

KEENE STATE COLLEGE FALL PROTECTION PROGRAM

1. TABLE OF CONTENTS

2.	Introduction	1
2.1.	OSHA Fall Protection Thresholds	2
3.	Responsibilities	2
3.1.	Environmental Health and Safety Manager	2
3.2.	Departments	2
3.3.	Supervisors	3
3.4.	Employees	3
4.	Locations/Equipment with Potential Fall Hazards	4
4.1.	Roofs	5
	Roof Access Policy	6
	Low Pitched Roofs	6
	Steep Roofs	7
5.	Equipment	7
5.1.	Ladders	7
5.2.	Aerial Lifts and Bucket Trucks	8
5.3.	Scaffolds	9
5.4.	Fall Arrest Systems	9
	Lanyards	10
	Inspections	10
	Technical Specifications	10
6.	Definitions	11
7.	Other Resources	15

2. INTRODUCTION

Falls are among the most common causes of serious work related injuries and deaths. Fall protection is best attained through engineering controls - modifying the work environment in order to reduce the risk of falling. Where possible, floor openings shall be guarded, railings installed or areas fenced off prior to working. When these types of controls are neither sufficient nor feasible, a fall arrest or protection system will be required in accordance with the State of New Hampshire Occupational Health & Safety Standards.

It is the intention of KSC to provide maximum protection for its personnel, students and visitors. Therefore, KSC has adopted the OSHA construction standard for the regulation of ladder and scaffold use when personnel are involved in construction activities. Strict compliance with OSHA 1926.453 Subpart L (Scaffolds) and 1926.1053 Subpart X (Ladder safety) is mandatory during construction at the KSC. General OSHA standards for ladder or scaffold use (29 CFR 1910.25 and 1910.26) are required during non-construction activities.

KSC's Fall Protection Program is applicable to faculty, staff, students, and visitors when working at elevated heights of four (4) feet or greater.

2.1. OSHA FALL PROTECTION THRESHOLDS

Depending on the work activity involved there are several OSHA thresholds for fall protection that pertain to types of work that may be performed at KSC. They are:

- General Industry: 4 feet: OSHA 29 CFR 1910.23 requires open-sided floors or platforms four feet or more above the adjacent floor or ground level to be guarded by a standard railing (guardrail) equipped with a top rail, mid rail, and toe board, or equivalent.
- Construction: 6 feet: OSHA 29 CFR 1926.501 requires each employee on a walking/working surface with an unprotected side or edge six feet or more above a lower level to be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.
- General Industry Scaffolds and Construction Scaffolds: 10 feet (see note): OSHA 29 CFR 1910.28 regulates scaffolds use for general industry but references the construction standard 1926.451. Each employee on a scaffold more than 10 feet above a lower level shall be protected from falling to that lower level and establishes the types of fall protection to be provided for each type of scaffold. **NOTE: KSC's insurance company (MEMIC Insurance) mandates that fall protection on construction scaffolding begins at 6 feet and not 10 feet as allowed by OSHA.**
- Portable Ladders: Fall distance limited to working height of ladder: Employees may work on an extension or step ladder up to the maximum working height of the ladder as specified by the ladder manufacturer. An employee is not permitted to work on a portable ladder on an elevated surface, such as a roof, and be exposed to the fall height of the ladder plus the height of the roof.
- Fixed Ladders: 20 feet: OSHA 29 CFR 1910.27 requires safety cages or ladder safety devices on all fixed ladders more than 20 feet in height and to a maximum unbroken length of 30 feet.
- Steel Erection: 15 feet: OSHA 29 CFR 1926.760 requires all employees (except connectors) to use adequate fall protection where there is an unprotected side or edge of more than 15 feet. Connectors (workers who connect the steel to the frame) must have fall protection when working above a lower level of two stories or 30 feet (whichever is less).

3. RESPONSIBILITIES

3.1. ENVIRONMENTAL HEALTH AND SAFETY MANAGER

- Provide necessary training to department employees.
- Assist in the evaluation of fall hazards and selection of personal fall arrest system equipment.

3.2. DEPARTMENTS

- Identify employees who may be exposed to fall hazards including but not limited to:
 - Maintenance personnel.
 - Telecommunications personnel.
 - Any full time, part time, or volunteer working four (4) feet off from working level.

- Make responsible use of primary fall protection systems such as scaffolds, aerial lifts, personnel hoists, etc.
- Ensure above systems are equipped with walking/working surfaces free of floor openings, standard guardrails, and a safe means of access.
- Support and enforce this policy to ensure compliance by all employees.

