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PURPOSE

The University of Illinois at Urbana-Champaign (University), through the Division of Safety and Compliance, Occupational Safety and Health Department (OSH), has established this Elevated Work Program to protect the health of university students, faculty and staff and to assure compliance with State and Federal occupational safety and health standards.

This Program provides the minimum requirements for unit-specific elevated work procedures. It is expected that campus units will utilize this Elevated Work Program to develop unit-specific standard operating procedures (SOP).

POLICY

It is the policy of the University to protect its students, faculty and staff from fall hazards. This is accomplished as far as feasible with effective engineering controls, employee training, and administrative controls. In cases where these controls are not adequate, personnel must be provided with personal fall protection equipment to eliminate the potential exposure to fall hazards.

This Elevated Work Program applies to all students, faculty and staff who perform work that expose them to fall hazards as part of their employment. Specific requirements for fall protection are based on the type of work performed and distance of fall to which the individual is exposed.

RESPONSIBILITIES**Occupational Safety and Health (OSH)**

OSH is responsible for the administration of this Program, which includes general awareness training, assisting in the identification of fall hazards, and assisting in the selection of appropriate fall protection systems. OSH maintains copies of all records for services provided by OSH pertaining to this Program. An OSH Program Coordinator is designated to provide guidance, regulatory interpretation, and oversight for this Program and to review this Program annually.

Deans, Department Heads, and Directors (Campus Units)

Campus Units shall designate a Responsible Person that will be charged with implementing this Program and unit-specific SOPs. Campus unit shall provide the resources necessary to implement this Program and unit-specific SOPs.

Campus Unit Responsible Person (Competent Person)

The Campus Unit Responsible Person shall complete fall protection competent person training and work with OSH to identify fall hazards in their Campus Unit. The Responsible Person shall identify other individuals within the unit to serve as competent persons, as needed, and ensure they receive appropriate training. The Responsible Person shall work with Campus Unit Supervisors to identify personnel that may be exposed to fall hazards and ensure that all personnel within their unit affected by this Program receive proper training. The Responsible Person shall ensure that unit-specific SOPs are reviewed annually.

Supervisors of Affected Employees (Supervisors)

Supervisors and Principle Investigators (PIs) are responsible for enforcing proper work practices and use of fall protection equipment under their responsible charge in accordance with this Program and unit-

specific SOPs. They shall assist in the development and annual review of unit-specific SOPs. They shall ensure that all their personnel who may be exposed to fall hazards receive training appropriate to the fall hazards to which they are exposed. They shall furnish appropriate fall protection equipment and devices for their employees exposed to fall hazards.

Employees

Employees shall follow the requirements of this Program, unit-specific SOPs, and training. They shall not perform work at height for which they have not been trained. They shall identify fall hazards prior to beginning work and implement controls to protect from falls. Hazards that the employee cannot control shall be reported to their supervisor.

PROCEDURES

General

All employees will be protected from falling when working on a surface that has an unprotected side, edge, etc. four feet or more above an adjacent lower level; when working from aerial lifts or other elevated work platforms; and when working above dangerous equipment.

Fall hazards will be evaluated by a Campus Unit fall protection competent person with assistance from the Campus Unit Responsible Person and the OSH Program Coordinator upon request to determine the best method to protect the employee. When selecting what type of fall protection to use, the fall protection competent person will consider the hierarchy of hazard controls, which organizes risk control techniques from most- to least-effective (examples are shown below in order of decreasing effectiveness and preference).

- Elimination of the fall hazard by bringing the work down to ground level;
- Passive fall protection systems, such as guard rails, that do not require active participation by the worker;
- Fall restraint that prevents a person from reaching a fall hazard;
- Fall arrest that utilizes equipment to stop a fall after it occurs; and
- Administrative controls such as work practices or procedures to signal or warn a worker to avoid approaching a potential fall hazard.

Fall Hazard Evaluation

A Campus Unit fall protection competent person will assess each assigned job task and area for potential fall hazards using Appendix D. This evaluation will document the required steps for protecting employees from the identified fall hazards. A list of fall hazard locations and protective measures/procedures will be maintained on file with the Campus Unit Responsible Person.

Fall Hazard Identification

It is the intent of this program to ensure all fall hazards are appropriately addressed to protect workers from injury. A fall hazard is defined as any condition on a walking-working surface that exposes an employee to a risk of harm from a fall on the same level or to a lower level.

Examples of fall hazards include, but are not limited to:

Unprotected Sides and Edges

Employees on a work surface with an unprotected side or edge which is four feet or more above a lower level shall be protected from falling by a guardrail system, safety net system, or personal fall restraint or arrest system. (Exception: employees engaged in leading edge work and the employer can prove that providing fall protection is infeasible or creates a greater hazard shall have a fall protection plan.)

Hoist Areas

Hoist areas shall be protected by a guardrail system, personal fall restraint or arrest system. If guardrail systems or portions of guardrail systems are removed to facilitate the hoisting process creating a potential fall hazard for the employee, that employee must be protected by a personal fall restraint or arrest system. The guardrail must be replaced as soon as possible.

Holes

Employees on a work surface where floor openings, holes, manholes, roof hatches and skylights that present fall hazards of four feet or more are present shall be protected from falling by guardrail systems erected around the holes, covers over the openings, or by personal fall restraint or arrest systems.

Employees shall be protected from tripping into or stepping into or through any hole that is less than four feet above a lower level by covers or guardrail systems.

Where skylights are in place, their design must meet applicable building codes and shall be of suitable strength to prevent a fall, protected by a guardrail system, or require the use of a personal fall restraint or arrest system.

Openings

Employees on a work surface near an opening where the inside bottom edge of the opening is less than 39 inches above the work surface and the outside bottom edge of the opening is 4 feet or more above a lower level must be protected from falling by guardrail systems, safety net systems, personal fall restraint or arrest systems.

Dangerous Equipment

Employees less than four feet above dangerous equipment shall be protected from falling into or onto the equipment by guardrail systems or equipment guards. Employees more than four feet above dangerous equipment shall be protected from fall hazards by guardrail systems or personal fall restraint or arrest systems.

Building Rooftops

Employees working on low-sloped roofs four feet or more above a lower level shall be protected from falling by guardrail systems, safety net systems, personal fall restraint or arrest systems, or a designated area.

Rooftop access (e.g. hatches, doors) must remain locked and secured. Keys that access the roof must remain controlled. Requests to access the roof must be referred to OSH per the "Roof Access Procedure," Appendix J. Upon receiving the request, OSH will perform a written hazard assessment to determine if additional safety measures are needed to protect faculty, staff, and students.

Only authorized personnel may access rooftops where fall restraint or arrest is installed. Authorized personnel must have completed personal fall arrest system training.

Where no rooftop fall protection is provided (e.g., permanent guardrail, permanent fall restraint/arrest system, etc.), a fall protection plan must be completed by a Campus Unit competent person. The plan must be based on the work being done and prior to employees accessing the rooftop to perform work. The plan may include the use of temporary anchor points, temporary guardrails or designated areas.

