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# **WORKING AT HEIGHTS**

Regional Code of Practice

## **WAH-2015-RCOP**



## TABLE OF CONTENTS

<b>1.0 VERSION TABLE .....</b>	<b>3</b>
<b>2.0 DISCLAIMER .....</b>	<b>4</b>
<b>3.0 PURPOSE .....</b>	<b>5</b>
<b>4.0 SCOPE .....</b>	<b>5</b>
<b>5.0 RESPONSIBILITIES .....</b>	<b>5</b>
5.1 Employer Responsibilities.....	5
5.2 Worker Responsibilities .....	7
<b>6.0 WORKING AT HEIGHTS .....</b>	<b>7</b>
6.1 Hazard Assessment.....	7
6.2 Hierarchy of Controls .....	8
6.3 Fall Protection Plan.....	8
6.4 Fall Protection Equipment.....	8
6.5 Water Danger .....	12
6.6 Fixed Ladders .....	13
6.7 Control Zone .....	13
6.8 Leading Edge Fall Protection System .....	14
6.9 Fall Protection on Vehicles and Loads .....	14
6.10 Procedures in Place of Fall Protection Equipment .....	14
6.11 Elevated Work Platforms (EWP) .....	15
6.12 Egress from Elevated Platforms .....	15
6.13 Suspended Personnel Baskets .....	15
6.14 Portable Ladders .....	16
<b>7.0 EMERGENCY RESPONSE/RESCUE PLANS.....</b>	<b>17</b>
7.1 Rescue Plan/Procedures .....	17
7.2 Suspension Trauma.....	17
7.3 Prohibition from Working Alone at Heights .....	18
<b>8.0 INSPECTIONS AND MAINTENANCE OF EQUIPMENT .....</b>	<b>18</b>
8.1 Inspections.....	18
8.2 Maintenance .....	19
<b>9.0 TRAINING .....</b>	<b>19</b>
<b>10.0 ASSURANCE AND ASSESSMENTS .....</b>	<b>19</b>
<b>11.0 REFERENCES .....</b>	<b>20</b>
<b>APPENDIX A - DEFINITIONS.....</b>	<b>21</b>
<b>APPENDIX B - SAMPLE FALL PROTECTION PLAN .....</b>	<b>25</b>
<b>APPENDIX C - FALL PROTECTION EQUIPMENT STANDARDS .....</b>	<b>27</b>
<b>APPENDIX D - CALCULATION OF FALL CLEARANCE DISTANCE.....</b>	<b>30</b>
Example 1 - Lanyard with a Shock Absorber .....	30
Example 2 - Self-Retracting Lanyard (SRL) .....	31

### 1.0 VERSION TABLE

Version No.	Date of Approval	Description / Comments	Approved by
1.0		Initial Release	
2.0			
3.0			
4.0			
5.0			

## 2.0 DISCLAIMER

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### 3.0 PURPOSE

Falls from heights are one of the leading causes of workplace injuries and fatalities in Alberta. The purpose of this Regional Code of Practice (RCOP) is to protect workers from the risk of injury due to falls from heights. This is accomplished through the identification of fall hazards, and then the elimination or control of the hazards.

For the purpose of this RCOP, a worker shall be protected from falling, at either a temporary or permanent work area, if the worker may fall:

- 1) A vertical distance of 1.8 m (6 ft.) or more,
- 2) a vertical distance of less than 1.8 m (6 ft.) if there is the possibility of an unusual injury,
- 3) into or onto a hazardous substance or object, or
- 4) through an opening in the surface on which they are walking or working.

Note: The words “temporary” or “permanent” work area describe the nature of the work being performed, not whether the area is a temporary or permanent structure.

### 4.0 SCOPE

The Alberta OH&S Code Part 9 - Fall Protection (referred to as the OH&S Code Part 9 in this document) specifies the minimum safety requirements for the protection of workers who work at heights. This RCOP meets all of the requirements of OH&S Code Part 9, and in some cases exceeds those requirements.

This document does not cover work from heights when building scaffolding, climbing wooden poles, using boatswain chairs, using swing stages, climbing structures or rope access. All of these work situations have unique applications and employers have a duty to ensure they follow the applicable standards, codes and requirements associated with these applications, in order to protect the worker.

Note: Rescue personnel involved in training or in providing emergency rescue services may use equipment and practices other than those specified in this document.

Note: Deviations to this Regional Code of Practice must be endorsed by the Board of Directors of the OSSA.

### 5.0 RESPONSIBILITIES

Employers and workers have a variety of responsibilities under Alberta legislation, both in general in regards to competency and hazard assessments, and specifically in regards to the requirements for working at heights. Failure to comply with any of these responsibilities on the part of either the employer or the worker can result in serious injury to the worker.

In addition to Alberta OH&S requirements, the manufacturers of fall protection equipment/systems have requirements which must also be followed to ensure the equipment is used and maintained properly.

#### 5.1 Employer Responsibilities

As per the OH&S Code Part 9, employers must ensure that all of the requirements below are met :

- 1) Workers are made aware of the fall hazards particular to their worksite and the steps being taken to eliminate or control those hazards.
- 2) Procedures are developed to protect workers from falls at heights by following the Hierarchy of Fall Protection. See Section 6.2 of this document for more information on the Hierarchy of Fall Protection.

- 3) A Fall Protection Plan is developed, is available at the work site and is reviewed with the workers prior to the start of the work which is at heights. See section 6.3 of this document of more information on these requirements.
- 4) Workers are properly trained and competent in the selection, fitting, inspection, use and care of all fall protection equipment and systems they will be required to use. See section 6.4 this document of more information on these requirements.
- 5) All fall protection equipment and systems supplied to workers meet all of the applicable CSA, ANSI or CEN standards. See Appendix C of this document for a summary of these standards.
- 6) The equipment used as part of a fall protection system is inspected, maintained and re-certified as per the manufacturer instructions. See Section 8 of this document for more information on these requirements.
- 7) The equipment used as part of a fall protection system is kept free from substances and conditions that could contribute to deterioration of the equipment
- 8) Workers use the required fall protection equipment and systems they are required to use as per the fall protection plan.
- 9) All components of a fall protection system are compatible with one another and with the environment in which they are being used.
- 10) Equipment used as part of a fall protection system is removed from service and either returned to the manufacturer or destroyed if it is defective or has come into contact with excessive heat, a chemical, or any other substance that may corrode or otherwise damage the fall protection system.
- 11) After a personal fall arrest system has stopped a fall, the system is removed from service and is not returned to service unless a professional engineer or the manufacturer certifies that the system is safe to use.
- 12) A personal fall arrest system is arranged so that a worker cannot hit the ground, an object which poses an unusual possibility of injury, or a level below the work area.
- 13) A personal fall arrest system without a shock absorber limits a worker's free fall distance to 1.2 metres (4 feet).
- 14) A personal fall arrest system limits the maximum arresting force on a worker to 6 kN, unless the worker is using an E6 type shock absorber in accordance with the manufacturer's specifications, in which case the maximum arresting force must not exceed 8 kN.
- 15) An anchor used by a worker is appropriate to the work being done, and that both permanent and temporary anchors meet the applicable strength requirements and are properly installed. See section 6.4(8) of this document for a summary of these requirements.
- 16) Flexible and rigid horizontal lifeline systems are properly installed, inspected prior to use, and properly used. See section 6.4(9) of this document for more information.
- 17) A worker who might fall into water from other than a boat is adequately protected. See section 6.5 of this document for more information.
- 18) A worker working from a fixed ladder is adequately protected. See section 6.6 of this document for more information.
- 19) A Control Zone is clearly marked and used in accordance to the applicable requirements. See Section 6.7 of this document for a summary of these requirements.
- 20) A Leading Edge is adequately protected. See Section 6.8 of this document for more information.
- 21) A worker does not climb onto a vehicle or its load unless the load is secured against movement. If the load is secured, the employer must\* ensure all other requirements are met. See section 6.9 of this document for a summary of these requirements.
- 22) When a procedure is being used instead of a fall protection system, it is only for the applicable situations allowed, and all requirements of are met. See Section 6.10 of this document for a summary of these requirements.

