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# **Best Practices for Fall Protection**

## ***In the Telecommunications Industry***

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**Prepared by the National Telecommunications Safety Panel**

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## **DISCLAIMER**

This document has been developed by safety representatives from major telephone companies across the United States as guidelines for telecommunications work performed on rooftops, towers and other elevated locations. It is not intended to be interpreted as a standard to be complied with or to replace regulated fall protection requirements. Rather, these are suggested guidelines to assist telecommunications companies in developing their own fall protection policies and procedures to meet regulatory requirements. Any adoption of these guidelines is made at the users' own discretion and volition and in doing so the users are forewarned.

This document is not intended to be construed as a suggestion to any manufacturer to modify or change any of its products, nor does this document represent any commitment by the developers to purchase any product, whether or not it provides the described characteristics. Nothing contained herein shall be construed as conferring by implication, estoppels or otherwise any license or right under any patent, whether or not the use of any information herein necessarily employs an invention of any existing or later issued patent.

The developers of this document do not recommend products and nothing contained herein is intended as a recommendation of any product to anyone.

At all times contractors should be aware of all current safety practices in the area that they are working.

These procedures are mainly based on Federal OSHA requirements. If work is being performed in an OSHA State Plan State, the state regulations, which may be more stringent, must be followed.

## **I. Scope**

This document is a composite of best practices from major telecommunications companies in the United States. The objective is to supplement the current federal and state regulations covering fall exposures in the telecommunications industry. This document encompasses rooftop work, flat commercial roofs, towers and other elevated locations where employees and contractors must work. These guidelines were developed based on the Federal OSHA standards in effect at the time this document was written. State Plan OSHA states may have more stringent requirements that must be followed in those states. Companies should always consult the most recent regulatory requirements that pertain to their operating areas.

## **II. Program Elements**

The telecommunications industry has long recognized the importance of providing fall protection for employees who perform work operations at elevated locations. In a cooperative effort to ensure the safety of employees and contractors in the industry, the NTSP recommend the following program, training and managerial elements for a Telecommunications Fall Protection Program.

A comprehensive fall protection program should include the following key elements:

- Recognition of fall hazards and exposures
- Engineering for the elimination of fall hazards
- Fall prevention or reduction of exposures
- Fall arrest methods
- Administrative procedures and training

## **III. Definitions**

### **ANCHORAGE**

Means a secure point of attachment for lifelines, lanyards or deceleration devices.

### **BODY BELT (Safety Belt)**

A strap with a means both for securing it around the waist and for attaching it to a lanyard, lifeline, or deceleration device. Body Belts are used in a positioning system or in a restraint system.

### **COMPETENT PERSON**

One who is capable of identifying existing and predictable hazards in the work environment and has authorization to take prompt corrective measures to eliminate them.

### **DECELERATION DEVICE**

Any mechanism, such as rope grabs, rip-stitch lanyards, specially-woven lanyards, tearing or deforming lanyards, automatic self retracting lifelines/lanyards, etc., which serve to dissipate a substantial amount of energy, or otherwise limit the force imposed on an individual, during a fall.

### **DEFORMATION**

Distortion in form through wear, damage or stress. Disfiguration.

### **EIA/TIA**

Electronic Industries Alliance/Telecommunications Industry Association

## **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.

## **FALL ARREST**

A reference to equipment or techniques, which control or stop a fall before the individual reaches the lower level. Examples of fall arrest equipment are a net, safety line, or a shock-absorbing lanyard.

## **FULL BODY HARNESS**

A series of straps which may be secured about the employee's body in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders and has a means for attaching it to other components of a personal fall arrest system.

## **GUARDRAIL**

A vertical barrier normally consisting of, but not limited to, an assembly of toprails, midrails, and posts, erected to prevent personnel from falling to lower levels.

## **HOLE**

A gap or void 2 inches or more in its least dimension, in a floor, roof, or a walking/working surface. All roof holes 2" x 2" or bigger must be covered or guarded, including skylights. Covers must be able to support twice the maximum weight of expected loads (employee and/or equipment), must be marked "hole" or "cover", and must be secured from accidental displacement.

## **INFEASIBLE**

When it is technologically or physically impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system).

## **LADDER SAFETY DEVICE**

Ladder safety device means a device other than a cage or well, designed to help prevent accidental falls from ladders, or to limit the length of such falls.

## **LEADING EDGE**

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

## **LIFELINE**

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

## **LOWER LEVELS**

Lower levels are those areas or surfaces such as ground levels, floors, ramps or platforms, onto which an employee can fall.

## **LOW-SLOPED ROOFS**

A roof with slopes less than or equal to 4 inches vertical for every 12 inches horizontal.

## **MIDRAIL**

The rail located approximately midway between the top rail and the toeboard or work surface of a guardrail system.

## **PERSONAL FALL ARREST SYSTEM**

A system used to arrest a fall from a working level. It consists of an anchorage point, connectors, body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

## **POSITIONING DEVICE SYSTEM**

A body belt or body harness system which allows an employee to be supported on an elevated vertical surface, such as on a pole, and work with both hands free while leaning.

## **RESIDENTIAL CONSTRUCTION**

1. For purposes of this instruction, an employer is engaged in residential construction where the working environment, materials, methods and procedures are essentially the same as those used in building a typical single-family home or townhouse.
2. Residential construction is characterized by:
  - Materials: Wood framing (not steel or concrete); wooden floor joists and roof structures.
  - Methods: Traditional wood frame construction techniques.
3. In addition, the construction of a discrete part of a large commercial building (not the entire building), such as a wood frame, shingled entranceway to a mall, may fit within the definition of residential construction. Such discrete parts of a commercial building would qualify as residential construction where the characteristics listed above are present.”
4. Alternative procedures are available to employers who are (1) engaged in residential construction, and (2) doing one of the listed activities.

## **RESTRAINT SYSTEM**

A restraint system prevents a worker from being exposed to any fall. If the employee is protected by a restraint system, either a body belt or a harness may be used. When a restraint system is used for fall protection from an aerial lift or a boom-type elevating work platform, the employer must ensure that the lanyard and anchor are arranged so that the employee is not potentially exposed to falling any distance.

## **RESTRICTED ACCESS ZONE**

Areas where signage, banners, etc., are used to alert workers that they are entering an area where fall protection or other specialized protective equipment are required.

## **ROOFS**

Exterior surfaces on the top of a building, excluding floors or formwork which, because a building has not been completed, has temporarily become the top surface of a building.

## **ROPE GRAB**

A device or a brake that travel on a lifeline and automatically locks onto the lifeline in order to stop a person's fall. A rope grab usually employs the principle of inertial locking, cam/lever locking, or both.

### **SELF-RETRACTING LANYARD OR LIFELINE**

A special device that contains a drum-wound line which may be slowly extracted from, or retracted onto, the drum under slight tension during normal worker movement. After the onset of a fall, the device will automatically lock the drum and arrest the fall.

### **SNAPHOOK**

A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Only double locking (requires two distinct and separate operations to open) snaphooks may be used in personal fall arrest and positioning systems.

### **STEEP ROOFS**

Roofs with slopes greater than 4 inches vertical for every 12 inches horizontal.

### **UNPROTECTED SIDES AND EDGES**

A side or edge (except at entrances to points of access) of a walking/working surface; e.g., floor, roof, ramp, pier hole or runway where there is no wall or guardrail system that meets OSHA specifications.

## **IV. Current Telecommunications Industry Fall Exposures**

The term fall protection is generally used to describe the protection for those working at specified heights above a lower level. Fall protection may be accomplished in a variety of ways including:

- The use of engineering controls, such as guardrail or parapets
- The use of personal protective equipment for fall restraint or fall arrest
- Other means of fall protection (such as safety nets, etc.)

Generally, fall protection exposures for the telecommunications industry are covered in 29 CFR 1910.268. Specifically, 1910.268(g) addresses personal climbing equipment for use while work is being performed at levels more than four feet above ground on poles and towers. The 1910.268(h) section addresses telecommunications ladder safety. Aerial platform work is covered in 1910.268(n) (7).

Construction work, other than telecommunications work, is covered by 29.CFR 1926.500-503. These standards would also apply to contractors/sub-contractors doing non-telecommunications work.

Employees performing any type of work on surfaces above or adjacent to dangerous equipment, materials or operations shall be protected by an appropriate fall protection system.

### **Exceptions:**

These guidelines do not apply when employees are making an inspection, investigation, or assessment of the workplace conditions prior to the actual start of work or after all work has been completed (see 29 CFR 1926.500(a))

**Examples of fall exposures include but are not limited to:**

Aerial platforms	Fixed Ladders	Towers
Pole platforms	Ladder platforms	Rooftops
Stepped poles	Other unprotected sides/edges	Un-stepped pole s
Personnel lifts	Powered industrial vehicles (e.g. Order pickers)	

**V. Fall Protection Recognition and Assessment**

This procedural outline is a summary of specific points of regulatory and best practices information concerning fall protection requirements for addressing recognized fall hazards, proper use of equipment, and restricted access zones. *Each company will have to develop specific practices and procedures for their company and fall exposures resulting from business operations.*

Fall protection shall be provided for employees performing telecommunications work at a position 4 feet or more above a lower surface. Employees performing non-telecommunications work shall be provided with fall protection while working 6 feet or more above a lower surface. Routine telecommunications work can normally be performed following established work practices for fall protection. A fall protection “hazard assessment” should be completed for each non-routine work site. A copy of the completed fall hazard assessment should be available to the employee planning to visit a site for installation, maintenance, or technical service duties. The fall protection hazard assessment identifies areas on the site where potential fall hazards have been identified and lists specific fall protection equipment needed. (See Appendix D)

There may be other options to the use of personal fall arrest systems, and their application(s) may vary from location to location. Other options may include warning lines, controlled access zones, guardrail systems, and safety monitoring systems.

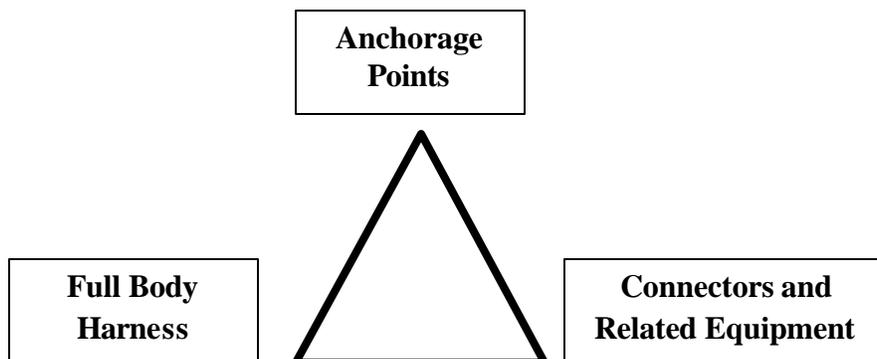
**VI. Non-telecommunication conditions requiring fall protection**

- Compliance with OSHA Standard 29CFR 1926.500-503, Subpart M; 29CFR 1926.450–454 Subpart L
- Unguarded work or equipment platforms with a height of 6 feet or higher(Example: working on a rooftop equipment platform)
- Walking or working within 6 feet of a roof edge with a parapet or guardrail height of less than 42 inches (Nominal)
- Working within six feet of drilled piers of towers with a depth of 6 feet or more
- Working inside restricted access zones

**VII. Use of Personal Fall Protection Systems**

**Personal Fall Arrest Systems (PFAS)**

A personal fall arrest system is designed to arrest the fall of a worker from an elevated level. It consists of the following:



A PFAS includes a suitable anchorage point, a full body harness and connectors, and may include, either alone or in combination, a lanyard, deceleration device or a lifeline. For most applications the lanyard and deceleration device are combined, either as a shock-absorbing lanyard, or self-retracting lanyard.

A PFAS must be rigged to limit free fall to no more than 6 feet, bring the fallen worker to a complete stop with no more than 3.5 feet of deceleration distance, **and prevent contact with a lower level.**

A PFAS shall be worn with the attachment point of the body harness located in the center of the wearer's back near shoulder level, or above the wearer's head. Anchorage points for a personal fall arrest system shall be capable of supporting at least 5,000 pounds per person attached, or shall be designed, installed, and used under the supervision of a qualified person as part of a complete personal fall protection system which maintains a safety factor of at least two. A safety factor of at least two means that the anchorage shall be capable of withstanding at least twice the maximum impact load.

A full body harness is the nucleus of a PFAS. Employees exposed to fall hazards must wear a full body harness as part of their PFAS whenever they are working more than 4 feet (29 CFR 1910.268) off the ground in most situations. However, a full body harness is not required when working on a pole, ladder, or where a restraint system is being used, e.g. in a bucket. Connecting devices include your fall arrest, restraint and positioning lanyards. Connecting devices also include the D-rings, carabiners and snap hooks that are used for connecting lanyards to both the anchor point and the harness or belt. These hardware components may or may not be constructed as part of the lanyards.

Harnesses, lanyards, and connecting components may not be modified or altered in any way. Any PFAS subjected to impact loading must be removed from service, inspected, and determined by a Competent Person to be undamaged prior to being reused for employee safety.

Employees are required to maintain 100% fall protection at all times. This means that while working at heights, you must be protected at all times whether by guardrail or by being attached to a personal fall arrest, restraint, or positioning system. While working on towers, you may be required to use a double shock-absorbing lanyard (also referred to as a "Y" lanyard or a twin lanyard) as part of their PFAS.

**NOTE** - Criteria and design requirements for PFAS and other fall protection can be found in 29 CFR 1926.502.

### **Ladder Safety Devices**

Ladder safety devices are designed to help prevent falls from fixed ladders and step bolts, or to limit the length of such falls. A ladder safety device usually consists of a carrier, safety sleeve, and body harness.

Ladder safety devices permit the employee to ascend or descend without continually having to hold, push or pull any part of the device, leaving both hands free for climbing.

The connection between the carrier mounted on the ladder and the point of attachment to the harness shall not exceed 9 inches in length. The attachment point on the harness must be located on the front of the harness for systems where the carrier is located in the center of the ladder. Where the carrier is located to one side of the ladder, the attachment point on the harness must be on the corresponding side.

Ladder safety devices shall be designed to activate within 2 feet after a fall occurs, in order to limit the descending velocity and the associated arresting force on the employee using the system.

Employees are responsible for following all manufacturers' instructions for the inspection, use and maintenance of ladder safety devices. Ladder safety device systems must be inspected by a competent person prior to use to ensure equipment reliability and proper functionality.

### **Guardrail systems**

The top member of a guardrail should be a minimum of 42 inches (nominal) above the guarded surface level. Existing guardrail installations constructed in accordance with older codes and standards may allow top member heights as low as 36 inches.

For all new construction, the top rail or member of a guardrail should be a minimum height of 42 inches above the guarded surface level when the guardrail is not subjected to a load. Existing guardrails, constructed in accordance with codes in existence at the time they were built, may continue to be used provided they meet the load deformation criteria specified below.

The top rail or member of a guardrail system shall be capable of withstanding, without failure, a force of at least 200 pounds applied within two inches of the top edge of the rail in any downward or outward direction. When the 200-pound load is applied in a downward direction on older systems less than 42 inches in height, the top edge of the guardrail may not be less than 36 inches above the guarded surface. When the top rail is less than 36 inches, a guardrail of the proper height should be installed or alternative means of fall protection should be used.

Midrails, screens, mesh, intermediate vertical members, solid panels, or equivalent structural members shall be provided between the top rail of the guardrail system and the guarded surface. The midrails and other intermediate members or rails shall be positioned so that the openings in the guardrail system are no more than 19 inches in their least direction. Midrails and equivalent structural members shall be capable of withstanding, without failure or permanent deformation, a force of at least 150 pounds applied in any downward or outward direction at any point along the rail.

### **Safety Net Systems**

Safety net systems are typically intended and used for bridgework and high-rise steel construction, and are not normally encountered in telecommunications work. Should employees be required to work on a construction site that is utilizing a safety net system, they should familiarize themselves with all the components of the system and be aware of its limitations.

*For more information refer to safety net standards (29 CFR 1926.502(c))*

### **Warning Line Systems**

A combined warning line system and safety monitoring system provides practical, effective fall protection for rooftop work on many low-sloped roofs. Warning line systems consist of ropes, wires or chains, and supporting stanchions that warn workers they are near an unprotected roof side or edge. Warning line systems mark off an area within which a person may do work without using guardrails, body belts or safety nets. Warning line systems are also effective on low-slope roofs for protecting workers who do not need to go near an unprotected edge.

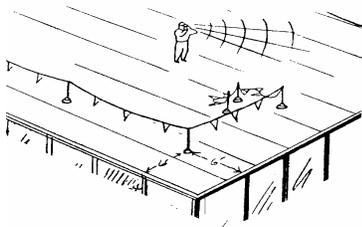
Warning line systems shall be set up as follows:

- Highly visible flags shall be placed at intervals not more than 6-feet (1.8 meters) apart;
- Lines shall be supported so that the lowest point (including sag) is no less than 34 inches (0.9 meters) from the walking/working surface and its highest point is no more than 39 inches (1 meter) from the walking/working surface.

- The stanchions, after being rigged with warning lines, shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 Newtons) applied horizontally against the stanchion, 30 inches (0.8 meters) above the walking/working surface, perpendicular to the warning line and in the direction of the floor, roof, or platform edge.
- The rope, wire, or chain shall have a minimum tensile strength of 500 pounds and, after being attached to the stanchions, must support without breaking the load applied to the stanchions as prescribed above.
- The warning line shall be attached to each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in the adjacent section before the stanchion tips over.

Warning lines shall be erected around all sides of roof work areas. When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8 meters) from the roof edge parallel to the direction of mechanical equipment operation, and not less than 10 feet (3 meters) from the roof edge perpendicular to the direction of mechanical equipment operation.

When mechanical equipment is not being used, the warning line must be erected not less than 6 feet



(1.8 meters) from the roof edge.

**NOTE 1** - No employee is allowed in the Restricted Access Zone between the warning line and the edge of the roof once the warning line is erected.

**NOTE 2** - Any mechanical equipment used or stored on the roof (which may cause obscure visibility, produce smoke or fumes, or provide a noise distraction) must have a warning line 10 feet from an edge or motion-stopping system close to that edge.

## VIII. Suggested work practices for telecommunications fall exposures

*Employees working in bucket trucks must be protected from falls by using either a personal fall arrest system or a restraint system as described below.*

### Personal fall arrest systems for bucket trucks



- The employee must wear a full body harness attached to an approved anchorage point on the bucket or boom
- All components of a personal fall arrest system must be visually inspected for damage or defects prior to each use.
- Fitting the harness:
  - Slip the straps over the shoulders with the D-ring in the middle of the upper back.
  - Buckle at the waist.
  - Secure leg straps between the legs and securely connect in the front at the waist.
  - Tighten all straps securely without causing discomfort or restriction of movement.
- Once the harness has been fitted, hook the connecting device to the D-ring in the middle of the upper back.
- Directly connect the shock-absorbing lanyard to the anchorage/attachment point on the bucket trucks boom.

### Restraint systems for bucket trucks

- Do not exceed the designated basket/bucket capacity.
- The user must be equipped with an aerial single floating D-ring body belt and a 2 foot lanyard with locking snap hooks, and be secured to an approved anchorage point at all times while in the bucket.
- All components of the belt and lanyard shall be visually inspected for damage, wear and deterioration prior to each use.
- Use of the restraint system:
  - Tighten the belt snugly around the waist.
  - Ensure that the D-ring moves freely from side to side.
  - Attach one locking snap hook of the lanyard to the D-ring of the belt.
  - Attach the other locking snap hook to an approved anchorage point.
  - Be sure that the snaphooks are engaged, do not rely on the “click.”
- Do not attempt to stand on the edges of the bucket or other object to gain additional height.
- Enter and leave the basket/bucket only in the manner recommended by the manufacturer.

### Commercial Buildings

#### Flat Roofs (less than 10 degrees slope)

Work on flat roofs may be performed using (in order of preference) guardrails, personal fall protection equipment, controlled access zones, or a combination of these methods.

Low Sloped Roofs – A low sloped roof is defined as having a slope less than or equal to 4 in 12 (vertical to horizontal angle). Telephone installation and repair work on low-sloped roofs may be conducted without additional fall protection if the following conditions are met [reference: OSHA Instruction STD 3-0.1A]: This does not apply to all commercial buildings. (*See definition for Residential Construction for more details.*) The OSHA instruction states:

- Only trained workers shall be allowed on roofs, and only as necessary to complete the job.
- Materials and equipment for the work shall be located conveniently close to the workers.
- Materials and other objects which could pose impalement hazards shall be kept out of the area below where work is being performed, or shall be properly guarded.
- Workers not involved in the job shall not stand below the roof where they could be struck by falling objects.
- When adverse weather creates a hazardous condition, work operations shall be delayed or suspended until the area is safe.

Steep Roofs – Steep roofs are defined as having a slope greater than 4 in 12 (vertical to horizontal angle). Steep roof work should be avoided whenever possible. Work operations should be engineered to eliminate the need for steep roof work. If steep roof work is to be conducted, contact a Competent Person to inspect and approve the fall protection plan prior to commencing work operations.

#### **Fall protection for railroad rights-of-way**

Telecommunications companies working on railroad right-of-ways should contact the applicable railroad authority to determine the proper setup and use of personal fall protection equipment prior to starting any work activity.

### **IX. Tower Fall Protection**

***Monopole Tower*** – A monopole tower shall be constructed of steel and equipped with a fixed ladder that has rungs spaced no greater than 12 inches apart or step bolts spaced between 10 and 14 inches apart for the worker to ascend or descend the tower. The steps shall be shaped so the worker's feet cannot slide off the end. Each step shall be capable of supporting 250 lbs. applied in the middle of the step. The tower shall have a fixed/rigid rail fall protection system or a vertical steel flexible cable fall protection system affixed to cable guides that are located between 25 – 40 feet on the tower to support the cable and prevent wind damage to the system. The flexible cable shall be tensioned with an adjustable spring assembly located at ground level. A fall block device shall be attached to the fixed/rigid rail or flexible cable (3/8" recommended) in a manner that allows the worker to ascend or descend without having to hold, push, or pull the device, leaving both hands free for climbing. The fall block device must activate within two (2) feet after a fall occurs. A fixed/rigid rail, ladder, flexible cable, cable support, and fall block device shall be inspected each time before being used or at least annually for wear, tear or cracks. Items found defective are required to be tagged "Defective" and placed out of service until appropriately repaired.

***Self-supporting or Lattice Tower*** – A self-supporting tower shall be made of steel and manufactured in accordance with the latest EIA/TIA standards. The tower should be equipped with a fixed ladder on one of the tower legs. Work performed on a self-supporting tower must be carefully planned and engineered by a Competent Person before work commences.

**Guyed Towers** – Guyed towers may be equipped with a ladder, step bolts, an elevator, or no climbing device at all. If available, the ladder, elevator or step bolts shall be used to ascend and descend the tower. If none of these are available, the tower shall be climbed with a double shock-absorbing lanyard using the procedure outlined below (See climbing “Towers without Fixed Ladders”).

## **Suggested Work Practices**

A minimum of two workers, trained in tower fall protection and rescue, must be present to perform elevated work on a tower. If an employee should experience a fall, the other climber would be available to perform a rescue.

Employees working at heights must remain 100% connected at all times.

### **Prior to climbing or working in an elevated area the following steps are recommended:**

- Conduct pre-climb safety meeting and include use of the attached Hazard Assessment sheet (See Appendix D).
- Determine the nearest medical facilities.
- Inspect the tower or elevated work area from the ground for obvious structural or member damage, bent supports, excessive corrosion, insect or bird nests, ice build-up, etc. (Use of binoculars is recommended).
- Inspect the safety climb/ladder safety device system and ensure that it is free of obstructions and in good condition.
- Ensure that the step bolts or ladder steps are aligned evenly spaced and completely secured throughout the structure.
- Ensure that the area to be accessed is free from obstructions.
- Identify approved anchorage points for fall protection devices.
- Identify other nearby potential hazards (power lines, AM transmission sources and other radio frequency (RF) generating sources, etc.).

**Towers With Fixed Ladders** - Personal fall arrest systems shall be used while climbing or working on telecommunications towers. The personal fall arrest system for climbing telecommunications towers with fixed ladders shall include a body harness equipped with a minimum of four D-rings that are located: one at each hip of the wearer, one at chest level and one at the back, shoulder level. A two-inch throated carabiner shall be connected between the D-ring located at chest level to a ladder safety device on the flexible cable or fixed rail of the ladder. The distance between the fall block device and the worker shall not exceed nine inches. The worker shall stay connected to the ladder safety device at all times while ascending or descending the tower. Once at the work location, a positioning lanyard rated for 5,000 pounds, with self-locking snaphooks, that limits the worker’s fall to two feet, or less, may be connected to the D-rings on the worker’s hips and an anchorage point on the ladder.

**Towers without Fixed Ladders** - A retractable lifeline or lanyard is one method that can be used while ascending or descending a telecommunication tower if a fixed ladder is not provided. The retractable device shall be connected between the D-ring on the worker’s back. A rope grab device and vertical lifeline is another system that may be used when ascending and descending a tower not equipped with a ladder. The rope grab device is attached to a weighted rope with the lanyard attached to the climber’s back D-ring. While rigging the lifeline the climber shall climb the structure using the “Y” lanyard procedures outlined in the next paragraph except that each leg of the “Y” lanyard would be attached to a tower structural member and not to the ladder side rails. The

retractable lifeline or lanyard must limit the worker's free fall distance to two feet or less and have a rated tensile strength of 3,000 pounds.

If these devices are unavailable then the tower must be climbed using a "Y" lanyard with large carabiners at the end of each leg using the following procedure:

1. Attach one leg of the lanyard to the ladder side rail above the climber.
2. Ascend the ladder so that the attached carabiner is approximately at knee level.
3. Attach the unconnected leg of the lanyard to the side rail above the climber's head.
4. Detach the lower connection.
5. Repeat steps 2 to 4 until at working height.

If descending the ladder the above procedure shall be reversed. This same procedure would be used when installing a vertical lifeline.

**The climber shall remain attached to the structure 100% of the time on the tower.**

***Climbing Laterally*** - Work operations on a tower that require the worker to climb laterally away from the ladder shall be engineered and planned prior to the worker ascending the tower. The worker shall stay connected to the tower while moving laterally by using a rip stitch or shock absorbing "Y" lanyard connected between the D-ring on the back of the harness and an anchorage connector strap rated for 5,000 pounds tensile strength. The worker shall have at least one of the straps of the "Y" lanyard connected to an anchorage point at all times while moving laterally. At no time shall employees climb out onto non-man rated structures (e.g. Antennae stand-offs, T arms).

A self-locking retractable lifeline or lanyard that limits the worker's free fall to two feet, or less, may be used to move laterally instead of a twin lanyard. The retractable device is connected between the D-ring on the worker's back and a horizontal lifeline directly above the worker's head. The lifeline must maintain a safety factor of at least two times the intended weight.

Repelling shall not be permitted at any time. If the need arises to lower a climber to a work position from an elevated level, a controlled descent device shall be used.

## **Rescue Techniques**

These procedures are designed to get a fallen or injured worker safely and rapidly to the ground. Once on the ground the necessary first aid procedures may be administered, however, you may have to initiate first aid prior to reaching the ground. For example: injuries causing respiratory failure, severe bleeding or cardiac arrest may require immediate attention and may not allow immediate lowering of the injured climber. Exercise careful judgment in electing to administer first aid on the structure. Ensure your safety, and that of the fallen climber, before starting to provide first aid while still on the tower.

There are several rescue techniques for injured or fallen workers, including:

- Manual rescue
- Rescue Services (Fire Dept., EMS, Boom Trucks, Ladder Trucks)
- Winch assisted rescue
- Suspension & descending devices (Fisk).
- Ascending & descending (Example: Rollgliss rescue system)

## **Manual Rescue**

When a climber is suspended in an easily accessed position, it may be possible to manually reach out and pull the climber back onto the structure. Care shall be taken to follow all safe climbing procedures during this climb. The rescuer shall remain connected to the tower 100% of the time.

Upon reaching the climber, the rescuer shall attach their positioning lanyard and fall arrest lanyard, and then physically help the fallen climber back to a safe perch on the structure. The rescuer then accompanies the injured climber to the ground and administers first aid as appropriate.

## **Rescue Services**

When working on towers, it is possible that a tower crew might be in a situation where they could have access to equipment that could be used for emergency rescue. Depending on the height and location of the tower that they are working on, an injured climber that is suspended from his lanyard may be reachable with equipment from the local Fire Department or a boom truck from a construction company. If the tower is a considerable distance from the nearest town, this equipment may be unavailable. For this reason, it is important to research the area in which the work will be performed. Determine the types, capabilities, accessibility and possible dispatch times of this equipment.

## **Winch Rescue:**

Although the winch may be used for emergency rescue, do not ride winch lines in normal operations. If a climber has fallen into a position that can not be reached while the rescuer is attached to the structure, or is injured so as to prevent the climber exiting the tower safely under the climber's own power, the availability of the winch's mechanical advantage can be of use.

If a winch is rigged, use it to lower the injured or fallen climber to the ground. When using a normal winch line rigging, only one hook is available for connecting. Whenever possible, the fallen climber should be attached to the winch hook and the rescuer should guide the winch line to protect the climber during the descent.

The winch operator should be experienced and in communication with rescuers, by radio if possible. If radios are not available, use agreed upon hand signals. The winch operator will lower the climbers smoothly and slowly.

## **Suspension and Descending Equipment**

There is a variety of equipment available for suspension and descending.

The procedure for completing a rescue using the Fisk descender is as follows:

- The rescuer rigs a load line for the Fisk above and as close as possible to the fallen climber's load line or lanyard.
- The rescuer rigs a separate lifeline or safety line next to the load line.
- The rescuer then attaches the rope grab to the safety line and the rope grab snaphook to his back D-ring.
- The rescuer attaches to the Fisk to the load line and attaches his chest D-ring to the Fisk with a carabiner.
- The rescuer lowers his/herself down to a position at or slightly above the fallen climber's back D-ring. This minimizes the weight drop on the rescuer's connection when the fallen climber is released from the suspension line or lanyard.

- The rescuer then attaches a carabiner to the fallen climber's back D-ring and attaches to the carabiner that is attached to the Fisk unit.
- The rescuer then releases the fallen climber from the suspension line or lanyard. The quickest and easiest way is to cut the lanyard or rope. Once the fallen climber is free from the rope or lanyard, the rescuer then lowers the fallen climber and his/herself down to the ground where first-aid can be administered.

### **Ascending and Descending**

The procedure for completing a rescue using the Rollgliss Rescue System is as follows:

- The rescuer rigs a load line for the Rollgliss above and as close as possible to the fallen climber's load line or lanyard.
- The rescuer rigs a separate lifeline or safety line next to the load line.
- The rescuer then attaches the rope grab to the safety line and rope grab snaphook to his back D-ring.
- The rescuer attaches to the running block of the Rollgliss with a carabiner, which is then attached to his chest D-ring.
- The rescuer lowers his/herself down to a position at or slightly above the fallen climber's back D-ring. This minimizes the weight drop on the rescuer's connection when the fallen climber is released from the suspension line or lanyard.
- The rescuer then attaches a carabiner to the fallen climber's back D-ring and attaches to the carabiner that is attached to the Rollgliss unit.
- The rescuer then releases the fallen climber from the suspension line or lanyard. The quickest and easiest way is to cut the lanyard or rope. Once the fallen climber is free from the rope or lanyard, the rescuer then lowers the fallen climber and his/herself down to the ground where first aid can be administered.

An alternate rescue method when using the Rollgliss is to lower the fallen climber while guiding the descent from above.

## **X. Training**

### **Initial Training**

Each employee who may be "exposed" to fall hazards when working must be provided with information about the hazards and trained in fall protection prior to initial assignment to work, and whenever the hazard changes.

"Exposure" or "exposed" means any employee on a walking/working surface 4 feet or more above a lower level, or when employees are working on surfaces that are less than four feet above a lower level but are above or adjacent to dangerous equipment, materials or operations. Each employee shall be trained by a Competent Person qualified in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- The role of employees in fall protection plans;
- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
- The rescue procedures to be used;

- The role of each employee in the safety monitoring system when this system is used, and;
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.

A written certification that the employee has successfully completed formal training should be maintained.

### **Refresher Training**

An employee who has been trained but fails to demonstrate an understanding of the fall protection training or does not have the required skills must be retrained. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete or incomplete.
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete or incomplete.
- There are inadequacies in an employee's knowledge or use of fall protection systems.

## **XI. Fall arrest equipment inspection and maintenance**

OSHA regulations require that all fall arrest equipment be inspected prior to each use. This includes, but is not limited to, examining the equipment for the presence of the following items:

- Frays or broken strands in harnesses, lanyards, lifelines and related equipment
- Oxidation, distortion or deformation of any metal connection devices
- Visible excessive wear damage
- Cuts, tears, abrasions, deterioration, or undue stretching
- Mold
- Distorted hooks, faulty hook springs
- Non-functional or worn parts
- Loose or damaged mountings
- Tongues that do not fit buckles
- Contact with fire, acids, or other corrosives
- Alterations or additions that limit effectiveness of original manufacturer's equipment

Inspect self-retracting lanyards by extracting several feet of the lanyard out of the housing and allowing it to slowly retract. The lanyard should retract in a smooth manner. Next, pull hard on the lanyard to ensure that it engages.

***NOTE: When maintaining and cleaning equipment, the user must always follow the manufacturer's instructions and recommendations for the product.***

## **Best Practices Appendix A**

### **References:**

- **29 CFR 1910.268** OSHA - Telecommunications Standard
- **29 CFR 1926.500 – 503** OSHA - Fall Protection Standard
- **29 CFR 1910.23** OSHA – Guarding floor and wall openings and holes
- **29 CFR 1910.27** OSHA – Fixed Ladders
- **29 CFR 1910.178** OSHA – Powered Industrial Vehicles
- **EIA/TIA Standard 222-G** EIA/TIA Structural Standard for Antenna Supporting Structures and Antennas

## Best Practices

### Appendix B

#### Engineering Criteria for Rooftop Telecommunications Equipment Installations and Other Considerations Related to Fall Protection

1. Working deck platforms should be expanded (if space allows) to encompass the total framework of the under-support structure. This will allow for future equipment installations and extra/needed space for personnel to safely service system items while reducing the risk of a fall from the platform.
2. All feed lines should be installed “under” the working deck platform (metal & concrete) to minimize tripping hazards. (*Note: This may be hard for existing installations but new and redesigned sites should be considered for this engineering upgrade.*)
3. No pathway to equipment should cause a person (associate/contractor/service personnel) to be exposed to an unprotected fall hazard.
4. All sites should have a “hazard exposures assessment” performed and incorporated into the pertinent site profile and be made accessible to associates and other interested parties.
5. All attachment points for fall protection should have identifiable signage or color-coding in place to alert personnel to required contact points. A “highlighted statement” on the hazard exposure assessment would be a good reference point to make note of the information.
6. Temporary or portable guardrails should be provided to all sites where raised working deck platforms are mounted and where the potential for a fall exists.
7. All deck grating should be designed to fill the “full area” of the support frame’s fixed structure.
8. For those sites requiring elevated, remote or roof work areas, an equipment/supply hoist should be installed to assist personnel in safely transferring needed materials from one surface to the next, thus minimizing the hazard to them carrying materials up/down ladders and voiding the three points of contact practice.
9. Attachment points should be engineered into the working deck platform and in proximity to other unprotected fall hazards along with related available equipment to assist and secure personnel from potential fall hazards.

## **Best Practices**

### **Appendix C**

### **Site Hazard Assessment for Rooftop Applications**

#### **Summary**

The purpose of this guide is to assist various telecommunications field personnel and other interested parties with general and recognized hazards related to potential and existing rooftop sites.

It is important to note that over time, due to business and equipment changes, that exposures are subject to change without notice.

An avenue of open communications should also be in place to allow the flow of pertinent or significant data to make its way to various management or change agents; i.e., engineering design, network operations, procurement, etc.

**Note:** *It is highly recommended that before anyone attempts a rooftop visit that the “hazard assessment” sheet (see Appendix D) for that specific site be accessed for related rooftop hazard data.*

*If changes are noted or made to a site that affects the current hazard assessment, the new information must be noted and updated for the site.*

#### **Site Hazard Assessment Development**

A grid map diagram or one of like design should be developed to “mark up” the site for reference. The diagram will be produced by a person knowledgeable with the site and the required practices for access.

The diagram should include some of the following items:

- Must be to scale with a legend for reference.
- Must include the exact location of various pieces of equipment.
- May include other types of equipment or equipment from other tenants.
- Must include required safe access points with visible and recognizable signage.
- Must include required pathways to equipment.
- Must be accessible to personnel. (**Note: This is especially important for new associates or individuals requiring access to the site.**)
- Must be updated and initialed if changes are made to the site diagram.
- Must include the location and phone number of nearest medical provider should the need arise or be required. Information must be in “bold” print to provide visual awareness to data.

## **Access Requirements to the Site**

There will be rooftop sites that may have many “special requirements” that are particular to a given site. These special requirements or instructions must be included in each site hazard assessment.

Some of those requirements could be:

- **How to secure access to the equipment service site:**

This should include at least the following and any other required special information:

- Door keys
- Elevator access
- Safe access routes
- On-site security contact
- Vendor support staff
- Other pertinent information
- Building owner or maintenance staff notification

**Required service tools and parts:**

This would be dictated by the site requirements and the status of the construction phase of the site.

- Vendor support contact names and numbers

**Other pertinent information or commonly-found exposures on rooftops:**

- Height of the equipment platform from the roof surface.
- Does the site have an equipment hoist in place?
- What are the pathways to access the site's equipment?
- Stairway, elevator, fixed ladder, handrails, etc.
- What are the means of entrance and egress, should the need arise?
- Working alone issues.
- Are there any approved attachment points for personnel to attach to should the situation demand such precautions?
- Is there a potential for personnel to come within six (6) feet of an unprotected edge when on a rooftop or servicing equipment?
- What type(s) of personal protective equipment is needed for personnel who access the site?
- Any known hazard information that is particular to the site given its location(s) on the site.

**Best Practices  
Appendix D**

**Fall Prevention Site Hazard Assessment Sheet**

**Conducted by:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Site Address:** \_\_\_\_\_

**City, State:** \_\_\_\_\_

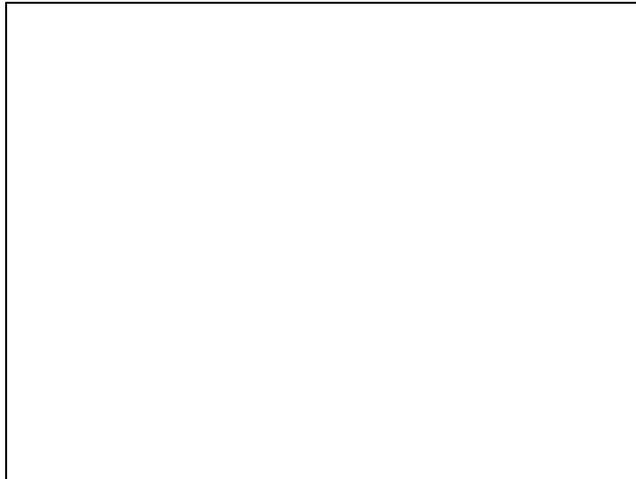
**Site Contact Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

**Door Key Access?** Yes \_\_\_\_\_ No \_\_\_\_\_ **On-Site Security Contact:** \_\_\_\_\_

**Elevator Access 7/24?** Yes \_\_\_\_\_ No \_\_\_\_\_ **Owner Notification Required?** Yes \_\_\_\_\_ No \_\_\_\_\_

**Site Description and Picture:**

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**Description Of Site Equipment To Be Installed/Or Installed:**

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Is there a potential for personnel to come within six (6) feet of an unprotected edge when on the roof?  
YES \_\_\_\_\_ NO \_\_\_\_\_

Is a site-specific fall protection plan is required for this location? YES \_\_\_\_\_ NO \_\_\_\_\_

## Fall Prevention Site Hazard Assessment Diagram

**The diagram should include some of the following items:**

- Should be to scale with a legend for reference
- Include the exact location of all equipment, including co-locators/tenants
- Include required egress pathways to equipment

**Location Address:** \_\_\_\_\_

**City, State:** \_\_\_\_\_

**Site owner contact:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

**Drawn By:** \_\_\_\_\_ **Date:** \_\_\_\_\_