Fall Protection Program
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Fall Protection Program

Purpose and Scope

The purpose of this fall protection program is to establish guidelines to protect all employees engaged in outdoor or indoor work activities that expose them to potential falls from elevations.

The scope of this fall protection program includes all agency/institutional buildings and staff. In particular those staff engaged in work activities, which expose them to falls from heights of 4 feet or more.

Definitions

**Authorized Person**: A person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or job site (e.g., building maintenance, roof repair, etc.).

**Competent Person**: A person capable of identifying existing and predictable hazards in the surroundings or working conditions, which are hazardous or dangerous to employees. A person who has the authorization to take prompt corrective action to eliminate such hazards.

**Qualified Person**: An individual, who by possession of a recognized degree, certificate, or professional standing or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, work, or project.

**Anchor Point**: A secure point of attachment for lifelines, lanyards, or deceleration devices. An anchor point must be capable of supporting at least 5000 pounds (fall arrest system) and 800 pounds (fall restraint system) per person and must be independent of any anchorage being used to support or suspend platforms. Anchor points must be inspected annually and certified decennial (every 10 years).

**Full Body Harness**: Webbing/straps which are secured about an employee’s body in a manner that will distribute the fall arrest forces over the thighs, pelvis, waist, chest and shoulders. Having means for attaching it to other components of a personal fall arrest system, preferably at the shoulders and/or middle of the back.

**Connector**: A device which is used to couple (connect) parts of the personal fall arrest system together.
**Deceleration Device:** Any mechanism, such as a rope grab, rip-stitch lanyard, a specially woven lanyard, tearing or deforming lanyard, automatic self-retracting lifeline/lanyard, etc., which serves to dissipate a substantial amount of energy during a 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 harness attachment point at the moment of activation 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.

**Free Fall Distance:** The vertical displacement of the fall arrest attachment point on the employee’s body harness between the onset of the fall and just before the system begins to apply force to arrest the fall. Free fall distance must not exceed 6 feet. **This distance excludes deceleration distance and lifeline/lanyard elongation distance.**

**Total Fall Distance:** The maximum vertical change in distance from the bottom of an individual’s feet at the onset of a fall, to the position of the feet after the fall is arrested. This includes the free fall distance and the deceleration distance.

**Guardrail System:** A 42” barrier erected to prevent employees from falling to lower levels. This system includes a toe board, mid-rail and top-rail able to withstand 200 pounds of force applied in any direction.

**Lanyard:** A flexible line of rope or strap that has self-locking snap hook connectors at each end for connecting to body harnesses, deceleration devices, and anchor points.

**Leading Edge:** The edge of a floor, roof, or other walking/working surface, which changes location as additional floor, roof, etc., is placed or constructed. A leading edge is considered an unprotected side or edge when not under active 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). This 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 of less than or equal to 4 in 12 (vertical to horizontal). A roof with approximately a 19.5 degree slope or less.

**Personal Fall Arrest System:** A system used to arrest (catch) an employee in a fall from a working level. It consists of an anchorage location, connectors, a body harness, and may include a lanyard, deceleration device, lifeline, or any combination of the before-mentioned items.

**Personal Fall Restraint System:** A system used to prevent you from falling. In a fall restraint system, a line is attached to an anchor and your harness in such a way that you cannot fall. The anchor must be able to withstand 3.5 kN (800 lbs.).
**Rope Grab**: A deceleration device, which travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest the fall of an employee.

**Rope Descent Systems (RDS)**: A rope decent system consists of components that when assembled, allow a worker to move along the length of that rope. Also known as rappelling or abseiling this method is used for a variety of job tasks such as window washing and building exterior inspections.

**Roof Work**: The hoisting, storage, installation, repair, and removal of materials or equipment on the roof.

**Safety Monitoring System**: A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards. All other fall protection systems must be deemed “infeasible” (through infeasibility study/review) to select/use a safety monitoring system.

**Snap hook**: A connector comprised of a hook-shaped member with a closed keeper which may be opened to permit the hook to receive an object and when released, automatically closes to retain the object. Snap hooks must be self-closing with a self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection, thus preventing the opportunity for the object to “rollout” of the snap hook.

