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|  | **2017** |
|  | State of Wisconsin, Bureau of State Risk Management, DOA |

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| **[ Fall Protection Guidelines]** |
| In 2016, OSHA passed a final rule expanding on the working/walking surfaces standard and adding a fall protection standard for general industry. The new rule requires general industry employers to identify fall hazards in their workplace, while, also establishing plans and procedures to ensure that slip and fall hazards on floors, roofs, stairs, ramps, dock boards, scaffolds, elevated platforms and many other forms of working/walking surfaces are guarded. The construction standard for fall protection is unaffected by the provision. Fall hazards are common amongst many institutions/agencies. Seemingly, it is the employer’s duty to protect workers from fall hazards at no cost to the employee. According to OSHA, in Fiscal Year 2016, fall protection in construction was the number one most cited standard. Amongst the citations were an alarming number of deaths from falls. Statistics derived from OSHA exemplifies 364 out of 937 total deaths in the construction industry were from falls during 2015. |

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**Goal**

The goal of this guideline is to establish minimum requirements for state agencies/institutions to prevent employees from falling off, onto or through working levels. In addition, this guideline outlines proper training and use of appropriate fall protection devices when employees are working at heights greater than four feet (general industry) and six feet (construction).

**Purpose**

A fall protection program is required under the Fall Protection Standard established and enforced by the Occupational Safety and Health Administration (OSHA) for the Construction Industry. It is necessary to consider the requirements of this standard due to its connection with any construction activities conducted. In addition, it is reasonably likely that the Department of Safety and Professional Services (DSPS) will hold locations to some of the requirements of this standard under the General Duty clause of the Occupational Safety and Health Act (§5(b)). This document is intended to: provide agencies/institutions with a mechanism to evaluate and improve current fall protection measures and practices, serve as a requirements guide designed to protect workers potentially exposed to falls.

**Requirements**

**1.** Determine walking/working surfaces are structurally safe.

**2.** Conduct a fall hazard assessment.

**Four Foot Rule**

**☞**Anytime working on a raised area above four feet, either guardrails or fall protection must be established to prevent falls.

**☞**Anytime three points of contact are compromised from a ladder; fall protection must be established to prevent elevated falls.

* A survey shall be completed identifying areas within the plant which present fall hazards to employees falling more than four feet, or where objects may fall on employees causing injury, followed by identifying specifics per area (See **Appendices E and F**).

**3.** Eliminate the need for fall protection, if possible.

**4.** Select the appropriate type of fall protection system.

* Review **Appendix A** to assess the most proficient means of fall protection.

**5.** Develop rescue/retrieval procedures.

**6.** Develop an equipment inspection, maintenance and storage program.

**7.** Provide fall protection training.

* Review **Appendix G**

**8.** Monitor the fall protection program.

1. **Definitions**
   * **Body Harness**: Straps that are secured about the employee in a manner that will distribute 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.
   * **Controlled Access Zone**: An area in which certain work may take place without the use of a guardrail system, or personal fall arrest system and access to that specified zone is controlled.
   * **Dangerous Equipment**: Equipment (such as machinery, electrical equipment, tanks, amongst many other types) which, as a result of form or function, may be hazardous to employees subjected to falling onto or into such equipment.
   * **Guardrail**: A barrier erected to prevent employees from falling to lower levels.
   * **Leading Edge**: The edge of a floor, roof or framework for a floor. In addition, leading edges may include other working/walking surfaces which continually change location as additional: flooring, roofing, decking or formwork is placed or constructed.
   * **Lifeline/Lanyard**: A line, part of a personal fall-arrest System (PFAS) that is flexible and serves as a connection from an anchor point to a body harness.
   * **Personal Fall Arrest System (PFAS)**: A system used to arrest an employee in a fall from a working level to a lower level. It consists of an anchorage point, connectors, body belt, body harness, lifeline, lanyard, deceleration device and/or any appropriate combination of these.
   * **Positioning System:** This system holds the worker in place while keeping his/her hands free to work. Whenever the worker leans back the system is activated. However, the personal positioning system is not specifically designed for fall arrest purposes.
   * **Safety Monitor System:** A worker whose sole duty is to protect up to eight other workers working in a control zone, while using voice commands to protect them from fall hazards.
   * **Safety Net:** A net to protect workers from injury after falling from heights by limiting the distance they can fall.
   * **Unprotected Side and Edges:** Any side or edge of any working/walking surface, or over dangerous equipment that is not accompanied by a guardrail or wall.
   * **Warning Line System**: A barrier erected on a low sloping roof accompanied by a guardrail of PFAS to warn employees that they’re approaching an unprotected roof side or edge. Seemingly, it designates an area where employees are allowed to perform work.

