

## **1.0 INTRODUCTION**

### **1.1 Purpose**

The purpose of this Code of Practice (COP) is to establish and maintain Canadian Plains Energy Services (CPES) standards and practices performed by workers who may be at risk of falling while working at heights when performing tasks on CPES work sites. This practice is the minimum requirement necessary to ensure activities conducted where an injury can result from a fall to a lower level are performed safely. The COP must be applied in conjunction with other CPES systems, such as Hazard Identification, Assessment and Control (HIAC). The two primary Hazard Sources related to falls are Gravity and Motion.

This COP will provide guidance to any person(s) working in a situation where fall protection is required or for anyone that is in control or directing the performance of work where fall protection is required.

This COP provides the CPES site representative(s) with the minimum requirements to ensure that trained and competent workers are selected for the tasks at heights and that workers implement the control methods identified. It also provides guidance for the hazard assessment process required for unique situations when working at heights.

### **1.2 Application**

This COP applies to all CPES personnel working at heights in excess of:

- 3 meters (10 feet); from a temporary work area,
- 1.2 meters (4 feet) from permanent work area,
- Where a fall from a lesser height involves unusual risk of injury; or,
- As otherwise designated by a client or other regulation.

### **1.3 Definitions**

<b>Anchor Plate</b>	An engineered plate which offers more than one point of attachment to which fall arrest equipment may be securely attached. The ultimate load capacity of the anchor point to which it is secured must be rated for 'All' workers attached.
<b>Anchor Point</b>	An engineered point to which fall arrest or fall restraint system is securely connected to. This point of attachment shall not be used for any other purpose.
<b>Anchorage</b>	A structure, or part of a structure, that is capable of withstanding any potential forces applied to a fall protection system
<b>ASME</b>	American Society of Mechanical Engineers
<b>Control Zone</b>	The area 2m (6.56ft) between an unguarded edge of an elevated surface on a building or structure and has an effective raised warning line, or equally effective method. A control zone is not applicable if the slope of the surface exceeds 4°.

**April 18, 2018**

**FALL PROTECTION**

<b>Dynamic Fall Event</b>	A fall from heights, where for the purposes of this COP, the worker is fully protected by his third line of defence by the Fall Arrest System. This involves swing falls, free falls, momentum, and/or inertia possibly transferred to the human body.
<b>Fall Arrest Anchor</b>	A secure point of attachment to which a personal fall arrest system is attached. It must have an ultimate load capacity, in any direction, of 22.2kN (5000lb/f) for each worker attached.
<b>Fall Arrest System</b>	A system that will stop a worker's fall to avoid contact with the surface below. It is composed of a full body harness, shock absorbing system, lanyard/lifeline, carabiner(s) and any other load rated connecting equipment used to secure the worker to an anchor.
<b>Fall Protection Plan</b>	A written plan that is completed, available and reviewed before work starts. It records the gravity sources, fall hazards, steps necessary to eliminate or control the exposure to the hazards, equipment required, guidelines pertaining to inspection, maintenance, assembly, anchor points, disassembly of fall protection equipment, fall clearances, and rescue procedures and responsibilities.
<b>Fall Protection System(s) Hierarchy</b>	Any of the following when used to protect (or minimize the risk) a worker from falling: <ul style="list-style-type: none"><li>• Elimination or Avoidance</li><li>• Guardrails (Passive fall protection device)</li><li>• Travel/Fall Restraint System</li><li>• Fall Arrest System</li><li>• Control zone</li><li>• Safety monitor with control zone</li><li>• Safety net</li></ul>
<b>Full Body Harness</b>	A body support device consisting of connected webbed straps designed to distribute a fall arresting force over at least the thighs, pelvis and shoulders, with provision(s) for attaching a lanyard, lifeline or other connecting component.
<b>Horizontal Lifeline System</b>	A load rated system composed of a synthetic or wire rope installed horizontally between 2 anchors, to which a worker attaches the self-locking carabiner from a personal fall arrest system.
<b>Lanyard</b>	A load rated flexible line of webbing, synthetic or wire rope, which is used to secure a full body harness to a lifeline or anchor.
<b>Lifeline</b>	A load rated synthetic or wire rope secured to one or more anchors, to which a worker's lanyard or other part of a personal fall protection system is attached.

**April 18, 2018**

**FALL PROTECTION**

<b>Locking Carabiner</b>	A link incorporating a gate that self closes and is opened with a double action motion. This must have a self-locking mechanism to secure the gate against accidental opening while under load. It is used to connect components of a personal fall arrest system.
<b>Operating Authority</b>	The person (job coordinator) having immediate control and responsibility for directing work.
<b>Performing Authority</b>	The person(s) performing the work, or is in direct charge of the work being performed, e.g., crew leader, job foreman.
<b>Permanent Work Area</b>	The word permanent refers to the structure, not the nature and frequency of work performed. Common areas such as facility catwalks, CPES shops and facilities, customer facilities and buildings are classified as permanent work areas.
<b>PIP</b>	Process Industry Practices – A collection of company engineering standards
<b>Safety Monitor</b>	A trained worker that is designated to monitor a control zone to ensure that work is performed in a manner that minimizes the potential for a worker to fall.
<b>Self-Retracting Devices</b>	Performs a tethering function, which allows vertical movement, but minimizes the fall distance and the impact force (i.e., self-retracting lanyard and/or lifeline). It has a load rated housing, normally attached to the anchorage of a fall arrest system, which contains a drum-wound lifeline. Quick movement, typically applied at the onset of a fall, locks the drum and arrests the user's motion.
<b>Shock Absorber</b>	A device intended to reduce the force transferred to a worker when a personal fall arrest system is subject to a dynamic fall event.
<b>Swing Fall Hazard</b>	The hazard to a worker of swinging and colliding with an obstruction when a personal fall arrest system is operating under a dynamic fall event
<b>Temporary Work Area</b>	The word temporary refers to the structure, not the nature of the work being performed. Temporary work areas include working from a ladder, movable work stand, scaffold, etc.
<b>Travel Restraint/Restriction System</b>	A work positioning system to prevent a worker from travelling to and falling from an edge (e.g., building roof and/or a control zone). Example: A system in which a harness or belt is attached to one or more lanyards, each attached in turn to a static line or anchorage point.
<b>Work Positioning System</b>	A system of components attached to a safety line and includes a full body harness, decent controller and positioning lanyards used to support or suspend a worker in a safely supported work position for the duration of the task being undertaken at height.

**April 18, 2018**

**FALL PROTECTION**

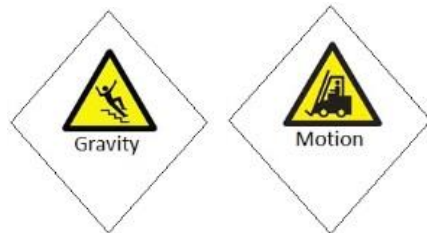
**Twin Tail / Dual Leg  
/ Bypass Lanyard**

A load rated flexible line of webbing or synthetic rope which has dual legs or twin tails with dual self-locking hooks and an E4 4kN (900lb/f) shock absorber. This is used to connect to a full body harness and anchor point more commonly used as a temporary system to climb fixed ladders without cable grab systems.

**2.0 POTENTIAL HAZARDS**

When a work site is identified as having gravity hazard sources and fall hazards which could include falling from a height to ground level or from ground level to a lower level, an assessment of the hazards must be completed.

**2.1 Hazard Sources and Hazards**



Hazards related to falling from a height may include activities in and around ladders, elevated platforms, modules, man-baskets, trenches and excavations, hydrovac slots and holes, scaffolds, moving vehicles, deep or moving water, tanks, etc. Other hazards on the work site (e.g., explosive, toxic, rotating equipment, rig pits, working on equipment such as high boy trailers/truck tanks) may increase the risk related to falling and need to be considered when planning fall protection. An example of this may be related to working on a platform/scaffold that puts the worker at less than minimum height (less than 3m (9.84ft)) for fall protection, but due to other hazards (e.g., process piping, valves, rebar or protruding equipment below the worker) fall protection controls are required as the secondary hazard may increase the potential consequence of a fall.

Other hazards are created by the task being performed or tools and equipment being used at heights. An example of this would be a welder working and creating hot slag which drops to the work environment below.

**2.2 Hazard Identification, Assessment and Control (HIAC)**

The HIAC process must identify the key hazards in relation to the hazard sources, including location of the hazard; frequency of worker exposure and potential consequences; distance of the potential fall; and the material and/or surface on which the worker might fall. Upon completion of the assessment, the appropriate fall protection controls (equipment and procedures) must be selected and used.

