

Personal Fall Protection System

8.5 Hour Training Program

Student Manual



Our Training Can Protect You



Disclaimer

This Fall Protection Course instructed by FreeBird Safety Services and all who are employed and contracted by this company put forth this material and is intended for information, training and understanding of the Fall Protection requirements in the Province of British Columbia as set forth by the legislation governed by the Workers Compensation Act and the authority of WorkSafe BC. At no time does FreeBird Safety Services, its instructors or any other personal associated with or in part, intend for this manual to take the place of the laws of the Workers Compensation Act of British Columbia or do we take responsible for a person's personal safety and welfare when applying the curriculum in whole or in part, or while in the course of working at heights.

It is the responsibility and due diligent of all persons using this curriculum in whole or in part to fully understand the laws of British Columbia and follow them in full compliance in regards to Fall Protection and all safety when it comes to a worker at work. It is also the personal responsibility of all who are using this course curriculum to receive site specific training from their employer and or a reasonable person of experience and knowledge of the task at hand.

FreeBird Safety Services also highly recommends that all workers who work at heights of any kind, review the legal requirements of Part 11 of the WorkSafe BC Regulation and any other Parts that are relevant to a workers Safe and Healthy work experience.



Request from FreeBird Safety Services. If by chance you notice a spelling mistake or any correction that need to be rectified, please inform us right away.

Company Information



FreeBird Safety Services
51421-Yale Rd.
Rosedale BC
V0X1X0
(604) 226-5933
<https://freebirdsafetyservices.ca/>
mikew@freebirdsafetyservices.ca
Owned and Operated by Mike Winbow
WorkSafe BC Account 898115



Personal Message from The Owner

I have been in the construction industry for over 30 years. I have seen with my own eyes the results of unsafe acts and disregarding the safety protocols on a construction site. It is not just my hope, but a personal mission to educate and train workers to be safe while at work or at home.

Every year on April 28 we mourn the fatalities of workers from the year prior due to the occupations they work in. Every year the construction industry of British Columbia has accidents that place it consistently in the top 3 industries. We must work safer. In order to achieve this, we must educate ourselves, ask questions and never do a task without a full understanding of the risk and hazards associated with it. I trust everybody will join me in this mission of Workers Safety.

Protect yourself, watch out for each other and always before you ever start a task, ask yourself one vital question, **What Can Go Wrong?** You owe it to your co-works, friends, and your employer. But most of all, you owe it to yourself and your family.



Mike Winbow
Instructor



Contents

Disclaimer	2
Company Information	3
Personal Message from The Owner	3
1. Course Description.....	6
1.1 Course Over View	6
1.2 Fall Protection Definitions	7
2. WorkSafe BC Regulations and	9
Legislative Requirements for Fall Protection	9
2.1 All Employees have the following three basic rights in Canada	9
The Right to Know.....	9
The Right to Participate	9
The Right to Refuse Unsafe Work.....	9
2.2 WorkSafe BC Regulations	11
2.3 Minimum Requirements at a glance.....	11
2.3(a) PPE	12
2.4 Specifications for Guards and Guardrails	13
2.5 Fall Protection Equipment Standards	14
3. Hierarchy of Fall Protection.....	15
3.1 Definitions	15
4. Assessing and Controlling Fall Hazards	16
4.1 The Statistics	16
4.2 Identifying and Eliminating a Fall Hazard	19
4.3 Guardrails	20
4.3(a) Guardrail Component Requirements	20
4.4 Floor Covers.....	22
4.5 Control Zones.....	22
4.6 Fall Protection for Roofs.....	23
4.6(a) Flat Roofs	23
4.6(b) Sloped Roofs	23
4.6(c) Steep Roofs.....	23
4.7 Areas of Concern.....	24
5. Watch the video Fall Protection Can Save Your Life.....	24
6. Generic Fall Protection Systems	25
6.1 Harnesses Class	25
6.1(a) Materials	26
6.2 Connecting Devices	26
6.2(a) Vertical Life Lines.....	26
6.2(b) Horizontal Lifelines.....	27
6.2(c) Lanyards	28
Chain Rebar/Positioning Lanyard	29
6.2(d) Shock Absorbers.....	31
6.2(e) Carabiners.....	31
6.2(f) Rope Grabs.....	32
Automatic.....	32
Manual	32
6.2(g) Snap Hooks	32
6.3 Anchors	33

☐ Permanent anchors;.....	33
☐ Anchors with multiple attachment points;	33
☐ Permanent horizontal lifeline systems; and	33
6.3(a) Temporary Anchors.....	33
7. Basic Requirements of An Effective Site-Specific Fall Protection Plan 11.3	35
7.1 Site Specific Fall Protection Plan Form.....	36
8. Integrating A Fall Protection Plan into an Existing OH&S Management System.....	41
9. Active vs. Passive Fall Protection System	41
10. Fall Arrest and Fall (Travel)-Restraint.....	42
10.1 Fall Restraint or Travel Restraint	42
10.2 Fall Arrest	42
11. Calculate Falling Distance and the Proper System	43
11.1 Free Fall	43
11.2 Swing Fall	43
12. Ladder Safety	44
12.1 When setting up ladders, Practice the following	44
12.2 What Should You Not Do.....	45
12.4 Extension Ladders.....	46
12.5 Job Built Ladders.....	47
Steps of Construction.....	47
13. Rescue Procedures – If a Worker Falls.....	48
13.1 Suspension Trauma (from the Canadian Safety Group Inc.)	49
13.2 Trauma Straps	50
13.3 After the Rescue.....	51
14. Personal Fall Protection Equipment Inspection Process	51
14.1 General Equipment Requirements	51
14.2 Harness, Belt and Lanyard Webbing	51
14.3 Buckle Inspection	52
14.4 Rope Inspection.....	52
14.5 Harness / Belt Snaps and “D” Rings.....	52
14.6 Equipment Cleaning	52
14.7 Removal from service.....	53
14.8 Inspection Form, Fall Protection Equipment.....	54
15. Donning a Harness and Suspending off the Ground.....	57
16. Self-Propelled Work Platforms.....	59
16.1 Safety Rules	59
16.2 Scissor Lift Exception.....	59
16.3 Genie Basket Anchor Points	60
16.4 Telehandler Work Platform Man Basket	60
16.5 JLG Basket Anchor Points	61
16.6 Scissor Lift Anchors.....	61
16.7 Control Zones under a AWP work Area	62
16.8 Road and Sidewalk Closers.....	62
16.9 Signage to Alert the Public	62
17. Scaffold.....	63
17.1 Basic of Scaffold Use	63
17.2 Rules for Scaffold Use	63
18. End of Course Video.....	64




1. Course Description

This Fall Protection Course is designed and instructed so as the participants will get an understanding in the legal requirements and full use of a Fall Protection System. This course has been structured to promote and in struct safety in Sector 72 General Construction in the Province of British Columbia Canada. A worker's safety and health in the course of doing their trade task on a job site is the most important aspect of the work environment. The following point forms are a baseline structure of what a student of this course will understand. A successful completion of this course requires at least an 80% on the final exam.

1.1 Course Over View

Persons Successfully Completing This Course Will Be Able To

- 
- ✓ Understand Three Basic Rights of Workers * Practice Directive 1-1-3 for Subcontractors
 - ✓ Know the Legislative Requirements for using Fall Protection
 - ✓ Importance of Guardrails, Covering Holes, Housekeeping, Control Zones
 - ✓ Hierarchy of Fall Protection and Hierarchy of Hazard Controls
 - ✓ Assessing and Controlling Fall Hazards
 - ✓ Generic Fall Protection Systems
 - ✓ Basic Requirements of an Effective Site-Specific Fall Protection Plan
 - ✓ How to Integrating a Fall Protection Program into an Existing Health & Safety Management System
 - ✓ Describe the Difference between an Active & Passive Fall Protection Systems
 - ✓ Describe the Difference between a Fall Arrest and a Fall / Travel Restraint Systems
 - ✓ Clearance Calculations
 - ✓ Safety Harness and Lanyard Inspection Process
 - ✓ How to Fill Out the Required Documents
 - ✓ Ladder Safety Requirements
 - ✓ Scaffold Proper Use
 - ✓ Rescue Requirements and Procedures (Self Rescue and Small Team)
 - ✓ Understand Suspension Trauma
 - ✓ Donning a Harness (To Put on and Wear)
 - ✓ Practical Exercise: Correctly Formulate a Site-Specific Fall Protection Plan and Rescue Procedures (a classroom exercise from a workplace scenario on a building over 25' high)
 - ✓ Practical Exercise: Personal Gear Inspection
 - ✓ Correctly answer a 20 Question Test (Passing Grade is 80%)
 - ✓ Feeling Your Own Body Weight in a Harness While Suspended



1.2 Fall Protection Definitions

Anchor

The secure point of attachment for a lifeline or lanyard. These are either temporary or Permanent. Permanent Anchors must be certified by an engineer.

Anchorage

A secure connection point for a fall protection system

Carabineer

The link with a gate that is normally closed or that automatically closes, and is used to connect components of a personal component system.

Control Zone

The area between an unguarded edge of a building or structure and an obvious line which is set back a minimum of 6'-6" from that leading edge.

Fall Arrest

A system that will prevent a worker from falling to the surface below. This system uses a shock absorber lanyard. This system is a last resort of protection

Fall Protection System

Any of the lists below when used to protect a worker from a fall or minimize the risk of falling:

- a) Guardrails
- b) A safety belt or full body harness with a lanyard an anchor, and their related components, a worker is tethered to a suitable fixed object;
- c) Control zones
- d) Other procedures acceptable to the board.

Fall Restraint * Travel Restraint

A work positioning system to prevent a worker from falling from a work surface, or a travel restriction system such as guardrails or a fall protection system to prevent a worker from traveling to an edge from which a worker could fall.

Full Body Harness

A body support device consisting of connected straps designed to distribute a fall arresting force over at least the thigh, shoulders and pelvis, with provision for attaching a lanyard, lifeline or other components.

Guard

A protective barrier around an opening in a floor or along the open sides of stairs or a ramp, landing, balcony, mezzanine, raised walkway or any other area to prevent a fall to a lower level, or inadvertent entry into a dangerous area

Guardrail

A guard consisting of a top rail 40 in. to 44 in. (102 cm. to 112 cm.) above the work surface, and an intermediate rail located approximately midway between the underside of the top rail and the top of the toe-board, if one is provided, or the work surface if no toe-board is provided.

Horizontal Lifeline

A system composed of a wire rope, installed horizontally between 2 anchors, to which a worker attaches a fall protection system.



Lanyard

A flexible line of webbing, or synthetic wire rope that is used to secure a safety belt or full body harness to a lifeline or anchor.

Lifeline

A synthetic or wire rope, rigged from one or more anchors, to which a worker's lanyard or other part of a fall protection system is attached.

Personal Fall Protection System

An individual worker's fall protection system composed of a safety belt or body harness, and lanyard, lifeline, and any other connecting equipment that is used to secure the worker to an individual anchor or to a horizontal lifeline system.

Reasonable Person

A phrase frequently used in tort and Law to denote a hypothetical **person** in society who exercises average care, skill, and judgment in conduct and who serves as a comparative standard for determining liability.

Rope Grab

A device that travels along a lifeline and will lock onto the lifeline when a sudden change in direction occurs.

Safety Belt

A body support device consisting of a strap with a means of securing it around the waist and attaching it to other components.

Safety Monitor System

A system in which a trained worker is designated to monitor work activities in a control zone to ensure work is done in a manner that minimizes the potential for a worker to fall.

Shock Absorber

A device intended to limit deceleration of a worker during a fall arrest. Usually deployed as part of a lanyard.

Swing Fall Hazard

The hazard to a worker of swinging and colliding with an obstruction following a fall when connected to a lanyard or lifeline that runs at an angle off vertical. (See page 30)

Total Fall Distance

The distance from the point where a worker would begin to fall to the point where the fall would be stopped.



2. WorkSafe BC Regulations and Legislative Requirements for Fall Protection

2.1 All Employees have the following three basic rights in Canada

If are a new and or young worker, and do not feel for any reason comfortable working at heights, doing a specific task at heights, or even being close to an edge of a building or any structure while being tied off, you do have the following rights.

A worker who is not sure of themselves while working at a high position becomes themselves a hazard.

The Right to Know

- All employees have a right to know what hazards are present on the job, and how these hazards can affect them. You usually learn about the hazards during health and safety training sessions and through on-the-job instructions. Learning about chemical safety through WHMIS - the Workplace Hazardous Materials Information System - is also part of the "right to know" system.

The Right to Participate

- All employees have a right to take part in health and safety activities. For example, you can be chosen to be a health and safety representative or a member of a committee. You also have a right to report unsafe practices and conditions without worrying that you will lose your job or be reprimanded (get in trouble).