**Appendix A**

**Fall Protection Systems**

**Guardrail Systems**

Guardrails must be constructed in accordance to the requirements in 29 CFR 1926.502(b).

* Guardrails must consist of a top rail, mid rail and toe board.
  + Toe boards (at least 3 ½”), screens, or guardrail systems must be erected adjacent to the walking/working surface to prevent objects falling from above.
* Top edge height of tops rails or equivalent guardrail system member shall be 42 inches plus or minus 3 inches above the walking/working level. Note: If work requires employees to use stilts, the top edge height of the top rail shall be increased by the amount equal to the height of the stilts.
* Mid rails must be installed at a height midway between the top edge and the walking/working surface.
* Guardrail systems must be able to withstand, without failure, a force of at least 200 pounds applied within two inches of the top edge, in any outward or downward direction, at any point along the edge. When the 200 pound force is applied in a downward direction, the top edge of the guard rail should not deflect to a height less than 39”.
* Guardrail systems should be surfaced to prevent injury to an employee from lacerations, punctures and to prevent snagging of clothing.
* The ends of top rails, mid rails and toe boards must not overhang the terminal posts, unless it does not create a projection hazard.
* Top rails and mid rails shall at least be one-quarter inch nominal diameter or thickness to prevent cuts and lacerations.
* If wire rope is used for top rails, it shall be flagged at no more than six foot intervals with high visibility material.
* Guardrail systems used to protect holes must protect all sides of the hole.
* When holes are used for points of access, a gate shall be provided to prevent a person from walking directly into the hole.

**Safety Net Systems**

Safety nets must be constructed in accordance to the requirements in 29 CFR 1926.502(c).

* When safety nets are used they must be installed as close as possible under the walking/working surface, but never more than thirty feet below the surface.
* Safety nets must extend outward from the outermost area of the work surface as follows:

|  |  |
| --- | --- |
| Vertical distance from working level 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 |

* Safety nets must be installed with sufficient clearance underneath the net and surface below to prevent contact with the surface or structure when subjected to a drop test.
* Safety nets and their installations must be capable of absorbing an impact force equal to that produced by the drop test.
  + **Performing a drop test**: A 400-pound bag of sand, 30 ± 2 inches in diameter, will be subjected to perform a drop test. The sand bag shall be dropped in the net from the highest point employees will occupy on the working level, but not less than 42 inches above the net.
* Defective nets must not be used.
  + Safety nets and components must be inspected at least weekly for: wear, damage, and deterioration, safety nets shall also be inspected following any fall into the net, and after any other incident that could affect the integrity of the net system.
  + Any defective components found must be removed and replaced.
* Materials, tools, scrap and any other foreign material fallen into the net must be removed immediately.
* The minimum size of each safety net mesh opening shall not exceed 36 square inches or be longer than six inches on any side, and opening.
* Each net and net section shall have a border rope for webbing. The minimum breaking strength of a border rope must be 5,000 pounds.

**Personal Fall Arrest System (PFAS)**

**A PFAS inspection checklist can be found in Appendix D.**

* Consists of anchorage, connectors, body harness, deceleration device, lifeline, or suitable combinations.
* Personal fall arrest systems, when stopping a fall, shall be rigged so an employee can neither fall 6 feet or make contact with a lower level.
* Must bring an employee to a complete stop and limit the maximum deceleration distance traveled to three and a half feet.
* Must be strong enough to withstand twice the potential impact energy of an employee free falling six feet or the free fall distance permitted by the system, whichever is less.
* PFAS must be inspected prior to each use for wear, damage and other deterioration.
* If a PFAS component is found to be defective or subjected to impact, it must be removed from service immediately.
  + PFAS subjected to impact must be inspected by a competent person prior to reuse.
* PFAS shall not be installed to a guardrail system.
* Body harnesses and components shall not be used to hoist materials or equipment.
* Equipment and procedures to ensure a prompt rescue in the event of a fall shall be in place.