Ladders

Unsafe ladder use, such as using the wrong kind of ladder or upsetting the ladder's balance by leaning too far from its center of gravity can result in injuries to employees and students. Individuals must be trained in the proper use of ladders.

See Appendix B for detailed information on types of ladders and ladder use.

Scaffolds

Scaffolds are complex systems with multiple connection points, subject to a number of factors that could affect their stability and reliability. Only a competent person/company who has received specific training will be permitted to erect scaffolds.

Users of Scaffolds must be trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. Training shall include the following areas, as applicable:

- The nature of any electrical hazards, fall hazards and falling object hazards in the work area;
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used;
- The proper use of the scaffold, and the proper handling of materials on the scaffold;
- The maximum intended load and the load-carrying capacities of the scaffolds used; and

See Appendix C detailed information on scaffold requirements.

Lifts (Aerial, Telescoping, Scissor)

Aerial lifts have replaced ladders and scaffolding on many job sites due to their mobility and flexibility. Only trained and authorized persons are allowed to operate lifts.

Fall Protection System Types & Use

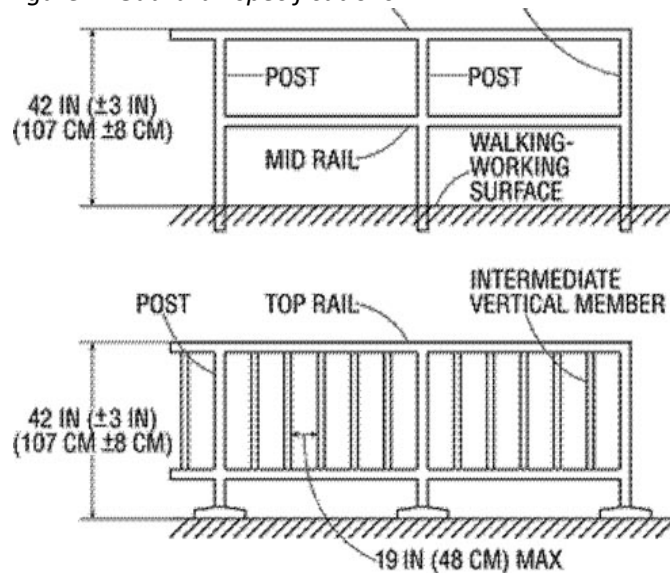
The hierarchy of controls shall be used to choose methods to eliminate or control fall hazards.

Guardrail Systems

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. It must consist of a top rail, intermediate rail and posts. Midrails, screens, mesh, 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 not a wall or parapet wall at least 21 inches high. Guardrails shall be so surfaced as to prevent injury to an employee from punctures or lacerations and to prevent snagging of clothing. See Figure 1.

Figure 1. Guardrail specifications



Covers

Where covers are used as fall protection measures, they shall remain in place when not in use. If removed the fall hazard must be attended by a designated employee who is protected by a guardrail system or personal fall restraint or arrest system. Covers must be capable of supporting without failure at least twice the maximum intended load that may be imposed on the cover at any one time and is secured to prevent accidental displacement.

Safety Nets

When safety nets are the appropriate option for fall protection, they will be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet below such level. Safety nets must meet the following criteria:

- Pass a 400-pound drop test or certified by employer or competent person before being used as a fall protection system, whenever relocated, after major repairs or at 6-month intervals if left in place;
- Extend sufficiently from outer edge of the walking/working surface to catch a falling employee;
- Have a maximum mesh size not exceed 6 inches by 6 inches;
- Be inspected at least weekly for wear, deterioration and damage;
- All objects must be removed from net by the end of the shift;
- Have a 5000 pounds minimum breaking strength of border rope; and
- Have an unobstructed fall area.

Warning Line Systems and Controlled Access Zones

Warning line systems and work in controlled access zones will be developed, based on the task, in accordance with OSHA regulation 1926.502 and must be approved by the a Campus Unit fall protection competent person before employees are exposed to fall hazards.

Control zone systems must comply with the following:

- Controlled access zones will be defined by a control line or other means that restricts access;
- Control lines will extend the entire length of the unprotected or leading edge and be approximately parallel to the unprotected or leading edge;
- Control lines must be connected on each side to a guardrail system or wall;
- Control lines may consist of ropes, wires, tapes or equivalent materials, and supporting stanchions;
- Control lines must be flagged or otherwise clearly marked at 6-foot intervals (maximum) with high-visibility material;
- Control lines must 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 45 inches above the walking/working surface; and
- Control lines must have a minimum breaking strength of 200 pounds.

Fall Restraint Systems

Fall restraint systems may 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.

The 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. Anchorages must be capable of supporting 1,000 pounds. All components, including connectors, D-rings, snaphooks, lanyards and body harnesses shall meet all applicable OSHA standards. Inspection

Work Positioning Systems

A work positioning system may be used when an employee is required to perform a task at height and needs to work hands-free. These systems restrict movement and hold or suspend the employee in place to carry out a task, thereby creating a safe working zone. An effective work position system is comprised of one or more anchor points, a connecting device that supports the worker, and a body support device (harness or work positioning belt).

Work positioning systems must be rigged so workers can free fall no more than 2 feet, and anchorages must be capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater. Work positioning systems must be combined with an appropriate backup personal fall arrest system at all times while working at height.

Inspection

Personal Fall Arrest Systems

If a fall occurs, the employee must not be able to freefall more than 6 feet, nor contact a lower level. To ensure this, a Campus Unit competent person will add the height of the worker, the lanyard length, and an elongation length of 5.5 feet to determine the minimum anchorage point height. All personal fall arrest system components that are subjected to an impact load must be removed from service immediately. Personal fall arrest systems must be inspected prior to each use by the user. A Campus Unit competent person shall perform inspections in accordance with the manufacturer's requirements, and damaged or deteriorated components will be removed from service and destroyed.

There are three main components to a personal fall arrest system:

- Anchorage point
- Body harness
- Connecting devices

All personal fall arrest system components must meet the requirements of the OSHA 1910.140 ANSI Z359 Standards.

Anchorage Points

Secure anchor points are the most critical component when employees must use fall arrest equipment. Some Campus buildings have existing identified anchor structures. Other work locations may require the installation of a temporary or permanent anchor. Guardrails and hoists cannot be used as anchorage points.

All anchor points shall be:

- Sound and capable of withstanding a 5000 lb. static load per employee attached and independent of any anchorage used to support or suspend platforms;
- Easily accessible by employees to avoid fall hazards during hook-up;
- Free of sharp edges that could reduce breaking strength when tying off. Chafing pads or abrasion-resistant straps must be used on any sharp edged structures to prevent cutting of safety lanyards or lifelines;
- At the worker's shoulder level or higher to limit freefall to 6 feet or less and prevent contact with any lower level (except when using a self-retracting lifeline or 3 foot lanyard); and
- Able to prevent or limit swing fall hazards. Horizontal lifelines will be used to keep the attachment point overhead and limit the fall vertically.