As part of the assessment process, workers need to consider that the improper use or fit of fall protection equipment can result in swing falls, body rollout and physical trauma associated with prolonged suspension in a harness and/or a variety of property damage and personal injuries up to and including death. Workers must also consider loose clothing, jewellery and contents in pockets while wearing a full body harness as they may cause additional injuries in the event of a fall arrest situation.

Workers are, as with any other tasks/jobs, required to re-assess the work environment and complete on-going observations of the work site to identify fall related hazards that may not have been identified as part of the initial assessment or that were created as part the task/job. As with hazards identified through the assessment process, workers are required to communicate, document, and implement appropriate controls prior to proceeding with the task/job at hand.

### **3.0 RESPONSIBILITIES**

An effective fall protection program is one in which everyone involved understands their roles and responsibilities.

#### **3.1 Senior Management**

*It is the responsibility of Senior Management to:*

1. Ensure the Code of Practice for fall protection is reviewed and approved.
2. Ensure the effectiveness of the Code of Practice is assessed.
3. Provide guidance on the implementation of the Code of Practice.

#### **3.2 Managers/ Superintendents**

*Managers/Superintendents are responsible to:*

1. Ensure the CPES Fall Protection COP is available, understood and implemented.
2. Ensure adequate systems are in place to identify workers who require fall protection and rescue training.
3. Ensure workers receive training before performing any work at heights as per this COP.
4. Ensure appropriate fall protection resources (equipment, training, standards, etc.) are available at each work site where a fall hazard is present.
5. Have assessments completed on facilities to incorporate proper fall protection and arrest equipment in the design.

#### **3.3 Foremen/Site Supervisors**

*Foremen/Site Supervisors are responsible to:*

1. Ensure that the site HIAC process identifies if workers could fall from height(s) and the applicable fall protection controls are in place.
2. Engage our clients in identifying gravity hazards sources and specific fall hazards.
3. Ensure fall protection plans are developed during the pre-job planning stage.
4. Ensure required inspections and maintenance of fall protection equipment are followed and documented as per manufacturers' specifications, removing defective equipment from the work site until repaired or replaced.
5. Ensure appropriate fall protection equipment is available, used and stored as per manufacturers' specifications.
6. Use certified companies to complete repairs and inspections on fall protection equipment.

April 18, 2018

FALL PROTECTION

7. Use certified and approved vendors to supply and erect temporary fall protection equipment.
8. Select trained/competent workers for the tasks performed at heights and monitor for compliance to controls selected.
9. Communicate this COP to workforce, including employees, ISPs and visitors.
10. Ensure all workers conform to this COP.
11. Ensure subcontractors have an effective fall protection program and if not, comply with CPES's.

### 3.4 Health, Safety Environment (HS&E) Department

*HSE Department is responsible to:*

1. Evaluate the Fall Protection COP, including the effectiveness of the training and orientation program, related to working at heights and use fall protection equipment.
2. Review and approve the content and providers of fall protection training in order to promote consistent implementation of this standard.
3. Assist with site-specific HIAC process to identify fall protection systems and procedures for both permanent and temporary structures, helping to eliminate and/or minimize potential fall hazards.
4. Assist with completion and review of fall protection plans.
5. Assist management, workers, ISPs and visitors in application of the COP.
6. Providing coaching and guidance on the understanding and application of this COP.
7. Monitor and evaluate the effectiveness of the Fall Protection program.

### 3.5 Workers

*Workers are responsible to:*

1. Participate in the HIAC process to understand the hazard sources, hazards and control methods identified.
2. Ensure that a fall protection plan is in place and reviewed prior to starting work.
3. Inspect fall protection equipment, prior to use, in accordance with manufacturer's requirements.

**Note:** Fall protection equipment must have a legible label in place and/or be tagged with an identification system to ensure standards are met or it will be considered out of service, as per CSA standards.

4. Attend fall protection training as identified in this COP.
5. Use fall protection equipment as required.
5. Clean, maintain and store fall protection equipment as per manufacturer's requirements.
6. Ensure they do not undertake work they are not trained and competent to perform.
7. Ask for assistance or more information where they are unsure or unfamiliar with this COP.

### **3.6 Sub-contractors**

*Sub-contractors are responsible to:*

1. Ensure that they have Fall Protection program that meets or exceeds CPES's COP.
2. In absence of a standard they must adhere to CPES's COP.

## **4.0 FALL PROTECTION CONSIDERATIONS**

### **4.1 FALL PROTECTION PLANNING**

Fall protection planning is a pre-job procedure/design that is intended to consider the fall hazards, the fall protection hierarchy of controls, selection of fall protection equipment and the human factor required to protect workers.

When working at heights greater than 1.2m (4ft) on a permanent work area, 3m (9.84ft) on a temporary work area, when working over an excavation greater than 1.2m (4ft) deep or when working over water, Fall Protection Planning is required.

A fall protection plan may also be identified through the site specific HIAC. Fall protection planning helps identify and assess the hazards and identify proper controls to keep workers aware of fall hazards and the actions necessary to mitigate those hazards.

Work tasks must be planned and scheduled so that the different work activities will not interfere with or be affected. This includes activities in a work crew or concurrent operations.

#### **4.1.1 Considerations for your fall protection plan**

##### **1. Factors associated with fall-arrest systems**

- a. **Swing Fall** - The hazard to a worker of swinging and colliding with an obstruction when a personal fall arrest system is operating under a dynamic fall event (Gravity and Motion). Swing fall is also known as the pendulum effect, and in some situations the user may swing onto the ground (which is called 'swing down') or swing back onto the building or structure (which is called 'swing back').
- b. **Use compatible components** – Fall restraint/arrest systems and safety harnesses should only be used with the individual manufacturer's components known to be compatible. The use of non-compatible components may lead to 'roll-out' with some hook/carabiner configurations, resulting in injury or death. If you are unsure whether components of a fall-arrest system are compatible, contact the manufacturer for further information.
- c. **Snap hooks** - Shall be of the double action type, requiring at least two consecutive deliberate actions to open. Snap hooks shall not be connected to each other as this could prevent the safe operation of the snap hook.

- d. **Limit free fall distance** - Fall-arrest systems, incorporating a lanyard, should be installed so that the maximum distance a person would free fall before the fall-arrest system takes effect is 1.2m (4ft). There should be sufficient distance between the work surface and any surface below to enable the system, including the action of any shock absorber to fully deploy. Lanyards must not be used in conjunction with self-retracting devices as this can result in an excessive amount of free fall prior to the fall being arrested.
- e. **Water Danger** - Employers must ensure that that a worker uses an appropriate fall protection system in combination with a life jacket or personal floatation device if the worker may fall into water that would expose the worker to the risk of drowning, unless the fall protection system prevents the fall into the water.

## **2. Work Surfaces**

The following is a list of some of the more common issues that should be taken into consideration when evaluating the workplace/worksite;

- a. The stability, fragility or brittleness of the work surface.
- b. The ability to slip (e.g. where surfaces are wet, polished, glazed or oily in the case of new steelwork).
- c. The safe movement of workers where surfaces change.
- d. The strength or capacity to support loads of the surface.
- e. The slope of work surfaces.
- f. Where levels change and workers may be exposed to a fall from one level to another.
- g. The stability of temporary or permanent work structures.
- h. The condition of ground for scaffolding or a work platform.
- i. Whether the working area that is crowded or cluttered.
- j. Check scaffold platform is fully decked, bracing, tying, guardrails, access.
- k. Edge protection for open edges of floors, working platforms, walkways, walls or roofs.
- l. Any penetrations, openings and holes which will require guarding (similarly unguarded shafts and excavations).

## **3. Proximity of workers to at risk work areas:**

- a. Where loads are placed on elevated work areas.
- b. When objects are below a work area, such as re-bar and pickets.
- c. Where work is to be carried out above workers (e.g. potential hazard from falling objects).
- d. Power lines near working areas.
- e. Movement of equipment.
- f. Access to, egress from and movement around the working area (checking for obstructions).



- g. Multiple contractors working in the same area.
- h. Manual handling - checking safe work practices for carrying awkward material, such as plaster boards and roof sheeting, which may be caught by the wind.
- i. Vision is impaired or restricted by the use of goggles, face shields, respirators or other devices, or there is reflective glare off surfaces.
- j. Lighting - should be adequate for the task.
- k. Weather conditions - when heavy rain, dew, extreme heat or cold or winds are present.
- l. Footwear and clothing - suitability for conditions.
- m. Ladders - where and how they are being used.