All components of a fall arrest system shall meet the specifications of the OSHA fall protection standard, and shall be used in accordance with the manufacturer’s instructions:

* The use of non-locking snap hooks is prohibited.
* Dee-rings and locking snap hooks shall:
  + Have a minimum strength of 5,000 pounds.
  + They must be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or suffering permanent deformation.
* Lifelines must be:
  + Designed, installed, and used under the supervision of a competent person.
  + Protected against cuts and abrasions.
  + Equipped with horizontal lifeline connection devices capable of locking both directions on the lifeline when used on suspended scaffolds or similar work platforms that have horizontal lifelines that may become vertical lifelines.
  + When vertical lifelines are used, each employee shall be attached to separate lifelines.
* Self-retracting lifelines and lanyards must:
  + Automatically limit free fall distance to 2 feet or less and shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.
  + If self-retracting lifelines and lanyards do not limit free fall distance to 2 feet or less, rip-stitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds applied in the fully extended position.
* Anchors must support at least 5,000 pounds per person attached and must be:
  + Designed, installed, and used under the supervision of a competent person.
  + Capable of supporting at least twice the weight expected to be imposed on it.
  + Independent of any anchorage used to support or suspend platforms.

**Positioning Device Systems**

* Body belt or body harness systems shall be set up so that an employee can free fall no more than two feet.
* Must be secured to an anchor capable of supporting twice the potential impact load or 3,000 pounds, whichever is greater.
* Requirements for snap hooks, dee-rings, and other connectors are the same as detailed under “Personal Fall Arrest Systems.”
* Positioning devices shall be inspected prior to each use for wear, damage, and other deterioration; defective components shall be removed from service.

**Safety Monitoring Systems**

Where it is not feasible, or would create a greater hazard to use a conventional fall protection system, a safety monitor may be applicable. (Note: Fall Protection Plan required, **Appendix C**).

* Safety monitors shall be:

1. Competent in the recognition of fall hazards;
2. Capable of warning workers of fall hazard dangers;
3. On the same walking/working surface as the employees, and able to see them;
4. Close enough to work operations to communicate orally with employees;
5. Free from other job duties that might distract them from the monitoring function.

* Mechanical equipment shall not be used or stored in areas where safety-monitoring systems are being used on low-slope roofs.
* Employees not covered by a fall protection plan, or not performing roofing work on low-slope roofs, shall not be permitted in areas where employees are protected by a safety monitor system.
* Employees protected by a safety monitoring system must promptly obey directions from the safety monitor.

**Warning Line System**

Warning line systems shall consist of vertical supporting braces and ropes, wires, or chains and shall be erected around all sides of low-sloped roof work areas. In addition:

* Lines shall be flagged at no more than six foot intervals with high visibility material.
* The lowest point of the line (including sag) shall be between 34 and 39 inches from the working/walking surface.
  + Supporting braces shall be capable of resisting at least sixteen pounds of force applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof or platform edge.
  + Ropes, wires, or chains must have a minimum tensile strength of 500 pounds.
  + Lines must be fastened so that pulling on the line between supporting braces does not cause slack being taken up in adjacent sections.
* Warning lines must be erected at least six feet from the edge, except in areas where mechanical equipment is in use.
  + When mechanical equipment is in use, warning line systems shall be erected at minimum six feet from the parallel edge, and at least ten feet from the perpendicular edge.
  + Mechanical equipment shall be used or stored only in areas where employees are protected by a warning line system, guardrail, or PFAS.
* Points of access, material handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.
  + When the path to a point of access is not in use, it must be barricaded by means of a rope, wire, or chain and equivalent to the strength and height of the warning line.
* Employees are not permitted in the area between the roof edge and the warning line unless the employee is performing work in that area, and should be protected by other means of fall protection.

