



Environmental Health & Safety

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The Ohio State University

Fall Protection Program

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1.0 Introduction

- 1.1 It is the policy of The Ohio State University (OSU) to take precautions to eliminate fall hazards from elevated work locations. This Fall Protection Program prescribes the duty to provide fall protection; sets the criteria and practices for fall protection; and outlines required training and recordkeeping.
- 1.2 Purpose: The purpose of this program is to outline the fall protection requirements to minimize/eliminate fall related injuries. This program is developed in accordance with the following Occupational Safety and Health Administration (OSHA) regulations:
- 29 CFR 1910 Subpart D, "Walking-Working Surfaces"
 - 29 CFR 1910 Subpart F, "Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms"
 - 29 CFR 1910.132 "Personal Protective Equipment"
 - 29 CFR 1926 Subpart M, "Fall Protection"
 - ANSI/ASSE Z359 Fall Protection
- 1.3 Scope: This Fall Protection Program establishes and outlines the OSU Working Unit, supervisor, and user responsibilities; identification of fall hazards and control measures; and training, inspection and recordkeeping related to fall protection on/in OSU buildings. The program applies to all OSU employees whose work duties require them to work at unprotected heights greater than four (4) feet. The use of ladders, scaffolds and aerial lifts are not covered in detail within this program.

2.0 Responsibilities

2.1 Environmental Health & Safety

- 2.1.1 Environmental Health & Safety (EHS) provides program oversight and consultation to OSU working units with fall protection components including training; maintains applicable records; performs program reviews and updates as necessary; and provides recommendations for fall protection during the building design process.

2.2 OSU Working Unit (Facilities Operations & Development (FOD); Athletics; OSU Medical Center (OSUMC); Student Life; et al.)

- 2.2.1 The working unit responsible for each building where fall protection is provided shall be responsible for implementing the fall protection program and ensuring specific fall hazards are identified and adequately controlled through engineering and/or administrative controls. In addition, working units shall assign a “competent individual/person” responsible for departmental fall protection program administration, implementation and maintenance including equipment inspections, inventory, training and recordkeeping.

2.3 FOD Facilities Design & Construction (FDC)

- 2.3.1 FDC shall ensure all new construction and renovations, where applicable, include an engineered fall protection component as required by The Ohio State Building Design Standards, Division 11-Equipment; 11.01.92-Perminant Fall Protection Systems (Roof). The preferred methods of fall protection are as follows:
 - 2.3.1.1 A parapet (equal to or greater than 42 inches) along the perimeter of work areas on rooftops.
 - 2.3.1.2 A standard handrail system along the perimeter of work areas on rooftops engineered in accordance with applicable regulations/standards.
- 2.3.2 FDC shall ensure all engineered fall protection systems include both the hardware components and the personal protective equipment, which is designed, manufactured and compatible for that system.

2.4 Supervisors

- 2.4.1 OSU employees who supervise personnel with responsibilities to work where fall hazards exist must be informed of the contents of this program; identify a

competent person to address fall hazards; and ensure compliance with the fall protection program and related standards.

2.5 Authorized Person

- 2.5.1 Employees working where fall hazards exist must comply with the provisions of this program including the use of personal protective equipment (PPE), fall protection equipment and rescue systems/operations; completion of equipment inspections; training; and reporting of any concerns related to fall protection.

2.6 Competent Person

- 2.6.1 Employees delegated the competent person shall be responsible for the oversight, implementation and management of the fall protection program
- 2.6.2 The competent person shall:
 - 2.6.2.1 Be knowledgeable through training and experience of applicable fall protection standards and regulations applicable to their operation(s)
 - 2.6.2.2 Conduct fall hazard surveys (job hazard analyses) to identify fall hazards before authorized persons are exposed to fall hazards.
 - 2.6.2.3 Have the authority to stop work immediately if it is determined unsafe to proceed.
 - 2.6.2.4 Prepare, update, and review written fall protection procedures and ensure a written rescue plan is developed for situations where fall hazards exist.
 - 2.6.2.5 Specify in written fall protection procedures the systems in place to include anchorage points, connecting means, and other fall protection equipment that authorized persons are required to use when exposed to a fall hazard.
 - 2.6.2.6 Supervise the selection, installation, use and inspection of noncertified anchor points.
 - 2.6.2.7 Verify the fall protection systems are installed and inspected in compliance with this plan and applicable standards.
 - 2.6.2.8 Verify and ensure all authorized persons working at heights are trained and authorized to do so.

- 2.6.2.9 Ensure a prompt rescue of authorized persons can be accomplished through adequate rescue operations.
- 2.6.2.10 Participate in investigations of all incidents related to falls from elevated work surfaces.
- 2.6.2.11 Immediately remove from service any fall protection equipment found defective or subjected to forces as a result of a fall from elevated work.
- 2.6.2.12 Inspect fall protection equipment as recommended by the manufacturer and specified in this plan and ensure inspections by qualified persons are conducted as required.

3.0 Definitions

Anchorage/Anchor point: secure point of attachment for lifelines, lanyards or deceleration devices.

Authorized person: a person assigned by employer to perform duties at a location where the person will be exposed to a fall hazard.

Body belt (safety belt): a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness: straps which may be secured about the employee 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.

Competent Person/Individual: one who is capable of identifying existing and predictable hazards in the work environment and who has the responsibility to inspect fall protection systems for certification purposes. Persons/individuals are deemed competent through a combination of training and hands-on experience to possess knowledge about all aspects of the fall protection program and fall protection equipment.