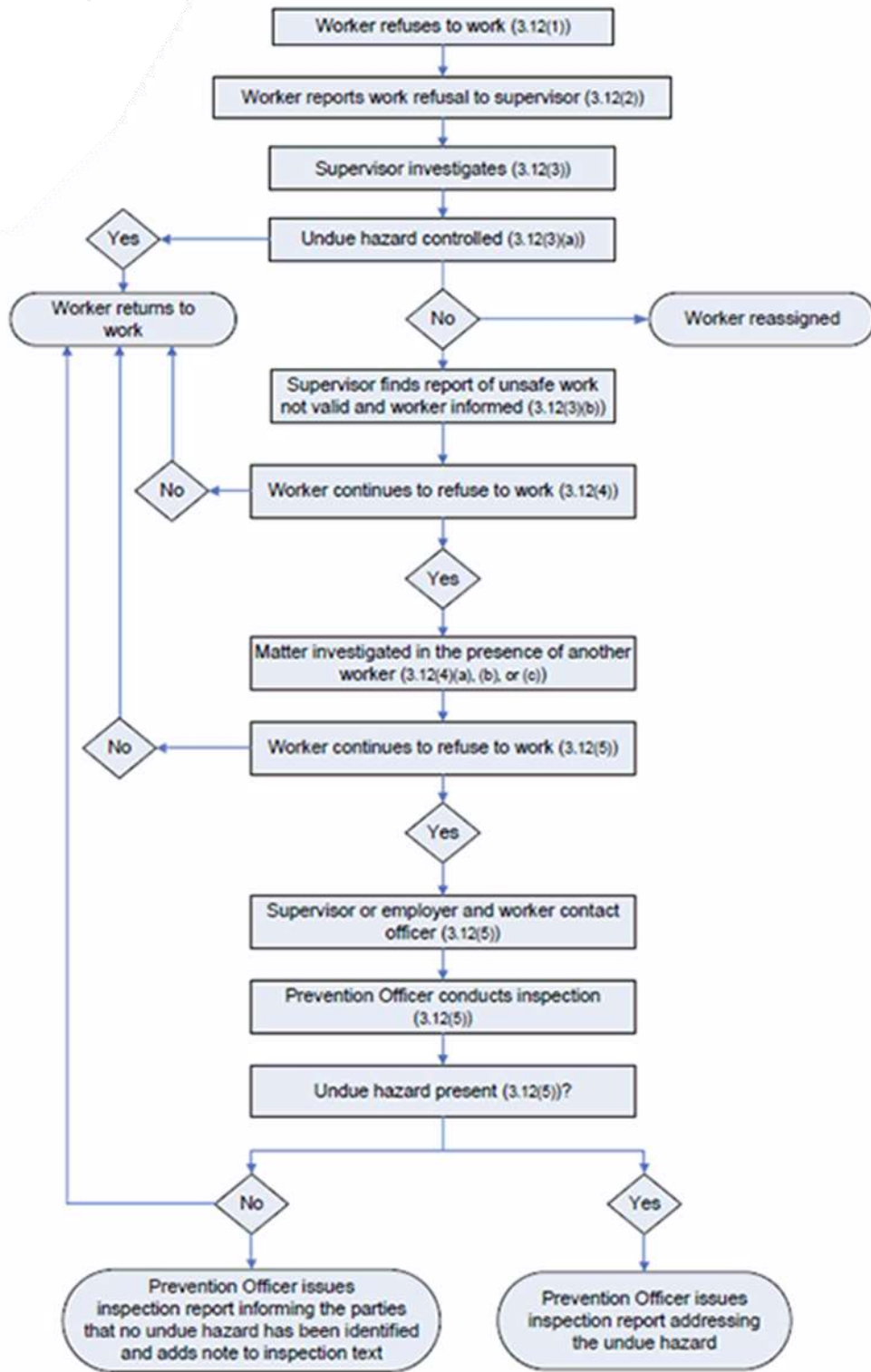
The Right to Refuse Unsafe Work

- **. Workers have not only the Right to Refuse Unsafe Work that they feel will put their lives or the lives of others (workers or the public) in danger, it is their Responsibility to do so.**
- The worker must immediately advise his or her foreman of the motives for this decision.
- The foreman must then evaluate the hazard and must attempt to amend the situation to the satisfaction of the worker and of the employer.
- The worker(s) in question can be assigned other tasks, always in view of the requirements of laws governing the construction industry.
- In the event where a situation can't be rendered safe in the eyes of the worker, then another task will be assigned to that worker. For example, if some worker fears heights, they will not be asked to work in high places whereas the fear could pose a danger to them selves or others.

See flow chart on next page figure 1

Figure 1.

Flowchart for Regulation Guideline 3.12





2.2 WorkSafe BC Regulations

The section that governs Fall Protection in the WorkSafe regulations are found in [Part 11](#) and [4.54-4.62](#).

11.2 Obligation to use fall protection

- (1) Unless elsewhere provided for in this Regulation, an employer must ensure that a fall protection system is used when work is being done at a place
 - (a) from which a fall of **3 m (10 ft)** or more may occur, or
 - (b) where a fall from a height of less than 3 m involves a risk of injury greater than the risk of injury from the impact on a flat surface.

11.3 Fall protection plan

- (1) The employer must have a written fall protection plan for a workplace if
 - (a) work is being done at a location where workers are not protected by permanent, guardrails, and from which a fall of 7.5 m (25 ft) or more may occur

4.55 Guardrail locations

An area accessible to workers must have guards or guardrails installed in any of the following circumstances:

- (a) if a raised floor, open-sided floor, mezzanine, gallery, balcony, work platform, ramp, walkway, or runway is 122 cm (4 ft) or more above the adjacent floor or grade level;
- (b) on both sides of any walkway over or adjacent to any substance which is a hazard if a worker fell in, or on it, or which is over machinery or work areas;
- (c) around the perimeter of any open container or containment area such as an open vat, bin, tank or pit which is 122 cm (4 ft) or more in depth and which has sides that do not extend at least as high as required for a guardrail above the adjacent grade or work surface;
- (d) if a stairway ends in direct proximity to dangerous traffic or other hazard to prevent inadvertent entry into the dangerous area.

2.3 Minimum Requirements at a glance

- Guardrails must be constructed to a minimum standard as illustrated in 4.48 of the regulations, and withstand a load of 550 N (125 lbs.) in any direction. 1 N (newton) = .224809 pounds of force.
- Fall Arrest systems must withstand a minimum of 22 kN (5000 lbs) or 2 times the maximum arrest force.
- Fall or Travel restraint systems must withstand a minimum of 3.5 kN (800 lbs) or 4 times a person's weight
- 0.0044482216 kN = 1 lbs
- a professional engineer must certify permanent anchors, anchors with multiple attachment points, permanent horizontal lifeline systems, and support structures for safety nets.
- After a fall protection system has arrested the fall of a worker, it must be removed from service, and not be returned to service until it has been inspected and recertified as safe for use by the manufacturer or its authorized agent, or by a professional engineer.



2.3(a) PPE

8.2 Responsibility to provide

- (1) A worker is responsible for providing
 - (a) clothing needed for protection against the natural elements,
 - (b) general purpose work gloves and appropriate footwear including safety footwear, and
 - (c) safety headgear.
- (2) An employer is responsible for providing, at no cost to the worker, all other items of personal protective equipment required by this Regulation.
- (3) If the personal protective equipment provided by the employer causes allergenic or other adverse health effects, the employer must provide appropriate alternate equipment or safe measures
- (4) Nothing in this section precludes or alters an existing or future agreement between a worker or workers and an employer to the effect that the employer will be responsible for the provision either at no cost or some cost to the worker, of any or all of the items described in subsection (1).

Note: Part 8 provides requirements for most types of protective clothing and equipment. See [Part 7 on Noise](#) for hearing protection requirements.

We all know the basic PPE that must be worn while on a construction worksite is

- CSA approved work boots with a 6" upper
- High visual vest or shirt
- CSA approved hard hat
- On most sites now, Eye Protection is Mandatory

8.11(4)

Chin straps or other effective means of retention must be used on safety headgear when workers are climbing or working from a height exceeding 3 m (10 ft), or are exposed to high winds or other conditions that may cause loss of the headgear. When in doubt, ask your company or site safety professional and always refer to the WorkSafe BC Regulations, Guidelines, Standards, and policies

You can always call FreeBird Safety Services as well.



2.4 Specifications for Guards and Guardrails

4.58

- (1) Guards in a building must be appropriate for the use and occupancy of the area.
- (2) Guards in areas not part of a building must meet the applicable criteria of subsections (3) to (5), or other standard acceptable to the Board.
- (3) Unless otherwise permitted by subsections (4) and (4.1), guardrails must be installed to withstand a load applied horizontally and normal to the span of the rail, of 550 N (125 lbs) applied at any point along the rail, and a vertical, downward load of 1.5 kN per m (100 lbs per ft) along the top rail, but the horizontal and vertical loads need not be considered to act simultaneously.
- (4) Guardrails temporarily installed during the construction, demolition, maintenance or renovation of a work area must be able to withstand a load of 550 N (125 lbs.) applied perpendicular to the span in a horizontal or vertically downward direction at any point on the top rail, or be built to the criteria of subsection (5).
- (4.1) If part or all of the top rail or a midrail of a guardrail that is temporarily installed during the construction, demolition, maintenance or renovation of a work area is made of fiber rope, wire rope, chain or other non-rigid material, that part of the guardrail must meet the requirements of WorkSafe BC Standard — Guardrails using rope or other non-rigid material, as set out in Schedule 4–A to this Part.
- (5) Unless designed by a professional engineer, temporary wooden guardrails on floors and platforms must meet the following criteria:
 - (a) posts must be spaced not more than 2.4 m (8 ft) apart, except a scaffold may have posts spaced not more than 3 m (10 ft) apart;
 - (b) wooden top rails must be at least 38 mm x 89 mm (2" x 4" in nominal) lumber for a span of up to 2.4 m between supports, and at least 38 mm x 140 mm (2 in x 6 in nominal) lumber for a span of 2.4 m to 3 m between supports;
 - (c) wooden midrails must be 19 mm x 140 mm (1 in x 6 in nominal) or 38 mm x 89 mm (2 in x 4 in nominal) lumber;
 - (d) wooden rails must be secured to the tops or inner sides of their vertical supports;
 - (e) wooden guardrail posts must be at least 38 mm x 89 mm (2 in x 4 in nominal) lumber, and must be installed with the narrow dimension facing the open edge;
 - (f) plastic or wire mesh fencing of adequate strength may be used in place of the midrail, but posts and top rails must comply with the requirements of this section and such fencing must be secured in place.

2.5 Fall Protection Equipment Standards

Standard Agency	Standard Number	Standard Title
ANSI	A10.11	Construction and Demolition Operations - Personnel and Debris Nets
ANSI	A14.3	American National Standard for Ladders - Fixed - Safety Requirements
ANSI	Z359.0	Definitions for Fall Protection and Arrest
ANSI	Z359.1	Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ANSI	Z359.2	Minimum Requirements for a Comprehensive Managed Fall Protection Program
ANSI	Z359.3	Safety Requirements for Positioning and Travel Restraint Systems
ANSI	Z359.4	Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ANSI	Z359.6	Specifications and Design Requirements for Active Fall Protection Systems
ANSI	Z359.12	Connecting Components for Personal Fall Arrest Systems
ANSI	Z359.13	Personal Energy Absorbers and Energy Absorbing Lanyards
ANSI	Z359.14	Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
CSA	CAN/CSA-Z259.10	Full Body Harnesses
CSA	CAN/CSA-Z259.11	Shock Absorbers for Personal Fall Arrest Systems
CSA	CAN/CSA-Z259.1	Safety Belts and Lanyards*
CSA	Z259.2.1	Fall Arresters, Vertical Lifelines, and Rails
CSA	Z259.2.2	Self-Retracting Devices for Personal Fall-Arrest Systems
CSA	Z259.2.3	Descent Control Devices
CSA	Z259.2.5	Fall Arresters and Vertical Lifelines
CSA	Z259.12	Connecting Components for Personal Fall Arrest Systems (PFAS)
CSA	Z259.15	Anchorage Connectors
CSA	Z259.16	Design of Active Fall-Protection Systems

3. Hierarchy of Fall Protection



Figure 2

3.1 Definitions

GUARDRAILS

Where fall hazards cannot be eliminated, permanent or temporary guardrails or handrails form a protective barrier around an opening or edge to prevent a fall to a lower level.

FALL RESTRAINT

After eliminating fall hazards and installing guardrails, a fall restraint system is the next level in the fall protection hierarchy. Fall restraint systems prevent you from falling through either travel restriction or work positioning. With travel restriction, workers are attached to a fixed-length line that prevents them from travelling to close to an opening or edge.

FALL ARREST

When it's not possible or practical to use a fall restraint system, the next line of protection is fall arrest. A fall arrest system (including a lanyard or lifeline, a harness, and, most importantly, an anchor) protects you after a fall by stopping you from hitting the surface below.

OTHER PROCEDURES

If guardrails, fall restraint, or fall arrest are not practicable, or will result in greater risk of injury, contact the [Prevention Information Line](#) at (604) 276-3100 to discuss alternative safe work procedures that are acceptable to WorkSafe BC.

[WorkSafe BC Regulations 11.2](#)

4. Assessing and Controlling Fall Hazards

We have all used the phrase “it’s not the fall but the sudden stop that kills you”. No truer words were ever spoken when it comes to the hazards that can cause a fall. Newtons law of gravity states an object in free fall in a vacuum will accelerate at **approximately 9.8 m/s²**, independent of its mass. With air resistance acting on an object that has been dropped, the object will eventually reach a terminal velocity, which is **around 53 m/s (195 km/h or 122 mph)**.

It is imperative that before a task at heights, we assess the task, recognize the hazards and then derive a plan to eliminate or at least control them. Field Level Hazard Assessment **Hand Out**

4.1 The Statistics

In Canada during the year 2015, 61 workers died from falls.

In one case, a construction project manager was sentenced to 3½ years in prison for his role in a fatal accident at a Toronto apartment building that left four workers dead on Christmas Eve 2009 due to falling 13 stories.

In BC.

