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FALL PROTECTION PROGRAM

1910 / 1926 OSHA Fall Protection

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Table of Contents

Environmental Health & Safety Office
P.O. Box 8795
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Purpose

The purpose of this program is to ensure that William & Mary employees can identify and control fall hazards to protect themselves against those hazards. This is accomplished by establishing guidelines and requirements that university supervisors and employees must uphold. There are various hazards associated with fall protection, and this program has been developed to assist in mitigating those hazards.

Standards

OSHA 29 CFR 1910 – General Industry Standards

- 1910.22 General Requirements
- 1910.23 Ladders
- 1910.27 Scaffolds and rope decent systems
- 1910.67 Vehicle-mounted elevating and rotating work platforms (Aerial lifts)
- 1910.269 Electric power generation, transmission, and distribution OSHA 29 CFR 1926 – Construction Standards

OSHA 29 CFR 1926-Construction

- 1926.451 General requirements (Scaffolding)
- 1926.501 Duty to have fall protection
- 1926.1052 Stairways
- 1926.1053 Ladders

Responsibilities

Environmental Health & Safety (EH&S)

EH&S has the primary responsibility for the implementation and enforcement of the Fall Protection Program (FPP) and is responsible for the following:

- Developing, implementing, and evaluating the Fall Protection Program to ensure compliance.
- Providing supervisors with a list of approved fall protection equipment
- Reviewing hazards and incidents associated with fall protection equipment.
- Assisting supervisors with employee training.
- Providing technical assistance when concerns or hazards are reported.

Supervisors

Supervisors are responsible for providing the necessary direction and support to ensure the effective implementation of the Fall Protection Program for their work areas. Supervisors are responsible for the following:

- Comply with all Fall Protection Program procedures.
- Identify all fall hazards and activities in their workplace and implement preventative measures for these hazards.
- Ensure all affected employees attend and complete the required training prior to encountering fall hazards.
- Ensure that all personal fall arrest or restraint systems are maintained in accordance with the

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

manufacturer's specifications.

- Ensure employees are using all fall protective equipment in accordance with OSHA regulations.
- Consult with EH&S when specific questions or concerns arise related to this plan.
- Notify management of unsafe or uncorrected hazardous conditions.

Employees

Affected employees are responsible for the following:

- Comply with all Fall Protection Program procedures.
- Maintain all Personal Protective Equipment (PPE) required to work at heights.
- Inspect all fall protection equipment prior to use.
- Attend and complete all training requirements.
- Immediately report all damaged or defective fall protection equipment to the supervisor
- Use all fall protection equipment in accordance with OSHA regulations.
- Report unsafe conditions, near misses and falls to the supervisor.

Competent Person for Annual Harness Inspections

- Maintain all required certifications for annual fall protection harness inspections.
- Complete and document annual fall protection harness inspections.

Contractors

Contractors performing work on state property shall follow all OSHA guidelines for fall protection as applicable in 29 CFR 1926.500

Fall Protection Requirements

All employees will be protected from falling when working on a surface that has an unprotected side, edge, etc. or elevated work platforms at a height of 4 feet or more above an adjacent lower level.

In each of these requirements, the fall hazards must be evaluated to determine the preferable method to protect the employee. Fall protection methods should follow the hierarchy of control for choosing the most effective control method. In order form most to least effective fall protection methods include:

- Elimination of the fall hazard by bringing the work down to ground level
- Use of passive fall protection systems such as guard rails
- Fall restraint to prevent a person reaching a fall hazard.
- Fall arrest which utilizes equipment to stop a fall after it occurs.
- Use administrative controls which use work practices to signal or warn an employee of a fall hazard.

The following are identified general industry fall hazards:

Loading Docks

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P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

Loading docks and other open sided floors greater than 4 feet above the ground must be protected. The approved method of protection is the installation of a standard guardrail system. The guardrail may have removable sections to provide access for loading but rails must remain in place when access is not required.

