

WILLIAM PATERSON UNIVERSITY
Physical Plant Operation
Fall Protection Procedure

Purpose

The purpose of the Physical Plant Operation Fall Protection Procedure is to protect Physical Plant personnel from the risks of injuries due to falls when working at elevated heights.

Procedure Statement

Managers who assign work activities to their faculty, staff or student members that are six feet or more above a lower level must use an appropriate Fall Protection System. Fall protection is necessary for extension ladders, aerial lifts, self powered platforms, suspended and supported scaffolds, etc. Assistance is available from the Office of Environmental Safety and Health to perform fall hazard analysis, recommend Fall Protection System options and coordinate personnel training on Fall Arrest Equipment.

Departmental Responsibility

1. Management is responsible for providing a safe workplace and working conditions for their faculty, staff and students. Managers must review work locations and activities to identify existing or potential fall hazards. Departments must also identify personnel that are exposed to fall hazards. Common work activities to be evaluated include, but are not limited to:
 - Roof maintenance and repairs (e.g., roof patching, repairing slates, repairing roof deck, pointing up chimneys, cleaning gutters, painting metal roofs)
 - Roof renovations (e.g., replacing roof materials, roof deck and gutters)
 - Building maintenance (e.g., window cleaning, painting)
 - Building heating, ventilation and air conditioning systems (e.g., access for installation, repairs, preventative maintenance and changing filters)
 - Lighting (e.g., auditoriums, stairwells, pools, stadium lights)
 - Scoreboards
 - Construction and renovations
 - Material storage
 - Production lighting (e.g., theatres)
 - Tree climbing
 - Utilities
 - Brick and masonry activities

2. Management must provide resources for personnel training and procurement of fall arrest equipment or other fall protection system necessary for working safely at elevated heights. Please refer to further information on Design and Installation Guidelines for Anchor Points in this program document.

3. Management must train faculty, staff or student members to recognize fall hazards specific to their work location or assigned work activities. Personnel must follow Fall Protection Safety Procedures established by the department to protect them from the risks of falls at elevated heights. Personnel who are assigned Fall Arrest Equipment must follow the equipment manufacturer's instructions in the proper use, care and inspection of their equipment. Personnel must also understand the equipment's limitations and when to remove the equipment from service.

FALL PROTECTION PROCEDURES

Definitions Applicable to These Procedures

Fall Protection System

Fall Protection Systems are designed to protect personnel from the risk of falls when working at elevated heights. Recognized systems include;

FALL PREVENTION - a structural design to limit a fall to the same level (e.g., guardrails, aerial lifts with work platforms)

FALL ARREST EQUIPMENT - an approved full body harness, shock absorbing lanyard or self retractable lifeline, locking snaphooks, and anchor points approved for a static load of 5000 pounds or engineered to meet a two or one safety factor.

Aerial Lift

Vehicle mounted elevating work platform (e.g., boom lifts, articulating telescoping boom lifts and scissor lifts)

OSHA

Occupational Safety and Health Administration

Supported Scaffold

One or more platforms supported by outrigger beams, brackets, poles, legs, uprights, posts frames or similar rigid support.

Suspended Scaffold

One or more platforms suspended by ropes or other non-rigid means from an overhead structure(s)

Competent Person

A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous to personnel and who has authorization to quickly correct the situation.

Qualified Person

A person with a recognized degree or professional certificate, (e.g., civil or mechanical engineering profession or Certified Safety Professional) and extensive knowledge and experience in this area, capable of doing design, analysis, evaluation and specifications.

Certification

ANSI (American National Standards Institute) defines certification as documentation that determines criteria meets the requirements of the standard through testing and proved analytical method (e.g., engineering calculations) or both, carried out under the supervision of a Qualified Person.

Purpose

The purpose of the Fall Protection Procedures is to instruct personnel on: (1) Fall Protection requirements and; (2) the Department's responsibility to train faculty, staff and student members exposed to the risk of falls on Fall Protection Systems established by the department, including their safety procedures to protect personnel from fall hazards. Assistance is available from the Office of Environmental Safety and Health to perform fall hazard analysis, recommend Fall Protection System options, audit fall protection programs, and coordinate personnel training on Fall Arrest Equipment.

Departmental Responsibility

1. Management must review work locations and activities to identify existing or potential fall hazards and identify personnel that may be exposed to fall hazards.
2. Employees that are six feet or more from a lower level must use an appropriate Fall Protection System.
3. Management must provide resources for personnel training and procurement of fall arrest equipment or other fall protection systems necessary for working safely at elevated heights.
4. Management must train faculty, staff or student members to: (1) recognize fall hazards specific to their work location or assigned work activities (2) follow established safety procedures to protect them from fall hazards and (3) use the selected Fall Protection System correctly.

Fall Protection Requirements

1. Climbing, standing on or working from equipment, pipes, ducts or other such areas is prohibited except for where the surface is designed for climbing or standing. Appropriate fall protection must be implemented when areas have been designed for climbing or standing and are elevated six feet or more from ground or a lower level.
2. **Aerial Lift** - Work activities that are performed with an aerial lift must be in conformance with **OSHA 29 CFR 1910.67 Vehicle Mounted Elevating and**

Rotating Work Platforms. Basic requirements include, but are not limited to:

- Initial training is required to operate aerial lifts.
 - Articulated and extensible boom platforms must have both platform (operator controls) and lower controls.
 - The Operator must test the controls each day to determine that the controls are in a safe working condition.
 - Body harnesses must be worn with a shock absorbing lanyard, (preferably not to exceed three feet in length). The point of attachment must be the aerial lift's boom or work platform. Personnel cannot attach lanyards to adjacent poles, structures or equipment while they are working from an aerial lift.
 - Personnel cannot move an aerial lift while the boom is in an elevated working position and the operator is inside of the life platform.
3. **Suspended Scaffolds** (swinging scaffolds) used to service buildings on a temporary basis must be in conformance with **Appendix D of OSHA 29 CFR 1910.66 Powered Platforms for Building Maintenance.**
4. **Supported and Suspended Scaffolding** for construction, renovation and maintenance activities must be in conformance with **OSHA 29 CFR 1910.26.450 - Scaffolds.** Basic requirements include, but are not limited to:
- Scaffolding will only be used by a competent person on staff.
 - The use of cross member supports on any and all vertical member or the scaffolding. (2 cross members for each section of scaffolding).
 - USE - Daily inspection of scaffold's integrity by a Competent Person; no horizontal movement with personnel on scaffold; personnel may not work off of ladders or other raised structures set up on the work platform of the scaffold.
 - FALL PROTECTION - Required when the work platform is ten feet or higher.
 - SUPPORTED SCAFFOLDS - Must be constructed on secure footings. Scaffolds that are four to one (vertical height four times higher than the scaffold's base width) must be restrained from tipping over. Typical restraints are tying into the structure or using outriggers.
 - USER TRAINING - Personnel who use, assemble, maintain or dismantle scaffolds are required to be initially trained in the following:
 - a. Scaffold Standard
 - b. Nature of electrical, fall and falling object hazards
 - c. Correct procedures and safety equipment for protection from those hazards
 - d. Proper use and procedures for erecting, dismantling, moving and inspecting scaffolds

e. Load capacities of scaffolds

5. **Ladder Safety** for wood/metal portable and extension ladders includes frequent inspection and prompt removal of defective ladders from service. Defective ladders must be tagged and **Dangerous, Do Not Use** and repaired or destroyed.

Ladder shall be visually inspected prior to each use.

- Wood ladders must be free of splinters, sharp edges and have no visual defects noted by wood decay or other irregularities.
- Metal ladders must not have structural defects, sharp edges or metal burrs.
- Ladders with broken, bent or missing steps, rungs or cleats or broken, bent or dented side rails or other defects must not be used. Improvised repairs cannot be made.
- Joints between the steps and side rails must be tight.
- Hardware and fittings must be securely attached and moveable parts must operate freely without binding.
- Locking spreaders are required and must operate to securely hold the front and back ladder sections in the open position.

LADDER SAFETY - USE OF:

- Use ladders according to the posted load limits.
 - Set up ladders on firm footing and secure in place to prevent the ladder from slipping.
 - Follow the Four to One Rule during set up) for every four feet of vertical ladder height, move the ladder out one foot from the wall, building or structure).
 - Do not place ladders onto unstable bases to obtain additional height, including setting up ladders onto the working platforms of scaffolding.
 - Do not set up ladders in front of doorways.
 - Ladders used to access roofs must extend up an additional three feet to allow a safe transition to the roof.
 - Do not stand on the top of ladders of work from the top two steps.
 - Do not climb ladders carrying equipment or tools. Use other means to transport equipment and tools up to the worksite.
 - Always face the ladder when going up and down.
 - Follow the "Three on Rule" (two hands and one foot on the ladder or two feet and one hand on the ladder at all times). Do not overreach from the sides of the ladder.
6. **Fall Arrest Equipment Requirement:** Fall arrest equipment reduces the risk of injuries that can occur when a worker falls from one level to another. If engineering controls are not feasible to prevent the fall, fall arrest equipment

becomes the last line of defense. Equipment manufacturers routinely test and certify components of their fall arrest equipment as a "system".

Components of fall arrest equipment from different manufacturers are rarely interchangeable or certified as a complete "fall arrest system." Consistency (one manufacturer's line of fall arrest equipment) is usually the best choice for departments and/or cost centers to ensure compatibility of equipment. Assistance is available from the Office of Environmental Safety and Health on selection and procurement of fall arrest equipment. Critical components of fall arrest equipment include:

- **BODY HARNESS** - Body Harnesses are required. The harness must, comfortably but snugly, fit the individual. Many body harnesses are designed for "universal fit" to accommodate several individuals. "Universal fit" has limitations. Small frame and large frame individuals may not be adequately accommodated by the mid range "universal fit."
- **SHOCK ABSORBING LANYARDS "Connector"** - Shock absorbing lanyards are required. Static rope and nylon lanyards must be replaced with an appropriate length shock-absorbing lanyard. During fall arrest, the rip stitching of the shock-absorbing lanyard absorbs the shock of the fall, drastically reducing forces onto the body and preventing significant injury. Special attention must be given to the stopping distance required by the manufacturer of the lanyard. Generally, the overall free fall distance may be nine feet.
- **LOCKING SNAPHOOKS "Connector"** - Locking snaphooks are required. All connection hardware (e.g., -snaphooks, caribineers) must have a locking mechanism to prevent roll out from the anchor and sized appropriately to fit with the anchor.
- **INSPECTION OF FALL ARREST EQUIPMENT** - OSHA and Fall Arrest Equipment Manufacturers require any defective equipment to be immediately removed from service and replaced. Defective equipment must be destroyed to prevent accidental use that could endanger someone's life.
- **HARNESS INSPECTION** - Defects include, but are not limited to:
 - Cuts
 - Abrasion
 - Loose threads
 - Tears
 - Stretching
 - Mold

- LOOK FOR DETERIORATION

- Exposure to molten metal or flame from hot work will fuse nylon fibers together. There may be hard shiny spots and the nylon appears shriveled and brown. The nylon will feel brittle.
- Exposure to harsh chemicals - change in color, appearing as a brownish smear. Nylon webbing loses elasticity.

- HARDWARE INSPECTION

Look for cracks, pitting and any distortion in all hardware components: buckles, D-rings, snaphooks and carabineers, rivets and grommets. Belt buckle grommets get a lot of wear from opening and closing. Snaphooks must lock and close tightly; buckles must function properly.

- USE OF FALL ARREST EQUIPMENT

- Always use a secure anchor point (hold 5000 lb. load)
- Connect to an anchor point at shoulder level or above. Never connect below the D-ring of the body harness.
- Connection to anchor points must prevent a dangerous swing fall hazard or impact with any lower level in the event of a fall.
- Connection to an anchor point must limit the fall to no greater than six feet.
- Use chafing pads or anchor slings to prevent cutting "connectors" (lanyards and lifelines) on sharp edges.
- Do not use knots on "connectors" (lanyards and lifelines).
- Vertical lifelines must be synthetic (nylon) fiber.
- Rope grab devices used on vertical lifelines must be secured twelve feet up from the terminal end of the vertical lifeline.
- Terminate the end of the vertical lifeline to prevent the rope grab device from slipping off.
- Only one person can "tie off" to a vertical lifeline.

- ANCHOR POINTS FOR PERSONAL FALL ARREST EQUIPMENT

Secure anchor points are the most critical component when employees must use fall arrest equipment. MSUs buildings may have existing structures (e.g., steel beams or anchored roof cupolas 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:

CRITERIA FOR AN EXISTING STRUCTURE

- 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.
- Prior to tying off to perform the work, a means of rescue in the event of a fall must be immediately available.
- Direct tying off around sharp edged structures can reduce breaking strength by 70%; therefore, chaffing pads or abrasion resistant straps must be used around sharp edged structures to prevent cutting action against safety lanyards or lifelines.
- OSHA limits free falls to six feet. Structures used as anchor points must be at the worker's shoulder level or higher free fall to six feet or less and prevent contact with any lower level.
- 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. **QUALIFIED PERSONS** must design horizontal lifeline systems.

CRITERIA FOR PERMANENT ANCHOR - In addition to all the criteria listed for EXISTING STRUCTURES, the following points must be considered:

- Environmental factors and dissimilarity of materials can degrade exposed anchors.
- Preserving roof/structure integrity after penetrating roof/structure for installation of anchors.
- Compatibility of permanent anchors with employee's fall arrest equipment.
- Permanent anchor systems that meet a two to one safety factor of at least 3,600 lb. must be **CERTIFIED**. The design and installation must be done by a **QUALIFIED PERSON**. If the permanent anchor system is not certified, it must meet a 5,000 lb. static load or greater.
- Inclusion of permanent anchors into a Preventative Maintenance Program.
- Schedule re-certification test.
- Determine appropriate end life and schedule for replacement.

- Visibly label permanent anchors.
- Roof anchors must be immediately removed from service and disposal of if subjected to fall arrest forces.

REUSABLE TEMPORARY ROOF ANCHORS

In addition to all the criteria listed for existing structures, the following points must be considered:

- 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.
7. **Cleaning and Storage of Fall Arrest Equipment:** Follow the equipment manufacturer's cleaning instructions. Always dry equipment naturally. Use an approved lubricant (light motor oil or aerosol lubricant) to oil snaphooks when dry. Store clean and dry away from direct sunlight and excessive heat.
8. **Outside Vendor/Contractors:** Contractor must follow all rules and regulations set forth in these requirements. They must also follow their own company's Fall Protection Policy. Contractors shall have their own Fall Protection equipment, as well as, Fall Protection Arrest System (Harness and Lanyards.) They must provide proof of training and certification on the equipment that they will be operation upon request prior to the commencement of any work.