Year	Trade	Age	Mechanism of Fatality
2015	Laborer	29	Worker fell down a high-rise parcade ventilation shaft
2015	Carpenter	56	Worker fell from the side of a large dumpster
2015	Soffit installer	71	Worker succumbed to pneumonia after slipping and falling from a roof.
2015	Sprayer	45	Worker fell off a scissor lift while cleaning up overspray on insulation
2015	Painter	52	While painting, worker fell from scaffolding.
2013	Plasterer	63	Worker took own life due to complications from a previous fall injury.
2014	Powerline technician	45	Worker fell 75 feet from a crane-supported work platform. Crane boom inadvertently moved causing platform to swing and worker to fall.
2015	Construction worker	54	Worker fell from a balcony deck onto a driveway
	Roofer helper	55	Worker succumbed to complications of paraplegia after slipping and falling from a roof.
2015	Iron Worker	66	Worker succumbed to pulmonary embolism after sustaining a spinal injury from a fall from scaffolding
2016	Construction worker	64	Succumbed to complications of paraplegia as a result of a fall
2016	Pipeline foreman	67	Succumbed to complications of quadriplegia as a result of a fall
2016	Painter	25	Fell from awning (Victoria BC)
2016	Carpenter	58	Fell from storage rack
2016	Roofer	55	Fell from roof
2016	Iron Worker	62	Fell approximately 7 meters.

From the BCCSA

In 2012, WorkSafe BC initiated a six-week targeted enforcement blitz to address fall-protection violations in residential construction and roofing worksites. WorkSafe BC officers issued 1,356 orders and imposed 23 penalties to residential construction employers as a result of these inspections.

Figure 3

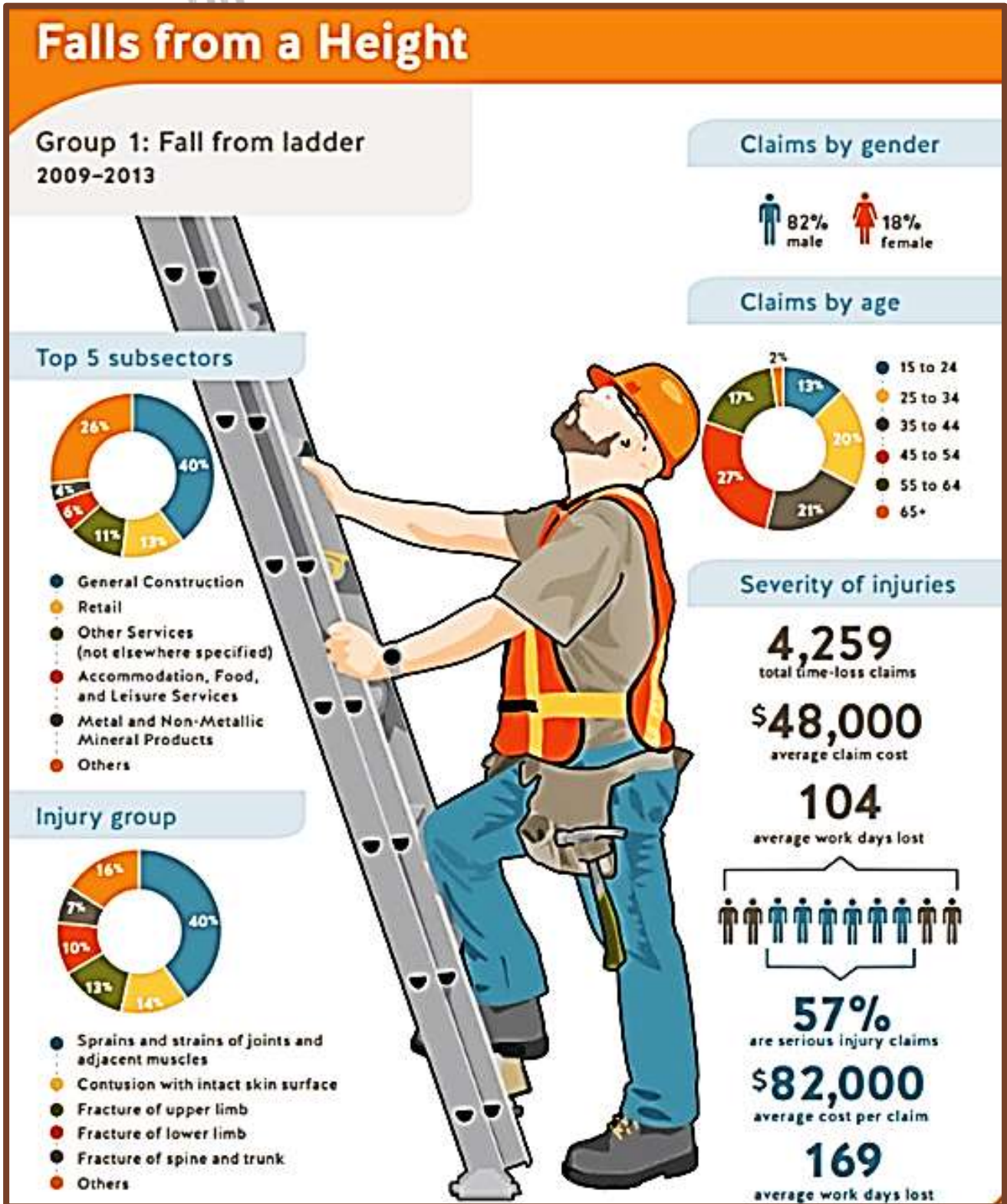


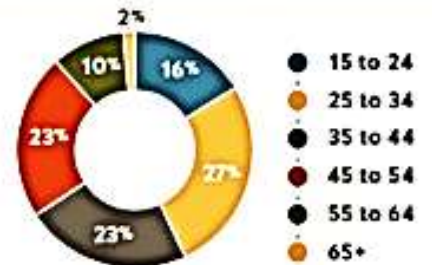
Figure 4

Group 4: Fall from roof/scaffolding 2009-2013

Claims by gender



Claims by age



Severity of injuries

1,902

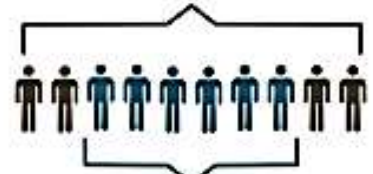
total time-loss claims

\$71,000

average claim cost

126

average work days lost

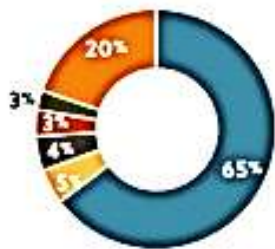


\$119,000
average cost per claim

207

average work days lost

Top 5 subsectors



- General Construction
- Other Services (not elsewhere specified)
- Metal and Non-Metallic Mineral Products
- Wood and Paper Products
- Retail
- Others

Injury group



- Sprains and strains of joints and adjacent muscles
- Fracture of lower limb
- Contusion with intact skin surface
- Fracture of spine and trunk
- Fracture of upper limb
- Others



4.2 Identifying and Eliminating a Fall Hazard

A Fall Hazard is anything in the workplace that could cause an unintended loss of balance or bodily support, and position, resulting in a fall. Fall Hazards cause accidents and injuries, some even result in the death of workers. A person can fall 16 feet in 1 second

Some of these hazards are as follows.

- Using scaffold walking surfaces less than 20 inches wide or gaps between decks
- Not covering holes in surfaces
- Not using guardrails or flawed installation
- A lack of training and pre-job preparation
- Tripping over materials, tools and debris
- Lack of illumination
- Unstable ladders and scaffold
- Working over machinery, water, heights of 10 feet or more
- Working over a jagged surface, rebar, debris or on wet slippery surfaces
- Not correctly using fall protection devices and PPE
- Regarding Productivity over Safety

These are just a few hazards. You have to do your best to eliminate the hazards before you start your task. You have several ways of eliminating the hazards.

- Take a Fall Protection training course
- Conduct a Job Hazard Assessment
- Fill out a Site-Specific Fall Protection Plan
- Know the rescue procedures and make sure others do as well.
- Pre-task tail gate meetings
- Install guardrails or red danger tape areas with signage.
- Cover holes and correct painted identification symbol.
- Use the proper harness and connections for you and the location
- Always use proper decks for scaffold
- Never use a defective or unstable ladder
- Never assume, if you don't know ask

4.3 Guardrails

A guardrail is a permanent or portable structural system consisting of a top rail, a middle rail, and a toe board secured to vertical posts intended to stop a worker from inadvertently stepping off a raised working level and falling to a level below.

Establishing a guardrail system should always be the first choice when protecting workers from a fall. This is part of the “Engineering” criteria in the Hierarchy of Hazard Controls. Companies should ensure that this is kept as their priority. Only if this system is impracticable, will another choice for fall protection be used. A temporary guardrail system must be used at edges where the dumping of refuse into a bin below takes place and the manual hoisting of materials from heights



4.3(a) Guardrail Component Requirements

With guardrails being quite a simple process, there are only a few requirements that need to be kept in mind. Most of the requirements pertain to the components themselves. The other important requirements are in the event of temporary removal.

1. Guardrails shall be installed on raised floors, work platforms, ramps, walkways, when these are a minimum of 4 feet or more above a grade level or another floor surface.
2. All walkways shall have guardrails where a walkway exists near hazards if a worker fell in, or on, or any areas where a worker may pass over machinery or other work areas.
3. Guardrails shall be installed around any open container, open vat, tank or pit where a fall of 4-10 feet or more could take place.
4. In ‘High-Rise’ construction, a ready-made cattle guard is one of the best types of guardrail systems to use, or a 42-inch-high by 8 feet long, 2x4 constructed frame with snow fencing covering it can be use. The 2x4 type must also have a middle rail at 21 inches as well. Always install these on the inside of a main concrete support column or screw jack fasted in place. Secure with heavy duty zap-straps or wire. Theses must be installed no closer to the edge then 6.5 feet and must be clearly marked with signs stating, **“Fall Protection Must Be Warn Past This Point”**
5. If any worker is working in an area where they may be elevated from the work surface, a guardrail shall be added, or another fall protection system will be used.
6. Guardrails shall be installed at area where required and will be able to withstand a maximum of 125 lb. force when applied from any direction.


- 
7. Wire rope or fibre rope shall not be used as a guardrail system unless prior permission from the board has been given.
 8. Guardrail vertical support posts shall not be placed more than 8'. Scaffolding vertical supports must not exceed a maximum 10'
 9. If the horizontal materials used on a guardrail are of wood materials, the top rail must be a minimum of 2 x 4 inches in measurement for a maximum of an 8-foot span. If the span is greater than 8 feet to a maximum of 10 feet, the minimum size of the material must be no less than 2 x 6 inches. However, if 2 x 4s are all you have then a top plate must be added, 3 ¼ nails to fasten down every 12 inches, or 3-inch screws every 12 inches.
 10. The top rail of a temporary guardrail must be no less than a minimum of 40 inches above a work surface and must not exceed 44 inches above the work surface.
 11. The mid-rail must be no less than 2 x 4-inch materials as well when used with an 8-foot span, and when exceeding that length to a maximum of 10 feet, 2 x 6 material must be used. If that isn't available a top plate must be added here as well following the same details. As in #8, the top plate prevents bowing and loosening of the fasteners used to secure the rails to the post.
 12. Horizontal rails on a guardrail must be secured to the top of the vertical supports or the inner side (working side) of the supports. Never install on the out side of the vertical posts. Pushing against a post is always stronger and more secure then the pull strength of a fastener.
 13. Vertical supports on a wooden guardrail system must be of a minimum 2" x 4" material and the narrow dimension facing the open edge.
 14. "Snow Fence" or mesh may be used in place of a mid-rail only provided that it has been adequately secured and does not replace the top or toe-board rails. This system is widely used for the outer edge in high-rise construction.
 15. Toe-boards must be used if there is a danger of any tools or materials falling off the work surface or a danger of slipping off the work surface due to the environment or the work practices being performed.
 16. For a base, a Safety Boot can be used as illustrated below. All installation instructions come with the unit and must be followed to the letter.



Figure 5



Figure 6

4.4 Floor Covers

If there is an opening or hole in a floor, the simplest way to protect workers from a fall is to cover over it with the appropriate dimension of plywood. For openings, no larger than 36 in (91.5 cm) x 36 in (91.5) a piece of 5/8 plywood secured down will suffice. Mark on the top of the plywood in safety orange paint a circle with an “X” over it.

Any larger of an opening and thicker plywood or a sub structure might need to be constructed, or put up a guardrail.

4.5 Control Zones

Control Zones and Safety Monitors: If any of the Fall Protection System are not feasible, a Control zones and safety monitor may be established. The closest distance from a leading edge of a 3 m (10 ft.) fall, workers may be no closer than 2 meters (6.5 feet). If there is a higher risk of fall due to a sloop, wet surface, the task to be performed or other conditions, the distance should be increased. The zone me be marked with delineators and “RED” danger tape.

Safety monitors Be experienced in the work overseen and trained in the role of safety monitor, be present at all times when a worker is in the control zone, have complete authority over the work as it relates to the prevention of falls, engage in no other duties while acting as the safety monitor, be positioned to have a clear and continuous view of the work, be able to have normal voice communication with the workers being protected, monitor no more than eight workers at a time and be instantly distinguishable from other workers.

4.6 Fall Protection for Roofs

4.6(a) Flat Roofs

The following choices of fall protection should be known and used by all workers for roofs. These choices are to be used strictly for flat roof only (4:12 horizontal or less) with other types of roof requirements set out in the other categories of this section of the program.

Primary choice – Guardrails. This should be the first choice as outlined in the earlier portion under “Determining a Fall Protection System”. Guardrails must be a minimum of 42” in height. Parapet walls may be used as a type of guardrail system but the height must be no less than 40”.

2nd Choice – Fall restraint. Being unable to travel over the edge of the working surface with a fall restraint system is the next best thing to guardrails, provided the anchor system is capable of providing a load capacity of no less than 800 lbs. in any direction.

3rd Choice – Fall arrest. This system will allow you to have slack in your lifeline and enable work to be done without tension on a worker during the work activities. In the event of a fall, the worker will be protected from hitting obstructions below or the ground. Anchors must withstand 5000 lbs.

