

**U.S. CONCRETE, INC.  
SAFETY POLICY and PROCEDURE MANUAL**

<b>FUNCTION</b>	Safety
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<b>TOPIC</b>	Fall Protection
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**OBJECTIVE(S):** To establish requirements for the use of fall protection devices and/or systems

**GENERAL POLICY:** (Defined below)

**APPLICATION:** U.S. Concrete, Inc.

**RESPONSIBILITY:** President/General Manager

## **1. CORPORATE POLICY, REQUIREMENTS AND PROCEDURES**

**1.1. Purpose** – To establish requirements for the use of fall protection devices and/or systems.

### **1.2. Definitions**

- A. Anchorage – A secure point of attachment for lifelines, lanyards or deceleration devices.
- B. Body Belt (Safety Belt) – A strap with means for both securing it about the waist and for attaching it to a lanyard. (Not to be used by Central Concrete Supply employees. Harnesses with waist D-rings will be used as positioning devices).
- C. Body Harness – Straps that may be secured about the employee in a manner that will distribute the fall arrest forces over the thighs, pelvis, waist, chest and

- shoulders with means for attaching it to other components of a personal fall arrest system.
- D. Buckle – The device used to hold the body harness securely around the employee’s body.
  - E. Connector – A device used to couple (connect) parts of the personal fall arrest system and positioning device system together. It may be an independent component of the system, such as a carabineer, or it may be an integral component or 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.
  - F. Potentially Dangerous Equipment – 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.
  - G. Deceleration Devices – Any mechanism, such as rope grab, rip stitch lanyard, specially-woven lanyard, tearing or deforming lanyard, automatic self-retracting lifeline/lanyard, etc. which serves to dissipate a substantial amount energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.
  - H. Deceleration Distance – The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping from the point at which the deceleration device begins to operate. It is measured as the distance a person’s body harness attachment point travels during a fall. It is measured from the moment of activation of the deceleration device (at the onset of the fall arrest forces) until the person comes to a full stop.
  - I. D-Ring – Forged steel rings that are used to attach connecting devices. D-rings shall have minimum tensile load strength of 5,000 lbs.
  - J. Equivalent – Alternative designs, materials or methods to protect against a hazard, which will provide an equal or greater degree of safety for employees.
  - K. Failure – Load refusal, breakage or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.
  - L. Free Fall – The act of falling before a personal fall arrest system begins to apply force to arrest the fall.
  - M. Free Fall Distance – The vertical displacement of the fall arrest attachment point on the person’s body harness between the onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

- N. Guardrail System – A barrier erected to prevent a person from falling to lower levels.
- O. Hoisting Area – A specific area of a structure where equipment, materials and/or tools are lifted from one level (floor or platform) to a higher level within a structure, or from the ground to an elevated floor or platform within a structure. When materials are not being lifted, guardrail systems guard these designated opening in floors or platforms. In order to facilitate the hoisting of equipment, materials and/or tools, portions of the guardrail system guarding these designated openings must be removed. The removal of these guardrail systems allows employees to receive or guide the hoisted items onto the receiving floor or platform.
- P. Lanyard – A flexible line of rope, wire rope, or strap, which generally has a connector at each end for connecting the body, harness to a deceleration device, lifeline, or anchorage.
- Q. 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.
- R. Lifeline – A component consisting of a flexible line for connection to an anchorage point at one end to hang vertically (vertical lifeline), or for connection to an anchorage at both ends to stretch horizontally (horizontal lifelines). Horizontal lifelines serve as a means for connecting other components of a personal fall arrest system to the anchorage.
- S. Lower Levels – Areas of surfaces to which a person can fall. Such areas or surfaces include, but are not limited to ground levels, floors, platforms, pits, tanks, water, equipment, structures, etc.
- T. Personal Fall Arrest System – The system used to arrest a person in a fall from a working level. The three components of a fall arrest system are body harness, lanyard and connectors, and anchorage.
- U. Positioning Device System – The system used to keep a person positioned away from the fall area. The three components of a positioning device system are body harness, lanyard and connectors that are adjusted to the proper length, and anchorage.
- V. Rope Grab – A deceleration device, which is to be used with independent lifelines with a minimum tensile strength of 5,000 lbs. A short three to four inch lanyard is attached to the rope grab, which the user can move up or down the lifeline, yet will lock instantly when activated by a fall.
- W. Self-Retracting Lifeline/Lanyard – A deceleration device containing a drum-wound line, which under slight tension, can be slowly extracted from the drum or be

retracted onto the drum. After the onset of a fall, the drum automatically locks and arrests the fall.

