



**WATER & SEWER**  
RISK MANAGEMENT POOL



# Fall Protection

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The following safety related program is for informational purposes only. The SORT committee hopes that each participating district will look at this program and discuss how it compares to the district's own practices. This program is NOT a complete safety program, but intended as guidelines. There is no guarantee that following a given program will eliminate or substantially reduce the risk of claim or injuries. It is expected that member districts will consider this program and adapt or modify it to fit the district's particular needs and circumstances.

# FALL PROTECTION SAFETY PROGRAM

## TABLE OF CONTENTS

PURPOSE / SCOPE.....	1
Policy Statement .....	1
EXEMPTIONS / EXCLUSIONS .....	1
HAZARD ANALYSIS.....	2
Hazard Description .....	2
Hazard Evaluation .....	2
Methods of Evaluation.....	2
Exposure Determination.....	3
RESPONSIBILITES.....	4
District.....	4
Designated Person or Safety Program Coordinator .....	4
Managers .....	4
Employees.....	4
GUIDELINES/RULES .....	5
Applicable SOPs .....	5
Required PPE .....	5
Prevention Actions.....	5
EMERGENCY PROCEDURES .....	22
First Aid Awareness and Actions .....	22
TRAINING .....	25
Supervisor Training .....	26
Outline: [x] – hour class.....	26
REFERENCES/RESOURCES.....	26
REVISION RECORD.....	26
DEFINITIONS.....	27
APPENDIX: forms .....	31



# FALL PROTECTION SAFETY PROGRAM

## PURPOSE / SCOPE

The purpose of the Fall Protection Safety Program is to ensure that all employees, engaged in work activities that expose them to potential falls from any level, understand the potential hazards and establish the requirements for working safely in such an environment.

This is intended to be a universal document that describes precautions and procedures that must be followed in all cases. Field management and staff will perform site specific hazard analysis and develop Standard Operating Procedures for work at specific sites. The Standard Operating Procedures (SOP's) will take into account all safety issues and will define the most effective methods of accomplishing the work objectives safely and efficiently.

All employees are encouraged to actively participate in identifying SOP's for reducing the hazards of working in these situations. Remember, fall hazards can exist at or below ground level, 4ft, 10ft or more.

Additional fall hazards can exist: -above ground, at ground level or on walking/working surfaces, openings, holes, pits, manholes, vaults, and open-sided floors or platforms.

## Policy Statement

It is the policy of the District that all employees who engage in work activities that expose them to potential falls from any level will comply fully with this Fall Protection Program. Employees shall use engineering controls wherever practical to reduce or eliminate the need for employees to work at elevations where they are exposed to potential falls.

The District will employ one of these systems for fall protection in the following order of preference:

1. Guard Rails – a physical barrier constructed to prevent employees from falling to a lower level.
2. Fall Restraint – equipment that prevents a free fall in the first place.
3. Fall Arrest – equipment that stops a free fall in progress.

The district will ensure that all fall protection devices and systems are in compliance with 296-155-24613 & 24615.

## EXEMPTIONS / EXCLUSIONS

If using two ladders to reach an elevated work area. A platform or landing is not required when a portable ladder is used to reach a fixed ladder on structures such as elevated water tanks where the bottom of the fixed ladder is elevated to limit access.

Fall restraint or fall arrest systems do not apply on low pitch roofs higher than 10' at points of access such as stairways, ladders and ramps.

Exemptions: Employees are exempt from wearing fall protection devices when:



## Fall Protection Program

- On the roof only to inspect, investigate or estimate roof level conditions.
- To install or remove fall protection anchor prior to or after work is completed
- Prior to or after completion of construction work
- Taking measurements
- Inspection for damage

No exemptions are allowed for employees engaged in work, loading or positioning tools and supplies.

### **Workers Inspecting on Roofs:**

Are considered by L. & I., to be walking on a hazardous slope regardless of pitch.

## **HAZARD ANALYSIS**

### **Hazard Description**

Each year in Washington, there are about 16,000 claims filed related to falls. The "fall" classification includes falls to the same level and falls to a lower level. It does not include slips, trips, and loss of balance that did not result in a fall (nearly 1000 cases with lost work days). In 2005, falls accounted for about 6,600 injury claims in Washington that involved an average of 6 days of lost work. The days of lost work for 26% of those 6,600 cases exceeded 30 days. The year 2005 in Washington saw 8 fatalities as a result of falls. Three of those fatalities were falls from ladders.

### **Hazard Evaluation**

Areas throughout the district where falls of 4 feet or more exist include:

- Vaults (PRV's, Lift stations, Well sites, Booster Pump stations, etc.)
- Tanks (reservoirs)
- Dry wells, wet wells
- Water & sewer manholes
- Roof tops, scaffolds
- Large vehicles (tops of the vehicles – Vactor trucks, etc.)
- Articulating or aerial man lifts and buckets, i.e., boom truck

### **Methods of Evaluation**

When employees are exposed to a hazard of falling from a location 4 feet or more in height the District must ensure that fall restraint, fall arrest or positioning device systems are provided, installed and implemented according to the requirements displayed below.

### **Total Fall Distance**

When selecting a fall protection methodology, consideration must be given to the total fall distance.

Calculating Total Fall Distance:

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## Program Name

The total fall distance is the distance from the worker's support to the level where a fall stops. This may be calculated as: The lanyard freefall distance + the deceleration extension of the shock absorbing portion of the lanyard + distance of the D-ring to the worker's feet.

### WAC 296-155-24624

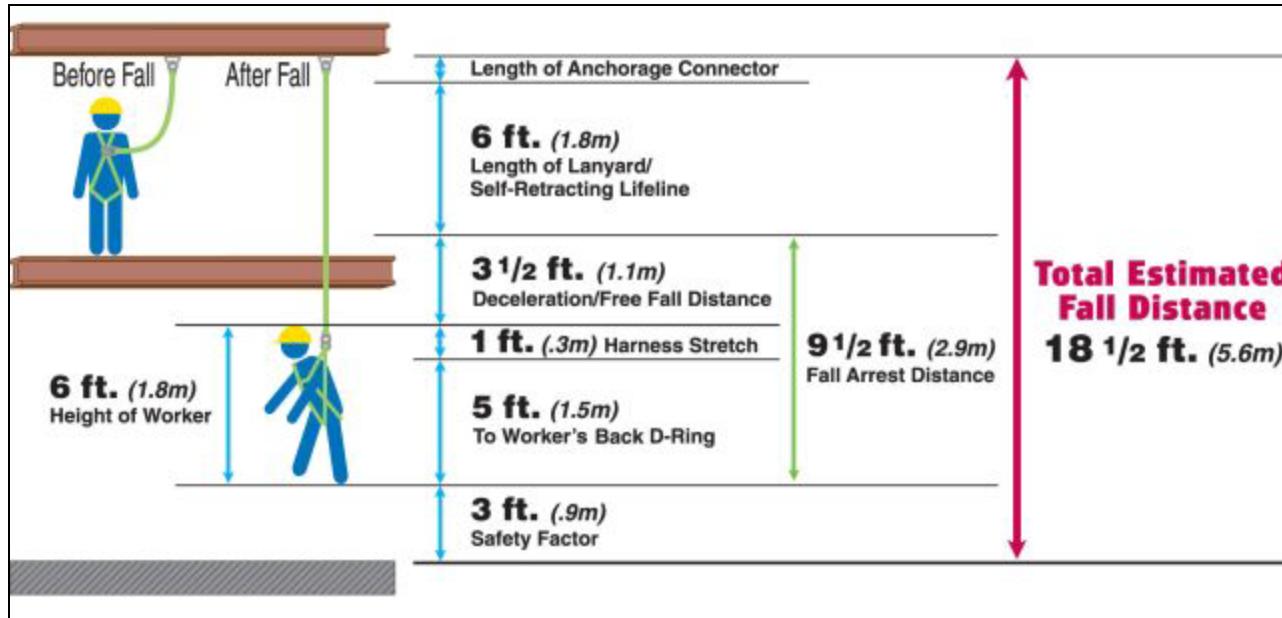
Appendix B — Calculating fall clearance distance using a shock-absorbing lanyard and D-ring anchorage connector — No mandatory guidelines for complying with WAC [296-155-24613](#) (1)(d).

Do the following to calculate the fall clearance distance using a shock-absorbing lanyard and D-ring anchorage connector:

First, add the length of the shock-absorbing lanyard (six feet) to the maximum elongation of the shock absorber during deceleration (three and one-half feet) to the average height of a worker (six feet).