- 23) All of the requirements for fall protection are met when workers work on an elevated work platform. See section 6.11 of this document for a summary of these requirements.
- 24) A worker has 100% tie-off when climbing out of/off of an elevated work platform, and that all other requirements of egress are met. See section 6.12 of this document for a summary of these requirements.
- 25) A suspended personnel basket used to support a worker is manufactured as per the requirements and that a worker in the basket is protected by a fall arrest system. See section 6.13 of this document for a summary of these requirements.

## 5.2 Worker Responsibilities

Workers also have responsibilities when it comes to their safety when working at heights. These responsibilities come from OH&S legislation, manufacturer's instructions and their employers. A worker must comply with all of the following requirements:

- 1) Use and/or wear the fall protection equipment/system their employer requires them to use or wear, including a full body harness if using a personal fall arrest system.
- 2) Use a vertical life safety rope in a manner that minimizes the hazards of swinging and limits their swing drop distance to 1.2 metres (4 feet) if they fall.
- 3) Perform all required equipment inspections, prior to using the equipment, including visually inspecting an anchor prior to attaching their fall protection system to it.
- 4) Immediately report to their employer any defective equipment or a harmful worksite condition that exists.
- 5) Review all required documentation, which may include a fall protection plan, a rescue plan a safe work permit or a hazard assessment, to ensure they understand the hazards associated with their work and mitigations in place to protect them.
- 6) Limit the vertical distance of a potential fall by selecting the shortest length lanyard that will still permit unimpeded performance of their duties, and chose an anchor point as per the requirements listed in section 6.4(8).
- 7) Use anchor connectors appropriate for their work and if using a personal fall arrest system or a travel restraint system, ensure they are safely secured to an undamaged anchor.
- 8) Not be inside a control zone, if they are not directly required for the work at hand inside the control zone.
- 9) Not climb onto a load on a vehicle if the load is not secured against movement.
- 10) Not travel in a basket, bucket, platform or other elevated work platform that is moving on a road or work site if road conditions, traffic, overhead wires, cables or other obstructions create a danger to a worker.

## 6.0 WORKING AT HEIGHTS

Work at heights brings with it not only the requirements for completing a specific job or task safely, but the added challenge of doing it while at a height. Employers and workers working together to ensure the identification and elimination or mitigation of these hazards is key to preventing injuries due to falls from heights. Good planning and assessment of work activities is important for both the protection of the worker, and efficiency in the field.

### 6.1 Hazard Assessment

Employers must assess the worksite at which they are working to identify existing and potential hazards before work begins. This hazard assessment (e.g. Job Safety Analysis or Job Hazard Analysis) must be in writing and must include all of the hazards associated with the work at heights and any other worksite specific hazards.

A Field Level Risk Assessment (FLRA) or Field Level Hazard Assessment (FLHA) involving the workers must be done in the field, just prior to the work starting. The hazards identified during this assessment could be, for example:

- Weather related (e.g. lightning, snow, ice, extreme heat or cold).
- Hazards caused by other work in the same proximity (e.g. sandblasting, welding, or hydrostatic testing).
- Vehicular traffic hazards.
- Process hazards due to day to day operations at the worksite (e.g. the activation of a relief valve or other loss of containment).

## 6.2 Hierarchy of Controls

Ideally, the risk of falls would be eliminated by changing how work is to be done during the design phase of projects, such as designing valves and gauges to be at ground level whenever possible.

Where it is not possible to eliminate the requirement to work at heights in the design phase, employers must apply the hierarchy of controls for fall protection, by first eliminating fall hazards through the use of permanent or temporary guardrail systems. If adding guardrails is not reasonably practicable, then an employer must ensure a worker uses a travel restraint system. If using a travel restraint system is not practicable, then an employer must ensure a worker uses a fall arrest system. If using a fall arrest system is not practicable, then an employer must ensure a worker uses an equally effective means of fall protection.

## 6.3 Fall Protection Plan

A fall protection plan must be developed if a worker may fall a vertical distance of 1.8 m (6 ft.) or more, or in special situations where a fall protection plan is required (i.e. an unusual risk of injury, or a level below the work area).

A fall protection plan must specify all of the following :

- 1) The Fall hazards at the work site.
- 2) The fall protection system to be used at the work site.
- 3) The anchors to be used during the work.
- 4) That clearance distances below the work area, if applicable, have been confirmed as sufficient to prevent a worker from striking the ground, or an object or level below the work area.
- 5) The procedures used to assemble, maintain, inspect, use and disassemble the fall protection system, where applicable.
- 6) The rescue procedures to be used if a worker falls and is suspended by a personal fall arrest system or safety net, and needs to be rescued.

Note: OSSA member sites do not typically use safety nets for fall protection.

A fall protection plan must be documented, available at the worksite and be reviewed with the workers before the work with a risk of a fall begins. The employer must also ensure that the plan is updated when conditions affecting fall protection change.

*See Appendix B for a sample of a basic fall protection plan template.*

## 6.4 Fall Protection Equipment

There are many individual pieces of fall protection equipment which make up a fall protection system, and each one of these pieces of equipment is important to the overall performance of the system. The employer must ensure that all of the pieces of equipment in a system are compatible with each other, and

are kept free from substances or conditions which could contribute to their deterioration. They must also ensure the equipment meets all the applicable standards, as outlined in the OH&S Code Part 9. See *Appendix C for the listing of these standards.*

In addition to the Alberta OH&S requirements, the manufacturers of the fall protection equipment also have requirements for its use, inspection and storage. These requirements must also be followed to ensure the fall protection equipment and/or systems remain fit for usage. See *Section 8 of this document for more information on the manufacturer requirements.*

Below is a list of the requirements from the OH&S Code Part 9, which employers must ensure are complied with.

The list below is not represented as an all-inclusive list of fall protection requirements, and therefore employers must ensure they reference the OH&S Code Part 9 for a current listing.

- 1) **Full Body Harnesses:** An employer must ensure a worker wears a full body harness as part of a personal fall arrest system. The worker must be trained to select a harness which is compatible with the work to be done (e.g. hot work can melt and cause damage to a nylon harness). The harness must be properly fitted and adjusted by the worker to ensure it functions as required in the case of a fall.

Note: Body belts shall never be used at OSSA work sites as part of a personal fall arrest system, a travel restraint system, or a fall restricting system.

- 2) **Lanyards and Attaching the Lanyard to an Anchor:** When choosing a lanyard, the length of the lanyard and the material of construction are two key considerations. A worker must limit the vertical distance of a potential fall by selecting the shortest length lanyard that will still permit unimpeded performance of their duties.

An employer must ensure a lanyard used as part of a fall protection system is made of wire rope or other material appropriate to the hazard if a tool, or corrosive agent, is used in the work area and could sever, abrade or burn a lanyard. If a worker works near an energized conductor or in a work area where a lanyard made of conductive material cannot be used safely, the employer must ensure another effective means of fall protection is used.

In addition to selecting the appropriate lanyard for their work activity, a worker must secure the lanyard to an anchor no lower than their shoulder height. If a shoulder height anchor is not available, a worker must secure the lanyard to an anchor that is located as high as reasonably practicable, as per the approved fall protection plan.

- 3) **Shock Absorber:** A lanyard used for fall arrest should be equipped with a shock absorber. Shock absorbers employ various principles such as deformation, friction, tearing of materials or breaking of stitches to accomplish energy absorption. In the rare case where a shock absorber is not used as part of a fall arrest system, the employer must ensure the free fall distance of the worker is limited to 1.2 m (4ft.) or less.