**Controlled Access Zone (CAZ)**

When used to control access to leading edge work, the CAZ shall be distinguished by a control line, or other means. In addition:

* The control line shall be flagged at no more than six foot intervals with high visibility material.
  + The line shall have a minimum breaking strength of 200 pounds.
* CAZ must be established between six and twenty-five feet from the unprotected edge or leading edge, except when constructing pre-cast concrete members. In this case, the control line must not be more than 60 feet from the edge, or half the length of the member, whichever is less.
* It is important that the control line runs the entire length of the unprotected or leading edge.
  + It must run approximately parallel to the edge.
  + It must connect to a wall or a guardrail.

**Appendix B**

Additional Resources

OSHA New Final Rule - Walking-Working Surfaces & Fall Protection <https://www.oshasafetymanagement.com/blog/osha-new-final-rule-walking-working-surfaces-fall-protection/>

Fall Protection—Safety and Health Topics OSHA

[www.osha.gov/SLTC/fallprotection/construction.html](http://www.osha.gov/SLTC/fallprotection/construction.html)

Miller Resources

<http://www.honeywellsafety.com/Supplementary/Documents_and_Downloads/Fall_Protection/4294993195/1033.aspx>

Oregon OSHA Fall Protection Resources

<http://osha.oregon.gov/Pages/topics/fall-protection.aspx>

Capital Safety Rescue Plan

<http://api.capitalsafety.com/api/assets/download/1/8077675>

**Appendix C**

Fall Protection Plan

If conventional fall protection cannot be used, or creates a greater hazard and a safety monitor is the only feasible option, the following steps must be taken:

1. The plan must be prepared by a qualified person and developed specifically for the site where the leading edge work or precast concrete erection is being performed and the plan must be maintained up to date.
2. Any changes to the fall protection plan must be approved by a qualified person.
3. A copy of the fall protection with all approved changes shall be maintained at the jobsite.
4. The implementation of the fall protection plan must be under the supervision of a competent person.
5. A copy of the fall protection plan shall include documented reasons why conventional fall protection cannot be used or would create a greater hazard.
6. The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems.

**Appendix D**

Personal Fall-Arrest System Checklist

|  |  |  |  |
| --- | --- | --- | --- |
| Agency:  Location:  Date of Inspection:  Inspected By:  Signature: Date: | | | |
| Safety Harness Manufacturer and Serial No. | | | |
| 1. | **Pass**  🞏Yes 🞏No | 9. | **Pass**  🞏Yes 🞏No |
| 2. | **Pass**  🞏Yes 🞏No | 10. | **Pass**  🞏Yes 🞏No |
| 3. | **Pass**  🞏Yes 🞏No | 11. | **Pass**  🞏Yes 🞏No |
| 4. | **Pass**  🞏Yes 🞏No | 12. | **Pass**  🞏Yes 🞏No |
| 5. | **Pass**  🞏Yes 🞏No | 13. | **Pass**  🞏Yes 🞏No |
| 6. | **Pass**  🞏Yes 🞏No | 14. | **Pass**  🞏Yes 🞏No |
| 7. | **Pass**  🞏Yes 🞏No | 15. | **Pass**  🞏Yes 🞏No |
| 8. | **Pass**  🞏Yes 🞏No | 16. | **Pass**  🞏Yes 🞏No |

**A competent person must utilize the questions on “Checklist Guide” to determine if harnesses and lanyards meet satisfactory requirements.**

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| **Impact Indicator (where applicable)**  **Checklist Guide** |
| Does it appear to be damaged? |
| Is it or any of its components missing? |
| Has it been deployed? |
| Has the Reserve Lifeline been deployed? |
| **Buckles** |
| Do any buckles appear to be cracked, bent, distorted or damaged by any means? |
| Do buckles function poorly? |
| Are there any missing components to buckles? |
| Do any buckles show any signs of corrosion? |
| Are there any burs or sharp edges on any of the buckles? |
| **D-Rings** |
| Is the D-ring cracked, bent, distorted or damaged by any means? |
| Does the D-ring seem to be welded in any place? |
| Are there any signs of corrosion on the D-ring? |
| Does the D-ring present any sharp edges or burs? |
| **D-Ring Plate (back pad)** |
| Does the back pad D-Ring show any of the above signs or missing/damaged? |
| **Connectors** |
| Do connectors appear to be cracked, bent, distorted or damaged by any means? |
| Do any connectors have sharp edges? |
| Are there any missing components to the connectors? |
| Does there appear to be any corrosion on the connectors? |
| Are labels worn, missing or improperly marked? |
| Are the gates on the connector sticky? |
| Does the gate stay open/won’t lock? |
| Is there excess dirt or grease on the connectors? |
| Does the connector close but won’t lock? |
| Does it work in a single action (non-locking type)? |
| **Labels** |
| Are labels missing or worn? |
| Are labels legible? |
| **Plastic Keepers** |
| Are any plastic keepers missing or damaged? |

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| **Wire Rope** |
| Are there any signs of heat damage? |
| Are there any kinks in the wire? |
| Does the wire appear to have any missing components, or is the thimble damaged? |
| Are there any loose ends? |
| Does the wire show any signs of corrosion? |
| Is there any distortion in the wire? |
| Are there any broken wires? |
| Is there any separation between strands of wire? |
| Does the wire appear to be “bird caging” by any means? |
| **Shock Absorber** |
| Are there any cuts/tears/abrasions on any part of the shock absorber? |
| Does the shock absorber show signs of being deployed, stretched or elongated? |
| Are there any plastic coverings missing? |
| Are there any holes or burns? |
| Does there appear to be any UV damage/fading? |
| Is there any excessive soiling on the shock absorber? |
| **Stitching** |
| Is stitching cut, broken, pulled, or burned? |
| Does there appear to be any missing stitching patterns? |
| **Webbing** |
| Are there any cuts/tears/holes? |
| Are any burns found? |
| Does the webbing have any knots or frays? |
| Does UV damage or any discoloration seem to be imminent? |
| Is there grease, grime, mold or paint on webbing? |
| Are there any damaged or missing stitching patterns? |
| **Rope** |
| Is there any inner core damage? Does it show through the sheath? |
| Does the rope appear to be fraying? |
| Are there any cuts or pulls in the fibers? |
| Are there any burns, knots, heat damage, or bird caging occurring? |
| Is discoloration seen on the rope? |
| Is there dirt, grease, paint or rust staining present? |

**Answering “yes” to any questions above requires the harness/lanyard to be removed from service.**

**Appendix E**

Plant Survey for Fall Protection Areas

A survey of areas in the plant and surrounding areas which present hazards to employees falling four feet or more, or where objects may fall on employees causing injury.

A-

B-

C-

D-

E-

F-

G-

H-

I-

J-

**Appendix F**

Elevated Work Assessment

Location:

Date:

List task performed, working at heights above four feet:

Explain where the task is being performed:

Explain specifically what task is being performed:

Explain specifically how the task is currently being performed:

List any equipment currently being used:

List suggested corrective actions:

**Appendix G**

Training Requirements

1. The Safety Coordinator shall assure that each employee is trained, as necessary, by a competent person qualified in the following areas:
   1. The fall hazards in the work area;
   2. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection system to be used;
   3. The use and operation of guardrail systems, personal fall arrest systems, controlled access zones, and other protection to be used;
   4. The role of each employee in the safety monitoring system when this system is used;
   5. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs;
   6. The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection; and
   7. The role of employees in fall protection plans.
2. The Safety Coordinator shall verify compliance with the training requirements.
3. When the Safety Coordinator has reason to believe that any affected employee who has already been trained does not have the understanding and skill required; the Safety Coordinator must retrain such employee. Circumstances include:
   1. Changes in the workplace which render the previous training obsolete;
   2. Changes in the types of fall protection systems or equipment to be used make the previous training obsolete;
   3. Inadequacies in an affected employee’s knowledge or use of fall protection systems, or the employee indicates that they have not retained the understanding or skill.