**The Pennsylvania State University**

**Fall Protection Program**

**Introduction**

It is the policy of the Pennsylvania State University (PSU) to take all necessary measures to prevent falls from elevated locations. Fall hazards shall be eliminated through the application of engineering controls whenever possible. Administrative controls and fall protection equipment shall be used when engineering controls are either not feasible or do not completely eliminate the fall hazard.

**Purpose**

The purpose of this program is to prevent injuries due to falls from elevated locations.

This program has been developed in accordance with the following OSHA standards:

* 29 CFR 1910 Subpart D, “Walking-Working Surfaces”
* 29 CFR 1910 Subpart I, Personal Protective Equipment. “1910.140 – Personal Fall Arrest Systems”
* 29 CFR 1926 Subpart M, “Fall Protection”

**Scope**

* This program applies to all employees at all PSU locations except the Hershey Medical Center and the College of Medicine.
* The use of ladders, scaffolds, and aerial lifts is not covered in detail within this program. Contact EHS for information pertaining to these types of equipment.

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1. **Responsibilities**
	1. **Budget Executives and Budget Administrators:**
		1. Ensure that responsibilities assigned with this program are carried out within their administrative work unit.
		2. Monitor implementation of this program within their work unit.
		3. Ensure adequate funding is available to support this program.
	2. **Environmental Health and Safety (EHS) Department:**
		1. Provide program oversight and assist work units in implementing the provisions of this program.
		2. Maintain records in accordance with this document.
		3. Periodically audit and update this program as needed.
	3. **College/Work Unit Safety Officers:**
		1. Be thoroughly informed of the contents of this program and how it relates to their areas of responsibility and authority.
		2. Coordinate implementation of the fall protection program within their work unit.
		3. Ensure specific fall hazards within their work unit are identified and adequately controlled.
		4. Identify a competent person/s responsible for conducting annual equipment inspections.
		5. Assist in the investigation of all injuries and incidents involving falls from elevated locations within their work unit.
		6. Ensure that records are maintained for their work unit in accordance with this document.
	4. **Supervisors:**
		1. Be thoroughly informed of the contents of this program and how it relates to their areas of responsibility and authority.
		2. Identify specific fall hazards encountered by their employees.
		3. Initiate control measures for fall hazards discovered within their assigned areas.
		4. Ensure employee compliance with all provisions of the fall protection program.
		5. Investigate all injuries and incidents involving falls from elevated locations within their work unit.
		6. Ensure that affected personnel attend fall protection training sessions and are provided with appropriate fall protection equipment.
	5. **Employees:**
		1. Comply with all provisions of this program, including the use of protective equipment and completion of pre-use inspections.
		2. Attend all training required relative to this program.
		3. Promptly report any concerns related to fall protection or any walking-working surface hazard to their immediate supervisor.
2. **Definitions**

The following terms are defined to allow for a better understanding of this program:

