

Fall Protection at SSC
SCWI-8715-0003
29CFR1926 Subpart M

Statistics

- Falls are the number one cause of fatalities in the construction industry.
- 150-200 workers are killed each year and more than 100,000 injured as a result of falls.
- Overall (including general industry) falls are the number two biggest cause of fatalities in the U.S. (motor vehicle accidents are number one).

Statistics

- Most falls occur on scaffolds or roofs
- 50% of fall fatalities are from heights of less than 30 feet

Physics of a Fall

- A body in motion (free fall) can cover vast distances in a short period of time. Consider this:
 - A body in free fall can travel 4 ft in 0.5 seconds
 - A body in free fall can travel 16 ft. in 1 second
 - A body in free fall can travel 64 ft. in 2 seconds

Fall Protection at SSC

NASA prime contractors and construction contractors shall:

- Ensure personnel are trained to recognize fall hazards and understand the basic Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) standards applicable to the area of fall protection.

Fall Protection at SSC (cont.)

- Ensure employees are trained in the proper use, wear, inspection and maintenance of fall protection equipment.
- Prime contractors who hire sub-contractors (e.g., construction contractors) to perform work at SSC are responsible to review fall protection plans of the sub-contractors they hire to ensure compliance with all applicable standards.

Fall Protection at SSC (cont.)

- Construction contractors shall have and submit fall protection plans as a part of their company safety plan for review by the appropriate safety office before fall protection is to be utilized on a jobsite. Plan shall be made specific to SSC.

Fall Protection at SSC (cont.)

- Construction contractor safety plan shall provide a fall protection section, unique to fall hazards they may encounter on the SSC jobsite and the proposed means of protecting workers from these hazards.

Fall Protection at SSC (cont.)

- Ensure an activity hazard analysis is conducted addressing fall hazards that employees may be exposed to and the mitigation of these hazards. The activity hazard analysis shall be completed prior to each job/task requiring the use of fall protection.

Fall Protection at SSC (cont.)

- Ensure that the training of employees on fall arrest systems cover the topics of application limits, proper anchoring and tie-off techniques, estimation of free fall distance, including determination of deceleration distance, and total fall distance to prevent striking a lower level, methods of use, inspection, and storage as well as manufacturer's recommendations.

Fall Protection at SSC (cont.)

- Ensure that all personal fall protection equipment is maintained and kept in a serviceable condition. Any fall protection equipment found to be un-serviceable shall be taken out of service and replaced.

Fall Protection at SSC (cont.)

- Conduct field audits of employee, contractor, and construction contractor fall protection work to ensure compliance with federal regulations and compliance with this document.

Application of Regulations

- Subpart M (1926.500) applies to fall protection during construction activities.
- There are a few exceptions from this rule for the following activities:
 - Inspection
 - Investigation
 - Assessing conditions prior to or after the work is performed

Duty to Have Fall Protection

- Fall protection is required when one or more employees have exposure to falls of six feet or greater to the lower level.
- Surfaces must be inspected before the work begins.
- Employees are only permitted to be on surfaces that are strong enough to support them.

Duty to have Fall Protection

- The following are examples of areas requiring fall protection when employees are exposed to falls (six feet or greater):
 - Leading edges
 - Ramps/runways
 - Residential construction
 - Hoist areas
 - Wall and floor openings
 - Unprotected sides and edges
 - Above dangerous equipment (any height)
 - Overhand brick laying
 - Steep or low slope roofs
 - Walking surfaces
 - Form work and reinforcing steel
 - Excavations, wells, pits
 - Precast concrete

Types of Fall Protection

- Passive are protective systems that do not involve the actions of employees.
- Active includes systems and components that require manipulation by employees to make them effective in providing protection.

Examples of Fall Protection

- Passive systems include:
 - Guardrails
 - Safety nets
 - Covers
 - Fences
 - Barricades
- Active systems components (personal fall arrest system-PFAS) include:
 - Anchorage points
 - Lanyard
 - Snap hooks
 - Life lines
 - Body harness

Guardrails

- Guardrails are the most common form of fall protection.
- May be made of wood, pipe, structural steel, or wire rope.
 - Flags must be provided on wire rope to increase visibility
- Must have top rail, mid rail, posts and toe board
- System must be strong enough to support 200 pounds of force applied to the top rail
- Steel or plastic bands are not acceptable

Guardrails-Design Criteria

- The top rail must be elevated above the surface 39-45 inches and must be free of jagged edges.
- The mid rail must be located between the top rail and the walking surface.
- Posts must be spaced no greater than 8 feet.
- Toe boards must be made of a solid material with no openings greater than one inch and be 3.5 inches high.
- Chains or movable rails must be used near hoists.

Personal Fall Arrest Systems

- PFAS shall not be tied to a guardrail system or hoists
- All components of a fall arrest system must be inspected before each use and after impact.
- Action must be taken promptly to rescue fallen employees.

Personal Fall Arrest Systems

- When stopping a fall, a PFAS must:
 - Limit the arresting force to 1800 pounds.
 - Be rigid so that an employee can not fall more than 6 feet of contact a lower level.
 - Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet.
 - Be able to withstand 2X potential impact of employee falling 6 ft. or permitted fall distance.

Inspecting Equipment

- Equipment must be inspected before each use for:
 - Degradation due to ultraviolet light
 - Any other condition that is not normal
- The following items must be inspected:
 - Tears or other wear
 - Deformed eyelets, D rings or other parts
 - Labels/placards
 - Dirt, grease, and oil

PFAS (Harness)

- Harness systems consist of either nylon or polyester and the best system will encompass the entire body (full body harness).
- Body belts can not be used for fall protection.
- A full body harness will evenly distribute weight across the waist, pelvis, and thighs.

PFAS (Lanyard)

- Lanyards connect the harness to the anchorage point.
- Must have a minimum breaking strength of 5000 pounds.
- Should be attached to a D ring between the shoulder blades above the employee.
- Only lanyards with built in deceleration devices (shock absorbing), or self retracting life lines which limit free fall distance to two (2) feet or less shall be used at SSC.

Types of Lanyards

- Self retracting
 - Eliminates excess slack in the lanyard (cable, rope, or web)
- Shock absorbing
 - Device slows and eventually stops descent and absorbs the forces (i.e.: rip stitch controlled tearing)

PFAS (Anchorage Points)

- The anchorage point is most effective when it is above the employee's head, located as to not allow an employee fall more than 6 feet.
- All anchorage points must be a solid immovable object that is capable of supporting 5000 pounds.
- Must not be used to support anything else.

Warning Line System

- Rope, wire, or chains are used to warn employees of an unprotected edge.
- Used mainly on roofs where PFAS is impractical.
- Established not less than six feet from the edge.
- Materials must have sufficient strength and complete structure must withstand 16 pound tipping force.

Controlled Access Zones (CAZ)

- Controlled Access Zones are not an acceptable means of worker protection from fall hazards at SSC.

Safety Monitoring System

The use of a safety monitoring system alone to provide fall protection for roofers on low-sloped roofs shall not be allowed at SSC.

Roofing Activities

- Roofers working on low-sloped roofs, with unprotected sides and edges six (6) feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system.

Questions?