#### **4. Organizing and Sequencing of Work**

Organize work so that workers do not interfere with or increase the risk of a fall for themselves or others. Sequence jobs so that different work crews are not working above or below each other at the same time. Plan the work so tasks are not performed for extended periods from a ladder, or so that work at height is minimised in extremely hot or cold weather.

### **5.0 PRACTICES AND GUIDELINES**

#### **5.1 Fall Protection Pre-Planning, Design and Procurement**

##### **5.1.1 Pre-Planning and Design**

Fall protection pre-planning is based on the hierarchy of control of elimination, engineering, administrative and personal protective equipment. This COP supports the theory that elimination and engineered controls are the preferred method to control hazards. (e.g. weld/wire at ground level; design maintenance methods that allow workers to stay at ground level).

Design of equipment and facilities should include, as the primary control for work areas, permanently attached ladders, stairs, walkways, guardrails, platforms and anchor points or plates. Where temporary access to equipment is the only functional method, CPES will ensure that fall protection systems (e.g., anchor points) are included in the design of the equipment and meet the standards identified.

##### **5.1.2 Procurement**

CPES's goal for engineering out fall hazards from new equipment recognizes that procurement plays a key role in obtaining equipment that minimizes or eliminates the need for working at heights.

This may include identifying specific types of fall arrest equipment. (e.g., cable grabs, climbing equipment that meets the criteria within this COP and monitoring equipment that eliminates the need for climbing to heights).

CPES's Health, Safety and Environment Department will assist the procurement personnel with the selection of fall protection equipment and the hiring of aerial equipment contractors.

**April 18, 2018**

**FALL PROTECTION**

## **5.2 Fall Protection Methods and Controls**

The following are the preferred engineered fall protection methods for existing work sites and future designs.

### **5.2.1 Permanent Work Platforms**

#### **1) Horizontal Platforms**

Horizontal platforms are structures, which are permanently located and may be greater than 1.2m (4ft) from the ground and are intended for workers to access on a regular basis (e.g., storage and loading docks). This platform will be engineered to meet standards including the requirement for toe boards, handrails and mid-rails. When properly designed with guardrails and kick plates, no other fall protection is required, unless the worker is working above the height of the guardrail or is extending his/her body beyond the guardrail.

For both permanent and temporary work sites where a horizontal work platform is less than 1.2m (4ft) above the ground, consideration is to be given to the installation of fall protection system due to the unusual possibility of injury due to the type(s) of objects on/in which a worker may fall (e.g., water, excavation, process piping, valves, rebar, protruding equipment, chemicals, extreme heat or cold, oxygen deficient or enriched atmosphere).

**An example of a non-compliant horizontal platform** is a platform without a swing gate or similar device if one is required; is missing any of the applicable hand and/or mid-rails or toe boards; and/or has flooring that is defective and/or is not properly supported.

#### Guidelines When Using Platforms

- Ensure platforms and associated walkways, runways and ramps are a minimum of 600mm (23.6in) wide.
- Ensure the swing gate or similar device is closed when conducting work.
- Keep tools in a working kit (not loose on the platform floor) and/or cordon off (e.g., tape or snow fence) the area below the work being conducted to prevent falling objects from striking other workers. Note: Toe plates on platforms prevent tools/materials from being inadvertently kicked off the platform.
- Raise and lower tools/materials with load rated tool bag and rope tied off to an acceptable anchor.
- Where guardrails are unavailable, an acceptable fall protection system is to be located in close proximity to the platform, and used by the workers while conducting their work.
- The platform must have a surface that provides adequate traction, ensuring safe walking and working conditions, and must be adequate for the conditions encountered (e.g., mud, snow/ice, oil residue).
- Consider the type(s) of atmosphere that may be encountered when working on a platform, including hazardous gases, wind, heat/cold, noise/communication, lightning, levels of lighting.
- Assess the movement of auxiliary equipment, including swing and travel paths, emergency escape line(s), and associated landing and anchor points for rescue equipment.

April 18, 2018

FALL PROTECTION

- If using fall arrest equipment to climb to the platform and where fall arrest equipment is required while on that platform, workers must attach the second method of fall arrest equipment prior to unlatching the first method.
- Workers shall not stand on mid-rails or handrails to extend their reach.  
**Note:** Where horizontal travel is necessary without an available platform, an engineered horizontal travel restraint system may be temporarily installed.

## 2) Steps/Stairs

Stairs are permanently attached structures, located at an angle (greater than 15°) to the facility and placed for a worker to climb to an elevation/height - opposed to fixed ladders which are vertical (less than 15°) to the facility. The rise and run of the treads on stairs must be a uniform height/depth. Stairs must include handrails where there are 5 or more risers, but it is considered a best practice to install handrails on all stairs. Handrails must be between 80cm (31.5in) and 92cm (36in) above the front edge of the tread and include mid-rail and toe boards.

**An example of a non-compliant stair** has irregular run/rise treads, damaged risers, missing applicable handrails, and improper or broken handrail supports; doesn't include grips/traction on the run; is not level; is missing a riser(s); and/or is damaged in any way.

### Guidelines When Using Steps/Stairs

- Stairs must be constructed to engineered standards (such as a PIP or ASME), with all stairs in the immediate vicinity of flammable environments to be of non-burnable material(s).
- When climbing/descending stairs take them one at a time.
- Workers should have one hand on railing when moving up or down the stairs to help control falls due to slips, trips or loss of balance.
- For access to or egress from equipment (i.e. tractor trailers, bull dozers, excavators, etc.), workers should face the centre of the vehicle and use the three-point contact method.
- Maximum run/rise of stairs is to be limited to 6:1.

## 3) Fixed Ladders/Climbable Structures/Rest Platform(s)

A fixed ladder is a permanent vertical engineered ladder structure designed for a worker to climb to an elevation (e.g., side of a shop, 750 bbl. tank ladders).

Ascending/descending a fixed ladder is not considered work in relation to this COP. Work must **not** be performed from a fixed ladder without a fall protection system in place. Work can be described as anything that brings any part of a person's body outside the side rails of the ladder, such as to swing a valve or flip a gauge board cable back onto a pulley.

A fall protection system is required when performing "work" higher than 3m (9.84ft) off of a fixed ladder. A ladder that extends above 6.1m (20ft) without a ladder loop cage should have a fall protection system such as a cable grab built into it.

A "ladder cage" is not considered as a fall protection system. It is a barrier between the worker and the surrounding space. It serves as a support to the worker should the worker need to rest against a barrier.

**April 18, 2018****FALL PROTECTION**

Fixed ladders must include rest platforms (landings) at intervals not exceeding 9.1m (29.8ft), and must extend one meter above the platform. If a fixed ladder extends beyond 9.1m (29.8ft) it must have a fall protection system built into it such as a cable grab system.

Where a worker is performing work and could fall 3m (9.84ft) or more, the ladder must be equipped with a fall protection system that meets CSA standards. This may include fall arresters or vertical lifelines, or some other system that offers an alternate method of fall protection, which provides continuous, equivalent protection and rescue capabilities for the workers at risk.

If ladders are equipped with a platform or ladder way floor opening, they require a self-closing double bar safety gate or equally effective method.

**An example of a non-compliant fixed ladder** has rungs that are home-made or damaged, or size and spacing that do not meet current standards (clearance between rung and structure is less than 150mm (6in), distance between rungs is between 250mm (9.84in) and 305mm (12in) and is less than 600mm (23.6in) wide; don't extend to the top or past the top of the landing area; have obstructions that prevent workers from putting a foot on a rung; or where the ladder's side rails are not properly secured to the structure.

Ladders that do not have rungs extended through the side rails or with welds that are butt welded/tac welded will not be used to support fall arrest equipment and require an alternative fall arrest system to support the worker.

#### Guidelines When Using Fixed Ladders

- Inspect ladder prior to use; look for loose rungs, loose/missing side rail supports, bent/broken rungs, improperly spaced rungs and rungs with insufficient space for placement of feet.
- Ladders recognized as damaged are to be tagged **Out of Service** for maintenance/repairs.
- Fixed ladders must have rest stops (landings) located at least every 9.1m (29.8ft), unless a fall protection system is used in conjunction with climbing. (e.g., ladder with self-retracting lifeline or cable grab).
- A worker must be physically fit to climb a ladder otherwise not undertake the task.
- Cages and rings are not considered fall protection systems.
- Fall protection system (e.g., cable grab) that meets CSA standards must be used when the worker works from a height greater than 3m (9.84ft).
- If no cable grab system is installed it is acceptable in the interim to use a twin tail/dual leg lanyard system to climb the ladder maintaining 100% connectivity. The ladder rungs must extend through the side rails and not be butt welded. The ladder must be identified as needing a cable grab system and outfitted as such if frequently/consistently used for work (i.e., once per week for any duration of time). It must be confirmed that the worker is trained and competent in the procedures and use of this fall protection system.
- Prior to climbing and conducting work on a permanent ladder, review and comply with area specific rescue plan requirements (e.g., inform co-worker of work being performed at height, in order to initiate rescue/emergency response if no call back is ascertained).