An employer must ensure a shock absorber is both:

- a. Part of the lanyard on a personal fall arrest system, unless there is not adequate clearance for a worker to prevent bottoming out in the event of a fall.
  - b. Used with a fixed ladder fall arrest system only if it is required by the manufacturer of the system.
- 4) **Connectors:** Carabiner and double locking snap hooks used to connect the components of a personal fall arrest system are subjected to the full maximum arresting force developed during a fall. The failure of any portion of this connecting hardware can lead to the failure of the entire fall arrest system. Compatibility of connectors with the other components of the fall protection system is also important, both in sizing and in materials of construction.

An employer must ensure carabiner or double locking snap hooks are both:

- a. Self-closing, self-locking, and may only be opened by at least two consecutive deliberate manual actions (to prevent roll-out).
  - b. Marked with its breaking strength on the major axis, and the name or trademark of the manufacturer.
- 5) **Fall Arrestors, Descent Control Device and Adjustable Lanyard for Work Positioning:** Fall arrestors are used when workers need to move vertically. They arrest the workers fall by clutching or seizing the life safety rope.

A descent control device is designed and intended to be used by one person for personal descent, or to lower another person from an elevation. A descent control device may be used either for egress or for work positioning.

Adjustable lanyards for work positioning are usually made of rope and are designed to limit movement, or to allow hands-free work while in position. Work positioning lanyards may be fixed length or adjustable, and have connecting components at both ends to allow for connection to the side D-rings of a worker's full body harness. Adjustable work positioning lanyards allow a worker to cinch up or adjust the lanyard, to optimize the worker's position.

- 6) **Self-Retracting Devices (SRD's):** SRD's are an alternative connecting device to a shock-absorbing lanyard. A SRD lets a lifeline be slowly extracted from it, or retracted into it during normal movement by the user. When subjected to the accelerations associated with a fall, the SRD stops the extraction of the lifeline and automatically locks and arrests the fall of the worker. SRD's require much shorter distance to arrest a fall than does a lanyard with a shock absorber, and therefore they can be used in situations where there is inadequate clearance for a lanyard with a shock absorber. There are 4 classes of SRD's.

*See Self-Retracting Devices in Appendix A – Definitions for the CSA classifications.*

An employer must ensure that a self-retracting device meets all of the requirements below:

- a. Is anchored above the worker's head, unless the manufacturer's specifications allow the use of a different anchor location.
  - b. Is used in a manner that minimizes the hazards of swinging.
  - c. Limits the swing drop distance to 1.2 m (4 ft.), if a worker falls.
- 7) **Life Safety Rope:** When choosing a life safety rope, consideration must be given to the type of work to be done. Similar to lanyards, some work (e.g. welding or cutting with a torch) can damage the life safety rope, causing it to fail. When using a life safety rope, the worker must ensure they use it in a manner that minimizes the hazards of swinging, and limits their swing drop distance to 1.2 m (4 ft.).

An employer must ensure that a life safety rope used in a fall protection system meets all of the requirements below:

- a. Extends downward to within 1.2 m (4 ft.) of ground level or another safe lower surface (unless the rope will extend into a roadway, or some other location where it could be a hazard to the worker, in which case the rope must be terminated at a safe distance above the danger area).
- b. Is free of knots or splices throughout the travel portion, except for a stopper knot at its lower end.
- c. Is effectively protected to prevent abrasion by sharp or rough edges.
- d. Is made of material appropriate to the hazard and able to withstand adverse effects.
- e. Is installed and used in a manner that minimizes the hazards of swinging and limits the swing drop distance to 1.2 m (4 ft.), if a worker falls.

- f. Has only one worker attached to it at any one time, unless the manufacturer's specifications or specifications certified by a professional engineer allow for the attachment of more than one worker.
- 8) **Anchors:** Anchors are a vital part of the fall protection system. A worker must use anchor connectors appropriate for their work. If using a personal fall arrest system or a travel restraint system, workers must ensure they are safely secured to an undamaged anchor. The anchorage chosen, to which the anchor will be coupled, must be capable of safely withstanding any potential forces applied by the fall protection system. For this reason, handrails, cable trays and valve handles should never be used as anchorage. Parts of structures located in the vicinity of where a worker is working are often used as improvised anchors (as opposed to engineered anchors) for travel restraint and fall arrest systems. Improvised anchors are not manufactured to any technical standard. Improvised anchors may include a beam, struts of a communication tower, a concrete Jersey barrier, a locked out and chocked vehicle, or other similar, robust structures.

An employer must ensure both permanent and temporary anchors installed after July 1<sup>st</sup>, 2009 meet all of the requirements below:

- a. Are inspected prior to a worker attaching a fall protection system to them.
- b. Are not used if there is any damage to the anchor until the anchor is repaired, replaced or re-certified by the manufacturer or a professional engineer.
- c. Are not used as part of an anchor used to support or suspend a platform to which a personal fall arrest system is attached.
- d. Are properly installed and meet the appropriate strength requirements.

A permanent anchor installed after July 1<sup>st</sup>, 2009 must be capable of safely withstanding the impact forces applied to it, and have a minimum breaking strength per attached worker of 16 kN (3,600 lbs.) or two times the maximum arresting force in any direction in which the load may be applied. This does not apply to anchors of flexible horizontal lifeline systems. An anchor rated at two times the maximum arresting force must be designed, installed, and used in accordance with the manufacturer's specifications, or specifications certified by a professional engineer.

A temporary anchor used as part of a Travel Restraint System must have a minimum breaking strength, in any direction in which the load may be applied, of at least 3.5 kN (788 lbs.) per worker attached, and it must be permanently marked as being for travel restraint only. It must be installed, used, and removed according to the manufacturer's specifications, or specifications certified by a professional engineer.

In addition, a temporary anchor used in a travel restraint system must be removed from use on the earliest of:

- a. The date on which the work project for which it is intended is completed, or
- b. the time specified by the manufacturer or professional engineer.

A temporary anchor used as part of a personal fall arrest system must have a minimum breaking strength, in any direction in which the load may be applied, of at least 16 kN (3,600 lbs.) or two times the maximum arresting force per worker attached. It must be installed, used and removed according to the manufacturer's specifications or specifications certified by a professional engineer.

In addition, a temporary anchor used in a personal fall arrest system must be removed from use on the earliest of:

- a. The date on which the work project for which it is intended is completed, or
- b. the time specified by the manufacturer or professional engineer.

Note: A wire rope sling used as an anchor must be terminated at both ends with a Flemish eye splice rated to at least 90 percent of the wire rope's minimum breaking strength.

- 9) **Flexible and Rigid Horizontal Lifeline systems:** A horizontal lifeline (HLL) allows a worker to move horizontally while safely secured to a fall arrest system. Synthetic rope HLLs should be considered temporary because they are usually subject to deterioration resulting from use, exposure to the elements, and exposure to other potentially damaging hazards. Wire rope HLLs may be either temporary or permanent. Rigid rail horizontal fall protection systems are almost always permanent.

An employer must ensure a rigid horizontal fall protection system:

- a. Is designed, installed and used in accordance with the manufacturer's specifications, or specifications certified by a professional engineer.
  - b. And, if it is a permanent installation, it is inspected prior to use, by a professional engineer, a competent person authorized by the professional engineer, the manufacturer, or a competent person authorized by the manufacturer. They must certify that the system has been properly installed according to the manufacturer's specifications, or to the specifications certified by a professional engineer.
- 10) **Clearance, Maximum Arresting Force and Swing:** When designing a personal fall arrest system, consideration must be given to the arresting forces on the workers body, free fall, the distance, and the clearance to ensure the safety of a worker should they fall.

Therefore, the employer must ensure all of the following requirements are met:

- a. The worker's personal fall arrest system is arranged so that the worker cannot hit the ground, an object which poses an unusual possibility of injury, or a level below the work area. A safety factor of 0.9 m (3 ft.) is used when calculating the clearance required.
- b. A personal fall arrest system without a shock absorber limits a worker's free fall distance to 1.2 m (4 ft.).
- c. A shock absorber (E4 or E6) for a personal fall arrest system is chosen based on the weight of the worker and their tools, and
- d. A self-retracting device and/or a life safety rope is used in a manner that minimizes the hazards of swinging, and limits the swing drop distance to 1.2 m (4 ft.).

