

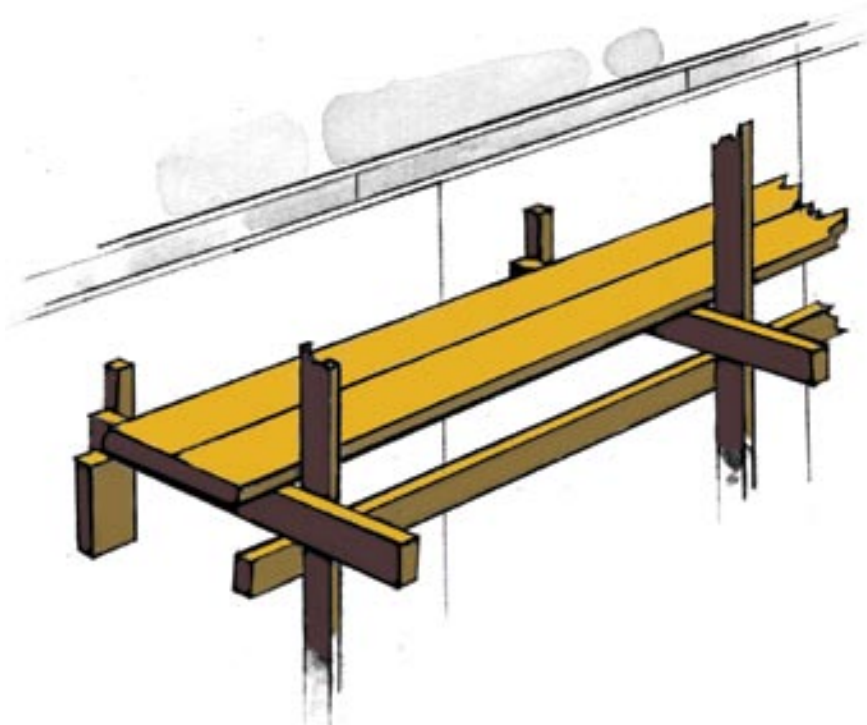
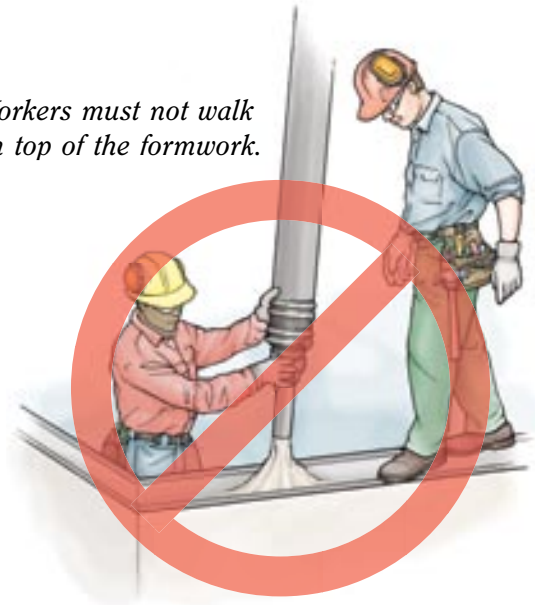


Concrete pouring and pumping

General requirements

- Exposed skin that contacts wet concrete can become extremely irritated. In some cases, the irritation is serious enough to result in injuries. To prevent exposure, personal protective equipment is required: hard hat, gloves, and safety glasses. Wear a long-sleeved shirt to protect against both site hazards and sun exposure.
- Unless working on the ground, pouring and pumping concrete into wall forms must be done from platforms. The platforms must be a minimum of 510 mm (20 in.) wide and set at about 1 m (3 ft.) below the top of the form.

Workers must not walk on top of the formwork.



Single-pole wooden scaffolding for pouring or pumping concrete.

Note: Guardrails may not be required if scaffolding is less than 3 m (10 ft.) above grade.

Project: _____ Address: _____

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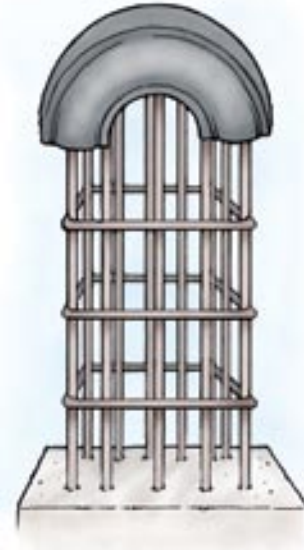
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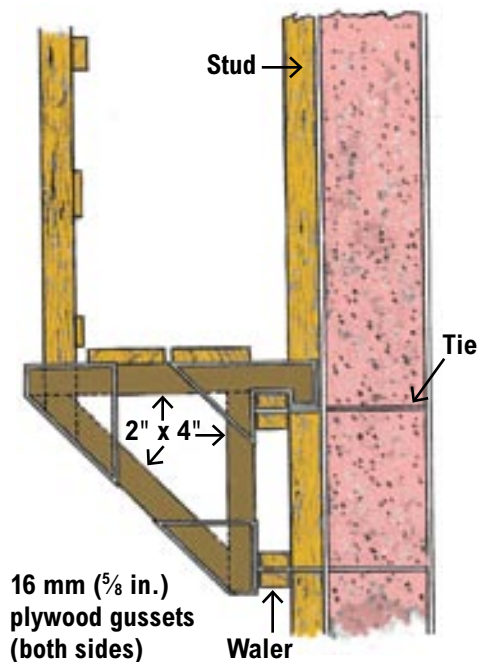
Formwork

General Requirements

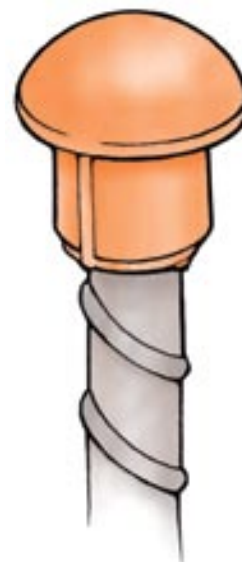
- Grade or ground beams are usually the first part of wall forming. The rebar dowels protrude above the beam so that the rebar can be attached to the wall. Protection must be provided to prevent workers from being injured by or impaled on the dowels.
- After the wall forms have been installed, ladders and work platforms must be used to provide safe access to and around the formwork.
- Stripping of the formwork should be done in an organized way that eliminates hazards such as tripping and nail punctures. For example, nails should be removed or bent as the stripping takes place.
- Formwork bracket scaffolding may be used on wall forms for light-duty work.



This form of protection will prevent impalement.



This type of light-duty formwork bracket can be built using either single or double waler systems.



This form of protection will prevent injuries other than impalement.

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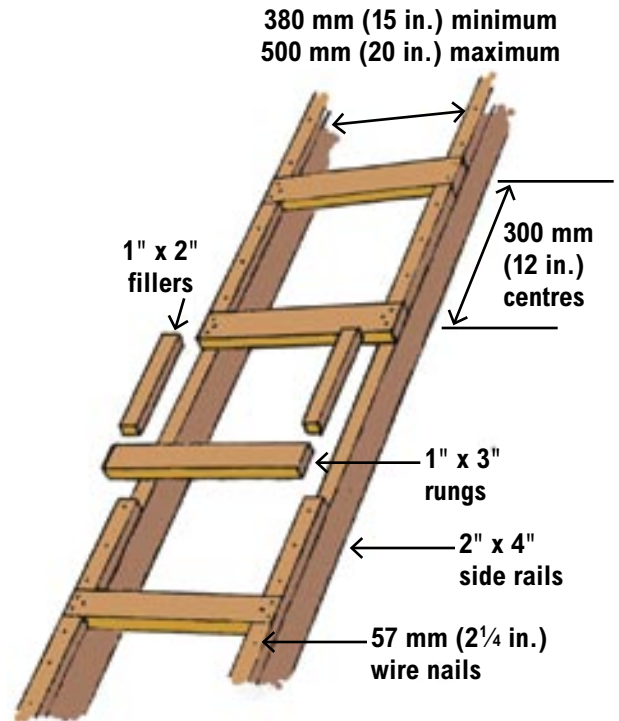
Job-built ladders

Poorly designed and constructed wooden ladders built on the job site have led to serious injuries to construction workers.

Job-built wooden ladders must be designed and constructed to the WorkSafeBC specifications set out below.

NOTE: The specifications shown here apply to ladders up to a maximum of 5 m (16 ft.) in length.

- All ladder components must be cut from lumber that is
 - Free of defects
 - Construction-grade or better
- The side rails must be 38 mm x 89 mm (2 in. x 4 in. nominal) dimensions. Side rails must not be notched, dapped, tapered, or spliced. The distance between the inner face of side rails must not be less than 380 mm (15 in.) nor more than 500 mm (20 in.).
- The rungs (cleats) must be 19 mm x 64 mm (1 in. x 3 in. nominal) dimensions. Rungs must be placed at 300 mm (12 in.) centres.
- Ladders must be tied, blocked, or otherwise secured to prevent them from slipping.
- Rungs must be nailed directly onto the edges of the side rails.



A job-built ladder up to 5m (16 ft.) long.

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Safe ladder use

Falls from ladders are one of the leading causes of injuries to construction workers in British Columbia.

- When climbing up or down, workers should
 - Always face the ladder
 - Use a three-point contact climbing method as shown at right (two hands and one foot, or one hand and two feet)
- Only one worker at a time is allowed on a single-width ladder.
- Workers must not use ladder-type material hoists for roof access unless the hoists are designed for that purpose.



Workers must not work from the top two rungs of a ladder.



Workers must not carry heavy, bulky, or hazardous materials when climbing ladders. Suitable hoisting equipment must be used for this purpose.

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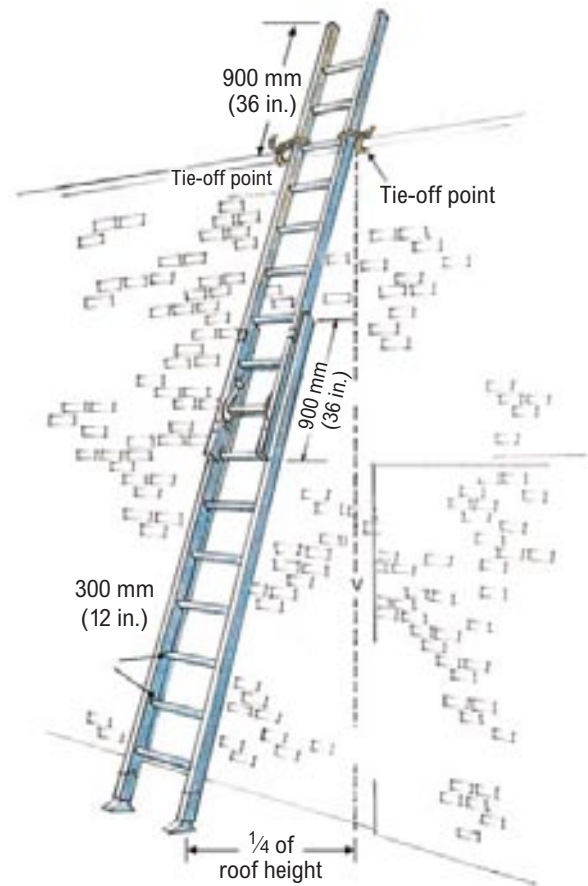
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Setting up a ladder

Falls from ladders are one of the leading causes of injuries to construction workers in British Columbia.

- Inspect each ladder before use. Ladders with loose, broken, or missing rungs, split or bent side rails, or other defects must be identified and removed from service.
- Use only CSA or ANSI Standard approved heavy-duty ladders or job-built wooden ladders built to WorkSafeBC Standard LDR 1-2004.
- Ladder tops must rest against a firm structure.
- Ladders must extend about one metre (three feet) above a safe landing or parapet wall.
- Ladders must be set up with a four vertical to one horizontal slope.
- Ladders must be tied, blocked, or otherwise secured to prevent them from slipping.
- The base of a ladder's side rails must rest on a firm, level foundation.
- Watch for overhead power lines before erecting a ladder. Metal, including wire-reinforced wooden ladders, must not be used near energized electrical conductors.



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Hearing protection

Construction workers are often exposed to on-the-job noise that can permanently damage hearing.

- It's important that workers wear hearing protection devices when exposed to noise from loud tools such as air nailers, chop saws, chainsaws, circular saws, routers, screw guns, drills, and power planers.
- Employers are responsible for providing the required hearing protection devices. To monitor the effectiveness of hearing protection, construction workers must have their hearing tested every year.
- Where communications with co-workers may be critical, wear hearing protection devices that do not block out too much noise. Examples include custom-moulded earplugs with vents, earplugs with a connecting cord, Class B earplugs or earmuffs, and electronic earmuffs or earplugs.
- Information on hearing testing, hearing protection devices, and hearing conservation programs can be found at WorkSafeBC.com. Click Safety at Work, and then under the Topics heading click Hearing Loss Prevention.



There are many options for hearing protection devices on a construction site.

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Basic personal protective equipment and clothing

All workers must equip themselves with suitable clothing, shirts, and long pants for protection against both the weather and workplace hazards. Unless otherwise agreed upon, workers are also responsible for providing their own work gloves, safety headgear, and safety footwear. However, if a product requires specified gloves to protect the user against hand injuries such as slivers and cuts, the employer must provide those gloves.

Employers are responsible for providing and enforcing the use of personal protective equipment. This includes fall, respiratory, eye, and hearing protection, and any other specialized protective equipment required by the Occupational Health and Safety Regulation.

Employers need to make sure that the appropriate personal protective equipment is identified for various phases of construction and is being used by workers. Employers must ensure that workers are trained in the use of specialized protective equipment, including fall protection equipment, prior to use.

Where there is a danger of making contact with moving parts of machinery, equipment, or tools:

- Avoid loose-fitting or frayed clothing.
- Remove accessories such as rings, dangling neckwear, loose-fitting bracelets, and watch bands.
- Confine long hair.
- Wear a short-sleeved shirt and long pants.

Foot protection

- Footwear must protect the ankle, sole, and toes. Safety footwear with a CSA green triangle symbol meets these requirements.
- It is the worker's responsibility to keep personal safety footwear in good repair. For example, exposed metal toecaps could be hazardous near electricity.
- Keep laces tied up at all times to avoid snagging or tripping.



Use safety footwear with a CSA green triangle.

Head protection

When entering a construction site, workers must wear CSA-approved hard hats.

When using a hard hat:

- A chinstrap or ratchet may be required if your job involves constant bending and your head is below the waistline.
- Keep it clean.
- Inspect it regularly.
- Change the suspension harness at least every five years.
- Don't use solvents to clean it.
- Don't drill holes into it unless approved by the manufacturer.
- Don't paint it.
- Don't use it if it has a crack or a deep gouge.
- Don't throw it around or use it as a hammer.



Inspect your hard hat regularly.

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Anchors

An anchor—what you connect your lanyard or lifeline to—is a key element of any personal fall protection system. An anchor may consist of a load-rated strap or sling wrapped around a substantial structural member of a building. An anchor may also be a manufactured component that permanently or temporarily attaches to a structure.

Selecting an anchor

The selection of a suitable anchor depends on the type of personal fall protection system you use.

- If you use a fall restraint system, your anchor must be capable of supporting at least 3.5 kN (800 lb.) or the equivalent of four times the weight of the worker.
- If you use a fall arrest system, your anchor must be capable of supporting at least 22 kN (5000 lb.). Alternatively, when the potential arrest forces are known, an anchor capable of supporting the equivalent of two times the maximum arrest force generated by a falling worker is acceptable. For example, the manufacturer will specify the maximum arrest force on personal energy-absorbing devices in the fall arrest system.

NOTE: The anchor values above do not apply to horizontal lifeline systems. The potential forces imposed on the anchors of a horizontal lifeline can be much greater than those for personal fall restraint or arrest systems. For more information, see the *Horizontal Lifelines Toolbox Meeting Guide*.



This is an example of a fall restraint system. Fall restraint systems prevent workers from falling.



This is an example of a fall arrest system. Fall arrest systems protect workers after they fall by stopping the fall before they hit the surface below.



These are examples of various fall protection anchors for slope roof applications.



These are the same anchors installed.

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Fall restraint or fall arrest?

In choosing a fall protection system, you should first consider installing guardrails or barriers. They provide a high degree of protection once installed properly.

However, installing guardrails or barriers at a worksite is not always practical. That's when you may need personal fall protection equipment.

Fall restraint systems **prevent** you from falling.

Examples include:

- Work-positioning systems—using either safety belts or full body harnesses that attach you to an anchor and leave both your hands free
- Travel-restriction systems—personal fall protection equipment used to prevent you from travelling to an edge from which you may fall

NOTE: In a fall restraint system, a line is attached to an anchor and to your harness or safety belt in such a way that you cannot fall. The anchor must be able to withstand 3.5 kN (800 lb.).

Fall arrest systems protect you **after** you fall by stopping the fall before you hit the surface below.

Examples include:

- Full body harnesses connected by lanyards or lifelines to secure anchors. The harness must be attached to an anchor that is able to withstand 22 kN (5000 lb.) or two times the maximum arrest force.
- Safety nets



This is an example of a fall restraint system. The worker cannot fall off the edge.



This is an example of a fall arrest system.

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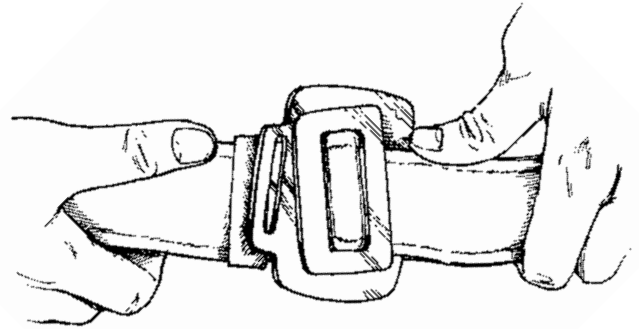
Inspecting a full body harness

Inspect your harness before each use. Check the buckles, the webbing, and the D-rings. Check the manufacturer's label for additional user information.

If the harness is damaged or worn, do not wear it.

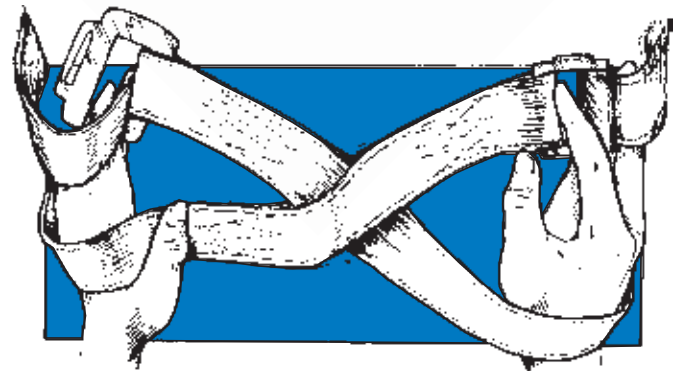
Buckles

- Many full body harnesses have interlocking buckles called friction buckles. Look for bent, cracked, or nicked buckles. Test the buckles to make sure the coupling is secure.



Webbing

- Look for frayed, cracked, cut, burned, or damaged webbing, and loose or broken stitching.



D-rings

- Look for bent, cracked, nicked, or gouged rings.

Manufacturer's label

- Inspect the manufacturer's label on the harness. The manufacturer's label on a CSA-approved full body harness will contain the following information:
 - Manufacturer or vendor identification
 - Size of harness
 - Date the harness was manufactured
 - Model number

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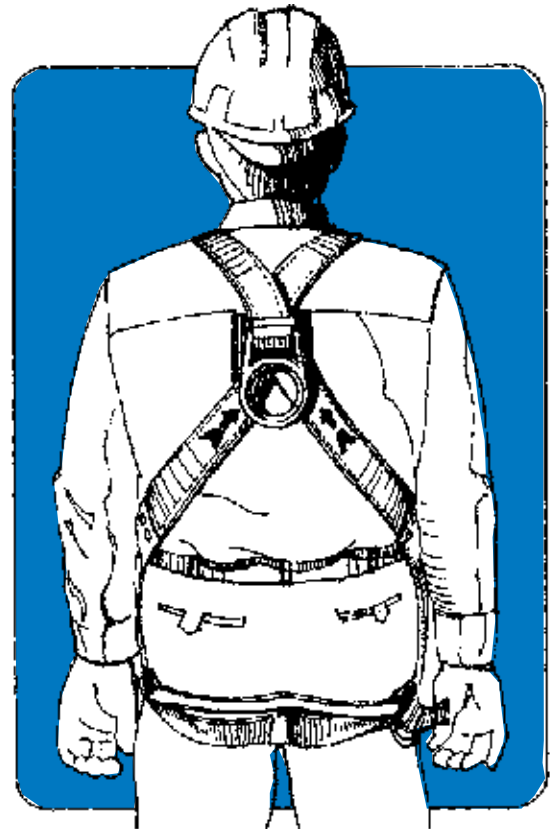


Putting on a full body harness

Some harnesses are designed to serve more than one purpose. Check the manufacturer's label for the harness's classification:

- Group A—Fall arresting
- Group D—Controlled descent
- Group E—Confined entry (raising and lowering)
- Group L—Ladder climbing
- Group P—Work positioning

NOTE: A full body harness that meets CSA Standards Z259.10 is acceptable to WorkSafeBC.



- Adjust all hardware and straps so the harness fits snugly but still lets you move freely. Tuck in all loose straps so they don't snag or cause you to trip.
- Hook onto the harness D-ring (marked "A" on each shoulder strap, as shown in the above-right diagram) designed to arrest falls.

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When to use a full body harness

When using personal fall protection equipment, wear a full body harness if you are at risk of falling.

A full body harness consists of straps passed over the shoulders, across the chest, and around the legs.

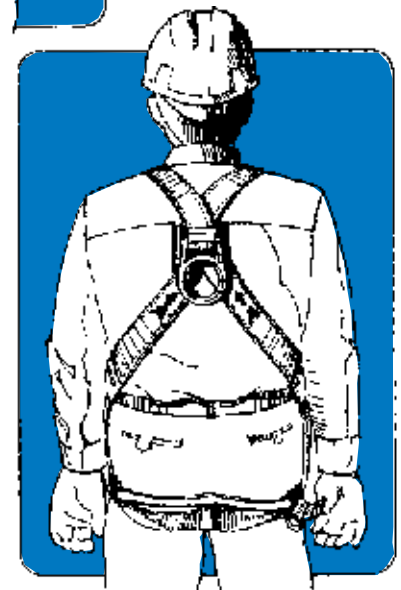
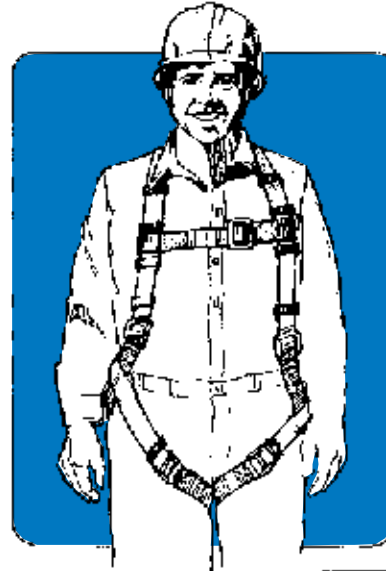
In a fall, a full body harness protects you more than a safety belt because the harness distributes the force of impact over a greater area of your body.

Using the right full body harness

A full body harness designed to arrest falls should have:

- A back-mounted D-ring located between the shoulder blades
- The letter “A” stencilled on each shoulder strap below the D-ring (as shown in bottom diagram)
- An arrow stencilled above each letter “A” pointing up at the D-ring

The arrows on the shoulder straps point to the only D-ring on the harness designed to safely arrest a fall.



This is a full body harness worn to arrest falls. Note that the D-ring is located between the shoulder blades.

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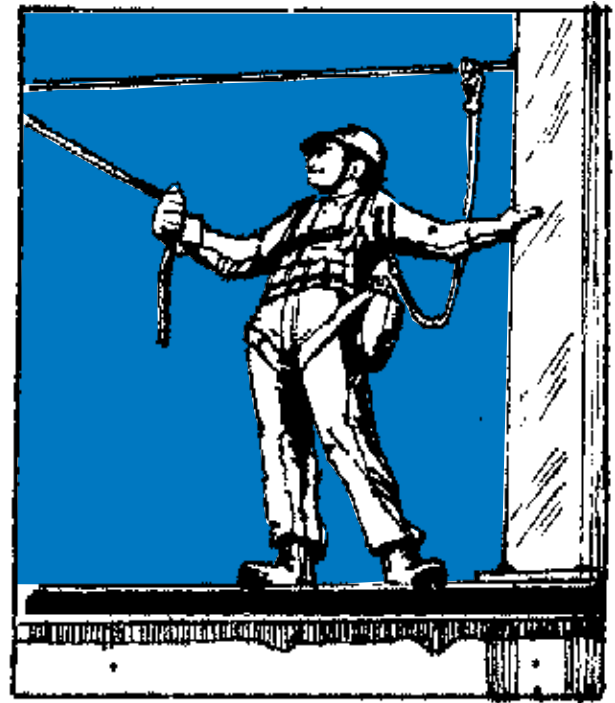
Horizontal lifelines

A horizontal lifeline consists of a synthetic or wire rope, or fixed rail, rigged between two substantial anchor points. Lifeline systems allow the worker to move horizontally along the work surface while being connected to the lifeline.

Horizontal lifelines and their anchors may be subject to extreme forces in the event of a fall. Therefore, all **permanently** installed horizontal lifeline systems must be certified by a professional engineer.

Temporary horizontal lifeline systems are acceptable if they are:

- Manufactured for commercial distribution, and installed and used according to the written instructions provided, OR
- Installed and used according to the written instructions of a professional engineer, OR
- Installed and used according to each of the following requirements:
 - The horizontal lifeline is a minimum 12 mm (1/2 in.) diameter wire rope with a breaking strength specified by the manufacturer of at least 89 kN (20,000 lb.).
 - The horizontal lifeline is free of splices except at the terminations.
 - Connection hardware, such as shackles and turnbuckles, has an ultimate load capacity of at least 71 kN (16,000 lb.).
 - The span is at least 6 m (20 ft.) and not more than 18 m (60 ft.).
 - End anchors have an ultimate load capacity of at least 71 kN (16,000 lb.).
 - The horizontal lifeline has an unloaded sag of approximately the span length divided by 60.
 - The elevation of the line at any point is at least 1 m (39 in.) above the working surface.
 - The free-fall distance is limited to 1.2 m (4 ft.).
 - A minimum of 3.5 m (12 ft.) of unobstructed clearance is available below the working surface.
 - No more than three workers are secured to the horizontal lifeline.
 - The horizontal lifeline is positioned so it does not impede the safe movement of workers.



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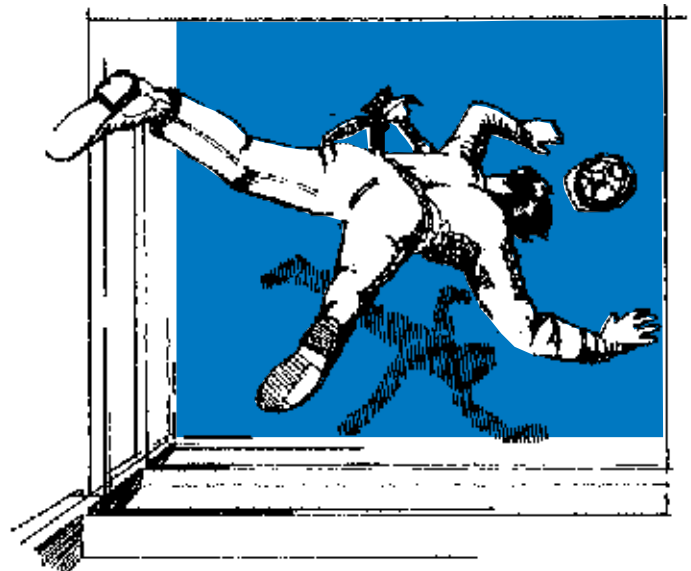


How long does it take to fall?

- The Occupational Health and Safety Regulation requires workers to use a fall protection system
 - Where they could fall at least 3 m (10 ft.) or
 - Where a fall from a lesser height may result in serious injury
- Workers must be trained thoroughly in the safe use and limitations of personal fall protection equipment including safety belts, harnesses, lanyards, and lifelines.
- Many workers believe that they have time to regain their balance before they fall. This belief is not always correct.
- The following table indicates how far you can fall in just a few seconds:

Time <i>(seconds)</i>	Distance <i>(metres)</i>	Distance <i>(feet)</i>
0.5	1.2	4
1	5	16
1.5	11	36
2	20	64
2.5	31	100
3	44	144
4	78	256

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



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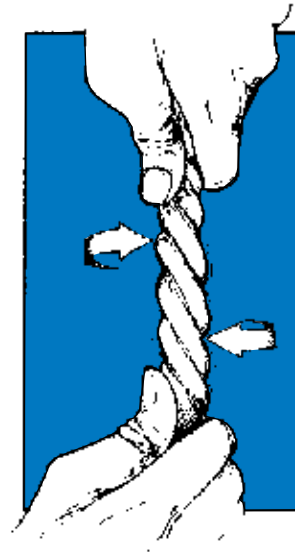
Inspecting your lanyard

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

Inspect the lanyard before each use. Check the rope or webbing, the snap hooks, and the manufacturer's label for additional user information.

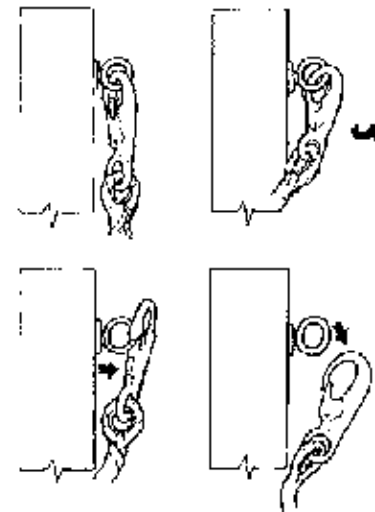
Rope or webbing

- Inspect the whole length of the lanyard and the eye splices. If you have a three-strand rope lanyard, carefully twist the rope open (as shown) to look for worn, broken, or cut fibres. Do not over-twist, or you could permanently deform the rope.
- Web lanyards should be discarded if
 - The webbing has cuts, holes, or is worn or frayed, or
 - The load-bearing stitches are damaged
- If you find any signs of deterioration, burns, or broken or damaged strands, or if you have any reason to suspect the lanyard, do not use it.



Snap hooks

- CSA Standard Z259.1 requires snap hooks to be self-locking to prevent accidental roll-out. Roll-out can occur when small D-rings, or other attachment hardware, cause the snap-hook gate to push open in a twisting action, thus separating the two components (as shown).



Manufacturer's label

The manufacturer's label on a CSA-approved lanyard will contain the following information:

- Manufacturer or vendor identification
- Length and diameter of the lanyard (if applicable)
- Material from which the lanyard was made
- Date the lanyard was manufactured
- Model number
- "Warning—any unit which has seen fall arrest service should not be used after such service"

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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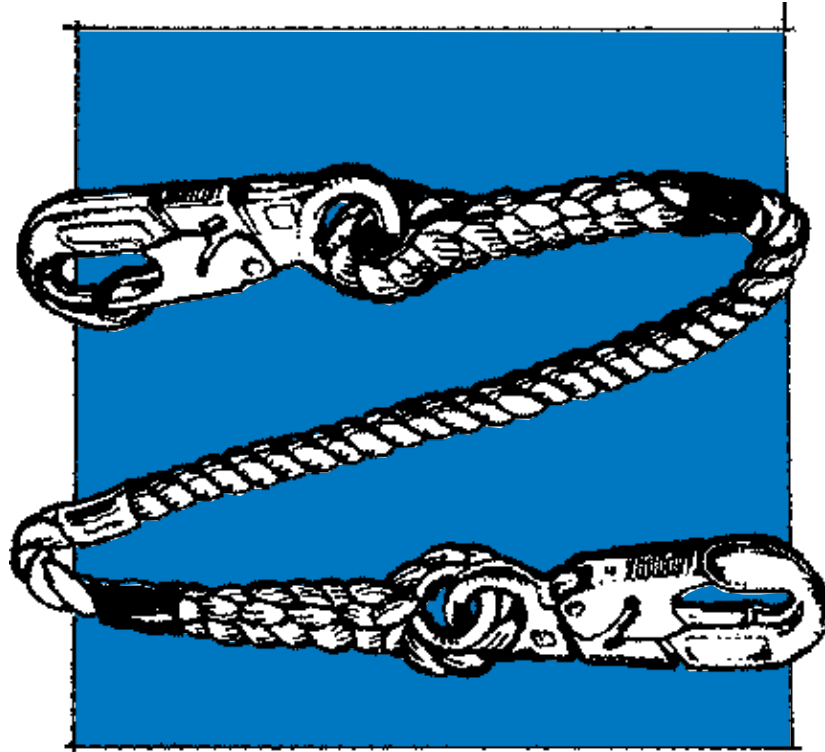
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Using the right lanyard

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

A lanyard that meets the requirements of CSA Standard Z259.1 is acceptable to WorkSafeBC.



- Keep lanyards as short as possible to reduce the distance you could fall. Try to arrange the lanyard to limit a free fall to no more than 1.2 m (4 ft.) in a fall arrest situation.
- When using a wire rope lanyard for fall arrest, a personal shock absorber must be included in your personal fall protection system in order to keep the arrest force at a safe level.

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Date: _____ Time: _____ Shift: _____

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Vertical lifelines

A lifeline is a length of synthetic fibre or steel wire rope attached to an independent point of anchorage. A lifeline is typically used in conjunction with a fall arrest device such as a rope grab.

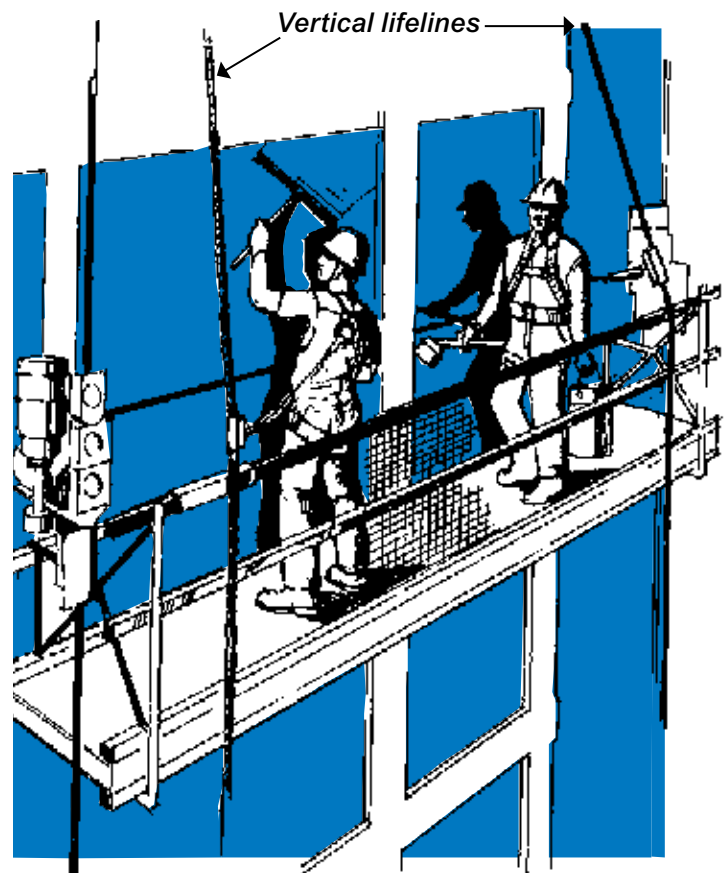
Using the right vertical lifeline

The rope used as a vertical lifeline in a personal fall arrest system requires a minimum breaking strength of 26.7 kN (6,000 lb.).

The reason for a breaking strength greater than that of the anchor is to allow for the eye splices and knots tied in the rope at the anchor end. Splices and knots will weaken a rope, so additional capacity of the lifeline is required.

The following are good industry practices for the safe use of a vertical lifeline:

- No knots or splices in the lifeline except at the termination points.
- Attach each lifeline to an independent point of anchorage.
- Only one worker connected to a vertical lifeline.
- The lifeline should extend to within 1.2 m (4 ft.) of the ground or a safe lower landing.
- If the suspended length of a lifeline exceeds 91 m (300 ft.), then lanyard length, rope construction, rope strength, and the effects of wind must be taken into account.



Inspecting a vertical lifeline

Exposure to sunlight causes most synthetic fibre ropes to deteriorate over time.

Before each use, carefully inspect your lifeline to make sure it is in good condition. Look for

- Signs of chafing or abrasion
- Cuts in the yarns or strands
- Any visible deformities that would weaken the rope or interfere with the free movement of the rope grab

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Personal shock absorbers and carabiners

Personal shock absorbers

A shock absorber slows and cushions a fall, reducing the forces of stopping the fall.

Personal shock absorbers are often made of “tear webbing.” In a fall, specific stitch patterns in the webbing absorb the force of impact and progressively tear apart.

WARNING: The shock absorber may increase the length of the lanyard by as much as 1.2 m (4 ft.) during a fall. Be sure to

1. **Refer to the label** on the shock-absorbing unit to determine the maximum elongation.
2. **Allow for extra fall distance** when you include a shock absorber in your personal fall protection system.

NOTE: A personal shock absorber that meets CSA Standard Z259.11 is acceptable to WorkSafeBC.

Carabiners

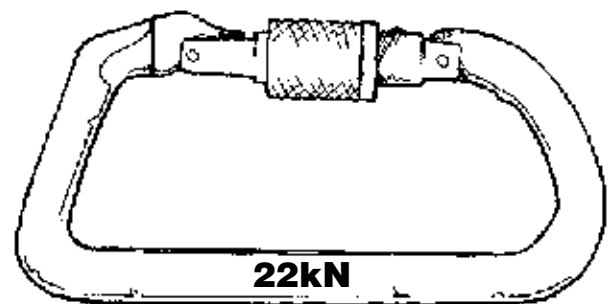
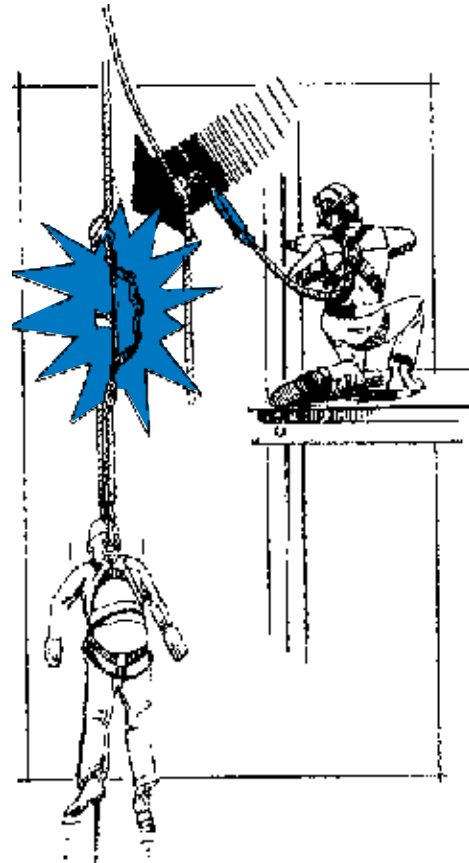
A carabiner is an oblong-shaped connecting device used to attach different components of a personal fall protection system.

A carabiner that meets the requirements of CSA Standard Z259.12 is acceptable to WorkSafeBC.

A carabiner should

- Have gates that are both self-closing and self-locking
- Have a breaking strength of at least 22 kN (5,000 lb.)
- Have the manufacturer’s identity and load capacity clearly marked on it

Inspect your carabiner before each use. Make sure it is free of damage, deformities, or excessive wear.



Project: _____ Address: _____

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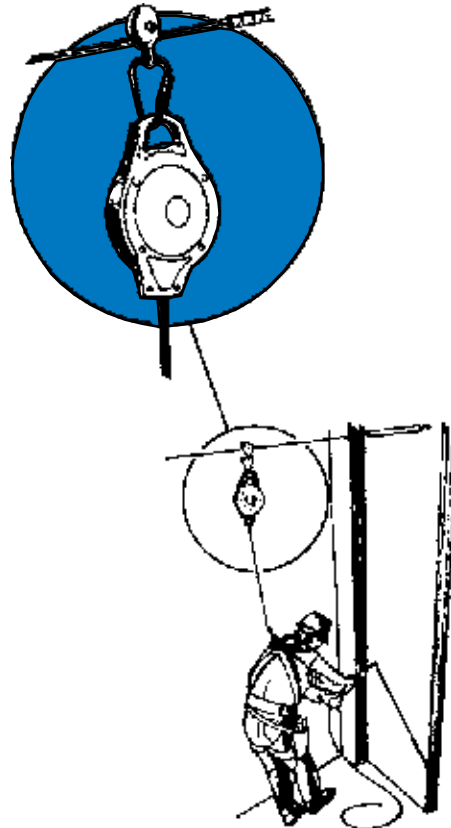


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Retractable lifelines

A retractable lifeline is a type of vertical lifeline that works somewhat like a seat belt in a car. The lifeline is coiled inside a protective housing. As you move up or down, the lifeline extends or retracts. The line is under constant tension and leaves no slack.



The moment you fall, the lifeline locks and stops your fall after a short distance.

Many retractable lifelines have fall indicators on their protective housings. **Do not** use the lifeline if the indicator shows that a fall has occurred.

After a fall, the manufacturer or the manufacturer's authorized agent must inspect the lifeline and approve it for continued use.

Always use a retractable lifeline block in the vertical position unless specifically allowed for by the manufacturer.

Project: _____ Address: _____

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Rope grabs

A rope grab is a device that travels along a lifeline and will lock onto it in the event of a fall.

- Rope used with all rope grabs must be the diameter specified by the manufacturer.
- Ensure the rope grab is installed on the rope in the correct orientation. The top of the device must point toward the anchor.

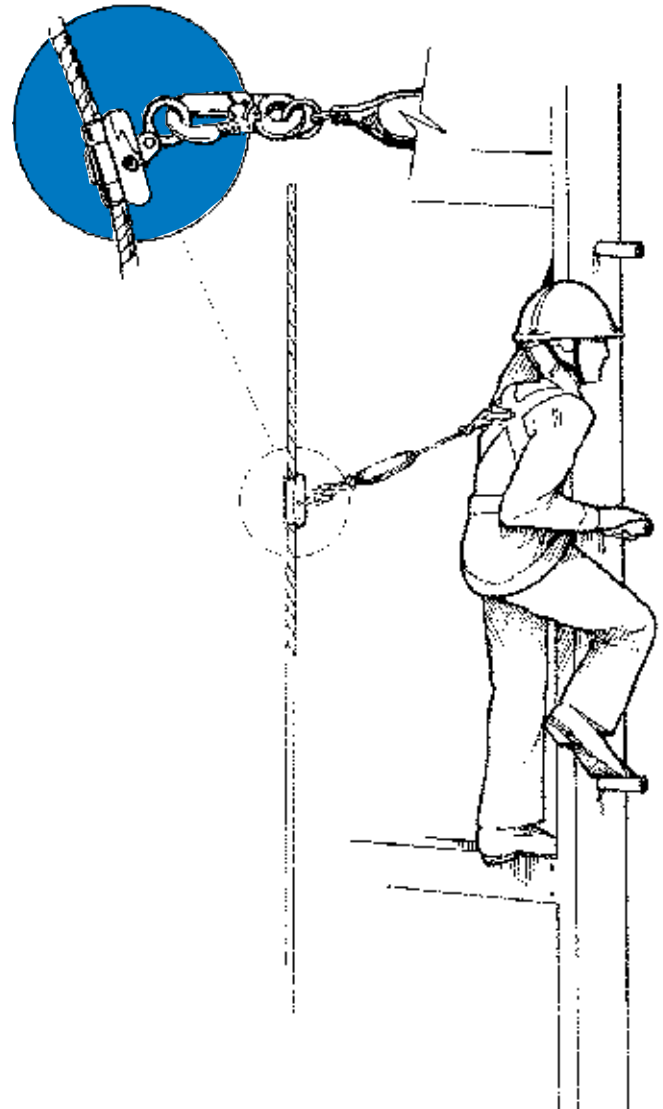
The two most common types of mechanical rope grabs are **automatic** and **manual**.

An automatic (or mobile) rope grab moves freely along the lifeline with you. If you fall, it locks automatically and stops you after a short distance.

- If you use an automatic rope grab, limit your lanyard to 0.6 m (2 ft.) in length.
- An automatic rope grab meeting the requirements of CSA Standard Z259.2.1 is acceptable to WorkSafeBC.

A manual rope grab does not move freely with you. It is always in a locked position on the lifeline and must be repositioned by hand.

- Manual rope grabs are best suited for use in fall restraint systems.
- The Canadian Standards Association (CSA) considers manual rope grabs to be “rope adjusting implements.” They are not covered by a CSA Standard, but are acceptable for use when operated in accordance with the manufacturer’s instructions.



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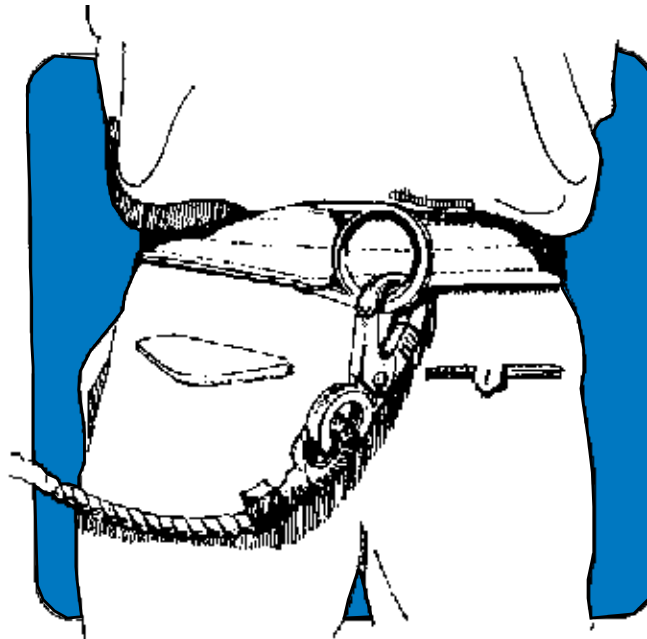
When to use a safety belt

You must never wear a safety belt in a fall arrest situation.

- If you fall while attached to a safety belt, you could suffer severe back and abdominal injuries.

Restrict the use of safety belts to fall restraint systems only.

- If there's a chance you could fall
 - Install guardrails OR
 - Wear a full body harness in a properly configured personal fall protection system



Putting on a safety belt

- Before putting on the belt, make sure you have the right size.
- Fasten the belt snugly around your waist. Wear it high on your waist, not low around the hips or pelvic area.
- Position the belt buckle at the front of your body, and make sure the belt tail is secure in the belt loop and not hanging out loosely.

Project: _____ Address: _____

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Manager's remarks: _____

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Health and safety responsibilities

To provide and maintain a safe and healthy worksite, owners, prime contractors, employers, supervisors, and workers must accept and follow their own level of responsibility.

Workers

Workers have a responsibility for their own safety as well as that of their fellow workers. Workers must:

- Understand and follow the safety program and jobsite work procedures
 - Wear appropriate clothing and use all required personal protective equipment
 - Not take unnecessary risks and not endanger other workers through practical jokes or horseplay
 - Not use any broken tools or unsafe equipment; unsafe tools and equipment must be removed from service
 - Stay off the worksite if impaired by drugs (medical or illegal) or alcohol
 - Refuse to carry out any work activity that could result in harm to themselves or any other employee
 - Maintain good housekeeping conditions
 - Report all injuries immediately to first aid, the supervisor, or the employer
- The jobsite is evaluated and hazards eliminated or minimized; if hazards cannot be controlled, the employer must develop special work procedures to prevent the risk of worker injury or disease
 - Workers wear appropriate clothing and the required personal protective equipment
 - Appropriate tools, equipment, and materials are available and used
 - Emergency jobsite procedures are developed and made known to workers

Employers

Employers have the responsibility to:

- Develop, implement, and maintain a safety program designed to prevent injuries and disease in the workplace
- Evaluate worksite hazards and take necessary steps to protect workers
- Ensure an effective WHMIS program is in place, including worker education and training
- Plan the work to be done, ensuring that the right tools, equipment, and materials are available when needed
- Ensure that supervisors train workers in safe work practices and procedures
- Provide required first aid services and equipment
- Ensure that the Occupational Health and Safety Regulation is complied with on an ongoing basis

Supervisors

Supervisors must ensure that:

- All workers are familiar with and follow the company safety program
- Workers are properly trained and follow the Workplace Hazardous Materials Information System (WHMIS) program, safe jobsite work procedures, and the Occupational Health and Safety Regulation

Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Flat roofs or roofs up to 4 in 12 slope

Falls from elevation are one of the leading causes of injuries to construction workers in British Columbia.

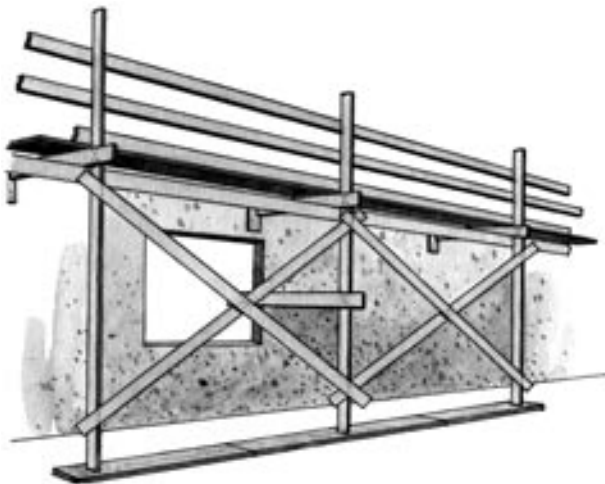
Fall protection systems must be used

- When there is a possibility of a fall of 3 m (10 ft.) or more, OR
- Where a fall from a height of less than 3 m (10 ft.) involves a risk of injury greater than the risk of injury from the impact on a flat surface

Selecting fall protection

When determining which fall protection system is most practicable, you must always follow the fall protection hierarchy as set out in section 11.2 of the Occupational Health and Safety Regulation.

First consideration—Are guardrails practical?



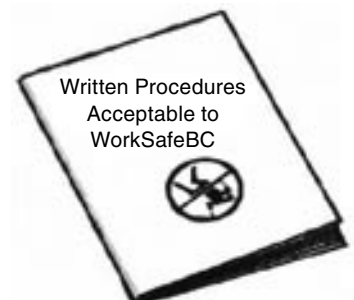
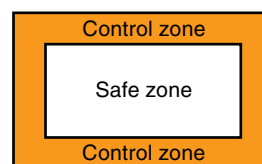
Second consideration—Can another fall restraint system be used?



Third consideration—Can a fall arrest system be used?



Fourth consideration—If none of these systems can be used, other written procedures acceptable to WorkSafeBC can be used.



Project: _____ Address: _____

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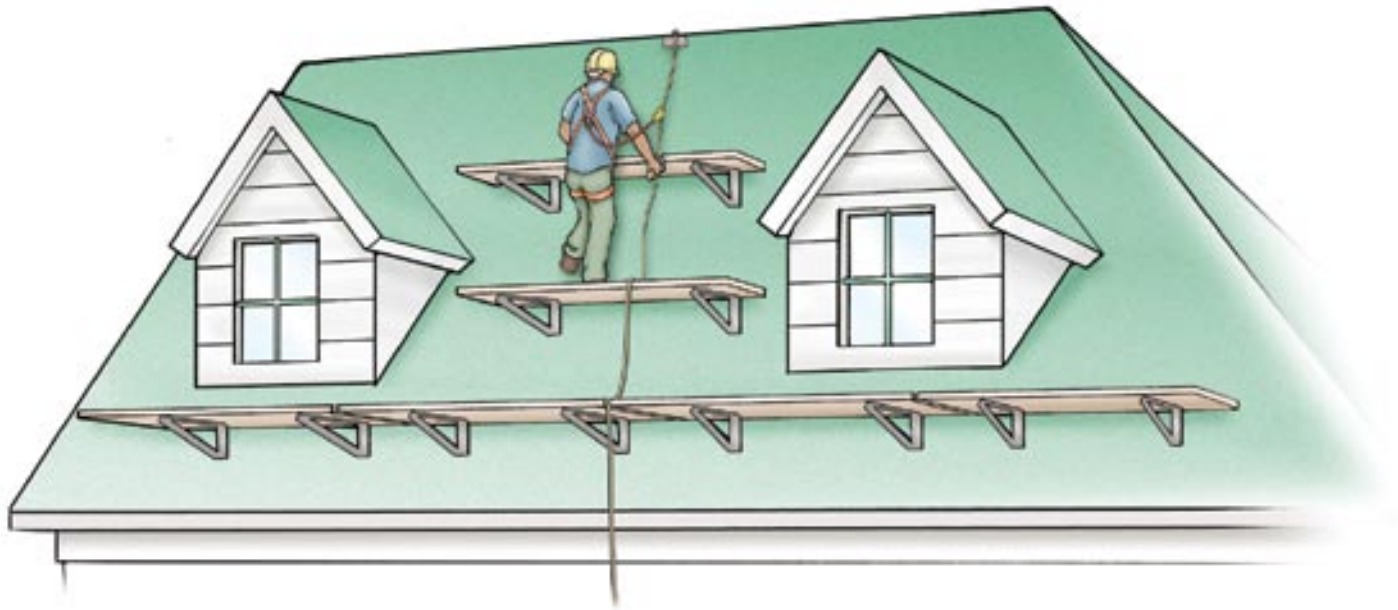


Roofs 8 in 12 slope or more

Falls from elevation are one of the leading causes of injuries to construction workers in British Columbia.

Fall protection systems must be used

- When there is a possibility of a fall of 3 m (10 ft.) or more, OR
- Where a fall from a height of less than 3 m (10 ft.) involves a risk of injury greater than the risk of injury from the impact on a flat surface



- Both toeholds and fall protection systems must be used when a roof has a slope of 8 to 12 (vertical to horizontal) or more.
- Toeholds must be at least 38 mm x 140 mm (2 in. x 6 in.).

NOTE: Exposed horizontal roof strapping may be used as toeholds as long as it provides safe footing.



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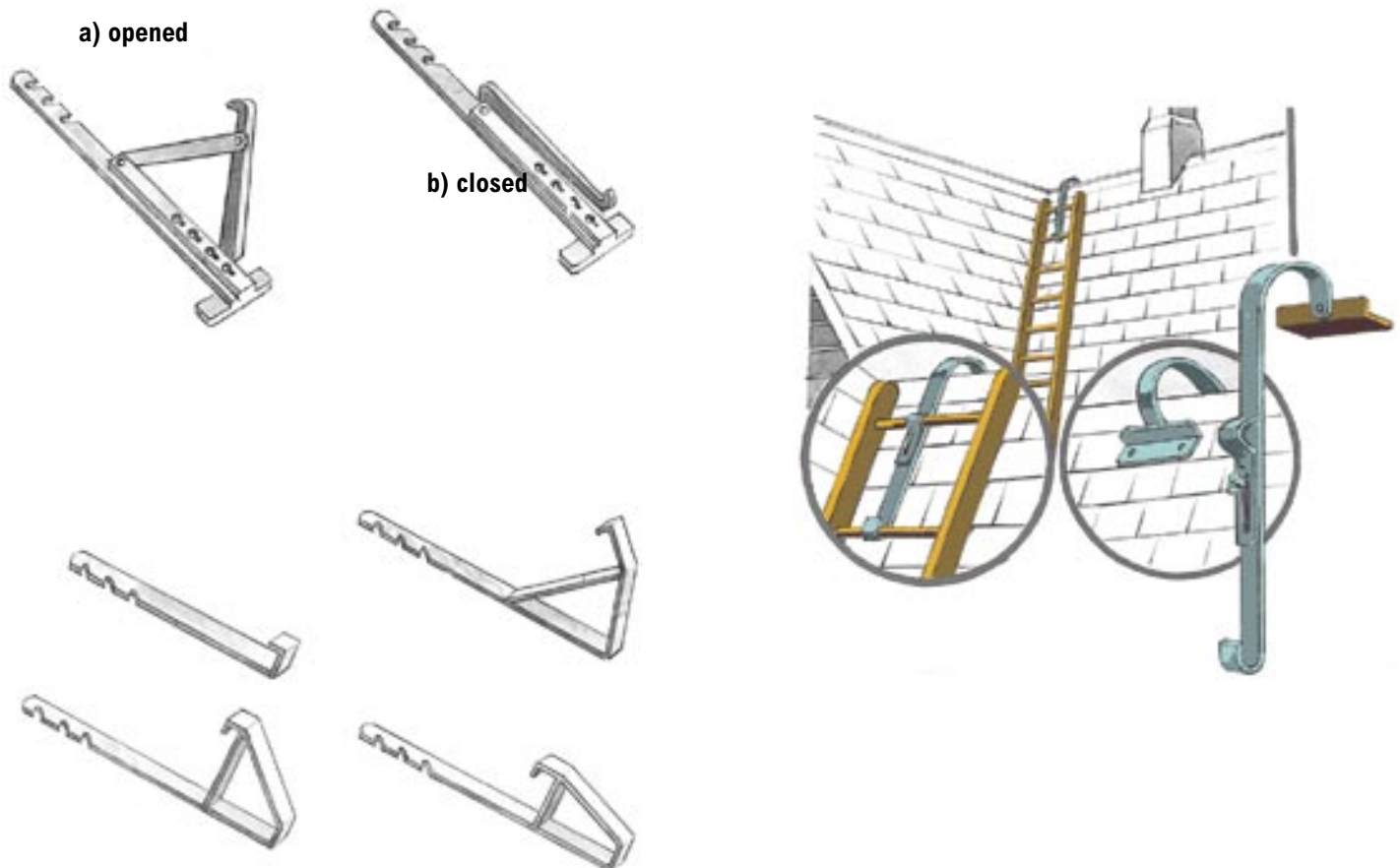


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Roof jacks and toeholds

- Roof jacks must be of substantial construction and maintained in good condition.
- Roof jacks must be equipped with effective non-slip devices.
- Exposed horizontal roof strapping may be used as toeholds as long as it provides safe footing.
- Crawl boards or ladders used for roof work must be securely fastened over the ridge of the roof or must be otherwise effectively anchored.
- The use of eavestroughs for support is prohibited.



Project: _____ Address: _____

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Manager's remarks: _____

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Roof more than 4 in 12 but less than 8 in 12

Falls from elevation are one of the leading causes of injuries to construction workers in British Columbia.

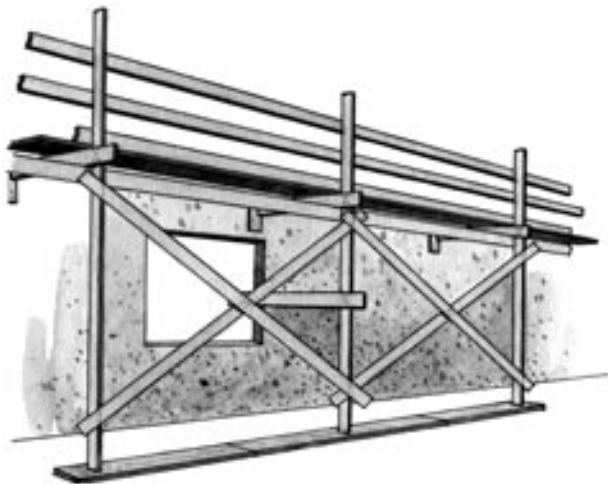
Fall protection systems must be used

- When there is a possibility of a fall of 3 m (10 ft.) or more, OR
- Where a fall from a height of less than 3 m (10 ft.) involves a risk of injury greater than the risk of injury from the impact on a flat surface

Selecting fall protection

- When determining which fall protection system is most practicable, you must always follow the fall protection hierarchy as set out in section 11.2 of the Occupational Health and Safety Regulation.

First consideration—Are guardrails practical?



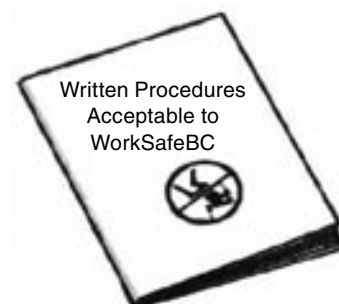
Second consideration—Can another fall restraint system be used?



Third consideration—Can a fall arrest system be used?



Fourth consideration—If none of these systems can be used, other written procedures acceptable to WorkSafeBC can be used.



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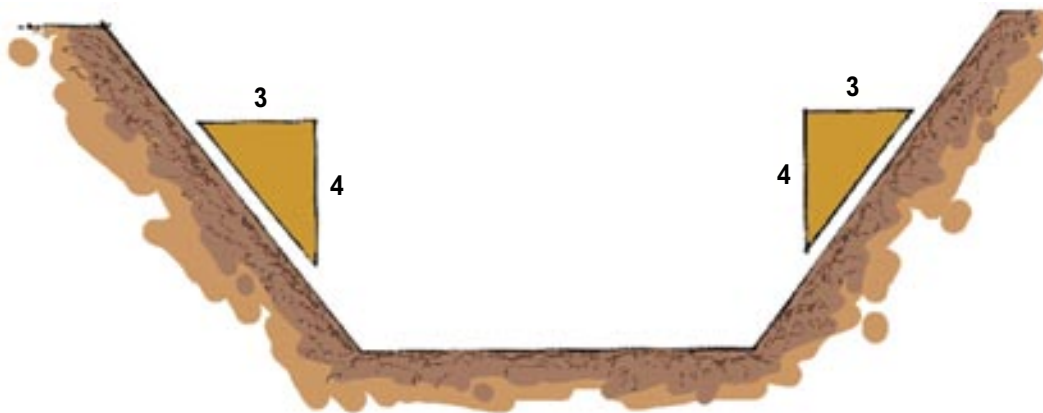
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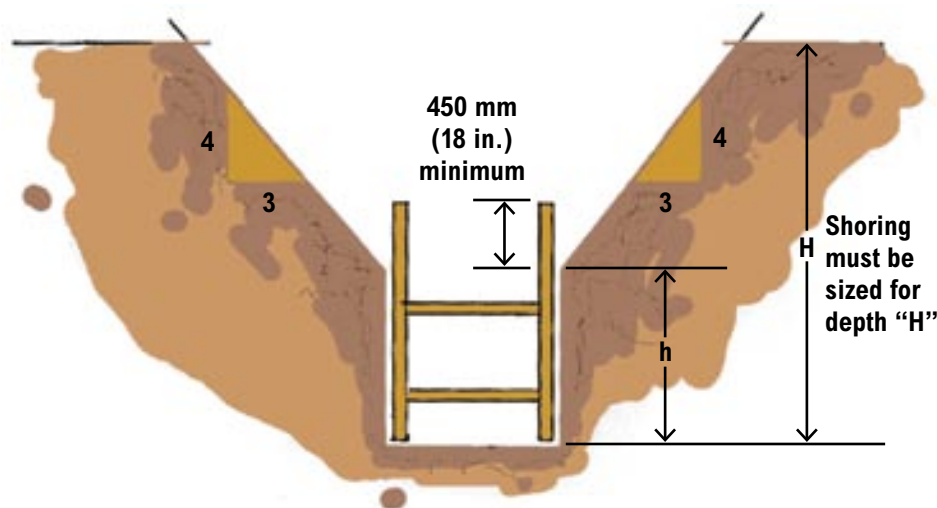
Sloping and shoring requirements

No worker may enter an excavation more than 1.2 m (4 ft.) in depth unless:

- The sides of the excavation are sloped to a safe angle no steeper than three horizontal to four vertical, OR
- The sides have been supported by use of sheet piling or shoring and bracing, OR
- A combination of both sloping and shoring is used, OR
- The sides of the excavation have been sloped or supported in accordance with the written instructions of a professional engineer



Unshored trench and excavation walls must be sloped flatter than the angle of repose, but in no case steeper than three horizontal to four vertical unless specified in writing by a professional engineer.



This is an example of combined sloping and shoring.

Project: _____ Address: _____

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CONCRETE REINFORCING Bending over at the waist poses MSI risk

Awkward postures such as bending over at the waist are common risk factors for musculoskeletal injury (MSI). Rod workers may work in a variety of awkward postures. One such posture involves bending over at the waist for long periods. Working in awkward postures can increase the risk of MSI.



Examples of MSI risk

- Bending over at the waist
- Maintaining bent posture for long periods
- Reaching away from the body

MSI control options



Use a rebar tying machine. It allows workers to tie while standing upright.



Prefabricate steel arrangements. This reduces forward bending.



Raise materials to waist height. This reduces forward bending.

Project: _____ Address: _____

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CONCRETE REINFORCING

Contact stress to hands can increase risk of MSI

Contact stress to the hands is a common risk factor for musculoskeletal injury (MSI).

Rod workers perform tasks that place large forces on small areas of the body. Some tasks involving contact stress include using pliers and side cutters, and shaking out rods. Contact stress can increase the risk of MSI.

Examples of MSI risk

- Tools that dig into the hand
- Rough-edged material in contact with soft tissue
- Bony body parts in contact with hard surfaces

Contributing factors

- Dull pliers
- Using the wrong pliers for the job



Typical contact stress points on the hand

MSI control options



Use well-designed tools. Longer, well-contoured, wider handles spread the pressure on the hand over a larger area.



Wear gloves. An extra layer of fabric between the hand and the tool reduces pressure points on the palm.

Project: _____ Address: _____

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Manager: _____ Supervisor: _____

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CONCRETE REINFORCING

Contact stress to shoulders poses MSI risk

Contact stress to the shoulders is a common risk factor for musculoskeletal injury (MSI).

Rod workers perform tasks that apply large forces to small areas of the body. Contact stress can increase the risk of MSI.



Typical contact stress point

Examples of MSI risk

- Pressure on shoulder muscles from carrying rebar
- Rough-edged material in contact with soft tissue

MSI control options



Pad the shoulder area. Wide, thick straps or extra fabric reduces pressure and softens the edges of rods packed on the shoulder.



Use the two-person lift procedure. This reduces weight on the shoulder for both workers.

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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CONCRETE REINFORCING

Overexertion can increase risk of MSI

Overexertion is a common risk factor for musculoskeletal injury (MSI).

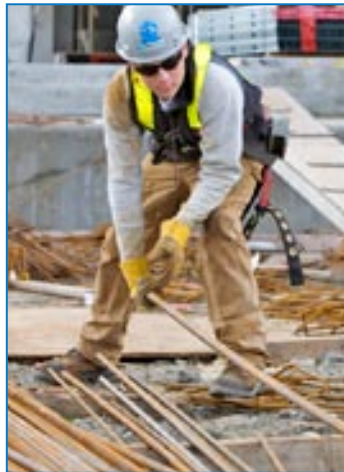
Rod workers perform many strenuous tasks. Some of these tasks include lifting, packing, tying, and shaking out rods. Performing physically demanding tasks all day can increase the risk of MSI.

Examples of MSI risk

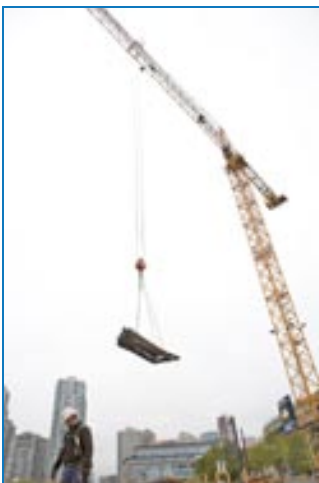
- Lifting and carrying heavy loads

Contributing factors:

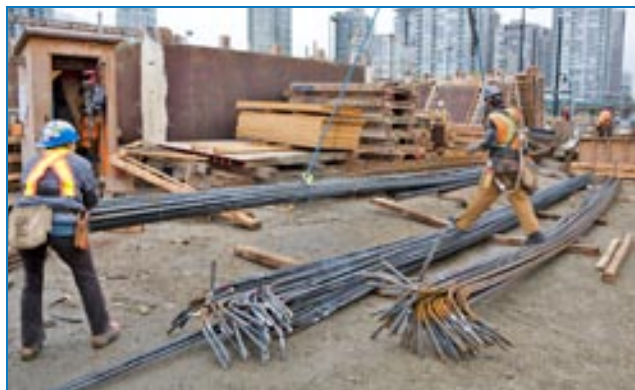
- Not using available mechanical aids such as cranes
- