

# Fall Protection Program

Safety & Security Services

September, 2003



## DEFINITIONS

**Anchor** - a secure point of attachment for lifelines or lanyards that is capable of withstanding the loads:

- fall restraint - 800 lbs
- fall arrest - 5000 lbs

**Control zone** - the area between an unguarded edge and a defined line which is set back a safe distance. (Minimum 2 m or 6 1/2 ft)

**Exceptional Hazard** - an additional hazard over and above the normal hazard of falling to the surface below, for example, falling onto a moving conveyor or onto protruding reinforcing steel.

**Fall distance** - the distance from the point where the worker would fall to the point where the fall would be arrested. (maximum of 4 ft without a shock absorber, 6 1/2 ft with a shock absorber)

**Fall arrest** - stopping a fall which has occurred before the worker hits the surface below.

**Fall Restraint** - the use of a work positioning system to prevent workers from falling from the position in which they are working or a travel restriction system to prevent workers from travelling to an edge from which they may fall.

**Free Fall** - The distance from the point where the worker would begin to fall to the point where the fall arrest system begins to cause deceleration of the fall.

**Full body Harness** - a configuration of connected straps to distribute a fall arresting force over at least the thigh, shoulders and pelvis, with provisions for attaching a lanyard, lifeline or other components.

**Horizontal Lifeline** - a rail, wire rope or synthetic cable that is installed in a horizontal plane between two anchors and used for attachment of a worker's lanyard or lifeline while permitting the worker to move horizontally.

- Fall restraint - ultimate load capacity of at least 800 lbs per worker
- Fall arrest - certified by a professional engineer

**Lanyard** - a flexible line of webbing, rope, or cable used to secure a safety belt or full body harness to a lifeline or anchor.

**Lifeline** - a line from a fixed anchor or between two horizontal anchors and used for attachment of a worker's lanyard, safety belt, full body harness or other device.

**Personal Fall Protection System** - a fall protection system which uses a safety belt or full body harness to secure each worker to an individual anchor by means of lanyards, vertical lifelines, or other connecting equipment.

**Safety Belt** - a body support component comprised of a strap with a means for securing it about the waist and for attaching it to other components. Used only for fall restraint systems.

**Shock absorber** - a component whose primary function is to dissipate energy and limit deceleration forces which are imposed on the body during fall arrest. With a shock absorber in place a free fall of 6 1/2 feet is permitted in a fall arrest system.

**Swing Fall Hazard** - the hazard of swinging and colliding with an obstruction or the ground following a fall by a worker connected to a lifeline at an angle to the anchor location.

**Work Procedures** - the prevention of fall injuries by the control zone or safety monitor systems under this system or other systems established by an employer to minimize the risks from not using a fall protection system.

## PURPOSE

Over the past 20 years falls have accounted for the largest amount of serious injuries and workplace deaths. Most of these incidents were due to; lack of fall protection equipment and improper use of fall protection equipment. The purpose of this program is educate college employees in:

- Recognizing fall hazards
- Identify and apply fall protection controls, including fall prevention and fall arrest.

In Ontario construction, falls have accounted for at least 30 deaths since 1995.					
	1995	1996	1997	1998	
Fall Fatalities	6	8	8	4	
Total Fatalities	13	23	15	24	

## RESPONSIBILITIES

### Employer Responsibilities

- Ensure a written Fall Protection Program is in place.
- Ensure supervisors and workers are trained.
- Ensure that a fall Protection System is being used.
- Ensure that guardrails are used when practicable.
- Ensure a Fall Restraint system is in place when applicable.
- If a Fall Restraint cannot be used, ensure a Fall Arrest system is in place.
- Provide appropriate Control Zone procedures if the above are not appropriate.
- Ensure all equipment is safe, maintained, inspected and used correctly.
- Investigate any hazards or potential hazards.
- Review the program annually.

### Supervisor Responsibilities

- Review the Fall Protection Program.
- Investigate any hazards or potential hazards and make recommendations.
- Advise workers on any existing or potential hazards and ensure workers are following the program.
- Keep records of all workers trained for the fall protection program.

- Ensure all workers affected, read and have a copy of the fall protection program.
- Ensure that all workers are provided with the appropriate equipment.
- Ensure all workers inspect, maintain, and use the equipment in the recommended methods.
- Enforce all Fall Protection Procedures.

### **Worker Responsibilities**

- Review the Fall Protection Program.
- Follow all Fall Protection Program procedures.
- Inspect and maintain all Fall Protection equipment.
- Report any hazards or potential hazards to supervisors.
- Ensure the equipment is used as the manufacturer recommends.

