

# FALL PROTECTION PROGRAM

<b>Document #:</b> OCC 34.02	<b>Distribution:</b> External
<b>Section:</b> Walking Working Surfaces	<b>Effective Date:</b> 1/2020
<b>Total Pages:</b> 15	<b>Revision Date:</b> 8/2024

## Purpose

The purpose of this program is to provide procedures to eliminate, prevent, and control hazards associated with falls from heights. It also establishes safe work practices when working at height. This program prescribes the duty to provide Fall Protection; sets the criteria and practices for Fall Protection; and outlines required training and recordkeeping.

## Definitions

- Anchor: A certified point of attachment for Fall Protection equipment, including building structures, lifelines, tie back posts, and flush mount Anchors.
- Authorized User: A person that has received training and is assigned to perform a specific type of duty or is allowed in a specific location or area where Fall Protection is required.
- Body Harness: Straps that secure about the employee in a manner to distribute 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 protection system.
- Certification: An Anchor is certified for use when load Proof Testing and inspections are current and performed by a Qualified Person.
- Competent Person: An employee, designated at the working unit level, responsible for the oversight, implementation and management of the Fall Protection Program.
- Connector: A device used to couple (connect) parts of the Fall Protection system together.
- Designated Area: A space which has a perimeter barrier erected to warn employees when they approach an Leading Edge and serves also to designate an area where work may be performed without additional Fall Protection.

- Fall Protection: Any equipment, device, or system that prevents an employee from falling from an elevation or mitigates the effect of such a fall. Fall Protection must be used whenever an employee has the potential to fall 4 feet or more to a Lower Level and there are no means to prevent a fall.
- Fixed Ladder: A ladder with rails or individual rungs that is permanently attached to a structure, building or equipment. Fixed Ladders include individual-rung ladders but not ship stairs, step bolts, or manhole steps.
- Free Fall Distance: The vertical fall distance before the fall arrest system takes effect.
- Gate: A form of passive Fall Protection which guards the entrance to a Leading Edge where access is required.
- Guardrail system: A barrier erected to prevent employees from falling to a Lower Level.
- Hole: A gap or open space in a floor, roof, horizontal Walking-Working Surface or similar surface that is at least 2 inches in its least dimension.
- IBC: International Building Code – latest adopted version by Pennsylvania Department of Labor and Industry.
- Infrequent Work: A job or task that is performed at intervals, monthly or yearly, or as needed such as equipment break down.
- Ladder Safety System: A Fall Protection option that is permanently attached to a fixed ladder, immediately adjacent to the ladder. The system is designed to eliminate or reduce the possibility of falling from a ladder. Ladder Safety Systems must be installed on all new or replacement fixed ladders that extend greater than 24 feet above a Lower Level.
- Leading Edge: The unprotected side and edge of a floor, roof, or formwork for a floor or other Walking-Working Surface (such as a deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.
- Low-Slope Roof: A roof that has a slope less than or equal to 10 degrees.
- Lower Level: A surface or area to which an employee can fall. Such surfaces or areas include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, or tanks.
- Opening: A gap or open space through which an employee can fall to a Lower Level.
- Parapets: A contiguous wall around the Leading Edge of a building's roof measuring 42 inches (+/- 3 inches).
- Personal Fall Arrest System (PFAS): A system used to arrest an employee in a fall from a Walking-Working Surface. It consists of a Body Harness, Anchor, and Connector. The

means of connection may include a lanyard, Deceleration Device, lifeline, or a suitable combination of these.