Then, add a safety factor of three feet to allow for the possibility of an improperly fit full body harness, a taller than average worker and/or a miscalculation of distance.

The suggested safe fall clearance distance for this example is eighteen and one-half feet.



## Exposure Determination

The Hazard Evaluation section above describes the typical areas of potential exposures to falls of 4 feet or more may be present. All District employees who have job responsibilities that require them to work in those areas may be exposed to potential fall hazards.



In addition to all employees' exposure to these hazards, certain non-District personnel may be exposed to fall hazards when upon district properties. Non-district personnel would consist of outside contractors, consultants and rescue personnel to name a few.

## RESPONSIBILITES

### District

- Identify all potential fall hazards within the District.
- Develop a fall protection plan for each area of fall exposure.
- Provide training to each employee involved in work where known fall hazards exist, so they acquire an understanding, knowledge and skills necessary to safely perform assigned duties. Training shall be documented.
- Do not allow untrained employees in the aspects of this program to access areas of fall hazards.
- Provide fall equipment including "Fall Arrest Systems" and "Fall Restraint Systems", which are appropriate to the work task.
- Provide rescue and emergency services.

### Designated Person or Safety Program Coordinator

- Establish and update the written Fall Protection Safety Program as needed.
- Provide consultation/training to staff regarding the Program.
- Assist in determining when and where a fall hazard exists.
- Review and approve all Standard Operating Procedures with respect to safety issues.
- Maintain training records.

### Managers

- Ensure that the equipment and materials required by this program are properly stocked, controlled, and maintained by assigned staff.
- Develop Standard Operating Procedures for the maintenance, calibration, repair and/or replacement of required personal protective equipment associated with fall protection.
- Develop Standard Operating Procedures that include WAC mandated Fall Protection Work Plans for work tasks, using fall protection equipment, which take into account all safety issues and define the most effective methods of accomplishing the work safely and efficiently.

### Employees

- Awareness and compliance with all guidelines, rules and procedures outlined in this Fall Protection Program.
- To be trained in the fall protection methods when in a fall hazard area.
- Inspect equipment prior to each use for mildew, wear, damage and other deterioration.
- Inform the safety officer if there is damage or defective components of the Fall Arrest and Restraint systems.

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## Program Name

- Care and maintenance of the components of the Fall Arrest and Restraint systems that are directly assigned to them.
- Prepare fall protection work plans for work activities where a fall hazard of 4' or more exists.
- Never work in a fall hazard area alone.

## GUIDELINES/RULES

N/A

### Applicable SOPs

Perform hazard assessments of your district's work areas requiring the use of fall protection or restraint systems. Some environments will be dry while others may be wet. Choose appropriate harness material and other related PPE for those conditions. Your district's SOP's should be site specific and reflect the actual working conditions.

### Warning lines

Note: Warning lines are not recommended for utility work. S.O.R.T. recommends that fall restraint or positioning device systems be utilized while working on top of water storage tanks or roofs.

### Required PPE

- Full Body Safety harness utilizing one of two below methods for climbing fixed ladders above or below ground, or rising up from a lower level:
  - For ladders 24 ft or more in length:
    - Fall Restraint Systems: wire rope grab or
    - Fall Arrest Systems: SRL (mandatory for permit required confined spaces)

Note: see confined space entry program for below ground procedures.

### Prevention Actions

Many fall hazards can be eliminated with design and engineering controls. Whenever practical, these methods will be implemented to minimize the need for fall arrest/restraint systems. Engineer controls that mitigate the potential for fall hazards might include:

- Walls
  - Barricades
  - Man lifts (see section on "Owned, Rented or Leased Aerial lifts" later in this program for fall protection equipment required).
  - Ladders
  - Scaffolding- WAC 296-874-20058 fall protection now required...
- ➲ follow:



## Fall Protection Program

- Appendix C, Part 1, WAC [296-24-88050](#) for powered platforms
- Appendix C, Part 1, for construction related activities
- Man baskets

All work sites with fall hazards of 4 feet or more will have a site-specific fall protection work plan completed before any employees begin work. The employees will be trained in the fall hazards and the method used to implement fall protection. All employees will use fall protection.

The evaluation of the jobsite and the completion of the fall protection work plan will be done by a safety officer and has the authority to take corrective action to eliminate employee exposure to fall hazards.

Fall restraint and/or fall arrest will be used in all cases where fall hazards are known to exist that cannot otherwise be mitigated.

- A fall restraint system is the preferred approach. Fall restraint systems function to restrain an employee in such a manner as to prevent that employee from falling to a lower level. Fall restraint protection must be rigged to allow the movement of employees only as far as the sides and edges of the walking/work surface.
- Where an employee must work in a manner in which they cannot be fully protected from falling to a lower level using fall restraint, a fall arrest system will be employed.

## Fall Protection Work Plan

In accordance with WAC 296-155-24611 for hazards 10 ft or more, a Fall Protection Work Plan will be prepared by the employer where fall hazards of 4 feet or more exist. The work plan will:

- Identify all fall hazards in the specific work area.
- Describe the method of fall arrest or fall restraint to be provided.
- Describe the correct procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used.
- Describe the correct procedures for the handling, storage, and securing of tools and materials.
- Describe the method of providing overhead protection for workers who may be in, or pass through the area below the work site.
- Describe the method for prompt, safe removal of injured workers.
- Be available on the job site for inspection.
- Prior to permitting employees into areas where fall hazards exist the employer shall ensure employees are trained and instructed in the items applicable to their work.

The Fall Protection Work Plan will be prepared individually for each work event where an employee is exposed to a fall hazard. The work plan will be for that event only and expires at the completion of the work task. (See the sample Fall Protection Work Plan at the end of this program document.)

## Fall Protection Limitations

**WAC 296-155-24607 Fall protection is required regardless of height:**

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## Program Name

(1) Regardless of height, open sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, such as dip tanks and material handling equipment, and similar hazards shall be guarded with a standard guardrail system.

(2) Floor holes or floor openings, into which persons can accidentally walk, shall be guarded by either a standard railing with standard toe board on all exposed sides, or a cover of standard strength and construction that is secured against accidental displacement. While the cover is not in place, the floor hole opening shall be protected by a standard railing.

(3) Regardless of height employees shall be protected from falling into or onto impalement hazards, such as: Reinforcing steel (rebar), or exposed steel or wood stakes used to set forms.

### **Monitor:**

Also: open hatches to vaults, pipe pits, PRV's, pump stations, manholes, trap doors or wet wells or other below ground cavities may require the presence of a monitor whose only duty is to warn workers of their proximity of the fall hazard. When a monitor is not being used: additional protective devices are required:

- Be certain that hinged covers are of a standard strength and construction and a standard guardrail systems used have only one exposed side.
- When the opening is not in use, the cover shall be closed or
- Exposed side shall be guarded at both top and intermediate positions by removable standard guardrail systems.

### **Standard Guardrail Systems**

When guardrails must be temporarily removed to perform a specific task, the area shall be constantly attended by a monitor until the guardrail is replaced. The only duty the monitor shall perform is to warn persons entering the area of the fall hazard. Where employees are working on platforms above the protection of the guardrail system, the employer must either increase the height of the standard guardrail system (refer to the WAC 296-155-24615), or select and implement another fall protection system:

- (b) A fall restraint system;
- (c) A personal fall arrest system;
- (d) A safety net system
- (e) A catch platform

No standard guardrail system installation may be completed unless first designed by a certified safety engineer. A standard guardrail system shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of thirty-nine to forty-five inches from upper surface of top rail to floor, platform, runway, or ramp level. When conditions warrant, the height of the top edge may exceed the forty-five inch height, provided the guardrail system meets all other criteria of this subsection.

The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least two hundred pounds applied in any direction at any point on the top rail. The top rail shall be between thirty-nine and forty-five inches in height at all points when this force is applied.



When the two hundred pound (890 N) load specified in of this section is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than thirty-nine inches (1.0 m) above the walking/working level. Guardrail system components selected and constructed in accordance with this part will be deemed to meet this requirement;

The intermediate rail shall be halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

### **Portable Guard Rails**

Portable guard rails must meet or exceed the Code of Federal Regulations (CFR) as follows:

- Fall Protection for Guardrail Regulations; sections 1910.23 & 1926.500 - 1926.503

Example of an approved system:



## **Hazardous slopes.**

Employees exposed to falls of four feet or more while working on a hazardous slope shall use personal fall restraint systems or positioning device systems.

