



Document	Revision	Date
CS-S-6	Draft	Month Year

1.0. PURPOSE

- 1.1. These guidelines identify when fall protection should be incorporated into work activities and provides options for protecting employees from the hazards of falls resulting from working at heights, near floor or wall openings, and excavations. Guidance is also provided on the use of ladders and aerial work platforms.
- 1.2. These guidelines do not address design activities, nor do they address all options available for the activities described.
- 1.3. These guidelines are not meant to supersede or replace regulatory requirements, nor is it intended to be all inclusive of the applicable regulatory requirements. Instead, view this data as supportive and complementary to any operating requirements.

2.0. SCOPE

- 2.1. The scope of this guideline is to provide safe and consistent methods for identifying and mitigating hazards to workers when working at heights or areas prone to falls, e.g. open floor holes. These situations include, but are not limited to:
 - 2.1.1. Working from a ladder or aerial work platform greater than four (4) feet off the floor.
 - 2.1.2. Working within 15 feet of a floor or wall opening that exposes the worker to a fall of four (4) feet or more.
 - 2.1.3. Working in any other position greater than four (4) feet above the floor and exposed to a fall hazard.
 - 2.1.4. Working from or erecting scaffolding greater than four (4) feet above the floor and exposed to a fall hazard.
- 2.2. These guidelines also address working at heights that exceed six (6) feet in height where guardrails or nets are not utilized. This includes work near and around excavations including pipeline trenching outside of a facility.

3.0. DEFINITIONS

- 3.1. **Anchorage:** A secure point of attachment for lifelines, lanyards, or a deceleration device.
- 3.2. **Body Harness:** Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall arrest system.



Document	Revision	Date
CS-S-6	Draft	Month Year

- 3.3. **Deceleration Device:** Any mechanism (e.g., rope grab, rip-stitch lanyard, specially woven lanyard, tearing, or deforming lanyards, automatic self-retracting lifelines/lanyards) that serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on a worker during fall arrest.
- 3.4. **Fall Protection Rescue Plan:** A plan designed to assist persons who are injured during elevated work, or have fallen and are suspended by a Fall Arrest System to a level where First Aid or medical care can be administered.
- 3.5. **Floor Hole:** An opening measuring less than 12 inches, but more than 1 inch, through which material but not persons may fall.
- 3.6. **Floor Opening:** An opening measuring 12 inches or more in its least dimension in any walking or working surface through which a person may fall.
- 3.7. **Guardrail System:** A barrier erected to prevent workers from falling to lower levels.
- 3.8. **Lanyard:** A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline or anchorage.
- 3.9. **Lifeline:** A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.
- 3.10. **Personal Fall Arrest System:** A system used to arrest a worker in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline or suitable combinations of these.

4.0. RESPONSIBILITIES

4.1. Management Responsibilities

- 4.1.1. Implement these guidelines or a site-specific fall protection program
- 4.1.2. Enforce continual observational safety checks of work operations
- 4.1.3. Enforce safety policy and procedures
- 4.1.4. Ensure all jobs are pre-planned prior to the start of work

4.2. Supervisor Responsibilities (includes all personnel on site with a supervisory role)



Document	Revision	Date
CS-S-6	Draft	Month Year

- 4.2.1. Ensure all persons assigned to work at elevated levels are protected by personal fall protection equipment
- 4.2.2. Make exposure determinations and discuss with their workers the extent to which scaffolds, ladders or vehicle mounted work platforms can be used
- 4.2.3. Ensure that fall protection equipment is available and in safe working condition
- 4.2.4. Provide for emergency rescue in the event of a fall
- 4.2.5. Pre-plan the job to ensure that workers have been properly trained in the use, limitations, inspections, and rescue procedures and that training records are on file

4.3. **Workers**

- 4.3.1. Ensure they have and use the fall protection equipment identified for the task
- 4.3.2. Understand the potential hazards of working at elevated levels, as well as gaining access to and from the work location
- 4.3.3. Understand the use and limitations of the fall protection system
- 4.3.4. Pre-plan the job with their Supervisor to agree the job can be done safely
- 4.3.5. Inspect such equipment before each use and report defective equipment immediately to their Supervisor

5.0. **HAZARD IDENTIFICATION**

- 5.1. Work locations should evaluate and control potential worker fall hazards. Areas where workers are required to work at heights should maintain a fall protection program including a rescue plan. All such locations should have adequate full body harnesses and related fall arrest equipment to allow workers to work safely at heights and to facilitate rescue.
- 5.2. Prior to beginning each job, an assessment should be performed to determine if fall hazards are present and if protective measures are needed. Fall hazards and protective measures should be included in job planning as appropriate.



Document	Revision	Date
CS-S-6	Draft	Month Year

5.2.1. Assess fall hazards to identify task-specific similarities within each facility, e.g. elevated work plans would be similar for Contact or Dehydration Towers.