**April 18, 2018**

**FALL PROTECTION**

- Workers must maintain 3-point contact at all times when ascending and descending, stay within the confines of the ladder side rails. They must not carry any tools or materials with them to impede their climbing ability.
- It is acceptable to have tool holding equipment, such as enclosed belt hooks/loops, to remove the tools from their hands.

### **5.2.2 Temporary Work Platforms**

#### **1) Elevating Platforms and Aerial Devices**

Elevating work platforms/aerial devices are described as movable/mobile equipment (e.g. articulating boom, scissor lift) that incorporates a device to change the height of the work platform. Elevating platforms and aerial devices must be operated and maintained in accordance with the manufacturers' specifications. Users of temporary work platforms must be trained in their use, limitations and load limits.

The occupants must be restrained from being "ejected" from the platform. Platforms are not designed to be used with fall arrest system but a fall restraint system. While in operation, a personal fall restraint system must be worn and the lanyard must be short enough to ensure the worker cannot fall out of the elevated work platform, but is long enough to complete the task.

While at a height greater than 3m (9.84ft), workers are not allowed to extend their bodies out through the sides of the railings to complete work or reach for support, stand on side rails, or have both feet off the flooring at the same time.

**An example of a non-compliant aerial device/scissor lift** is a device that is not intended for human occupancy (bucket of front end loader, forklift with pallet, etc.); or does not have a current annual inspection, applicable hand rails, holding block to prevent rapid descent of the lifting arms, spring loaded controls that centre in the neutral position, or engineered fall restraint anchor.

#### Guidelines When Using Aerial Devices/Scissor Lifts

- Ensure a competent worker has completed a visual inspection of the aerial device/scissor lift prior to use and documented the inspection on appropriate form(s) from supplier.
- Conduct a site HIAC to ensure that the lift does not come in contact with overhead power lines, overhead piping, or piping and structures below the equipment - downward swing path obstacles.
- Clear the area under the aerial device, and associated swing radius of unnecessary equipment to protect other workers from the potential hazard of falling objects.
- Barricade the area under the aerial device and associated swing path to prevent unauthorized workers from entering the space (e.g. through the use of signs, flagging tape and/or safety watch).
- Ensure that the outrigger pads, when equipped, are placed on firm ground/footings. Supporting surfaces should be firm and leveled.
- Only workers possessing a valid training certification or competency verification will operate elevated platforms and aerial devices such as a man-lift, scissor lift, articulating boom, etc.
- As determined during HIAC, spotters will be required to assist with the moving/positioning equipment.

April 18, 2018

FALL PROTECTION

- Conduct a test of the equipment before operation to ensure all safety devices are fully functional, including emergency kills, operating controls, level indicators and test lift the unit.
- Be aware of the tilt and weight limits of the device at its expected extension and only use the device for its engineered function (i.e., for lifting workers and associated tools/materials).
- When wearing fall protection equipment, ensure the equipment is not connected to an anchor outside of the machine - only attach the fall protection equipment to an approved anchor point within the platform to prevent ejection.
- Operators are to be knowledgeable of the manufacturer's chassis speed, related to boom height and extension, and operate equipment to meet manufacturer's specifications.

## 2) **Bucket Trucks**

A bucket truck is defined as a vehicle equipped with a bucket attached to the end of a boom (articulated and/or extendable) that is used to raise worker(s) off the ground to complete a task. Bucket trucks require dual controls, one set on the vehicle and the second set in the bucket, and a device to prevent over-centering/tipping of the bucket if pushed against something.

**An example of a non-compliant bucket truck** is a bucket truck that is used to lift any item other than a worker, that does not include a tie-off point for the worker, has a bucket that is detachable from the boom, or doesn't have controls located in the bucket.

### Guidelines When Using Bucket Trucks

- Prior to operating the bucket truck, the controls both on the ground and on the bucket must be tested for functionality. The operator should perform a trail lift at full radius.
- Outriggers, where equipped, must be extended as per manufacturer's recommendations and placed on load pads (ground is unacceptable) prior to workers entering the bucket.
- Workers must wear a full body harness, including a self-retracting device or a lanyard short enough to prevent workers from being ejected from the bucket. Attach the assembly to the bucket prior to being lifted using the manufacturer's approved anchor point.
- Inspect (visually) the tie-off point for the worker(s) and ensure the boom and the bucket are certified and in good condition. Certification must be current as per manufacturer's recommendations or the specifications of an engineering firm.
- Check that the anti-fall system (hydraulic block) is functional prior to lifting a worker to any height. Engineered relief valves should not allow overstressing.
- Workers operating a bucket truck must be familiar with the device prior to operating, including being an authorized user of the equipment, as per the bucket truck company management standards and/or training program.
- Only workers possessing a valid training will operate bucket trucks.
- Workers will not operate a bucket truck within 7m (23ft) of power lines/power sources.

April 18, 2018

FALL PROTECTION

### 3) **Personnel-Baskets**

A personnel-basket is an engineered device that is designed for human occupancy and to be suspended from a picker/crane or similar device. A personnel-basket must include a gate or steps for entrance/exit.

**An example of a non-compliant personnel-basket** is a basket without enclosed sides in the bottom half of the basket, non-engineered (certified), doesn't have a gate(s) or fall arrest anchor points, the receiver does not match the hook from the picker (throat too small), wall height shorter than 1.2m (4ft), or has not had a certified NDT test completed within the last year.

#### Guidelines When Using Personnel-Baskets

- Prior to using a personnel-basket, ensure that the live load rating is certified for use by a professional engineer.
- Ensure the worker is connected to an anchor point specified by the manufacturer.
- Ensure that the secondary fall arrest systems minimize the free fall distance of the basket to 1m (3.28ft).
- All workers are to use a fall arrest assembly when in a personnel-basket and the task supervisor(s) must ensure that each worker who is being raised or lowered in a personnel-basket has secured themselves properly, and that each worker has their own tie-off point or that the tie-off point has adequate provisions for this.
- When attaching a secondary fall restraint for the basket, it is required to have a secondary cable attachment point connected above the ball/hook of the winch line unless it is physically attached (secured) to the crane boom. This must have a load rated capacity for 'above' the weight of the contents and personnel in which the basket is about to carry.
- Workers will not operate a personnel-basket within 7m (23ft) of power lines/power sources.
- Workers are to stay within the confines of the basket at all times; workers are not allowed to stand on rails or put their body through handrails.
- Workers will use restraint devices for tools placed in the basket (e.g., tie-off ropes for larger tools - pipe wrench, large box end wrench) and tool kits/buckets for small tools. Ensure equipment and tools are evenly distributed with respect to weight. The basket will be outfitted with kick plates or mesh screening to prevent tools from being accidentally ejected from the basket.
- If workers are lifting tools and/or equipment into the basket from the ground, the worker in the basket will ensure, prior to lifting, that other workers are out of the fall-path of the item being hauled up by the rope.
- Personnel-baskets will not be used to lift equipment that extends outside of the edges of the basket as that may result in the overloading of the weight rating of the basket.



April 18, 2018

FALL PROTECTION

#### 4) **Scaffolding**

Scaffolding is a manufactured temporary work platform for workers and materials that is assembled, and consists of two end supports which incorporate a built in ladder, a removable walkway with brackets that are placed (hung) on the top of the end supports and cross bracing which provides stability to the scaffold structure. Scaffolding is intended to be used as a temporary work site when the work site is located above a point that a worker can reach from a fixed foundation and extends laterally farther than a worker can reach from other temporary work platforms (e.g., man-baskets, ladders and/or buckets). Below are guidelines; for more specific requirements please comply with your provincial legislation.