* 1. **“Anchorage”** means a secure point of attachment for equipment such as lifelines, lanyards, deceleration devices, and rope descent systems.
	2. **“Body Belt”** means a strap with means both for securing about the waist and for attaching to other components such as a lanyard used with positioning systems, travel restraint systems, or ladder safety systems. ***The use of a body belt for fall arrest is prohibited.***
	3. **“Body Harness”** means an interconnected set of straps that may be secured about a person in a manner that distributes fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders and has a means of attaching it to other components of a personal fall protection system.
	4. **“Cage”** means an enclosure mounted on the side rails of a fixed ladder or fastened to a structure behind the fixed ladder that is designed to surround the climbing space of the ladder. A cage is also called a “cage guard” or “basket guard”.
	5. **“Carrier”** means the track of a ladder safety system that consists of a flexible cable or rigid rail attached to the fixed ladder or immediately adjacent to it.
	6. **“Competent Person”** one who is capable of identifying existing and predictable hazards in the work environment and who has the authority to take prompt corrective measures to eliminate them.
	7. **“Construction Work/Activities”** means work for construction, alteration, and/or repair, including painting and decorating.
	8. **“Conventional Fall Protection System”** the following types of systems are commonly considered conventional fall protection systems: standard guardrail systems, fall restraint systems, and personal fall arrest systems. Conventional fall protection systems must always be considered first before a “specialized fall protection system”.
	9. **“Dangerous Equipment”** means equipment, such as vats, tanks, electrical equipment, machinery, equipment or machinery with protruding parts, or other similar units, that, because of their function or form, may harm an employee who falls into or onto the equipment.
	10. **“Deceleration Device”** means any mechanism (such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyard, automatic self-retracting lifeline or lanyard, etc.) which serves to dissipate a substantial amount of energy imposed on an individual during a fall arrest.
	11. **“Deceleration Distance”** means the additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate.
	12. **“Designated Area”** means a distinct portion of a walking-working surface delineated by a warning line in which employees may perform work without additional fall protection.
	13. **“Dockboard”** means a portable or fixed device that spans a gap or compensates for a difference in elevation between a loading platform and a transport vehicle. Dockboards include, but are not limited to, bridge plates, dock plates, and dock levelers.
	14. **“Fall Hazard”** means any condition on a walking-working surface that exposes an employee to a risk of harm from a fall on the same level or to a lower level.
	15. “Fixed Ladder” means 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.
	16. **“Free Fall”** means the act of falling before the system begins to apply force to arrest the fall.
	17. **“Grab Bar”** means an individual horizontal or vertical handhold installed to provide access above the height of the ladder.
	18. **“Handrail”** means a rail used to provide employees with a handhold for support.
	19. “Hoist Area” means any elevated access opening to a walking-working surface through which equipment or materials are loaded or received.
	20. **“Hole”** means a gap or open space in a floor, roof, horizontal walking-working surface or similar surface that is at least 2 inches (5 cm) in its least dimension.
	21. **“Infeasible”** means that it is impossible, highly impractical, or more hazardous to perform the work using a conventional fall protection system (i.e., guardrail system, fall restraint system, or personal fall arrest system)
	22. **“Ladder Safety System”** means a system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems.
	23. **“Lanyard”** means a flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.
	24. “**Lifeline**” means a component of a personal fall protection system consisting of a flexible line for connection to an anchorage at one end so as the hang vertically (vertical lifeline), or for connection to anchorages at both ends so as to stretch horizontally (horizontal lifeline), and serves as a means for connecting other components of a system to the anchorage.
	25. **“Low Sloped Roof”** Means a roof having a slope less than or equal to a ratio of 4 in 12 (vertical to horizontal). (a 4 in 12 roof would have a vertical rise of 4 feet over a horizontal distance of 12 feet)
	26. **“Leading Edge”** means the edge of a floor, roof, or formwork for a walking/working surface (such as a 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.
	27. **“Maximum Intended Load”** means the total load (weight and force) of all employees, equipment, vehicles, tools, materials, and other loads the employer reasonably anticipates to be applied to a walking-working surface at any one time.
	28. **“Mobile Ladder Stand”** (ladder stand) means a mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step. A mobile ladder stand also may have handrails and is designed for use by one employee at a time.
	29. **“Mobile Ladder Stand Platform”** mean a mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with means of access or egress.
	30. **“Opening”** means a gap or open space in a wall, partition, vertical walking-working surface, or similar surface that is at least 30 inches (76 cm) high and at least 18 inches (46 cm) wide, through which an employee can fall to a lower level.
	31. **“Personal Fall Arrest System”** means a system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and a connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these. ***The use of a body belt for fall arrest is prohibited.***
	32. **“Personal Fall Protection System”** means a system (including all components) an employer uses to provide protection from falling or to safely arrest an employee’s fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems.
	33. **“Platform”** means a walking-working surface that is elevated above the surrounding area.
	34. **“Positioning System”** (work-positioning system) means a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or window sill, and work with both hands free.
	35. **“Qualified Person”** One 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 subject matter, the work, or the project.
	36. **“Ramp”** means an inclined walking-working surface used to access another level.
	37. **“Residential Construction”** is where the working environment, materials, methods and procedures are essentially the same as those used in building a typical single family home or townhouse. Residential construction is characterized by the use of wood frames, floor joists and roof structures.
	38. **“Riser”** means the upright (vertical) or inclined member of a stair that is located at the back of a stair tread or platform and connects close to the front edge of the next higher tread, platform, or landing.
	39. **“Rope Grab”** means a deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employees the principle of inertial locking, cam/lever locking, or both.
	40. **“Runway**” means an elevated walking-working surface, such as a catwalk, a foot walk along shafting, or an elevated walkway between buildings.
	41. **“Roof Work”** means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work. “Roof work” does not include the construction of the roof deck.
	42. **“Self-Retracting Lifeline/Lanyard”** means a deceleration device containing a drum-wound line that can be slowly extracted from, or retracted onto, the drum under slight tension during normal movement by the employee. At the onset of a fall, the device automatically locks the drum and arrests the fall.
	43. **“Snaphook”** means a connector comprised of a hook-shaped body with a normally closed gate, or similar arrangement that may be manually opened to permit the hook to receive an object. When released, the snaphook automatically closes to retain the object. Opening a snaphook requires two separate actions. Snaphooks are generally one of two types: (i) automatic locking type (permitted) with a self-closing and self-locking gate that remains closed and locked until intentionally unlocked and opened for connection or disconnection; and (ii) non-locking type (prohibited) with a self-closing gate that remains closed, but not locked, until intentionally opened for connection or disconnection.
	44. **“Specialized Fall Protection Systems”** the following types of systems are commonly considered specialized fall protection systems: safety monitor system, designated areas, and fall protection plans.
	45. **“Standard Guardrail”** is an engineering fall protection control consisting of a top rail, intermediate rail and posts.
	46. **“Stair Rail or Stair Rail System”** means a barrier erected along the exposed or open side of stairways to prevent employees from falling to a lower level.
	47. **“Through Ladder”** means a type of fixed ladder that allows the employee to step through the side rails at the top of the ladder to reach a walking-working surface, such as a landing.
	48. **“Toe Board”** means a low protective barrier that is designed to prevent materials, tools, and equipment from falling to a lower level, and protect employees from falling.
	49. **“Travel Restraint System”** means a combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employee uses to eliminate the possibility of an employee going over the edge of a walking-working surface.
	50. **“Unprotected Sides and Edges”** means any side or edge of a walking-working surface (except at entrances and other points of access) where there is no wall, guardrail system, or stair rail system to protect an employee from falling to a lower level.
	51. **“Walking-Working Surface”** means any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or work place location.
	52. **“Warning Line”** means a barrier erected to warn employees that they are approaching an unprotected side or edge, and which designates an area in which work may take place without the use of other means of fall protection.
	53. **“Well”** means a permanent, complete enclosure around a fixed ladder.
1. **Identification of Fall Hazards & Control Measures**

