

2018

# FALL PROTECTION PLAN

(Construction Worksites)

## Pottawattamie County

### Safety & Health Program

#### Section B 16

It is the policy of Pottawattamie County to provide a safe and healthful workplace for employees. It is the intent of this policy to comply with OSHA requirements listed for Construction Workers under 29 CFR 1926; all local, state, and federal laws. See Appendix F for General Industry.



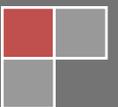
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Approved by the Board of Supervisors  
October 30, 2018



## FALL PROTECTION

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## I. Objective

Risk Management has developed this Program to ensure a safe work environment and to protect the health and safety of employees who may be required to work in areas where fall hazards are present. It is the intention of this Program to comply with the US Department of Labor, Occupational Safety and Health Administration (OSHA) Fall Protection standards 29 CFR 1926.500 and 29 CFR 1926.502.

## II. Scope and Applicability

- A. This Program establishes the required procedures, methods, precautions, training, and responsibilities that shall be used by Pottawattamie County personnel where fall protection is required.
- B. The following work situations are covered by the County's Fall Protection Program:
  - 1. Fixed Ladders – over 20 feet in height
  - 2. Elevating Personal Platforms – scaffolds, aerial platforms, scissors lifts forklift-mounted platforms, cherry pickers, etc.
  - 3. Elevated Surfaces – roofs (closer than 6 feet to the edge), catwalks, skylights, boilers, chillers, etc.
  - 4. Vertical Opening - ground level entry into excavations, trenches, holes, pits, vessels, and other confined spaces.
  - 5. Guardrails and handrails?
- C. Fall Protection Requirements for General Industry and Maintenance Activities

**Note:** A specific fall protection standard does not exist for general industry. Some Fall Protection Program requirements are contained in industrial specific standards and are addressed below.

## III. Authority and Responsibility

- A. Risk Manager is responsible for:
  - 1. Assisting departments with developing, implementing, and administering the program.
  - 2. Auditing for compliance and evaluating implementation with this program and the applicable OSHA standards.

3. Assisting departments in identifying areas/activities that require fall protection.
4. Developing training programs on the recognition of fall hazards.
5. Maintaining employee training records.
6. Determining if there are feasible engineering controls that can be implemented to eliminate fall hazards.
7. Work with the departments to ensure that fall protection systems/devices meet OSHA regulations.

**B. Departments and Supervisors are responsible for:**

1. Identify activities, equipment, or machinery that needs to be evaluated for fall protection measures.
2. Ensuring that all affected employees are properly trained and qualified to comply with the requirements of this Program.
3. Ensuring that all affected employees are aware of the locations or equipment where fall protection measures are required.
4. Ensuring that all affected employees comply with this Fall Protection Program and OSHA standards.
5. Conducting annual fall protection inspections per Appendix B.
6. Developing a rescue plan. This plan entails (in the event of a fall) emergency phone numbers, location of retrieval equipment, instructions on the use of retrieval equipment, etc. (Appendix C).
7. Ensuring that employees are trained in the recognition of fall hazards.
8. Maintain training records.

**C. Employees are responsible for:**

1. Complying with the requirements of this Program.
2. Conducting inspections of fall protection equipment.
3. Reporting equipment defects and problems to supervisors.
4. Complying with fall protection methods.

## **IV. Program Elements**

### **A. Fall Protection Requirements**

Fall protection is required whenever work is performed in an area 6 feet above its surroundings (except for portable ladders) and can generally be provided through the use of fall protection systems including (Additional fall protection criteria/requirements can be found in Appendices D, E, and F,):

1. Guardrails - Standard guardrails consist of a top rail, located 42 inches above the floor, and a mid-rail. Screens and mesh may be used to replace the mid-rail, so long as they extend from the top rail to the floor.
2. Personal Fall Arresting Systems - Components of a personal fall arresting system include a body harness, lanyard, lifeline, connector, and an anchorage point capable of supporting at least 5000 pounds.
3. Positioning Device Systems - Positioning device systems consist of a body belt or harness rigged to allow work on a vertical surface, such as a wall, with both hands free.
4. Warning Line Systems - Warning line systems are made up of lines or ropes installed around a work area on a roof. These act as a barrier to prevent those working on the roof from approaching its edges.
5. Covers - Covers are fastened over holes in the working surface to prevent falls.

