

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

1.0 PURPOSE

To establish the process for implementing appropriate fall protection for work conducted at the NCI at Frederick. It establishes the means, methods and safe practices for fall protection. It does not supersede or replace specific fall protection requirements established in procedures associated with access to flat roofs, scaffolds, or safe use of ladders.

2.0 SCOPE

This procedure applies to all NCI at Frederick activities and all work conducted by Leidos Biomedical Research, Inc. and its subcontractors at all facilities, to include leased facilities. Fall Protection shall be provided for all employees where there is a fall hazard of 4 feet or more for maintenance activities (general industry) and 6 feet or more for construction as required by 29 CFR 1910 and 1926.

3.0 PROCEDURE

Step	Job Role	Action
1	Job Supervisor or COTR	Identify work where there is a fall hazard of 4 feet or more for maintenance activities or 6 feet or more for construction activities. If the work cannot be conducted in compliance with referenced procedures or other EHS-approved standard operating procedures, contact EHS to begin review of the proposed work.
2	EHS Safety Staff Responder	Once notified that work will be conducted involving a fall hazard of 4-6 feet or more (as appropriate for the activity), respond to the appropriate location to review the proposed work scope.
3	Job Supervisor	The following applicable information shall be provided to EHS@mail.nih.gov no later than 7 business days prior to the start of work for planned work or as soon as practicable for emergency work. <ul style="list-style-type: none">• A Job Safety Analysis (JSA), task-specific plan, or standard operating procedure with the assistance of EHS staff consistent with Appendix A.
	COTR	The following applicable information should be provided to EHS@mail.nih.gov no later than 7 business days prior to the start of work for planned work or as soon as practicable for emergency work. <ul style="list-style-type: none">• A Job Safety Analysis (JSA) to include fall protection plans for subcontractors, job-specific plans for the task to be performed, worker training documentation, and all other related documentation, consistent with Appendix A.• When fall arrest systems involving safety harnesses, retractable lanyards, etc. are used, calculations and a sketch must be provided to demonstrate that the worker will not fall further than allowed by OSHA nor will the worker strike any lower surface if the worker were to fall.• All equipment to include anchor points, guard rail systems, etc. that are to be employed are to be listed and described.• If anchor points are being installed, engineering documentation and calculations signed by a qualified person must be provided demonstrating that the anchor points meet the requirements of this procedure.

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

Step	Job Role	Action
4	EHS Safety Staff Responder	<p>Evaluate the work as follows:</p> <ul style="list-style-type: none">Analyze the hazards.Review the proposed methodology for fall protection.Administer written approval <p>Review the proposed fall protection controls, to include associated documentation, in consideration of requirements in Appendix A. Consult other safety staff as needed. Complete the fall protection review and approval form and provide a copy to the requestor, the fall protection program manager, and the EHS administrative staff for recordkeeping. EHS will endeavor to provide a response within 2 business days.</p> <p>Provide any follow-up support to the requestor as needed to address issues and questions.</p>

4.0 RECORDS

Description of Record (include form number if applicable)	Custodian	Storage Medium
Fall Protection Review and Approval Form	EHS	Laserfische

5.0 RELATED DOCUMENTS

The following documents provide requirements and background information relevant to the subject of this procedure.

- 29 CFR 1926, Subpart M, Fall Protection.
- 29 CFR 1910, Subpart D, Walking-Working Surfaces
- “Safe Use of Ladders,” EHS-904, current version.
- “Flat Roof Access,” EHS-902, current version.

6.0 DEFINITIONS

Term	Definition
See Appendix B	

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

7.0 ABOUT THIS PROCEDURE

Issuing organization:	EHS
Final approver:	Terri Bray
Subject matter expert:	Greg Ragan
Review cycle (months):	36
Date last revised:	initial issue
Date last reviewed:	initial issue

8.0 SUMMARY OF CHANGES IN THIS VERSION

None. Initial issue.

APPENDIX A, Requirements

Fall Protection shall be provided for all employees where there is a fall hazard of 4 feet or more for maintenance activities (general industry) and 6 feet or more for construction.

Conventional fall protection methods shall be the preferred method for providing adequate protection. If fall protection cannot be accomplished, with EHS approval, non-conventional fall protection methods may be employed.

Conventional Fall Protection Methods

Fall Protection can be accomplished by one of the following:

Guardrails

- Top edge height of top rails of a guard rail system shall be 42 inches plus or minus 3 inches above the walking/working level (39-45 inches). Top rail can never deflect more than 3 inches.
- Toeboards that are nominally 4" in height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4-inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in greatest dimension.
- When employees are using stilts the top edge height of the top rail shall be increased an amount equal to the height of the stilts.
- Midrails shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.
- When screens and mesh are used they must extend from the top rail to the walking/working level along the entire opening.
- Intermediate members, such as balusters, when used between posts, and other horizontal structural members, shall be not more than 19 inches apart.
- Guardrail systems must be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top edge in any direction.
- Midrails, screens, mesh, intermediate vertical members, solid panels shall be capable of withstanding, without failure, a force of at least 150 pounds applied in any direction.
- Guardrail systems shall have smooth surfaces to prevent punctures, lacerations, and snagging of clothing.

