



## STANDARD PROCEDURE INSTRUCTION

Title		SPI
<b>Fall Protection</b>		<b>34-21</b>
Department	Supersedes SPI Dated	Effective Date
<b>Safety, Health and Environment</b>	<b>March 27, 2014</b>	<b>Jan 19, 2016</b>

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# Fall Protection

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## Purpose

To provide all employees working for Vale Manitoba Operations with a standard to ensure adequate fall protection is used in accordance with the Manitoba Regulations, where there is a risk of a worker falling:

- (a) a vertical distance of 1.5 m (5 feet) or more;
- (b) a vertical distance of less than 1.5 m (5 feet) where there is an increased risk of injury due to the surface or item on which the worker might land;
- (c) into operating machinery or moving parts of the machinery;
- (d) into water or another liquid;
- (e) into or onto a hazardous substance or object;
- (f) through an opening on a work surface; or
- (g) a vertical distance of more than 1.2 m (4 feet) from an area used as a path for a wheelbarrow or similar equipment.

## 1. Scope

This policy applies at all VALE Manitoba Operation properties and where work is being conducted under the authority of VALE Manitoba Operations, including both on and off the plant site.

## 2. Administration

Every two years the Manager of, Safety, Training, Health & Environment or their designate will review and if necessary revise this procedure.

## 3. Definitions

**Anchor** - means a secure point of attachment for a lifeline or lanyard.

**Clearance Calculation**-The minimum safe distance between the anchor point and the lower working level.

**It is comprised of the sum of:**

1. Length of lanyard
2. Shock absorber length (decelerator)
3. Harness stretch (1 foot)
4. Height of worker
5. Safety factor (2 Feet from lower working level)

**CSA** - means the Canadian Standards Association.

**Competent** – means possessing knowledge, experience and training to perform a specific duty.

**Fall Arrest System** - means a fall protection system that is designed to stop a worker's fall before the worker hits the surface below.

**Fall Protection System** - When the use of a guardrail system is not reasonably practicable or would not be effective, an employer must ensure that the worker is protected by at least one of the following fall protection systems:

- (a) a travel restraint system;
- (b) a fall arrest system;
- (c) a safety net;
- (d) another fall protection system approved by the director

**Full Body Harness** - means a device consisting of connected straps designed to contain the torso and pelvic area of a worker with provision for attaching a lanyard, lifeline or other component.

**Lanyard** - means a flexible line of webbing, synthetic fiber or wire rope that is used to secure a full body harness to a lifeline or anchor.

**Lifeline** - means a flexible synthetic line or rope made of fiber, wire or webbing, rigged from one or more anchors to which a worker's lanyard or other part of a fall protection system is attached.

**Professional Engineer** - means any natural person who holds a valid certificate of registration or temporary license entitling him or her to practice as a professional engineer.

**Shock Absorber** - This is a device that limits the force applied to the user when a fall occurs. It is designed to absorb the kinetic energy of the fall as the worker is stopped. The shock absorber prevents both injury to the worker and the amount of force transferred to the life line and anchor.

**Travel Restraint System** - means a fall protection system that is designed to prevent a worker from travelling to a location where there is a risk of falling.

#### 4. Reference Documents

- Workplace Safety and Health Act W210 10/02
- MR 212/2011 Operation Of Mines Regulation
- MR 217/2006 Workplace Safety And Health Regulation
- Manitoba Regulation 228/94 (repealed)

#### 5. Procedure

**5.1** All workers using a fall protection system must be trained in its use, care and inspection by a competent person. The Fall Protection Equipment Pre-use Inspection checklist must be used and is included below.

1. The buddy system (a second worker) must be used when working in a fall arrest condition in order to call for assistance if required.
2. A Clearance Calculation must be done prior to the formation of a Rescue plan. A Clearance Calculation Diagram is attached below.
3. A rescue plan must be in place prior to working in a fall arrest condition. A rescue plan template for this purpose is attached below.
4. All equipment used as part of a fall protection system must be:
  - 4.1. inspected before use on each work shift by:
    - a) the worker who uses the fall protection system, or
    - b) a competent person other than the worker using the system;
5. kept free from any substance or condition that could contribute to deterioration of the equipment; and

6. maintained in good working order and in accordance with the manufacturer's specifications.
7. Stored in accordance with the manufacturer's specifications; and properly fitted to the worker.