### **B. Notification**

Risk Management shall be notified when it can be clearly demonstrated that the use of these systems is infeasible or creates a greater hazard. Alternative fall protection measures may be implemented.

### **C. Controlled Access Zones**

Controlled access zones shall limit entrance to areas where leading edge work and other operations are taking place and shall be defined by a controlling line or other means that restricts access. Control lines shall consist of ropes, wires, tapes or equivalent material, supporting stanchions and each shall:

1. Be flagged or otherwise clearly marked at not more than 6 foot intervals with a high visibility material.
2. Be rigged and supported in such a way that the lowest point (including sag) is not less than 39 inches from the walking/working surface and the highest

point is not more than 50 inches.

3. Be strong enough to sustain a stress of not less than 200 pounds.
4. Extend along the entire length of the unprotected leading edge and shall be parallel to the unprotected or leading edge.
5. Be connected on each side to a guardrail system or wall.
6. When control lines are used they shall be erected no less than 6 feet and no more than 25 feet from the unprotected or leading edge, except when precast concrete members are being erected. In the latter case, the control line shall be erected not less than 6 feet and no more than 60 feet or half the length of the member being erected, whichever is less, from the leading edge.
7. Controlled access zones when used to access areas where overhand plastering and related work are taking place shall be defined by a control line erected not less than 10 feet and no more than 15 feet from the working edge. Additional control lines shall be erected at each end to enclose the controlled access zone. Only employees engaged in overhand bricklaying or related work is permitted in these zones;
8. On floors and roofs where guardrail systems are not in place prior to the start of overhand bricklaying operations, controlled access zones shall be enlarged as necessary to enclose all points of access, material handling areas and storage areas.
9. On floors and roofs where guardrail systems are in place, but need to be removed to allow leading edge work to take place, only the portion of the guardrail necessary to accomplish that day's work shall be removed

#### **D. Safety Monitoring Systems**

If no fall protection, including personal fall arrest systems, warning line systems, controlled access zones, or guardrail systems can be used, then a safety monitoring system shall be established. The responsible department shall designate a safety monitor to monitor the safety of the employees. The safety monitor shall:

1. Be competent in the recognition of fall hazards.
2. Be capable of warning workers of fall hazard dangers.
3. Detect unsafe work practices as in accordance with this Program.
4. Work on the same surface as the workers and maintain visual contact of all employees.

5. Be close enough to the work operations to communicate orally with the workers.
6. Have no other duties that will interfere or distract from the monitoring.

Mechanical equipment shall not be used or stored where safety monitoring systems are being used to monitor roofing operations on low-sloped roofs. No employees, other than those working on low sloped roofs or covered by a personal fall arrest system, shall be allowed in an area where the employee is being protected by a safety monitoring system. All workers in a controlled access zone shall be instructed to comply with all warnings issued by the safety monitor.

### **E. Covers**

Covers in floors, roofs, and other walking/working surfaces shall be capable of supporting (without failure) at least twice the weight of employees, equipment, and materials that may be on the cover at any one time. Covers in roadways and vehicular aisles shall be capable of supporting (without failure) at least twice the maximum axle load of the largest vehicle expected on the cover. All covers shall be secured when installed to prevent accidental displacement by wind, equipment, or employees. Covers shall be color coded or marked with the word "HOLE" or "COVER".

### **F. Protection from Falling Objects**

When an employee is exposed to falling objects, it is required that each employee wears a hard hat and implements one of the following measures:

1. Erect toe boards, screens, or guardrail systems to prevent objects from falling from higher levels.
2. Erect a canopy structure and keep potential falling objects far enough from the edge of the upper level, or
3. Barricade the area where overhead objects could fall and prohibit employees from entering the area.