3.3. SUPERVISORS

- Identify employees who may be exposed to fall hazards, including, but not limited to maintenance and grounds personnel (electricians, painters, arborists, etc.), and any full time, part time, or volunteer working four feet above the working level.
- Analyze all elevated tasks as to fall protection needs.
- Ensure adequate fall protection systems are provided.
- Instruct employees to the specific fall protection measures to be used and the proper use of fall arrest systems.

3.4. EMPLOYEES

- Attend required fall protection training.
- Visually inspect fall arrest devices prior to every use and record the date on a permanently attached inspection tag.
- Report any unsafe condition to supervisor.

3.5. CONTRACTORS

The procedures outlined in this program are not intended to represent or replace the Contractor's own programs for safety, nor does this program address and is not responsible for the Contractor's duty to its own employees. Although these procedures highlight some regulatory issues, it is not an exhaustive outline of all applicable laws and regulations for fall protection. The Contractor may not rely on this manual for guidance on legal requirements relating to safety for its employees.

Each contractor is responsible for fulfilling the requirements of the contract in a manner that protects the health and safety of the KSC community, including students, faculty, staff, contractors, and visitors. To this end, KSC expects that Contractors shall comply with the contents of this program and any project-specific guidelines developed by KSC. Compliance with such contents and guidelines are minimum standards, however, and shall not be deemed to fully satisfy the contractor's responsibility to provide and safe environment and work place. In the event law, regulation, industry practices, the Contractor's practices, or project-specific guidelines provided by KSC impose more stringent requirements than those established by this program, the Contractor must comply with the more stringent requirements.

Nothing contained herein shall relieve the Contractor from any liability or responsibility for failure to maintain a safe environment and work place, nor transfer to KSC any obligation to supervise the Contractor's maintenance of appropriate safety standards.

4. LOCATIONS/EQUIPMENT WITH POTENTIAL FALL HAZARDS

It is important to identify all potential tripping and fall hazards before work starts so that proper fall protection procedures are followed. Look for fall hazards such as open manholes, unprotected floor openings/edges, shafts, skylights, stairwells, and roof openings/edges.

Whenever you are working at any of the following locations where there is a potential fall hazard, use the following checklist:

Potential Fall Hazards	Yes	No
Stairs <ul style="list-style-type: none"> • All required covers or guardrails must be in place • Stair rails for 30° change in elevation or 4 risers • All handrails or guardrails are in place on stairways • All treads and risers on stairs are in good repair • Non-slip surfaces are in place on stairs • All stairs meet OSHA and ANSI specifications for design and safety 		
Ladders <ul style="list-style-type: none"> • Gripping safety feet in place and secure on ladders • Wooden ladders are coated with suitable protective material • All parts and fittings on ladders are secure • Non-slip surfaces are in place on ladder rungs • When setting ladder up footing of ladder is secure on a firm, level, and non-skid surface and top of ladder is placed against a solid, stationary object • All ladders meet OSHA specifications for design and safety 		
Loading Dock Areas <ul style="list-style-type: none"> • Loading docks over 4 ft above adjacent working surfaces guarded • Dock blocks are up and in place when dock is not in immediate use • Only trained loaders and unloaders perform loading and unloading duties in that area • Dock door is kept closed when a truck is not backed against it 		
Platforms <ul style="list-style-type: none"> • Guardrails are in place and securely attached • Toeboards are in place and secure • All platforms meet OSHA specifications for design and safety 		
Floor and Wall Openings, Open Manholes <ul style="list-style-type: none"> • All floor and wall openings are safely covered or blocked from access • If not safely covered and blocked from access, the opening has someone assigned for constant attendance to it. 		

Prior to beginning work in any area or on any device where fall hazards exist, complete a pre-work check:

- Always inspect fall protection equipment for defects before use.
- Select, wear and use fall protection equipment appropriate for the task.
- Secure and stabilize all ladders before climbing on them.
- Never stand on the top rung/step of a ladder.