Last Choice – Control zone with Safety monitor. This system is only used when any of the above systems are impracticable. Three examples of this would be:

1. Hot tar roofing;
2. There are no anchor points for travel restraint or fall arrest;
3. It would cause a greater risk to use fall restraint or fall arrest.

4.6(b) Sloped Roofs

When working on roofs that are classified as sloped roofs (over 4:12 horizontal but less than 8:12), workers should use one of the following fall protection systems are used with the first one noted taking priority.

1. Guardrails
2. Personal Fall Restraint System
3. Personal Fall Arrest System

Note: When workers are working on a sloped roof, they are much better to be in a fall restraint situation rather than a fall arrest situation.

4.6(c) Steep Roofs

When working on roofs with the classification of slope roof (8:12 pitch or greater), a worker will only use a personal fall protection system and Travel Restraint is preferred. If the materials being applied allow, 2x6 inch roof brackets must be installed and used for better footing. Strapping on the roof may be used provided the strapping provides adequate foot grip.



4.7 Areas of Concern

Hoist Areas

Workers in a hoist area shall be protected from falling six feet (1.8 meters) or more. This protection shall be a guardrail system or personal fall arrest system. Parts of a guardrail system (or chain gate or guardrail) may be removed to ease hoisting operations. Workers must have personal fall arrest systems if they must lean through the access opening or out over the edge of the access opening (to receive or guide equipment and materials, for example).

Overhand Bricklaying

Except as otherwise provided in OSHA Fall Protection Standards, each employee performing overhand bricklaying and related work six feet (1.8 m) or more above lower levels shall be protected from falling. This protection shall be by guardrail systems, safety net systems, personal fall arrest systems, or the employee shall work in a controlled access zone.

Roofing, Scaffolds, and Steel Erection

Steel workers, roofers, and those who work on scaffolds are at the most risk of experiencing a fatal fall. It is essential that these workers are trained on fall hazards, fall prevention techniques, and the use of fall protection.

Portable Ladder Accidents

Portable ladders are a common cause of falls in the workplace. Improperly used or placed ladders can slip from their supports. Unsteady ladders can cause you to lose your balance. Rungs that are weak or slippery can also cause falls. Workers should be trained on the use of ladders to avoid these kinds of accidents.

Protection from Falling Objects

When workers are exposed to falling objects, the employer must have workers wear hardhats and implement one of the following measures:

Erect toe-boards, screens, or guardrail systems to keep objects from falling from higher levels.

OR

Erect a canopy structure and keep potential falling objects far enough from the edge so that they will not go over the edge if they are accidentally moved.

OR

Barricade the area to which objects could fall. Keep employees from entering the barricaded area. Keep potential falling objects far enough away from the edge of a higher level so that they will not go over the edge if they are accidentally moved.

5. Watch the video Fall Protection Can Save Your Life

6. Generic Fall Protection Systems

A Generic Fall Protection Systems consists of 3 major components. A harness, connecting devices and an anchor. It works like a chain. If one of these links fails the whole system fails. The system must be appropriate for the location, task at hand and the person using the system.

11.5 Equipment standards

Equipment used for a fall protection system must

- (a) consist of compatible and suitable components,
- (b) be sufficient to support the fall restraint or arrest forces, and
- (c) meet, and be used in accordance with, an applicable CSA or ANSI standard in effect when the equipment was manufactured, subject to any modification or upgrading considered necessary by the Board.

6.1 Harnesses Class

There are a multitude of manufacturers of fall protection harnesses yet only a few classifications. The Canadian Standards Association (CSA) regulates the classifications for full body harnesses. A harness can have more than one classification; however, all full body harnesses must meet the requirements for class A Fall Arrest. CAN/CSA-Z259.10



Class A Fall Arrest

Class A harnesses are designed to protect workers when they are ten feet or more above the ground. They support the body during and after a fall. Dorsal (back) D-rings are used for fall protection. They slide on impact, keeping the worker in an upright position.



Class D Suspension and Controlled Descent

Class D harnesses are used to support and hold a worker while being raised and lowered. There is one sternal (front) D-ring and one dorsal (back) D-ring. The sternal D-ring is used for attachment to a descent device.



Class E Limited Access

Class E harnesses are designed to raise or lower a worker through a confined area. Shoulder D-rings serve as anchorage points for attaching an extraction yoke or other rescue device. The D-rings slide on the shoulder strap for optimal positioning of the worker.



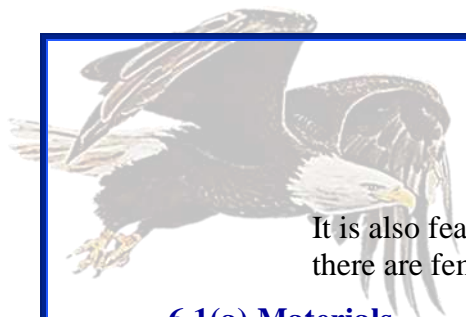
Class L Ladder Climbing

Class L harnesses are designed for use with a certified fall arrester that travels on a vertical lifeline or a rail. Sternal (front) D-rings are used for attachment to the vertical system.



Class P Work Positioning

Class P harnesses will hold and sustain a worker at a specific location, allowing full use of the hands, while limiting any free fall to two feet or less. Side D-rings at waist level are used for positioning and restraint. Safety belts are in this class.



It is also feasible to have classifications styles combined due to added D-Rings and there are female versions as well with different positioning of frontal straps.

6.1(a) Materials

Harnesses are constructed from synthetic webbing because of its superior strength and consistency.

- Nylon (Polyamide) is a strong and cost-effective material suited to most fall arrest applications. It has good strength to weight ratio, good abrasion resistance and is unaffected by alkalis.
- Polyester has superior strength and chemical resistance when compared to nylon.
- Kevlar® has similar strength properties to polyester with added resistance to heat, flame and sparks.
- Maximum Visibility has five rows of reflective material on both sides of the blaze orange polyester webbing.

6.2 Connecting Devices

6.2(a) Vertical Life Lines

WorkSafe BC Guidelines 115-3

1. Vertical lifelines shall meet the requirements of CSA Standard Z259.2.5 (Fall Arresting Devices, Personnel Lowering Devices, and Lifelines.) Any other lifeline material shall be one acceptable to the board first.
2. A vertical lifeline will have a breaking strength of no less than 5000 lbs.
3. If a vertical lifeline has a knot in it, the knot must (a) be at the end only, (b) not reduce the breaking strength of the lifeline below 5000 lbs.
4. Wire rope may be used for a vertical lifeline unless a hazard of contact with energized electrical is present.
5. Vertical lifelines must be protected from abrasion from corners or other sharp edges at points of attachment.
6. When tools are used that could sever, or damage the lifeline in any manner, a wire rope line must be used.
7. All vertical lifelines must extend to a minimum of 4'-0" from the ground or other safe surface.
8. No vertical lifeline must exceed a maximum length of 300 feet unless authorized by the Board.
9. When using a vertical lifeline system with a non-shock absorbing lanyard, the fall of a worker to the point of where fall arrest takes place, shall not exceed a distance of 4'-0".
10. When a shock absorbing lanyard is used as part of the fall protection system, the fall distance to the point of fall arrest shall not exceed a distance of 6'-6".
11. Vertical lifelines will be used in such a manner that minimizes any swing fall hazard.
12. Only one lifeline may be attached to a single anchor point at any given time.
13. Only one worker may be attached to a vertical lifeline at any time. Two workers must not use the same vertical lifeline or anchor point.

Figure 7



Figure 8



Figure 9



6.2(b) Horizontal Lifelines

1. The horizontal lifeline must be made only of wire rope with a minimum diameter of 12 mm (½ inch).
2. The breaking strength of the lifeline must be a minimum of at least 89 kN (20,000 lbs).
3. No splices may be present anywhere in a horizontal lifeline except at the ends.
4. All hardware used in the connection of the lifeline (i.e., shackles, turnbuckles, etc.) shall have a load capacity of 71 kN (16,000 lbs).
5. The span of a horizontal lifeline shall be a minimum of twenty (20) feet, but will not exceed a length of sixty (60) feet maximum. If for some reason there is a need to have a horizontal lifeline in excess of sixty (60) feet, a support in between must be designed and meet the specifications of an end anchor set out below.
7. End anchor of the horizontal lifeline shall have a load capacity of no less than 16,000 lbs.
8. The unloaded sag in a horizontal lifeline must be as follows: the overall length divided by 60.
9. The elevation of a horizontal lifeline must be a minimum of 39" above the working surface.
10. The free fall distance must be maximum 4'-0".
11. A minimum of twelve (12) feet of unobstructed clearance will be available below the work surface.
12. A maximum of three (3) workers may be connected to a horizontal lifeline at any given time.
13. The horizontal lifeline shall not impede the activities of the workers and must be designed and set up so as to avoid this problem.



Figure 11



Figure 10

6.2(c) Lanyards

Lanyards come in three (3) common materials:

1. Webbed type lanyards;
2. Synthetic rope and
3. Wire rope.

Lanyards also come designed in three (3) types:

1. Straight lanyards;
2. Lanyard with shock absorber;
3. Retractable lanyards.

Anytime workers are working with tools that could sever, burn or cause any other damage to the lanyard, a wire rope lanyard must be used with the personal fall protection system unless the worker is working near an energized electrical conductor. In this case two non-conductive lanyards must be used at one time or another form of a fall protection system chosen.

All snap hooks on a lanyard must be of a self-locking type and be in good maintenance. Always inspect the lanyard daily along with all your personal fall protection.

A shock absorber is to be used with:

- A lanyard made of wire rope or other inelastic material in a fall arrest system
- A wire rope vertical lifeline unless the lifeline is part of a ladder safety device

When a shock absorber is used in a fall arrest system, allowance should be made for the potential increase in the total fall distance. If a shock absorber is used, a free fall of up to 2 meters (6.5 feet) is allowed, or the limit specified in the manufacturer's instructions, whichever is less.

If a synthetic fiber lanyard is used without a shock absorber, the fall arrest system should be arranged to limit the free fall of a worker to 1.2 meters (4 feet)

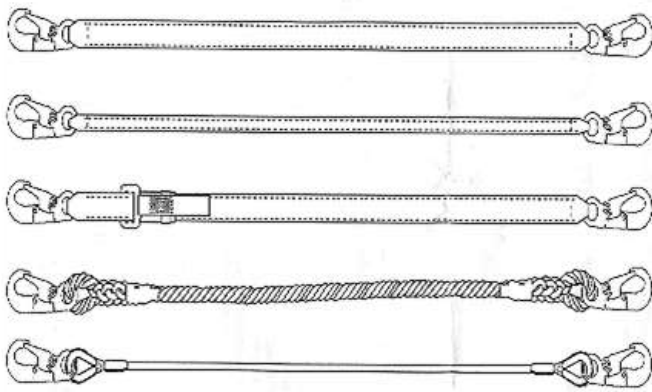


Figure 12



Figure 13

Never choke off a lanyard like this to act as an anchor as well. Either the gate on the snap hook can be overloaded, or since the lanyard strength can be reduced greatly when you choke, the lanyard itself can fail. To allow this a special lanyard that's made thicker with a 500-lb. snap hook



Figure 14

Chain Rebar/Positioning Lanyard

These are used for hands free positioning on a vertical rebar grid so the installers (rod busters) can tie the rebar together. These are mostly chain yet some are a web design. Standard lengths are from 45 cm (18 inches) to 60 cm (24 inches).

Restraint lanyards are one solid piece, no shock absorber. and can come in various lengths from .6 M (ft.) up to 1.8 M (ft.).

Figure 15



Some have dual legs for 100% tie off.



Figure 16

And some are even made of rope



Figure 17



Retractable lanyards are one of the best lanyards for freedom of mobility without the hazard of lifelines getting tangled and or creating a tripping hazard. In some cases, if the manufacturers have specified, some retractable like the miller scorpion can be inverted.

Figure 18

Types of tool lanyards. These prevent your tools from falling on anybody below.



Figure 19



6.2(d) Shock Absorbers

Figure 20

No fall arrest system may be used unless a shock absorber is used in the lanyard component.

Shock absorbers must meet the requirements of CSA Standard CSA-Z259.11 Shock Absorbers for Personal Fall Arrest Systems, or other standards acceptable to the Board.

An allowance must be made for the use of a shock absorber on a fall protection system. That allowance must be based on the maximum fall of 6-foot 6 inch to the point of arrest.

If a fall occurs, the shock absorber (a section of lanyard folded over, stitched together and encased in plastic, or stitched up and squished into a hollow section of the lanyard) will unravel and deploy. This action slows the descending workers velocity to the lanyard finally reaches slack end.

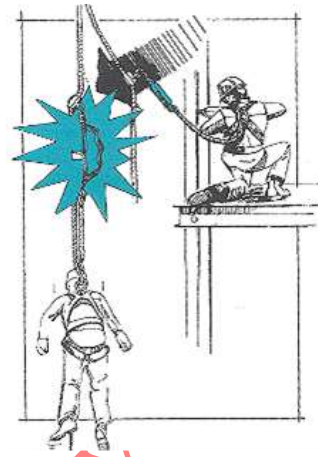


Figure 21



6.2(e) Carabiners

Carabiners will be designed with self-closing latches to prevent inadvertent opening during work activities. Carabiners shall have a load capacity of no less than 5000 lbs. and must have this load capacity clearly identified on the carabiner along with the manufacturer's identification

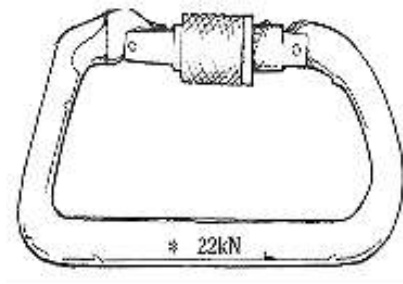


Figure 22

6.2(f) Rope Grabs

There are two types of mechanical rope grabs: automatic and manual. There are only a few things to remember when using a rope grab. These are:

1. Always inspect the rope grab before use. Check for deformities and excessive wear.
2. Test the rope grab to ensure it is functioning properly.
3. Rope grabs must meet CSA Standard Z259.2.1 or other standards acceptable to the Board.
4. Make sure the rope grab is suitable for the diameter of rope you are using and your weight class! As well, Do Not put it on the rope backwards!