*See Appendix D for more information on clearance calculation, and Appendix A for more information on E4 and E6 shock absorbers*

A worker must also ensure they help minimize the effects of a fall on their body by ensuring they use the fall arrest system in a way that limits their swing fall. Ideally, a worker will work directly below their anchor, or as close as possible to directly below their anchor. In addition, when possible, the anchor location chosen should be one that directs the workers fall away from any potential obstacles.

## 6.5 Water Danger

Work over water adds an additional hazard to work at heights. When a worker has to work over water and could drown from a fall from other than a boat, an employer must ensure that the worker uses an appropriate fall protection system in combination with a life jacket or personal flotation device. If the fall protection system used prevents the worker from falling into the water, then the life jacket or personal flotation device is not required to be worn.

## 6.6 Fixed Ladders

An employer must ensure that if a worker is working from or on a fixed ladder or climbable structure, constructed and installed after July 1, 2009, is at a height of 1.8 m (6 ft.) or more, and they are not protected by a guardrail, that they provide:

- 1) Continuous protection from falling by equipping the fixed ladder or climbable structure with an integral fall protection system that meets the requirements of the applicable standards (see *Appendix C – Fall Protection Equipment Standards*), or
- 2) an alternative fall protection system.

In addition employers must ensure fixed ladders meet all of the following requirements:

- 1) The requirements of ANSI Standard ALI A14.3-2008, American National Standard (ANSI) for Ladders – Fixed- Safety Requirements if installed after July 1<sup>st</sup> 2015.
- 2) Have rest platforms with a width and length of at least 760 millimeters (30 inches), at not more than 6.4 m (20 ft.) intervals.
- 3) Have ladder cages if ladder is in excess of 6.4 m (20 ft.)(Note: A fixed ladder cage is not considered fall protection.)
- 4) Are not be used as a means of access/egress to a work area if there is another safe and recognizable way to enter and exit.
- 5) Have self-closing double bar safety gates at ladderway openings and platforms if installed after April 30, 2004.

## 6.7 Control Zone

A control zone is a unique approach to fall protection, in that workers are kept, at minimum, 2 m (6.6 ft.) away from an unguarded edge of an elevated work surface. Control zones can be used on surfaces having a slope of up to 4 degrees measured from the horizontal, and at least 4 m (13 ft.) wide. A control zone cannot be used to protect workers from falling from a skeletal structure that is a work area.

If a control zone is being used as a fall protection system and a worker is working within 2 m (6.6ft) of the control zone (i.e. within 4 m (13 ft.) of the unguarded edge), the employer must ensure that the inner limit of the control zone is clearly marked with a raised warning line, rigged and supported with a height of between 920 mm (36 in) and 1070 mm (42 in.) above the work surface, or is marked with another equally effective method.

The raised warning line around a control zone can consist of ropes, wires or chains, and supporting stanchions, and shall meet all of the following requirements:

- 1) Be flagged or marked, with highly visible materials at intervals that do not exceed 2 m (6.5 ft.).
- 2) Be attached to each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in the adjacent section before the stanchion tips over.
- 3) Have a minimum tensile strength (the ropes, wires or chains) of 2.2 kN (500 lbs.).

An “other equally effective method” might be a substantial barrier (e.g. a tall parapet, building system pipes and ducts) that is positioned between the worker and the unguarded edge, preventing the worker from getting to the edge. Since this substantial barrier is acting as a guardrail, it must be at least 920 mm (36 in) tall while the protected worker is using it.

Employers must make every reasonable effort to ensure that a worker does not have to work inside a control zone. If there is no alternative, then the employer must ensure both of the following requirements are met:

- 1) The worker uses a travel restraint system, or an equally effective means that prevents the worker from getting to the unguarded edge (Note: A worker is not required to use a fall protection system

when crossing the control zone to enter or leave the work area, but they must follow the most direct route).

- 2) That any worker who is not directly required for the work is not inside a control zone.

Workers themselves must ensure that they are not in the control zone unless they are involved in the work in the control zone, and also must ensure that they are adequately protected, as per the requirements above.

### **6.8 Leading Edge Fall Protection System**

Leading edge work is dangerous, and workers must be protected if they are accessing a leading edge area. An employer using a leading edge fall protection system consisting of fabric or netting panels must ensure that all of the following requirements are met:

- 1) The system is used only to provide leading edge fall protection.
- 2) The system is used and installed according to the manufacturer's specifications.
- 3) A copy of the manufacturer's specifications for the system is available to workers at the work site at which the system is being used.
- 4) The fabric or netting is drop-tested at the work site in accordance with the requirements of 29 CFR Section 1926.502(C)4(i) published by the U.S. Occupational Safety and Health Administration, or certified as safe for use by a professional engineer.
- 5) All workers using the system are trained in its use and limitations.

### **6.9 Fall Protection on Vehicles and Loads**

An employer must ensure that a worker does not climb onto a vehicle or its load unless the load is secured against movement. If the load is secured and a worker has to climb onto the vehicle or its load at any location where it is not reasonably practicable to provide a fall protection system for the worker, an employer must both:

- 1) Take steps to eliminate, or reduce, the need for the worker to climb onto the vehicle or its load.
- 2) Ensure that the requirements of Section 6.10 - Procedures in Place of Fall Protection Equipment, requirements below are met.

### **6.10 Procedures in Place of Fall Protection Equipment**

The option of using an administrative procedure is not intended to allow an employer or worker to avoid using proper fall protection or an elevated work platform.

An employer must ensure a procedure based fall protection system is only used in the following situations:

- 1) The installation or removal of fall protection equipment,
- 2) roof inspections,
- 3) emergency repairs,
- 4) at-height transfers between equipment and structures if allowed by the manufacturer's requirements, or
- 5) situations in which a worker must work on top of a vehicle or load, and the requirements of Section 6.9 Fall Protection on Vehicles and Loads above have been met.

When using procedures in place of fall protection system, the employer shall document why it was not practicable to use fall protection.

In addition, the employer must ensure that all of the following requirements are met:

- 1) A written hazard assessment is completed before the work at height begins.

- 2) The procedures are being followed while performing the work, are in writing and available to the workers before they begin the work.
- 3) The work is carried out in a way that minimizes the number of workers exposed to a fall hazard while work is performed.
- 4) The work is limited to light duty tasks of limited duration.
- 5) The worker performing the work is competent to do it.
- 6) When used for inspection, investigation or assessment activities, these activities take place prior to the actual start of work, or after the work has been completed.
- 7) The procedures do not expose a worker to additional hazards.

### 6.11 Elevated Work Platforms (EWP)

EWP's offer flexibility for reaching, and completing work at heights. When using an EWP or Scissor lift at a worksite, an employer must ensure that both of the following requirements are met:

- 1) A worker uses a full body harness and lanyard connected to an anchor specified by the manufacturer. If no anchor is specified by the manufacturer, an anchor point is to be certified by a professional engineer that meets the requirements of CSA Standard Z259.16-04 (R2009), Design of Active Fall-Protection Systems.
- 2) When the lanyard is connected to the anchor, if reasonably practicable, it is short enough to prevent the worker from being ejected, but also is long enough to allow the worker to perform his or her work.

### 6.12 Egress from Elevated Platforms

When using an EWP, a worker should keep their feet on the floor of the platform during all normal work activities. Workers shall not enter or leave an elevated platform when elevated, except in an emergency, or unless all of the following requirements are met:

- 1) A written hazard assessment is completed, including wind speed and proximity to power lines.
- 2) The elevated platform is on a firm level surface.
- 3) The structural adequacy of the landing area has been established, and the landing area is clear.
- 4) The maximum gap between the platform and landing shall not exceed 100 mm
- 5) The platform shall be secured (e.g. tied) to a suitable point on the landing.
- 6) The egress does not take place unless a safety harness is properly worn and attached to a suitable anchorage on the structure.
- 7) The base controls of the elevated platform are tagged to indicate the equipment is in use, and to caution against interference.
- 8) 100% tie-off is maintained while moving from one platform to another.

