Fall Protection Program

Northern Illinois University
Environmental Health and Safety

4/17/17
## Review and Updates

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1. Introduction:

1.1 Purpose:

The Department of Environmental Health and Safety (EHS) at Northern Illinois University has developed this program to ensure a safe work environment and to protect the health and safety of NIU faculty and staff.

This fall protection program includes guidelines to be followed whenever an employee works at heights above 6 feet. These guidelines were established to ensure safety and to maintain compliance with the 29 CFR 1926 Subpart M, Occupational Safety and Health Administration (OSHA) fall protection standards.

1.2 Scope:

This program establishes the required procedure, methods, precautions, training, and responsibilities that shall be used by NIU and its contractors where fall protection is required. This program outlines the following components:

- Responsibilities
- Definitions
- Assessment
- Elimination
- Conditions and Guidelines
- Selection of Proper Fall Protection
- Fall Protection Systems Type and Use
- Rescue Operations
- Training
- Maintenance and Inspection of Equipment

2. Responsibilities:

2.1 Department of Environmental Health and Safety (EHS):

The Environmental Health & Safety Department (EHS) provides program oversight and consultation to NIU working units with fall protection components. The responsibilities of EHS include:

- 2.1.1 Develop and maintain the written Fall Prevention Program. EHS will also reevaluate this program periodically.
2.1.2 Provide necessary training, which will primarily consist of elevated platform safety, scaffolding safety, ladder safety and personal fall arrest system safety for those affected employees.

2.1.3 Serve the role of technical support and consultation to departments of affected employees to interpret requirements and establish safe practices.

2.2 Departments/Supervisors:

The department where fall protection is provided shall be responsible for the following:

2.2.1 Recognize potential fall hazards based on this policy.

2.2.2 Notify EHS of the need for appropriate training, such as ladder safety, scaffolding safety and personal fall arrest system safety.

2.2.3 Evaluate, on an annual basis, the effectiveness of the program as it applies to the work that their affected employees.

2.2.4 Contact EHS for technical support when questions arise regarding compliance and safe procedures.

2.2.5 Ensure that proper safety equipment is supplied to their affected employees where needed, such as fall arrest system, scaffolding, proper ladders, guard railings, toe kicks, etc.

2.2.6 Ensure that all work places are safe to perform the work that their affected employees are expected to conduct. This includes but is not limited to prevention of slipping, tripping and falling. All locations where fall hazards are present must be kept clean, dry (where possible) and orderly. Where wet processes are used, drainage will be maintained and false floors, platforms, mats, or other dry standing places are provided where practicable.

2.3 Affected Employees:

Employees working where fall hazards exist must comply with the provisions of this program including the use of personal protective equipment (PPE), fall protection
equipment and rescue systems/operations, completion of equipment inspections, training; and reporting of any concerns related to fall protection.

3. Definitions:

**Aerial Lift**: Equipment such as powered platforms, vehicle-mounted elevated and rotating work platforms, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and powered industrial truck platforms.

**Anchor Points**: A secure point of attachment for lifelines, lanyards or deceleration (grabbing) devices.

**Body Belts** (safety belt): A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device. The use of body belts is prohibited at NIU.

**Competent Person/Individual**: Person capable of identifying existing and potential hazards in the work environment. Persons/individuals are deemed competent through a combination of training and hands-on experience to possess knowledge about all aspects of the fall protection program and fall protection equipment.

**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 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.

**Fixed Ladder**: A ladder (including an individual rung ladder), which is permanently attached to a structure, building, or equipment.

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

**Full Body Harness**: An interconnected set of straps that may be secured about a person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a person fall arrest system.

**Guardrail System**: A barrier erected to prevent employees from falling to lower levels.
**Hole:** A gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.

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

**Life Lines:** 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 or more high and 18 inches or more wide) that is in a wall or partition through which person can fall to a lower level.

**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. Fall arrest systems are engineered to be compatible between the permanent system and the personal protective equipment. Interchanging the components is not permitted.

**Personal Fall Restraint:** Fall protection system, which prevents an employee from approaching a fall hazard through the use of a lanyard and body harness.

**Positioning device system:** A 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 with a recognized degree or professional certificate AND with extensive knowledge and training in the fall protection and rescue field who is
capable of designing, evaluating and specifying fall protection and rescue systems.

**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.

**Scaffold:** Any temporary elevated or suspended platform, and its supporting structures, used for supporting employees or materials or both.

**Snap-Hooks:** A connector consisting of a hood-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive and object and, when released automatically closes to retain the object.

**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, or body belt, systems to protect employees in the area.

**Working Surfaces:** Any surface, whether horizontal or vertical, on which an employee walks or works including, but not limited to, floors, roofs, ramps, bridges, and runways.
4. Assessment:

Fall protection is required whenever work is performed in an area 6 feet above its surroundings. Based on an assessment of the typical job sites encountered by NIU, the following list of conditions and their applicable guidelines are covered by the NIU program for fall protection:

1. Ladders
2. Stairs
3. Elevated platforms that are fixed
4. Scaffolding
5. Floor and wall openings
6. Working above 6 feet.

Each NIU project will be evaluated by the contractor and site supervisor to determine if employees will be exposed to fall hazards.

5. Elimination:

Engineering controls or other alternative work methods will be used whenever possible to eliminate the need for fall protection. This could include, but is not limited to redesign or automation of job, performing task at lower heights, use of tool extensions to enable work at ground level, use of permanent access platforms that provide built-in fall protection, etc.

6. Conditions and Guidelines:

There are a number of guidelines that need to be followed when potential fall hazard conditions or situations are present. This policy may not specifically address all possibilities. Therefore, when employees or supervisors recognize a condition that may present a fall hazard not specifically addressed by this written program, they shall involve the EHS department prior to addressing the safety concerns surrounding the condition.

The following is a list of conditions and guidelines that are addressed by this written program (note that this is not an all-inclusive list):

1. Ladders (permanent and temporary)
   Ladders shall exhibit the following conditions:

   1. Meet OSHA specifications for design and safety.
2. The appropriate type of ladder is being used for the job.
3. Metal ladders are not used near exposed electrical sources.
4. All parts, ropes, fittings and connections are secure and in good condition.
5. Non-slip surfaces are in place on ladder rungs.
6. Gripping safety feet are in place, secure and in sound condition.
7. Ladder has been set up safely:
   a) Floor/ground surface is firm.
   b) Floor/ground surface is flat.
   c) Floor/ground surface is not slippery.
   d) Ladder is level.
   e) Top of ladder (unless using step ladder) is against a solid, fixed surface.
   f) Ladders shall be maintained free of oil, grease, and other slipping hazards.
   g) For extension ladders, the 4-to-1 principal is accomplished (the base of the ladder should be placed at a distance from the wall that is equal to 1/4 of the height that the ladder is extended. (i.e. a ladder that is extended 20 feet high should have its base approximately 5 feet from the wall).
   h) When employees are on extension ladders at heights of 20 feet or higher, either a second person is present to steady the ladder’s base or the top of the ladder is effectively tied off to a sound anchor point.

2. Stairs (permanent and temporary):

   All stairs shall exhibit the following conditions:
   1. Meet OSHA specifications for design and safety.
   2. All required covers or guardrails are in place, including top rails, mid-rails, and toe kicks or spindles.
   3. All hand rails or guardrails are in place.
   4. All treads and risers are in good repair.
   5. Non-slip surfaces are in place.
   6. Adequate headroom is maintained above.
   7. Stairs are clear of clutter and slippery materials.
3. Elevated platforms that are fixed:

All elevated platform locations shall exhibit the following conditions:

1. Top guard rail in place, is between 36 and 45 inches from floor, is in sound condition and anchored appropriately.
2. Vertical rails (spindles), a solid surface or a mid-rail is in place, is in sound condition and is anchored appropriately.
3. If the railing is not solid down to the floor, a toe kick is present, in sound condition and anchored appropriately.
4. The flooring of the platform has no openings, is properly attached to sound surface and is in sound condition.
5. Walking surfaces are clear from obstruction and are not slippery.

4. Scaffolding:

Once erected, scaffolding is an elevated platform and shall meet the same safety requirements. However, due to the complexity of parts and connections, and due to the fact that they are routinely assembled and disassembled, they are far more complex and are potentially more dangerous. Therefore, all employees who erect or use scaffolding shall be properly trained prior to working with or on scaffolding.

5. Floor and wall openings:

All floor and wall openings that lead to a fall hazard shall exhibit the following conditions:

1. All floor and wall openings are safely covered or blocked from access.
2. Covers shall be sound, solid and not easily opened.
3. Floor surfaces surrounding the opening shall be clear of clutter or slippery material.
4. All 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.
5. Barriers that are designed to prevent someone from falling into the opening shall be visually noticeable, strong enough to hold the weight of multiple people and shall not, in themselves, have additional openings that create additional fall hazards.
6. Guardrail systems must be capable of withstanding at least 200 pounds of force applied within 2 inches of the top edge, in any direction and at any point along the edge, and without causing the top edge of the guardrail to deflect downward to a height less than 39 inches above the walking/working level.

6. Working above 6 feet without protection

Any time an employee works at elevations higher than 6 feet above the floor they shall use an appropriate ladder, an aerial platform lift, scaffolding or assemble an appropriate elevated platform whenever feasible. If these are not feasible, the employee shall be trained in the proper use of fall arrest systems and don their arrest systems appropriately throughout the duration of time that they work above 6 feet.
7. **Selection of Proper Fall Protection:**

Based on information gathered and evaluated during the fall protection hazard assessment, the appropriate type of fall protection system(s) must be selected. Fall protection can generally be provided through the use of fall protection systems which must meet applicable OSHA standards.

8. **Fall Protection Systems Type and Use:**

Fall protection systems incorporated into building or facility design shall meet all applicable standards including, but not limited to, ANSI A10.32-2004 Fall Protection Systems for Construction and Demolition Operations; ANSI Z359 Fall Protection Code; OSHA 29 CFR Part 1910 Subpart D-Walking and Working Surfaces; OSHA 29 CFR 1910 Subpart I-Personal Protective Equipment, and OSHA 29 CFR 1926 Subpart M-Fall Protection.

8.1 **Conventional Fall Protection Systems:**

Conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) provide the greatest protection against fall hazards and should be considered a priority when addressing employee protection.

8.1.1 **Guardrail Systems:**

8.1.1.1 Installed and temporary guardrail systems shall comply with OSHA 29 CFR 1190.23-Guarding Floor and Wall Openings and Holes. Guardrail systems installed during construction projects and activities shall comply with OSHA 29 CFR 1926.502-Fall Protection Systems Criteria and Practices. Guardrail systems provide a barrier to prevent employees from falling to lower levels, and which designates an area in which work may take place without the use of additional fall protection PPE.

8.1.1.2 Where guardrail systems are in place as a fall protection measure, the railing shall have a vertical height of 42 inches (+/-3 inches) measured from the upper surface of the top rail to the working surface and consist of a top rail, intermediate rail, and posts.

8.1.1.3 The intermediate rail shall be approximately halfway between the top rail and the working surface.
8.1.4 Guardrail systems must be capable of withstanding, without failure, a force of at least 200 pounds in any direction.

8.1.5 When 200 pounds of force is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches above the working surface.

8.1.6 Stair railings shall be not more than 34 inches or less than 30 inches from the upper surface of the top rail to the forward edge of the tread surface.

8.1.7 A standard toe-board shall be provided on all guardrail systems where persons can pass under the work surface; there is moving machinery; and/or equipment utilized on the elevated surface with which falling equipment creates a hazard. Toe-boards shall be 4 inches nominal in vertical height and securely fastened in place with not more than ¼ inch clearance above the working surface. Where material is stored near the guardrail system, at heights exceeding the toe-board, paneling from the work surface to the intermediate rail shall be provided.

8.1.8 Engineered guardrail systems may be utilized provided they meet these requirements and are installed as per the manufacturer’s specifications.

8.1.9 Portable guardrail systems may be utilized as a fall protection measures provided they meet the OSHA and ANSI guardrail specification requirements.

8.1.2 Fall Restraint Systems:

These systems are typically installed on aerial lifts and boom lifts. Refer to the appropriate regulations and NIU programs for additional information on fall restraint systems and aerial lifts. Fall restraint systems may also be utilized on elevated work surfaces as a preventative measure against fall hazards or as a positioning device system. These systems prevent an employee from approaching a fall hazard through the use of a lanyard and body harness.

8.1.2.1 The restraint lanyard must be short enough to prevent a fall from occurring; be protected against cutting and abrasion; and attach the
body harness directly to the anchor point independently of any other lines.

8.1.2.2 When used as a positioning device system, the lanyard length shall be rigged such that an employee cannot free fall more than 2 feet.

8.1.2.3 Full body harness use is required when utilizing fall restraint systems.

8.1.2.4 Anchor points must be capable of supporting at least twice the potential impact load of an employee’s fall or 3,000 pounds, whichever is greater.

8.1.2.5 All components of the fall restraint system including connectors, D-rings, snap-hooks, lanyards and body harnesses/belts shall meet all applicable OSHA requirements.

8.1.2.6 Fall protection equipment shall not be used to hoist equipment or tools to an elevated work surface. This includes window washing equipment.

8.1.2.7 Fall protection equipment including restraint lanyards and body harnesses should be stored in a well-ventilated, clean, dry area free from temperature and humidity extremes, corrosive materials or other contaminants.

8.1.3 Personal Fall Arrest Systems:

These systems are employed to prevent injury to employees if a fall from an elevated work surface occurs. The use of a fall arrest system requires a body harness system to be worn by the employee. Body belts are not permitted to be used with fall arrest systems. Fall arrest systems shall be engineered and constructed to prevent employees from reaching the work surface below if a fall occurs.

8.1.3.1 All components of a fall arrest system including connectors, D-rings, Snap-hooks, lanyards, body harnesses, life lines, ropes and straps shall be designed and engineered for use with a fall arrest system and meet all applicable ANSI and OSHA requirements.

8.1.3.2 Employees utilizing personal fall arrest systems shall not perform work alone.
8.1.3.3 Life line systems used as a component of a fall arrest system shall be designed, installed and used under the supervision of a qualified person as part of a fall protection program.

8.1.2.4 Life lines shall be protected from cutting and abrasion.

8.1.2.5 Life lines or other components of a fall arrest system should not be attached to guardrail systems, ladders, scaffolding components, building fixtures, conduit or plumbing, other lanyards, roof stacks/vents/pipes or other unauthorized anchor points.

8.1.2.6 Anchor points used for attachment of fall arrest equipment shall be independent of any other anchor point and capable of supporting at least 5,000 pounds per employee attached.

8.1.3.7 When stopping a fall, personal fall arrest systems shall:

1. Limit maximum arresting force on an employee to 1,800 pounds.
2. Ensure employees can neither free fall more than 6 feet or contact any lower level as a result of a fall.
3. Bring an employee to a complete stop and limit maximum deceleration distance to 3.5 feet.
4. Be capable of withstanding twice the potential impact energy of an employee falling a distance of 6-feet or the fall distance permitted by the system, whichever is less.
5. The attachment point of the body harness shall be located in the center of the wearer’s back near shoulder level.
6. Fall arrest systems are to only be used as personal protective equipment and not to hoist equipment or tools to elevated work surfaces.
7. Fall protection equipment including restraint lanyards and body harnesses should be stored in a clean, dry area free from temperature and humidity extremes, corrosive materials or other contaminants.
8.2 Specialized Fall Protection Systems:

If conventional fall protection systems are not practical or feasible, the use of a specialized fall protection system including a warning line system or safety monitoring system must be utilized to protect employees from fall hazards.

8.2.1 Warning Line Systems:

8.2.1.1 Warning line systems are typically composed of a physical barrier located near an unprotected side or edge to warn employees they are approaching a fall hazard area. Warning line system use is restricted to low slope roof top work and shall be used in conjunction with a safety monitoring system at a minimum. These systems may also utilize a guardrail or personal fall arrest system to minimize/eliminate the fall hazard.

8.2.1.2 These systems shall be erected around all open sides of the roof work area not less than 6 feet from the roof edge.

8.2.1.3 If mechanical equipment is being utilized on the roof top, the warning line shall be not less than 6 feet from the roof edge parallel to the direction of equipment operation, and not less than 10 feet from the roof edge perpendicular to the direction of the equipment operation.

8.2.1.4 Points of access, material handling areas, storage areas and hoisting areas shall be clearly delineated and connected to the work area by an access path formed by two warning lines.

8.2.1.5 When the path or point of access is not in use; a rope, wire, chain or other barricade equivalent in strength and height to the warning line shall be placed across the path.

8.2.1.6 Warning lines shall consist of ropes, wires or chains and supported by stanchions.

8.2.1.7 The line shall be flagged every 6 feet with high visibility flags.

8.2.1.8 The line shall be supported to ensure the lowest point is not less than 34 inches above the work surface; and not more than 39 inches at its highest point.
8.2.1.9 The warning line system, once erected, must be capable of withstanding a force of at least 16 pounds applied horizontally against the stanchion; and the rope, chain or wire shall have a minimum tensile strength of 500 pounds.

8.2.1.10 The line shall be attached at each stanchion in such a way that pulling on one section of the line will not result in slack being taken up in adjacent sections.

8.2.1.11 Employees are not permitted to enter the area between the roof edge and warning line unless work is being conducted on that portion of the roof and adequate fall protection measures are in place.

8.2.2 Safety Monitoring Systems:

8.2.2.1 A safety monitoring system relies on a competent person to monitor the work area and ensure employees are aware of fall hazards as they are working. This system may only be utilized on a low-slope roof and should be considered a last resort for protecting employees from fall hazards.

8.2.2.2 A competent person must be designated prior to work taking place on a roof top. The competent person, or their designee who has received adequate training and possesses sufficient knowledge, will act as a safety monitor during work and shall:

1. Be competent to recognize fall hazards;
2. Warn the employee when it appears they are unaware of a fall hazard or are acting in an unsafe manner;
3. Be on the same working surface and within visual distance of the employees performing work;
4. Be close enough to communicate verbally with the employees;
5. Ensure no unauthorized personnel access the work area;
6. Have no other responsibilities which may distract them while performing safety monitoring duties;
7. Have the responsibility to order work stoppage and personnel removal from elevated work areas in the event of dangerous, hazardous, or life threatening circumstances.
8. Mechanical equipment shall not be utilized where a safety monitoring system is being used as the fall protection method. Additional fall protection measures are required in these situations such as guardrail systems, fall restraint systems, fall arrest systems or warning line systems.

9. Rescue Operations:

Prompt rescue shall be provided for personnel who have fallen by contacting 9-1-1 from a campus phone or radioing for help. No work shall be performed where an emergency cannot be immediately observed and prompt rescue assistance summoned.

When a personal fall arrest system is utilized as a fall protection measure, the competent person must develop written rescue operations to ensure employees can be safely rescued from the fall. Rescue operations can be accomplished in a variety of ways. Specific operations should be developed based on the job being performed to ensure the safest method of rescue is employed. Employees utilizing personal fall protection systems as a fall protection method shall be provided with at least one other designated employee to monitor ongoing operations and have sufficient means to communicate in the event of a fall.

10. Training:

EHS (or an approved contractor) will sponsor all fall prevention related training programs for the university employees who require the need. The individual departments shall notify EHS of the need for training, which will include new hires and existing employees whose job has changed to require such training.

11. Maintenance and Inspection of Equipment:

An approved contractor or a competent person shall conduct necessary maintenance and inspection of the equipment. Any fall arrest system or component that has been used to arrest a fall (impact loading) shall be immediately removed from service and not reused. The department owning the piece of equipment belongs to shall be informed.