Automatic

The automatic (or mobile) rope grab moves along the lifeline with you. If there is a fall, it will automatically lock and stop you after a short distance. If an automatic rope grab is used it is advisable to use a shorter lanyard.



Figure 23

Manual

This is the best type for use with a fall restraint system. It does not move freely as you move and is always in the lock position. If you need to move it, this must be done by hand.



Figure 24

6.2(g) Snap Hooks

Snap Hooks are what we use at the end of our lanyard for a connection point to lifelines or anchors. The smaller hook is for straps or rings. The larger one is a scaffold hook and the third is a Peri Form Hook. This is a special hook for clipping into Concrete steel forms.



6.3 Anchors

Only one worker is allowed to tie off to a single anchor point at any time. If an anchor has been designed to support more than one worker, it must be certified to do so by a certified professional engineer with documentation of this readily available at the site where this system is being used.

If a worker is using a temporary plate-anchor, this device must be removed on completion of the work for which the temporary anchor was intended. When using a temporary anchor in a fall restraint system, it must have a minimum load capacity of no less than 800 lbs. in any direction the load may be applied.

The following types of equipment and systems, and their installation, must be certified by a professional engineer:

- Permanent anchors;
- Anchors with multiple attachment points;
- Permanent horizontal lifeline systems; and
- Support structures for safety nets

If a permanent anchor is used, the anchor must have a minimum load capacity of no less than 5000 lbs. and also must be certified by a professional engineer

6.3(a) Temporary Anchors

Condor temporary concrete anchors are quick and easy to use. A hole is drilled into cured concrete, the anchor is inserted, and the force of it pull upwards wedges the device solid in place. Capacity of 310 lbs, Tensile strength of 5000 lbs Ring dia. Of 1 ½ inches (specs may vary with different types and brands) always read the manufactures instructions and follow PPE procedures when drilling into concrete



Figure 25



I-beam anchors are widely used by the Iron Workers and Erectors. By sliding the jaws around the top plate of an I-beam a worker can move across the beam without much limitations. Capacity of 410 lbs Tensile and a capacity of 5000 lbs. (specs may vary with different types and brands) Always read the manufactures instructions

Figure 26

Winged roof anchors straddle over the ridge and screws hold the plate in place on the sheeting of a roof. Steel plates rated at a minimum of 5000 lbs tensile strength and a capacity of 425 lbs. The weak link in this system is the pull strength of the screws and wood sheeting. Always read the manufacturer's instructions. (specs may vary with different types and brands)



Figure 27

Figure 28



Straps are one of the least expensive ways to anchor yourself. Light and easy to use, but they do have limitations. If any stress is placed upon them, they must be decommissioned. Do not use on a rough surface with a potential to cut. Do not nail through them or use a marker on them. Rated at 5000 lbs tensile and 425 lbs. capacity.

Some useful information from the standards is reproduced in the WorkSafe BC guideline and copied here. The entire standard should be consulted for complete requirements. The standards specify that the manufacturer's instructions are to be followed, or, in the case of an engineered system, the engineer's instructions for the removal from service of fall protection anchors.

Both CSA Z259.15 and Z259.16 require that anchorage systems be provided with instructions for inspection, maintenance, and retirement of the system and all of its components and that employers follow the recommended frequencies and procedures for inspection and maintenance. In addition, there are specified criteria for removal of an anchorage connector from service if it has deformed from its original installed configuration. CSA also specifies that an anchor is not to be altered, relocated, or modified with additional anchorage connectors.

ANSI Z359.2 specifies inspections by an authorized person prior to use and at least annually by a qualified or competent person in accordance with the manufacturer's or a qualified person's instructions. In addition, this standard recommends recertification of anchorage systems at regular intervals. The design, type, location, size of structural members, the type of anchorage connector, and the environment and weather conditions dictate how often such an anchorage system should be inspected and re-certified.

ANSI Z359.2 specifies that a fall protection anchorage system is to be removed from service when any inspection reveals that it may no longer serve the required function, that it may be unsafe due to damage or wear, or if the required inspection interval has been exceeded.



7. Basic Requirements of An Effective Site-Specific Fall Protection Plan 11.3

- (1) The employer must have a written fall protection plan for a workplace if
 - a) work is being done at a location where workers are not protected by permanent guardrails, and from which a fall of 7.5 m (25 ft) or more may occur
- (2) The fall protection plan must be available at the workplace before work with a risk of falling begins.

WorkSafe BC list the Elements of a written fall protection plan as follows

- The fall hazards expected in each work area
- The fall protection system or systems to be used in each area
- The procedures to assemble, maintain, inspect, use, and disassemble the fall protection system or systems
- The inspection requirements for the anchors and anchorage used and the respective rejection criteria (refer to OHS Guideline [G11.10\(0.1\) Fall protection anchors - Inspection and removal from service](#))
- The procedures for rescue of a worker who has fallen and is suspended by a personal fall protection system or safety net, but is unable to self-rescue

In certain locations and situations, the employer may meet the need for rescue procedures by participating in the Industrial High Angle Rope Rescue Program discussed in OHS Guideline G4.13(3)(a) Industrial high angle rope rescue program.

Where a fall protection plan may not be required by the Regulation, the employer must still consider the need for rescue or evacuation under section 4.13.

Here is another structured Site-Specific Fall Protection Plan documentation form

This plan consists of 12 sections. (see figure 29 for an example)

1. General Information
2. Heights, Distance and System
3. Identify all fall hazards associated with this task
4. Safety In place
5. Fall Protection Equipment/System to Be Used
6. Ladder Usage
7. Scope of Work (SOW)
8. Procedure(S) For Special Assembly, Maintenance, Inspection, Use and Disassembly of The Fall Protection System(S)
9. User instructions of the fall protection system(s)
10. Rescues procedures for the rescue of a fallen worker (this could be a separate document but must be attached)
11. Sketch of the Job Site
12. Individuals in The Work Area

7.1 Site Specific Fall Protection Plan Form

Figure 29

11.3 Fall protection plan

- (1) The employer must have a written fall protection plan for a workplace if
 - (a) work is being done at a location where workers are not protected by permanent guardrails, and from which a fall of 7.5 m (25 ft.) or more may occur, or
 - (b) 11.2 (5) If subsection (4) is not practicable, or will result in a hazard greater than if a fall arrest system or a rope access system was not used, the employer must ensure that work procedures are followed that are acceptable to the Board and minimize the risk of injury to a worker from a fall.
- (2) The fall protection plan must be available at the workplace before work with a risk of falling begins.

General Information

Site Address:		Date:
Site Description:		
On Site Location of Work:		
Task:		
Superintendent:		CSO * OFA:
Task Supervisor:		Company:
Phone Number:		Number of Workers:

Heights, Distance and System

Hight Worker will be:		Max Hight of Structure:	
Roof Slope (if applicable)	Distance to Powerlines:	Are they Covered?	
Type of Fall Protection to be used: <input type="checkbox"/> Fall or Travel Restraint <input type="checkbox"/> Guard Rails in place <input type="checkbox"/> Fall Arrest <input type="checkbox"/> Safety Control Zone <input type="checkbox"/> Safety Monitor			
Mobile Equipment to be used			

Identify all fall hazards associated with this task:

Safety In place

<input type="checkbox"/> First Aid Attendant on Location	<input type="checkbox"/> Mandatory PPE is being worn
<input type="checkbox"/> Area below taped off	<input type="checkbox"/> Plan for Debris Removal in Place
<input type="checkbox"/> Rescue Plan in Place	<input type="checkbox"/> Hazards Removed or Engineered Out

Mark (X) all fall protection equipment/system to be used (refer to 11.3(3) (b) Fall Protection plan):

<input type="checkbox"/> Fall Arrest Anchors _____	<input type="checkbox"/> Horizontal Life Line
<input type="checkbox"/> Fall Restraint Anchors _____	<input type="checkbox"/> Safety Monitor
<input type="checkbox"/> Slings / Synch Straps	<input type="checkbox"/> Temporary Guardrails
<input type="checkbox"/> Spectra Sling (5000 lbs)	<input type="checkbox"/> Vertical Life Line
<input type="checkbox"/> Cable Dog Leash	<input type="checkbox"/> Rope size and Rope Grab _____
<input type="checkbox"/> Condor Concrete Anchor	<input type="checkbox"/> Full Body Harness
<input type="checkbox"/> Winged Roof Plates	<input type="checkbox"/> Waist Belt and Belly Straps or Chains
<input type="checkbox"/> I-Beam Clamp	<input type="checkbox"/> Lanyard * Fall Arrest _____
<input type="checkbox"/> Structural Anchor Point _____	<input type="checkbox"/> Lanyard * Fall Restraint _____
<input type="checkbox"/> Carabineers	<input type="checkbox"/> Retractable Lanyard.
<input type="checkbox"/> Other _____	<input type="checkbox"/> Other _____

Ladder Usage

<input type="checkbox"/> Set up on a firm and level base	<input type="checkbox"/> Roof Access 3 rungs, 1M or 3' past top
<input type="checkbox"/> 4:1 Ratio * Vertical to Horizontal	<input type="checkbox"/> Secured at top and bottom

Scope of Work (SOW)

What is the nature of the work? If changes occur, stop and revise this document and inform all parties involved.

If you need more room, use the reverse side of this document, or attach a separate piece of paper to the back



Procedure(s) for special assembly, maintenance, inspection, use and disassembly of the fall protection system(s) (Attach pre-printed manufacture's procedures, if required).

**User instructions of the fall protection system(s);
(Attach pre-printed manufacture's procedures as required)**

Rescues procedures for the rescue of a fallen worker:



Sketch Out the Job Site

This area may be used for sketching out the job site or roofline.
It may also be used for a rescue plan or task planning

Map Legend

(What's on the map)

Icon	Description	Icon	Description

Twices

A large grid for sketching the job site. The grid is composed of small squares and is mostly empty. In the center of the grid, there is a single black dot. The grid is intended for drawing a site plan or roofline.

As per the Fall Protection Program. All Personnel Involved and Participation in the work at hand must attend a Toolbox Meeting prior to work.



Mandatory.

All individuals in the work area must know the location and contents of the fall protection work plan. The individuals signing below have ensured that all work and fall protection considerations described within this work plan are known and understood by all those affected by this plan.

Company: _____ Supervisor: _____

_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date
_____ Name (please print)	_____ Signature	_____ Date

Notes

If you need more room, use the reverse side of this document, or attach a separate piece of paper to the back



8. Integrating A Fall Protection Plan into an Existing OH&S Management System

11.2 and 11.3 of the WorkSafe BC Regulations are very clear as to the legal requirements to use fall protection at a height of 3 meters (10 feet) and to have a fall protection plan for work being conducted at 7.5 meters (25 feet) or greater. Integrating A Fall Protection Plan into an Existing OH&S Management System can be achieved by the following points.

1. Explaining the legal requirements of having a fall protection plan to management in such a way that is clear, decisive and to the point of injuries will go down, in the long run money will be saved, workers will feel safer which in turn adds more to production. In addition, governmental inspection might diminish as well.
2. Begin a fall protection training program for all who have trade tasks that need to be conducted at heights and on the leading edge, pay those workers their wage as well during training hours.
3. Conduct an in-depth Hazard Assessment and if needed, take pictures with descriptions of height and hazards showing the need for a Fall Protection System.
4. Tool Box Talks and Safety Meetings explaining what a Fall Protection Plan will accomplish for the safety of all workers.
5. Showings statistics of proven track records. Number don't lie.
6. There may be a few bumps at the beginning, however in a short time it will look like it has always been there.

9. Active vs. Passive Fall Protection System

A Passive Fall Protection System is best described as a stationary protection system that is non-dynamic, doesn't change or move and requires no personal protective equipment. In the Hierarchy of Fall Protection, a passive system if possible, should always be the first choice of protection from a fall hazard. These are also considered engineering controls.

Examples of a Passive Fall Protection System are as follows:

1. Guardrails and cattle guards, snow fencing
2. Hand rails
3. Painted Hole Covers
4. Netting and catch platforms
5. A well established and very visible control zone

An Active Fall Protection System is dynamic and requires a worker's participation. This system can be moved from location to location, requires training and in some cases site specific plans.

There are 2 types of active systems. Fall Restraint and Fall Arrest.

Examples of an Active Fall Protection System are as follows:

1. Using Harnesses, life lines, and anchors.
2. Retractable lanyards, shock absorbers, restraint lanyards
3. Movable roof jacks for steep pitched roofs (still using a PFPS as well)
4. May also include a tripod, portable cranes and winches for rescue.



10. Fall Arrest and Fall (Travel)-Restraint

There are several differences between a Fall Arrest System and a Fall Restraint or Travel Restraint system. Both require a harness, lanyards and other connectors as well as an anchor point. Both must follow the height definitions under the WorkSafe BC Regulation. As well both must be inspected and cared for so as to not have them sustain damage. Finally, both must be taken out of service if a fall has occurred. The differences being Fall Restraint STOPS you at a determined distance, where as a Fall Arrest will allow you to go over the edge however will soften the stop and slack end of the deployed lanyard. Here are the differences between the two systems.