### 6.13 Suspended Personnel Baskets

When there is no alternative to working at heights, and the decision is made to use a suspended personnel basket, the employer must ensure that both of the following requirements are met:

- 1) The basket used is designed, constructed, maintained and used in accordance with CSA Standard CAN/CSA Z150-98 (R2004), Safety Code on Mobile Cranes, clause 5.4.7
  - a. If the personnel basket is not commercially manufactured, it must be designed and certified by a professional engineer.
- 2) The workers performing work using personnel baskets are using a personal fall arrest system.

If it is not practicable to provide a separate personal fall arrest system using a vertical lifeline for each worker in the personnel basket, then the employer must ensure that both the following requirements are met:

- 1) A separate support is attached between the suspended personnel basket and the hoist line above the hook assembly, and is capable of withstanding the gross weight of the personnel basket, materials, equipment and workers.
- 2) Each worker within the personnel basket is wearing a separate personal fall arrest system attached to the personnel basket.

## 6.14 Portable Ladders

Portable ladders (e.g. step ladders, single ladders, extension ladders) are useful and frequently used devices at a work site. Falls from portable ladders usually happen when the ladder shifts, moves or tilts. Unstable or slippery base surfaces are the primary reasons ladders shift, move or tilt. Other reasons workers fall from ladders include a misstep or a slip of the foot, a loss of balance, an overreach of the ladder, or the ladder being struck by a vehicle or other object.

Portable ladders come in a variety of lengths and grades, and the correct ladder should be chosen based on the work, the height and the hazards. For example, heavy grade ladders should be used on construction and industrial work sites. Metal ladders and wooden ladders with side rail metal reinforcement wires must not be used during the servicing of energized, or potentially energized, electrical equipment.

Typically, the ladders used are purchased, rather than constructed. However, if an employer constructs a ladder, it must meet the requirements of Alberta OH&S Code Part 8 Section 134 - Constructed Portable Ladders.

The vast majority of ladders are manufactured portable ladders, and they must be designed, assembled, maintained and disassembled according to the requirements of Alberta OH&S Code Part 8 Section 135 - Manufactured portable ladder.

An employer must ensure that a portable ladder manufactured on or after July 1<sup>st</sup>, 2009 meets the requirements of:

- 1) CSA Standard Z11-12 Portable Ladders,
- 2) ANSI Standard ASC A14.1-2007, American National Standard for Ladders – Wood – Safety Requirements,
- 3) ANSI Standard ASC A14.2-2007, American National Standard for Ladders – Portable Metal – Safety Requirements, or
- 4) ANSI Standard ASC A14.5-2007, American National Standard for Ladders – Portable Reinforced Plastic – Safety Requirements.

In addition the employer must ensure that a worker uses a personal fall arrest system if they are working from a portable ladder and could experience a fall of 1.8 m (6 ft.) or more. This does not apply while the worker is moving up or down the portable ladder, unless the distance exceeds 6 m (20ft).

If it is not reasonably practical to use a personal fall arrest system, a worker may work from a portable ladder without fall protection if all of the following requirements are met:

- 1) The work is a light duty task of short duration (e.g. when parts and tool weight do not affect balance, and no heavy force is needed for the work).
- 2) The worker's center of balance is at the center of the ladder at all times, even with an arm extended beyond the side rails of the ladder.
- 3) The worker maintains three-point contact whenever the worker extends an arm beyond a side rail (e.g. nothing in their hands or on their arms while ascending or descending the ladder).

When using a ladder, a worker must ensure that all of the following requirements are met:

- 1) The top of all straight ladders are secured against movement, and placed on a base that is stable (Note: The first ascent to secure the top of the ladder requires the assistance of a second person to hold the ladder.).
- 2) The base of an inclined portable ladder is no further from the base of the wall, or structure, than  $\frac{1}{4}$  of the height to where the ladder contacts the wall or structure.
- 3) The side rails of a portable ladder extend at least 1 m (3.3 ft.) above a platform, landing or parapet if the ladder is used as a means of access to the platform, landing or parapet.
- 4) They do not perform work from either of the top 2 rungs, steps or cleats of a portable ladder unless the manufacturer's specifications allow the worker to do so, or the step ladder has a railed platform at the top.
- 5) They inspect the ladder prior to each use to ensure no broken or missing parts. If the ladder is not fit for duty, the worker must tag it out of service and report it to their employer.

In addition, the worker shall practice good ladder safety, including all of the following:

- 1) Always facing the ladder when ascending and descending the ladder.
- 2) Never leaning to one side or overreaching while using a stepladder.
- 3) Never using a stepladder as a support for a working platform, as the ladder is too unstable, unless permitted by the stepladder manufacturer.
- 4) Only one worker using the ladder at a time, unless specified by the manufacturer.
- 5) Not placing a stepladder on boxes or scaffolds to gain extra height.
- 6) Always taking care to set up suitable barriers where necessary when positioning a stepladder in corridors, or near roadways, where it could be hit by a person, or vehicle.

## **7.0 EMERGENCY RESPONSE/RESCUE PLANS**

When a Fall Protection Plan is required, it must include a rescue plan if there is the possibility of a worker falling and being suspended by a personal fall arrest system, and in the rare case when a safety net is used.

Due to the risk of suspension trauma to a fallen worker, rescue plans and/or procedures shall be initiated as quickly as possible.

Note: A rescue plan is not necessary when a worker is using a travel restraint system since a worker will not fall and be left suspended in the air.

### **7.1 Rescue Plan/Procedures**

When a rescue plan is required it must be available at the work site as part of the fall protection plan, and must be reviewed with workers before the work begins. Workers should ensure that they are confident in their understanding of the rescue plan, and any concerns shall be reported to their employer. The rescue plan must be updated when conditions affecting fall protection change.

Personnel involved in performing a rescue must be trained in rescue procedures and these procedures should be practiced at regular intervals. Equipment required for the rescue shall be on site in order to quickly initiate a rescue.

### **7.2 Suspension Trauma**

Suspension Trauma, or orthostatic incompetence, is an effect which occurs when the human body is held upright without any movement for a period of time (e.g. a fallen worker suspended in a full body harness).

The onset of symptoms may be after just a few minutes, but generally occurs after 15 - 20 minutes of free hanging.

Once rescued and brought to the ground level, improper treatment of a worker with suspension trauma can result in the death of the worker. Due to the unique requirements for treating workers with suspension trauma, emergency response teams and rescue personnel and and/or first aid responders shall receive training on the care and treatment of workers suffering from suspension trauma.

### 7.3 Prohibition from Working Alone at Heights

Due to the health hazards of suspension trauma, at no time shall a worker work alone at heights where the fall protection system could allow a fallen worker to be suspended. The worker shall be in direct communication with another worker, team leader or supervisor. Using a radio or cell phone does not satisfy the direct communication requirement, since these devices can slip away from a worker during a fall.

This requirement does not apply to work done on a platform or scaffold with guardrails in place and no other means of fall protection is required, or where a travel restraint system, preventing a fall from height, is in use.

## 8.0 INSPECTIONS AND MAINTENANCE OF EQUIPMENT

Employers must ensure that the individual components of a fall protection system are inspected, maintained and recertified as per the manufacturer's instructions.

In addition, the employer must ensure any equipment used as part of a fall protection system is removed from service and either returned to the manufacturer or destroyed, if:

- 1) It is defective, or
- 2) has come into contact with excessive heat, a chemical, or any other substance that may corrode or otherwise damage the system.

Similarly, the employer must ensure any fall arrest system that has stopped a fall is removed from service, and is not returned to service unless a professional engineer or the manufacturer certifies that the system is safe for use.

### 8.1 Inspections

- 1) **Fall Protection Equipment:** All equipment used as part of a fall protection system must be inspected by the worker before it is used. The worker must ensure all equipment is in good working condition as per their training. Any equipment found to be defective during these inspections must be removed from service, tagged out of service, and must be reported to their employer.