Supervisors are responsible for identifying specific fall hazards encountered by their employees. EHS is available to assist in the identification and evaluation of fall hazards. The following is a list of potential fall hazards at PSU along with the applicable control measures for each condition:

*EXEMPTION*:

1. Fall protection is not required when employees are inspecting, investigating, or assessing workplace conditions or work to be performed prior to the start of work or after all work has been completed;
	1. This exemption does not apply when fall protection systems or equipment have been installed and are available for workers to use for pre-work and post-work inspections, investigations, or assessments.
2. Fall protection is not required on the exposed perimeters of entertainment stages and the exposed perimeters of rail-station platforms.
	1. General requirements:
		1. All places of employment, passageways, storerooms, service rooms, and walking-working surfaces are kept in a clean, orderly, and sanitary condition.
		2. The floor of each workroom is maintained in a clean and, to the extent feasible, in a dry condition. When wet processes are used, drainage must be maintained and, to the extent feasible, dry standing places, such as false floors, platforms, and mats must be provided.
		3. Walking-working surfaces are maintained free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice.
		4. Each walking-working surface can support the maximum intended load for that surface.
		5. Safe means of access and egress to and from walking-working surfaces must be provided.

3.2 **Open sided floors, platforms, catwalks and ramps four feet or more in height:**

* Fall hazards shall be addressed by installation of a standard guardrail on all open sides except where there is entrance to a ramp or stairway.

3.3 **Stairways:**

3.3.1 Fall hazards shall be addressed on an exposed side or edge of a stairway landing that is 4 feet or more above a lower level by a guardrail or stair rail system.

3.3.2 Fall hazard shall be addressed on a flight of stairs having at least 3 treads and at least 4 risers by stair rail system and handrail as seen below:

**AS FOUND IN OSHA REGULATION - Table D-2 -- Stairway Handrail Requirements**

| **Stair width** | **Enclosed** | **One open side** | **Two open sides** | **With earth built up on both sides** |
| --- | --- | --- | --- | --- |
| Less than 44 inches.  | At least one handrail | One stair rail system with handrail on open side. | One stair rail system each open side. |   |
| 44 inches to 88 inches. | One handrail on each enclosed side | One Stair rail system with handrail on open side and one handrail on enclosed side. | One stair rail system with handrail on each open side. |   |
| Greater than 88 inches. | One handrail on each enclosed side and one intermediate handrail located in the middle of the stair | One stair rail system with handrail on open side, one handrail on enclosed side, and one intermediate handrail located in the middle of the stair. | One stair rail system with handrail on each open side and one intermediate handrail located in the middle of the stair. |   |
| Exterior stairs less than 44 inches. |   |   |   | One handrail on least one side. |
| Note to table: The width of the stair must be clear of all obstructions except handrails.*Design criteria for Handrails and Stair Rail Systems can be found in OSHA regulation 1910.29(f).* |

3.4 **Loading Docks (Four or more feet in height):**

3.4.1 Guardrail systems on the working side of loading docks are not required, where it can be demonstrated that the presence of guardrails would prevent the performance of work (i.e. truck pulling in).

3.4.2 All other sides of loading docks shall be guarded by standard guardrail systems or a removable type of guardrail system.

3.4.3 Dock doors shall remain closed after use to eliminate the fall hazard.

3.4.4 Employees that may be exposed to fall hazards associated with this type of work must be trained to recognize and avoid these hazards.

3.4.5 Dock boards:

 3.4.5.1 Shall be capable of supporting the maximum intended load.

 3.4.5.2 Dock boards put into service on or after January 17, 2017 are designed, constructed and maintained to prevent transfer vehicles from running off the dock board edge.