- X. Snap hook – 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. When released, the keeper automatically closes to retain the object. The only snap hook that shall be used is the locking type with a self-closing, self-locking keeper, which remains closed and locked until unlocked and pressed open for connection or disconnection. Locking snap hooks shall have minimum tensile load strength of 5,000 lbs.
- Y. Walking/Working Surface – Any surface, whether horizontal or vertical, on which a person walks or works, including but not limited to floors, roofs, etc. These surfaces do not include ladders, vehicles or trailers, on which a person must be located in order to perform their job duties.
- Z. Work Areas – That portion of a walking/working surface where job duties are being performed.

### **1.3. General Requirements**

- A. Scaffolds, ladders or vehicle mounted work platforms shall be used to provide a safe working surface whenever possible to reduce the hazard of falling. When these measures cannot provide safe access to the work being performed for any reason, an acceptable fall protection system shall be used.
- B. The use of 100 percent fall protection at the point of work, as well as going to and from the work area, is mandatory for all Central Concrete Supply employees and all contractor personnel on Central Concrete Supply projects, when employees are at risk of falling or working a minimum of six feet or more off the floor or ground, except in plant areas covered by 29 CFR § 1910.23, where the minimum distance off the floor or ground is four feet.
- C. All fall protection components and/or systems used shall conform to the standards prescribed in 29 CFR § 1926.502.
- D. Types of fall protection systems available are:
  - Guardrail systems
  - Fall arrest systems.
  - Positioning device systems.
  - Safety netting.
- E. The walking/working surfaces on which employees are to work must have the strength and structural integrity to support each employee safely.
- F. Each employee on a walking/working surface with an unprotected side or edge which is six feet or greater above a lower level, shall be protected from falling by

the use of a guardrail system, personal fall arrest system or a positioning device system, except in plant areas covered by 29 CFR § 1910.23, where the minimum distance off the floor or ground is four feet. Fall arrest systems shall be rigged in such a manner that an employee can neither fall more than six feet nor contact any lower level.

- G. When employees are on walking/working surfaces near potentially dangerous equipment, each employee shall be protected from falling into or onto the dangerous equipment by a guardrail system or by equipment guards. Employees working above potentially dangerous equipment shall be protected from fall hazards by the use of guardrails or a positioning device system.
- H. When personnel are working or being hoisted in man lifts, bucket trucks, etc., each person shall be protected from the fall hazard by using a fall arrest system rigged in such a manner that the person can neither free fall more than six feet, nor contact any lower level. Traveling while being hoisted or held in a fixed position above a lower level is not recommended, and is only permitted on level paved surfaces at speeds of less than one mile per hour. Materials other than hand tools necessary for the specific elevated work shall not be transported with personnel.

#### **1.4. Training**

- A. Employees required to use fall protection will be instructed in fall hazard recognition; proper fall protection system selection; and procedures for erecting, maintaining, disassembling and inspecting the fall protection systems to be used.
- B. Additional training shall be provided if:
  - Changes in the workplace take place that render previous training obsolete.
  - Changes in the types of fall protection systems or equipment used are made that render previous training obsolete.
  - Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment are observed that indicate that the employee is not adequately trained.
- C. Fall protection will be a periodic safety-training topic.

**1.5. Monitoring and Enforcement** – The plant manager shall be responsible for implementation and enforcement of this policy. Failure to follow established fall protection procedures or failure to use proper personal protective equipment can result in an employee receiving a safety violation notice, loss of safety incentive, and/or disciplinary action up to and including termination of employment.

#### **1.6. Record Keeping**

- A. The plant manager or his designee shall maintain all records including inspection and training records.

- B. Training shall be documented by means of Central Concrete Supply “Training Documentation Forms” and/or Central Concrete Supply “Safety Meeting Forms” and a copy shall be placed in each employee’s file (see Part III, Training). Training records shall be retained for a period of three years from the date of the training and shall include the following information:
- Employee’s name.
  - Date of training.
  - Outline describing the training material.
  - Signature of trainer documenting that training was provided.
  - Signature of employee documenting that training was received.

## **2. COMPONENTS OF A FALL ARREST SYSTEM**

### **2.1. Guardrail Systems**

- A. Guardrails are the best method of fall protection available and are more acceptable than the use of a body harness for fall arrest or as a positioning device.
- B. Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.
- C. When guardrail systems are used at hoisting areas, a chain, inwardly opening gate or removable guardrail section shall be placed across the access opening between the guardrail sections when hoisting operations are not taking place.
- D. When guardrail systems are used around openings that are used as points of access, such as ladder ways, etc., they shall be provided with a gate or be offset so that a person cannot walk directly into the opening.

### **2.2. Body Harness**

- A. The body harness is the first of the three components that make-up a fall arrest system. Only a full body harness shall be used when there is a possibility that a worker could fall from an elevated level to a lower level. Full body harnesses distribute the forces of a fall throughout the worker’s body among the shoulders, legs, torso and buttocks. This distribution decreases the likelihood that the worker will be injured.
- B. Fall protection devices should only be attached to the D-ring, located in the center of the wearer’s back near shoulder level. Other D-rings, especially side and front rings, should only be used for positioning.
- C. When using full body harnesses, employees shall use the straps and buckles to adjust the harness to ensure a snug fit.
- D. Full body harnesses should never be used to hoist or lift materials.

- E. Body harnesses involved in a fall shall be taken out of service and destroyed.

### **2.3. Connecting Devices**

- A. Connecting devices are the second of three components that make-up a fall arrest system. These devices are used to attach the body-wear to the point of anchorage. The most common types of connecting devices are rope, webbing, steel or shock absorbing lanyards, but may also be retractable lifelines, rope grabs, etc.
- B. Only shock-absorbing lanyards or lanyards attached to a shock absorbing pack should be part of the fall arrest system.
- C. Lanyards and lifelines shall have a minimum breaking strength of 5,000 lbs., and shall be equipped with locking snap-hooks. The use of knots to connect lanyards is not permitted.
- D. Straps (webbing) used in lanyards and lifelines shall be made from synthetic fiber and shall be protected against being cut or abraded, and shall not pass over sharp edges without padding or “softeners.”
- E. Steel lanyards shall never be used.
- F. Self-retracting lifelines and lanyards, which automatically limit free fall distance to two feet or less, shall be capable of sustaining a minimum tensile load of 3,000 lbs. applied to the device with the lifeline or lanyard in the fully extended position.
- G. Self-retracting lifelines and lanyards which do not limit free fall distance to two feet or less, must have rip-stitch lanyards and tearing lanyards capable of sustaining a minimum tensile load of 5,000 lbs. applied to the device with the lifeline or lanyard fully extended.
- H. When using rope as part of a fall arrest system, environmental exposure should be considered. Factors affecting this decision are:
  - Polyester rope has good resistance to mild acidic conditions.
  - Polypropylene rope has good resistance to chemicals, but has a lower breaking strength.
  - Nylon rope should be protected from paint and chemicals. Nylon ropes may not be used in or near chlorine or chlorinated water due to the adverse chemical reaction.
- I. Well-maintained ropes have a service life of one to two years, and webbings have a service life of two to three years. Both have a five-year shelf life and shall be marked so their age can be accurately determined.

### **2.4. Anchoring Devices**

- A. The anchoring device is the third of the three components that make-up a fall arrest system. Selecting proper anchorage points and anchoring devices is one of the most important factors to be considered when completing a fall protection system.
- B. All anchorage points shall be capable of supporting 5,000 lbs. per attached worker and shall be approved by management prior to attachment. Examples of acceptable anchorage points are structural beams, eyebolts, etc.
- C. Anchorage points should be easily accessible and, if possible, should be directly above the worker to limit the free fall distance. Avoid tying off to an anchor at foot level, since this increases the fall distance allowed by the connecting device.
- D. The lanyard or lifeline locking snap hook shall be hooked so that it will close completely. Never put the open hook on a beam flange. When connecting to a beam, it is acceptable to lock the snap hook in a hole in the flange of the beam.
- E. Locking snap hooks shall be sized to be compatible with the structural member to whom they are being connected in order to prevent unintentional disengagement.

## **2.5. Fall Arrest System**

- A. Individually, none of the three components that make-up a fall arrest system (body harness, connecting devices and anchoring devices) will provide protection from a fall. Used properly with each other, they form a complete system and become an important part of the total fall protection system.
- B. It is essential not to mix and match components from several different manufacturers, since this can create a problem with compatibility of the components and not provide the required level of protection.
- C. Personal fall protection systems shall be inspected prior to each use for wear, damage and other deterioration. Defective components shall be removed from service.
- D. When stopping a fall, the personal fall arrest system used with a body harness shall be rigged to limit the maximum arresting force on an employee to 1,800 lbs., while ensuring that an employee will neither free fall more than six feet nor contact any lower level.
- E. The fall arrest system shall never be attached to guardrails and handrails, since these are not designed to withstand the forces generated in a fall.
- F. Impacted components of a fall arrest system shall be removed from service and not used again until a qualified person inspects them and finds them to be free of defects.

- G. Note: To meet the strength and design requirements of the fall arrest system, components of the system must meet the requirements of ANSI-Z-359.1-1992 standards.

## **2.6. Positioning Devices**

- A. Full body harnesses shall be used to restrain a worker in a hazardous position and reduce the possibility of a fall.
- B. The lanyard attached to the harness shall have the length adjusted to keep the worker positioned only as far as the edge of the walking/working surface and the worker shall be at zero free fall distance.
- C. Connecting devices that are of a decelerating type (rope grab, rip stitch lanyards, specially woven lanyards, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc.) shall not be used as a part of the positioning system because of the additional distances these devices allow one to fall after they are activated by the fall.
- D. Positioning devices shall be rigged such that an employee cannot free fall more than two feet.

## **2.7. Leading Edges**

- A. Each employee who is constructing a leading edge six feet or more above a lower level shall be protected from falling by guardrail systems, personal fall arrest systems or safety net systems.
- B. Each employee on a walking/working surface six feet or more above a lower level where leading edges are under construction, but who is not engaged in the leading edge work, shall be protected from falling by a guardrail system, personal fall arrest system or safety net system.
- C. In circumstances where it is infeasible to use guardrail systems, personal fall arrest systems, or safety net systems or where the use of these systems creates a greater hazard, Central Concrete Supply shall develop and implement a fall protection plan that meets the following requirements.
  - The plan shall be prepared by a qualified person and developed specifically for the site where the leading edge work is being performed.
  - A qualified person shall approve any changes to the plan.
  - A copy of the plan, including all approved changes shall be maintained up to date and at the job site.
  - The implementation of the plan shall be under the supervision of a competent person.

- The plan shall document the reasons why the uses of guardrail systems, personal fall arrest systems, or safety net systems are infeasible or why their use would create a greater hazard.
  - The plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from guardrail systems, personal fall arrest systems, or safety net systems. This discussion may include the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.
  - The plan shall identify each location where guardrail systems, personal fall arrest systems, or safety net systems cannot be used. These locations shall be classified as controlled access zones.
  - The plan shall include a statement that provides the name or other method of identification for each employee who is designated to work in the controlled access zones. No other employees shall be allowed to enter the controlled access zones.
- D. In areas where no other alternative measure has been implemented, Central Concrete Supply shall implement a safety monitoring system.
- E. In the event an employee falls or a near miss occurs, Central Concrete Supply shall investigate the circumstances of the fall or near miss. This investigation shall be completed to determine if the fall protection plan needs to be changed to include new practices, procedures, or training. Central Concrete Supply shall implement required changes to prevent similar types of falls or incidents.
- F. Controlled access zones and their use shall conform to the following requirements.
- The controlled access zones shall be defined by a control line or by any other means that restricts access.
  - The control lines shall be erected not less than six feet nor more than 25 feet from the unprotected or leading edge, except when erecting precast concrete members. When erecting precast concrete members, the control line shall be erected not less than six feet nor more than 60 feet or half the length of the member being erected, whichever is less, from the leading edge.
  - The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.
  - The control line shall be connected on each side to a guardrail system or wall.

- Control lines shall consist of ropes, wires, tapes, or equivalent materials. Control lines shall be supported in the following manner.
  - Each line shall be flagged or otherwise clearly marked at not more than six-foot intervals with high-visibility material.
  - Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches from the walking/working surface and its highest point is not more than 45 inches from the walking/working surface.
  - Each line shall have a minimum breaking strength of 200 pounds.
  
- G. Safety monitoring systems and their use shall conform to the following requirements.
  - Central Concrete Supply shall designate a competent person to monitor the safety of other employees and Central Concrete Supply shall ensure that the safety monitor complies with the following requirements.
    - The safety monitor shall be competent to recognize fall hazards.
    - The safety monitor shall warn an employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner.
    - The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored.
    - The safety monitor shall be close enough to communicate orally with the employee being monitored.
    - The safety monitor shall not have other responsibilities that could take the monitor's attention from the monitoring function.
  
  - Mechanical equipment shall not be used or stored in areas where safety-monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs.
  
  - No employee, other than an employee engaged in roofing work on a low-sloped roof or an employee covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.
  
  - Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from safety monitors.

## **2.8. Inspections**

- A. Before using any fall protection device, each employee shall personally make a visual inspection to determine that no parts of the device are damaged or defective. Defective components shall be removed from service.
  
- B. Before using any of the following devices, the following checks should be performed:

- Check **straps** for frayed edges, broken fiber, pulled stitches, cuts or chemical damage.
- Check **D-rings and D-ring metal wear pads** for distortion, cracks, breaks, and rough or sharp edges. The D-ring bar should be at a 90<sup>-degree</sup> angle with the long axis of the belt and should pivot freely.
- Check **buckles** to ensure tongues are free of distortion in shape and motion. Look for loose, broken or distorted grommets. Straps should not have additional punched holes. Rivets should be tight and not removable with fingers. Bent rivets will fail under stress.
- Check **friction buckles** for distortion. The outer bar or center bar must be straight.
- Check **snap hooks** to ensure there is no hook or eye distortion, cracks, corrosion or pitted surfaces. The keeper or latch of the hook should seat into the nose without binding and should not be obstructed. The force of the spring should adequately close the keeper. The hook must remain closed when locked.
- Check **thimbles** (the protective plastic sleeve spliced into ropes) to ensure they are firmly seated into the eye of the splice, and that the splice has no loose or cut strands.
- Check **web lanyards** for swelling, discoloration, cracks or breaks in the stitching. Do not use a web lanyard as part of the fall arrest system without a shock-absorbing device.
- Check **rope lanyards** for fuzzy, worn, broken or cut fibers. The rope diameter should be constant throughout the length of the lanyard. Changes in diameter may indicate a weakened area due to overloading. Do not use a rope lanyard as part of the fall arrest system without a shock-absorbing device.
- Check **shock-absorbing packs** for burn holes or tears. Check the stitching on areas where the pack is sewn to the D-ring, belt, or lanyard for loose strands, rips or deterioration.

### 3. STATUTORY REFERENCES

#### 3.1. 29 CFR § 1926 Subpart M – Fall Protection.

#### Ladders:

Definitions:

**Extension Ladder.** An extension ladder is a non-self-supporting portable ladder adjustable in length. It consists of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

**Extension Trestle Ladder.** An extension trestle ladder is a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder, with suitable means for locking the ladders together. The length of the trestle ladder base designates the size.

**Ladders.** A ladder is an appliance usually consisting of two side rails joined at regular intervals by crosspieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

**Sectional Ladder.** A sectional ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of two or more sections of ladder so constructed that the sections may be combined to function as a single ladder. The overall length of the assembled sections designates its size.

**Side-Rolling Ladder.** A side-rolling ladder is a semi fixed ladder, nonadjustable in length, supported by attachments to a guide rail, which is generally fastened to shelving, the plane of the ladder being also its plane of motion.

**Single Ladder.** A single ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. The overall length of the side rail designates its size.

**Special-Purpose Ladder.** A special-purpose ladder is a portable ladder, which represents either a modification or a combination of design, or construction features in one of the general-purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

**Step Ladder.** A stepladder is a self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

**Trestle Ladder.** A trestle ladder is a self-supporting portable ladder, nonadjustable in length, consisting of two sections hinged at the top to form equal angles with the base. The length of the side rails measured along the front edge designates the size.

**Trolley Ladder.** A trolley ladder is a semi fixed ladder, nonadjustable in length, supported by attachments to an overhead track, the plane of the ladder being at right angles to the plane of motion.

(c) **Materials. General Requirements.** All wood parts shall be free from sharp edges, splinters, irregularities and defects that affect the ladders structural integrity.

(d) **Construction Requirements.**

(1) Portable Step Ladders.

(A) Step ladders longer than 20 feet shall not be used. Stepladders as hereinafter specified shall be of three types, as follows:

Type I--Industrial step ladder, 3 to 20 feet for heavy duty, such as utilities, contractors, and industrial use

Type II--Commercial stepladder, 3 to 12 feet for medium duty, such as painters, offices, and light industrial use

Type III--Household stepladder, 3 to 6 feet for light duty, such as light household use.

(B) Step Spacing. Uniform step spacing shall be employed which shall be not more than 12 inches. Steps shall be parallel and level when the ladder is in position for use.

(C) Width and Spread. The minimum width between side rails at the top, inside to inside, shall be not less than 11 1/2 inches. From top to bottom, the side rails shall spread at least 1-inch for each foot of length of stepladder. Rungs shall be continuous members between rails.

(D) Spreader. A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in open position shall be a component of each step ladder. The spreader shall have all sharp points covered or removed to protect the user. For Type III ladder, the pail shelf and spreader may be combined in one unit (the so-called shelf-lock ladder).

(2) Single Ladder Length. Single ladders longer than 30 feet shall not be used.

(3) Two-Section Ladder Length. Two-section extension ladders longer than 60 feet shall not be used. All ladders of this type shall consist of two sections, one to fit within the side rails of the other, and arranged in such a manner that the upper section can be raised and lowered.

(4) Trestle and Extension Trestle Ladder Length. Trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet shall not be used.

(5) Painter's Step Ladder. Painter's stepladders longer than 12 feet shall not be used.

(6) Mason's Ladder. A mason's ladder is a special type of single ladder intended for use in heavy construction work. Mason's ladders longer than 40 feet shall not be used.

(7) Cleat Ladder. A cleat ladder is a special type of single ladder intended for general use in construction work.

(A) Cleat ladders longer than 30 feet shall not be used.

(B) Wood side rails of ladders having cleat steps shall not be less than 1 1/2 inches thick and 3 1/2 inches deep (2 by 4 inches nominal).

(C) Wood cleats shall be inset into side rails not less than 1/2-inch or shall be attached directly to the edge of the side rails, in which case filler blocks of the thickness of the cleats shall be securely attached to the edge of the rail for the full length between cleats, or equivalent construction. The cleats shall be fastened to each rail by three 10-d wire nails or the equivalent thereof.

(8) Double Cleat Ladder. A double cleat ladder is similar to a single cleat ladder, but is wider, with an additional center rail, which will allow for two-way traffic for workers in ascending and descending. The cleats shall extend the full width of the ladder.

(9) Other Types of Special Ladders. Other types of special ladders such as three-section extension ladders, fruit picker's ladders, combination step and extension ladders, stockroom step ladders, aisle-way step ladders, shelf ladders, and library ladders are not specifically covered by this code.

(10) Trolley and Side-Rolling Ladders. Trolley ladders and side-rolling ladders longer than 20 feet shall not be used.

(e) Care and Use of Ladders.

(1) Ladders shall be maintained in good condition at all times, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate freely without binding or undue play.

(2) Metal bearings of locks, wheels, pulleys, etc., shall be frequently lubricated.

(3) Frayed or badly worn rope shall be replaced.

(4) Safety feet and other auxiliary equipment shall be kept in good condition to insure proper performance.

(5) Ladders shall be inspected frequently and those, which have developed defects, shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

(6) Rungs shall be kept free of grease and oil.

(7) Portable rung and cleat ladders shall, where possible, be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder (the length along the ladder between the foot and the top support). The ladder shall be so placed as to prevent slipping, or it shall be lashed, or held in position. Ladders shall not be used in a horizontal position as platforms, runways, or scaffolds.

(8) More than one man should not use ladders for which dimensions are specified herein at a time nor with ladder jacks and scaffold planks where use by more than one man is anticipated. In such cases, specially designed ladders with larger dimensions of the parts shall be procured.

(9) Portable ladders shall be so placed that the side rails have a secure footing. The top rest for portable rung and cleat ladders shall be reasonably rigid and shall have ample strength to support the applied load.

(10) Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.

(11) Ladders shall not be placed on boxes, barrels, or other unstable bases to obtain additional height.

(12) Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment shall not be used.

(13) Short ladders shall not be spliced together to provide long sections.

(14) Ladders made by fastening cleats across a single rail shall not be used.

(15) Ladders shall not be used as guys, braces, or skids, or for other than their intended purposes.

(16) On two-section extension ladders the minimum overlap for the two sections in use shall be as follows:

Size of Ladder (Feet)	Overlap (Feet)
Up to and including 36.....	3
Over 36 up to and including 48.....	4
Over 48 up to and including 60.....	5

(17) Portable rung ladders with reinforced rails shall be used only with the metal reinforcement on the under side.

(18) No ladder shall be used to gain access to a roof unless the top of the ladder extends at least 3 feet above the point of support at eave, gutter, or roofline.

(19) The employer shall equip all portable rung ladders with non-slip bases when there is a hazard of slipping. Non-slip bases are not intended as a substitute for care in safely placing, lashing, or holding a ladder that is being used upon oily metal, concrete, or slippery surfaces.

(20) Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

#### Portable Metal Ladders:

Safety requirements for portable metal ladders placed in service after April 18, 1999 shall meet the requirements of ANSI A14.2-1990, which is hereby incorporate by reference. Safety

requirements for portable metal ladders placed in service on or before April 17, 1999, shall be based on the ANSI A14.2 provisions in effect at the time such ladders were placed in service.

(a) Scope. This section is intended to prescribe rules and requirements for the construction, care, and use of the common types of portable metal ladders, in order to insure safety under normal conditions of usage. It does not cover special-purpose ladders, which do not meet the general requirements of this code.

(b) Definitions. For definitions of terms associated with metal ladders, see Section 3278(b).

(c) Requirements.

(1) General. Specific design and construction requirements are not a part of this section because of the wide variety of metals and design possibilities. However, the design shall be such as to produce a ladder without structural defects or accident hazards such as sharp edges, burrs, etc. The metal selected shall be of sufficient strength to meet the test requirements, and shall be protected against corrosion unless inherently corrosion-resistant.

(A) Rung Spacing. The spacing of rungs or steps shall be on 12-inch centers.

(B) Rungs and Steps. Rungs and steps shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping.

(2) General Specifications--Straight and Extension Ladders.

(A) Ladder Width. The minimum width between side rails of a straight ladder or any section of an extension ladder shall be 12 inches.

(B) Ladder Length. The length of single ladders or individual sections of ladders shall not exceed 30 feet. Two section ladders shall not exceed 48 feet in length and over two section ladders shall not exceed 60 feet in length.

(C) Overlap. Based on the nominal length of the ladder, each section of a multi-section ladder shall overlap the adjacent section by at least the number of feet stated in the following:

Nominal Length of Ladder (Feet)	Overlap (Feet)
Up to and including 36.....	3
Over 36, up to and including 48.....	4
Over 48, up to 60.....	5

(D) Extension ladders shall be equipped with positive stops, which will insure the overlaps specified in the table above.

(3) General Specifications--Step Ladders.

(A) Length. The length of a stepladder is measured by the length of the front rail. Stepladders shall not exceed 20 feet in length.

(B) Feet. The bottoms of the four rails are to be supplied with insulating nonslip material for the safety of the user.

(C) Spreaders. A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in the open position shall be a component of each step ladder. The spreader shall have all sharp points or edges covered or removed to protect the user.

(4) General Specifications Trestles and Extension Trestle Ladders.

(A) Length. Trestle ladders or extension sections or base sections of extension trestle ladders shall be not more than 20 feet in length.

(5) General Specifications--Platform Ladders. The length of a platform ladder shall not exceed 20 feet. The length of a platform ladder shall be measured along the front rail from the floor to the platform.

(d) Care, Use and Maintenance of Ladders.

(1) General. Every employer using ladders shall enforce a maintenance program, which includes the appropriate requirements listed below.

(2) Maintenance. Ladders shall be maintained in good usable condition at all times. Hardware fittings and accessories shall be checked prior to use and kept in good working condition.

(3) Deteriorating Agents. When ladders are to be subjected to deteriorating agents, a protective coating shall be applied to the equipment.

(4) Oil and Grease. Equipment shall be cleaned of oil, grease, or slippery materials.

(5) Damaged Ladders. Ladders having defects are to be marked and taken out of service.

(6) Loading. Portable ladders are designed as a one-man working ladder based on a 200-pound load.

(7) Footing Support. The ladder base section shall be placed with a secure footing. Safety shoes of good substantial design shall be installed on all ladders.

(8) Top Support. The top of the ladder must be placed with the two rails supported, unless equipped with a single support attachment.

(9) Fastening Together. Ladders must not be tied or fastened together to provide longer sections. They must be equipped with the hardware fittings necessary if the manufacturer endorses extended uses.

(10) Improper Use.

(A) Ladders shall not be used as a brace, skid, guy or gin pole, gangway, or for other uses than that for which they were intended, unless specifically recommended for use by the manufacturer.

(B) Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

(11) Electrical Hazards. Portable metal ladders shall not be used in the vicinity of electrical circuits in places where they may come in contact with them. Portable metal ladders shall be legibly marked with signs reading "CAUTION--Do Not Use Around Electrical Equipment," or equivalent wording.

Portable Ladders:

The chief hazard when using a ladder is falling. A poorly designed, maintained, or improperly used ladder may collapse under the load placed upon it and cause the employee to fall.

A ladder is an appliance consisting of two side rails joined at regular intervals by crosspieces on which a person may step to ascend or descend.

The various types of portable ladders include:

- Stepladder—A self-supporting portable ladder, non-adjustable in length, having flat steps and a hinged back.
- Single Ladder—A non self-supporting portable ladder, non-adjustable in length, consisting of but one section. Its size is designed by overall length of the side rail.
- Extension Ladder—A non self-supporting portable ladder adjustable in length.

OSHA's requirements for portable ladders include:

- Portable stepladders longer than 20 feet shall not be used.
- Stepladders shall be equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in an open position.
- Single ladders longer than 30 feet shall not be used.
- Extension ladders longer than 60 feet shall not be used.
- Ladders shall be maintained in good condition at all times.
- Ladders shall be inspected frequently and those, which have developed defects, shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

Proper use of ladders is essential in preventing accidents. Even a good ladder can be a serious safety hazard when used by workers in a dangerous way.

OSHA standards require the following safety precautions for ladder use:

- Ladders shall be placed with a secure footing, or they shall be lashed, or held in position.
- Ladders used to gain access to a roof or other area shall extend at least 3 feet above the point of support.
- The foot of a ladder shall, where possible, be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder (the length along the ladder between the foot and the support).
- The worker shall always *face* the ladder when climbing up or down.
- Short ladders shall not be spliced together to make long ladders.

- Ladders shall never be used in the horizontal position as scaffolds or work platforms.
- The top of a regular stepladder shall not be used as a step.
- Use both hands when climbing or descending ladders.
- Metal ladders shall never be used near electrical equipment.

### **Fixed Ladders—[§1910.27](#)**

A fixed ladder is a ladder permanently attached to a structure, building or equipment.

A point to remember is that fixed ladders, with a length of more than 20 feet to a maximum unbroken length of 30 feet shall be equipped with cages or a ladder safety device.

A "cage" is a guard that is fastened to the side rails of the fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of the person who must climb the ladder.

Cages shall extend a minimum of 42 inches above the top of a landing, unless other acceptable protection is provided.

Cages shall extend down the ladder to a point not less than 7 feet or more than 8 feet above the base of the ladder.

A ladder safety device is any device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls and may incorporate such features as life belts, friction brakes, and sliding attachments.

Another feature of fixed ladders is the landing platform, which provides a means of interrupting a free fall, and serves as a resting place during long climbs.

When fixed ladders are used to ascend to heights exceeding 20 feet (except on chimneys), landing platforms shall be provided for each 30 feet of height or fraction thereof, when cages are used, except that, where no cage, well or ladder safety device is provided, landing platforms shall be provided for each 20 feet of height or fraction thereof.

Ladder safety devices may be used on tower, water tank, and chimney ladders over 20 feet in unbroken length in lieu of cage protection. No landing platform is required in these cases.

The preferred pitch of fixed ladders shall be considered to come in the range of 75 degrees and 90 degrees with the horizontal. Fixed ladders shall be considered to be substandard if they are installed within the pitch range of 60 and 75 degrees with the horizontal. Substandard fixed ladders are permitted only where it is found necessary to meet conditions of the installation. This substandard pitch range shall be considered as a critical range to be avoided, if possible.

Ladders having a pitch in excess of 90 degrees with the horizontal are prohibited.

As with all ladders, fixed ladders shall be maintained in a safe condition and inspected regularly.

<b>Approved by:</b>	<b>US Concrete</b>
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<b>Effective Date:</b>	<b>5/10/2001</b>
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<b>Signature:</b>	<b>File at US Concrete Houston</b>
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