

# Health and Safety Resources

## Caution to Users

Many of the resources in this archive were originally prepared by WSN's predecessor organizations for use by industry clients. While much of the information and many of the forms included with them are still valuable, users should recognize that examples, contact information and data such as legislative references may be out of date. The resources are offered as free tools for companies to use in an effort to continuously improve their health and safety systems. But users of these resources also need to ensure that they are aware of the most recent legislation, equipment and processes, as well as current practices.

## Fall Protection

### Leader's Notes - Fall Protection

Falls from elevation are one of the leading causes of accidental death in the Ontario mining industry. Everyone, even employees with years of experience working close to fall hazards, can become complacent about wearing fall protection equipment. This safety meeting talk is an excellent opportunity to reinforce the importance of wearing this equipment.



*Note: These notes are intended to guide the trainer through a crew safety meeting on fall protection. Review the slides and notes ahead of time. Bring a copy of your company's fall protection program to discuss with the group. Gather any procedures, statistics, incident or accident reports available from your operation. Referring to these will make the subject more relevant to the audience. If possible, have fall protection equipment on hand to demonstrate with your crew.*

### Fall Protection

Ontario Regulation for Mines and Mining Plants calls for:

- All walkways and working platforms located 1.5 metres above ground to have guardrails
- A fall arrest system to be used if there is a risk that a worker may fall more than three metres \*






Regulation 845, Mines and Mining Plants outlines the legislative requirements for fall protection. Section 14 addresses fall arrest. Section 60 addresses fall arrest while working in bins. Section 84(2) focuses on fall arrest with movement of bulk materials. Section 94 addresses fall protection while scaling. Section 190 focuses on fall arrest on scaffolds and stages. Section 46(3) addresses when guardrails are necessary. Regulation 213, Construction Projects, Section 26.1 to 26.9, provides more recent legislation on fall protection.


### Common Falls in Mining

Falls don't have to be from a great height to result in injury. Some of the most common falls in mining are:

|                                  |     |
|----------------------------------|-----|
| • Falls from stationary vehicles | 43% |
| • Fall to a lower level, NEC*    | 28% |
| • Falls from ladders             | 18% |
| • Falls on stairs                | 9%  |
| • Falls from shaft/raise         | 2%  |

\* Not elsewhere classified





It is important to stress that falls from elevation don't have to be at great heights to cause injury. Falls from stationary vehicles make up 43% of fall from elevation accidents.

## Fall Protection

### Components of a Typical Fall Prevention Program

Components of a program include:

- A policy that commits the company to first trying to eliminate then minimize the risk of fall hazards
- A designated person to oversee the administration of the program
- A risk assessment to identify any tasks or locations where workers may be exposed to hazard \*



Every company should have a fall protection program. This starts with a policy. A policy statement states the company's commitment to reducing fall hazards in the workplace. A designated person must be in charge to oversee a fall protection program and put in place controls to manage fall hazards identified during the risk assessment.

Note: *Discuss your company's policy with your crew.*

### Components of a Typical Fall Prevention Program

Once risk areas are identified, steps should be taken to control fall Hazards in the following order:

1. Can the hazard be eliminated? (e.g. Can a valve be moved to a lower location so a ladder is not needed?)
2. Can the installation of engineered design features such as railings, platforms and covers neutralize the hazard?
3. Can an engineered fall prevention system prevent the risk of falls? (i.e. installation of engineered anchor points and selection and fitting of appropriate fall protection equipment)



With your crew, review areas in your workplace where fall hazards exist. If possible, it is best to eliminate fall hazards from the workplace. If it is not possible to remove the hazard, the next best thing is to try and engineer the problem out through guard rails, platforms or covers. If this is not possible, clearly mark the fall hazard area and ensure that anyone working in the area is wearing the proper fall prevention equipment.

### Components of a Typical Fall Prevention Program (Cont'd)

Once a written program is developed, the following program Elements have to be implemented:

- Training and refresher training for workers in how to use, inspect and maintain fall protection equipment
- Training and refresher training for fall rescue
- A maintenance and inspection procedure for design features, fall protection gear and anchors.
- Enforcement to ensure adherence to procedures
- Inspections and audits of equipment and areas fall arrest or fall restraint are to be worn
- A program review to ensure compliance with legislation \*



In order for a fall protection program to be effective, training and refresher courses must teach workers on how to use, inspect and maintain their gear. Workers must also be trained in how to safely and efficiently rescue someone who has fall.

### Fall Protection

A fall arrest system is made up of a suitable combination of the following components:

- Full body harness
- Lanyard
- Anchor
- Shock absorber
- Lifeline \*



According to Section 14 of Regulation 845 a fall arrest system must be made up of a suitable combination of the following components: Full-body harness, lanyard, shock absorbers, anchor, and a rope grabbing device or lifeline. Shock absorbers help minimize the forces on the body that results from a fall.

## Fall Protection

### Fall Protection

The components of fall protection system must:

- Distribute the force of a fall in a manner to minimize injury to the worker
- Ensure anchors can support 22 kn (5000 lbs) for each person tied off
- In the event of a fall, limit the force of the body to 8 kn (1800 lbs.)



Anchors and fall protection equipment must be engineered to support 5000 lbs (22 kilonewton) for each person tied off and limit the force on the body to 1800 lbs (8 kn). Ask yourself 'is it strong enough to hold a pick-up truck?'

### Fall Distance

The fall distance of the worker can be no more than one metre. Distances of more than one metre can result in:

- Excessive force on body
- The possibility of the worker hitting the level below \*



The farther a person falls, the greater the speed and therefore the greater the force on the body when stopped by a fall arrest system. If the force is too great, this can result in internal injuries.

The lanyard must be adjusted to prevent a worker from falling more than one metre. (Regulation 854, Section 14(4)(a))

### Swing Distance

To prevent a worker from swinging during a fall:

- Anchors should be located above the worker \*



When a worker falls they will come to rest underneath the anchor they are fastened to. If the anchor is not directly above them, the worker will swing in the motion of a pendulum until he comes to rest under the anchor. If the swing distance is too great the worker may hit walls, causing further injury.

### Employee Health

Special attention should be given to the health of workers who use fall protection. The jarring effects of a fall may severely affect employees who have the following conditions:

- Heart problems
- Poor circulation
- Medical conditions, check with a doctor

Note: A special harness must be used for employees who weigh more than 260 pounds \*



While fall protection equipment is designed to limit force on the body and work as comfortably as possible, workers will experience jarring and be suspended in mid-air as the result of a fall. If workers have medical conditions they should check with their doctor. Full-body harnesses are designed for weights up to 260 lbs. If a worker weighs more than this they will require a special harness.

## Fall Protection

### Travel Restraint System

- The use of a travel restraint system is recommended if work is being done within 3 metres of a fall hazard
- A travel restraint system provides enough length for a worker to work near an edge, without falling over \*



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The restraint system is set up to prevent the worker from accidentally reaching the edge and falling off. Travel restraint systems are recommended when work is taking place within 3 metres of an edge, but the worker has to work right at the edge, a fall arrest system is necessary.

### Fall Arrest System

A fall arrest system should not be used by workers unless they:

- Have received proper training in set-up, use and inspections
- Are paired up in a buddy system
- Are trained in fall rescue
- Are aware of the location rescue equipment \*



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If you have to work near the edge of a fall hazard, a fall arrest system must be used. Two common types of fall arrest systems are: A full-body harness connected by a lanyard (with shock absorber) to an anchoring point; or a full-body harness connected to a self-retracting lifeline (with a shock absorber). It is very important that workers are comfortable and competent with the system they are to use. It is important to work in pairs due to the recommended 15 minute time frame to rescue someone from a fall. Workers must be properly trained in all aspects of fall protection: from gear inspection to rescue, and be aware of the location of rescue equipment and the time-constraints associated with suspension trauma.

### When Working in a Fall Protection Zone...

To work safely on raised platforms, protect yourself by:

- Wearing fall arrest protection
- Having a clean work area, free of tripping hazards
- Never stepping backwards
- Looking down first before shifting footing \*

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Develop good habits when working in a fall protection zone. Make sure the work area is free of tripping hazards. Never step backwards and always look down before shifting footing, and you will never have to engage your fall arrest system.

### Changing Anchors

- If it is necessary to change anchors while working lanyard with two loops must be used
- A worker must connect to his new anchor **BEFORE** disconnecting from his old anchor
- A worker should never find himself unconnected from his fall protection system \*

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A fall protection system only works if the worker is fastened into an anchor. When workers change anchors they leave themselves vulnerable to a fall. If the task they are performing requires changing anchors, the worker must have a lanyard with twin loops. This allows a worker to connect to the new anchor before detaching from the old anchor.