3.4.5.2.1 EXEMPTION: when there is no hazard of transfer vehicles running off the dock board edge, dock boards that do not have run-off protection can be used.

3.4.5.3 Portable dock boards shall be secured by anchoring them in place or using equipment or devices that prevent the dock board from moving out of safe position.

3.4.5.3.1 EXEMPTION: If securing the dock board is not feasible, then there must be sufficient contact between the dock board and the surface to prevent the dock board from moving out of position.

3.4.5.4 Wheel chocks or sand shoes shall be used to prevent transport vehicle (e.g. a tuck, semi-trailer, or rail car) on which a dock board is placed, from moving while employees are on the dock board.

3.4.5.5 Portable dockboards shall be equipped with handholds or other means to permit safe handling of dockboards.

 3.5 **Hoist Area (4 feet or more to a lower level):**

* Fall hazards shall be addressed by installation of a guardrail system, personal fall arrest system, or a travel restraint system. When any portion of a guardrail system, gate, or chains is removed, and an employee must lean through or over the edge of the access opening to facilitate hoisting, the employee is protected from falling by a personal fall arrest system.

3.6 **Holes (4 feet or more to a lower level):**

* Fall hazards shall be addressed by installation of a cover, guardrail system, travel restraint system or personal fall arrest system.

 3.7 **Hole (less than 4 feet above the lower level):**

* Each employee shall be protected from tripping into or stepping into or through by installation of a cover or guardrail system.

3.8 **Stairway Floor Hole**:

* Each employee shall be protected from falling by a fixed guardrail system on all exposed sides, except at the stairway entrance. However, for any stairway used less than once per day where traffic across the stairway floor hole prevents the use of a fixed guardrail system (e.g., holes located in aisle spaces), the employer may protect employees from falling into the hole by using a hinged floor hole cover and a removable guardrail system on all exposed sides, except at the entrance to the stairway.

3.9 **Ladderway Floor Hole**:

* Each employee shall be protected from falling by a guardrail system and toeboards erected on all exposed sides, except at the entrance to the hole, where a self-closing gate or an offset must be used.

3.10 **Dangerous Equipment**:

3.10.1 (Less than 4 feet above dangerous equipment), each employee shall be protected from falling into or onto dangerous equipment by a guardrail system or a travel restraint system, unless the equipment is covered or guarded to eliminate the hazard.

3.10.2 (4 feet or more above dangerous equipment), each employee shall be protected by a guardrail system, travel restraint system, or personal fall arrest system.

3.11 **Manholes:**

* Manhole covers shall be placed over manhole openings at all times. If removed, a designated employee must constantly attend the opening or the opening must be protected by a removable standard guardrails.

3.12 **Excavations more than six feet deep:**

3.12.1 Fall hazards shall be addressed by the installation of guardrail systems, fences, barricades, or covers of substantial strength.

3.12.2 Walkways crossing over excavations must be equipped with standard guardrails if the walkway is six or more feet above the excavation.

3.13 **Service platforms of bridge cranes:**

* + - Fall hazards shall be addressed by the installation of standard guardrails on all exposed sides.

3.14 **Hatchway and Chute-Floor Hole:**

3.14.1 Fall hazards shall be addressed by a hinged floor-hole cover and a fixed guardrail system that leaves only one exposed side. When the hole is not in use, the employer must ensure the cover is closed or a removable guardrail system is provided on the exposed sides; or

3.14.2 A removable guardrail system and toeboards on not more than two sides of the hole and a fixed guardrail system on all other exposed sides. The employer must ensure the removable guardrail system is kept in place when the hole is not in use; or

3.14.3 A guardrail system or a travel restraint system when a work operation necessitates passing material through a hatchway or chute floor hole.

3.15 **Skylights installed in roof surfaces:**

3.15.1 Fall hazards shall be addressed by:

3.15.1.1 The installation of standard skylight screens which are capable of withstanding a load of at least 200 pounds applied perpendicular to any point on the screen, or

3.15.1.2 A cover which is capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time, or

3.15.1.3 By installing standard guardrails, restraint, or personal fall arrest system.

3.16 **Roofs (work on low-slope roofs):**

3.16.1 When work is performed less than 6 feet from the roof edge, the employer must ensure each employee is protected from falling by a guardrail system, travel restraint system, or personal fall arrest system.

3.16.2 When work is performed at least 6 feet but less than 15 feet from the roof edge, the employer must ensure each employee is protected from falling by using a guardrail system, travel restraint system, or personal fall arrest system. The employer may use a designated area when performing work that is both infrequent and temporary.

