**COUNTY OF RIVERSIDE**
**STANDARD SAFETY OPERATIONS MANUAL**

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**PURPOSE:** To implement guidelines for a Countywide standard to protect employees who have to work in elevated work locations and to prevent slip and fall type accidents that can happen to employees in the course of their employment, since injuries resulting from employees falling from heights are usually very serious or fatal.

**POLICY:** Cal/OSHA requires that all employers develop an Injury Illness Prevention Program (IIPP) for hazards unique for their place of employment. The IIPP provides the framework for all County of Riverside Departments for preventing accidents according to State and Federal law. As part of the Safety Program for the County of Riverside, employees who work in elevated work locations such as aerial lift devices, scaffolds, elevated decks, and on roofs, must have adequate fall protection prevention. Employees are also to be protected from falls from heights in the form of guardrails and railings with toe boards, according to law. It is the policy of the County of Riverside that all employees are aware of the hazards associated with working in elevated work locations and the requirements of State law to prevent falls from heights.

**OBJECTIVES:**

1. Ensure that supervisors and employees are aware of their responsibilities concerning the State requirements for fall accident prevention.
2. Incorporate fall prevention safety as part of work planning and ensure that all employees are provided with the required Personal Protective Equipment related to fall accident prevention and trained in it's use.
3. Identify all fall hazards at facilities and work sites.
4. Ensure that supervisory personnel conduct safety self-inspections of facilities and work sites where fall protection of employees is necessary.
5. Ensure that employees are trained in recognizing and avoiding unsafe conditions related to fall accident prevention.

**SCOPE:** This policy applies to all County employees working in elevated work locations as part of their job activities. Also, all employees who could come in contact with substances that could cause them to lose their footing resulting in injury-related slips and falls as part of normal work activities.

**REFERENCES:** California Code of Regulations (CCR) Title 8, General Industry Safety Orders Sections 1621, 1632, 1669, 1670, 1671, 1675, 1676, 2320.8, 3203, 3210, 3276, 3278, 3280, 3636, 3637, 3638 and 3642.

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# I. FALL PROTECTION GUIDELINES

## A. Fall Protection Trigger Heights

- Above 30' – Iron workers: Connecting steel only.
- Above 20' – Roofers
- Above 15' – Iron workers, panelized roof construction and employees on 4 inch nominal or wider structural members.
- Above 7 ½' – Anyone working on unprotected platforms, scaffolds, or edge of structures.
- Above 6' – Rod busters: Working with rebar (exception is point to point travel)
- Grade or ground – Not required

## B. Control Measures in Preventing Falls

1. Prior to the presence of its employees, employer shall make a thorough survey of the worksite to determine the predictable hazards and extent of safeguard necessary to conduct work in a safe manner.
2. Determine if any work (even a small portion) can be performed **at ground level** or if a lifting device can be used to lift assembled portions (e.g, sections of roofing) into place, eliminating or reducing the number of workers exposed to falling.
3. Consider the use of aerial lifts or elevated platforms to provide better working surfaces, rather than walking top plates, joists, or beams.
4. Erect guardrails and ensure that all components are secured in place to protect workers from falls off edges.
5. Place covers over openings (mark and secure covers) as soon as the openings are created.
6. Use personal fall arrest systems (body harness) when required.
7. Body belts shall not be used as part of a personal fall arrest system.
8. Personal fall arrest systems shall be rigged such that an employee can neither free fall more than six feet, nor contact any lower level obstacle.
9. When vertical safety lines are used, each employee shall be provided with a separate safety line.

## I. FALL PROTECTION GUIDELINES - continued

H. Personal fall arrest systems or components shall be used only for employee fall protection.

### C. STANDARDS

#### 1. Guardrails and Covers / When and where needed?

a. Guardrails are needed wherever the workers could fall 7 ½ feet or more from scaffolds, runways, ramps, elevated platforms and surfaces. Exceptions:

(1) Float and ladder jack scaffolds.

(2) Bricklayers' and masons' scaffolds used in accordance with sections 1641(e) and 1644 (a)(6).

(3) During demolition on the floor or surface being demolished.

b. All stairs and stairwells need railings, toe boards and handrails.

c. All floor, roof and skylight openings shall be guarded by railing and toe-boards or be covered securely. The cover capable to support greater than a 200 – pound person or the weight of worker(s) and material(s) placed thereon. Covering shall prevent accidental removal or displacement and bear one inch painted or stenciled sign, stating: "Opening – Do Not Remove." Markings of chalk or kneel shall not be used.

d. Ladder-way floor openings or platforms need railings.

e. Pits and trap – door floor openings need railings or covers.

f. Manhole floor openings shall be guarded by covers or shall be protected by standard railings.

g. Temporary floor openings shall have standard railings.

h. Floor holes, into which persons can accidentally walk, shall have either a railing with toe-board on all exposed sides or a cover secured against accidental displacement.

i. Wall openings with a drop of more than 4 feet and the opening bottom is less than 3 feet above the working surface, shall be guarded as follows:

(1) When the height and placement of an opening in the working surface is such that either a standard or intermediate rail will effectively reduce the danger of falling, one or both shall be provided;

(2) The bottom of a wall opening, less than 4 inches above the working surface, regardless of width, shall be protected by standard toe-board or an enclosing screen of solid construction.

## I. FALL PROTECTION GUIDELINES - continued

j. Extension platforms outside a wall opening. One side may have removable railings in order to facilitate material handling.

k. When a chute is attached to an opening, this section shall apply, except a toe-board is not required. 1632(i).

l. Elevator shafts that do not have a cage or are not enclosed shall be guarded on all open sides.

m. Excavation crossovers need railings where the excavation is over 6 feet deep and over 30 inches wide.

n. Dredge discharge pipelines used as walkways need at least a top rail.

o. Catwalks and platforms need railings over water that is deeper than 4 feet.

p. Exposed edges of all temporary planked or temporary metal decked floors at the periphery of skeleton steel structure more than 30 feet in height need railings.

q. Perimeter and openings need railings as soon as false-work is erected.

r. At demolition sites wall openings need railings – except the ground floor and the floor being demolished.