As per SWP-56 Scaffolds and Temporary Platforms, CPES recognizes a color coding tag system to identify the condition of a scaffold; scaffolds are identified by three distinct tags:

**Green**

**Safe for Use** (scaffold is safe and good for use)

**Yellow**

**Caution: Potential or Unusual Hazard** (potential or unusual hazard is present - condition will limit use)

**Red**

**Unsafe for Use** (do not use)

A qualified worker designated by the site supervisor or a competent Scaffolder shall assess the scaffold using CF-S-25 Safe Scaffold Checklist prior to the release of the scaffold for use.

**An example of a non-compliant scaffolding** is a temporary work platform that, though assembled does not incorporate cross bracing, have walkways that extend past the end of the supports and are not secured to the supports, are not erected plumb, not on a stable surface, and/or have end supports that do not allow workers to climb to the work surface.

Non-compliant scaffolding is also defined as being unable to hold four times the intended load; was not green or yellow tagged or certified for use by capable/certified worker; the tag is more than 21 days old; and/or the walkway is less than 500mm (19.7in) wide on light duty scaffolding and less than 1m (3.28ft) wide on heavy duty scaffold platforms.

#### Guidelines When Using Scaffolds

- Scaffolding will only be erected, dismantled, maintained and inspected by a person trained and deemed qualified or appropriately certified to do so, as per industry and legislated regulations.
- The exception is Safeway Scaffolding or equivalent; this can be used by a competent employee or contractor when the scaffolding does not exceed three levels (includes two working decks and a third section to use only for fall protection).
- Workers will inspect the scaffold to ensure that a valid green/yellow tag is in place prior to use, and ensure that the tag is on the scaffold at all times. The yellow tag must identify the deficiency.
- Workers will red tag the scaffolding if it has not been certified, and will not use it until a certified worker has green/yellow tagged it. These tags are available from site supervision.
- All employees must be made aware of the maximum load rating of the scaffolding and recognize all hazards associated with it.
- Workers must use the 3-point contact method to climb/descend from scaffolds and raise/lower equipment through methods other than carrying that prevents 3-point contact.



Do not use pail handles (plastic or metal) to raise or lower tools and/or materials. Acceptable means would be ropes and load rated canvas bags.

- Workers must utilize a method to secure tools/equipment on the working surface of the scaffold, and must also warn other workers, through a label/flag/tape/sign of the potential of overhead hazards/falling objects.
- Where a modification to scaffolding is required, workers must receive approval from an approved erector, perform a hazard assessment and implement the control methods identified.
- Workers must use applicable fall protection equipment when the scaffold is considered a temporary work platform if handrails are not used.
- Workers must tie-off if they are required to extend their bodies, or a significant percentage of their body outside the edges of the scaffolding, with the tie-off point being of sufficient strength to support the worker in the event of a fall.
- Develop a rescue plan to remove workers from the top of the scaffold in an emergency. This includes identifying rescue personnel, triage process, equipment required to move the injured worker(s) and possible support services required.
  - For additional information and descriptions of scaffold types refer to OHS regulations, CSA standards and other applicable legislation.

### **5) Portable Ladders**

A portable ladder is a manufactured ladder that is designed to be moved from one work area to another; is light enough for a worker to carry; and is designed for temporary access only. A portable ladder may be constructed out of many materials, including unpainted wood, aluminum or fibreglass with different materials intended for different applications, and may come in different styles including step-ladders and extension ladders.

**An example of a non-compliant ladder** is; has rung width of less than 89mm (3.5in) wide; has rungs that are misshaped; has side rails that have cracks and/or deformities; does not extend past the platform landing or parapet by more than 1m (3.28ft); is not secured against movement; is placed on an unstable base; or does not meet the 4:1 ratio of height/distance from wall to ladder feet.

#### Guidelines When Using Portable Ladders

- Workers will restrict the type of work completed on portable ladders to light duty task(s); will keep their bodies centred within the side rails of the ladder; will maintain 3-point contact with the ladder, and will limit time of working to 15 minutes or less to minimize exposure to the hazards.
- When working on a portable ladder over 3m (9.84ft), and the above considerations cannot be met, the worker must use an appropriate fall protection system with an accompanying fall protection plan.

**Note:** If working on a portable ladder greater than 3m (9.84ft) and fall protection equipment is not practicable or creates a greater hazard, a worker can still climb and work actively for 15 minutes and then climb down, rest and re-climb.

**April 18, 2018**

**FALL PROTECTION**

- Workers must inspect the ladder prior to use, including looking for non-slip feet, deformed/cracked/damaged side rails and rungs, securing mechanism for extension ladder, CSA certification and be secured against movement by a rope, chain, cable or other suitable means.
- Workers must use the ladder in the manner intended by the manufacturer (not as an end to temporary scaffolding, to lie across a space and use as walkway, etc.)
- Workers will select the correct type of portable ladder for the type of task being completed (i.e., when working close to electrical circuits or wiring only fiberglass ladders are to be used).
- When in use, the extension ladder must extend a minimum of one meter above any platform or landing and be secured against movement by a rope, chain, cable or other suitable means. Extension ladders are not required to extend one meter above the point where work is being completed when a platform or landing is not involved.
- The ladder must be positioned so that it is no more than a quarter of its height away from the wall or structure against which it stands. The rule is 4:1, which is one foot out for every four feet up.
- Workers are required to stand on rungs below the top two rungs, steps or cleats of an extension ladder or from any step on a step ladder below the top step/top platform unless the ladder includes a railed platform on the top or the manufacturers' instructions allow it.
- Workers will restrict use of the ladder to only one person at one time, with workers leaving the ladder when climbing to a raised work area, prior to another worker climbing the ladder.
  - For more information on portable ladders refer to Safe Work Practice (SWP)-25, Ladders.

### **5.2.3 Fall from Ground to Sub-Surface (into holes)**

This section is intended to highlight the risk of falls from ground to a lower level created through mechanical excavation, which could include trenching, drilling, hydro-vac, pilings, etc. These hazards may be hidden at the work site due to work environment (e.g. heavy rain or snow fall, frozen ground, limited light conditions). The following controls are recommended for these types of situations, but controls may vary for each work site as each situation is unique.

Sub-surface fall protection controls vary from;

- Filling in holes, trenches and excavations.
- Barricading, installation of guardrails, fences or walls around hazardous areas, with consideration given to the durability and visibility of these barriers.
- Covering openings or holes into which a worker could fall.
- Implementing the use of stairs as opposed to ladders wherever possible.

### **5.3 Fall Protection Equipment**

Fall protection equipment, as a type of specialized Personal Protective Equipment, is the last line of defence in the hierarchy of controls. Where the risk cannot be reduced to an acceptable level by engineering and administrative controls, fall protection equipment shall be used

### **5.3.1 Equipment Use and Maintenance**

Workers must know the limitations, proper usage and inspection requirements for equipment they are using as per CPES standards. Workers are required to:

1. Conduct pre-use inspection, service checks and maintenance of fall protection equipment following CSA standards and manufacturers' requirements. These service checks must be recorded in an equipment maintenance log. It is essential that all equipment and all components of a fall arrest system be inspected by users. The preferred option for documentation is the Harness and Lanyard Checklist CF-S-27 (Appendix C). Due to the different requirements follow the requirements of the manufacturer.
2. Store fall protection equipment in clean dry areas, free from chemicals, lubricants, and other materials which may cause harm. Additionally, avoid unnecessary exposure to direct sunlight to minimize degradation by ultraviolet radiation.
3. Ensure annual inspections are completed by a competent individual and records maintained as per manufacturer's specification.
4. Remove fall protection equipment from service that is involved in arresting a fall and return to supervisor to ensure it is inspected, recertified or disposed.

**Note:** If a dynamic fall event occurs please contact your Supervisor and complete an incident investigation as soon as possible.

### **5.3.2 Fall Protection System – Fall Restraint and Fall Arrest**

A fall restraint system is both fixed equipment and PPE, which is used to stop a worker before the edge of a fall hazard. This may include a harness, lanyard, anchor point, horizontal or vertical life line.

A fall arrest system is both fixed equipment and PPE, which is used to secure a worker and to restrict (stop) the distance a worker falls from a height. This may include a harness, lanyard, shock absorber, anchor point, horizontal or vertical life line and/or mechanical fall arrest equipment.

The HIAC processes help identify which fall arrest systems are required on the work site. When using a fall restraint or arrest system workers must comply with the following:

1. Use CSA approved automatically engaging fall arrest devices on a vertical lifeline.
2. Use CSA Standard Z259.10-M90 (R2006) approved fall protection full body harnesses.
3. Use CSA Standard Z259.11-05 approved shock absorbers in personal fall arrest systems.
4. Use CSA Standard Z259.12-01 approved attachment hardware in fall arrest systems.
5. Design fall arrest systems so that a worker cannot hit the ground or an object or a level below the work area.
6. Calculate freefall and clearance requirements to prevent the worker from contacting a lower level or other obstruction, and control the worker from swinging into or impacting objects lateral to the work area. Refer to Appendix A.
7. If attached to a permanent or temporary anchor, use anchors that can withstand a force of at least 22.2kN (5000lbs).