## V. Training and Recordkeeping

### A. Training

Employees exposed to fall hazards shall be trained. Training shall be conducted and documented by Risk Management or authorized competent person and respective departments and shall include the following:

1. The nature of fall hazards in the work area.
2. The correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems.
3. The use and operation of guardrail systems, personal fall arrest systems, and other protection methods.
4. **Retraining** shall be conducted when:
  - a. Inadequacies in employee knowledge prove training to be warranted.
  - b. Any other situation that the supervisor or Risk Manager determines that retraining is warranted.
  - c. Where changes in fall protection usage is necessary due to technological changes of newly purchased fall protection equipment, or specific changes for fall protection usage occur.

### B. Recordkeeping

Employee training records shall be retained by Risk Management. Departments shall forward all training records to Risk Management.

## VI. REFERENCES

[OSHA 29 1910 Subpart D](#), Walking – Working Surfaces;  
[OSHA 29 CFR 1910 Subpart F](#), Powered Platforms, Man lifts, and Vehicle Mounted Work Platforms;  
OSHA Fall Protection Standards, [29 CFR 1926.500](#), [1926.501](#), [1926.502](#), [1926.503](#);

The activities listed below are not covered under [29CFR 1926.500](#). Fall Protection requirements are addressed in the specific standard listed below:

[OSHA 29 CFR 1926 Subpart L](#), Scaffolds;  
[OSHA 29 CFR 1926 Subpart N](#), Helicopters, Hoists, Elevators, and Conveyors;  
[OSHA 29 CFR 1926 Subpart R](#), Steel Erection;  
[OSHA 29 CFR 1926 Subpart S](#), Underground Construction, Caissons, Cofferdams, and Compressed Air; and  
[OSHA 29 CFR 1926 Subpart X](#), Stairways and Ladders

## APPENDIX A – Definitions

**Anchorage:** A secure point of attachment for lifelines, lanyards or deceleration devices.

**Body belt (safety belt):** A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

**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.

**Buckle:** Any device for holding the body belt or body harness closed around the employee's body.

**Competent Person:** A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions.

**Connector:** A device which is used to couple (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 body belt or body harness, or a snap hook spliced or sewn to a lanyard or self-retracting lanyard).

**Controlled access zone (CAZ):** An area in which certain work (e.g., overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

**Dangerous equipment:** Equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

**Deceleration device:** Any mechanism, such as a rope grab, rip-stitch lanyard, specially-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:** The additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or 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.

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

**Failure:** Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

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

**Free fall distance:** The vertical displacement of the fall arrest attachment point on the employee's body belt or 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.

**Guardrail system:** A barrier erected to prevent employees from falling to lower levels.

**Hole:** An opening measuring less than 12 inches (5.1 cm) but more than 1 inch in its least dimension, in any floor, platform, roof, pavement, or yard, through which materials bit not persons may fall; such as a belt hole, pipe opening, or slot opening.

**Infeasible:** Impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

**Lanyard:** A flexible line of rope, wire rope, or strap which generally has a connector at such end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

**Leading edge:** The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

**Lifeline:** A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

**Low-slope roof:** A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

**Lower levels:** Those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

**Mechanical equipment:** All motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.

**Opening:** A gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

**Overhand bricklaying and related work:** The process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

**Personal fall arrest system:** A system used to arrest an employee 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. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

**Positioning device system:** A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

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

**Rope grab:** A deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

**Roof:** 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:** 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.

**Safety-monitoring system:** A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

**Self-retracting lifeline/lanyard:** A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

**Snap hook:** A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap hooks are generally one of two types:

- The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
- The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. As of January 1, 1998, the use of a non-locking snap hook as part of personal fall arrest systems and positioning device systems is prohibited.