### **APPLICABLE LEGISLATION**

Under the construction regulations (Ontario Reg. 213/91) and the Industrial regulations (Ontario Reg. 851/90), components of a fall protection system must meet applicable National Standards of Canada standards. Most of the CSA standards require that components be labeled or marked to indicate their standard of compliance.

Always use equipment that meets these requirements. Look for the following CSA standard numbers attached to or etched on components:

- shock absorbers - CAN/CSA Z259.11
- self-retracting devices - CAN/CSA Z259.2.2
- descent control devices - CAN/CSA Z259.2.3
- fall arresters (rope grabs) - CAN/CSA Z259.2.1
- vertical lifelines when sold in bulk on a reel or container - CSA Z259.2.1 on the container or reel.

Standards for the following devices don't require marking, but most reputable manufacturers mark them anyway:

- harnesses - CSA Z259.10
- safety belts - CSA Z259.1
- lanyards - CSA Z259.1

If any of these devices are not marked, ask the manufacturer for evidence that it meets the requirements of the applicable CSA standard.

**WARNING:**

Do not use any fall protection components labeled, etched, or otherwise marked with a CSA standard number different from those noted above. Such components do not meet the requirements of current regulations.

**LADDERS**

Portable ladders are one of the handiest, simplest tools we use. Because of their effectiveness, ladders are used by many different people to perform many different tasks. Although ladders are very uncomplicated, planning and care are still required to use them safely. Each year in the U.S., accidents involving ladders cause an estimated 300 deaths and 130,000 injuries requiring emergency medical attention.

**LADDER HAZARDS**

Ladder accidents usually are caused by improper selection, care or use, not by manufacturing defects. Some of the more common hazards involving ladders, such as instability, electrical shock, and falls, can be predicted and prevented. Prevention requires proper planning, correct ladder selection, good work procedures and adequate ladder maintenance.

**Procedures:**

- O.Reg. 851, s73 (d) A Portable ladder shall

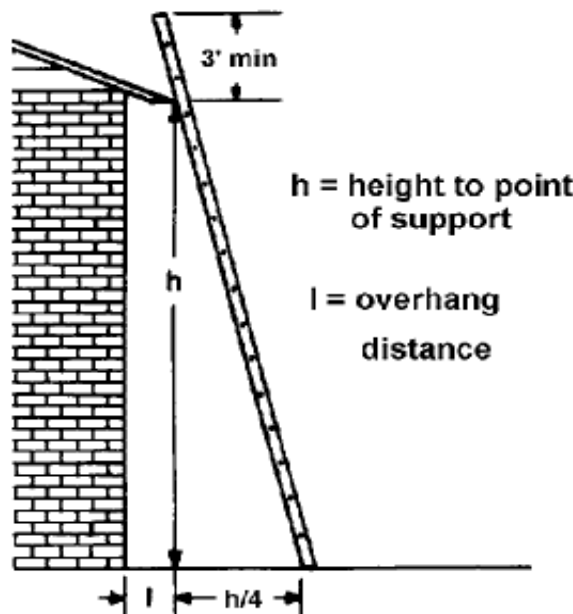
(d) where it,

- (i) exceeds six meters in length and is not securely fastened, or
- (ii) is likely to be endangered by traffic,

be held in place by one or more workers while being used.

- When any ladder must be set up next to an unprotected edge where a fall of 3 meters (10 feet) or more could occur, workers using the ladder must be protected by a fall-arrest system.
- User's must always keep three point contact.
- Ladders not tied off, or otherwise secured before being used.
- Do not hand-carry loads on a ladder.
- Do not try reaching so far that you lose your balance; move the ladder.
- Non-skid feet or spurs may prevent a ladder from slipping on a hard, smooth surface.
- Do not stand on the ladder's top three rungs.
- A damaged side rail may cause one side of a ladder to give way.

- The base should be spaced 1 foot away for every 4 feet it reaches up (see Figure 1).
- Ladders used to reach a walking surface or roof must extend at least 3 feet beyond.
- Extension ladders need both locks holding to prevent overloading a rail.
- Step ladders should be securely spread open. Never use a folding step ladder in an unfolded position.
- Electrical shock can occur with metal or wet wooden ladders. Not only is the shock itself dangerous, but it can cause falls resulting in injury.



A ladder should be 1 ft out for every 4 ft of height.

## LADDER SELECTION

Portable ladders are designed as "one-man" equipment with the proper strength to support the worker as well as his tools and materials. Ladders are constructed under three general classes:

- Type I **Industrial** - Heavy-duty with a load capacity not more than 250 pounds.
- Type II **Commercial** - Medium-duty with a load capacity not more than 225 pounds (suited for painting and similar tasks).
- Type III **Household** - Light-duty with a load capacity of 200 pounds.