10.1 Fall Restraint or Travel Restraint

1. Lanyards have NO shock absorber.
2. Temporary Anchors must hold a minimum of weight of 3.5 kN (800 lbs) or 4 times the workers total weight load (tools and PFPS included)
3. If used correctly, only allows the worker to get close to a leading edge and never has the length to allow a worker to fall over said edge.
4. When using a rope grab, a manual one is best as it is always in the locked position
5. Retractable lanyards without a shock absorber can be placed in this category and still give the worker the freedom of an arrest system

10.2 Fall Arrest

1. Lanyards that have a shock absorber consist of 2 types. They are a Pack or Pouch Style that's has a section of the lanyard folded over itself and stitched together then incased in a plastic case. Or an In-line style that is squinted together and, in some ways, resembles a spring inside the lanyard casing.
2. Anchors must withstand at least 22 kN (5000 lbs) or 2 times the arrest force
3. Must always be mindful of the possible use of the rescue procedure
4. If a fall occurs the forces on one's body can cause injury.
5. A fallen worker must be rescued within 15 minutes and if unconscious maximum time would fall to just under 3 minutes due to the person might not be breathing.
6. This would be the last choice in Fall Protection in accordance with the Hierarchy of Fall Protection

11. Calculate Falling Distance and the Proper System

11.1 Free Fall: Before starting any task that requires you to work at a height of 3 meters (10 feet) or more and within the distance of 2 meters (6.5 feet) from a leading edge, you will have to calculate the distance to the surface below and the correct Personal Fall Protection Gear you will require. Doing the math is one of the most important first steps.

Figure 1 shows just how far you will fall when you calculate the lanyard / life line, freefall, stretch, your height, and total distance to the surface below. Figure 2 shows the time it takes to travel those distances. Every task location is different. Never assume one is the same as the other even if they are just 20 feet apart.

After you calculate the distance select the correct Fall Protection System to use. Many workers believe that they have time to regain their balance before they fall —

this is not always true. You may not have time to grab hold of something safe, but you can still prevent a tragedy. Properly maintained and worn, a safety belt or full body harness attached to a secure anchor could save your life.

11.2 Swing Fall: Many workers are unaware of the serious results of a swing fall hazard. Figure 3. The reality of it is, if a worker ties to an anchor, a lifeline and the worker is at too much of an angle perpendicular to the anchor, a swing fall in this situation can have the same serious results of a fall to the ground. All connecting lines from the anchor to yourself should be directly above you. However sometimes this isn't possible. In that case never exceed a 22-deg. Angle. Retractable lanyards assist in minimizing the risk of creating a swing fall hazard.

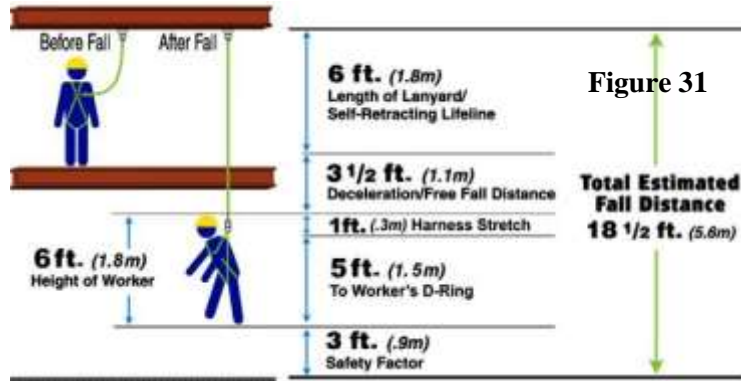


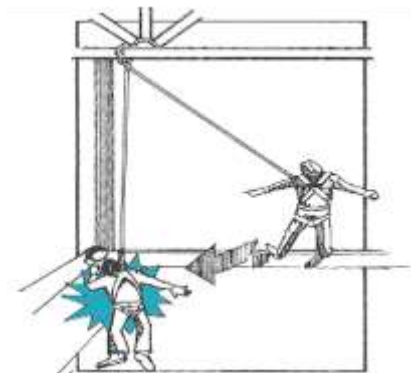
Figure 31

If a 200 lbs (91Kg) person were to fall, these are the numbers associated with this event

Time in Seconds	Distance in		Speed at impact		Force at Impact		Animal weight Per sq. ft
	Meters	Feet	kph	mph	Joules	Ft/Lbs	
.5	1.2	4	17	10.5	1070	789	False killer whale
1	5	16	35.5	22	4459	3288	Asian elephant
1.5	11	36	53	33	9809	7234	2 Hippopotamuses
2	20	64	71	44	17836	13155	3 killer whales
2.5	31	100	89	55	27646	20391	5 killer whales
3	44	144	106	66	39239	28941	Gray whale
4	78	256	141	87.5	69560	51305	Humpback whale

The column to the far right shows an idea of how much force at impact your body would receive if each animals weight was concentrated in a sq. ft.

Figure 32



12. Ladder Safety

Ladder Safety is a subject that should be taught in grade school. Everybody at least once will use some form of a ladder to reach an object, climb to a higher or even lower level, and also to do a repair or maintenance on your home or some other structure that is just out of reach. Like replacing a light bulb.

Falls from portable ladders are a major source of serious injury. All workers should be aware of the hazards and take proper precautions to prevent falling. Because of the nature and hazard rating of a new construction site, and the weight of a worker plus their tools and materials only Type 1 Heavy Duty, 1A Extra Heavy Duty, and 1AA Special Duty Ladders should be used on a construction sites, and locations where there is extensive demolitions and renovations. The chart below outlines ladder ratings that are currently in industry

Figure 33

Duty Rating	Load Rating	CSA Ladder Grade	ANSI Ladder Type
Special duty	170 kg (375 lbs)	1AA	IAA
Extra heavy duty	136 kg (300 lbs)	1A	IA
Heavy duty	113 kg (250 lbs)	1	I
Medium duty	102 kg (225 lbs)	2	II
Light duty	91 kg (200 lbs)	3	III

Most practices that you should and Should NOT do are universal to all ladders used on a jobsite. Before ever climbing on any ladder inspect the area and the ladder in self. Always use the right ladder for the job and never use a ladder that is defective. A manufactured portable ladder must be marked for the grade of material used to construct the ladder and the use for which the ladder is constructed.

12.1 When setting up ladders, Practice the following

- ✓ Reject and tag any ladders that have defects. Have faulty ladders repaired or throw out.
- ✓ Use a ladder designed for your task. Consider the strength, type, length and the CSA requirements.
- ✓ Always set up a ladder on level and firm ground and secure it by way of another worker holding it or tie it off at the top and use a peg to stop kick out at the bottom
- ✓ Set up barricades and warning signs when using a ladder in a doorway or passageway.
- ✓ Before mounting a ladder, clean off your boot soles if they are muddy or slippery. Avoid climbing with wet soles. Ensure that footwear is in good condition.
- ✓ Face the ladder when going up or down and when working from it. Always use **3 Point Contact**
- ✓ Keep the center of your body within the side rails.
- ✓ Wear protective footwear with slip-resistant soles and heels
- ✓ Ensure that all electrical equipment used during ladder work is in good condition and properly grounded.

12.2 What Should You Not Do

- X Do not use a ladder in a horizontal position as a scaffold plank or runway.
- X Do not carry objects in your hands while on a ladder. Hoist materials or attach tools to a belt.
- X Do not use a portable ladder when other equipment is available. Replace a ladder with a fixed stairway or scaffold.
- X Do not straddle the space between a ladder and another object.
- X Do not erect ladders on boxes, carts, tables, scaffold or other unstable surfaces.
- X Do not use ladders on ice.
- X Do not stand a ladder on any of its rungs. Ladders must rest on both side rails.
- X Do not allow anyone to stand under a ladder.
- X Do not overreach from a ladder; move as required.
- X Do not use any type of ladder near electrical wires.

12.3 Step Ladders

- ✓ Use the appropriate size ladder for the job
- ✓ While working, and using both hands, follow 3-point contact by leaning into the ladder and using your legs as a contact point.
- ✓ For long durations (over 15 minutes) use a platform step ladder as shown here.
- ✓ The platform measures 16" X 19.5" for is 312² inches of room to stand on
- X Do not paint wooden ladders. Defects may be hidden by the paint. Wood preservatives or clear coatings may be used.
- X Do not use items such as a chair, barrel or box as a makeshift ladder.
- X Never step on the top 2 rungs or the painters tray.
- X Don't use a step ladder that's lighter then your weight class.

Figure 34



CSA
Grade
1A



Wrong Use
of a Step Ladder

Figure 35



12.4 Extension Ladders

- ✓ Place the ladder feet 1/4 of the ladder's working length (e.g., foot to top support point) away from the base of the structure (e.g., for every 4 feet high, the base of the ladder should be out 1 ft. that means one horizontal foot from the support point).
 - ✓ Extend the ladder at least 1 m (3 ft) or 3 rungs above the landing platform.
 - ✓ Tie off ladders at the top and secure bottom to prevent them from slipping.
 - ✓ Get help when handling a heavy or long ladder.
 - ✓ Keep ladders away from electrical wires.
 - ✓ Check for overhead electrical wires before setting up a ladder.
 - ✓ Clear area around base and top of the ladder of debris, tools and other objects.
 - ✓ Tie yourself off with a safety harness when working 3 m (10 ft.) or more off the ground or when working with both hands.
 - ✓ Ensure that only one person is on a single-width ladder.
 - ✓ Grasp the rungs when climbing a ladder, not the side rails. If your foot slips on a ladder, holding onto rungs is easier than holding onto the side rails remember always use 3-point contact when climbing an extension ladder.
 - ✓ Rest frequently to avoid arm fatigue and disorientation when the work requires you to look up and reach above your head.
 - ✓ Drape your arms over a rung and rest your head against another rung or side rail if you become dizzy or panicky. Climb down slowly.
-
- ✗ Do not work from top three rungs. The higher a person goes on a ladder, the greater the possibility that the ladder will slip out at the base.
 - ✗ Do not join two short ladders to make a longer ladder. Side rails are not strong enough to support the extra load.
 - ✗ Do not place a ladder against flexible or moveable surfaces.
 - ✗ Never have the ropes used for elevating the second section loose and dangling around your feet.
 - ✗ If you are scared of heights, sick or dizzy, don't climb up a ladder

Figure 36



Wrong Use of Extension Ladders

Figure 37



12.5 Job Built Ladders

The history on construction sites was that if a worker needed a ladder, and didn't want to purchase one, they would nail 2x4 scraps to two longer rails made from 2x4 and you now have a ready-made ladder. These had a high probability of failure due to poor design causing worker injuries. Workers would fall after a rung broke or a rail snapped under the pressure.

Fig. 1 shows the specifications for a WorkSafe BC approved wooden Job-Built ladder that may be constructed to a maximum of 5-meters-high (16 ft.). All material mused must be free of defects and construction grade or better. Don't not use spliced 2x4 studs.

Always wear your PPE, and pre-inspect your tools prior to starting. Have a level firm ground to work on and no debris under your feet.

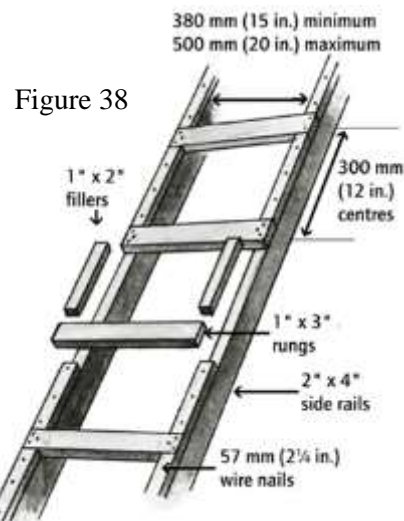


Figure 38

PPE Required:

- a) Hard Hat
- b) High visual apparel.
- c) Safety Glasses
- d) Gloves (not mandatory)
- e) CSA approved 6" Safety Boots

Tool:

1. Mitre saw
2. Extension cord
3. Hammer
4. Speed Square

Materials Needed:

- | | nominal | metric |
|----|---------|--------------------|
| 1. | 2" x 4" | (38 mm x 89 mm) |
| 2. | 1" x 2" | (19 mm x 38 mm) |
| 3. | 1" x 3" | (19 mm x 64 mm) |
| 4. | 2 1/4" | (57 mm) wire nails |

Steps of Construction

1. Wear the falling PPE before starting the task of construction the ladder.
2. Find an area to work that is clear of debris, other workers and close to a power source.
3. Gather the material you'll need and stack close enough to you but not in the way

Items 4 through 6, use a miter saw for perfect square cuts.

4. Pre-cut your 2x4 inch rails to the height you want your ladder and set aside
5. Pre-cut your 1x3 inch rungs to no shorter than 18" (for a 15" wide ladder) and no longer than 23" (for 20" wide ladder) and set aside. Any width in between and you'll have to do the math
6. Finally pre-cut your 1x2 inch fillers 10 1/2 "long and set aside.
7. Lay out your rails square to each other at a min. inner measurement of 15" (380 mm) or a maximum of 20" (500 mm) apart.
8. Start at the bottom with a 1" x 2" filler strip nailing it to the 2" side of your rails. Use 3 2 1/4 nail in each.
9. Next stack a 1" x 3" rung on to of the filler (See Figure 38). Secure with 3 nails aside. Make sure its square. Repeat process all the way up always checking for square.

13. Rescue Procedures – If a Worker Falls

Every company whether large or small should provide explicit direction to their employees and contractors in the unlikely event of a worker fall. All site personnel must have good knowledge of these procedures due to the fact that an injured worker requires knowledgeable personnel to assist in preventing further injury during the rescue procedures.