5.2.2. Anytime work or the potential for work outside the protection of a standard guardrail, a personal fall arrest should be worn, e.g. stationary elevated work platform or mobile lift platform.

5.2.3. Other situations where fall protection may be required:

- Unprotected sides and edges
- Hoist areas
- Holes or openings (a gap or void in a floor, roof, or other walking/working surface)
- Framework and reinforcing steel
- Ramps, runways, and other walkways (except for working on permanent walkways, work platforms, or tank landings equipped with top and mid-rails and toe boards.)
- Excavations if not sloped
- Over dangerous equipment
- Roofing work
- Building construction
- Wall openings (a gap or void 30 inches or more high and 18 inches or more wide through which workers can fall to a lower level)
- Incomplete scaffolds/work platforms
- Open top vessels and storage tank roofs without guardrails
- Crane baskets
- Personnel lifts
- Permanent ladders (and portable ladders where three points of contact cannot be maintained).

5.3. If a site-specific fall protection plan is required, it should be developed by a qualified person.

5.4. Control Fall Hazards



Document	Revision	Date
CS-S-6	Draft	Month Year

- 5.4.1. Eliminate the hazard
- 5.4.2. Use engineering or administrative controls, e.g. open-sided work platforms over four (4) feet above ground or next lower level should be guarded by a standard railing on all open sides except where there is an entrance to a ramp or stairway or fixed ladder.
- 5.4.3. Protect the worker by using personal fall arrest systems, personal protective equipment (PPE), nets, or barriers to prevent falling objects.
- 5.5. Locations should have plans in place to rescue workers promptly if they fall while wearing fall arrest equipment. Rescue planning should minimize the amount of time a person is suspended in a fall arrest harness and may include provisions for self-rescue, calling local emergency services, or use of on-site emergency responders.
 - 5.5.1. Verify the availability of personnel and personal fall arrest equipment to perform rescue
 - 5.5.2. Determine tools and equipment necessary to rescue workers, or provide for self-rescue, if they experience a fall, e.g., extension ladders, lift platforms, etc.
 - 5.5.3. Review the applicability of the rescue plan prior to working at heights.

6.0. HAZARD MITIGATION

6.1. Fall Protection Systems

- 6.1.1. Personal Fall Protection Systems (PFAS), include but are not limited to anchorage, connectors, lifelines, lanyards, positioning devices, etc., should conform to the requirements of 29 CFR 1926.502(d), and be designed and selected to interface compatibly with associated connections which will be attached to them.
- 6.1.2. All fall protection equipment must be inspected before each use. Any defective equipment must be removed from service.
- 6.1.3. Annually: A Competent Person, other than the user, should perform the annual inspection of the Personal Fall Arrest System.
- 6.1.4. Below are some guidelines for equipment inspection:



Document	Revision	Date
CS-S-6	Draft	Month Year

Inspect	For evidence of defect or damage including:
Hardware, D-rings, Buckles, Connectors, etc.	Cracks, sharp edges, deformation, corrosion, chemical attack, excessive wear, alterations, excessive heating
Ropes, Straps, Lines, Cables	Fraying, unsplicing, unlaying, kinking, knotting, broken or pulled stitches, excessive elongation, chemical attack, abrasion, excessive wear, excessive lubrication
Mechanical devices, Rope grabs, Connectors	Improper functioning, absence of parts

6.2. Anchor Point Considerations

- 6.2.1. The strength of any fall protection system is based on the system being connected to a secure anchor point. Attachment of the PFAS must be to an anchorage capable of withstanding the impact of a fall.
- 6.2.2. The anchor should be evaluated and approved prior to connection of the PFAS.
- 6.2.3. Permanent anchor points should be installed under the direction of a qualified person. Adequacy of permanent anchor points may be determined by:
 - Evaluation by a qualified person and/or engineer
 - Review of history and engineering/design documents, or
 - Review of manufacturer data.

6.3. Following are key points for fall arrest systems:

- 6.3.1. Anchor points should be as close to directly overhead as possible to minimize freefall and swing fall.
- 6.3.2. PFAS must prevent employees from falling to the next lower level and from striking any object or surface during a fall.
- 6.3.3. A knot in a lifeline or a lanyard can reduce the strength of the component by 50% or more.
- 6.3.4. The strength of a lifeline or lanyard can be reduced by 70% if looped or tied around an I-Beam due to the cutting action of I-Beam edges.

6.4. The table below provides guidance for fall protection systems for typical construction activities. This list should not be considered inclusive and site-specific conditions, company fall protection programs, and/or a qualified person should be consulted prior to beginning any work.