Dangerous equipment: equipment (such as cooling towers, fuel storage tanks, silos, etc.) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

Deceleration device: any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance: the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

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

Guardrail system: a barrier erected to prevent employees from falling to lower levels.

Hole: a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other

walking/working surface.

Lanyard: a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or 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: a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Low-slope roof: a roof having a slope less than or equal to 4 in 12 (vertical to horizontal)

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.

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

Opening: a gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

Personal fall arrest system: a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited. Fall arrest systems are engineered to be compatible between the permanent system and the personal protective equipment. Interchanging the components is not permitted.

Personal fall restraint system: fall protection system, which prevents an employee from approaching a fall hazard through the use of a lanyard and body harness.

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

Qualified person: a person with a recognized degree or professional certificate AND with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, evaluating and specifying fall protection and rescue systems.

Roof: the exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily becomes the top surface of a building.

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

Safety-monitoring system: a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

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 employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Shock-absorbing lanyard: a lanyard with energy absorbing capacity

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. Snaphooks are generally one of two types:

- The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
- The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. As of January 1, 1998, the use of a non-locking snaphook as part of personal fall arrest systems and positioning device systems is prohibited.

Standard Railing: railing or safety railing system which meets the requirements for top rail, mid-rail, and toeboard specifications.

Toeboard: a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

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 guardrail system at least 39 inches (1.0 m) high.

Walking/working surface: any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and

concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

Warning line system: a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, or body belt, systems to protect employees in the area.

4.0 Fall Hazard Identification & Control Measures

It is the intent of this program is to ensure all fall hazards are appropriately addressed to protect workers from injury. All newly constructed buildings, building renovations as well as roof repair or replacement projects must comply with Federal OSHA, consensus industry standards and OSU Building Design Standards and provide safe work areas. The following addresses potential fall hazards and applicable control measures.

4.1 Unprotected sides and edges

4.1.1 Employees on a work surface with an unprotected side or edge which is 6 feet (1.8 meters) or more above a lower level shall be protected from falling by the use of a guardrail system, warning line system or personal fall arrest system.

4.1.1.1 If one of these systems is not available or is infeasible during leading edge work, a fall protection plan must be developed and implemented to protect workers from fall hazards. Refer to Appendix A for an example of a fall protection plan.

4.1.1.2 Hoist areas shall be protected by guardrail or personal fall arrest systems. If guardrail systems or portions of guardrail systems are removed to facilitate the hoisting process creating a potential fall hazard for the employee, that employee must be protected by a personal fall arrest system.

4.1.1.3 Unprotected sides and edges 4-6 feet above the lower level shall be protected by a guardrail system. Loading docks more than 4 feet above a lower level are not required to have a guardrail system on the working side of the dock where it can be demonstrated that the presence of guardrails would prevent the performance of work. All non-working sides of a loading dock must be protected by a guardrail system. Dock doors shall remain closed when not in use to minimize the fall hazard and all personnel working around loading docks shall be trained to recognize and avoid the applicable fall hazards.

4.2 Holes and excavations

4.2.1.1 Floor openings, holes, manholes, roof hatches, and skylights. Employees on a work surfaces where floor openings, holes, manholes, roof hatches and skylights present fall hazards of six feet or more shall be protected from falling by guardrail systems erected around the hole, covers over the openings, or by personal fall arrest systems.

4.2.1.1.1 Where covers are used as fall protection measures, they shall remain in place when not in use. If removed, the fall hazard must be attended by a designated employee who is protected by a removable guardrail system.

4.2.1.1.2 Where skylights are in place, their design must meet applicable building codes and OSU Building Design Standards; and shall be of suitable strength to prevent a fall, protected by a guardrail system, or require the use of a personal fall arrest system.

4.2.1.2 Excavations. Employees working at the edge of an excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences or barricades. This includes trenches, wells, pits, shafts or other similar excavations.

4.2.1.2.1 Excavations where the public may be exposed shall be addressed as required by OSU Building Design Standards to not create potential fall hazards.

4.3 Dangerous equipment

4.3.1.1 Employees less than 6 feet above dangerous equipment shall be protected from falling into or onto the equipment by guardrail systems or equipment guards.

4.3.1.2 Employees 6 feet or more above dangerous equipment shall be protected from fall hazards by guardrail, personal fall arrest, or warning line systems.

4.4 Scaffolds, aerial lifts, and ladders

4.4.1.1 Fall hazards associated with scaffolds, aerial lifts and ladders are addressed in the OSU Aerial Lift and Elevated Work Platform Program. Fall hazards on scaffolds shall be addressed by the installation of a guardrail system. Fall arrest systems may also be warranted based on the type of work being conducted. Employees utilizing aerial lifts shall be protected from fall hazards according to the manufacturer's recommendations including guardrail systems, fall restraint systems, and fall arrest systems.

4.5 Building rooftops

4.5.1 All new construction or renovation/repair to existing roof systems shall incorporate engineered fall protection into the project design. This includes

guardrail (including parapets), personal fall arrest or fall restraint systems. Fall protection design shall be approved by a Professional Engineer as required by the OSU Building Design Standards.

4.5.1.1 On buildings where fall restraint or fall protection is installed, only authorized personnel may perform work. Fall protection system inspections and personnel training are addressed in sections 7 and 8 of this program.