- Use handrails when you go up or down stairs.
- Practice good housekeeping—keep cords, welding leads and air hoses out of walkways or adjacent work areas.
- **Personnel must work in teams of two or more where a potential fall hazard exists.**

Protect others from hazards associated with items falling from overhead work areas:

- Do not store equipment and materials within four (4) feet of an unprotected edge.
- Use toe boards (capable of withstanding a force of 50 lbs) where possible.
- Use temporary fencing, traffic barriers, caution tape, etc. to prevent unsuspecting pedestrians from entering the work area. **NOTE: Please be aware of the hazards to visually impaired pedestrians and take appropriate precautions (such as plastic traffic barriers, monitors, and or temporary fencing at all times), especially where open manholes, trenches, or excavations are present).**
- Hard hats are required when overhead work is being performed and there is a hazard associated with falling items.

If the situation calls for use of fall protection devices such as harnesses or lanyards because the fall hazard cannot be eliminated via engineering controls, then the employee must don such protective equipment before beginning the work and use it as intended throughout the duration of the work. Use of fall arrest systems is outlined in Section 5.

4.1. ROOFS

Table 1 provides a summary of the different types of roofs and the fall protection requirements that must be used during any roofing work.

TABLE 1. Residential-Type Fall Protection

Roof Type						Fall protection Options																							
	Tile or metal roof	<25 ft high	>25 ft high	>50 ft wide	<50 ft wide	Guard rail system	Safety net system	Personal fall arrest system	Safety monitoring system	Combination of warning line & guardrail	Combination of warning line and safety net	Combination of Warning line and personal fall arrest	Combination of warning line and safety monitoring	Roofing slide guards (roofing brackets 90° angle to roof ±10°) continuously along the eave	Roofing slide guards and additional slide guards (installed below the work area at intervals not to exceed 8 ft)														
																flat to 4:12 slope	✓		✓		✓	✓	✓	✓	✓	✓	✓		
																flat to 4:12 slope	✓			✓	✓	✓	✓	✓	✓	✓	✓		

4:12 to 6:12 slope		√				√	√	√						√	
6:12 to 8:12 slope		√				√	√	√							√
≥ 8:12 slope		√				√	√	√							
flat to 4:12			√	√		√	√	√		√	√	√	√		
flat to 4:12 slope			√		√	√	√	√	√	√	√	√	√		
≥ 4:12 slope			√			√	√	√							
flat to 8:12 slope	√	√		√		√	√	√		√	√	√	√		
flat to 8:12 slope	√	√			√	√	√	√	√	√	√	√	√		
flat to 4:12 slope	√		√	√		√	√	√		√	√	√	√		
flat to 4:12 slope	√		√		√	√	√	√	√	√	√	√	√		
≥4:12 slope	√		√			√	√	√							

Roof work shall not be performed during lightning storms or icy conditions.

Roof Access Policy

Only authorized employees/contractors are permitted to have limited access to the rooftops of KSC buildings. Students and visitors are specifically prohibited from roofs of any college building, unless being specifically escorted by authorized, trained employees.

Limited rooftop access is permitted provided that the area being accessed does NOT come with six (6) horizontal feet of the roof's outer edge or other location presenting a potential fall distance of greater than six vertical feet (i.e., from a higher portion of a flat roof to an adjacent lower portion), OR is currently protected by a parapet or other solid barrier at least 42-inches in height, and the individual is accompanied by an authorized employee. No more than five (5) individuals are permitted to be on the roof at one time and they MUST be accompanied by an authorized, trained employee.

Low Pitched Roofs

1. Employees engaged in roofing work on low-pitched roofs shall be protected from falling by using one or more of the following systems:
 - Guardrail System.
 - Personal Fall Protection System.
 - Motion-Stopping Safety system (MSS).
 - Warning Line System erected not less than six (6) feet from roof edges that are not protected by other means of fall protection. If employees are working outside the warning line system, an MSS system or safety monitoring system must be used in its place.
 - Safety Monitoring System on roofs fifty (50) feet or less in width where mechanical equipment is not being used or stored.
2. Employees engaged in roof work must be trained in the erection and use of the MSS system, the Warning Line and Safety Monitoring Systems as well as the job procedures required for roof work. **Exception: When employees are on roofs only to inspect, investigate, or estimate roof level conditions; they are exempt from requirement #1 above.**
3. Employees engaged in work on low-pitched roofs, other than roofing (such as HVAC maintenance and drain cleaning) and more than fifteen (15) feet from the edge, need to

have a guardrail system, safety monitoring system or warning line system around the work area.

Steep Roofs

Employees engaged in work on steep roofs may use either scaffolding or a crawling board (chicken ladder).

The crawling board must:

- Be at least ten (10) inches wide and one (1) inch thick.
- Have cleats 1 x 1 ½ inches.
- Cleat must be equal in length to the width of the board and spaced at equal intervals not to exceed 24 inches.
- Nails must be driven through and clinched on the underside.