**Steep Slope Roof**: A roof having a slope greater than 4 in 12 (vertical to horizontal). A roof with a slope greater than 19.5 degrees.

**Toe board**: A low protective barrier that will prevent the fall of materials and equipment to lower levels, usually 4 inches or greater in height.

**Unprotected Sides and Edges**: Any side or edge of a walking or working surface (e.g., floor, roof, ramp, runway, etc.) where there is no guardrail at least 42 inches high (+/- 3 inches).

**Warning Line System**: A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, which designates an area in which work can be conducted without the use of guardrails, personal fall arrest systems, or safety nets to protect employees in the area. This will be utilized on any roof only where the other forms of fall protection have been deemed infeasible to use.

**Current Requirements for Washington University Employees**

Currently any Washington University employee working within 15 feet of an unguarded leading edge, 4 foot or higher above a lower level, must use a fall restrain system and be tied off to an anchor point able to withstand 800 pounds of force. If this cannot be achieved than a contractor must be called in to do the work.

**Types of Fall Protection Systems**

1) An articulating man lift provided with a restraint system and full body harness to an approved anchor point below the waist (preferably at the floor level).
2) Guardrail with a toe board, mid-rail and top-rail.
3) Personal fall arrest systems.
   - Anchor points [rated at 5000 pounds per person (arrest systems) 800 pounds per person (restrain systems)].
   - Full body harness.
   - Restraint line or lanyard.
   - Retractable lanyard.
   - Rope grabs.
   - Connectors (self-locking snap hooks).

4) Engineered lifelines.
5) Warning lines.
6) Safety nets.
7) Safety monitor systems.
8) Rope Decent Systems (RDS).

Appropriate fall protection will be determined by the task (job) to be performed.

**Fall Protection Locations**

Fall protection is required wherever the potential to fall 4 feet or more exists. Washington University – St. Louis has identified the following places concerning fall protection:

1) All flat and low sloped roof locations, when within 15 feet of the roof edge or during roof repair/maintenance (4:12 pitch or less).
2) All exterior and interior equipment platforms, catwalks, antennas/towers, etc.
3) All exterior and interior fixed ladders above 24 feet. All ladders 24 feet or greater must be equipped with a cage by 2019 and must have ladder safety systems in place by 2037.
4) All mezzanine and balcony edges.
5) All open excavations or pits.
6) All tasks requiring use of the articulating man lifts.
7) All tasks requiring employees to lean outside the vertical rails of ladders (i.e., painting, stairwell light bulb replacement, etc.).
8) Scaffolding erection – 4 feet in height or greater.
9) Tuck pointing – chimney repair.
10) Gym- mezzanine/catwalk areas – whenever an employee must step outside the catwalk, additional fall protection (i.e., 6-foot lanyard to full body harness, self-retracting lanyard or rope grab system) shall be used.

Exceptions

Fall protection is not needed if an employee or employees are on a flat or low slope roof (4/12 or less) for inspection/observation only! Inspections and observations can only be done when conditions are safe (not during strong winds, or when ice/snow/slippery surfaces are present.).

There is no minimum height if you are working over dangerous equipment, machinery, or any hazard into which you could fall. Fall protection or machine guarding needs to be put in place. No exceptions.

Please see the appendix for fall protection flowchart.

Fall Protection Guidelines – Options

Engineering Controls

This should always be the first option for selection whenever possible (e.g., light bulb changing, telescoping arm, changing valve, relocate at ground level, etc.) or utilizing a contractor in extremely hazardous areas.

Guardrails

On all projects, only guardrails made from steel, wood, and wire rope will be acceptable. All guardrail systems will comply with the current Department of Commerce/OSHA standards (i.e., contain a 42” high top-rail, a mid-rail and toe board, which can withstand 200 pounds of force in any direction). These guardrails will be placed in the following areas if necessary or feasible based on job location or requirements:

1) On all open sided floors.
2) Around all open excavations or pits.
3) On leading edges of roofs or mezzanines.

