devices.

Lower Levels

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

Midrail

A rail approximately midway between the top rail and platform that is secured to the uprights erected along the exposed sides and ends of platforms.

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Opening

An open area in any floor or platform 12 inches or more in the least horizontal dimension. It includes: stairway floor openings, ladder-way floor openings, hatchways and chute floor openings.

Personal Fall Arrest System

A system used to slow and stop a person during a fall from elevated location. It consists of an anchorage, connectors, a body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. The use of a body belt for fall arrest is prohibited by law.

Personal Fall Restraint System

A system used to prevent an employee from access to a leading edge or other fall-hazard location. It consists of anchorages, connectors, body belt/harness. It may include, lanyards, lifelines, and rope grabs designed for that purpose.

Personal Fall Protection System

A generic term for any designed fall protection system that might include fall arrest systems, positioning device systems, fall restraint systems, safety nets, guardrails, etc.

Personal Protective Equipment (PPE)

As this term applies to Fall Protection Equipment, it defines the safeguarding obtained by use of fall protection safety devices worn by a person and that safeguards them from a fall hazard, and is of such design, strength, and quality as to eliminate, preclude, or mitigate the hazard.

Positioning Device System

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

Qualified Person, Attendant or Operator

A person designated by the Owner Department who, by reason of training, experience or instruction, has demonstrated the ability to safely perform all assigned duties and, when required, is properly licensed in accordance with federal, state, or local laws and regulations.

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Railing

(See "Guardrail")

Ramp

A surfaced sloping passageway connecting two different levels.

Roofing Bracket

(See "Bearer Bracket").

Rope

Refers to steel-wire rope unless otherwise specified.

Rope Grab

A deceleration device which travels on a vertical lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

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Safety Belt or Harness

A device specifically for the purpose of securing, suspending, or retrieving a worker in or from a hazardous work area.

Safety Factor

Ratio of the ultimate breaking strength of a structural member, piece of material or equipment to the actual working stress or safe load when in use.

Safety Line

A vertical line most often of polypropylene or other woven synthetic material provided to protect a person from falls caused by failure of suspended scaffolds, working platforms, or loss of balance, and that extend to within four feet of ground or other stable rescue surface.

Self-Retracting Lifeline/Lanyard

A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal movement by the user/wearer, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Safety Strap

A web strap designed specifically for use in conjunction with a lineman's belt as an aid in climbing poles and to secure the employee to the pole in a manner that permits hands-free work using both hands.

Snaphook

A connector comprised 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; also known as a "Carabineer".

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) where there is no wall or standard guardrail provided.

Wall opening

A gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition, through which employees can fall to a lower level.

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Types of Fall Protection Equipment (FPE)

A Personal Fall Protection System is comprised of three (3) key components:

1. Anchorage connector
2. Body wear
3. Connecting device to join them

FPE is selected and used to meet the design requirements for the following four categories of Fall Protection Systems:

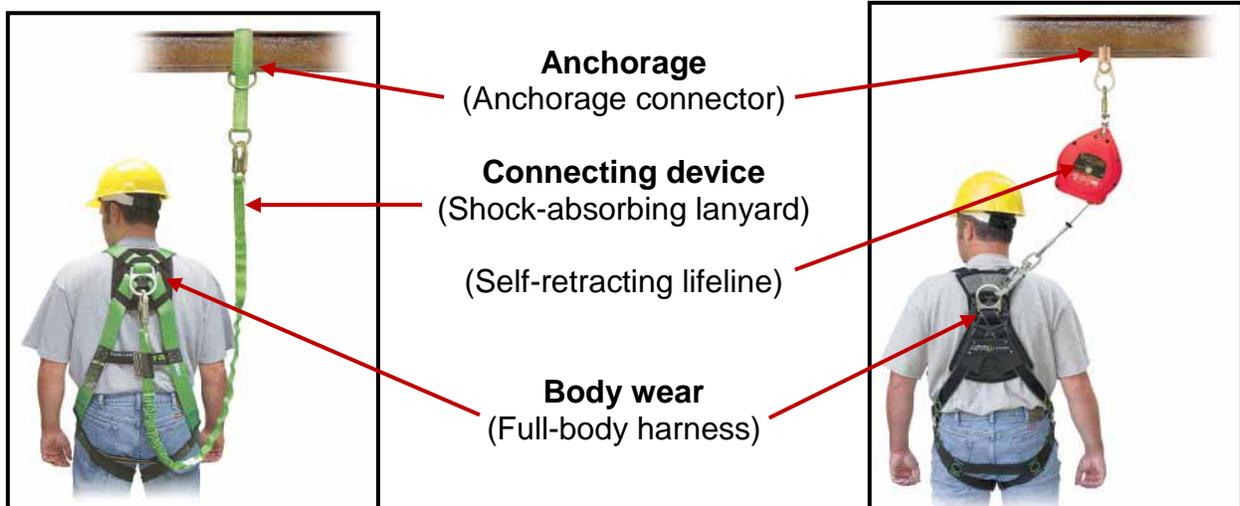
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Fall Arrest System

A personal Fall Arrest System is used to slow and stop a person during a fall from an elevated location. As a general rule, it is recommended that a Fall Arrest System be used at working heights of four (4) feet or more; however, regulatory agencies vary the height-use requirements based on tasks or industries. Contact EH&S to assure compliance with codes prior to procuring and using Fall Arrest Equipment. The Fall Arrest System consists of:



Positioning System

A positioning system is used to hold a worker in place while allowing a hands-free work environment at elevated heights. The positioning systems are not designed for fall arrest and, therefore, a back-up fall arrest system must be used. A typical positioning system consists of:

- Anchorage/anchorage connector**
- Body wear (full-body harness)**
- Connecting device (positioning lanyard)**