Annually, or more frequently, all fall protection equipment must be inspected by a trained and competent person, as per the manufacturer's instructions. A written record of this inspection should be kept to verify that the inspection took place. The manufacturer's instructions will also specify inspection frequency, and which equipment (SRD's for example) must be sent back to them for re-certification. The CSA Z259 series of standards also specify inspection requirements.

- 2) **Elevated Work Platforms (EWP):** The manufacturer's instructions for EWP's have inspections requirements that must be followed. The CSA B354 series of standards also specify daily, periodic, annual and structural inspections for EWP's.

## 8.2 Maintenance

- 1) **Fall Protection Equipment:** Manufacturer's instructions will include, along with other valuable information, information on the proper maintenance, cleaning, and storage of their fall protection equipment. These instructions should be retained, and must be followed to prevent deterioration of the equipment. Equipment not maintained or properly stored can become damaged, or degrade over time through exposure to extreme weather conditions, corrosive chemicals, sandblasting operations, etc.
- 2) **Elevated Work Platforms:** Manufacturer's instructions for EWP's have maintenance requirements that must be followed. The CSA B354 series of standards also specify preventative maintenance requirements.

## 9.0 TRAINING

Training is an important part of ensuring worker competency. Prior to allowing a worker to do any work in an area where a fall protection system is required, the employer must ensure that the worker is trained in the safe use of the required equipment. This includes, but is not limited to understanding all of the following:

- 1) Applicable Alberta legislation.
- 2) Requirements of a fall protection plan, and when one is needed.
- 3) Identification of hazards.
- 4) Assessment and selection of anchors/anchorage.
- 5) Selection, assembly, fitting and inspection, as applicable, of all parts of the fall protection system.
- 6) Effects of a fall on the human body.
- 7) Procedures to be used in the case of a fall from heights.
- 8) Requirements of inspecting, fitting, adjusting, and connecting of fall protection systems and components.
- 9) Emergency response procedures.

A prerequisite for performing work on any of the OSSA Sites is successful completion of the OSSA Working at Heights Training, which covers at a minimum, all of the requirements in this RCOP.

## 10.0 ASSURANCE AND ASSESSMENTS

Employers shall ensure they have a robust assurance system for ensuring compliance with this RCOP, and for assessing how their fall protection procedures are being implemented in the field. This should include, at minimum:

- 1) An in-field competency verification process to ensure the fall protection equipment is being used as required.
- 2) An in-field documentation verification process, which includes documentation of the equipment inspection requirements for all the components of their fall protection systems.
- 3) A feedback system for operator(s) to have input on how the RCOP and/or related procedure(s) can be improved.

## 11.0 REFERENCES

In addition to the CSA standards listed in Appendix C, the following references were used to create this RCOP.

- 1) Alberta Occupational Health and Safety Act (Revised Statutes of Alberta 2000 Chapter O-2), 2013
- 2) Alberta Occupational Health and Safety Regulation, 2013
- 3) Alberta Occupational Health and Safety Code, 2009
- 4) Alberta Occupational Health and Safety Code, 2009, Explanation Guide - Part 6
- 5) Alberta Occupational Health and Safety Code, 2009, Explanation Guide - Part 8
- 6) Alberta Occupational Health and Safety Code, 2009, Explanation Guide - Part 9
- 7) Canadian Natural Resource Limited Code of Practice Fall Protection, Rev.0, 2013-08-26
- 8) Shell Albian Sands Safety Working at Heights Compliance Work Practice, Rev.2, 2014-04-10
- 9) Suncor Standard Fall Prevention For Elevated Work Areas, 2010-06-05
- 10) Syncrude Working at Heights, Rev.0, 2014-05
- 11) Canadian Safety Association Standards as listed in Appendix C
- 12) ANSI Standard ALI A14.3-2008, American National Standard (ASC) for Ladders - Fixed - Safety Requirements.
- 13) OSHA Fall Protection Standard – FP2010

## **APPENDIX A - DEFINITIONS**

**100% tie off:** 100% tie-off is the requirement to remain connected to one anchor point while connecting to a second anchor point; i.e., not disconnecting from one point before connecting to the next. This method assures the worker is protected in the case of a fall 100% of the time.

**Anchor:** Is an engineered component for coupling a Fall Arrest or Travel Restraint System to an anchorage.

**Anchorage:** Is a structure or part of a structure that is capable of safely withstanding any potential forces applied by a fall protection system. CSA list the following as examples: Beams, girder, column or wall.

**ANSI:** The American National Standards Institute.

**Bottoming Out:** Bottoming out occurs when the Total Fall Distance is greater than the distance from the work surface to the next level, the ground, or some other hazard below.

**Carabiner:** A connecting component that generally consists of a trapezoidal or oval body with a self-locking gate that requires at least two consecutive, deliberate actions to open, and that when released automatically closes and locks to prevent unintentional opening.

**CEN:** European Committee for Standardization.

**Clearance Required:** This is the distance that is required to prevent a worker from hitting the ground, or an obstacle below them, after their fall arrest system has completely deployed.

**Connector:** A component or element that is used to couple parts of a fall protection system together. D-rings, Carabiners and Double Locking Snap Hooks are examples of connectors.

**Competent Person:** Is an adequately qualified, suitably trained person, with sufficient experience to safely perform work without supervision, or with only a minimal degree of supervision.

**Control Zone:** The area between an unguarded edge of an elevated work surface and a line which is set back a safe distance (2 m or 6.6 ft.).

**CSA:** Canadian Standards Association.

**Descent Control Devices:** A device that is designed and intended to be used by one person for personal descent or to lower another person from an elevation. A descent control device may be used either for egress or for work positioning.

**Double Locking Snap Hooks:** A locking type connector with a self-closing, self-locking mechanism that remains closed and locked until intentionally unlocked and opened for connection or disconnection, and requires at least two consecutive, deliberate actions to open.

**D-Ring:** A connector used integrally in a harness as an attachment element or fall arrest attachment, and in lanyards, shock absorbers, lifelines, and anchorage connectors an integral connector.

**E4 Type Shock Absorber:** An E4 shock absorber is designed for a person weighing, with tools, between 100 lbs. to 254 lbs., and limits the arresting force to 4 kN (900 lbs.) under normal conditions and allows the arresting force to increase to 6 kN (1,350 lbs.) if the shock absorber is wet and frozen.

**E6 Type Shock Absorber:** An E6 shock absorber is designed for a person weighing, with tools, between 220 lbs. to 386 lbs., and limits the arresting force to 6 kN (1,350 lbs.) under normal circumstances, allowing it to increase to 8 kN (1,800 lbs.) when the shock absorber is wet and frozen.

**Elevated Work Platform (EWP):** A device that has an adjustable position platform, supported from ground level by a structure. Examples, a boom supported device, a manlift, scissor lift, or forklift truck work platform, etc.

**Extension ladder:** A non-self-supporting portable ladder consisting of two or more Sections travelling in interlocking rails, guides, or brackets so arranged as to permit length adjustment

**Fall Arresters:** Fall arresters are used when workers need to move vertically, normally over substantial distances. Also known as rope grabs, or cable grabs.

**Fall Arrest System:** An assembly of components that when properly assembled and used together, and connected to a suitable anchorage, will arrest a workers fall before the worker hits any surface or equipment below.

**Fall Protection System:** A fall protection system consists of:

- a) A personal fall arrest system,
- b) a travel restraint system,
- c) fabric or netting panels intended for leading edge protection,
- d) a safety net,
- e) a control zone,
- f) use of procedures in place of fall protection equipment, or
- g) another system approved by an Alberta OH & S Director of Inspection.

**Fall Restricting System:** A type of fall arrest system that has been designed to a limited a worker's fall to a specified distance. Typically used when there is minimum clearance below a worker.

**Free Fall Distance:** The vertical distance from the points where a worker falls to the point at which deceleration of the fall begins because of the action of a personal fall arrest system.