4.5.1.2 Equipment designed and engineered for use as a fall protection system on a rooftop may not be interchanged with other fall protection systems. Including fall restraint systems and personal protective equipment.

4.5.2 On buildings where no rooftop fall protection is provided by a permanent guardrail system (including parapets) or fall arrest/restraint system, the supervisor must create a fall protection plan, based on the work being done, prior to employees accessing a rooftop. This may include the use of a warning line system, temporary guardrail and/or a safety monitoring system (see section 5).

5.0 Fall Protection System Type & Use

Fall protection systems incorporated into building or facility design shall meet all applicable standards including, but not limited to, ANSI A10.32-2004 Fall protection systems for construction and demolition operations; ANSI Z359 Fall Protection Code; OSHA 29 CFR Part 1910 Subpart D-Walking and working surfaces; OSHA 29 CFR 1910 Subpart I-Personal protective equipment; OSHA 29 CFR 1926 Subpart M-Fall protection; The Ohio State University Building Design Standards for Associate Architects and Engineers.

Choosing fall protection systems. The hierarchy of controls, or preferred order of controls, shall be used to choose methods to eliminate or control fall hazards.

- Conventional fall protection systems. Conventional fall protection systems provide the greatest protection against fall hazards and should be considered a priority when addressing employee protection.
 1. Standard guardrail system
 2. Fall restraint system
 3. Personal fall arrest system
- Specialized fall protection systems. If conventional fall protection systems are not practical or feasible, the use of a specialized fall protection system including a warning line system or safety monitoring system must be utilized to protect employees from fall hazards.
 1. Warning line system
 2. Safety monitoring system

Conventional fall protection systems:

5.1 Guardrail systems. Installed and temporary guardrail systems shall comply with OSHA 29 CFR 1190.23-Guarding floor and wall openings and holes. Guardrail systems installed during construction projects and activities shall comply with OSHA 29 CFR 1926.502-Fall protection systems criteria and practices. Guardrail systems provide a barrier to prevent employees from falling to lower levels, and which designates an area in which work may take place without the use of additional fall protection PPE.

- 5.1.1 Where guardrail systems are in place as a fall protection measure, the railing shall have a vertical height of 42 inches (+/-3 inches) measured from the upper surface of the top rail to the working surface and consist of a top rail, intermediate rail, and posts.

- 5.1.1.1 The intermediate rail shall be approximately halfway between the top rail and the working surface.
- 5.1.1.2 Guardrail systems must be capable of withstanding, without failure, a force of at least 200 pounds in any direction. Refer to Table 1 for material specifications for guardrail systems.
 - 5.1.1.2.1 When 200 pounds of force is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches above the working surface.
- 5.1.1.3 Stair railings shall be not more than 34 inches or less than 30 inches from the upper surface of the top rail to the forward edge of the tread surface.
- 5.1.1.4 A standard toeboard shall be provided on all guardrail systems where persons can pass under the work surface; there is moving machinery; and/or equipment utilized on the elevated surface with which falling equipment creates a hazard. Toeboards shall be 4 inches nominal in vertical height and securely fastened in place with not more than ¼ inch clearance above the working surface. Where material is stored near the guardrail system, at heights exceeding the toeboard, paneling from the work surface to the intermediate rail shall be provided.
- 5.1.1.5 Engineered guardrail systems may be utilized provided they meet these requirements and are installed as per the manufacturer's specifications.

Table 1: Guardrail system specifications

Material of construction	Post requirements	Top rail requirements	Intermediate rail requirements	Additional requirements
Wood	2-inch by 4-inch stock spaced 6 feet apart	2-inch by 4-inch stock	2-inch by 4-inch stock	If top rail is two right angle pieces of 1"x4", posts may be spaced 8 feet on center.
Pipe	1 ½ inches nominal diameter spaced not more than 8 feet on center	1 ½ inches nominal	1 ½ inches nominal	
Structural Steel	2"x2"x3/8" angles spaced not more than 8 feet on center	2"x2"x3/8" angles	2"x2"x3/8" angles	
Other	Provide strength to top rail to support 200 pounds applied in any direction	Smooth surface at a height 42-inches above the work surface, capable of withstanding 200 pounds top rail pressure	Protection between top rail and floor equivalent to that afforded by standard intermediate rails	

5.1.2 Portable guardrail systems may be utilized as a fall protection measures provided they meet the OSHA and ANSI guardrail specification requirements.

5.2 Fall restraint systems. These systems are typically installed on aerial lifts and boom lifts. Refer to the appropriate regulations and OSU programs for additional information on fall restraint systems and aerial lifts. Fall restraint systems may also be utilized on elevated work surfaces as a preventative measure against fall hazards or as a positioning device system. These systems prevent an employee from approaching a fall hazard through the use of a lanyard and body harness.

5.2.1 The restraint lanyard must be short enough to prevent a fall from occurring; be protected against cutting and abrasion; and attach the body harness directly to the anchor point independently of any other lines.

5.2.2 When used as a positioning device system, the lanyard length shall be rigged such that an employee cannot free fall more than 2 feet.