- **Proof Testing:** Proof Testing is performed by a Qualified Person on roof Anchors by connecting a dynamometer to Anchors, applying and holding a force, and measuring any deflection or damage as a result. The force applied is typically never the maximum listed load as this would damage or destroy the Anchor.
- **Pull Testing:** Typically performed preliminarily, an Anchor connection, such as an undercut bolt, are installed in a substrate with unknown characteristics such as masonry or concrete. The Anchor is then pulled with gradually increased force, measured by dynamometer, until failure to determine the expected load that can be handled.
- **Qualified Person:** A person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.
- **Self-Closing Gate:** A form of passive Fall Protection which guards the entrance to a Leading Edge where access is required that closes without manual manipulation.
- **Temporary Work:** A task or job that typically takes less than 1 to 2 hours to complete.
- **Toeboard:** A low protective barrier that is designed to prevent materials, tools, and equipment from falling to a Lower Level, and protect employees from falling.
- **Travel Restraint System:** A protective system that prevents employees from reaching a Leading Edge where a fall is possible. The restraint is generally a line from an Anchor to which the employee is secured in such a way as to prevent the employee from walking or falling off an elevated work surface. Travel Restraint Systems must be used such that they do not support any portion of the employee's weight and allows for free travel between the Anchors while preventing the possibility of a fall.
- **Walking-Working Surface:** Any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location.

## **Responsibilities**

### **Environmental Health & Radiation Safety (EHRS)**

- Ensures implementation and compliance with this program.
- Audits departmental program periodically.

- Assists in the assessment of workplaces and practices to determine how fall hazards can be eliminated, prevented, and controlled.
- Communicates inspection and certification status provided by Qualified Persons to appropriate stakeholders.
- Coordinates with Qualified Persons to perform inspections and certifications of roof Anchors as needed.

### **Project Delivery Group (PDG)**

- When possible, through design, eliminates fall hazards by placement of roof top equipment and other services greater than 15 feet from the roof's Leading Edge.
- Works together with EHRS to ensure all new construction and renovations, where applicable, include an engineered Fall Protection component. The preferred methods of Fall Protection are:
  - A Parapet or Guardrail System (equal to or greater than 42 inches, plus or minus 3 inches) along the perimeter of work areas on rooftops.
  - An engineered Fall Protection system, such as roof mounted Anchors, must be installed where fall hazards exist and are not protected by a Parapet or Guardrail System.

### **Qualified Person**

- Performs inspections and certifications of Anchors.
- Provides inspection and certification documentation.
- Documents and communicates, to EHRS, any Anchor defects that require repair or replacement.
- Performs necessary repairs or replacements to Anchors.

### **Competent Person**

- Conducts hazard assessments to identify fall hazards and communicates these hazards before employees are exposed to fall hazards.
- Provides training to Authorized Users.

- When needed, stops work immediately if it is determined unsafe to proceed.
- Prepares, updates, and reviews written Fall Protection procedures and ensures a written rescue plan is developed.
- Verifies that the Anchors and Fall Protection equipment to be used have been inspected, certified and are available to the requirements of this program.
- Maintains documentation of Fall Protection equipment inspections.
- Maintains records of Fall Protection training.

### **Authorized Users (Facilities Management, Service Operations, Library, Contractors, etc.)**

- Complies with the requirements outlined in this program.
- Ensures that Fall Protection equipment is inspected and in safe working condition prior to use.
- Reports defective equipment immediately to an appropriate supervisor.
- Understands the job hazards, limitations of Fall Protection equipment, and rescue procedures.

## **Preferred Methods of Fall Protection**

The following are preferred methods of Fall Protection, in order of preference based on the hierarchy of controls, at Temple University:

### **Elimination of fall risk**

Alternatives to elevated work must be considered first. Examples include aerial lifts, using extender poles to work from the ground, the employment of drone services, and any other means by which the employee will work from the ground up.

Whenever possible all work should be conducted greater than or equal to 15 feet from the roof edge. Work done greater than or equal to 15 feet from edge of roof does not require Fall Protection if Infrequent and Temporary, this area is highlighted in green on the [Roof Zone Information Poster](#).