In addition to all the criteria listed above, permanent anchor points will be inspected according to the manufacturer's specifications and re-certified to meet static load requirements. They will be visibly labeled as permanent anchors and all anchors must be immediately removed from service and re-certified if subjected to fall arrest forces.

Body Harness

- A full body harness is required. The use of body belts is prohibited in fall arrest situations.
- Fall protection equipment must never be load tested.

Connecting Devices

- Allowable devices include rope or web lanyards, rope grabs or retractable lifelines.
- All snap hooks must be self-locking.
- Horizontal lifelines will be designed by a qualified person and installed in accordance with the design requirements.
- Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds.
- Lanyards must be of an appropriate length to limit freefall to less than 6 feet.
- The use of steel lanyards is prohibited.
- A lanyard may not be clipped back to itself (e.g. around an anchor point) unless specifically designed to do so.
- If vertical lifelines are used, each employee must be attached to a separate lifeline.
- Lifelines must be protected against cuts and abrasion.

Personal Fall Arrest equipment shall not be distributed to employees until a completed Fall Protection Checklist (Appendix D) has been reviewed by a Campus Unit competent person.

Rescue

Personnel requiring the use of personal fall protection equipment will use a "Buddy System" or have an observer to render assistance when and if required. Prior to tying off to perform the work, a means of rescue in the event of a fall must be immediately available if employees cannot be expected to rescue themselves. All components of fall arrest system impacted by a fall event shall be removed from service. The components will be tagged with employee's name, date, and activity at time of fall and give the equipment to the Campus Unit Responsible Person. Rescue plans shall be documented using Appendix D.

Employees who experience an arrested fall, regardless of fall distance, while wearing a personal fall arrest system must be transported by ambulance to an emergency room for evaluation by a medical professional. The victim must not lay down until cleared to do so by a medical professional.

Self-Rescue

Persons working at heights may be able to perform a self-rescue by climbing back up to the level from which they fell, typically a few inches to 3 feet.

Assisted Rescue

Persons unable to self-rescue will be assisted, if appropriate, by their "buddy" or other observer. The "buddy" will obtain the approved rescue and descent device, and secure it to an anchor rated for at least 3,000 pounds. They will attach the haul line to the worker's fall arrest system using one of the following methods:

- Attaching the line directly to a D-ring on the worker's harness;
- Using a rescue pole for attaching the line; or
- Attaching a rescue grab to the lanyard or vertical lifeline.

The "buddy" will raise or lower the fallen worker to the appropriate work platform or ground, call 911 for emergency medical services, and provide first aid up to their level of skill and training.

Assisted Rescue with Lifts

Lifts can also be used to assist a fallen employee to safety. The lift can be maneuvered underneath the fallen worker. A second lanyard or self-retracting lifeline will be attached in the aerial lift to the fallen worker. Disconnect the rescued worker from the impacted fall arrest equipment. Lower the worker to the ground, call 911 for emergency medical services, and provide first aid up to their level of skill and training.

Training

Training, with the exception of Unit-Specific SOPs and any training that is equipment-specific, may be provided by OSH. If OSH is not available in the desired timeframe or the Campus Unit Responsible Person or Supervisor may contract training through an alternative provider but they shall ensure that all affected personnel receive training on the following topics prior to exposure:

- The nature of the fall hazards in the work area and how to recognize them;
- The procedures to be followed to minimize those hazards;
- The correct procedures for installing, inspecting, operating, maintaining, and disassembling the personal fall protection systems that the employee uses; and
- The correct use of personal fall protection systems and equipment including, but not limited to, proper hook-up, anchoring, and tie-off techniques, and methods of equipment inspection and storage, as specified by the manufacturer.

OSH can provide the following training:

- Introduction to Elevated Work (prerequisite for all other topics)
- Personal Fall Protection
- Ladder Safety
- Scaffold User
- Lifts (Aerial, Scissor, Telescoping)

In addition to the above, training must be provided to each employee who uses a dockboard to properly place and secure it to prevent unintentional movement; uses a rope descent system in proper rigging and use of the equipment; or uses a designated area in the proper set-up and use of the area.

Equipment-specific training and operator training must be provided by the owning Campus Unit or through a vendor coordinated and paid for by the Campus Unit. The Campus Unit must identify and pay for a suitable vendor to provide training beyond those listed above (e.g., fall protection and scaffold competent person training). Contact OSH for a list of local vendors.

Retraining is required when there is reason to believe there are inadequacies in an affected employee's knowledge or use of equipment indicate that the employee has not retained the requisite understanding or skills.

Situations requiring retraining include, but are not limited to, the following:

- When changes in the workplace render previous training obsolete or inadequate;
- When changes in the types of fall protection systems or equipment to be used render previous training obsolete or inadequate; or

- When inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee no longer has the requisite understanding or skill necessary to use equipment or perform the job safely.

All persons assigned to rescue duty must be trained by a competent rescuer trainer. Training will include how to inspect, anchor, assemble and use the fall protection and rescue equipment used in locations where the employee works. Training will include physical demonstrations by trainees to demonstrate their proficiency with the equipment.

Training will cover all types of equipment and systems used in locations where rescues may be required, including:

- Inspection of systems prior to use
- Common hazards associated with each system and component
- Component compatibility
- Descent control
- Dismantling and storage

Program Evaluation

This Program will be reviewed annually by OSH. The written Unit-Specific SOPs shall be reviewed and updated by the respective Campus Unit at least annually and more frequently as hazards, tasks, procedures and/or equipment change.

References

29 CFR 1910 Subpart D, Occupational Safety and Health Standards – Walking-Working Surfaces
29 CFR 1910.140, Occupational Safety and Health Standards – Personal Protective Equipment
University of Illinois Facilities Standards Section 11.24.29 – Facility Fall Protection, August 1, 2016



APPENDIX A – UNIT SPECIFIC INFORMATION

APPENDIX B – LADDERS

Portable Ladders

All portable ladders used by University faculty, staff and students will meet the following requirements:

- Rated greater than the weight of the worker and any tools or equipment carried by the worker;
- Appropriate ladder style for the job (i.e. step ladders will not be used in a folded position, step ladders will be tall enough to perform work without standing on the top two steps, extension ladders will extend a minimum of three feet above the discharge point, etc.);
- Metal ladders will not be used near electrical lines or sources; and
- Inspected prior to each use.

Ladders must be set up on a surface that is firm, flat and is not slippery. The top of extension ladders must be against a solid, fixed surface and extend at least three feet above the landing surface.

Extension ladders will be set up using the 4-to-1 principal (base of the ladder placed at a distance from the wall that is equal to one fourth of the height that the ladder is extended). When employees are on extension ladders at heights of 20 feet or higher, either a second person must steady the ladder base or the top of the ladder must be effectively tied off to a sound anchor point.

Ladders are rated according to the maximum weight they can safely support. The five rating classes are shown in the table below. Keep in mind that these ratings are for the combined weight of the user **and** any materials carried.