**April 18, 2018**

**FALL PROTECTION**

**Note:** Connecting components such as lanyards will and must have full extension lengths adhered to them in the form of an inspection label. All manufacturers must place these labels on their equipment as per CSA standards.

8. Inspect all equipment prior to each use and document inspection.
9. Ensure original instructions are kept on file. (When a new piece of equipment is purchased, the supplier must provide instructions for the use, storage and maintenance of the equipment.)
10. Inspect (by a competent person) equipment as per CSA Standards or manufacturer's specifications; document and file inspections.

### **5.3.3 Horizontal Lifeline**

A temporary horizontal lifeline is a device (normally cable) that is placed across a flat horizontal surface for a worker to anchor themselves to and to restrict the distance of travel should the worker fall over the edge of the horizontal surface (roof). The lifeline should incorporate a device that allows the worker movement in a lateral direction without restriction.

CPES, as part of site HIAC, will identify which facilities (offices, buildings, shops, tanks, etc.) require horizontal lifelines and will install lifelines when it is identified as a control method in the pre-job hazard assessment.

A designated CPES representative must ensure that all horizontal lifeline systems are installed by a competent worker according to the manufacturer's specifications.

### **5.3.4 Rigid Rail or Vertical Lifeline for Fixed Ladder Systems**

CPES, as part of site HIAC, will identify which facilities (e.g. fixed ladders) require rigid rails and/or cable grab systems, and will install lifelines when it is identified as a control method.

Where a rigid rail or cable grab ladder system is selected as a control method, it must be placed in the middle of a fixed ladder for a worker to anchor themselves to. The vertical lifeline will employ a device that is integral to the lifeline as the anchor, which will also allow the worker to move up and down the ladder without restriction at a normal rate of speed.

Workers will conduct pre-use inspections of vertical lifelines and anchor systems. This ensures that the lifeline and anchor has not been shock loaded (due to a dynamic fall event) or abnormally stretched during prolonged duty life and will function as designed in the event of a fall.

A designated CPES representative must ensure that a permanent rail system is installed under the direction of a professional engineer or designate, and that they can certify that the system is installed according to the manufacturer's specifications. As well, the designated CPES representative will ensure that vertical lifelines and any associated rigid vertical rails meet CSA Standard Z259.2.1-98(R2004) and that they extend to within 1.2m (3.93ft) of ground level or other solid surface.

**April 18, 2018****FALL PROTECTION****5.3.5 Temporary Vertical Lifelines**

Vertical lifelines are used for personal fall protection when vertical mobility is required and may be comprised of static lifelines made of synthetic fibre rope or cable equipped with approved rope grabs. They must be designed and used according to CSA Standard Z259.2.1-98. These would be used in other areas where vertical movement is required such as 'scaffolders' requiring temporary mobility alongside the vessel outside the scaffold unit.

**5.3.6 Anchors**

A large number of objects can be considered an anchor point, but an anchor is usually considered a point that is found above shoulder height, has round edges and ideally located to minimize swing. Ideally, an anchor is located above a worker, which would restrict the fall distance, but anchor points may be located at a lower level (i.e., horizontal lifelines).

Objects 'Not' considered to be anchor points would be support arms used to structurally brace a walkway or work platform (such as a tower platform or highline walkway), any electrical conduit or tray, and/or fixed ladder rung that is butt welded. An anchor sling must be connected to a sound structural point such as a beam.

Anchor points are required to meet the following standards:

- Permanent anchorage points for fall arrest must have a minimum load rated capacity of 22.2kN (5000lb/f).
- Temporary anchorage points for fall arrest must have a minimum load rated capacity of 22.2kN (5000lb/f).
- Temporary travel restraint anchorage points must have a minimum load rated capacity of 3.5kN (800lb/f)
- Non Designated Anchor Points - When using a non-designated anchor point such as a beam, column, or other sound structural component a proper anchor sling (cable or web) with a capacity of 22kN (5000lb) must be used. Other type of anchor connectors specified by a manufacturer or other qualified person may be used. Examples of these types of devices are beam grips and wire clasps.
- Anchor plates are to be temporary in nature and will only be used by highly trained workers in a unique fall arrest situation. Anchor plates will be designed to support multiple suspension lines and as such, requires a load rated anchor point applicable to each worker attached.
- Only an authorized CPES representative can approve an anchor point to be designed, installed and used as part of a fall protection system that is capable of withstanding twice the maximum arresting force that the anchor point could be subjected to, providing that it is used in accordance with the manufacturers' specifications or the specifications of a certified professional engineer.

**5.3.7 Harnesses and Lanyards**

A harness is described as a device that is made of webbing which is designed to support the entire body in the event of a fall. As a result of this design, the harness will include webbing that surrounds the entire body, waist, buttocks and includes straps that go over the shoulders and crosses-over in both the front and back.

Lanyards are described as a safety strap, normally webbing, which is used as the connector between the worker on the Dorsal ring (D-ring) of the harness and the anchor point. Lanyards must be of the 'shock absorbing' type, which reduces the amount of force applied to the worker should a dynamic fall event occur.

Guidelines when working with Harnesses and Lanyards

- Harnesses, lanyards and connecting equipment must be compatible with each other. The manufacturer's instruction manual will state compatibility, but for the purposes of this COP, harnesses and lanyards must be made by the same manufacturer and/or proven compatible.
- Harnesses must be of the Full Body type, certified to CSA Standard Z259.10-M90 (R2006) and include D-rings as required. Harnesses must bear the label/mark of an accredited testing organization such as CSA.
- Harnesses must be fitted properly to the worker's entire body as per manufacturer's specifications, but must still allow the worker(s) to perform their tasks.
- Lanyards are to be the shortest length possible that will still permit unimpeded performance and must have an integrated shock absorber. Lanyards must have the full extended length labelled on them to calculate fall distance requirements.
- Lanyards must be certified to CSA Standard Z259.11-95 (R1999), and where a chance of severe abrading, damage or the possibility of a burn exists, a steel cable lanyard with integral shock absorber must be used. Lanyards must bear the label/mark of an accredited testing organization such as CSA.
- Secure the lanyard to an anchor point no lower than the worker's shoulder height, or as high as reasonably possible, unless otherwise specified by the manufacturer. Lanyards must never be linked together (daisy chained) to make a longer one, and must never be wrapped around an anchor point and hooked back into itself.
- Lanyards must have an arresting force designated on the shock absorbing component that is within 4kN (900lb/f) (referred to as an E4). This combined with a proper shoulder height to above shoulder height tie off point will limit arresting forces applied to the human body.
- Twin tail/dual leg/bypass lanyards can be used in the interim for low frequency work of short duration. They must have a shock absorbing component that is within 4kN (900lb/f) (referred to as an E4) and be at a recommended length of 1.21m (4ft). While climbing a fixed ladder when the tails/legs of the lanyard are 1.21m (4ft) the easier it is to avoid entanglement with the rest of the body.
- Inspections must be performed on an annual basis by a competent inspector.

**5.3.8 Self-Retracting Devices**

A Self-Retracting Device is a mechanical device that incorporates a length of cable or webbing, braking mechanism, spring and body, and completes these three functions:

- Spools cable out when a worker climbs down from a height.
- Automatically spools cable onto the drum/into the body when a worker climbs to a height.

**April 18, 2018**

**FALL PROTECTION**

- Limits the amount of free fall and transfers less force to the body than an E4 shock absorbing lanyard.

When a Self-Retracting Device is used for fall protection, it must:

- Meet CSA Standard Z259.2.2-98(R2004) and used according to manufacturers' instructions.
- Be removed from service and serviced, or destroyed after experiencing a fall arrest situation. Repairs/service/certifications to Self-Retracting Devices will only be completed at authorized service centers.

**Note:** If a dynamic fall event occurs on the work site, please contact your Supervisor and complete an incident investigation as soon as possible.

- Be used in conjunction with approved harness(s).
- Be used by one worker at a time (inspected prior to use).
- Be recertified by manufacturer's representative as required by manufacturer.

**Note:** Uncontrolled lifeline retractions are not permitted - retractions of all Self-Retracting Devices must be controlled to ensure proper winding of the lifeline onto the drum.