If a worker does fall while using his personal fall protection system, and is hanging by this protective equipment, the following procedures will be executed:

1. Determine whether the fallen worker is able to get back safely without endangering himself. (i.e., a secondary landing below or climbing back up from where they fell from)
2. Assist the worker in getting on to the landing safely.

****Note** The rescuer must use a fall protection system while conducting this rescue procedure.**

3. Alert the site first aid attendant and ask him / her to check for any injuries.
4. Report the incident to your supervisor, and determine why the fall occurred.

****NOTE**:** If the worker is unable to perform a self-rescue due to injuries or other significant reasons, the following procedures must be performed, written down and be part of the Site-Specific Fall Protection Plan: 15 minutes is the maximum time a conscience person can be hanging in their harness without significant life altering damage, if unconscious the rescue must be performed within 3 minutes due to a potential cut off air-way and no longer than 6 minutes .

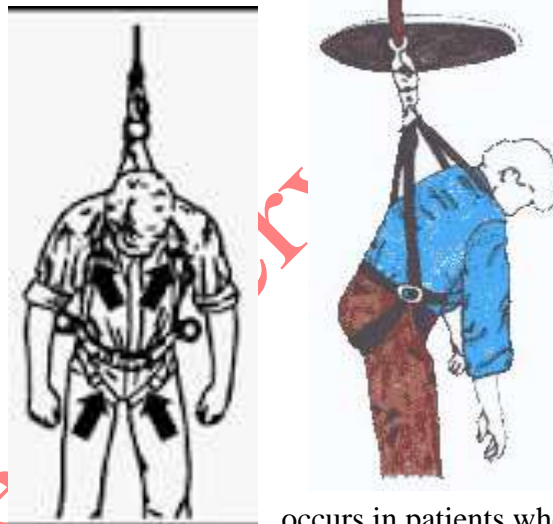
1. Dial 911 and alert Emergency Services. Inform them that you have a worker that has fallen and is suspended. State his condition!
2. Have a worker sound a horn for a 'RESCUE' to alert all personnel on site that a worker has fallen and needs immediate help. **1 long followed by 1 short airhorn blast. "TIME IS CRITICAL IN THIS SITUATION"**
3. Use ladders, scissor lifts, boom trucks or other elevated lift platforms to help rescue the worker if possible, and as a last resort, only a trained person may be suspended by the crane if one is on site to rescue the worker. (transferring to another lanyard)
4. Direct the fire and ambulance personnel to the suspended worker.

****Note**:** Do not attempt to remove the fallen worker from their harness while they are still hanging. This could further endanger the fallen worker and yourself. Harnesses must only be removed after the worker is on a solid surface, post rescue. This system should be part of the emergency response procedures as a whole, and practiced once a year with a weighted manikin or a set coveralls filled with a light weight substance. Pumice rock works really well for this. Read next section and follow the after-care procedures.

13.1 Suspension Trauma (from the Canadian Safety Group Inc.)

After a worker has fallen and hit slack bottom, they will be confused they might be dizzy, sweaty and some may even show other signs of shock like rapid breathing and pulse rate. After which the pulse rate and blood pressure will drop below normal followed by loss of consciousness. In the position they are in, the head will slum forward, the chin will rest on their chest or slightly off to one side cutting off their airway. Death in a forgone conclusion if they are not rescued soon.

Figure 39



- **Orthostatic Hypotension:** In suspension trauma, this refers to the pooling of blood in the leg veins of a worker that occurs when individuals fall in harnesses, are suspended in confined spaces, etc. and are forced to hang vertically with their legs relaxed (immobilized).
- **Reflow Syndrome:** The return of pooled, hypoxic blood and its metabolic byproducts from the extremities to the heart (more about this later).
- **Rescue Death:** When related to suspension trauma, this type of death occurs in patients who appear physiologically stable during the rescue and extrication but suddenly die after being freed.
- **Suspension Trauma:** Injuries Sustained from being immobilized in a vertical position when the legs are relaxed and immobile. Injuries include hypoxia (insufficient oxygen reaching the tissues); syncope (loss of muscle strength and/or fainting); hypoxemia (abnormally low levels of oxygen in the blood causing shortness of breath); acidosis (excessive acid in the body fluids or tissues, build up to CO₂); ventricular fibrillation (irregular contractions of the heart where the chambers quiver uselessly instead of pumping blood, generally followed by sudden cardiac arrest); myocardial infarction (heart attack or literally “death of heart muscle”); damage to the liver, kidneys and brain; and possibly death.
- **Suspension Syndrome:** The condition in which a suspended person becomes unconscious due to orthostasis (upright hanging position) *without* traumatic injury.

It does not normally affect people who wear a harness who are:

- Actively moving about (climbing, rope access, rescue work, etc.)
- Suspended for only a minute or two (parachutists)

Suspension Trauma can be fatal at the 15-minute

Signs and Symptoms that May be Observed in Someone Reaching Orthostatic Intolerance

Faintness	Dizziness
Breathlessness	Unusually Low Heart Rate
Sweating	Unusually Low Blood Pressure
Paleness	"Greying" or Loss of Vision
Hot Flashes	Nausea
Increased Heart Rate	Numbness in Lower Extremities



Factors that Can Affect the Degree of Risk of Suspension Trauma

Inability to move legs	Hypothermia
Pain	Shock
Injuries during fall	Cardiovascular Disease
Fatigue	Respiratory Disease
Dehydration	Blood Loss

13.2 Trauma Straps

To Prevent Suspension Trauma one very good piece of PPE that should be attached to every bodies harness on the belt ate each side are Trauma Straps. The Suspension Trauma Safety Strap was designed to help a worker overcome the potential negative health impacts of suspension trauma (otherwise known as Orthostatic Intolerance) The worker pulls them out, places their feet through the loops, relieving the presure in the grownj area and inacting the leg muscles allowing for circulkation.

Figure 40



Figure 41



13.3 After the Rescue:

Emergency Response for a Fallen/Suspended Worker

- Whatever plan you have written, it is vital that the lowering system can be controlled to prevent the worker's body from being laid flat as it reaches the ground.
- Anyone released from immobile suspension should be kept in a sitting position for **at least 30 minutes**
- Keep the harness on and do not release the leg straps
- Try to get the person to sit in the 'W' position (legs pulled towards chest) if possible



Figure 42

14. Personal Fall Protection Equipment Inspection Process

There is one constant fact about a worker's personal fall protection equipment. If you do not take care of it, keep it clean or abuse it, the day you might need it to save your life is the day it will fail. Your PFPS is a life saving collection of devices that needs to be treated with respect and care. Because the life it saves could be yours.

14.1 General Equipment Requirements

- Inspect your equipment daily.
- Replace defective equipment. If there is any doubt about the safety of the equipment, do not use it.
- Replace any equipment, including ropes, involved in a fall. Refer any questionable defects to a trained inspector.
- A trained inspector should examine equipment at least yearly.
- It is advisable to use shock absorbers if the arresting forces of the lanyard alone can cause injury.
- Use the right equipment for the job. Refer to CSA Standard Z259.1 "Safety Belts and Lanyards" or Z259.10 "Full Body Harnesses".

14.2 Harness, Belt and Lanyard Webbing

- Inspect the entire surface of webbing for damage. Beginning at one end, bend the webbing in an inverted "U." Holding the body side of the belt toward you, grasp the belt with your hands six to eight inches apart.
- Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage. Broken webbing strands generally appear as tufts on the webbing surface.
- Replace according to manufacturers' guidelines.



14.3 Buckle Inspection

- Inspect for loose, distorted or broken grommets. Do not cut or punch additional holes in waist strap or strength members.
- Check belt without grommets for torn or elongated holes that could cause the buckle tongue to slip.
- Inspect the buckle for distortion and sharp edges. The outer and center bars must be straight. Carefully check corners and attachment points of the center bar. They should overlap the buckle frame and move freely back and forth in their sockets. The roller should turn freely on the frame.
- Check that rivets are tight and cannot be moved. The body side of the rivet base and outside rivet burr should be flat against the material. Make sure the rivets are not bent.
- Inspect for pitted or cracked rivets that show signs of chemical corrosion.

14.4 Rope Inspection

- Rotate the rope lanyard and inspect from end to end for fuzzy, worn, broken or cut fibers. Weakened areas have noticeable changes in the original rope diameter.
- Replace when the rope diameter is not uniform throughout, following a short break-in period.
- The older a rope is and the more use it gets, the more important testing and inspection become.

14.5 Harness / Belt Snaps and “D” Rings

- Inspect hardware for cracks or other defects. Replace the belt if the "D" ring is not at a 90° angle and does not move vertically independent of the body pad or "D" saddle.
- Inspect tool loops and belt sewing for broken or stretched loops.
- Check bag rings and knife snaps to see that they are secure and working properly. Check tool loop rivets. Check for thread separation or rotting, both inside and outside the body pad belt.
- Inspect snaps for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should be seated into the snap nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to close the keeper firmly.

14.6 Equipment Cleaning

Basic care prolongs the life of the unit and contributes to its performance.

- Wipe off all surface dirt with a sponge dampened in plain water. Rinse the sponge and squeeze it dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion.
- Rinse the webbing in clean water.
- Wipe the belt dry with a clean cloth. Hang freely to dry.
- Dry the belt and other equipment away from direct heat, and out of long periods of sunlight.

Store in a clean, dry area, free of fumes, sunlight or corrosive materials and in such a way that it does not warp or distort the belt. Best practice is to hang it up in damp or have a designated sports bag or plastic bucket with a sealable lid.

14.7 Removal from service

It's very simple. During a pre-shift and prior to using inspection, if it appears broken "DON'T USE IT". In the event of a fall, all associated gear must be tagged out of service until inspected by the manufacturer of the harness and lanyard.

In the case of permanent anchors, anchors with multiple attachment points, permanent horizontal lifeline systems, and support structures for safety nets an engineer must recertify it again before it can be used. In the case of synch straps, any stress on them must be tagged out for use in a PFPS.

A Good Rule of Thumb "When in doubt, toss it out"

The only time a removed harness or lanyard can be reused after a fall is in the case of a Rescue Scenario.

What does WorkSafe BC say about it.

11.10

If, at any time, a permanent anchor does not meet the requirements of section 11.5 (c), the anchor must not be used until it has been inspected and recertified, by a professional engineer, as meeting the requirements of section 11.5 (c).

- (1) After a fall protection system has arrested the fall of a worker, it must
 - (a) be removed from service, and
 - (b) not be returned to service until it has been inspected and recertified as safe for use by the manufacturer or its authorized agent, or by a professional engineer.
- (2) Subject to subsection (3), subsection (1) (b) does not apply to a personal fall protection system designed and intended for reuse by a performer in the entertainment industry for conducting a planned fall sequence.
- (3) The following conditions must be met before a personal fall protection system described in subsection (2) will be exempt from subsection (1) (b):
 - (a) the system must be designed and used in accordance with a standard acceptable to the Board;
 - (b) each use of the system must be carried out in accordance with the plan for the conduct of the fall;
 - (c) the peak arrest forces generated in the system during each use must be at or below both the planned limits and the maximum forces allowed for the system;
 - (d) after each use of the system no part of the system, including the anchorage, may be reused until a qualified person has inspected it and determined it is in serviceable condition and safe for reuse.

14.8 Inspection Form, Fall Protection Equipment

Harness Manufacturer		Manufacture Date	
Unique ID Number		Purchase Date	
<input type="checkbox"/> Personal Equipment or <input type="checkbox"/> Company Equipment		Inspection Date	

Worker Information	Yes/No	Certification Number
Workers Name:	Training	
Company Name:	Expiry Date:	Years of Training:

Instructions

This checklist is designed to assist with inspection of the body harness and its attachments for wear, defects or damage. Inspection of fall protection equipment is a regulated requirement to be done before each use as well as once a year. Failure of the inspection process or loss of faith in any component indicates the entire unit must be removed from service. "Loss of faith" can be for a multitude of reasons, such as a fall, contact with a bad substance, or other obvious damage (i.e. dropped off roof, run over by a truck, stains) to age. If there are reasons not listed on the inspection form, loss of faith would be selected. The completed inspection checklist must be maintained so it is readily available for review.

Note: This is a sample checklist that may need to be modified to meet site-specific requirements, standards or practice and/or specific manufacturer's instructions for variations of approved fall protection equipment.

WEBBING	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
UV damage (discoloration), mildew, rotting								
Cuts, frays, abrasion								
Contact with chemicals solvents								
Contact with grease, oil, paint, felt marker								
Soiling, dirt, clay								
Evidence of heat damage (friction, welding splatter, sparks, burn holes)								

D-RINGS (includes hardware, keepers and back pads)	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
Damage								
Distortion, grooved, bent								
Sharp edges, cracks								
Burrs								
Corrosion								
Evidence of heat damage (friction, welding splatter, sparks, burn holes)								

Personal Fall Protection System



BUCKLES & ADJUSTERS	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
Damage								
Distortion								
Sharp edges, cracks								
Sticky springs								
Bent tongues								
Corrosion								

SNAP HOOKS	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
Excessive wear								
Excessive dirt								
Sharp edges, cracks								
2 Action open								
Locking action								
Corrosion								

STITCHING	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
Fully stitched								
Backstitch present								
Pulled or cut stitches								

LABELS & MARKINGS	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
Appropriate OHSA / CSA markings or labels								
Legible								
Securely held in place								
Manufacturer's in-service date								

Personal Fall Protection System



LANYARDS & LIFELINES	YES	NO	N/A	LOSS of FAITH	PASS	FAIL	INITIAL	DETAILS / COMMENTS
Appropriate OHSA / CSA markings or labels								
Cuts, burns, tears or frays								
Abrasion								
Knots								
Excessive soiling								
Contact with chemicals / solvents								
Contact with grease / oil / paint/ marker								
UV damage (discoloration), mildew, rotting								
Evidence of heat damage (friction, welding splatter, sparks, burn holes)								
Distortion of housing								
Spring tension allows for retraction and for retention								
Indicator for activation / deployed								
Broken wires								

Over All Condition And Disposition <input type="checkbox"/> Accepted <input type="checkbox"/> Rejected	Inspected By: _____
	Date: _____

If worker has record of training or certification, foreman or supervisor must declare.