<u>Type</u>	<u>Rating</u>	<u>Description</u>
1AA	375 lbs.	Extra-heavy-duty industrial ladder
1A	300 lbs.	Heavy-duty industrial ladder
1	250 lbs.	Heavy-duty industrial ladder
2	225 lbs.	Medium-duty commercial ladder
3	200 lbs.	Light-duty household ladder

Ladder Inspections

Portable ladders must be inspected prior to each use.

Ladder Condition

- This is the proper ladder type for the job
- No cracks in rungs or sides of ladder
- No loose rungs
- No slippery contaminants on rungs or side rails
- Connection hardware is in good condition
- No broken locks or pulleys
- No damage to ladder feet/base
- No frayed or worn ropes
- Frame is not bent, warped or uneven

Ladder Setup**Extension Ladders**

- Firm, level ground
- Firm/proper top resting point
- Top extends at least four rungs above resting point if accessing roof
- Level ladder legs
- No electrical hazards
- No horizontal forces
- Rung locking devices secure
- Area cordoned off (if necessary)
- If 20 or more feet high, secure top of ladder or have a second person stabilize the base

Step Ladders

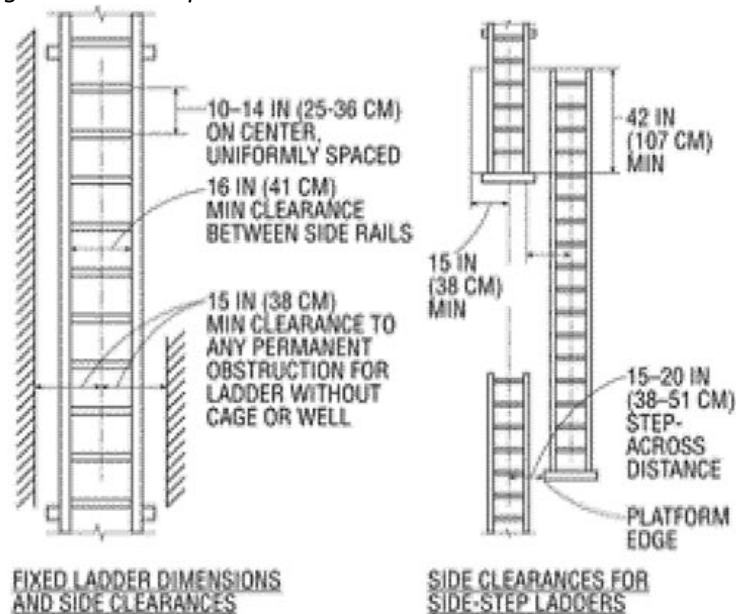
- Firm, level ground
- Reaches proper height
- No electrical hazards
- No horizontal forces required
- Work zone barricaded (if necessary)

Fixed Ladders

All fixed ladders used by University faculty, staff and students will meet the following requirements:

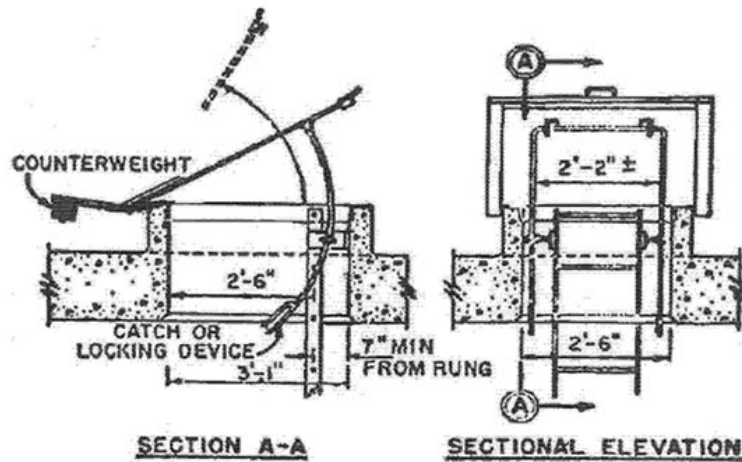
- Must be capable of supporting their maximum intended load;
- The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object in back of the ladder is 7 inches, except for elevator pit ladders, which have a minimum perpendicular distance of 4.5 inches;
- Grab bars do not protrude on the climbing side beyond the rungs of the ladder that they serve;
- The side rails of through or sidestep ladders extend 42 inches above the top of the access level or landing platform served by the ladder. For parapet ladders, the access level is:
 - The roof, if the parapet is cut to permit passage through the parapet; or
 - The top of the parapet, if the parapet is continuous;
- For through ladders, the steps or rungs are omitted from the extensions, and the side rails are flared to provide not less than 24 inches and not more than 30 inches of clearance. When a ladder safety system is provided, the maximum clearance between side rails of the extension must not exceed 36 inches;
- For side-step ladders, the side rails, rungs, and steps must be continuous in the extension (see Figure 2 below);

Figure 2. Side-Step Fixed Ladder Sections



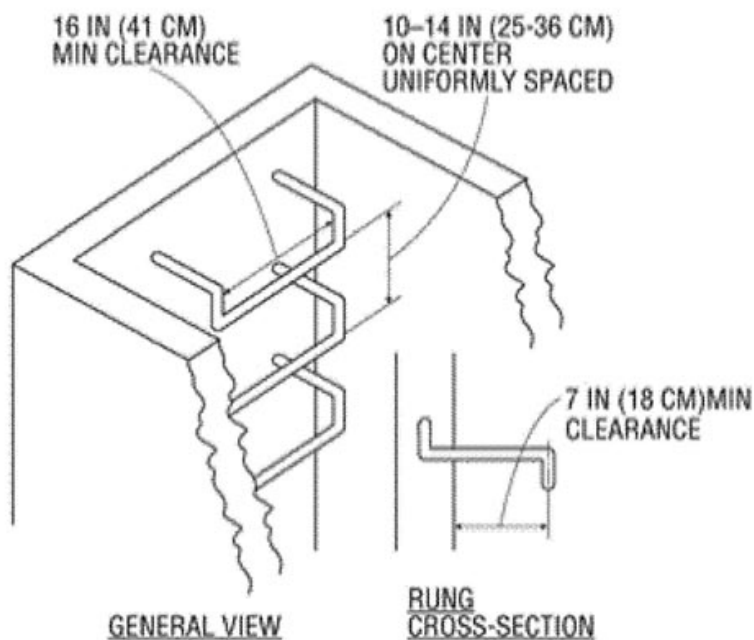
- Grab bars extend 42 inches above the access level or landing platforms served by the ladder;
- The minimum size (cross-section) of grab bars is the same size as the rungs of the ladder;
- When a fixed ladder terminates at a hatch (see Figure 3 below), the hatch cover:
 - Opens with sufficient clearance to provide easy access to or from the ladder; and
 - Opens at least 70 degrees from horizontal if the hatch is counterbalanced

Figure 3. Example of Counterbalanced Hatch Cover at Roof



- Individual-rung ladders are constructed to prevent the employee's feet from sliding off the ends of the rungs (see Figure 4 below);