## LADDER MAINTENANCE

**Wood ladders** should be protected with a clear sealer varnish, shellac, linseed oil or wood preservative. Wood ladders should not be painted, because the paint could hide defects. Check carefully for cracks, rot, splinters, broken rungs, loose joints and bolts and hardware in poor condition.

**Aluminum or steel ladders** should be inspected for rough burrs and sharp edges before use. Inspect closely for loose joints and bolts, faulty welds and cracks. Make sure the hooks and locks on extension ladders are in good condition. Replace worn or frayed ropes on extension ladders at once.

**Fiberglass ladders** should have a surface coat of lacquer maintained. If it is scratched beyond normal wear, it should be lightly sanded before applying a coat of lacquer.

## HELPFUL HINTS

- When working on cylindrical objects like poles and columns, the top rung of portable ladders can be replaced with chain or rope to reduce rocking.
- Aluminum ladders are very corrosion-resistant, but exposing them to fertilizer can cause damage.
- Use the ladder inspection checklist (page 9) to remind yourself of what you should look out for in order to prevent accidents.

### Ladder Inspection Checklist

General	Needs repair	O.K.	Date repaired
Loose steps or rungs (considered loose if they can be moved at all with the hand)?	_____	_____	_____
Loose nails, screws, bolts, or other metal parts?	_____	_____	_____
Cracked, spilt, or broken uprights, braces, or rungs?	_____	_____	_____
Slivers on uprights, rungs, or steps?	_____	_____	_____
Damaged or worn non-slip bases?	_____	_____	_____
<b>Step ladders</b>			
Wobbly (from side strain)?	_____	_____	_____
Loose or bent hinge spreaders?	_____	_____	_____
Stop on hinge spreaders broken?	_____	_____	_____
Loose hinges?	_____	_____	_____
Broken, split, or worn steps?	_____	_____	_____
<b>Extension ladders</b>			
Loose, broken, or missing extension locks?	_____	_____	_____
Defective locks that do not seat properly while extended?	_____	_____	_____
Worn or rotted rope?	_____	_____	_____

<b>QUICK REFERENCE FOR LADDERS</b>		
<b>Height that work is conducted (m)</b>	<b>Type of protection needed</b>	<b>Legislation Reference (OH&amp;S Act)</b>
0 - 3 m	None needed. Although MOL can still issue the College orders	O.Reg.851, sec 45
3 – 6 m	Fall Protection needed	O.Reg.851, sec 85
6 m, or greater	Securely fastened, or held in place by another person	O.Reg.851, sec 73 (d) & (e)

## POWER ELEVATED MOBILE WORK PLATFORMS



It shall be the responsibility of all users to read and comply with the following common sense rules which are designed to promote safety in the operation of power elevated mobile work platforms. These rules do not purport to be all-inclusive nor to supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these rules conflict in any way with any provincial statute or regulation said statute or regulation shall supersede these rules and it shall be the responsibility of each user to comply therewith.

### General Rules and Procedures:

1. **WORK AREA SURVEY:** Before operating the machine, the operator must make a work survey of hazards such as uncompacted soil, ditches, debris, overhead electric lines, unguarded openings or hazardous conditions created by other trades. The machine should not be operated on surfaces other than those intended by and set out in the manufacturers instructions.
2. **INSPECTION:** the operator must inspect all equipment prior to each shift. Such inspections should include the daily maintenance checks in accordance with manufacturers instructions and a visual inspection of the machine for damage. Any devices, which do not appear to operate properly, or Equipment that has obvious defects must be repaired before being operated.
3. **NEVER USE EQUIPMENT FOR PURPOSES OR IN WAYS FOR WHICH IT WAS NOT INTENDED**
4. **REPORT ANY UNSAFE CONDITION**
5. **NEVER TAKE CHANCES:** Do not work on platforms if your physical condition is such that you feel dizzy or unsteady in any way. Workers must ascend to and descend from the platform using the facilities provided.
6. **TRAINING.** Workers must be properly instructed on applicable model before they operate the equipment. Such instruction should include a review of manufacturers operating instructions. Location of all emergency devices, safety decals, daily maintenance checks, machine limitations and pertinent regulations regarding use of the equipment. Workers must be able to exercise common sense and be competent to operate this equipment. A worker must not operate a powered elevating movable work platform when illness medication, drugs or alcoholic beverages impair his physical abilities.
7. A safety belt with lanyard or body belt and safety straps must be attached to the basket or boom of extendible or boom platforms.