**Steep roof:** A roof having a slope greater than 4 in 12 (vertical to horizontal).

**Toe board:** A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

**Unprotected sides and edges:** Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

**Walking/working surface:** Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

**Warning line system:** A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

**Work area:** That portion of a walking/working surface where job duties are being performed.

# MODEL FORMS

Model forms for this program are located on the following pages. Departments may modify or develop their own forms based on the specific needs of their department.

Modified forms are subject to  
review and approval of Risk Management

**APPENDIX B – EQUIPMENT INSPECTION CHECKLIST**

<b>Full Body Harness Equipment Inspection Checklist</b>			
<b>Date Inspected:</b>			
	<b>Yes</b>	<b>No</b>	
E-Training Complete:			
Hands On Training Complete:			
Location/Facility:			
Inspected by:			
Description:			
Equipment Type:			
Manufacturer:			
Model #:			
Serial #:			
Factory Order #/Lot #/Batch #:			
Date of Mfg.:			
How is equipment stored:			
Other:			
<b>Component</b>	<b>Potential Defects</b>	<b>Pass</b>	<b>Fail</b>
Back D-Ring	Corroded, Bent, Cracked, Pitted, Rusted		
Waist D-Ring (if applicable)	Corroded, Bent, Cracked, Pitted, Rusted		
Sternum D-Ring (if applicable)	Corroded, Bent, Cracked, Pitted, Rusted		
Straps	Burns, Holes, Deterioration, Cuts, Frays		
Webbing & Stitching	Frayed, Cracked, Cut, Burnt		
Buckles	Bent, Torn Tongue Holes		
Label	Damaged, Missing Information		
<b>Final Appraisal</b>		<b>Pass</b>	<b>Fail</b>
Overall Pass or Fail			

<b>Lanyard Equipment Inspection Checklist</b>			
<b>Date Inspected:</b>			
		Yes	No
E-Training Complete:			
Hands On Training Complete:			
Location/Facility:			
Inspected by:			
Description:			
Equipment Type:			
Manufacturer:			
Model #:			
Serial #:			
Factory Order #/Lot #/Batch #:			
Date of Mfg.:			
How is equipment stored:			
Other:			
Component	Potential Defects	Pass	Fail
Connectors	Corroded, Bent, Cracked, Pitted, Rusted		
Shock Pack	Damage, Signs of Deployment		
Webbing & Stitching	Frayed, Cracked, Cut, Holes, Deterioration		
Label	Damaged, Missing Information		
<b>Final Appraisal</b>		Pass	Fail
Overall Pass or Fail			

<b>Lifeline Equipment Inspection Checklist</b>			
<b>Date Inspected:</b>			
		Yes	No
E-Training Complete:			
Hands On Training Complete:			
Location/Facility:			
Inspected by:			
Description:			
Equipment Type:			
Manufacturer:			
Model #:			
Serial #:			
Factory Order #/Lot #/Batch #:			
Date of Mfg.:			
How is equipment stored:			
Other:			
Component	Potential Defects	Pass	Fail
Housing (Self-Retracting)	Anchorage Point, Damage, Missing Bolts/Screws		
Connectors	Impact Indicator, Corrosion, Pitting, Nicks		
Lifeline	Frayed, Cut, Worn, Kinked, Caging		
Shock Pack	Damaged, Signs of Deployment		
Label	Damaged, Missing Information		
<b>Final Appraisal</b>		Pass	Fail
Overall Pass or Fail			