**2. Access and housekeeping:**

a. Access requirements to get to and from all platforms and levels.

b. Keep walkways, ladders, and/or stairs safe and clear at all times.

c. Assure all work areas are free of all tripping hazards.

**3. Safety Nets**

**Safety nets must be used when the following conditions exits:**

a. Approved personal fall protection is required but its use is impractical.

b. At the exterior and interior perimeter of the structure if the elevation is 25 feet or more and the use of approved personal fall protection is impractical.

c. The building structure is not adaptable to temporary floors, scaffolds are not used, and the fall distance exceeds 30 feet.

d. Connecting beams at the periphery of a building or structure, where the fall distance exceeds 30 feet and the use of approved personal fall protection is impractical.

## I. FALL PROTECTION GUIDELINES – continued

### 4. Standards/Prohibited Types of Scaffolds

a. Lean-to or jack scaffolds, shore scaffolds, nailed bracket, loose tile, loose blocks, stilts, or other similar unstable objects shall not be used as working platforms, or for the support of such platforms. **Exception:** Bricklayer's "jump boards" no higher than 20 inches above the regular scaffold platform are acceptable for such service when supported by piers of carefully piled bricks or concrete blocks.

## D. SPECIFICATIONS

### 1. Guardrails and Covers

a. Top rail 42-45 inches from floor to top of rail.

b. Mid-rail installed halfway between the top rail and the floor.

c. Top rails, handrails, and post are at least 2-inch by 4-inch, and mid-rails are at least 1-inch by 6-inch.

d. Railings are to be capable of withstanding a load of 13 pounds per linear foot applied vertically or horizontally at the top rail.

e. Wooden posts and the stair uprights are to be spaced on 8-foot or closer centers.

f. All covers for floor or roof openings shall be capable to withstand weight greater than a 200 pound person or the weight of workers and/or material on them.

g. All covers shall have a painted or stenciled sign with at least one inch high legible letters stating: "Opening-Do Not Remove."

### 2. Toe-boards

a. Four inches minimum in vertical height, toe-boards are required on all sides and ends of scaffolds at locations where persons are required to work or pass under.

### 3. Body Belts, Harnesses, Lanyard and Anchorage

a. Any lanyard, safety belt, or drop-line subjected to in-service loading, is to be immediately removed from service.

b. Lifelines and anchorages shall be capable of supporting a minimum dead weight of 5000 pounds.

c. Lanyards are to be secured at a level not lower than the employee's waist, limiting the fall distance to a maximum of 4 feet nor contact any lower level.

## I. FALL PROTECTION GUIDELINES - continued

### 4. Safety Nets

a. Safety nets shall be approved and extended at least 8 feet horizontally from the perimeter, and positioned at a distance not to exceed 10 feet vertically below.

b. Sufficient clearance to prevent user's contact with below surfaces.

c. Clearances shall be determined by impact loading test.

## II. ELEMENTS OF FALL PROTECTION PROGRAMS

When workers are required to work at elevations that expose them to numerous fall hazards, it is essential for employers to develop and implement comprehensive, written fall-protection programs. Fall protection programs should always be applied to all tasks with identified fall hazards, including work involving: aerial lifts, walking/working surfaces with questionable strength and structural integrity, bridges, floor openings, leading edges, low-slope, steep, and built-up roofs, personnel platforms, pre-cast concrete, safety nets, scaffolds, silos/tanks, steel erection and tree trimming.

Implementation of written fall-protection programs can reduce the number of fall-related injuries. These written programs should describe the appropriate fall-protection systems and equipment to be used for each anticipated fall hazard.

**There are two basic fall-protection systems in use in the construction industry, fall-prevention and personal fall-arrest systems. Fall-prevention systems usually involve passive components, such as guardrails and hole covers.** However, when passive systems are not feasible, it is possible to prevent falls by having workers tie off to self-retracting lifelines that are short enough to prevent the worker from reaching the fall hazard. **Personal fall-arrest systems are designed to limit the distance that a worker can fall, thus limiting the forces acting on the worker's body in the event of a fall.** Fall-arrest systems require the use of a full-body harness to distribute fall arrest forces so as to minimize the extent of injury sustained in a fall. Other components of a fall-arrest system may include one or more of the following: shock absorbing lanyards, various types of connection hardware (e.g., snap hooks or carabineers), horizontal or vertical lifelines, and anchorage points sufficient to withstand 5,000 pounds or two times the load expected in a fall.

Passive systems should be used where possible because their effectiveness does not depend on specific actions by the worker being protected.

County Organizations with fall protection hazards to employees should develop, implement, and enforce, a comprehensive written **fall protection program**. The program should be in writing and at a minimum meet the requirements of Title 8 Cal/OSHA Safety Order Section 1669. The following elements are recommended as a guide in developing a **fall protection program**. The program should include but not be limited to, the following:

1. Supervisors and Managers must address all aspects of safety and hazards in the planning phase of projects.

2. Supervisors must identify all fall hazards at each worksite.

## II. ELEMENTS OF FALL PROTECTION PROGRAMS - continued

3. Employees must be trained in the recognition and avoidance of unsafe conditions and the OSHA regulations applicable to their work environment to control or eliminate the hazards. OSHA recommends that fall-protection training include classroom instruction supplemented by hands-on training with the equipment. Training should commence at the time of hire for new employees exposed to fall hazards, and continue periodically thereafter. It should also involve workers, when feasible, to help identify which tasks create fall hazards, and what methods could be used to eliminate these hazards. Employee participation and acceptance is crucial to implementing an effective fall protection program.

4. Supervisors should perform a job hazard analysis for each task to be performed.

5. Supervisors must provide appropriate fall protection equipment to employees and instruct workers on the proper use of fall protection equipment and enforcing its use, and daily inspection of equipment.

6. Supervisors must conduct scheduled and unscheduled safety inspection of the worksites and facilities where fall protection hazards exist.

7. In reference to all of the responsibilities listed above, supervisors must address:

    a. Environmental conditions.

    b. Multi-language differences.

    c. Alternative methods/equipment to perform assigned tasks.

    d. Establishment of medical and rescue programs.