## Passive Fall Protection

### Guardrail Systems and Parapets

- Every open-sided floor or platform 4 feet or more above a Lower Level must be guarded by a Parapet or Guardrail System on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. New construction will be designed to the latest IBC standard.
- If a contiguous Parapet or Guardrail System is present, covering all areas where a fall of 4 feet or greater to a Lower Level is possible, no Fall Protection is required.
- A Guardrail System may be temporary and erected for specific tasks but must meet the same height and performance requirements as permanent Guardrail Systems.
- A Guardrail System must consist of top rail, intermediate rail, and posts, and must have a minimum vertical height of 42 inches, plus or minus 3 inches, from the upper surface of the top rail to floor, platform, runway, or ramp level.
  - For wood railings, the posts must be of at least 2-inch by 4-inch stock spaced not to exceed 6 feet between posts; the top and intermediate rails must be of at least 2-inch by 4-inch stock. If the top rail is made of two right-angle pieces of 1-inch by 4-inch stock, posts may be spaced on 8-foot centers, with 2-inch by 4-inch intermediate rail.
  - For pipe railings, posts and top and intermediate railings must be at least 1 1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.
  - For structural steel railings, posts and top and intermediate rails must be of 2-inch by 2-inch by 3/8-inch angles or other metal shapes of equivalent bending strength with posts spaced not more than 8 feet on centers.
  - Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be installed between the top edge of the Guardrail System and the Walking-Working Surface when there are no walls at least 21 inches high.
  - If intermediate vertical members (such as balusters) are used, they will be installed no more than 19 inches apart; and other equivalent intermediate members (such as additional midrails) will be installed so that the Openings are not more than 19 inches wide.
- The Guardrail System must be capable of withstanding a force of at least 200 pounds applied within 2 inches of the top edge in any outward or downward direction.

- The top rail must be smooth surfaced throughout the length of the railing. The ends of the rails must not overhang the terminal posts except where such overhang does not constitute a projection hazard.
- The railing must be provided with a Toeboard wherever, beneath the open sides, persons can pass, there is moving machinery below, or there is equipment with which falling materials could create a hazard.
- A standard Toeboard must be 4 inches nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It must be securely fastened in place and with not more than ¼ inch clearance above floor level. It may be made of any substantial material either solid or with Openings not over 1 inch in greatest dimension. It must be capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or outward direction at any point along the Toeboard.

### **Designated Areas**

A Designated Area, highlighted yellow in the [Roof Zone Info Poster](#), which comply with the requirements of this paragraph, may be established as an alternative to installing a Guardrail System and where a Competent Person demonstrates that employees within the Designated Areas are not exposed to fall hazards. In addition, the following conditions and requirements must be met in order to use Designated Areas in lieu of other Fall Protection measures:

- The work must be both Temporary and Infrequent, such as maintenance on roof top equipment and performed at least six feet from the Leading Edge.
- Designated Areas must be established only on Low-Sloping Roofs.
- The Designated Area must consist of an area surrounded by a rope, wire or chain and supporting stanchions erected in accordance with the following criteria:
  - Strength:
    - After being erected with the line (such as rope, wire or chain) attached, stanchions must be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion. The force must be applied 30 inches above the work surface and perpendicular to the Designated Area perimeter, and in the direction of the Leading Edge;
    - The line must have a minimum breaking or tensile strength of 500 pounds, and after being attached to the stanchions, must be capable of supporting the loads applied without breaking; and

- The line must be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
- Height:
  - The line must be installed in such a manner that its lowest point (including sag) is no less than 34 inches nor more than 39 inches from the work surface.
- Visibility:
  - The line forming the Designated Area must be clearly visible from any unobstructed location within the Designated Area up to 25 feet away, or at the maximum distance an employee may be positioned away from the line, whichever is less. (One method for meeting the visibility criteria for Designated Areas is to place a flag made of high visibility material on the rope, or wire or chain at not more than six-foot intervals.)
- Location:
  - The stanchions must be erected as close to the work area as is permitted by the task.
  - The perimeter of the Designated Area must be no less than six feet from the Leading Edge.

Access to the Designated Area must be by a clear path, formed by two lines, attached to stanchions, which meet the strength, height, and visibility requirements of this paragraph.

## **Gates**

A form of passive Fall Protection which guards the entrance to a Leading Edge where access is required. These are typically found before the entrance to a Fixed Ladder going to a Lower Level greater than 4 feet or at a loading dock.

- A Gate protecting a loading dock must be kept closed and secured to prevent accidental falls when a dock door is open, and the dock is not in active use.
- To guard through ways where a fall hazard exists, such as Fixed Ladders, a Self-Closing Gate must be used.
  - A Self-Closing Gate must open in the direction opposite of the fall hazard as they are intended to prevent someone from accidentally falling from the Leading Edge and must also close unassisted.



## **Active Fall Protection**

Areas of the roof less than 6 feet from the Leading Edge, as highlighted as the “red zone” in the [Roof Zone Info Poster](#), without a Guardrail System or Parapet require active Fall Protection.

### **Travel Restraint Systems**

Where employees must work at an elevated working surface while exposed to fall hazards and other means of Fall Protection aren't feasible, a Travel Restraint System may be considered to protect employees. A Travel Restraint System is designed to not allow the employee to reach the edge where a fall is possible. Travel Restraint Systems require:

- Anchors for Travel Restraint Systems cannot be installed on the Leading Edge of a rooftop.
- A Competent Person to assess the work area to ensure that a Travel Restraint System is feasible and to assist the employee in designating a suitable Anchor point and system components.
- The connecting lanyard must be adjusted to a length that will not allow the employee to reach the edge where a free fall is possible.
- Restraint lines in the system must be capable of sustaining a tensile load of at least 5000 pounds.
- A full-Body Harness must be used in a Travel Restraint System.
- An Anchor that is rated to at least 5000 pounds.

Direct supervision by a Competent Person of employees using a Travel Restraint Systems is critical to ensure that lanyards and lifelines are adjusted properly.

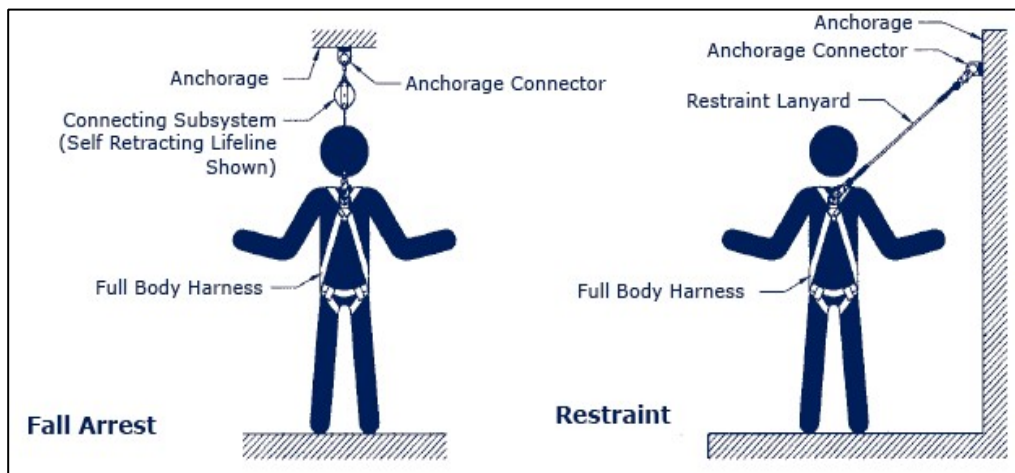


Figure 1: Fall Arrest vs. Travel Restraint (courtesy of UVA)

## Anchor Requirements

Where employees are assigned to work in an unguarded area, greater than or equal to 4 feet from a Lower Level in height, where a free fall is possible and either a Guardrail System or Parapet, or a Travel Restraint System is not feasible:

- Anchor points must be rated for 5,000 pounds in any direction.
- Anchor points must not be installed as to create a fall swing hazard.
- Anchor points must be inspected and certified by a Qualified Person and documentation must be available, and verified, before they are used.
- Anchors used for attachment of personal fall arrest equipment must be independent of any Anchor being used to support or suspend platforms.

Non-penetrating roof anchors may be considered if engineered anchors are not feasible. For more information on features and considerations reference the [Non-Penetrating Anchor Guide](#).

## Personal Fall Arrest System (PFAS) Requirements

### Design

- PFAS must only be attached to an inspected and certified Anchor point.
- All PFAS components must be compatible with each other.
- All PFAS equipment must meet applicable ANSI standards and OSHA regulations.

- All PFAS equipment must be used as per the manufacturer's instructions.
- PFAS harnesses must provide trauma straps, or similar suspension relief methods.
- The maximum arresting force on the employee may only be up to 1,800 pounds.
- PFAS equipment must be rated for the combined weight of employee and other equipment such as tools.
- Fall Protection equipment must be utilized for employee protection only and should not be used as hoisting slings, tow ropes, etc.

## Inspections

Fall Protection equipment must be inspected by the Authorized User before each use per the manufacturer's instructions. [The PFAS Inspection sheet](#) may be used in combination with manufacturer's instructions. A Competent Person must inspect PFAS at least annually. Any defective PFAS component found during inspections must be removed from service immediately.

## Storage

A dedicated storage area must be designated for the storage of Fall Protection equipment and all components. The storage area must keep the equipment clean, dry, out of direct sunlight or excessive heat as well as free from oils, chemicals and paint.

## Other

Falls through Holes, skylights and hatchways, must be prevented using a Guardrail System meeting the requirements of this program or a cover. The cover must:

- Be capable of supporting without failure, at least twice the maximum intended load that may be imposed on the cover at any one time, including employees, equipment, and materials.
- Be secured to prevent accidental displacement.
- Be labeled as "Hole" or "cover".

## Fixed Ladders

- If 24 feet or greater from a Lower Level, requires a Ladder Safety System or Personal Fall Arrest System
- Fixed ladders must be inspected before each use to identify visible defects. Any ladder with structural or other defects must be immediately removed from service.
- Fixed ladders must be capable of supporting their maximum intended load
- Requires 7 inches minimum clearance to nearest permanent object behind the ladder.
- The side rails of a through or sidestep Fixed Ladder must extend at least 42 inches above the top of the access level or landing platform.
- Fixed Ladders must have a clearance width of at least 15 inches on each side of the ladder's centerline to the nearest permanent object.
- Fixed Ladders must have a clearance minimum of 30 inches on the climbing side to nearest permanent object.

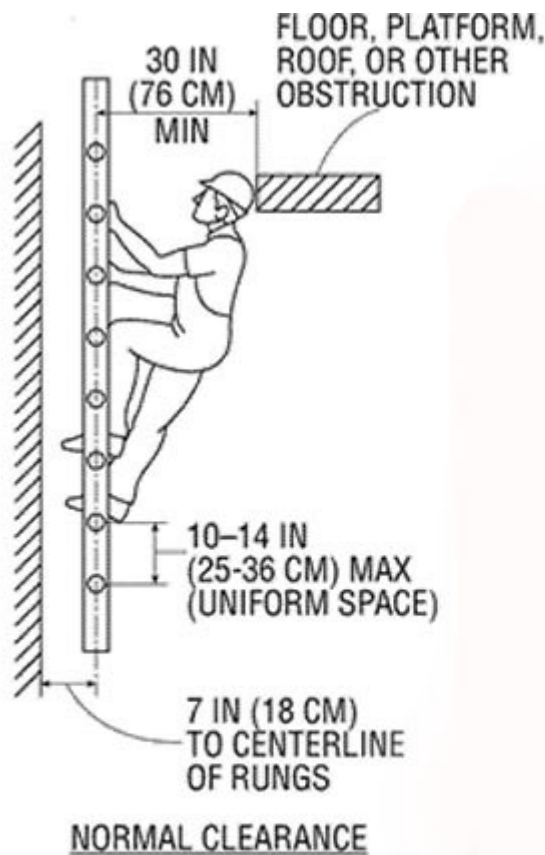


Figure D-5 -- Fixed Ladder Clearances

## **Ladder Safety Systems**

- Must be installed on new or replacement Fixed Ladders that extend 24 feet or greater from a Lower Level where a Personal Fall Arrest System is not used.
- Must be inspected per manufacturer instructions. Any defective system must be removed from service.
- Must allow the employee to climb up and down the ladder using both hands.
- The connection between the carrier or lifeline and point of attachment to the Body Harness or belt does not exceed 9 inches.
- The design and installation of the mountings and cable guides does not reduce the design strength of the ladder.

## **Ladder Cages and Wells**

- Cages and wells will not be installed on new or replacement Fixed Ladders that extend 24 feet or greater from a Lower Level. These ladders will use a Ladder Safety System or Personal Fall Arrest System.
- Must be inspected per manufacturer instructions. Any defective system must be removed from service.
- Permit easy access to and egress from the ladder.
- Direct employees to a lower landing.

## **Policy**

### **Hazard Assessment**

Before elevated work is performed a Competent Person must conduct a hazard assessment. The hazard assessment must capture.

- The scope of the work being performed
- The path of travel to the area where work is performed
- Potential fall hazards
- Controls for preventing falls

## **Work Practices**

- Elevated work must not be performed alone. A worker cannot be left on an elevated work surface without another worker present.
- Access to the roof must be limited to only trained employees who are capable of recognizing, evaluating and controlling fall hazards.
- Only Fall Protection systems chosen for the work by a Competent Person may be used.
- The area below elevated work must be secured to prohibit employees and pedestrians from entering the area where they could be exposed to overhead hazards.
- Toeboards must be installed on all scaffolds and Guard Rail Systems where employees or pedestrian are exposed to overhead hazards.
- Tools, equipment, or materials are not allowed to pile higher than the Toeboard.
- Where practical, tools, etc. must be secured with rope, wire, etc. to keep them from falling.
- Employees with potential for injury to the head from falling objects must wear head protection (hard hats).

## **Rescue or Retrieval**

Prior to the beginning of each elevated work assignment, a Competent Person must evaluate and plan for the prompt identification and rescue of employees involved in a fall.

The Rescue/Retrieval Plan should state the response course if a worker becomes suspended after a fall. Options available may include contacting Public Safety dispatch (215)-204-1234, the use of trained rescue personnel, ladders, mechanical devices with descent capability or man lifts.

## **Incident Investigations**

In the event of a fall, Public Safety must be notified immediately. After a fall, near miss, or other serious incident an investigation must be conducted. Involved parties must include EHRS and an appropriate supervisor. The incident investigations will include an evaluation of both the Fall Protection plan and the execution of that plan for potential improvements to practices, procedures or training in order to prevent reoccurrence.

Any corrective actions generated as a result of the incident investigation must be implemented immediately. Retraining for all employees will be conducted as needed.

## **Training**

Before any employee is exposed to a fall hazard, training must be provided by a Competent Person. Training must include:

- The nature of the fall hazards in the work area and how to recognize and minimize them.
- The procedures for installing, inspecting, operating, maintaining, disassembling, and storing the personal Fall Protection systems.
- Rescue or Retrieval options.
- Applicable OSHA regulations and ANSI standards.

Training records will be maintained by an appropriate supervisor. The records must contain:

- The name of the employees trained.
- The dates of training.
- The topics covered in the training
- The name and signature of the person who conducted the training.

Retraining must be conducted when:

- Changes in the workplace render previous training obsolete or inadequate.
- Changes in the types of Fall Protection systems or equipment to be used render previous training obsolete or inadequate.
- Inadequacies in an employee's knowledge or use of Fall Protection systems or equipment indicate that the employee no longer has the requisite understanding or skill necessary to perform the job safely.
- In the event of an incident or near miss.

## **References**

- [29 CFR 1910 Subpart D](#)
- [29 CFR 1910.140](#)
- [IBC – 2015 \(or latest adopted version\) – Section 1015 – Guards](#)
- [IBC – 2015 \(or latest adopted version\) – Section 3300 – Safeguards During Construction](#)