## **Roofs**

Employees working on steep pitched or low pitch roofs with fall hazards of 4 or more feet that utilize:

- Fall restraint system;
- Fall arrest system;
- Positioning device system;
- Safety monitor and warning line system; or
- Safety watch system.

## **Floor Openings**

Floor Openings must be guarded or covered. If the guarding or covering is removed, an employee must be positioned at the opening. The only duty of the employee is to prevent exposure to the fall hazard by warning other employees entering the area of the fall hazard.

Floor openings or platforms with ladders shall be guarded by standard guardrail system with standard toe boards on all exposed sides, except at entrance to opening, with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening. Hatchways and chute floor openings shall be guarded by one of the following:

- Hinged covers of standard strength and construction and a standard guardrail system with only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard guardrail systems.
- A removable standard guardrail system with toe board on not more than two sides of the opening and fixed standard guardrail system with toe boards on all other exposed sides. The removable railing shall be kept in place when the opening is not in use and shall be hinged or otherwise mounted so as to be conveniently replaceable.

Pits and trap door floor openings shall be guarded by floor opening covers of standard strength and construction. While the cover is not in place, the pit or trap openings shall be protected on all exposed sides by removable standard guardrail system.

Manhole floor openings shall be guarded by standard covers which need not be hinged in place. While the cover is not in place, the manhole opening shall be protected by standard guardrail system.



## **WAC 296-155-24609 Fall protection is required at four feet or more.**

(1) The employer shall ensure that the appropriate fall protection system is provided, installed, and implemented according to the requirements in this part when employees are exposed to fall hazards of four feet or more to the ground or lower level when on a walking/working surface.

(2) Guarding of walking/working surfaces with unprotected sides and edges. Every open sided walking/working surface or platform four feet or more above adjacent floor or ground level shall be guarded by one of the following fall protection systems.

Where employees are working on platforms above the protection of the guardrail system, the employer must either increase the height of the guardrail system as specified in (a)(i) of this subsection, or select and implement another fall protection system as specified in (b), (c), (d), (e), or (f) of this subsection.

When guardrails must be temporarily removed to perform a specific task, the area shall be constantly attended by a **monitor** until the guardrail is replaced. **The only duty the monitor shall perform is to warn people entering the area of the fall hazard.**

(a) A standard guardrail system, or the equivalent [as specified in WAC 296-155-24615(2)] on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a standard toe board wherever, beneath the open sides, persons can pass, there is moving machinery, or there is equipment with which falling materials could create a hazard.

(b) A fall restraint system;

(c) A personal fall arrest system;

(d) A safety net system;

(e) A catch platform; and

(f) A warning line.

Note: A warning line system erected at least fifteen feet from all unprotected sides or edges of the floor opening and meets the requirements of WAC [296-155-24615\(4\)](#).

(3) Guarding of ramps, runways, and inclined walkways.

(a) Ramps, runways, and inclined walkways that are four feet or more above the ground or lower level shall be equipped with a standard guardrail system or the equivalent, as specified in WAC [296-155-24615\(2\)](#), along each open side. Wherever tools, machine parts, or materials are likely to be used on the runway, a toe board shall also be installed on each open side to protect persons working or passing below.

(b) Runways used exclusively for special purposes may have the railing on one side omitted where operating conditions necessitate such omission, provided the falling hazard is minimized by using a runway not less than eighteen inches wide.

## **WAC 296-155-24611 Fall protection required at ten feet or more.**

(1) The employer shall ensure that the appropriate fall protection system is provided, installed, and implemented according to the requirements in this part when employees are exposed to fall hazards of ten feet or more to the ground or lower level, while:

- Engaged in roofing work on a low pitched roof;
- Constructing a leading edge;

**Note:** Employees not directly involved with constructing the leading edge, or are not performing roofing work must comply with WAC 296-155-24609, Fall protection required at four feet or more.

(c) Working on any surface that does not meet the definition of a walking/working surface not already covered in WAC 296-155- 24609;

(d) Engaged in excavation and trenching operations.

### **Exceptions: Excavations**

Fall protection is not required at excavations when employees are: (see below WAC)

(A) Directly involved with the excavation process and on the ground at the top edge of the excavation; or  
(B) Working at an excavation site where appropriate sloping of side walls has been implemented as the excavation protective system.

- Fall protection is required for employees standing in or working in the affected area of a trench or excavation exposed to a fall hazard of ten feet or more and:  
(A) The employees are not directly involved with the excavation process; or  
(B) Working at an excavation site where appropriate sloping of side walls has been implemented as the excavation protective system.

- Fall protection is required for employees standing in or working in the affected area of a trench or excavation exposed to a fall hazard of ten feet or more and:
  - The employees are not directly involved with the excavation process; or
  - The employees are on the protective system or any other structure in the excavation.

**Note:** Persons considered directly involved in the excavation process include:

- Foreman of the crew.
- Signal person.
- Employee hooking on pipe or other materials.
- Grade person.
- State, county, or city inspectors inspecting the excavation or trench.
- An engineer or other professional conducting a quality-assurance inspection.

## **WAC 296-155-655 – amended section**

### **Protection from hazards associated with water accumulation.**

(a) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, **or use**



### **of a safety harness and lifeline.**

(b) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

Fall protection:

(a) Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with chapter [296-155](#) WAC, Part C-1 shall be provided where walkways are 4 feet or more above lower levels.

(b) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

## **Portable Ladders**

Working on elevated, relatively flat surfaces are not the only places where you may encounter fall hazards. Ascending and descending ladders represent another point of exposure. Even when you are concentrating on not falling, a slip of a grip or misplacement of the foot can result in a fall and serious injury.

WAC 296-876-40040

You must:

- Make sure a ladder is not moved, shifted, or adjusted while anyone is on it.
- Secure the ladder at the top and bottom when working from it.
- Use a safety belt with a lanyard that is secured to the ladder when doing any work that:
  - a. Requires the use of both hands;
  - b. Is done from a ladder more than twenty-five feet above the ground or floor.

Prohibit work being done from a ladder more than twenty-five feet above the ground or floor if the work requires wearing eye protection or a respirator.

## **Fixed Ladders**

It is nearly impossible to stop or catch yourself once you start falling. It takes nearly a 2,500-pound force to stop the fall of a 200-pound person from six feet. A person can fall 4 feet in just half a second.

**While climbing a fixed ladder with safety equipment a condition known as suspension trauma or orthostatic intolerance can occur. Suspension trauma is a natural human reaction to being upright and immobile, where blood pools in the legs leading to unconsciousness. It can be caused by either deliberate or accidental suspension in a harness. If it is allowed to develop unchecked, it may be fatal.**

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## Program Name

Fixed ladders are most typically found in underground structures such as vaults and wet and dry wells. Above the ground, they are typically found in and upon water tank structures.

Use safety harness with a lanyard that is secured to the ladder when doing work that requires the use of both hands or working 25 feet or more above ground or floor.

A cage, well, or ladder safety system will be provided where the top of the ladder is greater than 24 foot.

All ladders without wells or cages shall be at least thirty inches from the nearest permanent object on the climbing side and measured perpendicular to the ladder from the centerline of the rungs, cleats or steps. Each side shall be at least fifteen inches and the back shall be seven inches, all measured from the center of the rung, cleat or step.

A cage, well or ladder safety system shall be provided when the length of the climb is less than twenty-four feet and the top of the ladder is more than twenty-four feet above the ground, floor or roof or the ladder is a single length that is equal to or greater than twenty-four feet.

Multiple ladder sections must have a cage, well or safety equipment on each section, each section shall not be greater than fifty feet, each section is offset from the adjacent section and landing platforms are provided at maximum intervals of fifty feet.

Cages shall meet all of the following:

- Extend at least forty-two inches above the top of the platform or above the point of access and egress at the top of the ladder.
- Has a provision for accessing or egressing from the platform or the point of access or egress of the ladder.
- There is at least twenty-seven inches, but not more than thirty inches, from the cage to the centerline of the step or rung at all points except where the cage flares at the bottom of the ladder.
- The cage is at least twenty-seven inches wide.
- There are no projections inside the cage.
- The bottom of the cage is at least seven feet but not more than eight feet above the point of access to the bottom of the ladder. Flared at least four inches all around within the distance between the bottom horizontal band and the next higher band.
- The vertical bars shall be spaced at intervals of nine and one-half inches or less on center around the circumference of the cage and fastened to the inside of the horizontal bands.
- The horizontal bands shall have vertical intervals between horizontal bands of no more than four feet on center.