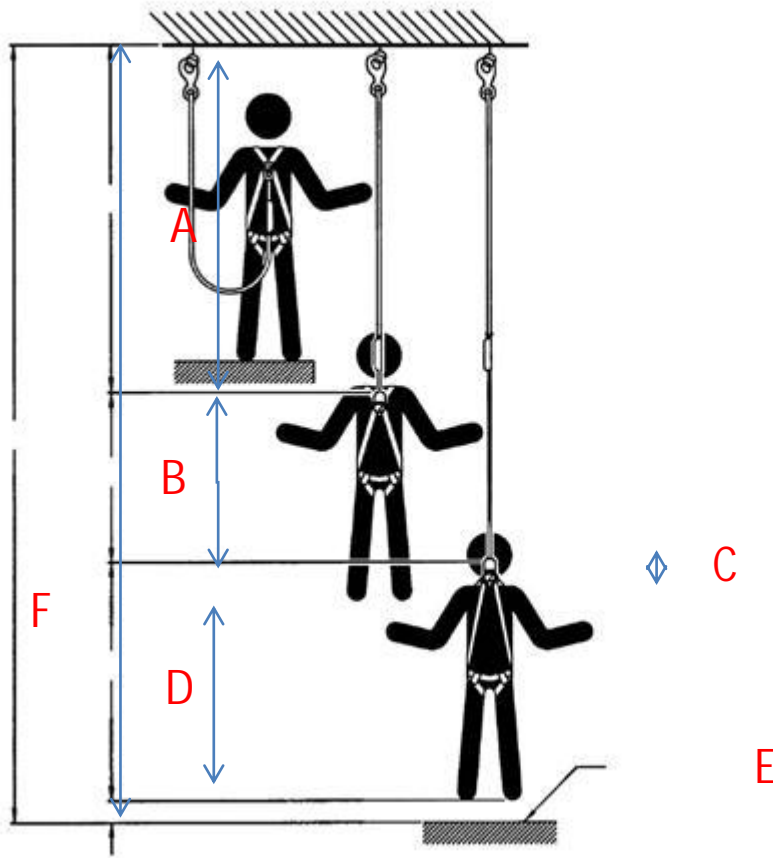
**5.2** No person may work within 3.75 meters (12 feet) of an open hole or where there is a danger of falling more than 1.5 meters (5 feet), without the use of a fall protection system. This will include but not be limited to:

1. A person (except underground) on a ladder-way that is steeper than seventy (70) degrees to the horizontal and not equipped with a safety cage.
2. A person working on top of bulk material in a silo, bin, hopper, chute, etc.
3. A person whose work includes reaching over a guardrail, handrail, bumper or fixed barrier to which there is an open hole condition.
4. Also any condition or activity in the opinion of the supervisor or worker that will reduce the potential for injury.

**5.3** An employer must ensure that no component of a “**Fall Protection System**” comes into contact with a sharp edge that could cut, chafe or abrade any component of the system.