Personal Fall Protection Systems

All employees on any project that will be required to wear a personal fall arrest or restraint system will follow these guidelines:

1) A full body harness will be used at all times.
2) Only shock absorbing lanyards or retractable lanyards are to be used so as to keep impact forces at a minimum on the body.
3) Only nylon rope or nylon straps with locking snap hooks are to be used for restraints.
4) All lanyards will have self-locking snap hooks.
5) The employee will inspect all personal fall arrest equipment before each use. Any deteriorated, bent, damaged, impacted, and/or harness showing excessive wear will be removed from service.
The maximum free fall distance is not to exceed 6 feet. Consideration must be given to the total fall distance. The following factors can affect total fall distance:

1) Length of connecting means (i.e., lanyard length, use of carabiners, snap hooks, etc.)
2) Position and height of anchorage relative to work platform/area (always keep above the head whenever possible).
3) Position of attachment and D-ring slide on the full body harness.
4) Deployment of shock absorber (max. 42”).
5) Movement in the lifeline.
6) Initial position of worker before free fall occurs (e.g., sitting, standing, etc.).

**Calculating Total Fall Distance**

It is the total length of shock absorbing lanyard + height of the person + the location distance of the D-ring from the work surface or platform.

Always allow a minimum of 6 feet of clearance above the ground, equipment, etc., at the end of the fall from the fall arrest point.

**Engineered Lifeline**

Lifeline systems must be designed and approved by an engineer or qualified person.

Lifeline systems must be engineered to have appropriate anchorages, strength of line designed to hold X number of individuals connected to it, line strength to aid in the arrest of a fall, and durability to hold a fallen employee(s) suspended until a rescue can occur.

**Warning Line System**

All work on a flat roof which is performed greater than 15 feet from the leading edge of the roof can be completed by installing a Warning Line and using a safety monitor. Warning Lines will consist of the following:

1) Will be erected 15 feet from the edge of the roof.
2) Be constructed of stationary posts made of wood or metal.
3) Wire or nylon rope and “Caution” tape will be strung from post to post and must be able to withstand 20 pounds of force.
4) The warning line will guard the entire perimeter of the roof where work is being performed.

*If an employee must access an area within 15 feet of the roof’s edge, for reasons other than exiting the roof via a ladder or fixed industrial ladder then the employee must don a full body harness and attach a fall restraint lanyard to an anchor point to prevent reaching the edge of the roof.
Rope Decent Systems (RDS)

No Washington University employee will ever use this system. Only certified contractors will be allowed to utilize this system on any Washington University owned properties. Contractors will provide Washington University with their fall protection policy. Washington University will be required to provide the contractor using the building anchor points information regarding identification, testing, maintenance and certifications of the points.

Inspection of Fall Protection Systems

The following criteria will be utilized to maintain all equipment in good working condition:

Full Body Harnesses

1) Inspect before each use.
   - Closely examine all of the nylon webbing to ensure there are no burn marks, which could weaken the material.
   - Verify there are no torn, frayed or broken fibers, pulled stitches, or frayed edges anywhere on the harness.
   - Examine the D-ring for excessive wear, pits, deterioration, or cracks.
   - Verify that buckles are not deformed, cracked, and operate correctly.
   - Check to see that each grommet (if present) is secure and not deformed from abuse or a fall.
   - The harness should never have additional punched holes.
   - All rivets should be tight and not deformed.
   - Check tongue/straps for excessive wear from repeated buckling.

2) A competent person will complete an annual inspection of all harnesses and documentation will be maintained (see Appendix 1).

3) Storage will consist of hanging in an enclosed cabinet, to protect from damage.

4) All harnesses that are involved in a fall will be destroyed.

Lanyards/Shock Absorbing Lanyards

1) Inspect before each use.
   - Check lanyard material for cuts, burns, abrasions, kinks, knots, broken stitches and excessive wear.
   - Inspect the snap hooks for distortions in the hook, locks, and eye.
   - Check carabiner for excessive wear, distortion, and lock operation.
   - Ensure that all locking mechanisms seat and lock properly.
   - Once locked, locking mechanism should prevent hook from opening.
   - Visually inspect shock absorber for any signs of damage, paying close attention to where the shock absorber attaches to the lanyard.
   - Verify that points where the lanyard attaches to the snap hooks are free of defects.
2) A competent person will complete an annual inspection of all lanyards and documentation will be maintained (see Appendix 2).
3) Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4) All lanyards that are involved in a fall will be destroyed.