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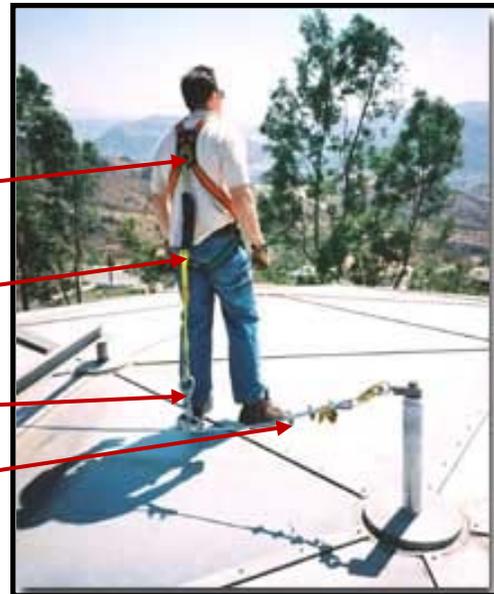
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Restraint System

A restraint system is used to restrict the worker's movement to prevent reaching a location where a fall hazard exists. The restraint systems are not designed for fall arrest and, therefore, a back-up fall arrest system must be used. A typical restraint system consists of:

- Body wear (full-body harness or body belt)**
- Connecting device (restraint lanyard)**
- Anchorage/anchorage connector**
- Horizontal Fall Line**



Suspension System

Suspension systems are used widely in the window washing and painting industries and are designed to lower and support a worker while allowing a hands-free work environment. The positioning and suspension systems are not designed for fall arrest and, therefore, a back-up fall arrest system must be used. A typical suspension system includes:

- Anchorage/anchorage connector**
- Body wear (full-body harness)**
- Suspension device (Boatswain chair)**



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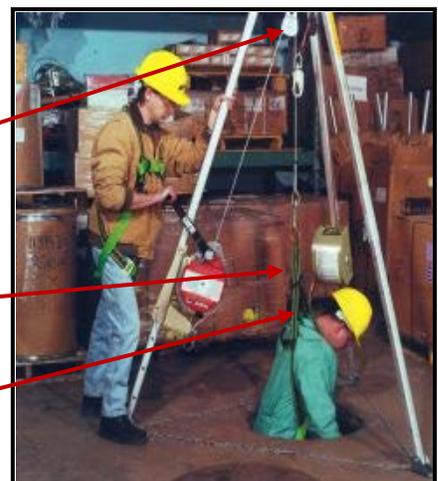
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Retrieval System

The retrieval system is primarily used in confined space applications where workers must enter tanks, manholes, etc., and may require retrieval from above should an emergency occur. Retrieval Systems may also be used in rescue after a fall has occurred and the victim is hanging by the Fall Arrest System in suspension. A retrieval system typically consists of:



- Anchorage**
- Anchorage connector (Tripod, davit)**
- Connecting device (Retrieval unit)**
- Body wear (Full-body harness)**



Selection/Procurement of FPE

FPE is designed and constructed according to the American National Standards Institute (ANSI) standards to safely hold greater than twice the expected load in positioning systems and a specific amount of weight in fall arrest systems in the event of a fall. The design-load capacity includes a person's fully clothed weight plus the weight of any tools and materials that are carried that could be part of the load on the FPE during a fall.

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Fall Hazard Assessment

Code requires the load rating must be attached or permanently printed on each piece of equipment and must be readable by the person using the equipment. The user must be able to plan the use of the equipment based on the load capacity. The kind of personal fall arrest system selected should match the particular work situation, and any possible free fall distance should be kept to a minimum. Consideration must be given to the particular work environment, the presence of acids, dirt, moisture, oil, grease, etc., and their effect on the system. Hot or cold environments may also have an adverse effect on the system. Wire rope should not be used where an electrical hazard is anticipated, etc.

Listed below are different types of fall safety equipment and their recommended usage.

Harnesses and Belts

Class 1	Body belts (single or double D-ring) are designed to restrain a person in a hazardous work position and to reduce the possibility of falls. They should not be used when a fall potential exists; positioning only.
Class 2	Chest harnesses are used when there are only limited fall hazards (no vertical free fall hazard) or for retrieving persons such as removal of persons from a tank or a bin.
Class 3	Full body harnesses are designed to arrest the most severe free falls
Class 4	Suspension belts are independent work supports used to suspend a worker, such as boatswain's chairs or raising or lowering harnesses.

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Connectors

Rope Lanyard	Offers some elastic properties for fall arrest; used for restraint purpose.
Web Lanyard	Ideal for restraint purposes where fall hazards are less than two feet.
Cable Positioning Lanyards	Designed for corrosive or excess heat environments and must be used in conjunction with shock absorbing devices.
Shock Absorbers	When used, the fall arresting force will be greatly reduced if a fall occurs.
Rope Grabs	A deceleration device which travels on a lifeline, used to safely ascend or descend ladders or sloped surfaces and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee.
Retractable Lifeline Systems (self-retracting lanyard)	Gives fall protection and mobility to the user when working at height or in areas where there is a danger of falling.

Guards

Safety Nets	Can be used to lessen the fall exposure when working where temporary floors and scaffolds are not used and the fall distance exceeds 25 feet.
Rail Systems	When climbing a ladder, rail systems can be used on any fixed ladder as well as curved surfaces as a reliable method of fall prevention.

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FPE Types and Selection for Use

Harnesses

Vest Harness

A harness is built into the vest to create a no-tangle body wear system.

The leg straps of the Vest Harness zip into the back of the harness for easy storage when not in use.

Used the same as any other fall protection harness, but offers pockets and can be visibility vests for use on construction sites.



Retrieval harness

This harness has spring loaded "stand-up" dorsal retrieval D-rings for quick rescue in the event of a fall or retraction (retrieval) from a confined space

Can be used as a fall arrest harness in man-holes and other confined spaces.



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Welding Harness

Edge Flame Resistant Harness is designed with welding applications in mind and features a replaceable outer shell to prolong the life of the harness by shielding the webbing from high intensity ultraviolet light, slag, and sparks produced by welding. Used as a fall protection harness on steel structures such as bridges where the person wearing the harness is welding.



Tower Harness

Tower Harness for climbing, work positioning, and suspension has an extra comfortable saddle and a body belt for positioning.

Typically used on broadcast towers and theater/concert production in instances where lifelines and positioning/restraint systems are used.



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Body Belt

Body belts can only be used for fall restraint or positioning systems, not for fall arrest.

Body belts (single or double D-ring) are designed to restrain a person in a hazardous work location and to reduce their inadvertent access to a fall hazard.



Lineman Harness

The extra wide cradle seat adds comfort to the lineman harness and includes four attached side positioning D-rings and a permanently attached tool belt.

These are mostly used for work from poles or in trees.



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Jacket Harness

The outer shell of this harness's jacket is designed to protect the person wearing it from wind and rain, and the accessory flaps prevent rain from getting inside their jacket.

These are similar to a vest harness as they are used the same as any other fall protection harness, but offers pockets and can be in orange visibility coloration for use on construction sites.



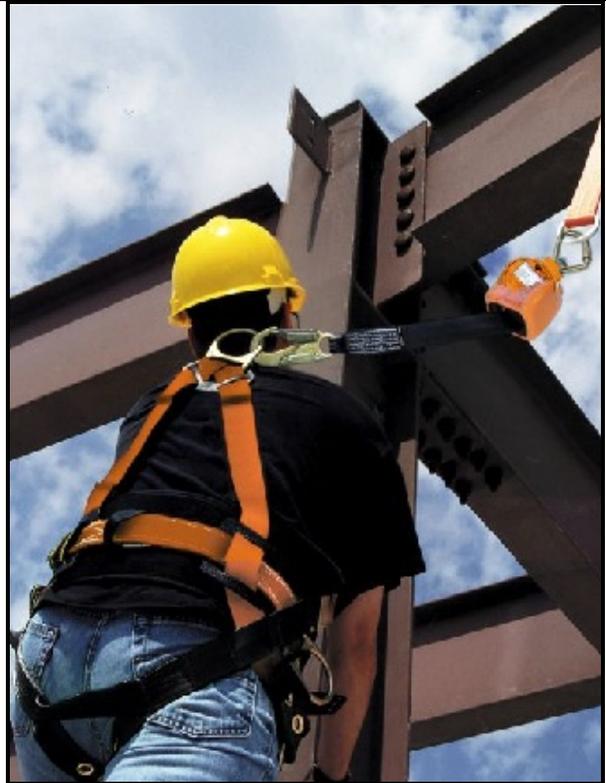
Connectors

Fall limiter

A short version of a self-retracting lanyard. The one shown here is attached to an elbow strap around the beam.

These are used in lieu of shock absorbing lanyards. They are designed to lock quicker (within two inches) than self-retracting lanyards.

<http://www.youtube.com/watch?v=c-IPMQ4YZEA>



Rope Grab Lanyard

A deceleration device which travels on a lifeline used to safely ascend or descend ladders or sloped surfaces and automatically, by friction, engage the lifeline and lock so as to arrest the fall of an employee.

These are used for fixed ladders.



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Cab Mount Lanyard

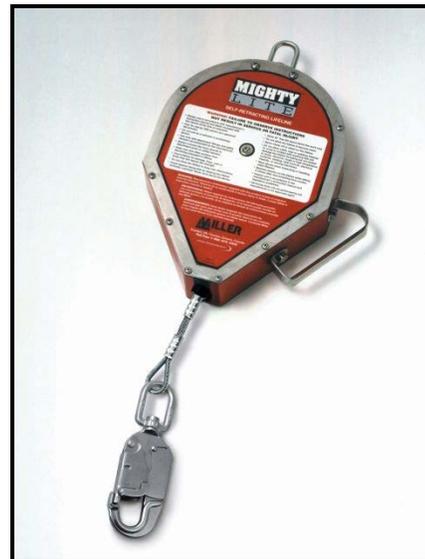
Designed to secure an operator into a cab of a forklift as shown in the picture.

It is a version of a fall-limiter. They are designed to lock quicker (within two inches) than self-retracting lanyards



Self-Retracting Lanyard

A Retractable Lifeline System that gives fall protection and mobility to the user when working at height or in areas where there is a danger of falling.



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Positioning Lanyard

These clip to both sides of waist D rings so the center clip can attach to ladder rungs or rebar. A person can be positioned so they can work with both hands free while secured to a vertical surface.

These are used for tying rebar or working off towers and allow hands free work.



Double legged Shock Absorbing Lanyard

Are attached to a dorsal D ring and used to alternate attachment when necessary.

Most often used for horizontal lifelines and having to detach from one line to reach around something like a vertical beam to attach to another line.



StopFall

A lanyard that cinches a pole while attached to the belt rings of a climbing belt or harness.

A positioning system lanyard used for "hitchhiking" trees and poles



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Vertical Lifeline

These attach to an anchor point on a roof, a beam, or something similar. A rope grab and/or a descender operates on the rope.

These are used as lifelines for temporary means of access such as suspended scaffolding and extension ladders.



Shock Absorbing lanyard

This type of connector, or alternatives such as fall limiters or self-retracting lanyards, is required for all fall arrest systems. The shock absorber is sewn layers of fabric in the black part of this lanyard. The snaphook at the opposite end is engineered to attach to webbing or anchor points.



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Self-Locking Carabineers

This is a prime connecting device and may be used to connect harnesses to lanyards, lanyards to anchors or decent devices.



Rescue Devices

Handled Ascender

Designed for ascending or descending along a rope or lifeline and, occasionally, for hauling (progress capture).



ASAP

Mobile fall arrest device for rope used as a lifeline. Stops a fall, a slide or uncontrolled descent. It locks even if the device is grabbed during a fall.

Works on vertical or angled rope. Moves up and down along the rope without manual intervention. Easy to install and remove at any point on the rope. Can be used with an energy absorbing lanyard.



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Self-braking Descender

Self-braking Descender (Petzl I'D) with anti-panic function for working on fixed ropes. Designed for work on a rope, the gate on the swinging side plate helps prevent dropping the device.

Multi-functional handle allows the user to:

- Unblock the rope and control the descent with the hand on the braking side of the rope
- Move more easily on horizontal or low-angle terrain thanks to the button on the handle
- Position themselves while on the rope



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Self-Rescue Device

This attaches to a harness and provides a means of self-rescue controlled descent as well as a means of rescue if the person using it is unconscious.

This may be used in any situation where a harness is used in addition to the harness itself.

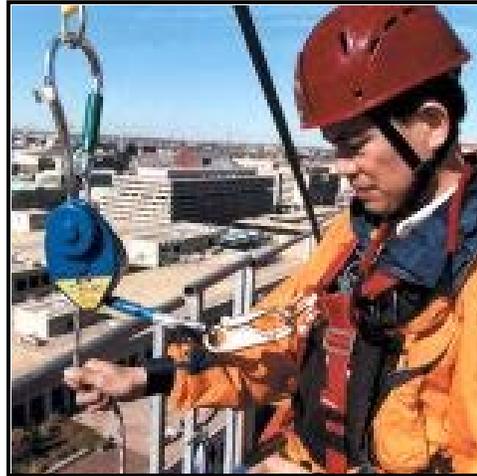
<http://www.pksafety.com/latchways-rescue-harness-rh3-68203.html>



Self-Rescue Emergency Controlled Decent Device

Designed for smooth, automatic vertical and angular controlled descent from overhead cranes, towers, aerial lifts, oil derricks, platforms or other elevated work areas.

This is specialized equipment for emergency use only.



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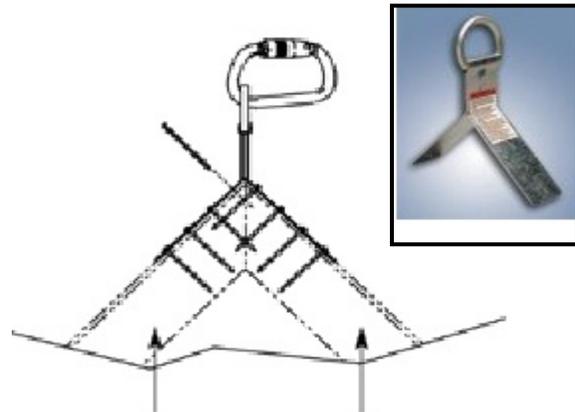
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Anchors

Temporary Roof Anchor

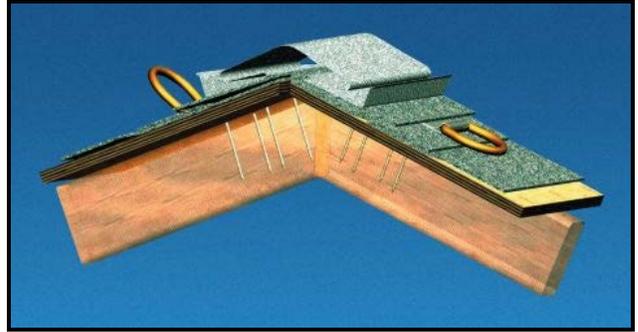
Attached to the crest of a roof by nails or screws and provides an anchor point while working on a roof.



Reusable Temporary Roof Anchor, Steep Pitched Roof



Permanent Roof Crest Double D



Tie-Back, or Elbow Strap Lanyards

These are designed to serve as an anchorage connector and wrap around beams or pipe that can support the 5,000 or 3,000 pound load depending on the fall protection system being used.



Permanent Anchorage Connectors

There are many designs for retrofit D rings. These two are designed to be secured through a hole in a steel structural member.



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Fixed Beam, adjustable Anchors

These are attached to I beams and are load rated to 5,000 lbs. so they can be used in a fall arrest system



Snap-hook for choking

This shows a type of snap-hook that is flattened on one end to be used for choking webbing lanyards



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Accessories and Their Uses

Relief Step Strap

The strap is a webbing loop that unfurls from the harness and provides a means for the person suspended after a fall to reduce/avoid suspension trauma.



Tool Lanyards

Used to prevent tools from falling and possibly injuring others below.



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Fall Protection Systems

Fixed Ladder Climbing System

When climbing a ladder, rail systems can be used on any fixed ladder as well as curved surfaces as a reliable method of fall prevention.



Horizontal Lifeline System

Temporary or permanent. A horizontal rope mounted to anchor points and allows movement all along its line while attached to the line.



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Continuous Pass-Through for Horizontal Lifelines

This allows movement along a horizontal lifeline without detaching or using a double legged lanyard to alternate attachments.



Temporary Horizontal Lifeline

A horizontal rope mounted to anchor points and allows movement all along its line while attached to the line. It's also known as a Catenary lifeline.



Trolley

Attachment point for a horizontal lifeline that allows continuous attachment.



Program Requirements/Procedures

Proper training, maintenance and inspection of all components of FPE are crucial in creating a safe work environment. The following procedures outline activities to be followed when implementing this program.

Owner Department Requirements

The Department owning FPE designates the “**Fall Protection Program Administrator(s)**” responsible for the following actions:

- Ensures that FPE purchased and used in the department are code-compliant and appropriate for the needed safe-work tasks.
- Consults with the EH&S Fall Protection Program Manager as needed to assess proper FPE use and procurement specifications.
- Coordinates with EH&S to provide documented fall protection safety training, or provides FPE training themselves (by JSA or other presentation), to all department personnel who use FPE. Periodically audits departmental compliance with the Fall Protection Program.
- Only allows persons who have successfully completed documented Fall Protection training to use FPE and conduct work requiring use of FPE.
- Informs EH&S when new equipment is purchased so it can be added to the EH&S FPE inventory.
- Ensures that all FPE owned by the department has documented FPE inspections completed by EH&S every 6-months.
- At least annually reminds the FPE users of their requirements under this program.

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Fall Protection User’s Procedures

Rescue Plan

Rescue plans are required because if a person has fallen and is suspended in a harness for a relatively short period of time, even two to ten minutes, the result could be suspension trauma. Suspension trauma can result in loss of consciousness and potential death; therefore, a rescue plan and its implementation are required by code whenever someone using FPE may not be able to rescue themselves after a fall.

A rescue plan must be written (see [Attachment 6](#)) and include the following:

UC Berkeley Fall Protection Safety Program

- A second person (attendant) must accompany the person using the FPE and be in direct communication with that person.
- The attendant must have been trained in the recognition of the pre-fainting symptoms (pre-syncope).
- The attendant must have immediate access to paramedic emergency services. (Berkeley Fire Department has the capability to arrive within five minutes and has the capabilities to administer circulatory stabilization, glucose, oxygen, and diuretics then transport to hospital.)
- The attendant must have some means of immediate rescue assuming the person who has fallen is not able to assist in the rescue.

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Fall Protection Equipment User's Safe-Work Rules

- FPE is selected so that it fits comfortably, can be adjusted so that it is comfortable and has the attachment points appropriate for its use (positioning, fall arrest, etc.).
- Prior to use each FPE device is inspected for the following:
 - Operation of snap-hooks or any other means of attachment
 - Condition of webbing, straps and buckles
 - Operation of brakes and ratchets in self-retracting lanyards and winches (See [Attachment 2](#) - Fall Protection Equipment Inspection for FPE Inspection Checklists.)
- Damaged, defective, or in any way questionable FPE is removed from use and Owner Department management is notified of the problem.
- The work area is prepared and cleared of unnecessary obstructions.
- Cordon off the area below to alert people passing below of potentially falling items.
- Clear or shield obstacles that could affect the safe use of the FPE. This includes obstacles at a landing point if using a controlled decent device or sharp/abrasive surfaces that could impact a lanyard.
- Lanyards are never clipped together.
- If using FPE while working off a ladder, the UC Berkeley Ladder Safety Program is referred to for the safe use of the ladder and fall protection on ladders.
- When working aloft, tools and supplies are secured with tool lanyards so they cannot fall.
- FPE is not used for any operation that it was not designed for.

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FPE Maintenance and Care

- FPE is not stored in the sunlight or in another source of ultraviolet light. Ultraviolet light degrades the condition of synthetic webbing. Store FPE in a dry clean place not subject to dust or weather. Hanging on storage hooks is a good idea for webbing devices.
- FPE is not stored with weight over folded webbing. The webbing can be creased and therefore be damaged.
- FPE is not exposed to any solvents that could breakdown webbing. This includes products containing acetone, MEK, lacquer thinner or other similar solvents.
- FPE is not subjected to hot surfaces or welding splatter. Any burn marks on or stiffening of webbing due to heat will make the device unusable.
- Always keep FPE ready for use by following the safe-cleaning and storage procedure outlined in [Attachment 3](#).

Fall Protection – When working from ladders.

The [UC Berkeley Ladder Safety Program](#) outlines information on the use of fall protection when working from a ladder including very specific activities that must be followed to work without fall protection. In addition, [Attachment 4](#) details safe-work rules when working from ladders with FPE.

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Training Requirements

The Department that owns the FPE has the option of providing FPE user training by a training provider outside the University, within the department (assuming the trainer is an FPE-skilled person), or by EH&S. Contact EH&S at 642-3073 to arrange for training to be done by EH&S.

Regardless of the source, the complete contents and safe-work procedures outlined in this program must be part of any fall protection safety training at UCB. Training content and attendance is documented and kept in a readily accessible location by the Owner Department for reference as needed by department management, EH&S, or regulatory agency (e.g. Cal/OSHA).

For any FPE/Fall Protection Safety Program training, a list of training attendees with their name, employee identification number, their supervisor's name and employee identification number must be provided to EH&S for inclusion in the L.M.S. Master training records database.

Fall Protection Program Administrator

The Owner Department's Fall Protection Program Administrator is trained on their roles and responsibilities in the management of the Fall Protection Program as it applies to their department, and maintenance requirements and the semi-annual equipment inspections outlined in this program.

FPE Users

Are trained as part of their work activities once on the contents of this program and the general safe-work procedures it contains. In addition, site-specific or task-specific safe-work orientation as well as tail-gates trainings may be needed in the use of FPE for unusual operations. Annual review of the general requirements and safe-work rules of this program is recommended for tailgate meetings or periodically scheduled safety meetings.

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Record Keeping Requirements

Department Requirements

FPE user and FPE Program Administrator – In conjunction with EH&S, retain records which include the attendees name, their employee identification number, their supervisor's name and employee identification number. EH&S maintains the master training records in the L.M.S. Master Training Record database for ten years after the person has retired or left University employment.