**Fixed Ladder:** A ladder that is permanently fixed to a supporting structure in a vertical position.

**Full Body Harness:** A body support device designed to transfer suspension forces or impacts during a fall arrest to the worker's pelvis and skeleton. Depending on classification, a full body harness may also be designed for travel restraint or work positioning.

**Hazard Assessment:** Is an evaluation of a situation, condition or thing that may be dangerous to health and safety of workers, with the goal of eliminating or mitigating the hazards.

**Hierarchy of Controls for Fall Protection:** As referenced in the Guide to Part 9 of the Alberta OH&S Code, the hierarchy for fall protection is a means to identify hazard controls in order of decreasing effectiveness.

**Horizontal Lifeline:** A component of the horizontal lifeline system that extends horizontally from one end anchorage to another and consists of a flexible line made of wire, fibre rope or rod, complete with terminations.

**Horizontal Lifeline System:** A fall protection system that uses a horizontal lifeline to which one or more workers may attach their personal fall-arrest system(s) using a suitable connection means.

**Kernmantle Rope:** Is a rope constructed with its interior core (the kern) protected by a woven sheath (the mantle) designed to optimize strength, durability and flexibility. The core fibres provide the tensile strength of the rope, while the sheath protects the core from abrasion during use.

**kN:** The acronym for a Kilonewton, which is a unit of force (1kN = approx. 225 pounds of force)

**Lanyard:** A flexible line or strap attached to a workers harness that is used to secure a worker or a shock absorber to a lifeline, anchor or anchorage connector.

**Leading Edge:** A leading edge is the edge of a floor, roof, or formwork for a floor or deck or other walking or working surface that changes location as additional Sections are placed, formed or built.

**Legislation:** All municipal and local laws, statutes, ordinances, by-laws and regulations, orders, directives and decisions rendered by any ministry, department or administrative or regulatory agency relating in any way to the health and safety of workers in the Province of Alberta.

**Life Safety Rope:** Is a length of synthetic or steel wire rope, attached to an independent point of anchorage. It is rigged from one or more anchor points; to which a worker's lanyard or other part of a personal fall arrest system is attached. Also known as a vertical lifeline.

**Maximum Arresting Force:** The maximum force imposed on a human body during a fall from heights.

**Must:** A specific or general regulatory and/or legal requirement that has to be followed in order to be in compliance.

**OH&S:** Alberta Occupational Health and Safety legislation.

**OSSA:** Oil Sands Safety Association

**Personal Fall Arrest System:** A fall arrest system, other than a safety net, designed to safely stop a worker from reaching a lower level or obstructions if a fall occurs.

**Personnel Basket** (or Crane Basket): Any suspended cage capable of, and intended to carry people.

**PIP:** Process Industry Practices.

**Practicable:** A requirement capable of being put into practice, or of being done or accomplished.

**Prusik Hitch Knot:** A Prusik knot is a sliding hitch knot used to ascend or descend a rope. These and other similar sliding hitch knots can only be used in the place of a fall arrestor during emergency situations or during training for emergency situations and only by a competent worker. They are not to be used as part of a normal fall arrest system.

**Roll-out:** What can happen when a force is applied to the top of a non-locking gate of a connector, and the gate opens releasing the hardware attached. This results in failure of the fall protection system, and most likely injury to the worker.

**RCOP:** Regional Code of Practice

**Safety Margin:** Is the distance between the bottom of workers feet and the level or an obstacle below. OSHA uses a 3 ft. (0.9 m) safety margin.

**Self-Retracting Device (SRD):** Is a component that pays out lanyard (i.e. automatically adjusts its length under light tension) while maintaining a rewinding force and automatically applies an arrest force in the event of a fall. There are four classifications of SRD's:

1. **Self-retracting lifeline (Class SRL):** A class SRL device shall be suitable for applications where:
  - i) It is anchored not lower than the elevation of the dorsal d-ring on the user's full body harness when used for fall arrest.
  - ii) The extracted lifeline cannot bear against a sharp or abrasive edge during fall arrest.
2. **Self-retracting lifeline with integral rescue capability (Class SRL-R):** A class SRL-R device shall be a class SRL or SRL-LE device that is provided with an integral means for assisted-rescue.  
Note: Assisted rescue via raising or lowering the rescue subject.
3. **Self-retracting lifeline with leading edge capability (Class SRL-LE):** A class SRL-LE device shall be suitable for applications where:
  - i) It is anchored lower than the elevation of the dorsal d-ring on the user's full body harness, or
  - ii) the extracted lifeline can bear against an edge during fall arrest.
4. **Self-retracting lifeline with leading edge and integral rescue capabilities (Class SRL-LE-R):** A class SRL-LE-R device shall be suitable as both SRL-LE and SRL-R.

**Shall:** A term used to identify a required practice or provision that the employer and/or worker is obliged to satisfy, in order to comply with this Regional Code of Practice.

**Shock Absorber:** Any device that dissipates kinetic energy and limits deceleration forces on the human body during an arrested fall. Also known as an Energy Absorber.

**Single Ladder:** A non-self-supporting portable ladder, non-adjustable in length, consisting of one section only. Single ladders may be either step or rung-type.

**Stepladder:** A self-supporting portable ladder, non-adjustable in length, having flat steps and hinged back.

**Total Fall Distance:** Is the vertical distance from the point at which a worker falls, to the point where the fall stops after all fall arresting system components have extended.

**Travel Restraint System:** An assembly of components that when properly assembled and used together, and when connected to a suitable anchorage, will prevent a worker from reaching an unprotected edge or another opening through which they could fall. A system designed solely for travel restraint most likely will not meet the requirements of a personal fall arrest system.

**Unusual Risk of Injury:** This may include working above moving water, operating equipment, open vessels containing hazardous substances, extremely hot or cold surfaces, etc.

**Worker:** For the purpose of this document a worker is any employee, who has to perform any type of work at heights.

**APPENDIX B - SAMPLE FALL PROTECTION PLAN**

When a Fall Protection Plan is required as per the Alberta OH&S Code Part 9 - Fall Protection, Section 140, it must be in writing, available at the worksite and reviewed with the workers prior to the start of work from heights. Below is an example of a fall protection plan, taken from the Guide to the Code Part 9.

<b>Company/Work Site Name:</b>	<b>Pg. 1</b>
<b>Address/Location:</b>	
<b>Fall Hazards</b>	
Identify all existing and potential fall hazards associated with the work site.	
<b>Fall Protection Systems To Be Used</b>	
Identify the fall protection systems to be used at the work site to protect the workers from the fall hazard (i.e. Travel restraint, personal fall arrest system, safety net, control zone, etc.).	
<b>Procedures</b>	
Identify detailed procedures to assemble, inspect, use, maintain & dismantle the fall protection system identified above.	
<b>Rescue Plan</b>	
Describe the procedure that will be followed if a worker falls and needs to be rescued.	
This fall protection plan was developed by:	
Name:	Signature:                      Date:



**APPENDIX C - FALL PROTECTION EQUIPMENT STANDARDS**

The Alberta OH&S Code Part 9 - Fall Protection lists the CSA, ANSI and/or CEN standards to which Fall Protection Equipment manufactured on or after July 1, 2009 must be approved to. Employers must ensure all equipment they supply their workers meets or surpasses these standards.

Note: The list below is not represented as an all-inclusive list of fall protection equipment, and therefore employers must ensure they reference the most current version of the OH&S Code Part 9.