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

- The ends of top rails and midrails shall not overhang the terminal post where such overhang constitutes a projection hazard.
- Steel and plastic banding cannot be used as top rails and midrails.
- When guardrail systems are used at holes they shall be built on all unprotected sides of the hole.
- Guardrail systems used on ramps and runways shall be built on each unprotected side or edge.
- Where a ladder or other access is provided the guardrail shall be removable or have a gate or chain installed.
- When guardrail systems are constructed of 2 x 4 materials they will have upright posts every 8 feet.
- When guardrail systems are constructed of wire rope they shall be at least one-quarter inch nominal diameter to prevent cuts and lacerations. Top rails shall be flagged at least every six feet intervals with high visibility material.
- Guardrail systems shall be inspected by the competent person on a daily basis and repaired as needed.

Personal Fall Arrest System (PFAS)

- Body belts are not acceptable as part of a Personal Fall Arrest System, and shall not be used.
- Employees shall be trained in the proper use of PFAS and components.
- Body harnesses and components shall be inspected before each use, and on an annual basis, and removed from service if found to be defective.
- Body harnesses shall be connected by a lanyard and shock absorbers not more than 4 feet in length or retractable type lanyard.
- Lifelines shall be attached to a point capable of supporting 5000 pounds per person.
- Only locking type snap hooks shall be used.
- Dee-rings and snaps hooks shall have a minimum of tensile strength of 5000 pounds. Lanyards and vertical life lines must have a minimum breaking strength of 5000 pounds.
- Ropes and straps used in lanyards, life lines, and strength components of body harnesses must be made from synthetic fibers.
- Anchorages for attachments of PFAS equipment must be independent of any anchorage being used to support or suspend platforms and be capable of supporting at least 5000 pounds per employee attached.
- Lifelines shall be protected from being cut or abraded.
- When using a PFAS the lanyard shall be adjusted as to not allow the employee to fall more than 4 feet.
- Use of retractable lanyards shall be used on all sloped roofs and 100% tie off shall be provided.
- Employee shall inspect all components of their PFAS before use each use.

Covers

- All covers must support, without failure, at least two times the maximum intended weight that might be imposed on the cover.
- All covers shall be secured from accidental displacement by wind and other employees.
- All covers shall be marked or color coded to warn of the hazards of falling through holes if removed. Covers must be marked using the words "COVER" or "HOLE".

Non-Conventional Fall Protection Systems (NCFPS)

The use of NCFPS such as Warning Line System, Controlled Access Zones, Safety Monitoring Systems, Fall Protection Plan are authorized by EHS only after over-all conditions of the work site have been analyzed and it has been determined that the use of conventional fall protection is infeasible or creates a greater hazard.

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

Warning Line System

Note: A warning line system is only used on flat roofing work (< 4 in12).

- A warning line shall be erected on all sides of the roof area and shall be six (6) feet back from the roof edge.
- All points of access, materials handling areas, storage areas and hoisting areas shall be connected to work area by a path of two warning lines.
- When mechanical equipment is being used warning lines shall erected not less than 6 feet from roof edge which is parallel to the operations and not less than 10 feet perpendicular to the operation.
- When a point of access or a path is not in use, that area shall be blocked so as not to allow anyone to walk directly into that area.
- Warning lines shall consist of ropes, chains, or wires, supported by stanchions.
- Warning lines shall be flagged with a high-visibility material every 6 feet.
- Warning lines shall be rigged and supported in such a way that the lowest point (including sag) is not less than 34 inches from the walking working surface and the highest point is not more than 39 inches from the walking working surface.
- Lines and stanchions shall be capable of resisting tipover when a force of 16 pounds 30 inches above the walking working surface is applied against them.
- All lines shall have a tensile strength of 500 pounds and shall be capable of supporting without breaking when loads applied to them.
- Lines shall be attached to each stanchion in a way so not to allow the slack to be taken up between stanchions.
- No employee shall be allowed between the roofs edge and the warning lines unless the employee is performing roofing work in that area.

Note: If work requires being between the roof's edge and the warning lines, alternate methods for providing fall protection shall be used.

- Mechanical equipment shall be used or stored only in areas where warning lines system or personal fall arrest system are used.
- All employees shall be trained in the use of system that they will be working under.

Controlled Access Zones (CAZ)

Note: A CAZ is used in overhand brick laying or leading edge work.