Ladder safety devices and related support systems shall be capable of withstanding, without failure, the test drop of a five hundred pound weight for a free-fall distance of eighteen inches. The system does not require a person to continually hold, push or pull any part of the device and allows them to have both hands free to grip the ladder. In the event of a fall, the system shall activate within two feet, limit the fall velocity to seven feet per second or less and have a connection between the carrier or lifeline and the point of attachment on the full body harness that is not longer than nine inches.



## Fall Protection Program

If two or more ladders are used to reach an elevated work area, the ladder shall be offset with a platform or landing between them.

Verify that welding meets the requirement of the ANSI A14.3 at the time the ladder is installed.

Ladder safety devices that are used will not require a person to continually hold, push, or pull any part of the device and will allow them to have both hands free to grip the ladder. In the event of a fall, the device will activate within 2 feet and it will limit the fall velocity to 7 feet per second or less. The connection between the carrier or lifeline and the point of attachment on the full body harness will not be longer than 9 inches.

Ladder safety devices with rigid carriers will have mountings that are attached at each end of the carrier and have intermediate mountings that are all of the following:

- Spaced along the entire length of the carrier in accordance with the manufacturer's recommendations.
- Installed within one foot below each splice on the carrier.
- Has a maximum distance between mountings that is 25 feet or less.

Ladder safety devices with flexible carriers will have mountings that are attached at each end of the carrier and cable guides that are spaced at least 25 feet, but no further than 40 feet, apart along the entire length of the carrier.

The design and installation of mountings and cable guides will not reduce the design strength of the ladder.

## Fall Restraint Protection

Fall restraint protection will consist of either standard guardrail systems ~~or safety belts and/or~~ harness systems that conform to ANSI Standard:

- Class III full body harness
- Class IV suspension/position belt

The Class III full body harness is recommended.

(1) Personal fall restraint systems shall be rigged to allow the movement of employees only as far as the unprotected sides and edges of the walking/working surface, and shall consist of:

- (a) A full body harness shall be used.
- (b) The full body harness must be attached to securely rigged restraint lines.
- (c) All hardware assemblies for full body harness shall be capable of withstanding a tension loading of four thousand pounds without cracking, breaking, or taking a permanent deformation.
- (d) The employer shall ensure component compatibility.
- (e) Anchorage points used for fall restraint shall be capable of supporting four times the intended load.

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## Program Name

(f) Rope grab devices are prohibited for fall restraint applications unless they are part of a fall restraint system designed specifically for the purpose by the manufacturer, and used in strict accordance with the manufacturer's recommendations and instructions.

Rope grab devices are prohibited for fall restraint applications unless they are part of a fall restraint system designed specifically for the purpose by the manufacturer, and used in strict accordance with the manufacturer's recommendations and instructions.

Prior to each use, the user will inspect the components of the fall restraint system for:

- Webbing, Cables, & Lanyards - Cuts, tears, abrasion, fraying, stretching, mold, mildew, chemical damage.
- D-rings - Cracks, breaks corrosion, rough edges.
- Tongue-buckle - Distortions, added holes, broken grommets.

Defective components will be removed from service if their function or strength has been adversely affected. The removed components will be clearly marked as having been removed from service and the reason for the removal. Additional inspection criteria can be found in WAC 296-155-24605 & 24615.

Anchorage points used for fall restraint will be capable of supporting 4 times the intended load. The restraint protection will be rigged to allow the movement of employees only as far as the sides and edges of the walking/working surface.

## Fall Arrest Protection

### WAC 296-155-24613

#### Fall arrest specifications.

Fall arrest protection shall conform to the following provisions:

(1) Personal fall arrest system shall consist of:

(a) A full body harness shall be used.

(b) Full body harness systems or components subject to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a competent person to be undamaged and suitable for reuse.

(c) Anchorages for full body harness systems shall be capable of supporting (per employee):

(i) Three thousand pounds when used in conjunction with:

(A) A **self-retracting lifeline that limits the maximum free fall distances to two feet or less**; or

(B) A shock absorbing lanyard that restricts the forces on the body to nine hundred pounds or less.



(ii) Five thousand pounds for all other personal fall arrest system applications, or they shall be designed, installed, and used:

(A) As a part of a complete personal fall arrest system which maintains a safety factor of at least two; and

(B) Under the supervision of a qualified person.

(d) When stopping a fall, personal fall arrest systems must:

(i) Be rigged to allow a maximum free fall distance of six feet so an employee will not contact any lower level;

(ii) Limit maximum arresting force on an employee to one thousand eight hundred pounds (8 kN);

(iii) Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to three and one-half feet (1.07 m); and

(iv) Have sufficient strength to withstand twice the potential impact energy of an employee free falling a maximum distance of six feet (1.8 m).

- Shock absorbers that meet the requirements of ANSI Z359.1-2007 that are used as a part

**Notes:** of a personal fall arrest system in accordance with manufacturer's recommendations and instructions for use and installation will limit the maximum arresting forces on an employee's body to one thousand eight hundred pounds or less.

- To calculate fall clearance distance using a shock absorbing lanyard and D-ring anchorage connector, see WAC [296-155-24624](#), Appendix B.

(e) All safety lines and lanyards shall be protected against being cut or abraded.

(f) The attachment point of the full body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

(g) Hardware shall be drop forged, pressed or formed steel, or made of materials equivalent in strength.

(h) Hardware shall have a corrosion resistant finish, and all surfaces and edges shall be smooth to prevent damage to the attached full body harness or lanyard.

(i) When vertical lifelines (drop lines) are used, not more than one employee shall be attached to any one lifeline.

**Note:** The system strength needs in the following items are based on a total combined weight of employee and tools of no more than three hundred and ten pounds. If combined weight is more than three hundred and ten pounds, appropriate allowances must be made or the system will not be in compliance. For more information on system testing see WAC [296-24-88050](#), Appendix C, Part II.

(j) Vertical lifelines (drop lines) shall have a minimum breaking strength of five thousand

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## Program Name

pounds (22.2 kN), except that self-retracting lifelines and lanyards which automatically limit free fall distance to two feet (.61 m) or less shall have a minimum breaking strength of three thousand pounds (13.3 kN).

(k) Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

(l) Drop lines or lifelines used on rock scaling operations, or in areas where the lifeline may be subjected to cutting or abrasion, shall be a minimum of seven-eighths inch wire core manila rope or equivalent. For all other lifeline applications, a minimum of three-fourths inch manila rope or equivalent, with a minimum breaking strength of five thousand pounds, shall be used.

(m) Lanyards shall have a minimum breaking strength of five thousand pounds (22.2 kN).

(n) All components of full body harness systems whose strength is not otherwise specified in this subsection shall be capable of supporting a minimum fall impact load of five thousand pounds (22.2 kN) applied at the lanyard point of connection.

(o) D-rings and snap hooks shall be proof-tested to a minimum tensile load of three thousand six hundred pounds (16 kN) without cracking, breaking, or taking permanent deformation.

(p) Snap hooks shall be a locking type snap hook designed and used to prevent disengagement of the snap hook by the contact of the snap hook keeper by the connected member.

(q) Unless the snap hook is designed for the following connections, snap hooks shall not be engaged:

(i) Directly to the webbing, rope or wire rope;

(ii) To each other;

(iii) To a D-ring to which another snap hook or other connector is attached;

(iv) To a horizontal lifeline; or

(v) To any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur by the connected object being able to depress the snap hook keeper and release itself.

(2) **Safety net systems.** Safety net systems and their use shall comply with the following provisions:

(a) Safety nets shall be installed as close as practicable under the surface on which employees are working, but in no case more than thirty feet (9.1 m) below such level unless specifically approved in writing by the manufacturer. The potential fall area to the net shall be unobstructed.

(b) Safety nets shall extend outward from the outermost projection of the work surface as follows:



Vertical distance from working levels to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface	
Up to 5 feet	8 feet	
More than 5 feet up to 10 feet	10 feet	
More than 10 feet	13 feet	

(c) Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in (d) of this subsection.

(d) Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test.

(i) Except as provided in (d)(ii) of this subsection, safety nets and safety net installations shall be drop-tested at the job site after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at six-month intervals if left in one place. The drop-test shall consist of a four hundred pound (180 kg) bag of sand  $30 \pm 2$  inches ( $76 \pm 5$  cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than forty-two inches (1.1 m) above that level.

(ii) When the employer can demonstrate that it is unreasonable to perform the drop-test required by (d)(i) of this subsection, the employer (or a designated competent person) shall certify that the net and net installation is in compliance with (c) and (d)(i) of this subsection by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with (c) of this subsection and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the job site for inspection.