8. Supervisors should encourage workers to actively participate in workplace safety, especially at “Toolbox Safety” meetings.

9. Supervisors must train employees for what to do in the event of an emergency. Fall protection equipment is very specific in its application. Great care should be taken when choosing the correct system for the application intended, in accordance with industry standards or guidelines on specific worker needs. Manufacturer’s instructions for correct use and maintenance must be followed explicitly; otherwise, injuries and fatalities can result. Compatibility of a fall-protection system’s components is crucial. Employers and employees should realize that not all components (such as lanyards, connectors, lifelines, deceleration devices, and harnesses) are interchangeable. The benefits derived from safely performed work at heights include: more organization, more employee cooperation, greater productivity for management, less danger to life on the job, and a lower insurance risk for hazardous work in high places.

## II. ELEMENTS OF FALL PROTECTION PROGRAMS - continued

Cal/OSHA regulations under Safety Order Section 1670, requires employers to provide workers who are exposed to fall hazards of over 6-feet with adequate fall protection. This may involve the installation of either fall prevention systems, or of personal fall-arrest systems. However, the OSHA regulations provide an exception in selected work situations where the employer can demonstrate that it is infeasible, or it will create a greater hazard to install these systems. Employers have the option of developing and implementing a fall protection plan in lieu of installing fall protection systems only when they can demonstrate the infeasibility, or greater hazard created by fall protections systems. This exception in the OSHA fall protection regulation is further described below.

***Exception:*** When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a **fall protection plan**, which meets the requirements of Cal/OSHA Safety Order 1671.1 (e.g., employers engaged in leading edge work, pre-cast concrete construction work and residential construction). A **fall protection plan** must include the following:

1. Applies when it can be shown that the use of conventional fall protection or compliant alternative measures (scaffolds, ladders, work platforms, etc), is impractical or creates a greater hazard.

2. Plan must be prepared by a qualified person and developed specifically for the job site where work is performed. The qualified person's name must be in the plan.

3. A copy of the fall protection plan with approved changes shall be maintained at the job site.

4. The implementation of the plan shall be under the supervision of the competent person.

5. Document reason or reasons why the use of conventional fall protection systems are infeasible or why their use would create a greater hazard.

6. Plan shall include written discussion of other measures to be taken to reduce or eliminate fall hazard for workers.

7. Plan shall identify each location where conventional fall protection methods cannot be used and these shall be designated "controlled access zones".

8. The employer shall implement a safety monitoring system when fully compliant alternative measures are not used.

9. Plan must provide the name or identification for each employee who is designated to work in controlled zones.

10. In the event an employee falls, or a serious accident occurs (near miss), the employer shall investigate the circumstances of the fall and determine if changes are needed and implement them.

## III. FALL PREVENTION STRATEGIES

### A. Ladders (General)

- Visually inspect ladders for structural damage, such as split/bent side rails, broken or missing rungs/steps/cleats.
- Check for missing or damaged safety devices, such as rung locks, lock spreaders or safety shoes/feet/spurs/spikes.
- Look for grease, dirt or other contaminants on ladder rungs that could cause slips or falls.
- Check condition of paint or stickers (except warning labels) that could hide possible defects.

**Note:** ***Damaged ladders should be tagged or marked for repair, replacement or destruction.***

#### *1.* Ladder climbing guidelines:

a. Wear slip-resistant footwear.

b. Keep the area around the top and bottom of the ladder clear.

c. Wear approved fall protection equipment, if applicable.

d. Never carry large objects while ascending or descending the ladder. Use a hoist or pulley mechanism to move large/awkward objects up to working level or down to the ground.

e. Keep both hands free for climbing.

f. Face the ladder and maintain three-point contact (two hands and one foot or one hand and two feet on the ladder) at all times.

g. Do not load ladders beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

h. Use ladders only for the purpose for which they were designed.

#### 2. Extension Ladders

a. Use ladders only on stable and level surfaces unless secured to prevent accidental displacement.

b. Extend extension ladder side rails at least 3-feet above the upper landing to which the ladder is used to gain access.

c. Set up the ladder so that the height-to-base ratio is 4-feet to 1-foot (e.g., 4-feet away from vertical member for a 16-foot ladder.

d. Have another person hold the ladder during ascent or descent, or if nobody is available, tie or stake the foot or side rails in place (top and bottom).

## III. FALL PREVENTION STRATEGIES – continued

e. Set the ladder so that both rails of the ladder maintain equal contact with the supporting structure.

f. Use adjustable feet to level the ladder, if applicable.

g. Never lean more than 12-inches beyond either side rail. *Belt-buckle rule: always keep your belt buckle inside the side rails of the ladder.*

h. Carry small tools and other work materials in your clothing or attached to a tool belt.

i. The third highest rung of an extension ladder is the maximum climbing height.

### 3. Step Ladders (Self-Supporting)

a. Use a stepladder only on a solid, level surface.

b. Never try to use a folded stepladder as a straight ladder.

c. Fully extend and lock the spreaders of step ladders.

d. Never climb or stand on the leg braces, the top step, or on the service tray.

e. Avoid using an unprotected stepladder in a doorway or high-traffic area.

f. When working in a high-traffic area, lock or barricade doors, mark the area off, or have a co-worker monitor the area while work is performed.

g. Carry small tools and other work materials in your clothing or attached to a tool belt.

h. Maintain three- point contact if it is necessary to carry large objects up or down a ladder.

### 4. Fixed Ladders

a. Fixed ladders shall be used at a pitch no greater than 90-degrees from the horizontal, as measured to the backside of the ladder.

b. Each step or rung shall be capable of supporting a single concentrated load of at least 250-pounds (114 kg) applied in the middle of the step or rung.

c. The rungs and steps of fixed metal ladders shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping.

d. Where the total length of a climb equals or exceeds 24-feet (7.3m), fixed ladders shall be equipped with one of the following: cages, wells, ladder-safety devices, or self-retracting lifelines.