## Fall Protection

### In the Event of a Fall...

#### The Faint Cycle:

- A fallen worker is suspended in his harness in a vertical position. Within 10-15 minutes, gravity can move blood from the brain to lower extremities, causing the worker to faint.
- If the worker is not rescued promptly a cycle of fainting can occur which can result in a fatality \*



Make verbal contact with a fallen worker to ensure they are okay and let them know you are starting the rescue process. Once a person has fallen, a rescue must begin immediately. If the rescue takes too long, the victim will begin a faint cycle as a result of blood being pulled by gravity from the upper extremities and brain to the lower extremities. After each period of fainting, the victim's level of consciousness becomes more and more diminished - this can eventually result in a fatality.

### In the Event of a Fall...

- If a worker has fallen and is conscious, they must move their legs and feet to encourage circulation.
- If a worker is unconscious, a rescue must take place within 15 minutes to prevent blood from pooling.
- After being rescued a worker should sit down (not lie down). Blood will have pooled in the lower extremities, if the victim lies down the sudden change in pressures can damage the heart and release blood clots \*



Encourage the worker to move their arms and legs to encourage circulation. Once the worker is rescued, make sure they sit down (not lie down). Sitting down allows blood located in the lower extremities to return to the upper extremities at a slower pace. A sudden change in pressure (from lying down) can result in increased blood pressure, release of blood clots, and rapid change in heart rate that causes damage to the heart. There are special suspension straps available to help a fallen worker rest their legs while awaiting rescue.

### In the Event of a Fall...

#### Ontario Regulation for Mines and Mining Plants calls for:

- Various equipment is available to help encourage blood circulation in the event of a fall. Some pieces allow a worker to recline or provide straps for the worker to raise his legs.
- These products can help a worker avoid the fainting cycle, but should not be used in place of a prompt rescue program \*



All fall protection equipment is sold with manufacturer's instructions for care and maintenance. It is essential your program takes these recommendations into account.

Note: Discuss the manufacturer's instructions for your company's fall arrest equipment with your crew.

### Full Body Harness

#### When inspecting a harness, look for:

- Cuts, frayed edges or broken stitches in webbing
- Discolouration, melted fibers or brittleness due to heat or chemicals
- Excessive oil or grease contamination
- Cracks, distortions, sharp or rough edges on the harness' buckles
- Rusting on grommets \*



Inspect each piece of equipment carefully before use.

## Fall Protection

### Lanyard

The lanyard attaches the harness to the anchor. When inspecting lanyards, look for the following:

- Worn, broken or cut fibers
- Free of knots
- Evidence of stretching or loading
- Excessive oil or grease contamination
- Cracks, distortion, corrosion or signs of stress on connecting hardware
- Shock absorber intact
- Shock absorber is installed at man end, no anchor end
- Correct length to ensure a fall of no more than one metre \*



Inspect each piece of equipment carefully before use. Do not tie knots in lanyards, hook two lanyards together or tie a lanyard back on itself. This compromises the integrity of the lanyard.

### Anchors

Permanent anchors must be engineered. To inspect an anchor, look for:

- Signs of corrosion
- Rough edges, nicks or burrs \*



Inspect each piece of equipment carefully before use. Anchors used in the underground environment require special attention, as they are placed directly into rock. Section 26.7 of Regulation 213, Construction Projects outlines design requirements for anchors.

### Lifelines

- A lifeline is a vertical or horizontal length of rope, cable, or strap attached at one or both ends to an anchoring hitch. The harness is attached to the lifeline by a lanyard, lanyard and shock absorber, or lanyard and rope grabbing device. \*



Inspect each piece of equipment carefully before use.

### Lifelines

When inspecting a lifeline look for:

- Damaged strands, cuts, abrasions, burns or foreign materials lodged in the strands
- Discolouration from heat or chemical exposure
- Excessive oil or grease contamination \*



Inspect each piece of equipment carefully before use.

## Fall Protection

### Self-Retracting Lifeline

To inspect a self-retracting lifeline test for:

- Spring action
- Locking action

- Inspect for:
- Corrosion
  - Visible cracks
  - Broken wires
  - Deformations \*



Inspect each piece of equipment carefully before use.

The following resources can be used to supplement this safety meeting talk:

- Company fall protection program
- Manufacturer's instructions and inspection checklist
- Safety videos available from manufacturer
- Construction regulations 213, Section 26(1) - 26(9)
- Guideline for Section 14, Regulation 854

The information contained in this material is provided as a guide only. WSN recognizes that individual companies must develop health and safety policies and programs which apply to their workplaces and comply with appropriate legislation. This material does not constitute legal advice. While the information provided, including references to legislation and established practice, is current at the time of printing, it may become out-of-date or incomplete with the passage of time.

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