3.16.3 When work is performed 15 feet or more from the roof edge, the employer must:

 Protect each employee from falling by a guardrail system, travel restraint system, or personal fall arrest system or a designated area. The employer is not required to provide any fall protection, provided the work is both infrequent and temporary;

**and**

 Implement and enforce a work rule prohibiting employees from going within 15 feet of the roof edge.

Further explanation of the terms: “Infrequent and temporary”.

-the term infrequent means that the task or job is performed only on occasion, when needed (e.g. equipment breakdown, on an occasional basis, or at sporadic or irregular intervals. Infrequent tasks include work activities such as annual maintenance or servicing of equipment, monthly or quarterly replacement of batteries or hvac filters, and responding to equipment outage or breakdown.

-the term temporary means that the duration of the task the worker performs is brief or short. Temporary and brief or short tasks generally include those that a worker is able to perform in less time than it takes to install or setup conventional fall protection. Temporary task also include those that workers are able to complete at one time rather than repeatedly climbing up or returning to the roof or requiring more than one work shift to complete. The task generally are those that take less than 1-2 hours to complete. Examples include changing a filter in a roof-top hvac system, replacing a part on a satellite dish, caulking or resealing the flashing around a skylight, or sweeping a chimney.

3.17 **Fixed Ladders**:

3.17.1 For fixed ladders that extend more than 24 feet above a lower level fall hazards shall be addressed by:

3.17.1.1 Existing Fixed Ladders. Each fixed ladder shall be equipped with a personal fall arrest system, ladder safety system, cage, or well.

3.17.1.2 New Fixed Ladders installed by the date of this program (Revision 2), shall be equipped with a rigid rail type ladder safety system (Appendix E).

3.17.1.3 Replacement. When a fixed ladder, cage, or well, or any portion of a section thereof, is replaced, a ladder safety system is installed in at least that section of the fixed ladder, cage, or well where the replacement is located.

3.17.1.4 Final Deadline. On and after November 18, 2036, all fixed ladders are equipped with a ladder safety system.

3.17.2 Ladder safety systems shall provide protection throughout the entire vertical distance of the ladder.

3.17.2.1 Rest platforms shall be provided at maximum intervals of 150 feet.

3.17.2.2 Rest platforms shall be provided on ladder having a cage or well at maximum intervals of 50 feet.

*Design criteria for Ladder Safety Systems can be found in OSHA regulation 1910.29 (i).*

3.18 **Opening**:

* Including ones with a chute attached, where the inside bottom edge of the opening is less than 39 inches above a walking working surface and the outside bottom edge of the opening is 4 feet or more above a lower level, fall hazards shall be addressed by guardrail system, travel restraint system, or personal fall arrest system.

3.19 **Runways and similar walkways (4 feet or more above a lower level)**:

* Fall hazards shall be addressed by a guardrail system.

3.20 **Any other situation where an individual is exposed to a fall distance of four feet or more:**

* + - Fall hazards shall be addressed by the installation of a standard guardrail system. When this is infeasible, other conventional or specialized fall protection systems can be utilized according to the hierarchy of controls listed in the next section.
	1. **Protection from falling objects**:

3.21.1 When an employee is exposed to falling objects a hard hat must be worn;

 **AND be protected by at least one of the following**;

* Toeboards, screens, or guardrail systems to prevent objects from falling to a lower level;
* Erecting canopy structures and keeping potential falling objects far enough from an edge, hole, or opening to prevent them from falling to a lower level;
* Barricading the area into which objects could fall, prohibiting employees from entering the barricade area, and keeping objects far enough from an edge or opening to prevent them from falling to a lower level.

**4.0 Hierarchy of Controls**

The hierarchy of controls, or preferred order of controls, shall be used to choose methods to eliminate or control fall hazards. More than one control measure may be used to reduce the risk of a fall and/or control a hazard. A summary of the hierarchy of controls is as follows:

***Conventional Fall Protection Systems – Fall protection systems must be considered according to the following hierarchy of controls. Conventional fall protection systems must be utilized/installed before a specialized fall protection system can be considered.***

*1. Covers*

*2. Standard guardrail systems*

*3. Travel restraint systems*

*4. Personal fall arrest systems*

***Specialized Fall Protection Systems – Specialized fall protection systems are only permitted after conventional types of fall protection are found infeasible.***

1. *Controlled Access Zone*

*2. Safety monitor system*

*3. Fall protection plans*

1. *Positioning system*
2. *Designated area (warning line)*

4.1 **Conventional Fall Protection System – Covers**

4.1.1 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; and

 4.1.2 Is secured to prevent accidental displacement.

4.2 **Conventional Fall Protection System - Standard guardrail system requirements**:

4.2.1 Top rails shall have a vertical height of 42 inches, plus or minus 3 inches, when measured from the upper surface of the rail to the working surface.

4.2.2 Midrail shall be halfway between the top rail and floor surface.

4.2.3 **Toe boards**:

 -Shall have a minimum vertical height of 3.5 inches as measured from the top edge of the toeboard to the level of the walking-working surface.

 -Shall not have more than .25 inch clearance or opening above the walking working surface.

 -Shall be solid or do not have any opening that exceed 1 inch at its greatest dimension.

 --Refer to OSHA regulation for additional requirements regarding toeboards: 1910.29(k).

4.2.4 Refer to OSHA regulation for additional requirements regarding standard guardrail systems: 1910.29(b).

**4.3** **Conventional Fall Protection System - Travel restraint system requirements:**

This system is used to prevent someone from falling off the edge of a walking/working surface to a lower level. The lanyard must be short enough to prevent a fall from occurring.

4.3.1 The anchor point must be capable of supporting 5000 pounds or twice the maximum expected force as determined by a qualified person.

4.3.2 Restraint lines must connect the harness directly to the anchorage independently of any other lines.

4.3.3 Knots shall not be made in lanyards or lifelines.

4.3.4 Fall protection equipment shall only be used for employee protection and not to hoist equipment or tools.

4.3.5 Restraint lines must be protected against cutting and abrasion.

4.3.6 Fall protection equipment shall be stored in clean, dry areas that are free from exposure to fumes, corrosive elements, and temperature extremes.

4.3.7 The following OSHA regulation shall be consulted regarding all requirements for a restraint personal fall protection system:

 OSHA's Work-Positioning System regulation: 1910.140 (c).

**4.4 Conventional Fall Protection System - Personal fall arrest system requirements:**

If a fall occurs, this system stops the persons fall before they reach the next lower level (see Appendix B for further information).

 Below are some key points regarding Personal Fall Arrest Systems.

 The following OSHA regulation shall be consulted regarding all requirements for a personal fall arrest system:

 OSHA's Personal Fall Arrest System regulation: 1910.140 (d).

4.4.1 Only commercially manufactured equipment specifically designed for fall protection may be used.

4.4.2 Only snaphooks with a self-closing and self-locking gate shall be used.

4.4.3 The attachment point of the body harness shall be located in the center of the wearer’s back near shoulder level.

4.4.4 Body belts may not be used as part of a fall arrest system. Only body harnesses may be used for this purpose.

4.4.5 Lifelines shall be protected against cutting and abrasion.

4.4.6 Knots shall not be made in lanyards or lifelines.

4.4.7 Lanyards are not permitted to be attached to each other in an attempt to increase length.

4.4.8 Fall arrest devices shall be connected in a manner, preferably above head level, that minimizes the free fall distance and prevents any contact with lower levels in the event of a fall (see Appendix B for further information).

4.4.9 The maximum potential free fall distance is six feet (see Appendix B for further information).

4.4.10 The maximum permissible deceleration distance is 3.5 feet (see Appendix B for further information).

4.4.11 Horizontal lifelines shall be designed, installed, and used under the supervision of a qualified person as part of a complete fall arrest system which maintains a safety factor of at least two times the intended load.

4.4.12 Fall protection equipment shall only be used for employee protection and not to hoist equipment or tools.

4.4.13 Anchorages used for attachment of fall protection equipment shall be independent of any anchorage being used to suspend platforms.

4.4.14 Anchorages shall be capable of supporting at least 5000 pounds per individual attached or shall be designed, installed, and used under the supervision of a qualified person as part of a fall arrest system which maintains a safety factor of at least two times the intended load.

4.4.15 Fall arrest systems and components subject to a fall shall be immediately removed from service. Such equipment must be destroyed prior to disposal.

4.4.16 Fall arrest systems shall not be attached to:

* standard railings,
* standard guardrails,
* ladders/rungs,
* scaffolding,
* light fixtures,
* conduit or plumbing,
* wiring harnesses,
* other lanyards,
* roof stacks, vents, or pipes

4.4.17 Fall protection equipment shall be stored in clean, dry areas that are free from exposure to fumes, corrosive elements, and temperature extremes.

***Specialized Fall Protection Systems shall be used only if conventional fall protection systems are infeasible.***

4.6 **Specialized Fall Protection - Controlled Access Zone:** A Controlled Access Zone is an area in which certain work may take place without the use of guardrail systems or personal fall arrest systems, and access to the zone is controlled. The use of this type of fall protection is only permitted when conducting overhand brick laying operations and related leading edge work. *Consult with EHS if this type of fall prevention is being considered.*

4.7 **Specialized Fall Protection - Safety monitoring system**: A safety monitoring system is one in which a trained worker is designated to monitor work activities in a control zone to ensure that work is done in a manner that minimizes the potential for a worker to fall. A safety monitoring system can only be utilized during low-sloped roof work when combined with a warning line system. If the roof is 50-feet or less in width the use of a safety monitoring system alone is permitted. *Consult with EHS if this type of fall prevention is being considered*.