### **5.3.9 Safety Nets**

A safety net is a device made of webbing that is used as a catch pan for workers when other forms of fall protection and/or arrest are not available/practical. Common areas within CPES where safety nets may be used would be in the construction of facilities overtop of rivers/large openings and/or as a type of barrier that would restrict/prevent a worker from falling from a level working surface to an excavated area.

**Note:** The term safety net is interchangeable with debris net, which is netting placed over a work area to prevent tools from falling on passing workers. This section only applies to safety nets used as catch pans.

When safety nets are utilized as catch pans for workers, they must:

- Meet ANSI A10.11-1989 (Construction and Demolition Operations – Personnel and Debris Nets).
- Have safety hooks or shackles of drawn, rolled or forged steel with an ultimate tensile strength of not less than 22.2kN (5000lb/f).
- Have joints between net panels capable of developing the full strength of the web.
- Extend not less than 2.4m (8 ft) beyond the work area.
- Extend not more than 6m (20ft) below the work area.
- Be installed and maintained so that the maximum deflection under impact load does not allow any part of the net to touch another surface.
- Attach to a supporting structure certified by an engineer.



**April 18, 2018**

**FALL PROTECTION**

### **5.3.10 Control Zones**

A Control Zone is the area between an unguarded edge of an elevated surface on a building, structure or ground surface and has an effective raised warning line, or equally effective method. A control zone is not applicable if the slope of the surface exceeds 4°.

When using a Control Zone as a means of fall protection the following must be applied:

- The use of a Control Zone is not permitted as a fall protection system:
  - On a working surface where the slope of the surface exceeds a 4 vertical to a 12 horizontal;
  - on skeletal structure work, or
  - for scaffold erection or removal.
- The width of a control zone must be at least 2 m (6.5 ft).
- Additional distances must be added to the minimum width of a control zone with regard to whether:
  - The working surface is slippery or sloped,
  - The work is carried out at an elevation relative to the unguarded edge, and
  - The risk is increased by the use of equipment near the control zone.
- If workers will at all times remain further from the unguarded edge than the width of the control zone, no other fall protection system is required.
- If a worker will be working within 2 meters (6.5 ft.) of a control zone, the line defining the control zone must be established by a raised warning line or other equally effective means at all times during such work.
- A raised warning line marking the edge of a control zone must be:
  - A line of high visibility material, or a line flagged or clearly marked with high visibility materials at intervals not exceeding 2 meters (6.5 ft.), and
  - Rugged and maintained to between 0.85 m and 1.15 m (34 in and 45 in) above the working surface.
- A Safety Watch must be assigned when the preplanning assessment indicates that there will be workers who may perform work too close to the control zone and by the nature of their work may unknowingly enter the control zone.
- The Safety Watch must be able to warn the workers when they are entering the control zone.

## **6.0 MONITORING AND REVIEW OF CONTROL MEASURES**

Implementing a fall control plan is not the end of the risk management process. Control measures must be monitored and reviewed to ensure that they continue to control the risks. Where an alteration of a specific fall protection measure is to be undertaken, the person with control of the work should make sure that the integrity of the system is maintained and communicated.



**April 18, 2018**

**FALL PROTECTION**

Each person with control of a construction project or work should ensure that:

- A planned program of inspections and maintenance is in place.
- A review is undertaken each time the work environment changes.
- The process for hazard identification, risk assessment and control is regularly reviewed to ensure it is effective.
- In determining the frequency of the monitoring and review process, consideration should be given to the level of risk (high-risk construction work requires more frequent assessment).

## **7.0 FALL PROTECTION AND RESCUE PLAN**

The Fall Protection and Rescue Plan will state the appropriate emergency response plans and will ensure rescue equipment can be accessed in a timely manner. All workers working in the area where a fall protection system is to be used, including those using it, must be informed of the plan before work commences. Refer to the Additional Information section in this COP for required forms.

### **7.1 Planning for Emergencies**

Persons with control of a project or people should ensure that whatever and wherever there is a risk of a fall from a height, emergency procedures and facilities, including first aid, are established and provided.

In developing emergency procedures, the different types of emergency and rescue scenarios that might arise should be considered, if there are no means of self or team rescue then an approved competent third party high angle rescue company must be used.

If the job is being carried out in a remote location, this should be taken into consideration during the emergency planning process and incorporated into the site specific safety plan.

It is imperative that the rescue of a worker who is suspended in a full body harness should occur promptly. Suspension trauma is a condition whereby a person suspended in a harness in a substantially upright position may experience blood pooling in the legs. Depending on the susceptibility of the individual, this may lead to loss of consciousness, renal failure and eventually death. To enable the worker to be removed from the suspended position as quickly as possible, employers should consider having a pre-rigged retrieval system in place and ensure that workers using safety harnesses do not work alone. Any worker involved in a fall shall be examined by a medical professional prior to returning to work

The plan will be documented and will include:

1. The fall risks at the work site and fall clearance distances below the proposed work area. Refer to Appendix A- Fall Clearance Calculation/Sample.
2. The fall protection system(s), including anchor points, to be used at the work site.
3. The procedures used to assemble, maintain, inspect, use and disassemble the fall protection system.
4. The rescue procedures to be used if a worker falls and/or is suspended by a personal fall arrest system or safety net and needs to be rescued. Refer to the reference section in this COP for required forms.

April 18, 2018

FALL PROTECTION

5. A communication process; usually completed as part of you site HIAC and the Safe Work Agreement.
6. The identification of applicable rescue equipment and procedures for the rescue of workers.
7. The number, name and roles of workers who will complete a rescue from a height. When identifying the number of workers required, consideration has to be given to the equipment to be used, the environment that exists on the work site and the health/capabilities of the potentially injured workers and rescuers.

**Note:** 911 in most cases is not a viable option to rescue a worker suspended by a fall protection system. If third party responders are being considered as a rescue option for the site, they must be contacted prior to allowing workers to work at height and be included in the site rescue plan.

**Note:** Workers who are required to rescue workers that have fallen and are suspended or are not capable of returning to ground level on their own accord are required to be trained in rescue techniques applicable to the work site.

Fall protection plans are required on a CPES worksite whenever work is to be performed at heights that meet or exceed the limits indicated within this COP.

**Note:** Fall protection plans may be an addendum to the Safe Work Permit/Agreement and should be completed as part of the HIAC process to ensure risks are assessed and controls implemented.

## 8.0 TRAINING

Workers on CPES work sites, when required to perform or supervise work that exposes a worker to falling from a height greater than 3m (9.84ft), or when a hazard assessment identifies an unusual risk to the worker, will be required to complete the following training:

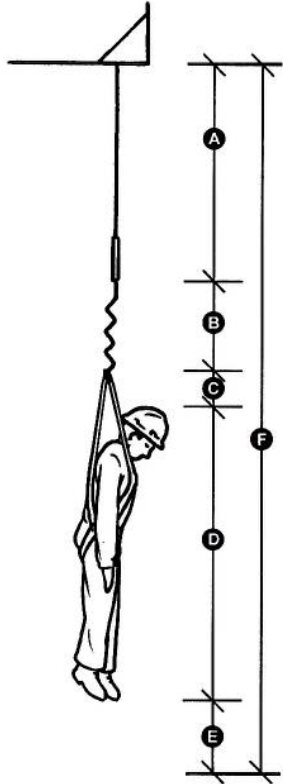
1. Fall Protection COP. CPES workers will review this code and be re-assessed in their knowledge and skills relative to the Fall Protection COP every three years, or whatever a critical change is implemented.
2. All workers engaged in working at heights must receive training in fall protection that meets the criteria stated below. Fall protection training is required from approved vendors who must include the following criteria:
  - (a) A review of current legislation pertaining to fall protection;
  - (b) An understanding of what a fall protection plan is;
  - (c) Fall protection methods a worker is required to use at a work site;
  - (d) Identification of fall hazards;
  - (e) Assessment and selection of specific anchors that the worker may use;
  - (f) Instructions for the correct use of connecting hardware;
  - (g) Information about the effect of a fall on the human body, including maximum arresting force, the purpose of shock and energy absorbers, swing fall, and free fall;
  - (h) Pre-use inspection;
  - (i) Emergency response procedures to be used at the work site, if necessary; and
  - (j) Practice in inspecting, fitting, adjusting and connecting fall protection systems and components, and emergency response procedures.