(e) Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.

(f) The maximum size of each safety net mesh opening shall not exceed thirty-six square inches ( $230 \text{ cm}^2$ ) nor be longer than six inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than six inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.

(g) Each safety net (or section of it) shall have a border rope or webbing with a minimum breaking strength of five thousand pounds (22.2 kN).

(h) Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than six inches (15 cm) apart.

(3) Catch platforms.

- (a) A catch platform shall be installed within four vertical feet of the work area.
- (b) The catch platform's width shall be a minimum of forty-five inches wide and shall be equipped with standard guardrails and toe boards on all open sides.

## **Self Retracting Lifelines (SRL)**

Note: SRL you choose should be class A & must limit the maximum free fall to 2 feet or less, and must be used in conjunction with a full body harness as described in this program.

### **ANSI/ASSE Z359.14-2012 Self-Retracting Device Classifications:**

Self-retracting devices shall be classified according to dynamic performance (see Section 3.1.9) as follows:

- Class A: Maximum arrest distance of 24 inches (610mm).
- Class B: **Not allowed** = Maximum arrest distance of 54 inches (1,372mm).

## **Positioning device system specifications.**

### **WAC 296-155-24617**

Positioning device systems and their use shall conform to the following provisions:

- (1) Positioning harnesses or full body harnesses shall be used.
- (2) Positioning devices shall be rigged to prevent an employee from a free fall greater than two feet.
- (3) Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or three thousand pounds (13.3 kN), whichever is greater.
- (4) Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.
- (5) Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.
- (6) Connecting assemblies shall have a minimum breaking strength of five thousand pounds (22.2 kN).
- (7) D-rings and snap hooks shall be proof-tested to a minimum tensile load of three thousand



six hundred pounds (16 kN) without cracking, breaking, or taking permanent deformation.

(8) Snap hooks shall be a locking type snap hook designed and used to prevent disengagement of the snap hook by the contact of the snap hook keeper by the connected member.

(9) Unless the snap hook is designed for the following connections, snap hooks shall not be engaged:

(a) Directly to webbing, rope or wire rope;

(b) To each other;

(c) To a D-ring to which another snap hook or other connector is attached;

(d) To a horizontal lifeline; or

(e) To any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur by the connected object being able to depress the snap hook keeper and release itself.

## Continuous Fall Protection

If fall protection is required, continuous fall protection will be employed so that there is no point where the employee is exposed but not protected. An example would be the transition from a fixed ladder climb on the side of a water tank to the top surface of the tank.

## Overhead Protection

There is always the possibility of injuries being caused by dropped tools, parts, or debris when persons are engaged in work that requires the use of personal fall protection systems. The following steps will be taken to minimize injury to people on the ground or lower levels:

1. Post signage stating that work is being performed overhead and hard hats are required.
2. The area underneath the work being performed must be barricaded to prevent anyone from inadvertently crossing below potential dropped objects.
3. Only authorized personnel will be allowed in the area while such work is being performed.
4. When tools are passed up to the worker. Anyone in the area underneath must be clear of the area before the person above begins to lift the tools.

## Equipment Storage

- 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.).
- Hang equipment in a cool, dry location in a manner that retains its shape.
- Always follow manufacturer recommendations for inspections.
- Clean with a mild, nonabrasive soap and hang to dry.
- Never store equipment near excessive heat or chemicals.
- Never use this equipment for any purpose other than personal fall arrest.
- Once exposed to a fall, remove equipment from service immediately.

## **Owned, rented, or leased aerial lifts.**

WAC 296-869-20045 & WAC 296-869-20015

### **IMPORTANT:**

This section applies if you own, rent, or lease an aerial lift.

### **You must:**

- Meet the requirements of the Responsibilities of Owners, section 8, of ANSI A92.2-2001, American National Standard for Vehicle-Mounted Elevating and Rotating Aerial Devices, if you own an aerial lift.
- Meet the requirements of the Responsibilities of Renters, Lessors or Lessees, section 11, of ANSI A92.2-2001, American National Standard for Vehicle-Mounted Elevating and Rotating Aerial Devices, if you rent or lease an aerial lift.

### **ANSI Standards: Working from the platform**

#### **You must**

- Make sure boom and platform load limits specified by the manufacturer aren't exceeded.
- Make sure persons stand firmly on the floor of the platform and don't:
  - Sit or climb on the edge of the platform
  - or
  - Use guardrails, planks, ladders, or any other device to gain additional height or reach

Prohibit wearing climbers when working from the platform.

- Make sure all persons on the platform wear a full body harness with a lanyard attached to either:
  - The manufacturer's recommended attachment point
  - or
  - The boom or platform if the manufacturer doesn't specify an attachment point
- Never attach a lanyard to an adjacent pole, structure, or equipment.

## **Electrical Work**

Workers shall conform to WAC 296-45-25510 Fall Protection guidelines for electrical work.



## Equipment Inspection Guidelines

1. A competent person will complete an annual inspection of all harnesses and documentation will be maintained (see Appendix A-Full Body Harness Checklist).
2. All harnesses that are involved in a fall arrest will be removed from service until approved by a competent person or manufacturer for return to service.

## EMERGENCY PROCEDURES

### First Aid Awareness and Actions

If there is an injury, and the injured person is readily accessible. Basic procedures for responding to medical emergencies described below should be followed.

### Medical Emergencies

If an injury occurs and you are able to provide medical assistance to the injured person, calmly and carefully assess the medical emergency. Provide assistance to the level of your training.

If you are injured, promptly report it to any manager, the Human Resources Manager or the Designated Person as soon as possible, complete an "Employee Report / Investigation Report" form.

**Injured employees shall not drive themselves to a medical care facility.** If you are the injured person, request someone else to transport you.

**In case of serious injury, do not move the injured person unless absolutely necessary. Only provide assistance to the level of your training.** Call 911 and then attend to the injured person.

### Suspension Trauma

Suspension trauma or orthostatic intolerance, is a natural human reaction to being upright and immobile, where blood pools in the legs leading to unconsciousness. It can be caused by suspension in a harness (deliberate or accidental), when trapped in a confined space, when secured to a vertical stretcher or litter - any situation where you are forced to stay upright without standing. If it is allowed to develop unchecked, it will be fatal.

**Treating someone with suspension trauma is not standard First Aid.**

Our blood supply and heart cannot cope very well with standing up - gravity pulls blood into the tissues of our legs and the heart only pumps blood. When standing and walking normally, leg muscles pump the blood back to the heart. Eventually, if enough blood pools in the legs, we will faint. Fainting allows the blood to rush back to the heart. If the blood is not allowed to return to the heart the person will die.

If you are going to be in an upright position for more than five or ten minutes without moving your legs, then you will be at risk.

## Prevention of Suspension Trauma

Preventing suspension trauma can take one of two approaches - either stop the blood from pooling in the legs or make sure the blood is pumped back to the heart.

### Plan 1

In the sitting position your legs do not move. Suspension trauma does not occur due to the fact your thighs are almost horizontal – the thighs are where most of the blood pools and so if they are kept elevated then suspension trauma is almost impossible.

For anyone suspended in a harness and who doesn't need to or can't move about all the time. Keep them in a sitting position. Looping something under their knees or sitting them on a swing-seat is a good method to use. **It's very important to do this as soon as possible - within a few minutes of suspension - so the blood has no time to begin pooling.**

The trick is to lift the knees and to use your legs as little as possible - the more you use them the more blood is sent down to the muscles.

### Plan 2

Using your legs keeps the blood flowing. Even hanging in a harness, if you are using your legs to prevent suspension trauma will not occur. The 'keep your legs active' plan works great if you have surfaces to kick against or pretend to ride an invisible bicycle. Once you start pedaling that invisible bicycle in mid-air, you cannot stop. If you do, the blood rushing into your legs stays there and you will lose consciousness.

To prevent suspension trauma never get into a position where going to be suspended for an extended length of time. To help prevent the hazard if you're in a suspended mode, lift the knees so your thighs are horizontal and use your legs as little as possible.

Never leave anyone alone who may be at risk of suspension trauma.

If you follow the normal advice for 'fainting' then you can easily kill your patient.

### Reflow syndrome in suspension trauma

Anyone who has developed suspension trauma is also at risk from reflow syndrome. Reflow syndrome is caused when the pooled blood in their legs is allowed to flow back towards the heart. It is potentially fatal.