4.8 **Specialized Fall Protection - Fall protection plan**: This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. *Consult with EHS if this type of fall protection is being considered.*

4.9 **Specialized Fall Protection – Positioning System**:

 “Positioning System” (work-positioning system) means a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or window sill, and work with both hands free.

 *Consult with EHS if this type of fall protection is being considered.*

4.10 **Conventional Fall Protection System – Designated Area:**

* *Must be a purchased system and must conform to the requirements below.*

*This type of fall protection shall only be utilized in situations noted in this program*.

4.10.1 Employees remain within the designated area while work operations are underway;

**AND**

the perimeter of the designated area is delineated with a warning line consisting of a rope, wire, tape, or chain that meets the requirements below:

4.10.2 Has a minimum breaking strength of 200 pounds;

4.10.3 Is installed so its lowest point, including sag, is not less than 34 inches and;

4.10.4 is not more than 39 inches above the walking-working surface;

4.10.5 Is supported in such a manner that pulling on one section of the line will not result in slack being taken up in adjacent sections causing the line to fall below the limits above;

4.10.6 Is clearly visible from a distance of 25 feet away, and anywhere within the

designated area;

4.10.7 Is erected as close to the work area as the task permits; and

4.10.8 Is erected not less than 6 feet from the roof edge for work that is both

temporary and infrequent, or not less than 15 feet for other work.

4.10.9 When mobile mechanical equipment is used to perform work that is both temporary and infrequent in a designated area, the employer must ensure the warning line is erected not less than 6 feet from the unprotected side or edge that is parallel to the direction in which the mechanical equipment is operated, and not less than 10 feet from the unprotected side or edge that is perpendicular to the direction in which the mechanical equipment is operated.

**5.0 Training**

5.1 Fall protection training shall be provided to all personnel who use fall protection devices at PSU. Such training shall be provided before working in elevated locations.

5.2 Fall protection trainers need to be approved by EHS.

5.3 Fall protection training includes:

* Nature of the fall hazard in the work area and how to recognize it;
* The procedures to follow to minimize those hazards;
* The correct procedures for installing, inspecting, operating, maintaining, and disassembling the personal fall protection systems that the employee uses;and
* The correct use of personal fall protection systems including, but not limited to, proper hook-up, anchoring, and tie off techniques and methods of equipment inspection and storage, as specified by the manufacturer.

5.4 Supervisors are responsible for ensuring that their employees receive fall protection training when required by their job duties before they are exposed to the hazard.

5.5 Each work unit is responsible for maintaining records of fall protection training for their employees. These records must be accessible to EHS upon request.

5.6 Re-training shall be provided to employees under the following circumstances:

* Changes in the workplace render previous training obsolete.
* Changes in the type of fall protection systems or equipment used render previous training obsolete.
* Inadequacies in an affected employee’s knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skills.

**6.0 Inspection**

6.1 Pre-Use Inspections (Personal Fall Protection Systems)

6.1.1 Fall protection equipment shall be visually inspected prior to each use by the employee who uses the equipment for any component with damage, such as a cut, tear, abrasion, mold, or evidence of undue stretching, an alteration or addition that might affect its effectiveness, damage due to deterioration, fire, acid, or other corrosive damage, distorted hooks or faulty hook springs, tongues that are unfitted to the shoulder of buckles, loose or damaged mountings, non-functioning parts, or wear, or internal deterioration.

6.1.2 Defective equipment shall be immediately removed from service and destroyed.

6.2 Annual Inspections (Personal Fall Protection Systems-i.e. lanyards, self-retracting lifeline, harnesses, carabiners)

6.2.1 An annual inspection of this type of fall protection equipment shall be made by a competent person who has been trained to conduct such inspections.

 6.2.2 Annual inspection results shall be documented using Appendix A or an equivalent (i.e. manufacturer’s inspection checklist).

6.2.3 Defective equipment shall be immediately removed from service and destroyed.

* Additional inspection frequencies may be required by the manufacturer. Refer to the equipment instruction/owner’s manual for complete details regarding inspection.

6.3 Inspection of Horizontal Lifeline Systems and Fixed Single Point Anchors (i.e. on roofs).

6.3.1 Installations shall be inspected by a competent person on a regular basis not to exceed one year, unless more frequently if required by manufacturer’s instructions.

6.3.2 To be considered competent to inspect these systems training must be obtained from manufacture representative/or a 3rd party familiar with these types of systems and their inspection requirements. A designer (3rd party) may also be able to provide this training.

OR

A 3rd party can be utilized to conduct the inspections.

6.4 Personal fall protection equipment such as, lanyards, harnesses, and carabiners subjected to impact loading must be removed from service immediately and destroyed.

6.4.1 Horizontal Lifeline Systems and Fixed Single Point Anchors (i.e. on roofs) must be visibly marked out of service and not put back in service until a 3rd party whom is familiar with horizontal lifeline systems and single point anchors inspects the system.