**9.0 REFERENCES**

**References / Additional Information**

- Alberta OH&S Code Part 9 Fall Protection
- Alberta OH&S Code Part 8 (Section 124-137)
- British Columbia OH&S Regulation Part 11 Fall Protection
- Manitoba Workplace Safety and Health Regulations Part 14 Fall Protection
- North West Territories OHS Regulations Part 7 Personal Protective Equipment (Section 102-108)
- Ontario OHS Construction Projects O. Reg 213/91 (Section 26-26.9)
- Ontario OHS Industrial Establishments O. Reg 851/90 (Sections 13-15, 85, 86)
- Saskatchewan OH&S Part VII Personal Protective Equipment
- Saskatchewan OH&S Part IX Safeguards, Storage, Warning Signs and Signals
- Compliance with Technical Regulations
- Full Body Harness must comply with CSA standard CAN/CSA-Z259.10-M90 (R1998) Full Body Harnesses
- Lanyards must comply with CSA standard CAN/CSA-Z259.11-M92 (R1998) Shock Absorbers for Personal Fall Arrest Systems
- Carabiners, D-rings, Self-Locking Connectors meet the requirements of CSA Standard Z259.12-01 Connecting Components for Personal Fall Arrest Systems
- Self-Retracting devices used with personal fall arrest must be approved to CSA Standard X259.2.2-98 Self-Retracting Devices for Personal Fall Arrest Systems
- Confined Space Entry Code of Practice COP- 03– CPES
- Fall Protection and Rescue Plan CF-S-28
- Harness and Lanyard Checklist CF-S-27
- Safe Scaffold Checklist CF-S-25

developed by:	Ray Dawson	HSE Team	Date: June 28, 2013
	Scott Desautels		
Last Revised by:	HSE Team	HSE Team	Date: August 15, 2014
	Ryan Obleman		April 18, 2018

**Appendix A – Fall Clearance Calculation/Sample**

**Assumptions:**

The worker is 1.8 m (6 ft.) tall using a 1.8 m (6 ft.) long lanyard. 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** 1.1 m (3.5 ft) due to shock absorber elongating — 1.75 m (5.75 ft) for European shock absorber
- C** Harness stretch plus D-ring sliding – 0.3 m (1 ft.) for regular harness and 0.75 m (2.5 ft) for stretch harness
- D** Height of worker – 1.8 m (6 ft)
- E** Safety factor – clearance below feet of 0.6 m (2 ft)
- F** A+B+C+D+E  
Overall minimum clearance is 5.3 m (17.3 ft) to 5.75 m (18.9 ft) beneath the anchor

**Clearance calculation:**

Free fall = 2 x lanyard length + lock off of the fall arrester = 2 x 1.8 m +0.3 m	3.90 m
Stretch of the vertical life safety rope = 15% of the rope length =15% of 30 m	4.50 m
Maximum deployment of the shock absorber	1.07 m
Swing Drop	1.20 m
Stretch of the harness	0.75 m
Stretch-out of the worker (falling from a kneeling position)	0.75 m
Mandatory Safety Buffer	0.60 m
<b>Total Required Clearance below the working platform</b>	<b>12.77 m</b>



**CODE OF PRACTICE**

**COP-06**

**April 18, 2018**

**FALL PROTECTION**

**Appendix B – Fall Protection Plan, CF-S-28**

The Fall Protection and Rescue Plan is a tool for job planners and workers to use in planning the fall protection components of any non-routine or planned job involving working at heights. A fall protection system must be used when work is being done at a work area in which a fall of 3 metres or more, where a fall from a lesser height involves an increased risk of injury, or where specific client or site requirements dictate (i.e. 6 feet). This form is designed to ensure the hazards to workers are considered before work commences and regulatory requirements for fall protection are met.

**Instructions:**

- Workers required to use fall protection shall complete and sign this form. A job supervisor should complete most of the form on behalf of crew members.
- The form must be attached to the worksite copy of the Safe Work Permit and returned with the permit upon completion of the task.

General Information		
Business Unit: _____	Project #: _____	Date: _____ MM/DD/YYYY
Safe Work Permit #: _____	Job #: _____	Elevation (metres): _____
Scope of Elevated Work: _____		
Elevated Work Location: _____		
Are there obstructions below? <input type="checkbox"/> Yes <input type="checkbox"/> No    Is there a risk of implement? <input type="checkbox"/> Yes <input type="checkbox"/> No		
If yes, describe obstructions: _____		
Workers Authorized To Perform Work At Heights:		
Have all workers been trained and involved in the fall protection and rescue planning? <input type="checkbox"/> Yes <input type="checkbox"/> No		
If no, explain: _____		
Engineering Control Details:		
<input type="checkbox"/> Toe boards	<input type="checkbox"/> Guardrails	<input type="checkbox"/> Aerial Platform <input type="checkbox"/> Scissor lift <input type="checkbox"/> Man Lift
Pre-use inspection completed? <input type="checkbox"/> Yes <input type="checkbox"/> No    Comments: _____		
Fall Protection Equipment Details		
<input type="checkbox"/> Full Body Harness (FBH):	<input type="checkbox"/> Bosun's Chair:	<input type="checkbox"/> Cable Slider/Carabineer:
Pre-use inspection completed? <input type="checkbox"/> Yes <input type="checkbox"/> No    Comments: _____		
Lanyards		
<input type="checkbox"/> Lanyard-Regular    Length: _____	<input type="checkbox"/> Shock Absorbing Lanyard    Length: _____	<input type="checkbox"/> Lanyard Rope    Length: _____
<input type="checkbox"/> Lanyard By-Pass    Length: _____	<input type="checkbox"/> Lanyard-Cable    Length: _____	<input type="checkbox"/> Retractable Lanyard (SRL)
Pre-use inspection completed? <input type="checkbox"/> Yes <input type="checkbox"/> No    Comments: _____		
Lifelines		
<input type="checkbox"/> Vertical Lifelines	<input type="checkbox"/> Horizontal Lifelines	Pre-use inspection completed? <input type="checkbox"/> Yes <input type="checkbox"/> No
Comments: _____		
Anchor Slings		
<input type="checkbox"/> Cable Anchor Slings	<input type="checkbox"/> Webbing Anchor Slings	Pre-use inspection completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Comments:

**Fall Arrest Anchor Details**

 Permanent anchor available?  Yes  No      Appropriate anchor point(s) selected?

Describe anchor:

 Is Client or Engineer approval needed?  Yes  No      If yes, was the design reviewed?

**Fall Distance Clearance Required (from selected anchor)**

Variable	Feet	Metres
A. Lanyard Length		
B. Shock Absorber Deployment		
C. D-Ring Slide (includes harness stretch)		
D. Average Workers Height (Heels to Rear D-ring)		
E. Safety Distance (0.6 metre min)		
F. Clearance Requirement (add items A-E):		

**Other Considerations:**
**Controls in Place**

 Has the Swing Factor been considered?  Yes  No

 Hot Slag falling to area below?  Yes  No

 Worker's exposure to heat?  Yes  No

**Concurrent Operations:**

 Are there concurrent operations?  Yes  No      Will they be working in close proximity?

 Have they been informed?  Yes  No      Have controls been put in place?

 If yes, which controls?  Barriers  Flags  Signage      Other: \_\_\_\_\_

**Rescue Systems for Site (List the rescue service or methods in the event of emergency.)**
**Rescue Plan:**

Response Location: \_\_\_\_\_

Emergency Contact on Site: \_\_\_\_\_ Phone #: \_\_\_\_\_

Rescue Equipment Location: \_\_\_\_\_



CODE OF PRACTICE

COP-06

April 18, 2018

FALL PROTECTION

<b>Supervisor</b> (Print Name)	<b>Signature</b>
<b>Attach to Tailgate</b>	

**Appendix C – Harness Lanyard Checklist, CF-S-27**

	HARNES/LANYARD CHECKLIST	CF-S-27
--	--------------------------	---------

<b>Harness #:</b>		<b>Division:</b>	
<b>Lanyard #:</b>		<b>Date:</b>	
<b>Material</b>	<b>Condition</b>		<b>Material</b>
	<b>Yes</b>	<b>No</b>	<b>Yes</b>
<b>Harness Webbing</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Yes</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Harness Stitching</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Yes</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Lanyard Webbing</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Yes</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Lanyard Stitching</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Yes</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			

<b>Inspection Final:</b>	<input type="checkbox"/> Remove from service
	<input type="checkbox"/> Return to Service

Inspected by: \_\_\_\_\_ Signature: \_\_\_\_\_

Supervisor: \_\_\_\_\_ Signature: \_\_\_\_\_