Fall Protection Equipment Pre-Use Inspection						
<b>General Safety Guidelines</b>	<ul style="list-style-type: none"> <li>Fall arrest equipment needs to be properly maintained in accordance to the manufactures requirements.</li> <li>Personally inspect all of your components before each use in accordance to the manufactures requirements.</li> <li>If the inspection reveals any defective components, remove it from service immediately.</li> <li>Never alter any personal fall arrest equipment; altering this equipment could cause serious injury or death.</li> <li>This record of inspection must be kept by the Operating Department whenever fall protection equipment is used for a period of 2 years.</li> </ul>					
<b>Components</b>	<b>Pass</b>	<b>Fail</b>	<b>What to check for:</b>	<b>Pass</b>	<b>Fail</b>	<b>What to check for:</b>
<b>Class A</b> Full Body Harness <b>Class D</b> Controlled Decent <b>Class E</b> Escape & Evacuation <b>Class L</b> Ladder Climbing <b>Class P</b> Work Positioning	<input type="checkbox"/>	<input type="checkbox"/>	Are Labels legible	<input type="checkbox"/>	<input type="checkbox"/>	Check load capacity of harness
	<input type="checkbox"/>	<input type="checkbox"/>	Checked to see which classification of harness required for job, Class A, D, E, L, or P.	<input type="checkbox"/>	<input type="checkbox"/>	D-Dorsal, check all positioning rings, ring worn, bent, cracked
	<input type="checkbox"/>	<input type="checkbox"/>	Tongue buckle damaged, missing	<input type="checkbox"/>	<input type="checkbox"/>	Sub Pelvic Strap in good condition
	<input type="checkbox"/>	<input type="checkbox"/>	Plastic Pads & keepers are all in place, free of cuts, broken or cracks.	<input type="checkbox"/>	<input type="checkbox"/>	Metal buckle bent, cracked
	<input type="checkbox"/>	<input type="checkbox"/>	Webbing frayed, cut, burned, broken fibers	<input type="checkbox"/>	<input type="checkbox"/>	Check for impact indicator, ensure it is not deployed
<b>Connectors</b>	<input type="checkbox"/>	<input type="checkbox"/>	Connector clean	<input type="checkbox"/>	<input type="checkbox"/>	Cracks, burrs, or corrosion
	<input type="checkbox"/>	<input type="checkbox"/>	Hook bent, cracked, twisted	<input type="checkbox"/>	<input type="checkbox"/>	Springs weak, broken, missing
	<input type="checkbox"/>	<input type="checkbox"/>	Locking mechanism not works	<input type="checkbox"/>	<input type="checkbox"/>	Working parts move freely as intended
<b>Lanyard</b>	<input type="checkbox"/>	<input type="checkbox"/>	Check for any tears, burns, abrasions, or discoloration	<input type="checkbox"/>	<input type="checkbox"/>	All stitching patterns complete and intact
	<input type="checkbox"/>	<input type="checkbox"/>	Broken stitches	<input type="checkbox"/>	<input type="checkbox"/>	Connection's are not bent, cracked, twisted, corroded, to snap hook
<b>Lanyard with shock</b>	<input type="checkbox"/>	<input type="checkbox"/>	Rope and Webbing frayed, cut, burned, damaged by chemicals	<input type="checkbox"/>	<input type="checkbox"/>	Stretching/ distortion from shock loading
	<input type="checkbox"/>	<input type="checkbox"/>	Stitching loose or ripped	<input type="checkbox"/>	<input type="checkbox"/>	Connection's are not bent, cracked, twisted, corroded, to snap hook
	<input type="checkbox"/>	<input type="checkbox"/>	Jacket cut, torn, burned; signs of shock loading	<input type="checkbox"/>	<input type="checkbox"/>	No Knots in rope lanyard
	<input type="checkbox"/>	<input type="checkbox"/>	End loops cut, torn, burned, stretched			
<b>Rope grab Lifeline</b>	<input type="checkbox"/>	<input type="checkbox"/>	Fails hand test/death grip	<input type="checkbox"/>	<input type="checkbox"/>	Gate can't close fully
	<input type="checkbox"/>	<input type="checkbox"/>	Not used with appropriate diameter and type of rope	<input type="checkbox"/>	<input type="checkbox"/>	Locking pin not working
	<input type="checkbox"/>	<input type="checkbox"/>	Springs broken, missing	<input type="checkbox"/>	<input type="checkbox"/>	Safety latch broken
	<input type="checkbox"/>	<input type="checkbox"/>	Diameter must match that of rope grab	<input type="checkbox"/>	<input type="checkbox"/>	Teeth on cams worn
	<input type="checkbox"/>	<input type="checkbox"/>	Polypropylene or equivalent	<input type="checkbox"/>	<input type="checkbox"/>	Discoloration from sun, chemicals
	<input type="checkbox"/>	<input type="checkbox"/>	Rope frayed, rotted, cut, weakened by knots	<input type="checkbox"/>	<input type="checkbox"/>	Stretching from shock load
<b>Self Retractable Lifeline Type 1, 2, or 3</b>	<input type="checkbox"/>	<input type="checkbox"/>	Fall Stopping Brake test	<input type="checkbox"/>	<input type="checkbox"/>	Lifeline inspection "full length"
	<input type="checkbox"/>	<input type="checkbox"/>	Verified Type of Retractable 1, 2 or 3.	<input type="checkbox"/>	<input type="checkbox"/>	Impact indicator
	<input type="checkbox"/>	<input type="checkbox"/>	Load Capacities	<input type="checkbox"/>	<input type="checkbox"/>	Cable retraction test/ three stages
<b>Rescue Retractable Life Line</b>	<input type="checkbox"/>	<input type="checkbox"/>	Refer to specific manufacturer instructions on testing requirements	<input type="checkbox"/>	<input type="checkbox"/>	Refer to specific manufacturer instructions on inspection of all mechanical operations
<b>Anchor</b>	<input type="checkbox"/>	<input type="checkbox"/>	Ensure anchor has proper load capacity for fall arrest system being used.	<input type="checkbox"/>	<input type="checkbox"/>	Signs of Corrosion, cracks, or broken parts,
	<input type="checkbox"/>	<input type="checkbox"/>	Refer to specific manufacturers instructions on proper set up and application			
<b>Rock Bolt ( Underground use)</b>	<input type="checkbox"/>	<input type="checkbox"/>	Does the Anchor Point Bolt sound solid?	<input type="checkbox"/>	<input type="checkbox"/>	Is surrounding ground supported to standard and stable?
<b>General Maintenance Guidelines</b>	<input type="checkbox"/>	<input type="checkbox"/>	Does Harness and lanyard require cleaning with mild soap detergent and warm water?	<input type="checkbox"/>	<input type="checkbox"/>	Wipe off any hardware, Do Not force dry with heat.
	<input type="checkbox"/>	<input type="checkbox"/>	Hang fall protection equipment in a designated locker or area, avoiding sunlight, Alkaline or Acid environments.			
<b>Corrective Actions</b>						
<b>Action Completion Date</b>				<b>Signed</b>		