**Snap Hooks**

1) Inspect before each use.
   - Inspect snap hook for any hook and eye distortions.
   - Verify there are no cracks or pitted surfaces.
   - The keeper latch should not be bent, distorted, or obstructed.
   - Verify that the keeper latch seats into the nose without binding.
   - Verify that the keeper spring securely closes the keeper latch.
   - Test the locking mechanism to verify that the keeper latch locks properly.
2) A competent person will complete an annual inspection of all snap hooks and documentation will be maintained (see Appendix 3).
3) All snap hooks involved in a fall will be destroyed.

**Self-Retracting Lanyards/Lifelines**

1) Inspect before each use.
   - Visually inspect the body to ensure there is no physical damage to the body.
   - Make sure all nuts and rivets are tight.
   - Make sure the entire length of the nylon strap/wire rope is free from any cuts, burns, abrasions, kinks, knots, broken stitches/strands, excessive wear and retracts freely.
   - Test the unit by pulling sharply on the lanyard/lifeline to verify that the locking mechanism is operating correctly.
   - If the manufacturer requires, make certain the retractable lanyard is returned to the manufacturer for scheduled annual inspections.
2) A competent person will conduct monthly inspection of all self-retracting lanyards/lifelines and documentation will be maintained (see Appendix 4).
3) Service per manufacturer specifications (1-2 years).
4) Inspect for proper function after every fall.

**Tie-Off Adapters/Anchorages**

1) Inspect for integrity and attachment to solid surface.
2) A competent person will complete an annual inspection of all tie-offs and anchorages and documentation will be maintained.
3) All tie-offs and anchorages will be destroyed after a fall.
Articulating Man Lift

1) Inspect before each use.
2) Inspect/service per manufacturer guidelines. Forklift, scissors lifts, and safety nets will be inspected at the beginning of each shift in use. Structural integrity of the forklift basket will be checked per the same schedule.
3) A competent person will complete an annual inspection of the forklift basket and documentation will be maintained.
4) Fall protection will be worn when working in lifts.

Horizontal Lifelines

1) Inspect before each use for structural integrity of line and anchors.
2) A competent person will complete an annual inspection.

Guardrails

1) Temporary systems – Daily visual inspection will be completed by a competent person.
2) Temporary systems – Weekly, a complete structural inspection will be completed by a competent person.
3) Permanent systems – Annual structural inspections will be completed by a competent person with future frequency of inspection defined based on conditions/controls present.

Storage and Maintenance of Fall Protection Equipment

1) Never store the personal fall arrest equipment in the bottom of a toolbox, on the ground, or outdoors exposed to the elements (i.e., sun, rain, snow, etc.).
2) Hang equipment in a cool, dry location in a manner that retains its shape.
3) Always follow manufacturer recommendations for inspections.
4) Clean with a mild, nonabrasive soap and hang to dry.
5) Never force dry or use strong detergents in cleaning.
6) Never store equipment near excessive heat, chemicals, moisture, or sunlight.
7) Never store in an area with exposures to fumes or corrosive elements.
8) Avoid dirt or other types of build-up on equipment.
9) Never use this equipment for any purpose other than personal fall arrest.
10) Once exposed to a fall, remove equipment from service immediately.

Training

All employees engaged in fall protection will be trained and have the knowledge to:

1) Recognize the fall hazards of/on their job sites.
2) Understand the hazards associated with working near fall hazards.
3) Work safely in hazardous areas by utilizing appropriate fall protection measures.
4) Understand and follow all components of this fall protection program.
5) Identify and understand the enforceable Department of Commerce/OSHA standards and ANSI standards that pertain to fall protection.

**Rescue Procedures**

**Rescue Methods/Options of Fallen Personnel**

If an employee is using a fall arrest system then a fall rescue policy must be developed and implemented before fall arrest equipment use. Currently *fall restrain systems* are all that can be used by Washington University employees. In the unlikely event that a fall arrest occurs on-site, trained personnel with the use of an articulating man lift or ladders where feasible, will rescue all employees. Alternate rescue would be through the local emergency services.

**Communication Issues**

In the event of a fall, the following people will be notified as soon as possible.

1) Rescue personnel (i.e., maintenance personnel).
2) Manager/Supervisor.
3) Safety officer/coordinator
4) Fire Department and emergency medical services if necessary.

At the beginning of any work activity where fall protection is an issue, rescue plans must be identified and discussed with all employees in case of a fall. The Washington University Department (i.e. facilities) Contractor or Sub-Contractor will develop the rescue plan(s) for activities that involve fall protection.

All employees involved in a fall arrest or fall will be sent immediately for a medical evaluation to determine the extent of injuries, if any.

**Fall Investigation**

All fall investigations will be conducted by Environmental Health & Safety.

The following documentation will be completed as part of the fall investigation:

1) Interviews with staff and witnesses.
2) Employee injury/accident report.
3) Supervisor injury/accident report.
Program Evaluation

This fall protection program will be evaluated periodically to determine the effectiveness. The following criteria will be used to evaluate its performance:

1) Accident reports
2) Number of accidents.
3) Management/staff compliance with program components.
4) Periodic on-site audits.
5) Staff feedback and interviews.

Contractors

All outside contractors working in or on the premises of Washington University – St. Louis will be required to follow the guidelines set forth by OSHA’s Walking Working Surfaces Standard. Contractors in the pre-job meeting must present Washington University’s Project Manager with a copy of their fall protection program. If rope decent systems will be used Washington University will provide contractors with locations of anchor points and testing information for those points.

Ladders

Fixed Ladders

Fixed ladders are permanently attached to a structure, building, or equipment. New OSHA regulations (as of 2017) phases in a requirement for employers to have ladder safety or personal fall arrest systems for fixed ladders that extend more than 24 feet. The new requirement will phase out the use of cages or wells as acceptable means of fall protection. Beginning in 2019, all new fixed ladders and replacement ladder sections must have a ladder safety system or personal fall protection system. For existing ladders, by 2019, employers must install a cage, well, ladder safety system or personal fall protection system on fixed ladders (exceeding 24 feet) that do not have any fall protection. Within 20 years, all fixed ladders more than 24 feet must have a ladder safety system or personal fall arrest system.

Portable Ladders

Portable ladders usually consist of side rails joined at intervals by steps, rungs or cleats. They can be self-supporting or lean against a supporting structure. All University ladders will be either made of fiberglass or metal (no wooden ladders are to be used on WU properties) and they must have slip resistant rungs and steps.

Proper uses of portable ladders include:

- Never stand on the top steps and caps of stepladders
- Securing and stabilizing ladders that are used on slippery surfaces
- Never moving, shifting or extending a ladder while in use
- Never fasten or join ladders together for additional length unless designed for such use
- Never place ladders on boxes, barrels, or other unstable surface to obtain added height
• Never use metal ladder while working on electricity
• Always be aware of power lines and stay at least 10 feet away from them
• Be aware of load ratings before using ladder
• Always maintain 3 points of contact when using a ladder
• When using an extension ladder set the ladder at the proper angle andextent top of the ladder 3 feet above the surface or secure the ladder at its top.

Refer to OSHA 29 CFR 1910.23 for a complete list of ladder safety standards.
Appendix

Washington University in St. Louis
Environmental Health & Safety
Fall Protection Flowchart

Will you be performing work or performing an inspection?

Performing an inspection before or after work.

Performing work.

Will you be < 15 feet from a leading edge 4 feet high or greater?

No fall protection required.

Is the leading edge guarded by a barrier or guardrail 42” high or greater?

Fall protection required.

Are the conditions safe to be out on the roof (No strong winds, ice, etc.)?

Reschedule for a different day when conditions are better.

Will the inspector be < 15 feet from the leading edge > 4 feet above a lower level?

No fall protection required.

Is it a low-pitched roof (4/12 or less)?

Fall protection required.

No fall protection required.

No fall protection required.

Fall protection required.