EH&S Requirements

Retain indefinitely the following:

- Records of training provided by EH&S and other entities
- Historical documents and revisions of the Fall Protection Program
- Records of semi-annual FPE inspection

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References

Cal/OSHA

- §1620. [Design and Construction of Railings.](#)
- §1621. [Railings and Toe-boards.](#)
- §1660. [Suspended Scaffolds for Loads of 425 Pounds or Less.](#)
- §1662. [Boatswains' Chairs.](#)
- §1663. [Float Scaffolds.](#)
- §1664. [Needle-Beam Scaffold.](#)
- §1669. [General Requirements for Fall Protection Use.](#)
- §1670. [Personal Fall Arrest Systems, Personal Fall Restraint Systems and Positioning Devices.](#)
- §1671. [Safety Nets.](#)
- §1671.1. [Fall Protection Plan.](#)
- §1671.2. [Controlled Access Zones and Safety Monitoring Systems.](#)
- §1704. [Pneumatically Driven Nailers and Staplers.](#)
- §1710. [Erection of Structures.](#)
- §1712. [Reinforcing Steel and Other Similar Projections.](#)
- §1716. [Bolting, Riveting, Fitting-Up and Plumbing.](#)
- §1730. [Roof Hazards.](#)

Fed/OSHA Fall Protection Regulations

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10756

EH&S

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Issued By and Next Review Date

Issue Date: June 1, 2012
Issued by: Jim Gilson, Senior Safety Engineer
Gary Bayne, Health and Safety Specialist
Approved by: Brandon DeFrancisci, H&S Associate Director
Review Date: Three years from issue date

Attachments

[Attachment 1](#) - Fall Protection Equipment Identification Numbering System

[Attachment 2](#) - Inspecting Fall Protection Equipment

[Attachment 3](#) - Cleaning Fall Protection Equipment

[Attachment 4](#) - Ladder User Safe Work Rules

[Attachment 5](#) - Hazard Analysis for the Use of FPE

[Attachment 6](#) - Fall Protection Rescue Plan

[Attachment 7](#) - Fall Protection Safety Fact Sheet

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Attachment 1 – FPE Identification Numbering System

An FPE identification number is permanently attached to or marked on each piece of equipment. EH&S conducts regularly scheduled inspections performed by a certified Fall Protection Equipment Inspector. The identification number allows the inspections to be conducted at any place and time and the results added to the EH&S data base at a later date.

Fall Protection Equipment Identification Codes				
First Digit	Second Digit or Dash	Third Digit or Dash	Sequential Number (two digits)	Months to be Inspected (3/9 = March & September)
A = Athletics	A = Arborist	A = Aitiens		
C = Cal performances	E = Electrician	AB = Abrasion Sleeve		
E = EERC @ RFS	G = Grounds	B = Bandoleax		
P = PP-CS	R = Roofers	C = Caribeener		
R = RSSP	U = Utilities	DC = Dasy Chain		
	C = Carpenter	E = Cross arm strap, chain		
	P = Painter	FL = Flip Line		
	S = sheet metal	GG = Grie-Grie		
	GL = Glazers	H = Harness		
	H=Stage Hands	L = Lanyard		
	EL=Elevator	LR = Rope		
		S= Self retracting Lanyard		

Examples of Unique FPE Identification Numbers:

1. Example Identification Number for an Athletics Department’s Harness used by electricians: AEH01 3/9. It’s the first one added to the inventory when it was first inspected, and since it should be inspected about every six months (regardless of the frequency of its use). It should be inspected in March (the third month) and September (the ninth month): AEH01 3/9.
2. Example Identification Number for a PP-CS Department’s Self-retracting lanyard used by carpenters: PCS04 6/12. It’s the fourth one added to the inventory when it was first inspected, and since it should be inspected about every six months (regardless of the frequency of its use) it should be inspected in June (the sixth month) and December (the twelfth month): PCS04 6/12.

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Attachment 2 – Inspecting Fall Protection Equipment

Body wear and connecting devices must have an undocumented inspection before each use by the FPE user, and a documented inspection semi-annually by a certified inspector. Both inspections follow the same inspection protocol as outlined below.

Harness (and Body Belt) Inspection

To inspect your harness or body belt, perform the following procedures:

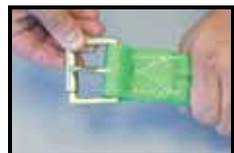
Webbing – Grasp the webbing with your hands 6 inches (152 mm) to 8 inches (203 mm) apart. Bend the webbing in an inverted “U” as shown. The surface tension resulting makes damaged fibers or cuts easier to detect. Follow this procedure the entire length of the webbing, inspecting both sides of each strap. Look for frayed edges, broken fibers, pulled stitches, cuts, burns and chemical damage.



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.



Attachment of Buckles – Inspect for any unusual wear, frayed or cut fibers, or broken stitching of the buckle or D-ring attachments.



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



Tongue Buckles – 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.



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 at the center bar.



Quick-Connect Buckles – Inspect the buckle for distortion. The outer bars and center bars must be straight. Make sure dual-tab release mechanism is free of debris and engages properly.

Lanyard Inspection

When inspecting lanyards, begin at one end and work to the opposite end, slowly rotating the lanyard so that the entire circumference is checked. Additionally, follow the procedures below.

Hardware –

Snaps – Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.



Thimbles – The thimble must be firmly seated in the eye of the splice, and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.



Wire Rope Lanyard – While rotating the wire rope lanyard, watch for cuts, frayed areas, or unusual wearing patterns on the wire. Broken strands will separate from the body of the lanyard.



Web Lanyard – While bending webbing over a pipe or mandrel, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Swelling, discoloration, cracks and charring are obvious signs of chemical or heat damage. Observe closely for any breaks in stitching.



Rope Lanyard – Rotate the rope lanyard while inspecting from end-to-end for any fuzzy, worn, broken or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in period.



Inspection of Fall Arrest System

Shock Absorber Pack – The outer portion of the pack should be examined for burn holes and tears. Stitching on areas where the pack is sewn to D-rings, belts or lanyards should be examined for loose strands, rips and deterioration.



Shock-Absorbing Lanyard – Shock-absorbing lanyards should be examined as a web lanyard (described in Item 3 above); however, also look for the warning flag or signs of deployment. If the flag has been activated, remove this shock-absorbing lanyard from service.



Self-Retracting Lifeline Inspection

Check Housing – Before every use, inspect the unit’s housing for loose fasteners and bent, cracked, distorted, worn, malfunctioning or damaged parts.



Lifeline – Test the lifeline retraction and tension by pulling out several feet of the lifeline and allow it to retract back into the unit. Always maintain a light tension on the lifeline as it retracts. The lifeline should pull out freely and retract all the way back into the unit. Do not use the unit if the lifeline does not retract. The lifeline must be checked regularly for signs of damage. Inspect for cuts, burns, corrosion, kinks, frays or worn areas. Inspect any sewing (web lifelines) for loose, broken or damaged stitching.



Braking Mechanism – The braking mechanism must be tested by grasping the lifeline above the impact indicator and applying a sharp steady pull downward which will engage the brakes. There should be no slippage of the lifeline while the brakes are engaged; once tension is released, the brakes will disengage and the unit will return to the retractable mode. Do not use the unit if the brakes do not engage.



Check the hardware as directed [above](#). The snap hook load indicator is located in the swivel of the snap hook. The swivel eye will elongate and expose a red area when subjected to fall arresting forces. Do not use the unit if the load impact indicator has been activated.

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Attachment 3 – Cleaning Fall Protection Equipment

Basic care of all safety equipment will prolong the durable life of the unit and will contribute toward the performance of its vital safety function. Proper storage and maintenance after use are as important as cleansing the equipment of dirt, corrosives or contaminants. Storage areas should be clean, dry and free of exposure to dust, fumes or corrosive elements.

Nylon or Polyester – Remove all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion; then wipe with a clean cloth. Hang freely to dry, but away from excessive heat and direct prolonged sunlight.

Equipment Housings – Periodically clean the unit using a damp cloth and mild detergent; towel dry.

Drying – Equipment should dry thoroughly without close exposure to heat, steam or long periods of sunlight.

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Attachment 4 – Safe-Work Rules For Use of a Ladder

1. Select a ladder that is the proper length and duty rating for the intended work.
2. The leaning-ladder must extend at least 36” above the edge of a roof/mezzanine when properly installed. A step ladder must be tall enough so that you don’t have to stand on the top or the top two rungs of the ladder to access your work.
3. Do not use electrically conductive (e.g. aluminum) ladders for electrical work or near live electrical parts.
4. Inspect the ladder for broken or defective parts prior to each use.
5. Remove damaged or defective ladders from use and notify department management of the problem ladder.
6. Do not place ladders where they can be accidentally struck or displaced.
7. If the ladder is used in an area where anyone could walk under it, the area must be cordoned off with a visual barrier such as yellow caution tape to alert pedestrians to the hazard of something falling from the ladder.
8. Ladders must not be placed in passageways, doorways, driveways, or any location where they may be displaced by activities conducted on any other work, unless protected by barricades or guards.
9. Tie, block, or otherwise secure portable ladders while in use.
10. Do not splice ladders together.
11. Face the ladder while ascending and descending.
12. Do not stand on the top two rungs of a single ladder, extension ladder or the top cap and top step of a step ladder.
13. Do not stand on the top three rungs of ladders unless there are members of an adjacent structure that provide a firm handhold, or the ladder user is protected by a personal fall protection system (e.g., positioning device or fall restraint system) tied off to a CalOSHA certified fall protection anchor.
14. If working outside of the ladder’s footprint, or when standing on the upper-most parts of the ladder as noted above, use an appropriate fall protection system as described in the UC Berkeley Fall Protection Program.
15. Do not place planks on the top cap or any other part of a ladder.
16. Do not use the X-bracing or other structures on the rear section of a stepladder for climbing unless the ladder is designed to be climbed from both sides. (See Extension Trestle Ladders and similar.)
17. Make sure that the stepladder is properly set up and that the spreader is locked in place before use.
18. Do not use the stepladder as a lean-to ladder.
19. Always use a tool belt and other ‘hands-free’ carrying devices when ascending and descending a ladder.
20. When working aloft secure tools and supplies so they cannot fall from the ladder.

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Attachment 5 – Fall Hazard Analysis

Answer these questions whenever you are about to work from an elevated location and may want to use FPE:

1. Will the work require special PPE (besides fall protection)?
2. How will I get equipment and tools to the work location?
3. Do I need to prevent my activities from resulting in hazards to those below by following appropriate barricading methods to keep non-essential personnel away?
4. Can I work from the ground level instead by bringing the work down?
5. Can I work safely from a ladder instead?
6. Can I use an aerial (boom) lift or scissors lift instead (and, am I qualified to operate one?)
7. If not, can we install portable guardrails for the job?
8. If not, can I use fall restraint?
9. If not, will I use fall arrest?

The goal is to find another way to perform the work without the necessity to use FPE and avoid the need of rescue. So, if you've chosen to use FPE, answer the following questions:

1. Are there any existing approved anchorage points I can use? Where?
2. Is it labeled as an approved anchorage point or obviously capable of holding 5,000 lbs. or more as determined by a qualified person?
3. If not, can approved pre-manufactured or engineered anchorages be installed?
4. Do I have the right equipment (full body harness, minimum length lanyard, shock absorber, connecting hardware, I-beam strap, self-retracting lifeline, etc.)?
5. What is the clearance or distance I may fall into?
6. Is there at least 15-18 feet of clear space from anchorage point before the next level down? (Calculate fall distance to include lanyard length, deceleration distance of 3.5 feet, your height, one foot of harness slack, elongation factor, and a safety factor.)
7. What is between me and the ground or floor below?
8. What will I hit on the way down?
9. How would I be rescued if I fall and suspended in the harness? (Has the Fall Protection Rescue Plan Form been completed?)