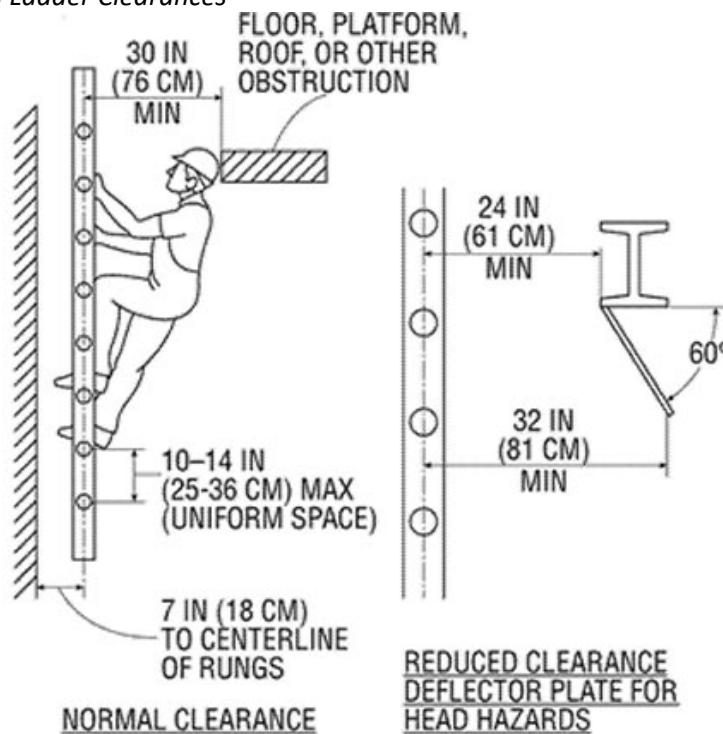
Figure 4. Individual Rung Ladder



- Fixed ladders having a pitch greater than 90 degrees from the horizontal are not used;
- The step-across distance from the centerline of the rungs or steps is:
 - For through ladders, not less than 7 inches and not more than 12 inches to the nearest edge of the structure, building, or equipment accessed from the ladders; and
 - For side-step ladders, not less than 15 inches and not more than 20 inches to the access points of the platform edge;

- Fixed ladders that do not have cages or wells have:
 - A clear width of at least 15 inches on each side of the ladder centerline to the nearest permanent object; and
 - A minimum perpendicular distance of 30 inches from the centerline of the steps or rungs to the nearest object on the climbing side. When unavoidable obstructions are encountered, the minimum clearance at the obstruction may be reduced to 24 inches, provided deflector plates are installed (see Figure 5 below).

Figure 5. Fixed Ladder Clearances



Fixed Ladders that Extend More Than 24 Feet Above a Lower Level

- *Existing fixed ladders.* Each fixed ladder installed before November 19, 2018 is equipped with a personal fall arrest system, ladder safety system, cage, or well;
- *New fixed ladders.* Each fixed ladder installed on and after November 19, 2018, is equipped with a personal fall arrest system or a ladder safety system;
- *Replacement.* When a fixed ladder, cage, or well, or any portion of a section thereof, is replaced, a personal fall arrest system or ladder safety system is installed in at least that section of the fixed ladder, cage, or well where the replacement is located; and
- *Final deadline.* On and after November 18, 2036, all fixed ladders are equipped with a personal fall arrest system or a ladder safety system.

When a one-section fixed ladder is equipped with a personal fall protection or a ladder safety system or a fixed ladder is equipped with a personal fall arrest or ladder safety system on more than one section, then:

- The personal fall arrest system or ladder safety system provides protection throughout the entire vertical distance of the ladder, including all ladder sections; and
- The ladder has rest platforms provided at maximum intervals of 150 feet;
- The employer must ensure ladder sections having a cage or well:
 - Are offset from adjacent sections; and
 - Have landing platforms provided at maximum intervals of 50 feet; and
- The employer may use a cage or well in combination with a personal fall arrest system or ladder safety system provided that the cage or well does not interfere with the operation of the system.

Cages, Wells, and Platforms Used with Fixed Ladders

- Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures 5 and 6 below);
 - Cages and wells are continuous throughout the length of the fixed ladder, except for access, egress, and other transfer points;
 - Cages and wells are designed, constructed, and maintained to contain employees in the event of a fall, and to direct them to a lower landing; and
 - Platforms used with fixed ladders provide a horizontal surface of at least 24 inches by 30 inches.

Figure 5. Clearances for Fixed Ladders in Wells

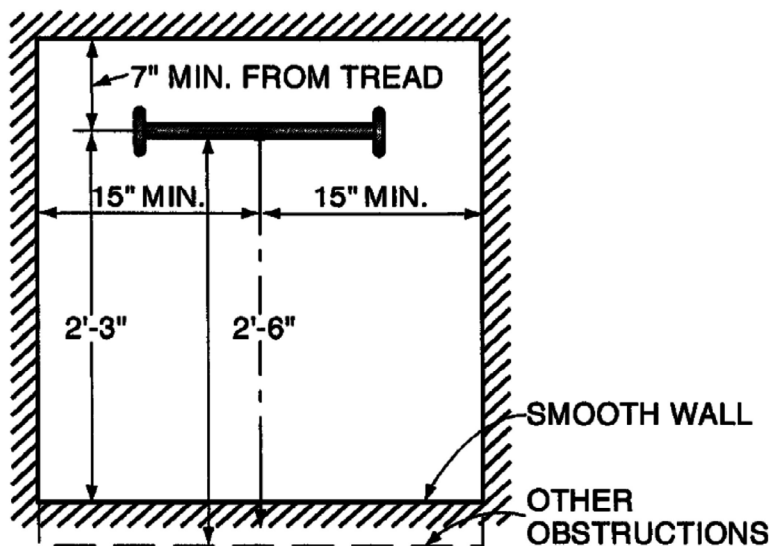
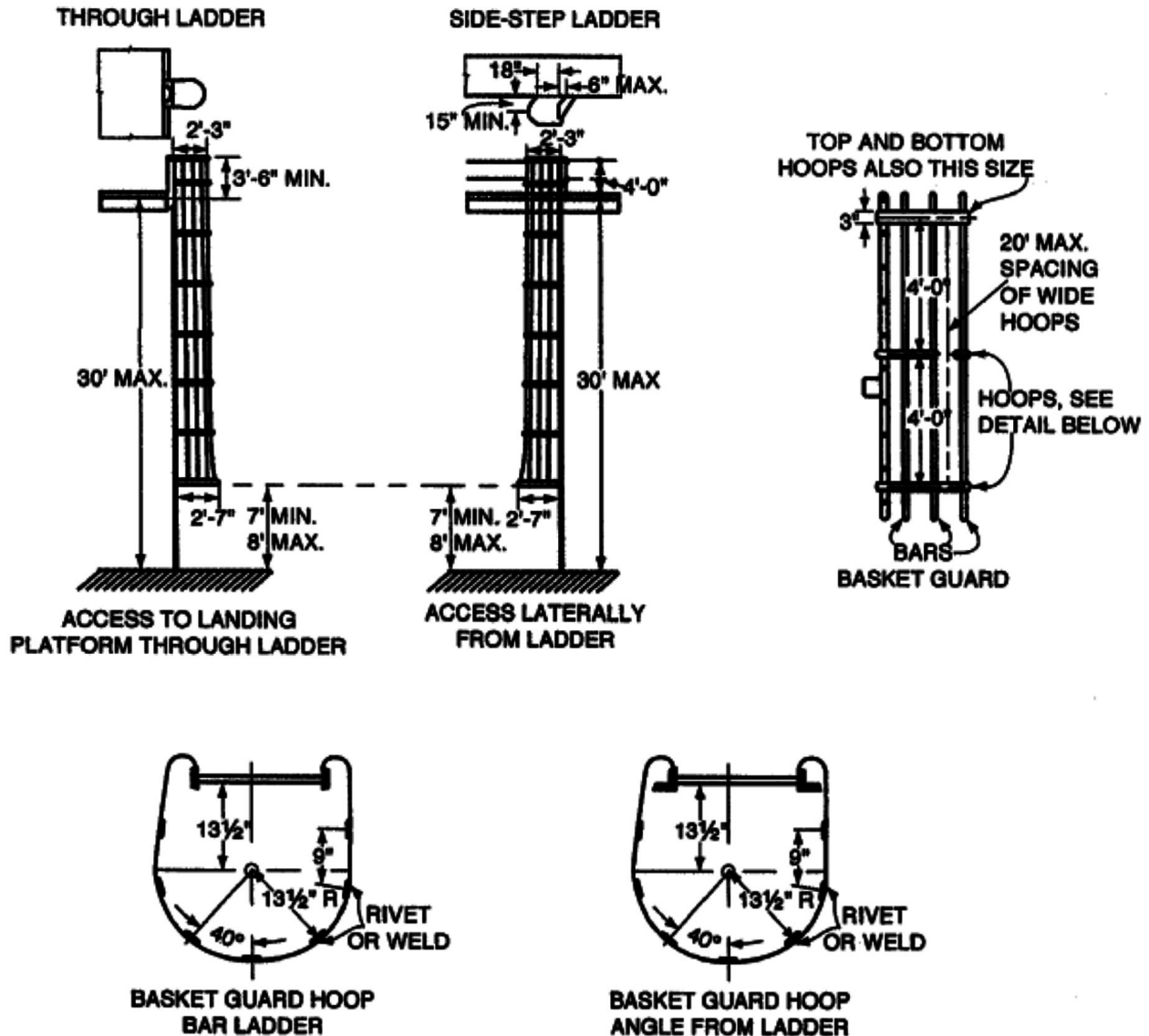


Figure 6. Example of General Construction of Cages



Ladder Safety Systems

- Each ladder safety system allows the employee to climb up and down using both hands and does not require that the employee continuously hold, push, or pull any part of the system while climbing;
- The connection between the carrier or lifeline and the point of attachment to the body harness or belt does not exceed 9 inches;
- Mountings for rigid carriers are attached at each end of the carrier, with intermediate mountings spaced, as necessary, along the entire length of the carrier so the system has the strength to stop employee falls;

- Mountings for flexible carriers are attached at each end of the carrier and cable guides for flexible carriers are installed at least 25 feet apart but not more than 40 feet apart along the entire length of the carrier;
- The design and installation of mountings and cable guides does not reduce the design strength of the ladder; and
- Ladder safety systems and their support systems are capable of withstanding, without failure, a drop test consisting of an 18-inch drop of a 500-pound weight.

APPENDIX C – SCAFFOLDING

Basic Requirements

- The working edge of the scaffold will be placed no more than 14 inches from the front of the building or structure.
- Platforms will extend over the end supports by at least 6 inches, and not more than 12 inches, unless cleated or restrained.
- All components that are supplied by the manufacturer will be used unless they are parts specifically designed for optional uses and are not being used at the time.
- All parts, including casters, pipes/poles, rails, toe boards, platforms, cams, locking pins and all connection devices must be inspected and found to be in good condition prior to each use. See Appendix C.
- A workplace inspection will be conducted by a scaffold competent person and documented prior and during the erection of the scaffolding, as well as prior to each use. Example inspection checklists follow.
- Guardrails are to be placed between 36 and 45 inches high and placed at the open ends and sides of the platform, and must be able to withstand a force of 200 pounds. Midrails will be placed halfway between the top rail and the toeboard. Toeboards must be in place where employees working below are exposed to falling objects.
- Cross bracing and railings should not be used as a means of climbing to or accessing the platform. Workers will only use the installed ladders.
- For mobile scaffolds, the caster wheels must be locked and all locking pins in place prior to use.
- Fall protection systems are required when employees erect and disassemble scaffolding.
- Hard hats are to be worn at all times while working on or around scaffolding.

Component Inspection

All scaffold components will be inspected before use.

- Frame posts in good condition
- Runner poles in good condition
- Bearer poles in good condition
- Cross bracing poles in good condition
- Horizontal poles in good condition
- Panel guard rails in good condition
 - Top rail
 - Mid rail
 - Uprights
 - Toe kicks
- Connector clamps
- Locking pins
- Base plates
- Casters with locking equipment
- Climbing ladders
- Climbing ladder brackets
- Outrigger brackets (if applicable)
- Outriggers (if applicable)
- Planking (solid treated lumber, LVL, metal, etc.)

Additional components:

- _____
- _____
- _____
- _____

Additional accessories added:

- _____
- _____
- _____
- _____

Comments

Worksite Inspection

Date _____ Department _____ Inspector _____

- Is scaffold equipment inspection complete?
- No electrical within 10 feet (or insulation if <300 V)
- No overhead obstruction
- Scaffold grounded if powered equipment is used
- Only trained personnel erecting or using scaffolding
- Ground or floor is providing adequate support
- Ground or floor flat and level, or adjustments have been made
- Area around base is cordoned off
- If casters are used, they are locked
- Base plates are in place and secured
- Each frame and panel is braced by:
 - Horizontal bracing
 - Cross bracing
 - Diagonal bracing
- Diagonal and cross bracing is used near bottom and every 20 feet
- All bracing connections and couplers are secured
- All vertical post connections and couplers are secured
- All locking pins and locking mechanisms are in place and engaged
- All posts are plumb and planking is level
- All planking overhangs the ends by 6-12 inches
- All 4:1 sections properly secured (when height exceeds four times the width)
 - Tied to wall or fixed surface
 - Guyed
 - Outriggers used
 - Other effective restraints used
- A means of access to all platforms is provided (e.g. ladder)
- No climbing of cross bracing, horizontal or diagonal parts is necessary
- No homemade or makeshift devices used
- No additional ladders or devices used to gain height on platforms
- Erected scaffolding reaches safe working height
- Weight capacity of the scaffold system will not be exceeded

Comments

APPENDIX D – FALL PROTECTION PLAN

Fall Protection Assessment

Work performed: Indoors Outdoors

Work surface elevation: _____ feet Number of Workers: _____

Fall hazards present:

<input type="checkbox"/> Unprotected sides or edges	<input type="checkbox"/> Ramp, runways and other walkways
<input type="checkbox"/> Leading edges	<input type="checkbox"/> Dangerous equipment
<input type="checkbox"/> Holes	<input type="checkbox"/> Other _____
<input type="checkbox"/> Wall openings	

Type of surface: _____

Task requires: Vertical movement Horizontal movement

Existing Protection System(s):

<input type="checkbox"/> Guardrail systems	<input type="checkbox"/> Ladder Safety Device
<input type="checkbox"/> Covers	<input type="checkbox"/> Other _____
<input type="checkbox"/> Safety net systems	<input type="checkbox"/> Other _____
<input type="checkbox"/> Permanent Anchor	<input type="checkbox"/> Other _____

Frequency of Task: _____

Can the fall hazard be eliminated or prevented by:

Process Change?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Working in a guarded area, utilizing guardrail or gates?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Using a fall restraint system?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

If "no" to all of these questions, complete the Fall Protection Equipment Selection section, or see OSH assistance.

Fall Protection Equipment Selection

- | | | | | | | | |
|---------------------------------|--------------------------|---------|----------------------------|----------------------------|----------------------------|-----------------------------|------------------------------|
| Harness | <input type="checkbox"/> | Size: | <input type="checkbox"/> S | <input type="checkbox"/> M | <input type="checkbox"/> L | <input type="checkbox"/> XL | <input type="checkbox"/> XXL |
| Retractable Lanyard | <input type="checkbox"/> | Length: | _____ | | | | |
| Shock-absorbing Lanyard | <input type="checkbox"/> | Length: | _____ | | | | |
| Double-leg Retractable Lanyard | <input type="checkbox"/> | Length: | _____ | | | | |
| Rope and Rope Grab | <input type="checkbox"/> | Length: | _____ | | | | |
| Dead Weight Anchor Point | <input type="checkbox"/> | | | | | | |
| Temporary anchor point(s) | <input type="checkbox"/> | Type: | _____ | | | | |
| Warning Lines | <input type="checkbox"/> | | | | | | |
| Warning Lines w/ Safety Monitor | <input type="checkbox"/> | | | | | | |

Completed by:

Name

Signature

Competent Person:

Name

Signature

Rescue Plan

Date: _____ Location: _____

Job Description

Contacts

Rescuer(s): _____

Emergency Contact

Call 911, request Technical Rescue Team

Method of Contact:

- PA
- Face-to-face
- Radio
- Phone
- Other

Frequency: _____
Number: _____

Describe the tasks that will be done prior to work to prevent a fall and the step by step process that will be followed in the event of a fall.

Pre Work Tasks:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Response Procedure:

1. Notify Emergency Contact. Call 911 and request technical rescue
2. Make medical assessment of person.
3. If possible have employee perform self-rescue.
4. _____
5. _____
6. _____

Rescue Equipment (Check all that apply)

- | | | |
|--------------------------------------|--------------------------------------|--|
| <input type="checkbox"/> Ladder | <input type="checkbox"/> Rescue Rope | <input type="checkbox"/> Alternative Lifting & Lowering Device |
| <input type="checkbox"/> Rescue Pole | <input type="checkbox"/> Aerial Lift | <input type="checkbox"/> First Aid Kit |
| <input type="checkbox"/> Scaffold | <input type="checkbox"/> Crane | <input type="checkbox"/> Other _____ |

Location of Equipment at job site: _____

Critical Rescue Factors:

Anchor Point _____

Landing Area _____

Rescue Obstructions/Hazards _____

- Have alternatives to using fall arrest equipment been considered?
- Has rescue equipment been inspected and found in good shape?
- Is equipment adequate for the rescue plan?
- Have communication devices been identified, located, & tested?
- Are all rescuers familiar with the use of the rescue equipment?
- If working over water, is there a boat available?

Completed by: _____
Name

Signature

Reviewed by: _____
Name

Signature

APPENDIX E – ELEVATED WORK EQUIPMENT INSPECTION SHEETS

Boatswain Chair Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Webbing	Frayed Edges			
	Broken Fibers			
	Pulled Stitches			
	Cuts			
	Burns			
	Hard/Shiny Spots			
	Hardness/Brittleness			
	Chemical Damage			
	Discoloration			
Metal Components	Distortion			
	Cracks			
	Breaks			
	Rough/Sharp Edges			
	Rust			
	Move Freely			
Seat	Unusual Wear			
	Reinforcements Attached			
	Warped/Bent			
Snap Hooks	Self-Locking			
	Twist, Bend, Elongated			
	Latch Seats w/o Binding			
	Modified by User			
	Rust/Pitting/Corrosion			
	Cracks			
	Excessive Wear			
Tags	Present			
	Legible			

PASS: FAIL: Remove from Service

Inspector _____

Signature _____

Date _____

Tie-back Anchor Strap Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Webbing	Cuts/Nicks/Tears			
	Broken/Cracked Fibers			
	Modification by User			
	Fraying/Abrasions			
	Hard/Shiny Spots			
	Undue Stretching			
	Burn/Charred/Melted			
	Hardness/Brittleness			
	Knots in Lanyard			
Stitching	Pulled			
	Missing			
	Cuts/Nicks/Tears			
D-Ring	Distortion			
	Cracks			
	Breaks			
	Rough/Sharp Edges			
	Rust			
	Move Freely			
Tags	Present			
	Legible			

PASS: FAIL: Remove from Service

Inspector _____

Signature _____

Date _____

Harness Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Webbing	Frayed Edges			
	Broken Fibers			
	Pulled Stitches			
	Cuts			
	Burns			
	Hard/Shiny Spots			
	Hardness/Brittleness			
	Chemical Damage			
	Discoloration			
D-Ring	Distortion			
	Cracks			
	Breaks			
	Rough/Sharp Edges			
	Rust			
	Move Freely			
Buckle Attachment	Unusual Wear			
	Frayed/Cut			
	Broken Stitching			
Tongue Grommets	Loose			
	Distorted			
	Broken			
	Additional Holes Punched			
Tongue Buckles	Sharp edges			
	Distortion			
	Roller Moves Freely			
Buckles	Distortion			
	Bars Straight			
	Corner/Attach of Center Bar			
Tags	Present			
	Legible			

PASS: FAIL: Remove from Service

Inspector

Signature

Date

Web Lanyard Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Webbing	Cuts/Nicks/Tears			
	Broken/Cracked Fibers			
	Modification by User			
	Fraying/Abrasions			
	Hard/Shiny Spots			
	Undue Stretching			
	Burn/Charred/Melted			
	Hardness/Brittleness			
	Knots in Lanyard			
Stitching	Pulled			
	Missing			
	Cuts/Nicks/Tears			
Snap Hooks	Self-Locking			
	Twist, Bend, Elongated			
	Latch Seats w/o Binding			
	Excessive Wear			
	Modified by User			
	Rust/Pitting/Corrosion			
	Cracks			
Locking Mechanism	Open Smoothly			
	Snaps Back			
Snap Hook Keeper	Released - Snaps Back			
	Stays Locked When Pushed			
	No Side Play in Nose			
Tags	Present			
	Legible			