**APPENDIX C – RESCUE PLAN**

Date: _____ Job Description: _____ Location: _____		
<p style="text-align: center;"><b><u>Contacts</u></b></p> <p>Rescuer(s) _____</p> <p>Competent Person _____</p> <p>Emergency Contact _____</p> <p><b>Method of Contact:</b></p> <p><input type="checkbox"/> PA      <input type="checkbox"/> Verbal/Face to face</p> <p><input type="checkbox"/> Radio Channel: _____</p> <p><input type="checkbox"/> Phone Number: _____</p> <p><input type="checkbox"/> Other _____</p>	<p style="text-align: center;"><b><u>Rescue Equipment</u></b></p> <p><input type="checkbox"/> Ladder</p> <p><input type="checkbox"/> Block &amp; Tackle</p> <p><input type="checkbox"/> Rescue Pole</p> <p><input type="checkbox"/> First Aid Kit</p> <p><input type="checkbox"/> Rescue Rope</p> <p><input type="checkbox"/> Life Ring</p> <p><input type="checkbox"/> Spider</p> <p><input type="checkbox"/> Work Vest</p> <p><input type="checkbox"/> Scaffold</p> <p><input type="checkbox"/> Cutting Device</p> <p><input type="checkbox"/> Stokes Litter</p> <p><input type="checkbox"/> Alternative Lifting &amp; Lowering Device</p>	<p style="text-align: center;"><b><u>Critical Rescue Factors</u></b></p> <p>Anchor Point _____</p> <p>_____</p> <p>Landing Area _____</p> <p>_____</p> <p>Rescue Obstructions/Hazards: _____</p> <p>_____</p>
Check for Yes		Comment
<input type="checkbox"/> Have alternatives to using fall arrest equipment been considered?		
<input type="checkbox"/> Has rescue equipment been inspected and found in good shape?		
<input type="checkbox"/> Is equipment adequate for the rescue plan (weight ratings, length, connection type, etc.)?		
<input type="checkbox"/> Have communication devices been identified, located, & tested?		
<input type="checkbox"/> Are all rescuers familiar with the use of the rescue equipment?		
<input type="checkbox"/> If working over water, is there a boat available?		
<b><u>Pre Work Tasks:</u></b>	<b><u>Response Procedure:</u></b>	
1)	1) Notify Emergency Contact.	
2)	2) Make medical assessment of person.	
3)	3)	
4)	4)	

## APPENDIX D - Areas or Activities That Require Fall Protection

OSHA has identified 15 areas or activities where some type of fall protection is needed if the potential fall distance is 6 feet or greater. The following are situations where fall protection is needed. Please keep in mind there may be other situations where a fall of 6 feet or more is possible.

### 1. **Unprotected Sides and Edges**

Employees on a walking/working surface with an unprotected side or edge that is 6 feet or more above a lower level shall be protected from falling by the use of guardrail systems or personal fall arrest systems. All employees shall be instructed on the necessary precautions prior to conducting inspections, investigations, or assessments.

### 2. **Leading Edges**

Employees constructing a leading edge that is 6 feet or more above a lower level shall be protected by guardrail systems or personal fall arrest systems. Any employee on a walking/working surface 6 feet or more above a lower level where leading edges are under construction, but the employee is not performing the leading edge work, shall be protected from falling by a guardrail system or personal fall arrest system. If a guardrail system is chosen to provide the fall protection, and a controlled access zone has already been established for leading edge work, the control line may be used in lieu of a guardrail along the edge that parallels the leading edge.

### 3. **Hoist Areas**

Each employee in a hoist area shall be protected from falling 6 feet or more to lower levels by guardrail systems or personal fall arrest systems. If a guardrail system or portion(s) of the system is removed to hoist objects and the employee must lean through the access opening or out over the edge, that employee shall be protected by using a personal fall arrest system.

### 4. **Openings/Holes**

Each employee on walking/working surfaces shall be protected from falling through openings/holes (including skylights and roof penetrations) more than 6 feet above lower levels, by personal fall arrest systems, covers, or guardrails erected around the holes/openings. Each employee shall be protected from tripping or stepping into or through openings/holes by use of hole covers of standard strength and construction. Each employee on a walking/working surface shall be protected from objects falling through openings/holes from above.

### 5. **Formwork and Reinforcing Steel**

Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by personal fall arrest systems or positioning device systems.

### 6. **Ramps, Runways, Platforms, and Other Walkways**

Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet or more to lower levels by guardrail systems or personal fall arrest systems.

**7. Excavations**

Each employee at the edge of an excavation, pit, well, or shaft 6 feet or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers. Excavations less than 6 feet deep shall be marked with barrier tape and appropriate warning signs.