## III. FALL PREVENTION STRATEGIES – continued

### B. Scaffolds

1. The footing or anchorage for scaffolds should be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects, such as barrels, boxes, loose bricks or concrete blocks, should not be used to support scaffolds or planks.

2. No scaffold should be erected, moved, dismantled, or altered except under the supervision of a competent person.

3. Guardrails and toe boards should be installed on all open sides and ends of platforms more than 10-feet above the ground or floor, except needle-beam scaffolds and floats.

4. Guardrails should be 2-inches by 4-inches, or the equivalent, approximately 42-inches high, with a midrail, when required. Supports should be at intervals not to exceed 8-feet, and toe boards should be a minimum of 4-inches in height.

5. Scaffolds 4-feet to 10-feet in height, having a minimum horizontal dimension in either direction of less than 45-inches, should have standard guardrails installed on all open sides and ends of the platform.

6. Scaffolds and their components should be capable of supporting at least 4 times the maximum intended load without failure.

7. Any scaffold having accessories such as braces, brackets, trusses, screw legs, ladders, etc., which are damaged or weakened from any cause should be immediately repaired or replaced.

8. All scaffold platforms should be tightly planked with scaffold plank grade, or equivalent, as recognized by approved grading rules for the species of wood used.

9. After the erection of scaffolding at any project site, the employer should designate a competent person to initially inspect the scaffolding and, at designated intervals, re-inspect the scaffolding. Areas of consideration for inspection should include but not be limited to the following: a) braces, b) brackets, c) footing (anchorage), d) guardrails and toe boards, e) ladders, f) legs, g) locking pins, h) overhead protection, i) planking, j) poles, k) securing, l) slippery conditions, m) trusses and n) uprights.

10. Suspension-scaffold rigging should be inspected periodically by a competent person to ensure that all connections are tight and that no damage to the rigging has occurred since its last use.

## IV. PREVENTING FALLS FROM BUILDINGS

The following recommendations were based on NIOSH investigative/research experience, and OSHA and ANSI safety standards for falls from or out of buildings or other structures.

### A. General Fall Protection Guidelines

1. A competent person should routinely inspect all protective devices (e.g., guardrails, lifelines, etc.) to ensure they operate properly.

## IV. PREVENTING FALLS FROM BUILDINGS - continued

2. Employers should ensure that workers follow pre-fabrication building plans and procedures and comply with existing standards regarding structural steel assembly.

3. Employers should ensure that workers using **personnel** hoists and work platforms comply with existing standards regarding the use of **personnel** hoists and work platforms.

4. Approved personal fall protection systems shall be worn by employees whose work exposes them to falling more than 7 ½-feet off buildings or through roof openings to the ground, or on roofs sloped at 7:12 or on sloped surfaces greater than a 40-degree roof angle.

5. Facility owners/operators should identify areas that may be hazardous to all personnel, including contractors, and restrict or prohibit the use of, or access to these areas.

### B. Roof Openings

1. Install guarding and/or fall protection on all roof openings.

2. Warning signs should be present on all roof openings.

3. Employers should consider, when applicable, cutting the roof openings as the last action on the roof to help minimize exposure to fall type hazards.

### C. Floor Openings

1. Install guarding in the form of a standard railing and toe boards on all sides of floor openings, or install a cover capable of supporting the maximum intended load.

2. Hatchway floor openings should be guarded by hinged-floor-opening covers of standard strength and construction, equipped with standard railings or permanently attached thereto, so as to leave only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard railings.

### D. Skylights

1. To guard against falls through skylights by maintenance or other personnel who must access the roof once construction is completed, building owners should consider installing permanent railings around skylight perimeters or protective covers over individual skylights.

2. Skylight manufacturers and building owners should voluntarily affix warning signs (e.g., “DANGER – skylights have been installed on this building. Stepping or sitting on the skylight may result in severe injury or death”) on the skylights and at or near points of access (e.g., roof hatches, fixed ladders, stairways, doors, etc.) to areas containing these skylights.

3. Employers should assure that all workers required to work near roof openings or skylights are adequately trained to recognize the serious hazard of falls (even from relatively low heights) through roof openings, and the danger of sitting or stepping on skylights.

## IV. PREVENTING FALLS FROM BUILDINGS - continued

### E. Leading Edges and Wall Openings

1. Provide fall protection measures along unguarded roof perimeters and balconies.

2. During steel erection, secure temporary flooring from displacement.

3. Work near an open or damaged window should be done from the side rather than from directly in front of the window, whenever possible. This is also true of door and window openings prior to installation of the door and window. Guardrails should be installed across the opening until the door or window is installed.

## V. AERIAL LIFT VEHICLES AND TREE WORK

A. A full-body harness must be worn and a lanyard attached to the boom or basket when working from an aerial lift.

B. Attaching the lanyard to an adjacent pole, structure, or equipment while working from an aerial lift should not be permitted.

C. Employees should always stand firmly on the floor of the aerial lift basket, and should not sit or climb on the edge of the basket or use planks, ladders, or other devices on the floor of the basket to elevate their work position.

D. An aerial lift truck should not be moved when the boom is elevated in a working position with personnel in the basket, except for equipment, which is specifically designed for this type of operation.

E. “Pole climber devices” should not be worn while performing work from an aerial lift.

F. The brakes of Aerial Lift trucks should be set, and when outriggers are used, they should be positioned on pads or a solid surface. Wheel chocks should be installed before using an aerial lift truck on an incline.

**II.** Regular inspection and maintenance should be performed on all tools and equipment prior to use.

**III.** Conduct daily jobsite surveys before beginning work to identify hazards on the sites where aerial lifts are to be used.

**IV.** Maintain minimum safe working distances from electrical lines while working in aerial lifts.

1. Tree work

   a. Workers should not perform tree trimming or cutting without appropriate safety training.

   b. Employees must use safe work procedures provided by the employer and/or equipment manufacturer for climbing, felling, topping and pruning trees.

   c. Employees must use safe work procedures provided by the employer and/or equipment manufacturer to prevent the cutting of climbing ropes, lanyards and harnesses or straps.