Document	Revision	Date
CS-S-6	Draft	Month Year

For construction work on this surface:	Typical fall protection system:	Additional information
Surfaces with unprotected sides and edges 6 feet or more above lower levels. These are surfaces not listed below.	Guardrail system, safety net system or personal arrest system	
Leading edges 6 feet or more above lower levels for workers engaged in the leading-edge work. Erecting precast concrete members (including erection of wall panels, columns, beams, and floor and roof “tees”) and when performing related operations 6 feet or more above lower levels. Fall protection plan is allowed ONLY for leading edge work, precast concrete work and residential construction. Residential construction activities 6 feet or more above lower levels.	Guardrail system, safety net system or personal fall arrest system.	Exception: If these are not feasible or create a greater hazard, develop and implement a fall protection plan
Workers who are working on a walking/working surface 6 feet or more above a lower level where leading edges are under construction, but who are not engaged in the leading-edge work.	Guardrail system, safety net system or personal fall arrest system	Note: When a guardrail system is chosen and when a controlled access zone has already been established for leading-edge work, use, if desired, the control line instead of a guardrail along the edge that parallels the leading edge.
Hoisting areas more than 6 feet above lower levels	Guardrail system or a personal fall arrest system.	Note: If guardrail systems are removed during hoisting operations, ensure workers leaning through the access opening or over the edge use



Document	Revision	Date
CS-S-6	Draft	Month Year

For construction work on this surface:	Typical fall protection system:	Additional information
		personal fall arrest systems.
When working around holes (including skylights) more than 6 feet above lower levels. This includes holes created by temporarily removing grating.	Personal fall arrest system, cover or guardrail system erected around the holes.	Cover holes (including skylights) to protect workers from tripping in or stepping into or through holes and objects falling through holes.
Formwork and reinforcing steel 6 feet or more above lower levels.	Personal fall arrest systems, safety net systems or positioning device systems	
Ramps, walkways and runways 6 feet or more above lower levels.	Guardrail systems	
Edges of excavations 6 feet or more in depth and when the excavations are not readily seen because of plant growth or other visual barrier.	Guardrail systems, fences or barricades	
Edges of wells, pits, shafts and similar excavations 6 feet or more in depth.	Guardrail systems, fences, barricades, or covers.	
When working less than 6 feet above dangerous equipment	Guardrail systems or equipment guards	
When engaged in overhand bricklaying and related work 6 feet or more above lower levels.	Use guardrail systems, safety net systems, personal fall arrest systems or controlled access zones. When reaching more than 10 inches below the level of the surface being worked on, use a guardrail system, safety net system or personal fall arrest system.	Note: This does not apply to bricklaying done from scaffolds. (See OSHA, 1926, Subpart L.)



Document	Revision	Date
CS-S-6	Draft	Month Year

For construction work on this surface:	Typical fall protection system:	Additional information
When doing roofing work on low-slope roofs with unprotected sides and edges 6 feet or more above lower levels.	Guardrail systems, safety net systems, personal fall arrest systems or in combination with a warning line system when workers are outside the warning line.	Note: On roofs 50 feet or less in width, using a safety monitoring system alone (without the warning line system) should require permission of the site manager.
All work activities on low-slope roofs that are not related to roofing work.	Use fall arrest equipment if you are close enough to the edge to fall unless the perimeter is enclosed with guardrails or parapets at least 39 inches high.	
Inspections prior to the actual start of construction work or after construction work has been completed.	Fall protection is would not be required for inspection, investigation or assessment of workplace conditions prior to the actual start of construction work or after all construction work has been completed. Fall protection is required for inspections that take place while construction work is underway.	
Steep roofs with unprotected sides and edges 6 feet or more above lower levels.	Guardrail systems with toe boards, safety net systems, or personal fall arrest systems	



Document	Revision	Date
CS-S-6	Draft	Month Year

For construction work on this surface:	Typical fall protection system:	Additional information
When working on, at, above or near wall openings (including those with chutes attached) when the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface.	Guardrail system, safety net system, or personal fall arrest system.	
Where the potential for falling objects exists, use hard hats and do one of the following:	<ol style="list-style-type: none"> 1. Erect toe boards, screens or guardrail systems to prevent objects from falling from higher levels. 2. Erect a canopy structure and keep objects far enough from the edge of the higher level to prevent their falling over the edge if they are accidentally displaced. 3. Barricade the area to which objects could fall, prohibit workers from entering the barricaded area and keep objects far enough from the edge to prevent their falling over the edge if accidentally displaced. 	

7.0. REFERENCES

- 7.1. Occupational Safety and Health Administration (OSHA)



Document	Revision	Date
CS-S-6	Draft	Month Year

- 7.1.1. 29 CFR Part 1910 OSHA Standards for General Industry
 - Subpart D, Walking-Working Surfaces
 - Subpart F, Power Platforms, man lifts, and vehicle-mounted work platforms
- 7.1.2. 29 CFR Part 1926 OSHA Standards for Construction Industry
 - Subpart M, Fall Protection
 - Subpart L, Scaffolds

8.0. HISTORY OF REVISIONS

Revision	Date	Description
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