8. Elevating work platforms, normally, are not intended for use near electrically energized circuits. User should Therefore; consider the work platform to be non-insulated unless otherwise labeled.
9. The operation of any work platform is subject to certain hazards that cannot be protected against by mechanical means but only by the exercise of intelligence, care, and common sense. Therefore, It is essential to have competent careful operators that are physically and mentally fit and thoroughly trained in the safe operation of this type of equipment. ***If you do not fit this description do not operate equipment***
10. Read manufacturer's operating instructions. Never exceed manufacturer's recommended load. All accessories must be installed and used in accordance with manufacturers recommended procedures
11. Perform manufacturer's daily maintenance checks and make visual inspection of vehicle and surrounding area to be sure both are clear of other personnel and obstructions (including overhead obstructions)
12. Guardrails: Do not use machine without guardrails. Do not stand on guardrails to gain extra reach Do not use guardrails to carry materials unless designed for this purpose ant do not allow excessive overhang of materials when elevating the platform
13. Do not lean out over platform railings to perform work.
14. Do not use ladders or makeshift devices on the platform to obtain greater height
15. All personnel must remain clear while equipment is in use. Do not climb up or down extendible, articulating or scissor arms
16. Outriggers or stabilizers must be used in accordance with manufacturer's recommendation.
17. Care must taken to prevent ropes, electric cords, hoses, etc. from becoming entangled in equipment when platform is being elevated or equipment moved.
18. Do not alter equipment or override safety devices in any way
19. A powered elevating work platform must not be operated near electrically energized overhead power lines, unless insulated per C.S.A.
20. It is the responsibility or the operator to ensure that the load of workers, materials and tools on the platform does not exceed the capacity or the machine. Loads should be secured from rolling or excessive movement.
21. The machine must not be moved until the operator has determined by visual inspection that the direction of intended movement is clear of hazards, obstructions, and other site personnel.
22. Under no circumstances may a machine be modified without the written approval of the manufacturer. In addition, the machine must not be operated when any of the safety devices are inoperable.
23. When a scissor or boom lift is left unattended by the operator, the unit shall be locked or rendered inoperative, to prevent the device from being started or set in motion by an unauthorized person.

**IF YOU DO NOT UNDERSTAND THESE INSTRUCTIONS ASK YOUR SUPERVISOR FOR CLARIFICATION.**

## **GUARDRAILS**

Guardrails are the first line of defence in fall prevention. They should be installed along the open sides of any area where a worker may fall 2.4 metres (8 feet) or more or into water, operating machinery, or hazardous substances. Areas to be protected include

- floors and floor openings
- balconies
- slab formwork
- stairways and landings
- roof tops
- scaffolds and other work platforms
- runways and ramps
- bridge surfaces.

Guardrails should have a top rail, mid-rail, and toeboard secured to vertical posts or supports.

Available in wood, wood-slat, wire rope, and manufactured wire mesh systems, guardrails must meet the following minimum dimensions:

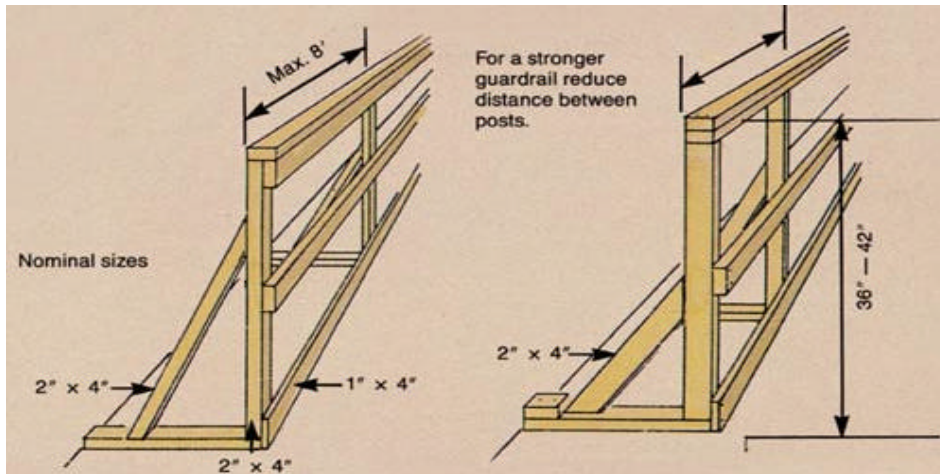
- top rail between 91 cm (3 feet) and 1.07 metres (3 feet, 6 inches) high
- toeboard at least 10.2 cm (4 inches) high and installed flush with the surface
- posts no more than 2.4 metres (8 feet) apart.

These components should be secured to the inside of the posts or jacks.

Toeboards should be installed on all open sides of a scaffold or work platform.