Section of Code	Equipment	Requirement
142	<b>Full body harness</b>	<p>A full body harness manufactured on or after July 1, 2009 must be approved to:</p> <ol style="list-style-type: none"> <li>1. CSA Standard CAN/CSA Z259.10-12, Full Body Harnesses,</li> <li>2. ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components, or</li> <li>3. CEN Standard EN 361: 2002, Personal protective equipment against falls from a height – Full body harnesses</li> </ol>
142.2	<b>Lanyard</b>	<p>A lanyard manufactured on or after July 1, 2009 must be approved to:</p> <ol style="list-style-type: none"> <li>1. CSA Standard Z259.11-05 (R2010), Energy absorbers and lanyards,</li> <li>2. ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components, or</li> <li>3. CEN Standard EN 354: 2010, Personal protective equipment against falls from a height – Lanyards.</li> </ol>
142.3	<b>Shock absorber</b>	<p>A shock absorber or shock absorbing lanyard used as part of a personal fall arrest system, must be approved to one of the following standards if manufactured on or after July 1, 2009:</p> <ol style="list-style-type: none"> <li>1. CSA Standard Z259.11.05 (R2010), Energy-absorbers and lanyards;</li> <li>2. ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components, or</li> <li>3. CEN Standard EN 355: 2002, Personal protective equipment against fall from a height – Energy absorbers.</li> </ol>
143	<b>Connectors, carabiners and snap hooks</b>	<p>Connecting components of a fall arrest system consisting of carabiners, D-rings, O-rings, oval rings, self-locking connectors and snap hooks manufactured on or after July 1, 2009 must be approved, as applicable, to:</p> <ol style="list-style-type: none"> <li>1. CSA Standard Z259.12-11, Connecting Components for Personal Fall Arrest Systems (PFAS),</li> <li>2. ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components,</li> <li>3. CEN Standard EN 362: 2004, Personal protective equipment against falls from a height – Connectors, or</li> <li>4. CEN Standard 12275: 2013, Mountaineering equipment – Connectors – Safety requirements and test methods.</li> </ol>

Section of Code	Equipment	Requirement
144	<b>Fall Arrestors</b>	<p>A fall arrestor manufactured on or after July 1, 2009 must be approved to:</p> <ol style="list-style-type: none"> <li>1. CSA Standard Z259.2.1-98 (R2011), Fall Arresters, Vertical Lifelines, and Rails,</li> <li>2. ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components, or</li> <li>3. CEN Standard EN 353-2: 2002, Personal protective equipment against falls from a height – Part 2: Guided type fall arrestors including a flexible anchor line.</li> </ol>
145	<b>Self-retracting device</b>	<p>A self-retracting device manufactured on or after July 1, 2009 and used with a personal fall arrest system must be approved to CSA Standard Z259.2.2-14 - Self-Retracting Devices.</p>
146	<b>Descent control device</b>	<p>Automatic or manual descent control device manufactured on or after July 1, 2009 and used with a personal fall arrest system must be approved to:</p> <ol style="list-style-type: none"> <li>1. CSA Standard Z259.2.3-12 (ISO 22159.2007,MOD) Descent Control Devices,</li> <li>2. CEN Standard EN 341:2011, Personal protective equipment against falls from a height – Descender devices, or</li> <li>3. NFPA Standard 1983, Standard on Life Safety Rope and Equipment for Emergency Services, 2012 edition, classified as general or light duty.</li> </ol>
147	<b>Life Safety Rope</b>	<p>A life safety rope manufactured on or after July 1, 2009 and used in a fall protection system must be approved to:</p> <ol style="list-style-type: none"> <li>1. NFPA Standard 1983, Standard on Life Safety Rope and Equipment for Emergency Services, 2012 Edition, as light-use or general-use life safety rope, or</li> <li>2. CEN Standard EN 1891:1998, Personal protective equipment for the prevention of falls from a height – Low stretch kernmantle ropes, as Type A rope, or meets the requirements of: <ol style="list-style-type: none"> <li>a) CSA Standard CAN/CSA-Z259.2.1-98 (R2011), Fall Arresters, Vertical Lifelines, and Rails, or</li> <li>b) ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components.</li> </ol> </li> </ol>
148	<b>Adjustable lanyard for work positioning</b>	<p>An adjustable lanyard manufactured on or after July 1, 2009 and used by a worker as part of a work positioning system must be approved to:</p> <ol style="list-style-type: none"> <li>1. CSA Standard Z259.11-05 (R2010), Energy absorbers and lanyards, as a Class F adjustable positioning lanyard, or</li> <li>2. CEN Standard EN 358: 2000, Personal protective equipment for work positioning and prevention of falls from a height – Belts for work positioning and restraint and work positioning lanyards.</li> </ol>

Section of Code	Equipment	Requirement
153	<b>Flexible and rigid horizontal lifeline systems</b>	<p>A flexible horizontal lifeline system manufactured on or after July 1, 2009 must meet the requirements of:</p> <ol style="list-style-type: none"> <li>1) CSA Standard Z259.13-04 (R2009), Flexible Horizontal Lifeline Systems, or</li> <li>2) The applicable requirements of CSA Standard Z259.16-04 (R2009), Design of Active Fall-Protection Systems.</li> </ol>
154	<b>Fixed ladders and climbable structures</b>	<p>A fixed ladder or climbable structure, constructed and installed after July 1, 2009 and equipped with an integral fall protection system must meet the requirements of:</p> <ol style="list-style-type: none"> <li>1) CSA Standard Z259.2.1-98 (R2009), Fall Arresters, Vertical Lifelines, and Rails, or</li> <li>2) ANSI/ASSE Standard Z359.1-2007, Safety requirements for personal fall arrest systems, subsystems and components, or</li> <li>3) An alternate fall protection system.</li> </ol>
156	<b>Boom supported work platforms and aerial devices</b>	<p>If there is no anchor specified by the manufacturer of a boom-supported elevating work platform, a boom-supported aerial device, or forklift truck work platform which uses a personal fall arrest system, an anchor point must be certified by a professional engineer that meets the requirements of CSA Standard Z259.16-04 (2009), Design of Active Fall-Protection Systems.</p>

## APPENDIX D - CALCULATION OF FALL CLEARANCE DISTANCE

*Note: The following two examples are illustrative and are not applicable to all situations.*

### Example 1 - Lanyard with a Shock Absorber

Drawing not to scale

**Example #1**  
**Using a lanyard with a shock absorber:**

The worker is using a 1.8m (6 ft.) long lanyard **with shock absorber**. The combined weight of the worker, clothing, and tool belt is at least 100 kg (200 lbs.).

- A** Length of lanyard – 1.8 m (6 ft.)
- B** Shock absorber deployment – 1.1 m (3.5 ft.)
- C** Height of worker – 1.8 m (6 ft.)
- D** Safety factor – clearance below feet of 0.9 m (3 ft.)
- E** A+B+C+D = Overall minimum clearance – 5.6 m (18.5 ft.)

**Note:** This example is illustrative. It assumes the anchor point is at a height, equal to or above, the worker's D-ring. This example would not apply to situations where the anchor point is below the height of the worker's D-ring.

### Do your own math

Lanyard with shock absorber	Metric	Imperial
<b>A</b> Length of lanyard		
<b>B</b> Length of shock absorber	+	
<b>C</b> Height of worker	+	
<b>D</b> Safety factor	+	0.9 m    3 ft.
<b>E</b> Total fall distance	=	

**Example 2 - Self-Retracting Lanyard (SRL)**

**Example #2**  
**Using a self-retracting lanyard (SRL):**

The worker is using a self-retracting lanyard and **NO shock absorber**. The combined weight of the worker, clothing, and tool belt is at least 100 kg (200 lbs.).

- A** Swing fall – 0.6 m (2 ft.)
- B** Deceleration distance – 0.8 m (2.5 ft.)
- C** Height of worker – 1.8 m (6 ft.)
- D** Safety factor – 0.9 m (3 ft.)
- E** A+B+C+D = Overall minimum clearance – 4.1 m (13.5 ft.)

**Note:** This example is illustrative. It assumes the anchor point is above the worker's head, and that the equipment is being used per the manufacturer's instructions. This example would not apply to situations where the anchor point is below the worker's head.

*Drawing not to scale*

**Do your own math**

SRL – No shock absorber	Metric	Imperial
<b>A</b> Swing fall		
<b>B</b> Deceleration distance	+	
<b>C</b> Height of worker	+	
<b>D</b> Safety factor	+	0.9 m 3 ft.
<b>E</b> Total fall distance	=	