PASS: FAIL: Remove from Service

Inspector _____

Signature _____

Date _____

Retractable Lanyard Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Webbing	Cuts/Nicks/Tears			
	Broken/Cracked Fibers			
	Modification by User			
	Fraying/Abrasions			
	Hard/Shiny Spots			
	Undue Stretching			
	Burn/Charred/Melted			
	Hardness/Brittleness			
	Knots in Lanyard			
	Stitching	Pulled		
Missing				
Cuts/Nicks/Tears				
Snap Hooks	Self-Locking			
	Twist, Bend, Elongated			
	Latch Seats w/o Binding			
	Excessive Wear			
	Modified by User			
	Rust/Pitting/Corrosion			
	Cracks			
Locking Mechanism	Open Smoothly			
	Snaps Back			
Snap Hook Keeper	Released - Snaps Back			
	Stays Locked When Pushed			
	No Side Play in Nose			
Tags	Present			
	Legible			
Retractable	Retracts Smoothly			
	Pulls Smoothly			
	Break Engages			
	No Slippage when Break Engaged			
	Break Disengages Smoothly			
	Load Impact Indicator Not Activated			

PASS: FAIL: Remove from Service

Inspector _____

Signature _____

Date _____

Rope Grab Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Rope Grab	Cracks/Wear			
	Corrosion			
	Loss of Tension in Cams/Springs			
	Locking Mechanism			
	All Parts Move Freely			
	Rivets: Damage/Cracks/Wear Corrosion			
	Broken/Missing Springs			

PASS: FAIL: Remove from Service

Inspector

Signature

Date

Synthetic Rope Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Rope	Cuts/Nicks/Tears			
	Broken/Cracked Fibers			
	Fuzzy/Worn Fibers			
	Overall Deterioration			
	Modification by User			
	Fraying/Abrasions			
	Hard/Shiny Spots			
	Fused Fibers/Strands			
	Burn/Charred/Melted Fibers			
	Kinks/Hocking/Knots			
	Severe Discoloration			
	Splices Not Secured from Unraveling			
	Splices Unraveling			
	Splices Damaged/Deteriorating			
Change in Original Diameter				
Thimbles/Eyes	Missing			
	Loose			
	Rusted Eyes			
	Damaged			
Snap Hooks	Self-Locking			
	Twist, Bend, Elongated			
	Latch Seats w/o Binding			
	Excessive Wear			
	Modified by User			
	Rust/Pitting/Corrosion			
	Cracks			
Locking Mechanism	Open Smoothly			
	Snaps Back			
Snap Hook Keeper	Released - Snaps Back			
	Stays Locked When Pushed			
	No Side Play in Nose			
Tags	Present			
	Legible			

PASS: FAIL: Remove from Service

Inspector _____

Signature _____

Date _____

Wire Rope Retractable Lanyard Inspection Sheet

Manufacturer _____ Serial Number _____ Date of Manufacture _____

Part	Specific	Fail	Pass	Comments
Rope	Cuts/Frayed Areas			
	Worn/Broken Strands/Fibers			
	Excessive Outside Wear			
	Modification by User			
	Rust/Pitting/Corrosion			
	Crushed/Jammed/Flattened Strands			
	Bulges in Rope			
	Gaps Between Strands			
	Knicks/ Bird Caging			
	Core Protrusion			
	Heat Damage: Torch Burns/Elect Arcing			
Fittings	Wear/Cracks			
	Corrosion/Pitting			
	Deformation/Bends			
	Mismatched Parts			
	Modified by User			
	Obvious Damage			
Splices	Worn or Broken Wires			
	Crushed/Jammed/Flattened Strands			
	Corrosion			
Tags	Present			
	Legible			
Retractable	Retracts Smoothly			
	Pulls Smoothly			
	Break Engages			
	No Slippage when Break Engaged			
	Break Disengages Smoothly			
	Load Impact Indicator Not Activated			

PASS: FAIL: Remove from Service

Inspector

Signature

Date

APPENDIX F - DEFINITIONS

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

Body harness (safety harness) means 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.

Competent Person means an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Connector means 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).

Dangerous equipment means 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 means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifeline/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.

Equivalent means 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 means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Guardrail system means a barrier erected to prevent employees from falling to lower levels.

Hole means a gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.

Infeasible means 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 means 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.

Leading edge means 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 section are placed, formed, or constructed. A leading edge is considered to be an “unprotected side and edge” during when it is not actively and continuously under construction.

Lifeline means 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.

Lower level means those areas or surfaces to which an employee can fall without danger of falling farther. 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.

Opening means a gap or void 30 inches or more high and 18 inches or more wide in a wall or partition through which an employee can fall to a lower level.

Personal arrest system means a system used to arrest an employee in a fall from 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. Use of a body belt for fall arrest is prohibited.

Qualified Person means an individual who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Rope grab means 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 principal of inertial locking, cam/level locking, or both.

Roof means an exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily become the top surface of a building.

Roofing work means 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 means a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Self-retracting lifeline/lanyard means 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 means 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. Use of a non-locking snap-hook as part of personal fall arrest systems and positioning device systems is prohibited.

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

Toe-board means 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 means any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, or ramp runway where there is no wall or guardrail system at least 39 inches high.

Walking/working surface means 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 means 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 means that portion of a walking/working surface where job duties are being performed.

APPENDIX G – ROOF ACCESS PROCEDURES

Occupational Access (Non Research/Academic purposes)

Roof access hatches, doors, etc. must remain locked and secured. Keys that access the roof must remain controlled. Contact OSH to perform a written hazard assessment to determine appropriate safety measures. Upon receiving the request OSH will perform a written hazard assessment to determine the appropriate safety measures.

Research/Academic Access

In order for a roof to be accessed by a department as research space, the participating College or Department must agree to the following requirements:

- College or Department must assume the Division of Responsibility (DoR) for the roof area being utilized for research. An addendum must be developed, appropriately approved and attached to the existing DoR documents for the building.
- Installation of an Andover card access system (currently required on all exterior doors by building standards) will be required for all roof research areas to insure the maximum level of security and safety is maintained.
- Access must be limited to properly trained/approved personnel.
- Roof penetrations may not be made without prior F&S Building Maintenance Department approval and must be made by F&S Roofing Shop employees or a qualified roofing contractor.
- Planned activities and research projects equipment siting must be submitted to and approved by appropriate F&S Departments (Code Compliance and Fire Safety and/or Occupational Safety and Health) to assure compliance with applicable codes and standards.
- Reinforced walkways will be required on roof surfaces.
- In instances requiring lightning strike protection, departments will be responsible for costs associated with the installation and maintenance of the protective equipment.

Contact the Office of the Vice Chancellor for Research with questions.

<https://research.illinois.edu/contact-us>

Document Revisions