Guardrails should be installed as close to the edge as possible and must be capable of resisting any load likely to be applied. This may require extra reinforcement in special situations, such as where forklifts or buggies are used.

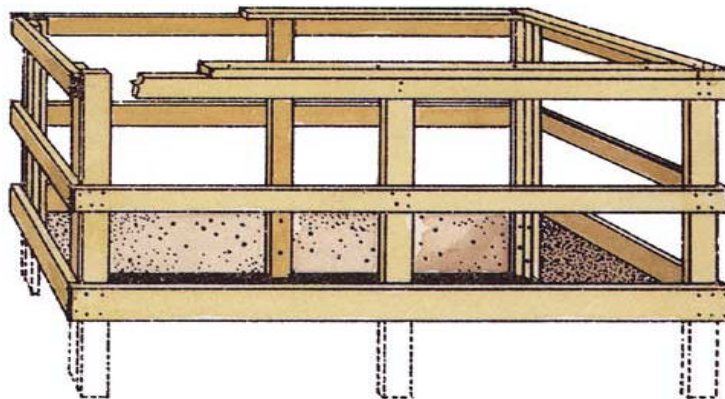
For maximum resistance to sideways force, the 2x4 top rail of wooden guardrails should be laid flat, with the larger dimension horizontal. To further strengthen guardrails, double the top rail and reduce the spacing of posts to between 1 and 2 metres (3 feet 4 inches and 6 feet 8 inches.)



Wood guardrails must be supported by posts extending to the top rail and braced and solidly fastened to the floor. Shoring jacks used, as posts should be fitted with plywood softener plates at top and bottom. Snug up and check the posts regularly for tightness.

For slabs and the end of flying slab forms, manufactured posts can be attached to the concrete with either clamps or insert anchors.

If guardrails must be removed, the opening edge should be roped off and marked with warning signs. In addition, workers should use a fall-arrest system properly anchored and tied off.



### **Fall protection: two basic types**

In construction, eliminating the risk of falls may not be possible. It then becomes essential to select proper fall protection.

Two basic types of fall protection are:

- fall arrest
- fall restraint.

Where guardrails or other protection is not in place, you must use a fall-arrest or travel-restraint system if you are in danger of falling

- more than 3 metres
- into operating machinery
- into water or another liquid
- into or onto a hazardous substance or object.

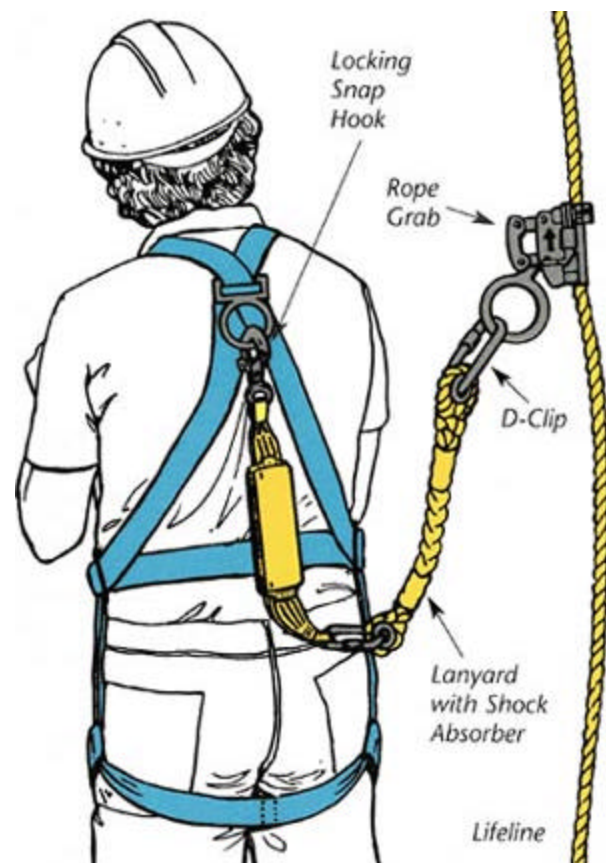
<b>QUICK REFERENCE FOR SCAFFOLDS AND LIFTS</b>		
<b>Height that work is conducted (m)</b>	<b>Type of protection needed</b>	<b>Legislation Reference (OH&amp;S Act)</b>
0 - 3 m	None needed. Although MOL can still issue the College orders	O.Reg.851, sec 45
3 m, or greater	Fall Protection needed	O.Reg.851, sec 85

## FALL ARREST

Fall arrest is the most common system. It stops a fall within a few feet of the worker's original position. A full body harness is required with a fall-arrest system. A typical system consists of the following parts connected together:

- full body harness (CSA- certified)
- lanyard (with locking snap hooks or D-clips)
- rope grab
- lifeline
- lifeline anchor.