The crawling board must extend from the ridgepole to the eaves. A firmly fastened lifeline of at least 3/4-inch diameter rope, or equivalent, must be strung beside each crawling board for a handhold. Lifelines must be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds.

5. EQUIPMENT

5.1. LADDERS

Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries.

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards! – Look for power lines before handling a ladder. Do not use a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.
- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing.
- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use a step ladder as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Use a ladder only on a stable and level surface unless it has been secured (top or bottom) to prevent displacement. Do not use a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support. Do not stand on the three top rungs of a straight, single, or extension ladder.

- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface.
- A barricade must be erected to keep traffic away from the ladder if it is placed in any location where it can be displaced by other work activities, and the ladder must be secured.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.
- When employees are working off portable ladders and the task requires work "outside the confines of the ladder", a fall arrest system must be used.

5.2. AERIAL LIFTS AND BUCKET TRUCKS

Aerial lifts include boom-supported aerial platforms, such as cherry pickers or bucket trucks, aerial ladders and vertical towers (OSHA regulates scissor lifts as mobile scaffolds, not as aerial devices). The major causes of fatalities are falls, electrocutions, and collapses or tipovers.

Workers who operate aerial lifts must be properly trained in the safe use of the equipment. Personnel working from or riding in any aerial device shall wear a fall arrest system with the lanyard attached to the boom or basket.

- Test the controls and inspect the aerial lift before use each day. Make sure that all controls are clearly marked as to their function.
- Never override hydraulic, mechanical, or electrical safety devices. Maintain and operate aerial lifts according to the manufacturer's instructions.
- Establish and clearly mark a danger zone around the aerial lift support vehicle. Workers on the ground must always wear hardhats within the danger zone.
- **Use a body harness or restraining belt with a lanyard attached to the boom or basket to prevent the worker from being ejected or pulled from the basket.** Never belt off to an adjacent pole, structure or equipment while working from an aerial lift.
- Always stand firmly on the basket floor. **DO NOT SIT OR CLIMB** on the edge or rails of the basket. Never use planks, boxes or other items inside the basket to extend your reach.
- Never move the equipment with workers in an elevated platform unless this is permitted by the manufacturer
- Do not allow workers to position themselves between overhead hazards, such as joists and beams, and the rails of the basket. Movement of the lift could crush the worker(s)
- Maintain a minimum clearance of at least 10 feet (or 3 meters) away from the nearest overhead lines or any conductive object (wires, transformers, ducts, pipes, etc.). Always treat power lines, wires, and other conductors as energized even if they are down or appear to be insulated.
- **Never lose awareness of overhead hazards.**
- Ensure that all wheels of an elevated lift are on a solid base. Use outriggers, if provided. Set the brakes, and use wheel chocks when on an incline

- Do not exceed the load limits of the equipment. Allow for the combined weight of the worker, tools, and materials.
- De-energize and lockout/tagout aerial lifts before performing any maintenance or repairs.

5.3. SCAFFOLDS

OSHA regulates many types of scaffolds, including mobile, ladder, pump jack, fabricated frame, and tube and coupler scaffolds under 29 CFR 1926, Subpart L. Key provisions of OSHA's scaffolding standard include:

- Guardrails and/or a personal fall arrest system are required for scaffolds more than 10 feet above a lower level (**NOTE: KSC's worker's compensation insurance provider requires fall protection for scaffolds more than six feet above a lower level**). They must be installed before releasing the scaffold for use by employees, other than erection and dismantling crews. Guard rails are not required when the platform is less than 14 inches from the face of the work (18 inches if employees are plastering and lathing, or if outrigger scaffolds are 3 inches or less from the front edge). Employees on single-point and two-point adjustable systems must be protected by both a guardrail and personal fall arrest system.
 - The height of the top rail (or the cross point if cross bracing is used as a top rail) must be between 38 inches (36 inches for guardrails manufactured before 2000) and 45 inches.
 - Mid rails must be installed approximately halfway between the top rail and the platform surface. When a cross bracing is used the cross point must be between 20 and 30 inches above the work platform.
- Scaffold footings shall be level and capable of supporting the loaded scaffold.
- Scaffold platforms shall be fully planked or decked.
- Scaffolds must support at least 4 times the maximum intended load.
- Employers must train each employee who works on a scaffold on the hazards and the procedures to control the hazards.
- A competent person must inspect the scaffold for visible defects before each work shift and after any occurrence that could affect the structural integrity. A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- When erecting and dismantling supported scaffolds, a competent person must determine the feasibility of providing a safe means of access and fall protection for these operations.
- Each scaffold platform and walkway must be at least 18 inches wide. If the work area is less than 18 inches wide, guardrails and/or personal fall arrest systems must be used.