**8. Dangerous Equipment**

Each employee working above dangerous equipment regardless of height shall be protected from falling into or onto equipment by guardrail equipment or by equipment guards. Each employee 6 feet or more above dangerous equipment shall be protected from fall hazards by guardrail systems or personal fall arrest systems.

**9. Overhand Bricklaying and Related Work**

Each employee performing overhand bricklaying and related work 6 feet or more above lower levels, shall be protected from falling by guardrail systems, personal fall arrest systems, or shall work in a controlled access zone. Any employee reaching more than 10 inches below the level of the walking/working surface on which they are working shall be protected from falling by a guardrail system or personal fall arrest system.

**10. Low Slope Roofs**

Employees performing roofing activities on low-slope roofs with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by the following systems:

- a. Guardrail systems;
- b. Personal fall arrest systems; or
- c. A combination of the following:
  - i. Warning line system and guardrail system;
  - ii. Warning line system and personal fall arrest system;
  - iii. Warning line system and safety monitoring system.

**11. Steep Roofs**

Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems with toeboards or personal fall arrest systems.

**12. Precast Concrete Erection**

Each employee engaged in the erection of precast concrete members and related operations working 6 feet or more above lower levels shall be protected from falling by guardrail systems or personal fall arrest systems.

**13. Wall Openings**

Each employee working on, at, above, or near wall openings where the outside bottom edge 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, shall be protected from falling. This protection shall be provided through the use of guardrail systems or a personal fall arrest system.

**14. Protection from Falling Objects**

When an employee is exposed to falling objects, Indiana University requires that each employee wear a hard hat and implement one of the following measures:

- a. Erect toe boards, screens, or guardrail systems to prevent objects from falling from higher levels;
- b. Erect a canopy structure and keep potential falling objects far enough from the edge of the upper level; or
- c. Barricade the area where overhead objects could fall and prohibit employees from entering the area.

**15. Walking/Working Surfaces Not Addressed**

If the specific activity was not addressed above, each employee on a walking/working surface 6 feet or more above a lower level shall be protected by a guard rail system or personal fall arrest system.

## APPENDIX E – Personal Fall Protection Systems

All fall protection systems (i.e. guardrails, etc.) used within Pottawattamie County shall meet the requirements of 29 CFR 1926.502 "Fall Protection Systems Criteria and Practices."

### Personal Fall Arrest System

When work is performed on elevated surfaces such as roofs, or during construction activities, protection against falls must be considered. Fall arrest systems, which include lifelines, body harnesses, and other associated equipment, are often used when fall hazards cannot be controlled by railings, floors, nets, and other means. These systems are designed to stop a free fall of up to 6 feet while limiting the forces imposed on the wearer.

A personal fall arrest system could consist of the following components:

1. **Full-body harness** - A full-body harness consists of nylon and/or polyester straps that encompass the chest, chest and waist or full body. In the event of a fall, a full body harness distributes the fall arrest force over the pelvis, thighs, waist and shoulders. The attachment point must be in the center of the back or at the shoulder level of the wearer.
  - a. Body harness systems shall not be used to hoist materials.
  - b. Personal fall arrest systems and components subjected to impact loading or a fall shall be removed from service and shall not be used again.
  - c. Note: The use of a body belt for fall protection is prohibited.
2. **Lanyard** - A lanyard connects the body harness to the anchorage point. The lanyard should be attached to a D-ring on the body harness between the shoulder blades and above the employee. Lanyards can be equipped with deceleration or shock absorbing devices that limit up to 80 percent of the arresting force placed on the wearer during a fall. The lanyard must be of sufficient strength to withstand twice the impact energy of a person free falling 6 feet or the free-fall distance permitted by the system if the free-fall distance is less than 6 feet.
3. **Self-retracting lifelines** – A lanyard that automatically limit the free fall distance to 2 feet or less 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. Self-retracting lifelines and lanyards that 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 to the device with the lifeline or lanyard in the fully extended position.
4. **Anchorage** - Used for attachment to personal fall arrest systems shall be independent of any anchorage being used to support or suspend platforms and shall be capable of supporting at least 5,000 pounds per person attached or shall be designed, installed, and used as part of a complete personal fall arrest system that maintains a safety factor of at least two and under the supervision of a qualified person.

## 5. Personal fall arrest systems

- a. Shall limit the maximum arresting force on an employee up to 1,800 pounds for a body harness;
- b. Shall be rigged so that the user can neither free fall more than 6 feet, nor contact a lower level;
- c. Shall bring the user to a complete stop and limit the maximum deceleration distance the user travels to 3.5 feet;
- d. Shall have sufficient strength to withstand twice the potential impact energy of the user free falling a distance of 6 feet or the free fall distance permitted by the system;
- e. All personal fall arrest systems shall be inspected by the user prior to each use. Inspect for wear, damage, and other deterioration. If any defects or damage is present; the system shall be removed from service immediately;
- f. Personal fall arrest systems shall not be attached to guardrail systems or hoists. When personal fall arrest systems are used at hoist areas, they shall allow movement of the user only as far as the edge of the walking/working surface;
- g. Fall protection equipment that was used to arrest a fall, shall be removed from service and shall not be used again.

**Note:** If a personal fall arrest system is used by an employee that has a combined tool and bodyweight of 310 pounds or more, the employer must appropriately modify the system to provide adequate fall protection or the system will be not in compliance with the protocols contained in [29 CFR 1926 Appendix C to Subpart M](#) and [1926.502\(d\)\(16\)](#).

6. **Lifeline** - A lifeline consists of a flexible line that is connected to the anchorage point at one or both ends which serves as means to connect other components of the personal fall arrest system to the anchorage. Self-retracting lifelines provide mobility as well as worker protection.

**Note:** The line retracts as the worker moves toward the unit and pulls out as the worker moves away from the unit. If the worker slips or falls, the sudden jerk on the cable activates the breaking mechanism and the worker is brought to a stop within 2 feet. Lifelines can be either vertical or horizontal.

7. **Vertical Lifeline** - A vertical lifeline consists of a flexible vertical line suspended from affixed anchorage to which a fall arrest device is secured. Vertical lifelines must have a minimum breaking strength of 5,000 pounds. When vertical lifelines are used, each worker must have a separate lifeline except during the construction of elevator shafts and provided the breaking strength of the lifeline is 10,000 pounds.
8. **Horizontal Lifeline** - A horizontal lifeline consists of a flexible line connected to two horizontal fixed anchorage points to which a fall arrest device is secured. Horizontal lifelines are used when maximum horizontal mobility is required and no overhead anchorage point is available.

**Note:** Horizontal lifelines shall be designed, installed, and used under the supervision of a qualified person, as part of a complete fall arrest system that maintains a safety factor of at least two. Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds. Lifelines shall be protected against being cut or abraded.

On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

9. **Snap Hooks** – Snap hooks are used to connect the lanyard to the D-rings on the body harness. Snap hooks must be constructed from smooth, corrosion-resistant steel and be double-locking. Snap hooks and D-rings must be compatible. This helps prevent roll-out, which occurs when the D-ring twists out of the throat of the hook and rolls out, causing the catch to open and the D-ring to come loose. Locking Snap hooks shall be used instead of non-locking snap hooks because of the potential for unintentional release (rollout).

**Note:** Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth. D-rings and snap hooks shall have a minimum tensile strength of 5,000 pounds. They shall be proof tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or becoming permanently deformed. All snap hooks used shall be locking-type.

Snap hooks that are not designed for the following connections shall not be engaged directly to:

- Webbing, rope or wire rope;
- To each other;
- To a D-ring to which another snap hook or other connector is attached;
- To a horizontal lifeline; or
- To any object incompatible in shape or dimension relative to the snap hook that may cause the connected object to depress the snap hook keeper and release it unintentionally.

10. **Positioning Device Systems** - shall not allow an employee to free fall more than 2 feet and shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.

## APPENDIX F - Fall Protection Requirements for General Industry and Maintenance Activities

**Note:** A specific fall protection standard does not exist for general industry. Some Fall Protection Program requirements are contained in industrial specific standards and are addressed below.

### 1. Floor Openings

- a. Stairway floor openings shall be guarded by a standard railing and toe board. Ladder way floor openings or platforms shall be guarded by a standard railing and toe board on all exposed sides.
- b. Hatchway and chute floor openings shall be guarded by either a hinged floor cover of standard strength and construction with standard railing or a removable railing with toe board on not more than two sides and fixed standard railings with toe boards on all other exposed sides.
- c. Skylight floor openings and holes shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides.
- d. Pit and trap door floor openings, infrequently used, shall be guarded by a cover of standard strength and construction. While the cover is not in place, the pit or trap door openings shall be constantly attended by someone or shall be protected on all sides by removable standard railings.
- e. Manhole floor openings shall be guarded by a standard manhole cover. While the cover is not in place, the manhole shall be constantly attended by someone or shall be protected by removable standard railings.
- f. Temporary floor openings shall have standard railing or be constantly attended by someone.
- g. Floor holes in which persons can accidentally walk into shall be guarded by standard railing with toeboards on all exposed sides or shall be guarded by a cover of standard strength and construction. While the cover is not in place, the hole shall be constantly attended by someone.
- h. Floor holes in which persons cannot accidentally walk into (because of fixed machinery or equipment) shall be protected by a cover that leaves no openings more than 1 inch wide. The cover shall be held securely in place to prevent tools or materials from falling through.

### 2. Wall Openings and Holes

- a. Wall openings from which there is a drop of more than 4 feet shall be guarded by a rail, picket fence, half door or equivalent barrier. Removable toeboards shall be used when there is an exposure below to falling material.

- b. Chute wall openings where there is a drop of more than 4 feet shall be guarded by a rail, picket fence, half door or equivalent barrier.
- c. Window wall openings at a stairway landing, floor, platforms, or balcony from which there is a drop of more than 4 feet, and where the bottom of the opening is less than 3 feet above the platform or landing, shall be guarded by standard slats, standard grill work or standard railing. If the window opening is below the landing or platform, a standard toe board shall be provided.
- d. Temporary wall openings shall have adequate guards but these do not need to be made of standard construction.
- e. Where there is a hazard of materials falling through a wall hole, standard toeboards or an enclosing screen shall be installed.

### **3. Protection of Open Sided Floors, Platforms and Runways**

- a. Open sided floors, platforms, or runways 4 feet or more above the adjacent floor or ground level shall be guarded by a standard railing on all open sides except when there is an entrance to a ramp, stairway, or fixed ladder. Toeboards are required where persons can pass below, there is moving machinery, or there is equipment, which could create a hazard.
- b. Regardless of height, floors, walkways, platforms or runways located above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units and similar hazards shall be guarded with standard railing and toeboards.

### **4. Fixed Industrial Stairs**

- a. Every flight of stairs having 4 or more risers shall be equipped with standard stair railings or standard handrails.
- b. Standard railings shall be installed on the open sides of all stairways and stair platforms, which are located 4 or more feet above a lower level even if there are less than 4 risers in the flight of stairs.

### **5. Fixed Ladders**

Ladder safety devices (life belts, friction brakes, sliding attachments) are required on tower, water tanks and chimney ladders that are over 20 feet, unless cage protection is provided.

### **6. Portable Ladders**

Portable ladders include step, extension, and other portable ladders. Users must be able to recognize and avoid ladder hazards and be aware of safe practices in setting up, storing, and working with ladders

**7. Scaffolds**

Guardrails, midrails, and toe boards shall be installed on open sides of scaffolds which are 10 feet or greater in height. Full body harnesses and lifelines are required for suspension scaffolds and boatswains chairs.

**8. Aerial Lifts**

Employees working in a bucket truck, boom lift, or scissor lift are required to wear a full body harnesses and lanyards.