The blood pooled in the legs starts off perfectly normal, with oxygen and nutrients dissolved in it. Over time, the cells in the legs use up the oxygen and nutrients. When all the oxygen is used up, the cells start to burn fats. This process, called anaerobic metabolism, is usually only seen in extreme exercise and relies on a fast blood flow to keep the process safe. As the blood in the legs is not moving, toxic byproducts of fat burning start to build up in the blood. After quite a short time they can reach dangerous levels.

If the blood is allowed to rush back towards the heart, then these toxins and the lack of any oxygen can cause very serious problems. The heart can stop, the liver, kidneys and brain can be



damaged and in many cases they will die. **This will happen if the patient is allowed to lie flat on the floor.** Therefore, it's very important that they stay in a sitting upright position with their legs bent at the waist until they reach hospital. During a rescue or transporting to the hospital the victim must be kept in this position and NEVER allowed to lie down.

#### First Response

Our guideline is that they should stay sitting for 30 minutes after being released from suspension. It does not matter if they have fainted or not. Anyone who has developed suspension trauma to any extent will have reduced blood flow to the brain. This initially causes symptoms of shock and if untreated will lead to loss of consciousness. The goal of the first responder is to prevent Reflow Syndrome. A 'safe position' is the sitting upright with their legs bent at the waist. During a rescue, transporting to a hospital or even when they arrive, they have to be kept in this position and NEVER allowed to lie down even for an instant.

Normally, suspension trauma makes the legs feel numb. If the patient has no other injuries and yet complains of severe pain in their legs, especially when you try to move them, then they may have developed a severe condition called compartment syndrome. You should summon an ambulance with great urgency. The patient may deteriorate rapidly. There is nothing you can do for compartment syndrome as a first responder.

#### If the patient is conscious

Your first action should be to place the patient in a sitting position with their body upright and their legs flat. This will reduce the pooling effect of gravity, but will keep most of the pooled blood in the legs, preventing reflow. The patient must not be allowed to stand up, exercise, drink or eat. If possible keep them as calm and relaxed as you can, to reduce the effects of stress on the heart rate. Do not give the patient any other medication or fluids. Summon medical help as soon as possible.

Obviously they need to be removed from suspension and kept in the same sitting position at all times. They may feel faint so stay with them and prevent them collapsing onto the floor.

Remember that **everyone** suspended for more than a few minutes should be sent to hospital for routine blood tests, even if they are not injured.

You will have to manage the airway while keeping the patient in a sitting position. Suspension trauma rarely leads to cardio respiratory arrest in the short term, but if the patient requires CPR then this overrules the posture policy and you must of course lay them flat or attempt CPR in the sitting position.

A patient who has been rendered unconscious by another event (such as impact in a fall or electrocution) and who is reached within the first 10 to 20 minutes of suspension may be allowed to lay flat.

## Rescue

Incidents involving work where the fall protection system has been engaged may result in a rescue action being necessary to retrieve the employee to a safe and accessible location. The required rescue may be either below grade (typically from a confined space) or above grade. The first step in any rescue/retrieval effort is to call your rescue services, advise them of the situation and request an emergency response. Remember to give some important information (Who, What, Where, Why, and When). You will be prompted by your rescue services for any necessary information not received.

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## Program Name

Any fall rescue program should be as safe as possible and take as little time as possible to bring a fallen worker to safety. When a fall occurs, any number of factors can create challenges to the effective rescue of the victim. Weather conditions, physical obstacles and the condition of victim can consume time and create hindrances for rescue personnel.

Rescue plans should be regularly reviewed to ensure that the procedures are manageable and realistic in their own best interests by implementing the safest and quickest rescue plan and by practicing procedures to maximize preparation for a real emergency.

OSHA recommends:

- Rescue suspended workers quickly.
- Be aware of the potentially life threatening risks and signs and symptoms of orthostatic intolerance and suspension trauma.

A non-entry fall rescue is a potential scenario when a fall occurs during the ingress or egress phase of the work in the confined space and the entrant is anchored to a tripod or retrieval system. If you cannot do the fall rescue without entering the confined space, you must contact your rescue services for their assistance.

## For Emergency Medical Service

Call 911. Do not attempt to transport the person yourself. If your manager is not on the scene, advise them or another responsible District person that 911 has been called.

If a worker feels in need of medical assistance, **do not let them drive or transport themselves.** Advise your manager of the need and arrangements will be made for someone to transport the worker.

## TRAINING

Prior to permitting employees into areas where fall hazards exist, the employee will be trained and instructed in the following:

1. How to identify hazards in the work area.
2. The methods of fall arrest or fall restraint that the District uses.
3. The correct procedures for the assembly, maintenance, inspection and disassembly of the fall protection system used.
4. The correct procedures for the handling, storage and securing of tools and materials.
5. The methods of providing overhead protection for workers who may be in or pass through the area below the work site.
6. The method for prompt, safe removal of injured workers.
7. Training and retraining shall be consistent with WAC 296-155-24621:
  - ⌚ Initial training for new employees
  - ⌚ Retrain employees who demonstrate lack of knowledge or understanding
  - ⌚ When new equipment is purchased



- ⇒ Changes in workplace dictate changes in training

## Supervisor Training

Be aware of the hazards of fall protection.

Assure that employees maintain the skill needed to perform their job safety. Training must include:

- Nature of fall hazards.
- Correct procedures for erecting, maintaining, disassembling and inspecting of the fall protection systems to be used.

## Outline: [x] – hour class

N/A

## REFERENCES/RESOURCES

- WAC 296-155-24601-24624
- WAC 296-800, Safety & Health Core Rules
- WAC 296-24, part J-1, working surfaces, guarding floors and wall openings.
- OHSA 29 CFR part 1910.23 & 1926.500 - 1926.503

## REVISION RECORD

Revision No.	Revision Date	Approval Date	Change
1	8-29-08	New format	1

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Program Name

## APPROVALS

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Safety Committee Chairperson      Date      General Manager      Date

## DEFINITIONS

### **WAC 296-155-24603**

**Affected area** means the distance away from the edge of an excavation equal to the depth of the excavation up to a maximum distance of fifteen feet. For example, an excavation ten feet deep has an affected area extending ten feet from the edge of any side of the excavation.

**Anchorage** means a secure point of attachment for lifelines, lanyards, or deceleration devices which is capable of withstanding the forces specified in this part.

**Catch platform** means a type of fall arrest system that consists of a platform installed within four vertical feet of the fall hazard, is at least forty-five inches wide and is equipped with a standard guardrail system on all exposed sides.

**Catenary line** - See horizontal lifeline.

**Competent person** means an individual knowledgeable of fall protection equipment, including the manufacturer's recommendations and instructions for the proper use, inspection, and maintenance; and who is capable of identifying existing and potential fall hazards; and who has the authority to take prompt corrective action to eliminate those hazards; and who is knowledgeable of the rules contained in this part regarding the installation, use, inspection, and maintenance of fall protection equipment and systems.

**Connector** means a device which is used to connect parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabineer, or it may be an integral component of part of the system (such as a buckle or D-ring sewn into a harness, or a snap hook spliced or sewn to a lanyard or self-retracting lanyard).

**Deceleration device** means any mechanism, such as a rope grab, rip stitch lanyard, specifically 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** means 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 full 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.



**Drop line** means a vertical lifeline secured to an upper anchorage for the purpose of attaching a lanyard or device.

**Equivalent** means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate and will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in this standard.

**Fall arrest system** means a fall protection system that will arrest a fall from elevation. Fall arrest systems include personal fall arrest systems that are worn by the user, catch platforms, and safety nets.

**Fall distance** means the actual distance from the worker's support to the level where a fall would stop.

**Fall protection work plan** means a written planning document in which the employer identifies all areas on the job site where a fall hazard of ten feet or more exists. The plan describes the method or methods of fall protection to be used to protect employees, and includes the procedures governing the installation, use, inspection, and removal of the fall protection method or methods which are selected by the employer. See WAC [296-155-24611\(2\)](#).

**Fall restraint system** means a system in which all necessary components function together to restrain/prevent an employee from falling to a lower level. Types of fall restraint systems include standard guardrail systems, personal fall restraint systems, warning line systems, or a warning line system and safety monitor.

**Floor hole** means an opening measuring less than twelve inches but more than one inch in its least dimension in any floor, roof, platform, or surface through which materials but not persons may fall, such as a belt hole, pipe opening, or slot opening.

**Floor opening** means an opening measuring twelve inches or more in its least dimension in any floor, roof, platform, or surface through which persons may fall.