6.5Inspections (Walking-Working Surfaces)

6.5.1 Walking-working surfaces shall be inspected, regularly and as necessary, and maintained in a safe condition.

6.5.1.1 If corrective actions or repairs cannot be made immediately the hazard shall be guarded until corrected.

**7.0 Recordkeeping**

7.1 Each work unit is responsible for maintaining the following:

7.1.1 Records of all fall protection training provided to employees within the work unit.

7.1.2 Records of annual fall protection equipment inspections. Records shall be kept for the life of the equipment.

 7.1.2.1 If additional inspection frequencies are required by the manufacturer, those records must also be kept for the life of the equipment.

**8.0 Contractors**

8.1 Contractors engaged in activities that require working at heights shall comply with all applicable OSHA regulations regarding fall protection.

8.2 Contractors are responsible for providing their own fall protection equipment.

**9.0 Rescue**

9.1 When a personal fall arrest system is utilized, procedures shall be in place to provide prompt rescue in the event of a fall.

9.2 There are a variety of ways in which this requirement can be met, depending on the particular circumstances of the work site. Some examples include, but are not limited to, ensuring that at least one other designated employee shall be available to monitor ongoing operations, equipping the employee utilizing the fall arrest system with communication equipment that enables the worker to obtain help promptly or by calling 911 or local emergency services.

9.3 All personal fall arrest systems (harness) must be equipped with at least one “Relief Step Safety Device” manufactured by Miller or an equivalent device (Appendix F). This device alleviates the effects of orthostatic intolerance (pooling of blood in the legs which restricts blood flow to the brain and other organs), also known as suspension trauma.

**Appendix A**

**Fall Protection Annual Inspection Checklist**

**User: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Type of Equipment: Harness / Lanyard / Self-Retracting Lifeline / Carabiner / OTHER (specify)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Make and Model: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Serial Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Competent Person conducting the inspection: (PRINT)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***If any failures are found the unit must be removed from service***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Part*** | ***Criteria*** | ***Pass*** | ***Fail*** | ***N/A*** | ***Comment*** |
| **Label** | Label present |  |  |  |  |
| Legible |  |  |  |  |
| Less than 5 years old (If not=fail) |  |  |  |  |
| **Fabric** | Cut, torn, holes |  |  |  |  |
|  | Mildew |  |  |  |  |
|  | Fraying |  |  |  |  |
|  | Heat or chemical damage (discoloration) |  |  |  |  |
|  | Hardening |  |  |  |  |
|  | User self-repaired (if yes=fail) |  |  |  |  |
| **Hardware** | Corroded |  |  |  |  |
|  | Bent |  |  |  |  |
|  | Cracked |  |  |  |  |
|  | Any alteration or absence of parts |  |  |  |  |
| **D-Ring** | Cross-section cracked |  |  |  |  |
|  | Bent |  |  |  |  |
|  | Corroded |  |  |  |  |
| **Snaphook** | Does it lock |  |  |  |  |
|  | Corroded |  |  |  |  |
|  | Bent |  |  |  |  |
|  | Cracked |  |  |  |  |
| **Shock Absorber** | Signs that a fall occurred (different color showing) |  |  |  |  |
| **Self-Retracting Lanyard** | Damage to outer casing |  |  |  |  |
|  | Nuts/bolts/rivets intact |  |  |  |  |
|  | Check entire length of nylon/metal cable for damage |  |  |  |  |
|  | Cable fully retracts |  |  |  |  |
|  | If cloth cable, is unit less than 5 yrs. old |  |  |  |  |
|  | Breaking mechanism function |  |  |  |  |

 **Other Comments:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Sign:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Appendix B**

**Diagram showing total fall distance**

*Picture obtained from Millerfallprotection.com*

**NOTE: Self-Retracting Lifelines**

* **Self-Retracting lifelines shall be utilized instead of lanyards whenever possible (not permitted when utilizing a restraint system, positioning system or a body belt).**
* **They come in various lengths and sizes.**
* **They drastically reduce not only fall distances but the force put on the body during a fall.**

**Appendix C**

**Sample picture showing a guardrail system**

*Photo obtained from http://www.wildeck.com/*

**Appendix D**

**Sample picture showing a fall restraint system**

*Photo obtained from* [*http://kcontracts.com/site/*](http://kcontracts.com/site/)

**Appendix E**

**Example of a Rigid Rail Ladder Safety System**

**Appendix F**

**Example of a “Relief Step Safety Device”**

**Easy to Deploy and Use** ***(Attaches to any brand full-body harness)***

|  |  |  |  |
| --- | --- | --- | --- |
| Pull tab to deploy | Insert foot into loop step and adjust  |  Ability to stand allowing improved circulation | Two Relief Steps provide added support, balance and comfort  |

*Picture obtained from Millerfallprotection.com*