## V. AERIAL LIFT VEHICLES AND TREE WORK continued

d. Employees must ensure that proper fasteners are used at the connectors for all climbing-cradle ropes.

e. Supervisors must inspect all fall-protection equipment, before use to ensure that it is not damaged or defective.

f. Employees can operate mobile equipment (e.g., aerial lifts) only if properly trained.

g. Employees in aerial lift buckets, trimming trees, must use a body harness and safety lanyard.

h. Supervisors and employees performing tree maintenance must inspect trees and limbs for structural weakness and damage and proximity to electrical lines before climbing or cutting procedures are started.

## VI. PERSONAL FALL PROTECTION SYSTEMS

A. Approved personal fall arrest and restraint systems shall be worn by employees whose work exposes them to fall hazards in excess of 7 ½-feet from the perimeter edge of a structure, unprotected leading edges, through roof openings or on roof surfaces steeper than a 7:12 slope or other sloped surfaces greater than 40-degrees.

B.. Personal fall arrest systems consist of a full body harness, safety lanyards or self-retracting lifelines and anchorage hardware.

C. Lanyards and vertical lifelines shall have a minimum breaking strength of 5000-pounds.

D. Lanyards and self-retracting lifelines should limit the free fall distance of an employee to 4-feet or less and prevent contact with any lower level.

E. The attachment point of the lanyard to the full body harness must connect to the center of the employee's back so that the employee's weight is evenly distributed, if the employee does fall.

F.. Each personal fall arrest system shall be inspected not less than twice annually by a competent person in accordance with the manufacturer's recommendations. The dates of the inspections shall be documented.

## VII. FALL PROOFING YOUR OFFICE OR HOME

Falls can "trip" up people of all ages. Falls are also the leading cause of injury related hospital admission for older adults. However, falls happen to younger persons as well, and falls at work are the third highest category concerning industrial fatalities behind transportation accidents and workplace violence deaths. Many of fall related injuries at work happen from heights from employees using ladders and scaffolding. However, the greatest number of falls at work is simply the result of an employee walking and slipping on a liquid on the floor and falling, which may result in an injury.

Work related slips and falls could easily be prevented by safety conscious employees taking an active part in the County's Safety Program. The best place to start fall proofing your office or home, is at the front door.

## VII. FALL PROOFING YOUR OFFICE OR HOME - continued

Remember these points when fall proofing your office or home:

A. Make sure that there are handrails on the steps.

B. To prevent falls, vary the color and texture of the floors to help identify changes in floor height.

C. Avoid installing shag carpeting in offices; it can cause falls by getting caught on shoes or walkers.

D. Arrange furniture so there are adequate pathways to exits.

E. Keep electrical, computer and telephone cords out of walkways by placing them along baseboards.

a. Remove tripping hazards from the floor such as small items, toys, crayons, magazines, etc., that could cause a fall.

b. Clean up grease, oil, water and other liquids from the floor immediately.

c. If you have elderly persons coming to your office or in your home, it might be a good idea not to wax the floors.

I. Keep a night light on in the bathroom.

**V.** Use bathroom rugs with non-skid backings.

**VI.** Use grab rails on the wall near the toilet and in shower enclosures.

**VII.** Vary the colors in your bathrooms so you can see spills on floors clearly.

**VIII.** Make sure that shower stalls have code standard shatterproof glass.

**IX.** Avoid climbing on chairs in the office to reach into high cabinets; use a stepstool.

With a little effort, each of us can become aware of the steps we can take on an individual basis to help eliminate falls to employees at work as well as family members at home.

## VIII. SAFE WORK PRACTICES TO PROVIDE PROTECTION FROM FALLS

A. Where conventional fall protection or compliant alternative measures can be shown to be impractical, designate workers as safety monitors to observe employees and to alert them of hazards and unsafe work practices that could cause a trip or fall.

B. All workers shall be given frequent accident prevention instructions (e.g., safe use of fall protection equipment). New workers must be instructed upon arrival at the worksite.

C. Foreman, supervisors and lead-persons, must insist on employees observing and obeying all rules, regulations, and orders as is necessary for the safe conduct of the work.

## IX. CONCLUSION

The Occupational Safety and Health Act of 1970 was established “to assure so far as possible, every working man and woman in the nation, safe and healthful working conditions and to preserve our human resources”. One means of achieving this goal is by providing for the development and promulgation of occupational safety and health standards. Included in these standards are safety and health regulations applicable to fall protection and guarding which include, but are not limited to, ladders, scaffolds, floor and wall openings, vehicles, tree trimming, and personal protective and life saving equipment. These regulations and other applicable standards from the American National Standards Institute along with NIOSH recommendations should be followed where the possibility of falls from elevations exists.

## X. APPENDICES (WITH GRAPHICS)

A. Fall Protection Checklist

B. Glossary of Terms

C. Travel Restraint Systems

D. Seat Belts

E. Personal Fall Arrest Systems

Examples:
i. Vertical Fall Arrest System
ii. Horizontal Fall Arrest System
iii. Sloped-Roof Arrest System
iv. Retractable Lifeline Fall Arrest System

F. Fixed Ladders

Examples:
i. Ladder Cage
ii. Ladder Fall Arrest System

G. Aerial Devices

Examples:
i. Bucket Truck
ii. Crane Suspended Work Platform
iii. Ladder Truck

H. Fall Containment Systems

## APPENDIX A

## FALL PROTECTION CHECKLIST

Items in the checklist are for evaluation purposes only. No checklist is a substitute for a comprehensive safety program or audit.