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Attachment 6 – Fall Protection Rescue Plan

A rescue plan must be developed whenever fall arrest systems are in use and when personnel may not be able to self-rescue should a fall occur. What is the emergency contact information of professional rescue services available, such as the local Fire Department, and what are the instructions for summoning immediate assistance?

Worker using FPE and may fall: _____

Attendant: _____

Date: _____

Building/Location: _____

Is rescue equipment immediately available for this location?

(E.g. Ladders, aerial devices, elevating work platforms, tripods, additional harnesses, controlled descent devices, winches, pulleys, etc.)

List Rescue Equipment Available:

Who to contact for equipment use? _____

Their phone number: _____

What obstructions are in the way reaching the suspended worker?

How will rescue be assured within 15 minutes of the occurrence of a fall to minimize the risk of further injury or death due to suspension trauma?

Who to Call: _____

Their Phone Number: _____

How will the safety of the rescuers be assured as well as that of the suspended worker?

What communication systems will be used between the suspended worker and rescue team?

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EH&S FACT SHEET

Fall Protection Safety



This fact sheet provides awareness level information of Fall Protection Equipment use hazards and the controls of those hazards in the UC Berkeley Fall Protection Program ([Go to the TOC of Fall Protection Program](#)). The program is designed for those who may have to use FPE as part of their work activities, and the Department administrators responsible for their training and safe use.

Go to the beginning of the [UC Berkeley Fall Protection Program](#)

[CLICK ON ANY ENTRY IN THE TABLE OF CONTENTS
TO BE TAKEN TO THAT SECTION OF THE PROGRAM.]

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Does this Fall Protection Safety Program apply to my department?

If personnel in your department work at elevated levels and have a possibility of falling, this Fall Protection Program may apply to your department. Contact EH&S to assist you in your decision.

What types of fall protection does this Program apply to?

This Fall Protection Program applies when any type of equipment that involves the use of a body harness or safety belt, the means of attaching it to a solid object (the connector), and what the connector attaches to is part of your operations. See the [Applicability](#) section.

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Who is responsible for running this Program in my department?

All persons using Fall Protection Equipment are [responsible](#) for following [safe-work practices](#) outlined in this program. Implementation of this program is the responsibility of the Director or head of the [Owner Department](#). This may be delegated to a Principle Investigator for a specific research project, or someone designated by the head of the department or Principle Investigator as the [“Fall Protection Safety Program Administrator”](#) for the Project or Department.

Does this include guard rails, or scaffolds?

No, this only includes “active” fall protection devices. They are active because the person using the equipment must be actively involved in their safe use and condition. Guardrails, scaffolds and similar systems are called “passive” or primary fall protection systems and should be installed/used whenever possible in lieu of personal fall protection devices.

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As a designated “Fall Protection Safety Program Administrator”, what do I have to do?

Become familiar with the Fall Protection Safety Program by reading the program. [Understand the requirements](#) of the program including choosing the right equipment, providing training to the Department’s personnel who will be using the equipment and understanding the inspection and maintenance of the equipment. Once you know what’s required, contact EH&S to arrange for assistance in procurement, implementation and training.

Who’s responsible for inspecting the Fall Protection equipment?

The user of the equipment is responsible for an inspection of the equipment [before each use](#). An [inspection checklist](#) is [Attachment 2](#) of this Program. Departments must maintain their own inspection records. An EH&S certified fall protection equipment inspector performs documented semi-annual inspections and maintains the data base for all the known fall protection equipment on campus.

Are there “Safe Work Rules” for fall protection equipment users to follow?

Yes. The work rules are described in the program sections, “[Fall Protection User’s Procedures](#)” and [Attachment 4](#) of this Program.

Do we have to use fall protection equipment when using ladders?

The program allows use of ladders **WITHOUT** a personal harness tied off to a Cal/OSHA approved fall protection anchor when the ladder can be tied-off and stabilized to a permanent structure and then is used for [very specific activities](#). Otherwise, fall protection must be used in all ladder-use situations unless the Owner Department can demonstrate that the planned work activities are equivalently safe to the noted requirements.

Alternatives to using fall protection include temporary scaffolding with appropriate railings, the use of a “Lift Pod”, the use of Genie lifts or bucket trucks, etc., and should be considered before using ladders in such situations. If alternatives are unavailable or not feasible, the ladder user must use fall protection devices. For further explanations of fall protection devices, see the EH&S Fact Sheet, “[Fall Protection Equipment and Inspection](#)”.

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Who should be trained, and how do we get training?

Cal/OSHA requires that the employer train all employees on the hazards associated with the use fall protection equipment. [Training requirements](#) are detailed in the program and can be provided at no cost to the Owner Department by EH&S or for cost by outside Vendor.

Who keeps the records of inspections, inventories and training?

[Owner Departments must keep records](#) concerning the Fall Protection Safety Program’s application to their work activities. It’s likely they will delegate this task to the “[Fall Protection Safety Program Administrator](#)” for the Department. Discuss with your department management who the Program Administrator is in your department. All records must be kept for certain periods of time as [outlined in the program](#) by the Department in conjunction with EH&S, and must made available to regulatory agencies such as Cal/OSHA, and EH&S if they request.

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Why do we need a [rescue plan](#) and an attendant whenever we use fall protection equipment?

You may not need to use it every time if someone has the option of [rescuing themselves](#), such as using a ladder fall protection system, since they are not likely to fall more than two feet and would remain in reach of the ladder after a fall; however, there is a good possibility of death as a result of being suspended in a harness for an extended period of time or losing consciousness while suspended. After a fall, suspension trauma can set-in within two to ten minutes of the fall and can be fatal. Therefore, when FPE is used, a rescue plan and attendant to offer immediate assistance get a rescue victim down to safety is required by CalOSHA code to ensure the victim's long term wellbeing.

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