5.4. FALL ARREST SYSTEMS

Employees shall use a fall arrest system with continuous attachment when there is a fall hazard of six (6) feet or greater. Exceptions: 1) Areas that are protected by properly installed guard rail systems do not fall into this category, and 2) Ladders that are less than twenty (20) feet are exempt from this requirement.

The primary fall arrest device shall be a Class III body harness. The lanyard anchorage point must be such that the maximum fall distance is four (4) feet or six (6) feet if the lanyard is used

in conjunction with an ANSI approved shock absorber. Shock-absorbing lanyards together with a Class III body harness shall meet a force limit of 1800 pounds.

Body belts are not to be considered a means of fall arrest protection and are prohibited by OSHA 1926.502 for fall protection.

Personnel must work in teams of two or more where a potential fall hazard exists.

Lanyards

Approved safety lanyards shall be a minimum of ½ inch thick nylon or equivalent, with a maximum length to provide for a fall of no greater than six (6) feet. Lanyards will have double locking snap hooks. Minimum breaking strength requirement for lanyards is 5,400 pounds.

If a lanyard made of synthetic fibers is subjected to hot surfaces, an insulated cover must be used for protection. Lanyards must be protected against sharp surfaces.

If fall arrest devices have been subjected to impact loading they shall be removed from service and destroyed.

Inspections

Fall arrest devices shall be visually inspected for defects prior to use.

Fall arrest devices shall be inspected when new and every six months thereafter for the following conditions:

- Cuts or abrasions
- Burns
- Excessive wear
- Loose splices
- Defective hardware
- Distorted thimbles

The date of each inspection shall be recorded on an inspection tag and permanently attached to the fall arrest device.

Technical Specifications

Requirements (from 29 CFR 1926.502) of a personal fall arrest system (PFAS) include:

- D-rings and snap hooks are to have a minimum tensile strength of 5,000 pounds. A proof test of 3,600 pounds is required.
- Lanyards and lifelines are to have a minimum breaking strength of 5,000 pounds.
- Lanyards are not to exceed six feet in length (when used in conjunction with shock absorbers).
- Self-retracting lifelines and lanyards are to have a strength of at least 3,000 pounds and limit free fall to two feet or less.
- Anchor points for fall arrest systems are to be capable of supporting at least 5000 pounds per employee when the system is designed, installed (temporarily or permanently), and used under the supervision of a qualified person.
- Personal fall arrest systems are to limit the maximum arresting forces to 1,800 pounds with a full body harness.
- The maximum free fall distance is six feet for all systems.
- The maximum deceleration distance is 3.5 feet.
- Personal fall arrest systems are to have sufficient strength to withstand twice the potential impact energy of the falling employee.

- Impacted components are to be removed from service.
- Prompt rescue must be provided for personnel who have fallen.
- Personal fall arrest systems are to be inspected prior to each use.
- Lifelines subject to cutting or abrasion are to be a minimum of 7/8-inch wire core manila rope. All other lifeline applications are to use a minimum of 3/4 inch manila rope or its equivalent.

6. DEFINITIONS

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

- **Anchorage point:** Must be capable of resisting twice the force created by the fall of a 250 lb. person a distance of six feet and stopped by a lanyard with a built-in shock absorbing device.
- **Fixed Anchorage:** Secured point of attachment and not part of the work surface.

Body Belt (Class 1 safety belt): device worn around the waist to which a lanyard or lifeline grabbing device is attached. Body belts are not allowed for use at KSC.

Body Harness (Class III): harness system designed to spread shock load. Has straps which may be secured about 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 fall arrest system.

Buckle: any device for holding the body belt or body harness around the employee's body.

Competent Person: a person, who has the appropriate knowledge and training for the type of work being performed, is capable of identifying and correcting hazardous conditions, and who has the authority to take prompt corrective action. A competent person may be appropriately defined in specific OSHA regulations 29 CFR 1910 and 29 CFR 1926.

Connector: a device which is used to couple (connect) parts of the personal fall arrest system and positioning system device together. It may be an independent component of part of the system, such as a carabineer, or it may be an integral part of the system (such as a buckle or Dee-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): a work area designated and clearly marked in which certain types of work (such as overhand bricklaying) may take place without the use of conventional fall protection systems—guardrail, personal arrest or safety net—to protect the employees working in the zone.

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 rope grab, rip stitch lanyard, specially woven lanyard, tearing or deforming lanyards, automatic self-retracting lanyards/lifelines, 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.

Employer: person(s) responsible for a business, company, or other employment category that utilizes workers for the purpose of providing a service, specialized function, or type of work. The employer shall be responsible for providing the necessary applicable training to each employee in accordance with local, state, and federal regulatory requirements, including the General Duty Clause, OSHA section 5A1. The employer would be either Keene State College or an outside contractor employed by the College.

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 the 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. Guardrail systems shall comply with the following provisions;

- Top edge of the guardrail system shall be 42" in height, plus or minus 3" above the walking or working surface
- Mid rails, screens, mesh and intermediate vertical members or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no parapet at least 21 in height. Mid rails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working surface. When using a suitable fence, mesh or plywood system, the mid rail can be eliminated.
- Toe boards are required for every elevated work surface > 6' above the lower level. Toe boards shall not be < 3 1/2" above the walking / working surface
- Screens and mesh, when used, shall extend from the top rail to the walking/working surface and along the entire opening between the rail supports and shall not be secured to the rails with connectors that may cause personal injury, such as metal banding or protruding nails/screws.
- Guardrails must be able to support a force of 200 lbs applied down and out, at any point along the top edge of the guardrail.
- When material, equipment and supplies (including block, brick, slate, tools and debris) are placed on the walking/working surface, above the level of the toe board, then a fence, mesh or screening shall be installed.

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: 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 of these systems to provide fall protection.

Lanyard: a flexible line of rope, wire rope, or strap that secures the wearer of a harness to a vertical or horizontal lifeline of a fixed anchorage. Generally has a connector at each 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 a 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.

Life Line: 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 that serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Low-slope or Low-Pitched 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 there-of.

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

Motion-Stopping Safety (MSS) System: System providing fall protection by using the following equipment singly or in combination: guardrail; scaffolds, or platforms with guardrail; safety nets; and body belt/harness systems.

Opening: a gap or void 30 inches (76 cm) or more 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.

Parapets are protective walls along the edge 24 inches or higher. They offer protection on monolith roofs with slope great than 4:12 and multiple unit roofs of any slope.

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 harness, and may include a lanyard, deceleration device, lifeline, or suitable combination 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.

Rope Grab: a deceleration device which travels on a lifeline and automatically, by friction, engages a 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 top of a building. This does not include floors or formwork which temporarily becomes the top surface of a building due to the fact that a building has not been completed.

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 in a roofing crew and warns them when it appears to the monitor that they are unaware of the hazard or are acting in an unsafe manner. The competent person must be on the same roof and within visual sight and voice communication of the other employees.

Safety Net System(s) if used as a fall protection system, shall comply with the special provisions of 29 CFR 1926.502.

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 will automatically lock the drum and arrest the fall.

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

- **1926.500(b)(1)** :The locking type with a self-locking keeper remains closed and locked until unlocked and pressed open for connection or disconnection; or
- **1926.500(b)(2)** : 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 devices 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 provides protection from falls for personnel.

Unprotected Sides and Edges: any side or edge (except 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 excluding ladders, vehicles, or trailers on which employees must be located in order to perform their duties.

Warning Line System: a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and that designates an area in which roofing work may take place without the use of a guardrail, body belt, or safety net systems to protect employees in the area. Constructed of rope, wire, or chain and supporting stanchion erected not less than six feet from the edge of a roof and flagged at no more than six foot intervals with high visibility material. Minimum tensile strength of the rope, wire or chain must be 500 pounds.

Work Area: the portion of a walking/working surface where job duties are being performed.

Working within the Confines of a Ladder: Defined as an employee maintaining their mid-body area within the ladder side rails.

7. OTHER RESOURCES

- Fall Protection in Construction - <http://www.osha.gov/SLTC/fallprotection/index.html>
- Stairways and Ladders - <http://www.osha.gov/Publications/osha3124.pdf>
- Care of Safety Belts, Harnesses, and Lanyards - <http://www.ccohs.ca/oshanswers/prevention/ppe/belts.html>
- A Guide to Scaffold Use in the Construction Industry: <http://www.osha.gov/Publications/osha3150.pdf>