Floor and Wall Openings and Holes

For stairway openings, standard railings shall be provided on all exposed sides except at the stairway entrance. Where an employee can accidentally walk into a floor hole opening measuring 12 inches but more than 1 inch in its least dimension, shall be guarded by either a standard railing with toe board, or a floor hole cover of strength and construction to support required load. A wall opening of 4 feet or more above an adjacent surface shall be guarded.

Open Sided Floors or Platforms

An open sided floor or platform or a runway that is 4 feet or more above the ground level or above the adjacent floor shall be guarded by a standard railing on all open sides except for the entrance (to a ramp, stairway, or ladder). If equipment or materials could fall and create a hazard, then the railing system must include a toe board on each side.

Skylights

Skylights are considered an opening when present on a roof. A standard guardrail or skylight screen capable of supporting at least 200 pounds must be provided around the opening to prevent employees from falling through to the surface below.

Open Pits, Tanks, or Spillways

Protect employees from hazards of open pits, tanks, and spillways by using covers and/or guardrails.

Aerial Lifts and Self-Powered Work Platforms

Body harnesses must be worn with a lanyard, not to exceed 3 feet in length, or a self-retracting lifeline when working from all elevated mobile work platforms. The point of attachment must be the anchor point of installation and designated by the equipment manufacturer.

Scissor lifts and telescoping lifts that can only move vertically do not require the use of a harness and lanyard as long as the work platform is protected by a proper guardrail system and occupants do not stand on or above guardrail system.

An employee cannot move an aerial lift while the boom is in an elevated working position and the operator is inside of the lift platform.

Covers

Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

All other covers shall be 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.

All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.

Dangerous Equipment

Each employee less than 4 feet above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

Each employee 4 feet or more above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

Excavations

Each employee at the edge of an excavation 4 feet or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier. Each employee at the edge of a well, pit, shaft, and similar excavation 4 feet or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

Holes, Hoist Areas and Hatchways

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 4 feet above lower levels by personal fall arrest systems, covers, or guardrail systems erected around these areas.

Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by placing covers over the holes.

Each employee on a walking/working surface shall be protected from objects falling through holes (including skylights) by placing covers over the holes.

Leading Edge

Each employee who is constructing a leading edge 4 feet or more above levels shall be protected from falling by guardrails systems, safety net systems, or fall arrest systems.

Each employee on a walking/working surface 4 feet or more above a lower level where leading edges are under construction, but who is not engaged in the leading-edge work, shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

Protection from Falling Objects

When an employee is exposed to falling objects, the supervisor shall have each employee wear a hard hat and shall implement one of the following measures:

- Erect toe boards, screens, or guardrail systems to prevent objects from falling from higher levels.

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

- Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced.
- Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

Roofing Work or Low-Slope Roofs

Each employee engaged in roofing activities on low-slope roofs, with unprotected sides and edges 4 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system, or warning line system and safety monitoring system. Or, on roofs 50 feet or less in width the use of a safety monitoring system alone is permitted.

Steep Roofs

Each employee on a steep roof with unprotected sides and edges 4 feet or more above lower levels shall be protected from falling by guardrail systems with toe boards, safety net systems, or personal fall arrest systems.

Unprotected Sides and Edges

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 4 feet or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

Wall Openings

Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 4 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface, shall be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.

Fall Protection Systems

One of the following systems shall be in place whenever an employee is exposed to a fall hazard:

Guardrail Systems

The use of guardrail systems is considered a passive method of fall protection and is the preferred method when fall hazards cannot be eliminated.

Guardrails are needed at the edge of work areas 4 feet or more in height to protect employees from falling. This includes the edge of excavations greater than six feet in depth. Guardrail systems need to meet the following criteria:

- Top rail is 42 inches, +/- 3 inches above the walking/working level

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

- Mid rail is located midway between the top rail and the walking/working level
- It is important to remember that the working level is that level where the work is being done. Someone working on a stepladder next to an edge may raise his/her working surface well above the walking surface.
- Both top and mid rails should be constructed of materials at least one-quarter inch in thickness or diameter. If wire rope is used for top rails, it needs to be flagged with a high-visibility material at least every 6 feet and can have no more than 3" of deflection.
- The top rail needs to withstand a force of 200 pounds when applied in any downward or outward direction.
- The mid rail needs to withstand a force of 150 pounds applied in any downward or outward direction.
- Toe boards are required for all guardrails on elevated walking or working platforms where employees working below are exposed to falling objects. Toe boards must be four inches in height and must be securely fastened.
- The system should be smooth to prevent punctures, lacerations or snagging of clothing.
- The ends of the top rail shouldn't overhang the terminal posts, except when such overhang does not present a projection hazard.
- When a hoisting area is needed, a chain, gate or removable guardrail section must be placed across the access opening when hoisting operations are not taking place.

Personal Fall Arrest Systems

When an employee is requiring the use of personal fall protection equipment they shall employ another employee to render assistance when and if required.

There are three main components to the personal fall arrest system. This includes the personal protective equipment the employee wears, the connecting devices, and the anchorage point. Prior to tying off to perform the work a means of rescue in the event of a fall must be immediately available. All personal fall arrest system components must meet the requirements of the ANSI Z359 Standards.

The system needs to meet the following criteria for each component:

Personal Protective Equipment

- Full body harnesses are required. The use of body belts is prohibited.
- The attachment point of the body harness is the center D-ring on the back.
- Employees must always tie off at or above the D ring of the harness except when using lanyards 3 feet or less in length.
- Harnesses or lanyards that have been subjected to an impact load shall be destroyed.
- Load testing shall not be performed on fall protection equipment.

Connecting devices

This device can be a rope or web lanyard, rope grab or retractable lifeline.

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

- Only auto-locking snap hook and carabiners may be used and must be ANZI approved.
- Horizontal lifelines will be designed by a qualified person and installed in accordance with the design requirements.
- Lanyards and vertical lifelines need a minimum breaking strength of 5,000 pounds.
- The length of a single lanyard shall not exceed six feet.
- The use of steel lanyards is prohibited.
- Lanyards may not be clipped back to itself (e.g. around an anchor point) unless specifically designed to do so.
- If vertical lifelines are used, each employee will be attached to a separate lifeline.
- Lifelines need to be protected against being cut or abraded.
- Connecting devices with leading edge protection must be used for when working near unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.

Anchorage

Secure anchor points are the most critical component when employees must use fall arrest equipment. University buildings may have existing structures (e.g., steel beams that may meet the criteria for a secure anchor point). Other work locations and assignments may require the installation of a temporary or permanent anchor. As a minimum, the following criteria must be considered for each type of anchor point:

- Structure must be sound and capable of withstanding a 5000 lb. static load.
- Structure/anchor must be easily accessible to avoid fall hazards during hook up.
- Direct tying off around sharp edged structures can reduce breaking strength by 70% therefore; chafing pads or abrasion resistant straps must be used around sharp edged structures to prevent cutting action against safety lanyards or lifelines.
- Structures used as anchor points must be at the worker's shoulder level or higher to limit free fall to 6 feet or less and prevent contact with any lower level (except when using a self-retracting lifeline or 3 foot lanyard).
- Choose structures for anchor points that will prevent swing fall hazards. Potentially dangerous "pendulum" like swing falls can result when a worker moves horizontally away from a fixed anchor point and falls. The arc of the swing produces as much energy as a vertical free fall and the hazard of swinging into an obstruction becomes a major factor. Raising the height of the anchor point can reduce the angle of the arc and the force of the swing. Horizontal lifelines can help maintain the attachment point overhead and limit the fall vertically. A qualified person must design a horizontal lifeline.

Permanent Anchor Requirements

In addition to all the criteria listed above, the following points must be addressed:

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

- Environmental factors and dissimilarity of materials can degrade exposed anchors.
- Compatibility of permanent anchors with employee's fall arrest equipment.
- Inclusion of permanent anchors into a Preventive Maintenance Program with scheduled annual re-certification.
    - Anchors that are not current on their annual inspection cannot be used for fall protection or fall restraint.
- Visibly label permanent anchors.
- Roof anchors must be immediately removed from service and re-certified if subjected to fall arrest forces.

Reusable Temporary Anchors

- Reusable temporary roof anchors must be installed and used following the manufacturer's installation guidelines.
- Roof anchors must be compatible with employee's fall arrest equipment.
- Roof anchors must be removed from service at the completion of the job and inspected prior to reuse following the manufacturer's inspection guidelines.
- Roof anchors must be immediately removed from service and disposed of if subjected to fall arrest forces.

Complete system

- If a fall occurs, the employee should not be able to free fall more than 6 feet nor contact a lower level.
- To ensure this, add the height of the worker, the lanyard length and an elongation length of 5.5 feet. Using this formula, a six-foot worker would require a tie-off point at least 15.5 feet above the next lower level.
- A personal fall arrest system that was subjected to an impact needs to be removed from service immediately.
- Personal fall arrest systems need to be inspected prior to each use and damaged or deteriorated components removed from service.
- Personal fall arrest systems should not be attached to guardrails or hoists.

Warning Line System

The warning line shall be erected around all sides of the roof work area.

When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet from the roof edge.

When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet from the roof edge which is perpendicular to the direction of mechanical equipment operation.

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

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

When the path to a 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 at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.

Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:

1. The rope, wire, or chain shall be flagged at not more than 6 foot intervals with high-visibility material.
2. The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches from the walking/working surface.
3. After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge.
4. The rope, wire, or chain shall have a minimum tensile strength of 500 pounds, and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions.
5. The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing roofing work in that area.

Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.

Inspection

The employee shall inspect the entire personal fall arrest system monthly and prior to every use. Inspection should follow manufacturer instructions.

The competent person will inspect the personal fall arrest system annually and shall follow the manufacturer's recommendations. Any components of a personal fall arrest system noted to be damaged shall be removed from service immediately.

Cleaning

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

Perform cleaning and storage according to manufacturer instructions. Webbing materials should be cleaned using water and a mild detergent solution. Wipe off hardware with a clean, dry cloth, and hang to air dry. Store equipment in a cool, dry, clean environment out of direct sunlight.

Storage of Fall Protection Equipment

Fall protection equipment must be appropriately stored to prevent damage or aging of material. It should be kept in a cool, dry place, away from extreme temperatures. Do not store equipment when wet.

Ladders

All ladders in use by employees will meet the following requirements:

- Only ladders made of synthetic materials shall be used where an electrical hazard exists.
- All ladders must be inspected daily before use.
- Ladders should be stored in such a way as to prevent damage from sagging, weather conditions, excessive heat, etc.
- If a ladder is found to be damaged and is deemed unsafe, it shall be tagged "DANGEROUS-DO NOT USE!", made inoperable, and disposed of.
- Ladders shall not be left unattended in the upright position and should be removed once the worker has descended the ladder.
- When setting up a portable ladder, be sure to set the ladder at the proper angle to the building (usually about 25% of the ladder's vertical height).
- Never lean a ladder against cables or wires of any type.
- Use the help of another worker to extend the ladder to the proper height and positioning.
- Be sure the locks are secure.
- When a climber is ascending the ladder, another worker should be used to stabilize the ladder by holding the sides and supporting the feet of the ladder.
- The climber should use the three-point method when climbing a ladder. This means that two hands and one foot or two feet and one hand should be in contact with the ladder at all times during the climb.
- Never carry tools up the ladder in one hand. Always use two hands to climb.
- Never climb a ladder from the side or underside.
- Never "walk" or "shift" a ladder while standing on it.

Training

Each employee who may be exposed to fall hazards must be trained to recognize the hazards and the procedures to follow to minimize the hazards. Employees must complete training every two years to be qualified for fall protection use. Training should consist of the following:

Environmental Health & Safety Office
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2146

- Review of OSHA requirements for fall protection.
- Fall hazards in the work area.
- Correct procedures for erecting, using, maintaining, disassembling, and inspecting the fall prevention and protection systems.
- The proper use and can of fall protection equipment.
- Limitations of fall protection equipment.
- Receiving emergency assistance.