| YES | NO | |
|---|---|---|
| ____ | ____ | Is your management actively committed to providing a safe jobsite? Does this include training issues? |
| ____ | ____ | Is the work site inspected daily or more often for housekeeping problems that may cause a fall from elevation or a same-level fall? |
| ____ | ____ | Is the entire site surveyed on a regular basis for changing work conditions that may create a tripping or other fall hazard?(Safety self-inspections.) |
| ____ | ____ | Are walkways kept clear and excess building materials kept orderly, allowing free walkway space? |
| ____ | ____ | Are the walkways kept free of combustible materials? |
| ____ | ____ | Are spills cleaned up immediately? |
| ____ | ____ | Is loose granular material, such as sand, swept up and removed immediately? |
| ____ | ____ | Are workers' tools and tool boxes/gang boxes properly located and stored? Are all stray tools gathered and stored properly at the end of each work shift? |
| ____ | ____ | Is a safe clearance for material handling equipment provided through aisles and doorways? |
| ____ | ____ | Is stored material stable and secure from tipping or falling over? |
| ____ | ____ | Are openings to outside walls adequately barricaded and labeled before any work begins in the area? |
| ____ | ____ | Are employees not allowed to sit on ledges of openings to outside walls? |
| ____ | ____ | Are all floor openings identified with appropriate signage and covered or barricaded prior to worker exposure in the area? |
| ____ | ____ | Have all employees been advised about how to report unsafe conditions at the site? |
| ____ | ____ | Do they know whom to contact in such cases? (supervisors, Safety Office, etc.). |
| ____ | ____ | Are reported items or unsafe conditions documented? |
| ____ | ____ | Do employees wear appropriate safety footwear for floor conditions? |
| ____ | ____ | Does their footwear fit properly, to prevent slips caused by excessive wear or damage? |

**FALL PROTECTION CHECKLIST** - continued

| YES | NO | |
|---|---|---|
| ____ | ____ | Is damaged or defective footwear replaced or repaired? |
| ____ | ____ | Is the level of lighting adequate for safe employee movement and for the work being performed? |
| ____ | ____ | Are temporary hand railings kept free from protruding nails and splinters? |
| ____ | ____ | Are floors and walkways evaluated for evenness? Are changes in elevation, such as joints, labeled to prevent falls? |
| ____ | ____ | Are covers or guardrails in place and marked around open trenches, pits, tanks or other surface interruptions? |
| ____ | ____ | Are ladder ways and other unfinished wall openings guarded by a railing? |
| ____ | ____ | Are floor openings guarded by a standard railing or a person posted on guard at all times when employees are exposed? |
| ____ | ____ | Are plans in place for fencing and barricading the work site from public use and vehicular traffic? Is the perimeter wide enough to protect outsiders from debris and potential fall hazards? |
| ____ | ____ | Are aisles, ramps, docks and other vehicle ways kept clear of tripping hazards? |
| ____ | ____ | Do workers for your department or subcontractors who use scaffolding utilize a competent person for its set-up, use and removal? |
| ____ | ____ | Are scrap bins monitored for spillover that could create a slip/fall hazard? |
| ____ | ____ | Are stored materials properly labeled, stacked and spaced? |
| ____ | ____ | Is adequate space allowed for forklifts or other material handling equipment to prevent stacked items from being struck and falling over? |
| ____ | ____ | Are adequate cleanup supplies and absorbents available for spills? |
| ____ | ____ | If there is an injury; Do the employees know how to report it? |
| ____ | ____ | Do employees know where to find first aid supplies on the site? |
| ____ | ____ | Are emergency numbers posted as required? |
| ____ | ____ | Are employees using fall protection body harness and lanyards while in aerial lift buckets? |

## APPENDIX B

## GLOSSARY OF TERMS

1. **anchorage point** – The anchorage must be capable of supporting a static load of 17.8kN (4000 lbs.) in any direction, with proper provision to accept a lifeline connection. If the anchor is exposed to the elements, it must be corrosion resistant. (The minimum thickness of an eyebolt type anchor is 19mm (3/4") with a 38mm (1 ½") opening diameter.

2. **lifeline** – This is the part of the system that is attached to the anchor point and the user of the system. Lifelines must have a minimum strength equivalent to 60 mm (5/8 inch) diameter polypropylene fibre rope. Lifelines must be properly secured to the anchorage point and be protected from abrasion or damage along their full length. Lifelines may run vertically or horizontally (installed between two or more anchors), depending on the application. Horizontal systems must be engineered properly, due to the loading applied to the anchors.

   Temporary lifelines are made of wire or synthetic rope. Permanent systems may be made of rigid steel or aluminum rails, wire ropes, or similar materials. References latest edition of CSA Z259.2.1 "Fall Arrestors, Vertical Lifelines and Rails".

3. **fall arrestor (rope grab)** – This is a device that automatically locks onto the lifeline when a fall occurs. It is fitted between the lifeline and lanyard and normally slides freely on the lifeline until there is a sudden downward motion. When this sudden motion occurs, the fall arrestor "grabs" the lifeline and holds firmly. Fall arresting mechanisms are also built into retractable lifeline devices, that play out and retract as necessary, but hold fast in the even of a fall (similar to a seat belt in an automobile).

4. **lanyard** – a lanyard is an approved device located between the fall arrestor and the worker's safety harness. Lanyards should conform to CSA Z259.1 "Safety Belts and Lanyards".

5. **shock absorber** – This is a device that limits the force applied to the user when a fall occurs. It is designed to absorb the kinetic energy of the fall as the worker is stopped. The shock absorber prevents both injury to the worker and the amount of force transferred to the lifeline and anchor. A shock absorber may be a separate device or built into the lanyard design. Lanyards should conform to the latest edition of CSA Z259.11 "Shock Absorbers for Personal Fall Arrest Systems".

6. **full body safety harness** – This device designed to contain the torso and pelvic area of a worker and to support the worker during and after a fall. A Grade A full-body safety harness conforming to Canadian standards Association CSA-Z259.10-M90 "Full Body Harnesses" is the type to be used for a fall arrest system.

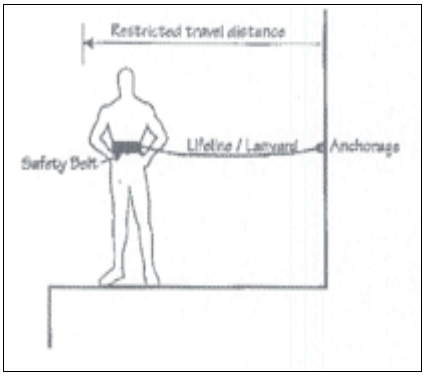
Lifelines may be of the fixed length type, adjustable with rope grab or self adjusting (retractable) type. Shock absorbing mechanisms are available either incorporated into the lanyard or as an add-on and are recommended to be used to lessen the shock to the worker.

## APPENDIX C

## TRAVEL RESTRAINT SYSTEMS

A travel restraint system is intended to limit a worker's movement so the worker is unable to reach a location where there is a risk of falling.

The restraint system is made up of a safety belt (or safety harness), lifeline and/or lanyard and anchor. The safety belt is secured to a lifeline having a fixed length which is attached to a secure anchor. The length of the lifeline is such that the worker can only proceed to within approximately 1 metre of an opening or edge. Under no circumstances should a travel restraint system be rigged so that a worker is in a position to fall.




*Travel Restraint System*

## APPENDIX D

## SEAT BELTS

A seat belt may be considered a “travel restraint system”, since it serves as a device to limit movement when a force is applied to the user. The use of seat belts most often applies to operating motor vehicles and mobile equipment. The seatbelt prevents the operator or passenger from falling out of the protective compartment of the equipment. This is much safer than being thrown out of the equipment onto a surface or object.

All mobile equipment that is equipped with ROPS must have seat belts installed. Any worker operating equipment must wear the seat belt at all times the vehicle is in operation.

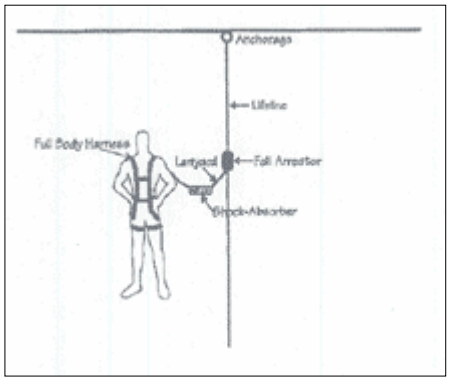
## APPENDIX E

## PERSONAL FALL ARREST SYSTEMS

A fall arrest system differs from a travel restraint system. Unlike travel restraint, a fall arrest system does not prevent a fall; it reduces the chance of injury when a fall takes place.

A complete fall arrest system consists of an anchorage point, lifeline, fall arrestor, lanyard, shock absorber, and full body safety harness.

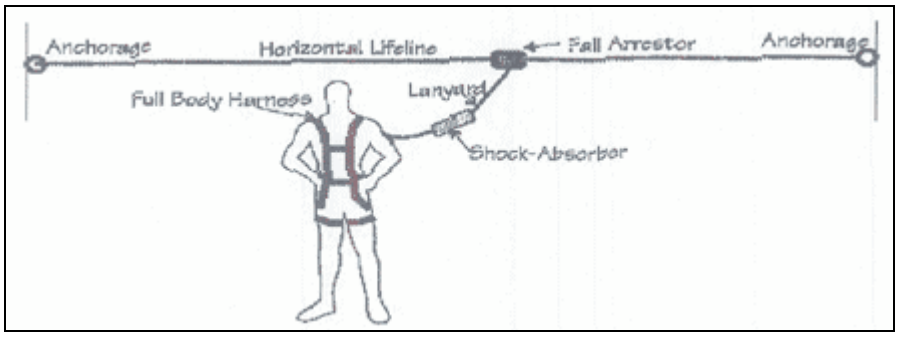
A 100 kg (220 lbs.) worker free falling 1.0 metres (3 ft.) generates an impact force of approximately 12kN (2700 lbs.).



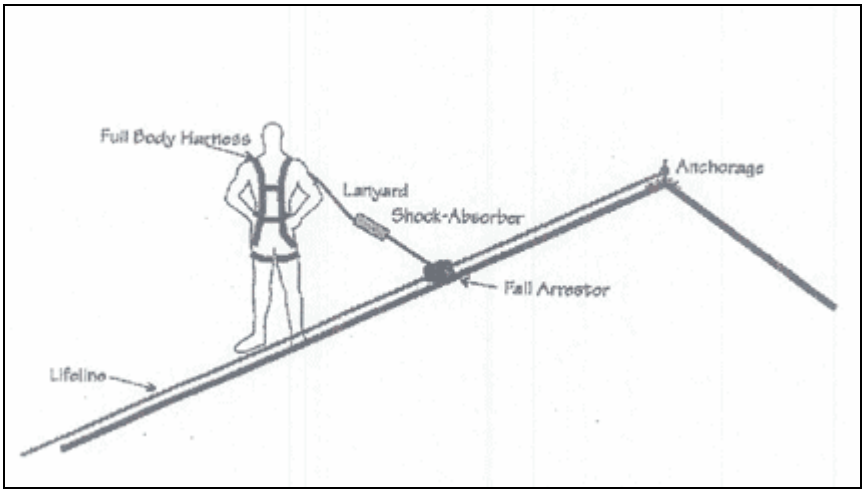

*i. Vertical Fall Arrest System*

***Specifications for a Fall Arrest System***

Note: A fall arrest system must be rigged to limit the fall of a worker to a maximum of 1.0 metres (3 feet).

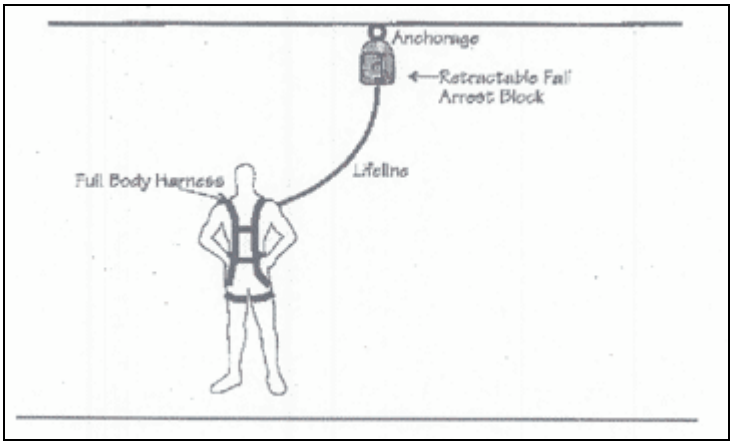



*ii. Horizontal Fall Arrest System*




*iii. Sloped-Roof Arrest System*

**PERSONAL FALL ARREST SYSTEMS** - continued




*iv. Retractable Lifeline Fall Arrest System*

## APPENDIX F

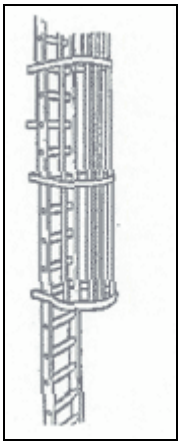
## FIXED LADDERS

Vertical fixed ladders should be provided with a means to protect a worker from falling. This may consist of a ladder cage or fall arrest system.