- When using control lines to control areas of access, the lines shall be made of rope, wires, tapes or equivalent.
- Each line shall be flagged every 6 feet with high-visibility material.
- Each line shall be rigged in such a way that the lowest point (including sag) is not lower than 39 inches from the walking working surface and the highest point not more than 45 inches from the walking working surface.
- Materials used for line shall have a minimum breaking strength of 200 pounds.
- When using CAZ in precast concrete work, lines shall be erected not less than 6 feet and not more than 25 feet from the unprotected edge.
- When setting precast concrete members the lines shall be not less than 6 feet nor not more than 60 feet or half the length of the member whichever is less.

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

- Control lines shall extend along the entire length of the unprotected or leading edge and connected on each side to a guardrail or wall.
- When using CAZ where overhand brick laying work is taking place the control line shall be erected not less than 10 feet and not more than 15 feet from the working edge.
- Controlled area shall extend for a distance to enclose all employees performing overhand brick laying activities.
- Only employees engaged in overhand brick laying shall be permitted in the CAZ.
- On floor and roof areas where guardrail systems are not in place prior to the beginning of this operation, CAZ shall be enlarged to enclose all points of access.
- In areas where guardrail systems need to be removed to allow overhand brick laying to take place only the portion necessary to accomplish that day's work shall be removed.

Safety Monitoring Systems

Note: A safety monitoring system is used on flat roofing work.

- The employer shall designate a competent person to recognize hazards and monitor the safety of other employees.
- The safety monitor shall warn employees when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner.
- Safety monitor shall be on the same surface, within visual distance and be able to communicate with the employees being monitored.
- The safety monitor shall have no other duties that would interfere with the monitoring duties.
- Mechanical equipment shall not be used or stored in areas where safety monitoring system is being used.
- No employee other than those engaged in flat roofing work or covered by a fall protection plan shall be allowed in the area where employees are being protected by a safety monitor system.
- Each employee shall comply when warned of a fall hazard identified by the monitor.

Non-Conventional Fall Protection Plan

Note: This option is available only to employees engaged in leading edge work or precast concrete erection work who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment.

- A fall protection plan shall be prepared by a qualified person and developed specifically for that site.
- A copy of the fall protection plan shall be maintained at the job site and reviewed with each employee involved in the work.
- The fall protection plan shall document the reasons conventional fall protection systems are infeasible.
- The fall protection plan shall include measures taken to reduce or eliminate the fall hazards to employees.
- The fall protection plan shall identify each location where conventional fall protection cannot be used.
- Where no other measure has been implemented, the employer shall implement a safety monitoring system.
- The fall protection plan shall identify each employee and designate the work to be performed.
- In the event of an accident or incident, EHS Safety Staff must be notified immediately and the fall protection plan shall be reviewed to determine if changes need to be made.

Note: If the work manager believes that conventional fall protection system cannot be used, they must first contact the EHS prior to implementing a non-conventional fall protection plan and shall submit a Fall Protection Plan for acceptance.

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

Protection from Falling Objects

When exposed to falling objects, in addition to wearing hard hats, each employee shall be provided with additional protection from falling hand tools, debris, and other small objects as follows:

- The area below the working surface/location to which objects can fall, will be barricaded and employees will not be permitted to enter the hazard area.
- During roof work of steep roofs, tool and materials shall be secured to prevent objects from falling.
- A toeboard will be erected along the edge of platforms when platforms are more than six feet high.
- Where tools, materials, or equipment are piled to a height higher than the top edge of the toeboard, paneling or screening extending from the toeboard or platform to the top of the guardrail shall be erected.
- Materials and equipment shall not be stored within 6 feet of a roof edge unless guardrails are erected at the edge.
- A guardrail system, when used as falling object protection, will be installed with opening small enough to prevent passage of potential falling objects.
- A canopy structure, debris net, or catch platform strong enough to withstand the impact forces of the potential falling objects shall be erected over the employees below.

Fall Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

APPENDIX B, Definitions

Construction Work - "construction work" means work for construction, alteration, and/or repair, including painting and decorating.

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 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.

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

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.

Infeasible - that it is 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 each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

Lifelines - 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.

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, (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 anchor, connectors, and a 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 Protection

EHS Procedure EHS-901, Rev. 0

Effective Date: 1/1/2015

Point of Attachment - The location where the lifeline is secured.

Fall Arrest Platform – A platform or scaffolding around the edge of a building or area to prevent worker from falling.

Rescue System – is a system to assist employees with rescue ie: foot straps, mechanical devices or rescue units.

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.

Shock Absorber – See “e” Deceleration Device

Snaphook - 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. Snaphooks are generally one of two types.

Toeboard - 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 or edge, and which designates an area in which roofing work may take place without the use of guardrail, body harness, 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.