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

**Free fall distance** means the vertical displacement of the fall arrest attachment point on the employee's full body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

**Full body harness** means a configuration of connected straps that meets the requirements specified in ANSI Z359.1-2007, that may be adjustable to distribute a fall arresting force over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration devices.

**Full body harness system** means a full body harness and lanyard which is either attached to an anchorage meeting the requirements of this part; or it is attached to a horizontal or vertical lifeline which is properly secured to an anchorage(s) capable of withstanding the forces specified in this part.

**Handrail** means a rail used to provide employees with a handhold for support.

**Hardware** means snap hooks, D-rings, bucklers, carabiners, adjusters, O-rings, that are used to attach the components of a fall protection system together.

**Hazardous slope** means a slope where normal footing cannot be maintained without the use of devices due to the pitch of the surface, weather conditions, or surface material.

**Horizontal lifeline** means a rail, rope, wire, or synthetic cable that is installed in a horizontal plane between two anchorages and used for attachment of a worker's lanyard or lifeline device while moving horizontally; used to control dangerous pendulum like swing falls.

**Lanyard** means a flexible line of webbing, rope, or cable used to secure a positioning harness or full body harness to a lifeline or an anchorage point usually two, four, or six feet long.

**Leading edge** means the advancing edge of a floor, roof, or formwork which changes location as additional floor, roof, or formwork sections are placed, formed, or constructed.

**Lifeline** means a vertical line from a fixed anchorage or between two horizontal anchorages, independent of walking or working surfaces, to which a lanyard or device is secured. Lifeline as referred to in this text is one which is part of a fall protection system used as back-up safety for an elevated worker or as a restraint for workers on a flat or sloped surface.

**Locking snap hook** means a connecting snap hook that requires two separate forces to open the gate; one to deactivate the gatekeeper and a second to depress and open the gate which automatically closes when released; used to minimize roll out or accidental disengagement.

**Low pitched roof** means a roof having a slope equal to or less than four in twelve.

**Mechanical equipment** means all motor or human propelled wheeled equipment except for wheelbarrows, mop carts, robotic thermoplastic welders and robotic crimpers.

**Personal fall arrest system** means a fall arrest system that is worn by the employee to arrest the employee in a fall from elevation. It consists of an anchor point, connectors, a full body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

**Personal fall restraint system** means a fall restraint system that is worn by the employee to keep the employee from reaching a fall point, such as the edge of a roof or elevated work surface. It consists of an anchor point, hardware assemblies, and a full body harness and may include a lanyard, restraint lines, or suitable combinations of these.

**Platform** means a work surface elevated above the surrounding floor or ground.

**Positioning device system** means a full body harness or positioning harness that is worn by an employee, and is rigged to allow an employee to be supported on an elevated vertical or inclined surface, such as a wall, pole or column and work with both hands free from the body support.

**Positioning harness** means a body support that meets the requirements specified in ANSI Z359.3-2007 that encircles and closes around the waist and legs with attachment elements appropriate for positioning work.



**Qualified person** means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

**Restraint line** means a line from a fixed anchorage or between two anchorages to which an employee is secured in such a way as to prevent the worker from falling to a lower level.

**Roof** means 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** means 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.

**Rope grab** means a fall arrester that is designed to move up or down a lifeline suspended from a fixed overhead or horizontal anchorage point, or lifeline, to which the full body harness is attached. In the event of a fall, the rope grab locks onto the lifeline rope through compression to arrest the fall. The use of a rope grab device is restricted for all restraint applications. See WAC [296-155-24615](#) (1)(f).

**Runway** means a passageway for persons, elevated above the surrounding floor or ground level, such as a foot walk along shafting or a walkway between buildings.

**Safety line** - See lifeline.

**Safety monitoring system** means a type of fall restraint system in which a competent person whose only job responsibility is to recognize and warn employees of their proximity to fall hazards when working between the warning line and the unprotected sides and edges, including the leading edge of a low pitch roof or other walking/working surface.

**Safety net system** means a type of fall arrest system, as described in WAC [296-155-24613](#)(2).

**Safety watch system** means a fall protection system as described in WAC [296-155-24615](#)(6), in which a competent person monitors one worker who is engaged in repair work or servicing equipment on low pitch roofs only.

**Self-rescue device** means a piece of equipment designed to allow a person, who is suspended in a personal fall arrest system, to independently rescue themselves after the fall by moving the device up or down until they reach a surface and are no longer suspended.

**Self-retracting lifeline** means a deceleration device which contains a wound line which may be slowly extracted from, or retracted onto, the device 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** means a flexible line of webbing, cable, or rope used to secure a full body harness to a lifeline or anchorage point that has an integral shock absorber.

**Snap hook** - See "locking snap hook."

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## Program Name

**Standard guardrail system** means a type of fall restraint system that is a vertical barrier consisting of a top rail and mid rail, and toe board when used as falling object protection for persons who may work or pass below, that is erected along all open sides or edges of a walking/working surface, a floor opening, a floor hole, wall opening, ramp, platform, or runway.

**Standard strength and construction** means any construction of railings, covers, or other guards that meets the requirements of this part.

**Static line** - See horizontal lifeline.

**Steep pitched roof** means a roof having a slope greater than four in twelve.

**Toe board** means a vertical barrier at floor level erected along all open sides or edges of a floor opening, platform, runway, ramp, or other walking/working surface to prevent materials, tools, or debris from falling onto persons passing through or working in the area below.

**Unprotected sides and edges** means any open side or edge of a floor, roof, balcony/deck, platform, ramp, runway, or walking/working surface where there is no standard guardrail system, or parapet wall of solid strength and construction that is at least thirty-nine inches in vertical height.

**Walking/working surface** means any area including, but not limited to, floors, a roof surface, bridge, the ground, and any other surfaces whose dimensions are forty-five inches or more in all directions, through which workers can pass or conduct work. A walking/working surface does not include vehicles or rolling stock on which employees must be located in order to perform their job duties.

**Wall opening** means an opening at least thirty inches high and eighteen inches wide, in any wall or partition, through which persons may fall, such as an opening for a window, a yard arm doorway or chute opening.

**Warning line system** means a barrier erected on a walking and working surface or a low pitch roof (four in twelve or less), to warn employees that they are approaching an unprotected fall hazard(s).

## APPENDIX: forms

### Annual Inspection Checklists

Consider for the following:

- Full Body Harness
- Lanyards
- Snap Hooks & Carabiners
- Self-retracting Lanyard/Lifeline

**Sample Forms: Fall Protection Work plan**

ADMINISTRATIVE			
Facility Name:	Facility Type:	Date:	
Facility Location:			
Task Description:	<input type="checkbox"/> High Angle <input type="checkbox"/> Above grade <input type="checkbox"/> Below grade		
HAZARD IDENTIFICATION			
Hazards in the work area:			
FALL ARREST / FALL RESTRAINT SYSTEM TO BE USED			
<input type="checkbox"/> Controlled Access Zone	<input type="checkbox"/> Warning Lines	<input type="checkbox"/> Safety Monitor	<input type="checkbox"/> Guardrails
<input type="checkbox"/> Fall Restraint	<input type="checkbox"/> Fall Arrest	<input type="checkbox"/> Ladder Safety Device	<input type="checkbox"/> Vertical Lifeline
<input type="checkbox"/> Full Body Harness	<input type="checkbox"/> Tripod w/winch	<input type="checkbox"/> Davit w/winch	<input type="checkbox"/> Horizontal Lifeline
<input type="checkbox"/> Deceleration Device	<input type="checkbox"/> Lanyards	<input type="checkbox"/> Connectors	<input type="checkbox"/>
<input type="checkbox"/> Anchorage, Permanent Installation – Located: _____			
<input type="checkbox"/> Anchorage, Temporary Installation – Located: _____			
SYSTEM INSPECTION			
<b>Webbing, Cables, &amp; Lanyards:</b> <input type="checkbox"/> Cuts <input type="checkbox"/> Tears <input type="checkbox"/> Abrasion <input type="checkbox"/> Stretching <input type="checkbox"/> Mold <input type="checkbox"/> Chemical Damage <input type="checkbox"/> Mfg Date			
<b>D-rings, Connectors:</b> <input type="checkbox"/> Cracks <input type="checkbox"/> Breaks <input type="checkbox"/> Corrosion <input type="checkbox"/> Rough Edges			
<b>Tongue-buckles:</b> <input type="checkbox"/> Distortions <input type="checkbox"/> Added Holes <input type="checkbox"/> Broken Grommets			
<b>Damaged System Components:</b> <input type="checkbox"/> Removed from service <input type="checkbox"/> Clearly marked with reason for removal from service			
SYSTEM ASSEMBLY			
<b>Warning Lines</b> <input type="checkbox"/> > 6' from leading edge <input type="checkbox"/> 36" to 42" high <input type="checkbox"/> Resist 16 lb. side load at 30" w/o tipping over <input type="checkbox"/> 200 lb. min. tensile strength			