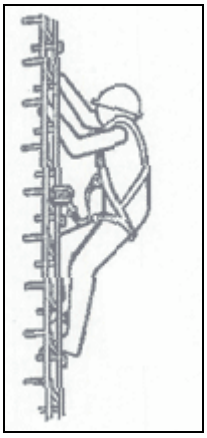
A ladder cage is a permanent structure attached to a ladder that provides a barrier between the worker and the surrounding space. It serves only as a support to a worker, if the worker needs to rest against the barrier. It does not provide complete fall protection on its own. However, it could be used in conjunction with a full body harness and lanyard. The worker would be able to secure to the rung or side rail of the ladder at any time during the climbing of the ladder. This still does not provide complete fall protection.

A much better approach is to provide a complete fall arrest system into the ladder design. This could be a permanently installed metal rail or wire rope anchoring system with an automatic fall arresting device. The automatic fall arresting device would travel freely on the rail or cable, allowing the worker to use both hands while climbing up or down. Should the worker slip or fall, the device would lock instantly and limit the worker's fall t a matter of inches.

Another possibility is to mount a retractable fall arresting device to a fixed anchor at the top of the ladder. The worker would then be equipped with a full body safety harness secured to the end of the retractable lifeline. The worker would be in a position to move up and down the ladder, at all times protected.



*i. Ladder Cage*



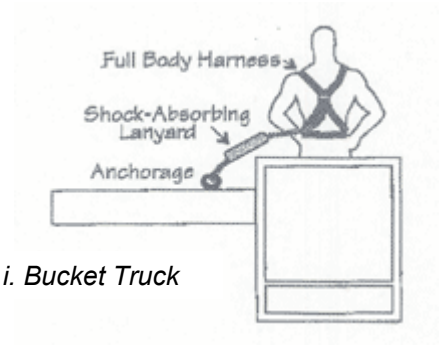
*ii. Ladder Fall Arrest System*

## APPENDIX G

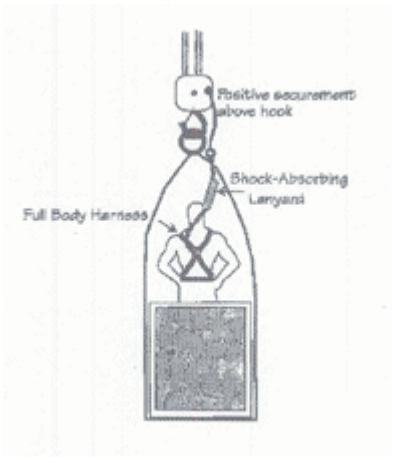
## AERIAL DEVICES

Fall Protection systems are required for all workers working at elevation from aerial devices. These devices include ladder trucks, aerial baskets or bucket trucks, crane suspended lift baskets, and other similar devices that carry a worker to an elevated work position.

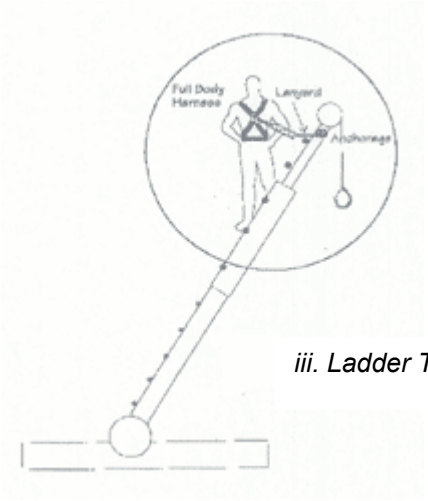
A proper fall arrest system must be incorporated into the work procedure, consisting of a full body harnesses, shock-absorbing lanyard and suitable anchorage.




*i. Bucket Truck*




*ii. Crane Suspended Work Platform*




*iii. Ladder Truck*

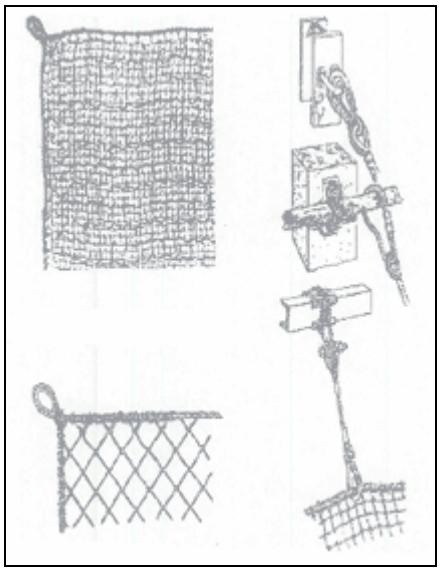
## APPENDIX H

## FALL CONTAINMENT SYSTEMS

Safety Nets

Where it is impractical to provide a fixed barrier or fall arrest systems, an alternate solution is the provision of safety nets. Safety nets are used most often where it is difficult or impossible to arrange for guard railing or to provide a proper anchoring and lifeline system for fall arrest. The most common applications for safety nets are bridge work and structural steel erection.

Safety nets shall be designed, installed, tested and maintained in accordance with ANSI Standard A10.11. (See reference next page.) The net shall be installed so that it extends 2.5 metres (8 feet) beyond the edge of the work area and not further than 7.7 metres (25 feet) below the working surface.



*Safety Net and Securement*