CLEARANCE CALCULATIONS  
(EXAMPLE ONLY)



The lanyard and shock absorber are fully extended and the fall has been arrested.

A- lanyard length 6'

B- shock absorber 3.5'

C- harness stretch 1'

D- worker height 6'

E- Safety Factor 2'.

F- TOTAL Minimum Required Clearance  
from Anchor to lower level = 18.5 feet.



## 6. System Requirements

### 6.1 Travel Restraint Systems

1. Safety belts (miners belt) with adequate attachment points are only allowed as part of a travel restraint system below the collar as per 4.7(2) of the Mines Regulation 212/2011. On surface, travel restraint systems must include a full body harness.
2. a lifeline or lanyard
3. Anchorage points capable of supporting a static force of at least 2 kN (500 lb-force) without exceeding the allowable unit stress for each material used in the fabrication of the anchor point.
4. The length of the lifeline or the lanyard is selected so that the worker can only proceed to within 1 m (3 feet) of an opening or edge.

### 6.2 Fall Arrest Systems

1. Full body harness with adequate attachment points

Is attached by a lifeline or lanyard to an independent fixed support that meets the requirements of MR 217-2006 (14.14(1))

A lifeline or lanyard is designed in accordance with CSA Standard Z259.16-04, Design of Active Fall-Protection Systems and CSA Standard Z259.13-04, Flexible Horizontal Lifeline Systems;

- a) is manufactured so that a worker's free fall distance does not exceed 1.2 m (4ft) excluding the increase in the total fall distance resulting from the use of "shock absorbers"; and
  - b) is arranged so that a worker cannot
    - i. hit the ground or an object or level below the work, or
    - ii. swing in a manner that poses a risk to the safety or health of a worker.
2. When a lanyard referred to above is equipped with a shock absorber or other similar device, the shock absorber or device must comply with CSA Standard Z259.11-05, Energy Absorbers and Lanyards.
  3. A fall arrest system must not include a shock absorber if wearing or using one could cause a worker to hit the ground or an object or level below the work.
  4. A fall arrest system must ensure that in the event of a fall, a worker will not be subject to forces greater than 8 kN (1800 lb-force).

### 6.3 Fixed Support System Requirements



1. A permanent anchorage system used as the fixed support in a travel restraint system or fall arrest system for that building meets the following requirements:
  - i. the anchor has an ultimate capacity of at least 22.2 kN (5000 lb-force) in any direction in which the load may be applied for each worker attached;
  - ii. the anchorage system is certified by a professional engineer as having the required load capacity
2. When a permanent anchorage system cannot be used at a workplace, an employer must ensure that the temporary fixed support in a travel restraint system or fall arrest system meets the following requirements:
  - i. when a fall arrest system without a shock absorber is used, a support used in a fall arrest system must be capable of supporting a static force of at least 8 kN (1800lb-force) without exceeding the allowable unit stress for each material used in the fabrication of the anchor point;
  - ii. when a shock absorber is used in a fall arrest system, the support must be capable of supporting a static force of at least 6 kN (1500 lb-force) without exceeding the allowable unit stress for each material used in the fabrication of the anchor point;

## 7. Inspection After Fall Arrest

1. After a fall protection system has arrested the fall of a worker, the entire system must be removed from service and is not returned to service until it has been inspected and certified as safe by the manufacturer or a professional engineer.
2. After a fall protection system has arrested the fall of a worker, the lanyard, shock absorber and harness shall be destroyed.

Approved By	Title  Vice President, Manitoba Operations
Date	