A fall-arrest system must be worn when you are on a rolling scaffold that is being moved or when you are getting on, working from, or getting off suspended access equipment such as a swingstage or bosun's chair.



- Employees exposed to a free fall distance of 3 m (10ft) or more (without restraint) must wear fall arresting equipment, using a full-body harness system.
- Inspect components of the fall arrest system before each use for wear, damage and other deterioration. Defective components are removed from service when the components' function or strength has been adversely affected.
- **Fall arrest equipment must meet the minimum criteria:**
  - hardware used must be drop-forged, pressed or formed steel, with a corrosion-resistant finish, with surfaces and edges smooth to prevent damage to the attached body harness or lanyard;

- vertical life-lines must have a breaking strength specified by the manufacture as 27 kN (6000lbs); termination knots or splices can not reduce the strength of lifeline to less than 22 kN (5000lbs)
- horizontal life-lines must be 12 mm diameter wire rope with a manufactures specified breaking strength of at least 89 kN (20000 pounds);
- increase the above forces by 25% if two workers are connected to the same horizontal static line. lanyards must have a minimum tensile strength of 2449 kg (5400lb).
- body harness components must be CSA-approved.
- Secure full-body harness systems to anchorage points capable of supporting 2272 k (5000lb).
- Protect safety lines and lanyards against cuts or abrasion.
- Limit the free fall distance (through rigging) to a maximum of 1.2 m (4 ft) without a shock absorber or 6 1/2 ft with a shock absorber.
- Only one employee may be attached to any one vertical lifeline.
- Connect only one snap hook to any one D-ring.

Snap hooks must not be connected to one another.

## **FALL RESTRAINT**

Travel-restraint systems prevent falls by restraining a worker from getting too close to an unprotected edge.

A travel restraint system must be arranged to keep the worker back from the fall hazard area. The system usually consists of

- safety belt of full body harness (CSA-certified)
- lanyard
- rope grab
- lifeline
- lifeline anchor.

The basic problem with fall-restraint systems is that the rope grab must be continually adjusted to allow free movement and travel but still keep the worker away from the edge. One technique is to use a self-retracting lifeline (see article below).

Restraint protection is rigged to allow the movement of employees only as far as the sides and edge of the walking/working surface. Temporary anchorage points used for fall restraint must be engineered to be capable of supporting four times the intended load, with a minimum strength requirement of 364 kg (800 lb).

- Work within the confines of a perimeter (standard) guardrail.
- Wear an approved safety belt or harness attached to securely rigged restraint lines where:
  - safety belt and/or harness conform to all CSA (Canadian Standards Association) Standards
  - rope-grab devices must be used in accordance with manufacturer's recommendations and instructions.
- Inspect fall restraint components before each use, for wear, damage and other deterioration. Remove defective components from service when the component's function or strength has been adversely affected.
- fall restraint components must be compatible
- Tie restraint lines, independently of other lines, to the anchorage point.

In practice, fall-restraint systems are not foolproof because the length of the lifeline is not always adjusted properly. If the self-retracting lifeline, for instance, is longer than the distance to the nearest edge, a worker moving in that direction will not be restrained before falling.

But even if the system doesn't *prevent* a fall, it still *arrests* the fall.

## **SELF-RETRACTING LIFELINES**

Self-retracting lifelines (SRLs) are widely used in construction to provide fall protection, especially where workers must move about to handle or install material. SRLs let the user move the full length of the line but stop and lock at any sudden pull. This action is designed for fall arrest -- not for travel restraint.

Users of SRLs most know the manufacturers' recommendations for proper operation as well as any safeguards required for specific applications.

SRLs have traditionally been anchored above the worker's head with the line running near vertical down to the worker's safety belt or harness. There's general agreement that this is the best application of SRLs.

In construction, however, different applications have appeared. In addition to the traditional position, two other basic options are

- anchor and unit at the ridge of a pitched roof above the worker's location
- anchor and unit situated on a flat work surface so that the lifeline is drawn out by the worker in a horizontal plane.



Each manufacturer's manual provides information and guidelines for SRLs anchored above a worker's head.

Not all of the manuals, however, cover the use of SRLs in horizontal applications. In these cases the user must confirm that the particular model is approved for horizontal use. The manufacturer will then outline requirements for proper horizontal use.

Remember -- SRLs are NOT travel restraints. Travel restraints are designed to restrain the user's movement near open edges and prevent falling altogether.

The only time an SRL can act as a travel restraint is when the line is completely drawn out yet still short enough to keep the user from moving forward or laterally into a hazardous location.