I _____ the supervisor of _____ declare that he/she is fully competent in the skills of Personal Fall Protection in regards to inspecting the equipment prior to shift, dawning the harness, how to tie off to an anchor of sufficient strength for the style of lanyard used and how to assist is a rescue if another worker falls.

Supervisors Signature _____

Date _____ Company _____

Additional Notes:

15. Donning a Harness and Suspending off the Ground

Before Donning a harness, remove all items from your pant pockets. If by some misfortune a fall did occur items such as keys may become imbedded into your legs due to the force exerted on your body at full deployment of a shock absorber and slack end of the lanyard. As well any bulky clothing with metal or sharp buttons and any belts for your pants you may be wearing.



Step 1. Hold harness by back D-ring. Shake harness to allow all straps to fall in place. If any are knotted, un knot them careful as to not damage or deform any components of your harness.



Step 2. If chest, leg and/or waist straps are buckled, release straps and unbuckle at this time. Always keeping an eye out for any damage that might have been missed during the inspection.



Step 3. Slip the top straps over your shoulders so the D-ring is located in middle of back between shoulder blades. This is the exact position the D ring needs to be for balance and comfort during a fall. If its position lower or higher on the back, a risk of physical damage to yourself and or falling out is increased.



Step 4. Pull the leg strap between your legs and connect to opposite end. Repeat with the second leg strap. If belted harness, connect waist strap after leg straps. These leg straps must be snug so as to only allow 2 fingers to wedge in between the leg straps and your legs. (Men might need to perform an adjustment during this procedure). Some accidents in the past have resulted in a catastrophic injury due to loss straps.



Step 5. Connect your chest strap and position in the mid chest area (nipple to nipple). If you have it any higher, a choking hazard or a serious neck injury may occur. Any lower and you might fall out. Tighten to keep shoulder straps taut. Again only 2 fingers of snug space.



Step 6. After all straps have been buckled, tighten all buckles so that the harness fits snug but allows full range of movement. Pass excess strap through loop keepers, or bundle them up and use some construction string to secure them. Never has loose or dangling straps hanging from your harness. They could get caught and damaged.

Step 7. Both you and your partner should inspect each other's harness, strap position, D ring location and even snugness. As well you will need another worker to connect your lanyard to your D ring. Protect Each Other.





16. Self-Propelled Work Platforms

This addition covers the basic use of Fall Protection in a Self-Propelled Work Platforms. Either Telescoping Manlifts, Scissor Lifts, or Bucket Lifts off Trucks. For a more comprehensive instructional, a separate training program must be taken

16.1 Safety Rules

These Safety Rules are generic to any Self-Propelled Aerial Work Platform.

Do Not Operate Unless:

You learn and practice the principles of safe machine operation contained in this operator's manual.

1. Avoid hazardous situations.
2. Know and understand the safety rules before going on to the next section.
3. Always perform a pre-operation inspection.
4. Always perform function tests prior to use.
5. Inspect the workplace.
6. Only use the machine as it was intended.

You read, understand and obey the manufacturer's instructions and safety rules and operator's manuals and machine decals.

You read, understand and obey employer's safety rules and worksite regulations.

You read, understand and obey all applicable governmental regulations.

You are properly trained to safely operate the machine.

When working in a self-propelled lift, like a Genie or JLG, a personal fall protection system must be used 100% of the time, and you must be connected to the designated anchor points only.

Never let your feet leave the floor on any manlift.

Never climb the guardrails or climb out when raised in the air.

Only tie off to the appropriate anchors supplied by the manufactures of the AWP.

16.2 Scissor Lift Exception

13.33(1)(1.1)(1) WSBC Regulations

A person on a scissor lift, or on an elevating work platform with similar characteristics to a scissor lift, that is on a firm level surface with no irregularities to cause platform instability, is exempt from wearing a personal fall arrest system, provided that all manufacturer's guardrails and chains are in place. However, most companies enforce Fall Protection 100% of the time in any AWP

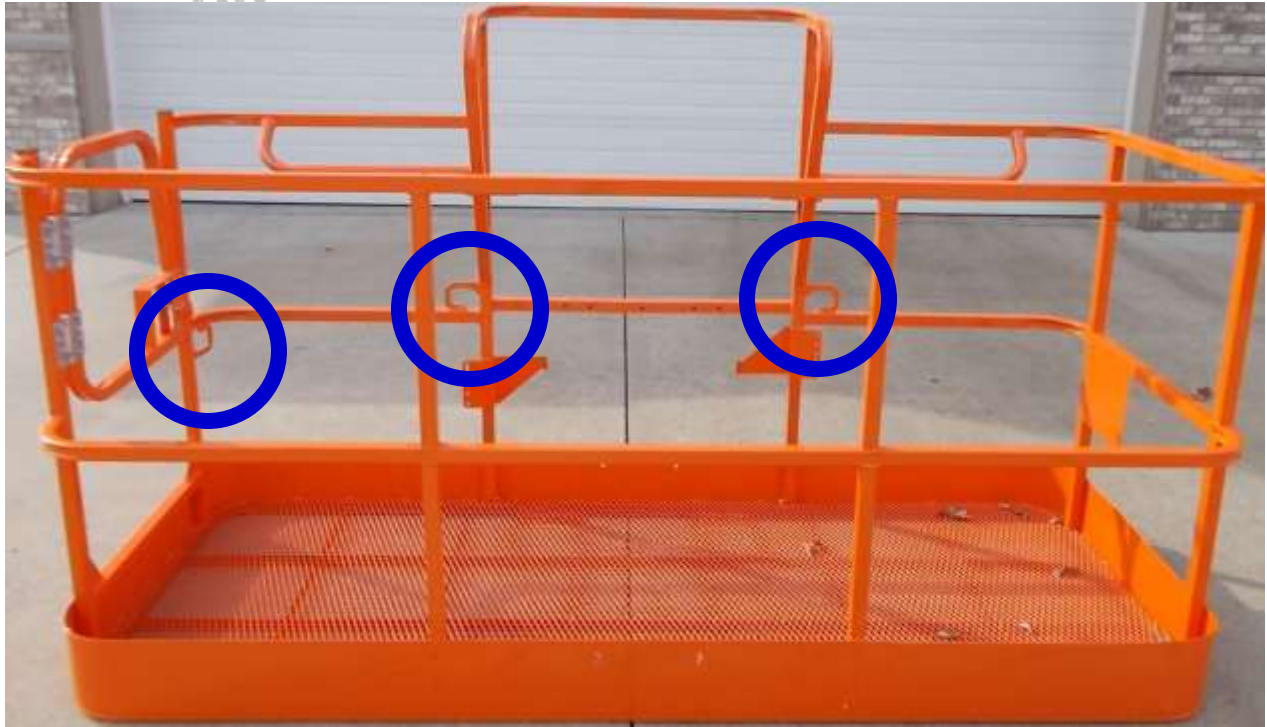
16.3 Genie Basket Anchor Points



16.4 Telehandler Work Platform Man Basket



16.5 JLG Basket Anchor Points



16.6 Scissor Lift Anchors



16.7 Control Zones under a AWP work Area

When you are working at heights in a AWP, you need to establish a control zone under the area you are working. This zone must be at least another 10 feet past the furthest point of your actual work area under the boom. Establish this Control Zone with Delineators, Red Danger Tape and Signage.

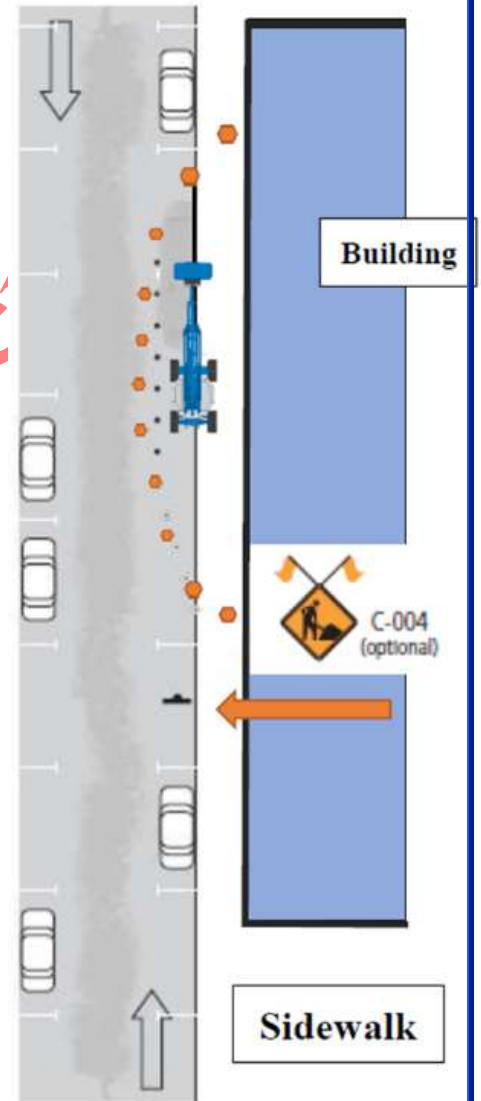


16.8 Road and Sidewalk Closers

The same process is used to close off an area on the side of the roadway in a mall. When working on the side of the laneway, place your delineators 3 feet apart and 32 inches at least on the outside of the rotators swing radius. Again, use the red danger tape from each delineator to the next. In some cases when traffic and the public are overwhelmingly numerous, it would be wise to sub contract a TCP company. They have all the signage, trucks with arrow boards and personnel.

16.9 Signage to Alert the Public

One of the biggest hazards is the public walking around and vehicles driving around. Use signage to alert them you are working above and to do not enter the area.



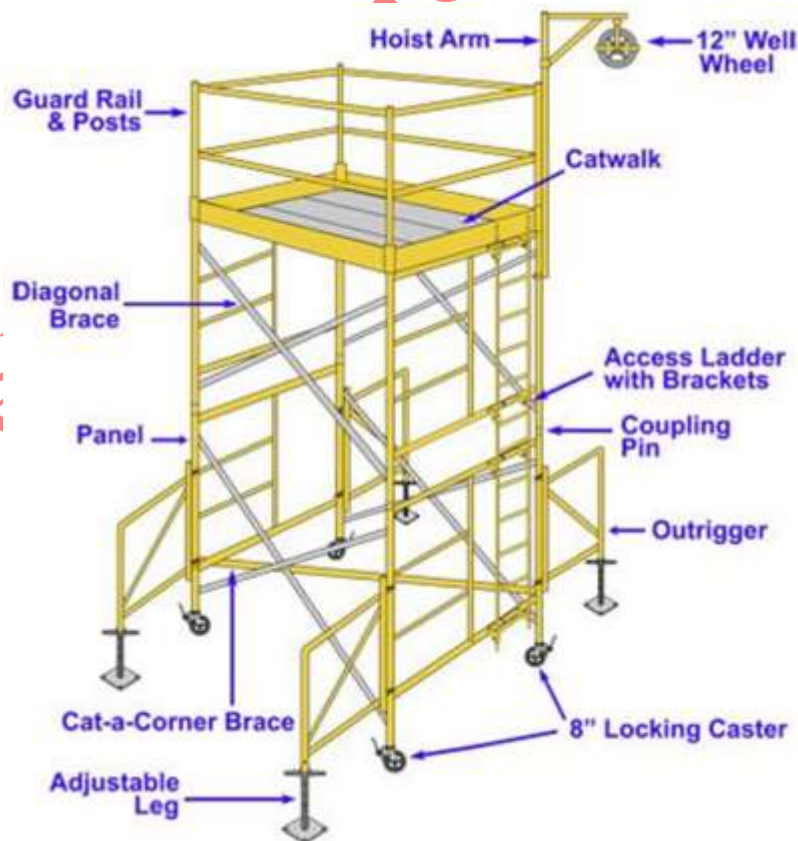
17. Scaffold

17.1 Basic of Scaffold Use

There are a various different types of scaffold systems being used on sites today. Constructed out of steal or aluminum, most are installed by certified trades people when it becomes structural and engineered. However, for temporary use the average person can build a basic scaffold structure. Scaffolds are a lot safer when working at heights then using ladders. Years ago, scaffold was constructed on site out of wood. When in doubt or instructed to, TIE OFF.

17.2 Rules for Scaffold Use

- ✓ Always follow WorkSafe BC Regulations
- ✓ Guardrails must be in place with a top rail, mid rail and a toe board.
- ✓ Cross braces are not guardrails. To many large open gaps to fall through.
- ✓ Always look first to see if an inspection tag has been completed before using.
- ✓ When using rolling scaffold, always lock the wheels before working off it.
- ✓ Never ride mobile scaffold and secure any material and tools first prior to moving it.
- ✓ If a harness is required, never anchor to mobile or lightweight scaffold.
- ✓ Deck boards must not have any gaps bigger than a few inches
- ✓ Never alter engineered scaffold without permission.





18. End of Course Video

Standing on the Edge

Published on April 29, 2013



Remember one final thought.
Before starting any task,
Stop and **Think**
And ask yourself one question

“WHAT COULD GO

Are you ready for the Final Exam?

This material is not to be copied or misused in any shape, way or form with out explicit permission from ownership of FreeBird Safety Services. If for any reason an error or misprint is found, please inform the instructor right away. Published January 2020. 2st Edition.

Notes:

FreeBird Safety Services