{Insert the **NAME** your organization here}

## FALL PROTECTION WORK PLAN

<b>Guardrails</b>	<input type="checkbox"/> 42" +/- 3" high <input type="checkbox"/> Top rail, Mid rail, & 4" Toe board installed <input type="checkbox"/> Max 8' post spacing <input type="checkbox"/> Withstand 200 lb. load (all directions) on top rail
<b>Horizontal Lifeline</b>	<input type="checkbox"/> Designed and installed by a competent person <input type="checkbox"/> Protected against being cut or abraded
<b>Vertical lifelines</b>	<input type="checkbox"/> Only one employee attached to the line <input type="checkbox"/> Min. 5,000 lb. tensile strength <input type="checkbox"/> If device auto limits the fall to 2', then 3,000 min. tensile strength <input type="checkbox"/> Protected against being cut or abraded
<b>Lanyards</b>	<input type="checkbox"/> <u>Restraint</u> - Min. 4,000 lb. tensile strength <input type="checkbox"/> <u>Arrest</u> - Min. 5,000 lb. tensile strength <input type="checkbox"/> Protected against being cut or abraded
<b>D-rings</b>	<input type="checkbox"/> Min. 3,600 lb. tensile strength without cracking, breaking, or permanent deformation
<b>Snap-hooks</b>	<input type="checkbox"/> Locking type only  <u>NOT ENGAGED</u> <input type="checkbox"/> Directly to webbing, rope or wire rope <input type="checkbox"/> To each other <input type="checkbox"/> To a D-ring to which another snap-hook or other connector is attached <input type="checkbox"/> To a horizontal lifeline <input type="checkbox"/> To any object which is incompatibly shaped or dimensioned in relation to the snap-hook such that unintentional disengagement could occur by the connected object being able to depress the snap-hook keeper and release itself.

<b>SYSTEM ASSEMBLY, CONT.</b>	
<b>Restraint Anchorage</b>	<input type="checkbox"/> Capable of supporting 4 times the intended load
<b>Restraint Rigging</b>	<input type="checkbox"/> Allows movement of employees only as far as the sides and edges of the walking/working surface
<b>Arrest Anchorage</b>	<input type="checkbox"/> Capable of supporting 5,000 lb. per employee <input type="checkbox"/> If device auto limits the fall to 2' then 3,000 lb capability
<b>Arrest Rigging</b>	<input type="checkbox"/> Free fall distance minimized <input type="checkbox"/> Max. free fall distance of 6' <input type="checkbox"/> No contact with lower level at end of fall
<b>SYSTEM STORAGE AND HANDLING</b>	
<input type="checkbox"/> System components stored in clean, dry area away from corrosive materials <input type="checkbox"/> System components protected from cuts, tears, abrasion, mold, chemical damage during handling	
<b>OVERHEAD PROTECTION PROVISIONS</b>	
<input type="checkbox"/> Toe boards installed <input type="checkbox"/> Controlled access zone established <input type="checkbox"/> Hard hats required by all personnel <input type="checkbox"/> Warning lines installed <input type="checkbox"/> Other:	
<b>RESCUE PLANNING</b>	
<b>Below Grade Rescue:</b>	<input type="checkbox"/> Non-entry rescues by District staff from confined spaces <input type="checkbox"/> ENTRY RESCUE BY EASTSIDE FIRE & RESCUE (9-1-1) ONLY



<b>Above Grade:</b>	<input type="checkbox"/> Rescue by District staff – not high angle – not confined space <input type="checkbox"/> Rescue by Eastside Fire & Rescue (9-1-1)
<b>High Angle Rescue:</b>	<input type="checkbox"/> Slope angle $> 60^\circ$ = High angle rescue. <b>RESCUE BY EASTSIDE FIRE &amp; RESCUE (9-1-1) ONLY</b>
Minimum response time required for effective rescue?	_____
Response time capability confirmed with rescue service? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Safe to proceed with task? <input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>NOTES</b>	
Work Plan prepared by:	

# **Full Body Harness**

## **Annual Inspection Checklist**

Harness Model/Name: \_\_\_\_\_

Serial Number: \_\_\_\_\_ Lot Number: \_\_\_\_\_

Date of Manufacture: \_\_\_\_\_ Date of Purchase: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<b>General Factors</b>	<b>Accepted/Rejected</b>	<b>Supportive Details/Comments</b>
1) <b>Hardware:</b> includes D-rings, buckles, keepers and back pads. Inspect for damage, distortion, sharp edges, burrs, cracks and corrosion.	Accepted  Rejected	
2) <b>Webbing:</b> Inspect for cuts, burns, tears, abrasions, frays, excessive soiling and discoloration.	Accepted  Rejected	
3) <b>Stitching:</b> Inspect for pulled or cut stitches.	Accepted  Rejected	
4) <b>Labels:</b> Inspect, making certain all labels are securely held in place and are legible.	Accepted  Rejected	
5) Other:	Accepted  Rejected	
6) Other:	Accepted  Rejected	
7)  <b>Overall Disposition:</b>	Accepted  Rejected	<b>Inspected By:</b>  <b>Date Inspected:</b>

Program Name

# Lanyards

## Annual Inspection Checklist

Lanyard Model/Name: \_\_\_\_\_

Serial Number: \_\_\_\_\_ Lot Number: \_\_\_\_\_

Date of Manufacture: \_\_\_\_\_ Date of Purchase: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

General Factors	Accepted/Rejected	Supportive Details/Comments
1) <b>Hardware:</b> (includes snap hooks, carabiners, adjusters, keepers, thimbles and D-rings) Inspect for damage, distortion, sharp edges, burrs, cracks, corrosion and proper operation.	Accepted Rejected	
2) <b>Webbing:</b> Inspect for cuts, burns, tears, abrasions, frays, excessive soiling and discoloration.	Accepted Rejected	
3) <b>Stitching:</b> Inspect for pulled or cut stitches	Accepted Rejected	
4) <b>Synthetic Rope:</b> Inspect for pulled or cut yarns, burns, abrasions, knots, excessive soiling and discoloration.	Accepted Rejected	
5) <b>Energy Absorbing Component:</b> Inspect for elongation, tears and excessive soiling.	Accepted Rejected	
6) <b>Labels:</b> Inspect, making certain all labels are securely held in place and are legible.	Accepted Rejected	
<b>Overall Disposition:</b>	Accepted Rejected	<b>Inspected By:</b> <b>Date Inspected:</b>

# **Self-Retracting Lanyard/Lifeline**

## **Annual Inspection Checklist**

Self-Retracting Lanyard/Lifeline Model/Name: \_\_\_\_\_

Serial Number: \_\_\_\_\_ Lot Number: \_\_\_\_\_

Date of Manufacture: \_\_\_\_\_ Date of Purchase: \_\_\_\_\_

Department/Location: \_\_\_\_\_

Comments: \_\_\_\_\_

<b>General Factors</b>	<b>Accepted/Rejected</b>	<b>Supportive Details/Comments</b>
1) <b>Impact Indicator:</b> Inspect indicator for activation (rupture of red stitching, elongated indicator, etc.).	Accepted Rejected	
2) <b>Screws/Fasteners:</b> Inspect for damage and make certain all screws and fasteners are tight.	Accepted Rejected	
3) <b>Housing:</b> Inspect for distortion, cracks and other damage. Inspect anchoring loop for distortion or damage.	Accepted Rejected	
4) <b>Lanyard/Lifeline:</b> Inspect for cuts, burns, tears, abrasion, frays, excessive soiling and discoloration. (See impact indicator section.)	Accepted Rejected	
5) <b>Locking Action:</b> Inspect for proper lock-up of brake mechanism.	Accepted Rejected	
6) <b>Retraction/Extension:</b> Inspect spring tension by pulling lanyard out fully and allowing to retract fully (lifeline must be taut with no slack).	Accepted Rejected	
7) <b>Hooks/Carabiners:</b> Inspect for physical damage, corrosion, proper orientation and markings.	Accepted Rejected	
8) <b>Labels:</b> Inspect, making certain all labels are securely held in place and are legible.	Accepted Rejected	
<b>Overall Disposition:</b>	Accepted Rejected	<b>Inspected By:</b> <b>Date Inspected:</b>