## **INSPECTION ESSENTIAL**

Fall-arrest systems can only prevent fatal falls if they are used properly. Correct use includes inspection. Your life depends on it.

## **Harness**

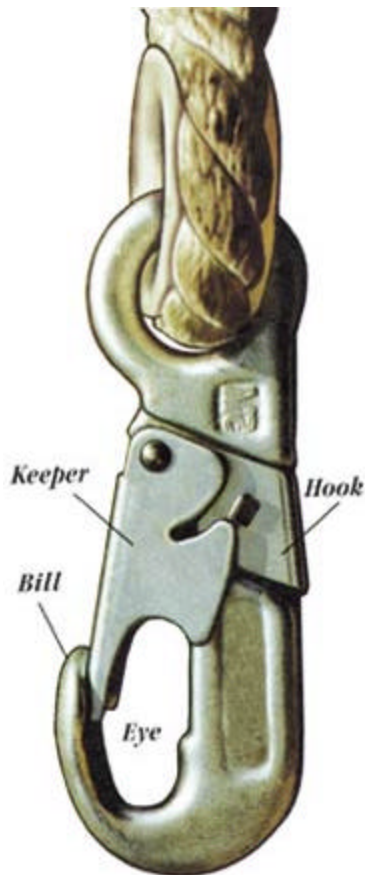
- Always check the tag for date of manufacture. Most web-type harnesses have a service life of five years. If the harness doesn't have a tag, don't use it.
- Look for cuts, fraying, broken stitching, and other damage to webbing. Check for chemical or heat damage.
- Inspect metal buckles for distortion, cracks, and sharp or rough edges. All buckles should slide easily for adjustment.
- Check for worn, cut, or frayed fibres where buckles attach to harness.
- Inspect D-ring for distortion, cracks, sharp or rough edges, and chemical or heat damage.
- Ensure that the plate holding the D-ring in position is free from cracks, heat damage, and other defects. The plate must keep the D-ring from sliding out of place.

## **Lanyard**

Most lanyards have a service life of five years. Check tag for date of manufacture. Inspect lanyard for worn, broken, or cut fibres; signs of stretching; evidence of chemical or heat damage; and cracked or distorted connecting hardware.

## Shock Absorber

A shock absorber should carry a tag indicating date of last inspection. If the tag is missing, return the absorber to your supervisor for advice on its suitability. If the absorber is made with tear-away stitching designed to absorb fall-arrest load, make sure stitching is intact.



## Snaphook

Check for cracks and corroded or pitted surfaces.

Ensure that bill and eye sections are not twisted or bent.

Check that locking mechanism works properly. Push the keeper into the open position with the mechanism still engaged. If the keeper opens, discard the snaphook immediately.

Ensure that spring has enough tension to close keeper securely.

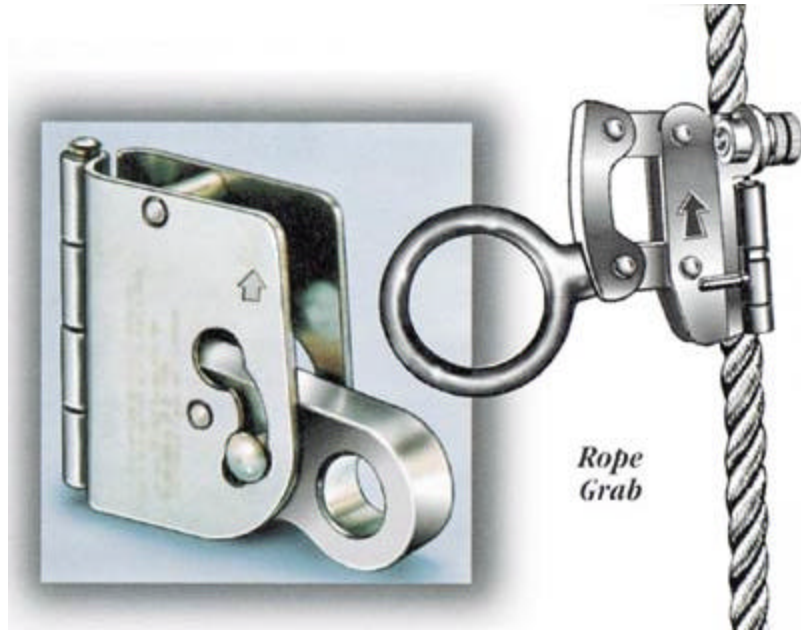
Open the keeper and release. The keeper should sit into the bill without binding.

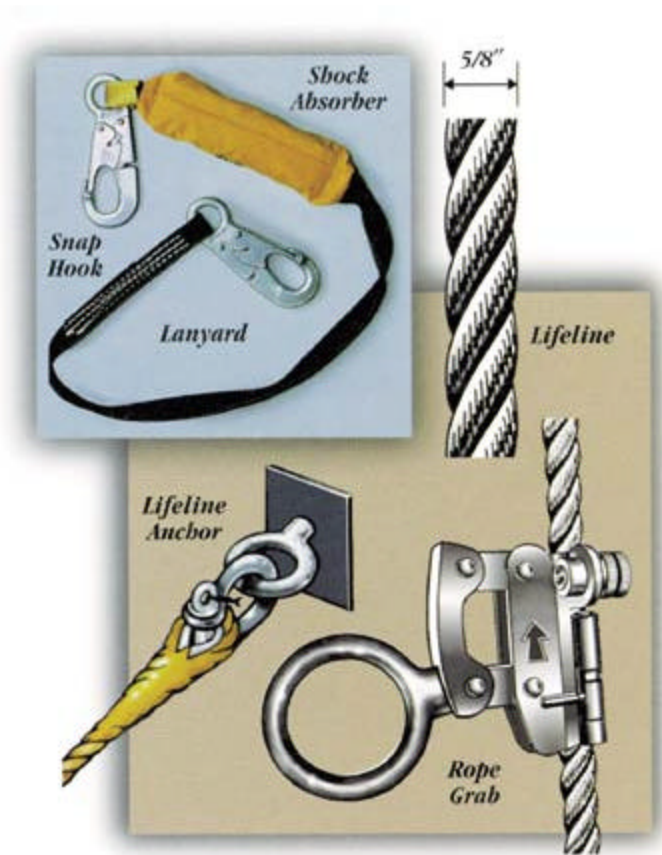
## Rope Grab

Make sure that grabs are installed rightside up. Most grabs feature a directional arrow to indicate proper orientation.

Ensure that proper size lifeline is used. The required size is marked on the rope grab.

Mount the grab on the lifeline. Pull the grab down sharply. The grab should lock within 30 cm (12 inches).





**Lifeline**

Lifelines must be at least 16mm diameter polypropylene or material of equal strength. Inspect lines from end to end before installation. Look for cuts, burns, fraying, and chemical or heat damage. Signs of decreased diameter may indicate that line has been involved in a fall arrest and should be discarded.

**Lifeline Anchorage**

Ensure that lifelines are securely attached to solid anchor points.

Whenever possible, attach only one lifeline to each anchor.

Never anchor to bundles of material that may be moved or depleted through use. Do not anchor to exposed rebar unless embedment length is adequate.

**CONTROL ZONES**

***The use of a Control Zone is prohibited on a surface where the slope exceeds 4 vertical and 12 horizontal or for scaffold erection and removal.***

A Control Zone is used for leading edge or fixed edge work where:

- a minimum distance from the edge of 2 m (6.5 ft) is used to protect employees and students, not wearing fall arrest or fall restraint equipment; NOTE: the Control Zone should be

expanded during adverse condition, (e.g. slippery roof) or when working at an additional elevation within the "Safe Zone" (e.g. on a step ladder)

- employees or students working within the "control zone" must be using appropriate fall arrest or fall restraint equipment
- if work is to be conducted inside the Control Zone warning lines must be installed to identify the Control Zone. The lines must be highly visible and maintained at a height of between 0.85 m and 1.15 m (34" and 45") at intervals not exceeding 1.8 m (6ft).

### **Fall Protection Planning**

- Identify all fall hazards anticipated during the course of the project.
- Describe the method of access to the work area.
- Describe the methods of material and tool handling used on elevated surfaces.
- Establish procedures for inspecting fall protection equipment.
- Identify the tasks and applications requiring worker fall protection.
- Match tasks and applications to appropriate fall protection systems.
- Describe assembly, maintenance, inspection and disassembly procedures for the fall protection systems used.
- Describe procedures for handling, storing, and securing fall protection equipment.
- Describe methods of securing lanyards and lines.
- Identify anchor locations.
- Identify areas where workers may be exposed to falling objects and define measures for protecting them.
- List workers who have been trained to use safety equipment on the job site.
- Describe how workers injured by falls will be rescued and if need be, medically treated.
- Post emergency phone numbers and make all workers aware of them.
- Describe equipment available for rescue and retrieval.
- Post essential elements of the fall protection plan, if utilized, at the work site and, make all workers aware of them.

## REFERENCES

1. National Safety Council, *Job Made Ladders*, Data Sheet No. 1-568-76, 1976.
2. National Safety Council, *Accident Prevention Manual for Industrial Operations*, Ninth Edition, 1988.
3. Construction Safety Association, Basics of Fall Protection “User’s Guide”