5.2.3 Full body harness or belt use is required when utilizing fall restraint systems.

- 5.2.4 Anchor points must be capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.
 - 5.2.5 All components of the fall restraint system including connectors, dee-rings, snaphooks, lanyards and body harnesses/belts shall meet all applicable ANSI and OSHA requirements.
 - 5.2.6 Fall protection equipment shall not be used to hoist equipment or tools to an elevated work surface. This includes window washing equipment.
 - 5.2.7 Fall protection equipment including restraint lanyards and body harnesses should be stored in a well-ventilated, clean, dry area free from temperature and humidity extremes, corrosive materials or other contaminants. Newly installed fall protection systems require storage of equipment be in a lockable, ventilated metal cabinet, as per OSU Building Design Standards.
- 5.3 Fall arrest system. These systems are employed to prevent injury to employees if a fall from an elevated work surface occurs. The use of a fall arrest system requires a body harness system to be worn by the employee. Body belts are not permitted to be used with fall arrest systems. Fall arrest systems shall be engineered and constructed to prevent employees from reaching the work surface below if a fall occurs.
- 5.3.1 All components of a fall arrest system including connectors, dee-rings, snaphooks, lanyards, body harnesses, life lines, ropes and straps shall be designed and engineered for use with a fall arrest system and meet all applicable ANSI and OSHA requirements.
 - 5.3.2 Employees utilizing personal fall arrest systems shall not perform work alone.
 - 5.3.3 Life line systems used as a component of a fall arrest system shall be designed, installed and used under the supervision of a qualified person as part of a fall protection program.
 - 5.3.3.1 Life lines shall be protected from cutting and abrasion.
 - 5.3.3.2 Life lines or other components of a fall arrest system should not be attached to guardrail systems, ladders, scaffolding components, building fixtures, conduit or plumbing, other lanyards, roof stacks/vents/pipes or other unauthorized anchor points.
 - 5.3.4 Anchor points used for attachment of fall arrest equipment shall be independent of any other anchor point and capable of supporting at least 5,000 pounds per employee attached.

5.3.5 When stopping a fall, personal fall arrest systems shall:

5.3.5.1 Limit maximum arresting force on an employee to 1,800 pounds

5.3.5.2 Ensure employees can neither free fall more than 6 feet or contact any lower level as a result of a fall.

5.3.5.3 Bring an employee to a complete stop and limit maximum deceleration distance to 3.5 feet.

5.3.5.4 Be capable of withstanding twice the potential impact energy of an employee falling a distance of 6-feet or the fall distance permitted by the system, whichever is less.

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

5.3.7 Fall arrest systems are to only be used as personal protective equipment and not to hoist equipment or tools to elevated work surfaces.

5.3.8 Fall protection equipment including restraint lanyards and body harnesses should be stored in a clean, dry area free from temperature and humidity extremes, corrosive materials or other contaminants.

Specialized fall protection systems:

5.4 Warning line system. Warning line systems are typically composed of a physical barrier located near an unprotected side or edge to warn employees they are approaching a fall hazard area. Warning line system use is restricted to low slope roof top work and shall be used in conjunction with a safety monitoring system at a minimum. These systems may also utilize a guardrail or personal fall arrest system to minimize/eliminate the fall hazard.

5.4.1 Warning line systems shall be erected around all open sides of the roof work area not less than 6 feet from the roof edge.

5.4.1.1 If mechanical equipment is being utilized on the roof top, the warning line shall be not less than 6 feet from the roof edge parallel to the direction of equipment operation, and not less than 10 feet from the roof edge perpendicular to the direction of the equipment operation.

5.4.2 Points of access, material handling areas, storage areas and hoisting areas shall be clearly delineated and connected to the work area by an access path formed by two warning lines.

5.4.2.1 When the path or point of access is not in use; a rope, wire, chain or other barricade equivalent in strength and height to the warning line shall be placed across the path.

5.4.3 Warning lines shall consist of ropes, wires or chains and supported by stanchions.

5.4.3.1 The line shall be flagged every 6 feet with high visibility flags.

5.4.3.2 The line shall be supported to ensure the lowest point is not less than 34 inches above the work surface; and not more than 39 inches at its highest point.

5.4.3.3 The warning line system, once erected, must be capable of withstanding a force of at least 16 pounds applied horizontally against the stanchion; and the rope, chain or wire shall have a minimum tensile strength of 500 pounds.

5.4.3.4 The line shall be attached at each stanchion in such a way that pulling on one section of the line will not result in slack being taken up in adjacent sections.

5.4.4 Employees are not permitted to enter the area between the roof edge and warning line unless work is being conducted on that portion of the roof and adequate fall protection measures are in place.

5.5 Safety monitoring system. A safety monitoring system relies on a competent person to monitor the work area and ensure employees are aware of fall hazards as they are working. This system may only be utilized on a low-slope roof and should be considered a last resort for protecting employees from fall hazards.

5.5.1 A competent person must be designated prior to work taking place on a roof top. The competent person, or their designee who has received adequate training and possesses sufficient knowledge, will act as a safety monitor during work and shall:

5.5.1.1 Be competent to recognize fall hazards;

5.5.1.2 Warn the employee when it appears they are unaware of a fall hazard or are acting in an unsafe manner;

5.5.1.3 Be on the same working surface and within visual distance of the employees performing work;

5.5.1.4 Be close enough to communicate verbally with the employees;

5.5.1.5 Ensure no unauthorized personnel access the work area;

5.5.1.6 Have no other responsibilities which may distract them while performing safety monitoring duties.

5.5.1.7 Have the responsibility to order work stoppage and personnel removal from elevated work areas in the event of dangerous, hazardous, or life threatening circumstances.

5.5.2 Mechanical equipment shall not be utilized where a safety monitoring system is being used as the fall protection method. Additional fall protection measures are required in these situations such as guardrail systems, fall restraint systems, fall arrest systems or warning line systems.

6.0 Protection from falling objects

When elevated work is taking place and there is the potential for falling objects to create a hazard to persons on lower levels to an elevated work surface, precaution must be taken to ensure injuries do not occur.

6.1 Where the work site is restricted to employees and the public is not allowed access, and the employees are exposed to falling object hazards one of the following precautions should be implemented.

- 6.1.1 Employees shall wear a hard hat at all times;
- 6.1.2 Toeboards, screens or guardrail systems are placed on the elevated work surface to prevent objects from falling;
- 6.1.3 A canopy structure is erected to keep potential fall objects far enough from the edge or the elevated work surface so as not to create a fall hazard;
- 6.1.4 The area to which objects can fall is barricaded and access to the area is not authorized any time work is being done on an elevated work surface.

6.2 When the elevated work area creates a potential fall hazards where the public may be exposed to falling object hazards one of the following precautions should be implemented.

- 6.2.1 Redirect public traffic through a barrier system to ensure they do not enter areas where falling object hazards exist;
- 6.2.2 Erect a structure capable of withstanding impact from a fallen object under which the public may travel.

7.0 Training

Training shall be provided to all employees performing work on an elevated work surface or who may be exposed to a fall hazard. The training program should enable employees to recognize fall hazards and provide the requirements to be followed to minimize these hazards. Training must be completed and documented prior to employees working in areas where fall hazards exist.

7.1 Competent person training (16-hour) must be completed by all employees designated by their employees to become a competent person and must cover the following topics

7.1.1 Fall protection definitions and responsibilities; fall protection standards; harness fitting; inspection, maintenance and storage of fall protection equipment; citations and penalties; types of fall protection systems; testing; rescue operations.

7.2 Employees exposed to fall hazards as part of their job duties shall be trained in the following areas by a competent person to become an authorized person;

7.2.1 The nature of fall hazards in the work area;

7.2.2 Procedures for erecting, maintaining, disassembling and inspecting fall protection systems being utilized;

7.2.3 The use and operation of guardrail systems, fall restraint systems, personal fall arrest systems, warning line systems, safety monitoring systems, and other protection to be used;

7.2.4 The role of each employee in the safety monitoring program, if being incorporated into the fall protection program for the work to be performed;

7.2.5 Limitations on the use of mechanical equipment during roof work on low-sloped roof tops;

7.2.6 Procedures for handling and storage of equipment and materials and the erection of overhead protection;

7.2.7 The employee's role in the fall protection program;

7.2.8 The applicable standards and regulations affecting the work to be performed;

7.2.9 Limitations of fall protection equipment;

7.2.10 Personal protective equipment specific to fall protection including use, inspection, care and storage requirements;

7.3 Employees must demonstrate competency on the proper use of fall protection systems and understanding of this fall protection program.

7.4 In addition to the requirements in 7.1, competent individuals shall be trained specifically for the fall protection systems under their responsibilities.

7.4.1 Training shall address inspection and maintenance needs.

7.5 A written certificate of training shall be maintained for all employees exposed to fall hazards. The certificate must include the employee name, date of training, and signature of trainer or employee.

7.5.1 The supervisor must maintain the latest certification for all their employees.

7.6 Retraining shall be completed when the following occur:

7.6.1 Authorized persons shall complete annual refresher training.

7.6.2 It is suspected that any affected employee who has already received training is no longer competent in the fall protection program;

7.6.3 Changes in the workplace render the current training insufficient;

7.6.4 Changes in the types of fall protection systems in place.

7.7 Installations of new fall protection systems are installed on OSU buildings require retraining of the competent individuals by the installing fall protection company or their representative.

8.0 Maintenance & Inspection

It is the responsibility of the OSU working unit to maintain all fall protection systems in place on OSU buildings. This can be accomplished through assigning a competent person who has completed all relevant training or utilizing contractors known to perform these operations.

8.1 Fall protection systems permanently installed on OSU buildings.

8.1.1 Systems must be certified by a qualified person (professional engineer) upon completion of installation. Re-certification must be completed every 10 years or as required by the manufacturer and if the system has been placed under tension as a result of a fall incident. Re-certification must be performed by a qualified person who is certified through the manufacturer of the specific fall protection system to perform such inspections.

8.1.2 Fall protection systems must be inspected annually by a competent individual. Annual inspections should address all components of a fall protection system including, but not limited to, anchor points, lifelines, structural components, and personal protective equipment. Any deficiencies identified during the inspection or certification process must be addressed prior to the fall protection system being used by an employee.

8.1.3 Additional inspection requirements may be required by the equipment manufacturer. Adhere to all manufacturer recommendations when performing annual inspections. Refer to Section 9.0 Recordkeeping, for maintenance of inspection records.

8.2 Fall protection equipment including life lines, lanyards, body belts/harnesses, snaphooks and dee-rings shall be inspected prior to each use by the user. Defective equipment shall be taken out of service and rendered not useable. Refer to Appendix A for a sample inspection checklist.

8.3 If an employee is involved in an accident where a fall from an elevated work surface occurs, the fall protection equipment must be inspected by a competent person to determine if it is suitable for reuse or must be discarded. Harnesses and lanyards involved in a fall incident may not be placed back into service.

8.4 Temporary fall protection equipment such as warning lines shall be inspected upon erection by a competent individual. If the system is placed under tension as a result of an accident or near miss, the system should be re-inspected to ensure it meets all applicable requirements.

8.5 Guardrail systems or parapets should be visually inspected prior to work on an elevated surface. Any deterioration or deficiencies noted, which may cause the fall protection system to fail should be addressed prior to work commencing.

9.0 Recordkeeping

It is the responsibility of each OSU working unit to maintain applicable records for employees and fall protection systems.

9.1 Employee training must be maintained for all employees exposed to fall hazards.

9.2 All inspection and certification records must be maintained for fall protection systems and PPE.

9.3 An inventory of all fall protection systems on working unit buildings should be maintained.

9.3.1 Information to be included in fall protection system tracking includes the following:

9.3.1.1 Building name

9.3.1.2 Building number

9.3.1.3 Status

9.3.1.3.1 Installed complete roof

9.3.1.3.2 Partial roof protection

9.3.1.3.3 In progress

9.3.1.3.4 Certified

9.3.1.4 Type of design/system

9.3.1.5 Year installed

9.3.1.6 Latest annual inspection date

9.3.1.7 Latest qualified person certification date

9.3.1.8 Equipment manufacturer

9.3.1.9 Competent person

9.4 Written fall protection procedures should be developed for specific operations being conducted within the OSU working unit to address measures taken to eliminate fall hazards.

9.5 Written rescue operations must be developed by the competent person for each system or project where fall hazards exist.

9.6 Fall protection PPE lockers must be maintained with the following:

- 9.6.1 Equipment inspection checklist (refer to Appendix A for a sample of an equipment inspection checklist)
- 9.6.2 Schematic of the fall protection system to include (refer to Appendix B for a sample fall protection system schematic):
 - 9.6.2.1 Location of PPE
 - 9.6.2.2 Map/layout of system components
 - 9.6.2.3 Exit/entry points
- 9.6.3 Rescue operations

10.0 Rescue Operations

When a personal fall arrest system is utilized as a fall protection measure, the competent person must develop written rescue operations to ensure employees can be safely rescued from the fall.

10.1 Rescue operations can be accomplished in a variety of ways. Specific operations should be developed based on the job being performed to ensure the safest method of rescue is employed.

10.2 Employees utilizing personal fall protection systems as a fall protection method shall be provided with at least one other designated employee to monitor ongoing operations and have sufficient means to communicate in the event of a fall.

11.0 Contractors

Contractors performing work on OSU buildings equipped with fall protection systems must be fully trained prior to conducting work and must comply with the fall protection system standards.

Contractors performing work as part of a construction project where fall hazards exist must develop and implement a fall protection program to protect contract employees from fall hazards. Contractors are responsible for supplying and maintaining their equipment as required by OSHA and ANSI regulations and standards.

Appendix A: Sample PPE Inspection Checklist

FALL PROTECTION EQUIPMENT INSPECTION CHECKLIST & LOG

Inspection date: _____		Inspector: _____		Contact: _____	
Equipment Inspected: <input type="checkbox"/> full body harness <input type="checkbox"/> lanyard <input type="checkbox"/> vertical life line <input type="checkbox"/> rope grab					
Issued to: _____		Date of issue: _____			
If the equipment below has arrested a fall the harness and lanyard must be retired and destroyed. Retractable must be inspected before being used again for fall protection.					
Harness Info		Rope Grab Info		Lanyard Info	
Make: _____		Make: _____		Make: _____	
Model: _____		Model: _____		Type: <input type="checkbox"/> Single <input type="checkbox"/> Double	
Serial Number: _____		Serial Number: _____		Length: _____	
Manufacture Date: _____		Lifeline size (dia): _____		Shock Absorber: <input type="checkbox"/> Y <input type="checkbox"/> N	
Lot Number: _____					
Inspect the Following		Full body harness		Rope Grab	
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	
Hardware (includes snap hooks, carabiners, adjusters, keepers, thimbles, and D-rings)		Notes: _____		Notes: _____	
Look for distortion, sharp edges, burrs, cracks, corrosion and proper operation					
Webbing					
		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	
Inspect for cuts, burns, tears, abrasion frays, excessive soiling, written on, and discoloration		Notes: _____		Notes: _____	
Note: Writing on webbing, unauthorized modifications, partial deployment of shock absorber					
Stitching					
		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	
Inspect for pulled or cut stitches		Notes: _____		Notes: _____	
Labels/Equipment information					
		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	
Inspect to ensure all labels are present and held securely in place, all text is legible, directional indicator is visible		Notes: _____		Notes: _____	
Mechanical components					
Locking mechanism functioning, all connectors present and functioning, gates open/close, system operates as designed		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	
		Notes: _____		Notes: _____	
Ropes (includes slings, life lines and lanyards)					
		<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	
Inspect for broken threads, loose eye connections, excessive abrasions, crushing, stretching		Notes: _____		Notes: _____	
Overall Assessment		<input type="checkbox"/> OK <input type="checkbox"/> Retire		<input type="checkbox"/> OK <input type="checkbox"/> Repair	
Notes: _____					

INSPECTOR'S SIGNATURE _____

SUPERVISOR'S NAME & SIGNATURE _____

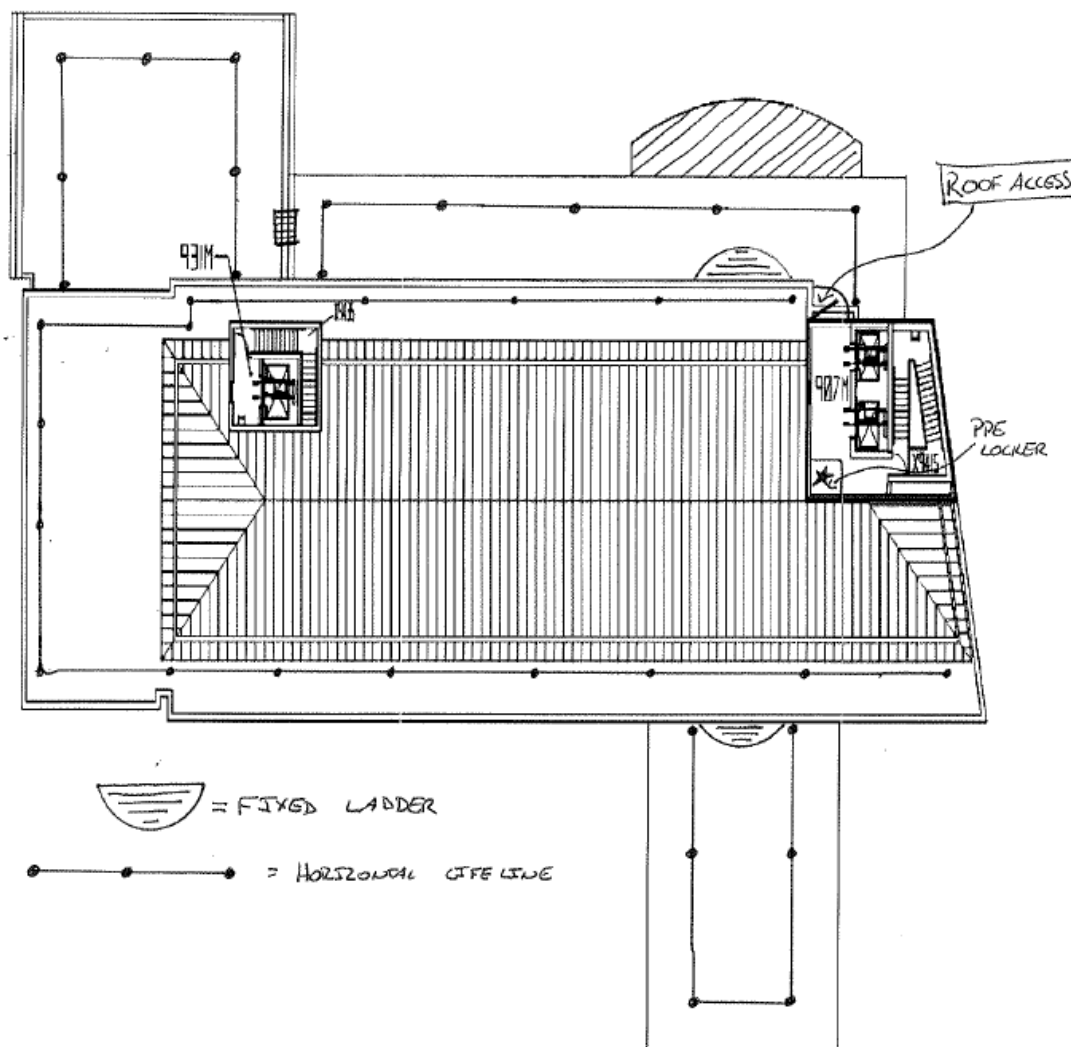
Appendix B: Sample Fall Protection System Schematic

Campus Building Roof

1234 OSU Way

Building #: 1

Last Revised: 2011




Rescue Operations:

Required to have on hand: Scissor lift able to reach 20 feet; communication to call 9-1-1 for medical treatment;

In the event of a fall, call 9-1-1 and attempt rescue with available scissor lift.

Appendix C – Fall Protection Checklist

 Facilities Operations and Development		Fall Protection Information & Checklist
<p>The following is a brief description of the requirements for fall protection in construction workplaces set forth by OSHA. The standards are contained in 29 CFR 1926 Subpart M, "Construction Industry Standards."</p>		
<p>Fall Protection Categories</p>		
<p>All fall protection products fit into four functional categories:</p>		
<ol style="list-style-type: none"> Fall Arrest: A fall arrest system is required if any risk exists that a worker may fall from an elevated position. As a general rule, the fall arrest system should be used anytime a working height of 6 feet or more is reached. Working height is the distance from the walking/working surface to a grade or lower level. A fall arrest system will come into service only if a fall occurs. A full-body harness with a shock-absorbing lanyard or a retractable lifeline is the only product recommended. A full-body harness distributes the forces throughout the body, and the shock-absorbing lanyard decreases the total fall-arresting forces. Positioning: This system holds the worker in place while keeping his/her hands free to work. Whenever the worker leans back, the system is activated. However, the personal positioning system is <u>not</u> specifically designed for fall arrest purposes. Suspension: This equipment lowers and supports the worker while allowing a hands-free work environment and is widely used in window-washing and painting industries. This suspension system components are not designed to arrest a free fall. A backup fall arrest system should be used in conjunction with the suspension system. Retrieval: Preplanning for retrieval in the event of a fall should be taken into consideration when developing a proactive fall management program. 		
<p>Fall Protection Systems</p>		
<p>Listed below are different types of fall safety equipment and their recommended usage.</p>		
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 fall potential exists. They are for positioning only.	
Class 2	Chest harnesses are used when there are only limited fall hazards (no vertical free-fall hazard) or for retrieving people, such as removing people 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.	
Rope Lanyard	Offers some elastic properties for all arrest. They are used for restraint purposes.	
Web Lanyard	Ideal for restraint purposes where fall hazards are less than 2 feet.	
Cable Positioning Lanyards	Designed for corrosive or excess heat environments, they 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.	

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Rope Grabs	A deceleration device that 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	Gives fall protection and mobility to the user when working at heights or in areas where there is a danger of falling.
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 and curved surfaces as a reliable method of fall prevention.

Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. An employee who uses a body belt as a personal fall arrest system is exposed to hazards, such as falling out of the belt, serious internal injuries, and technical asphyxiation through prolonged suspension. Note that the use of a body belt in a positioning device system is acceptable and is regulated at 29 CFR 1926.502(e).

Inspection and Maintenance

To maintain their service life and high performance, all belts and harnesses should be inspected frequently. Visual inspection before each use should and routine inspections by a competent person should become routine. If any of the conditions listed below are found, the equipment should be replaced before being used.

Harness Inspection

- ☐ **Belts and Rings:** For harness inspections, begin at one end, hold the body side of the belt toward you, grasping the belt with your hands 6-8 inches apart. Bend the belt in an inverted "U." Watch for frayed edges, broken fibers, pulled stitches, cuts, or chemical damage. Check D-rings and D-ring metal wear pads for distortion, cracks, breaks, and rough or sharp edges. The D-ring bar should be at a 90° angle with the long axis of the belt and should pivot freely.
- ☐ Attachments of buckles and D-rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles. Rivets should be tight and unremovable with fingers. The body side rivet base and outside rivets should be flat against the material. Bent rivets will fail under stress.
- ☐ Inspect frayed or broken strands. Broken webbing strands generally appear as tufts on the webbing surface. Any broken, cut, or burned stitches readily will be seen.
- ☐ **Tongue Buckle:** Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Rollers should turn freely on the frame. Check for distortion or sharp edges.
- ☐ **Friction Buckle:** Inspect the buckle for distortion. The outer bar or center bars must be straight. Pay special attention to corners and attachment points of the center bar.

Lanyard Inspection

- ☐ When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so the entire circumference is checked.
- Spliced ends require particular attention. Examine hardware under procedures detailed below.


Hardware

- ☐ **Snap:** Inspect closely for hook and eye distortion, cracks, corrosion, or pitted surfaces. The keeper or 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 rocks must provide the keeper from opening when the keeper closes.
- ☐ **Thimbles:** The thimble (protective plastic sleeve) 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 should be free of sharp edges, distortion, or cracks.

Lanyards

- ☐ **Steel Lanyards:** While rotating a steel lanyard, watch for cuts, frayed areas, or unusual wear patterns on the wire. The use of steel lanyards for fall protection without a shock-absorbing device is not recommended.
- ☐ **Web Lanyard:** While bending webbing over a piece of pipe, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Because of the limited elasticity of the web lanyard, fall protection without the use of a shock absorber is not recommended.
- ☐ **Rope Lanyard:** Rotation of the rope lanyard while inspecting from end to end will bring to light 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. When a rope lanyard is used for fall protection, a shock-absorbing system should be included.
- ☐ **Shock-Absorbing Packs:** The outer portion of the shock-absorbing pack should be examined for burn holes and tears. Stitching on areas where the pack is sewn to the D-ring, belt, or lanyard should be examined for loose strands, rips, and deterioration.

Visual Indication of Damage to Webbing and Rope Lanyards

- ☐ **Heat:** In excessive heat, nylon becomes brittle and has a shriveled brownish appearance. Fibers will break when flexed and should not be used above 180°F.
- ☐ **Chemical:** Change in color usually appears as a brownish smear or smudge. Transverse cracks appear when belt is bent over tightly. This causes a loss of elasticity in the belt.
- ☐ **Ultraviolet Rays:** Do not store webbing and rope lanyards in direct sunlight, because ultraviolet rays can reduce the strength of some material.
- ☐ **Molten Metal or Flame:** Webbing and rope strands may be fused together by molten metal or flame. Watch for hard, shiny spots or a hard and brittle feel. Webbing will not support combustion; nylon will.
- ☐ **Paint and Solvents:** Paint will penetrate and dry, restricting movements of fibers. Drying agents and solvents in some paints will appear as chemical damage.
- ☐ **Cleaning of Equipment:** Basic care for fall protection safety equipment will prolong and endure the life of the equipment and contribute toward the performance of its vital safety function. Proper storage and



Fall Protection Information & Checklist

maintenance after use is as important as cleaning the equipment of dirt, corrosives, or contaminants. The storage area should be clean, dry, and free of exposure to fumes or corrosive elements.

- ☐ Nylon and Polyester: Wipe off 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 the belt dry with a clean cloth. Hang freely to dry but away from excessive heat.

- ☐ Drying: Harness, belts, and other equipment should be dried thoroughly without exposure to heat, steam, or long periods of sunlight.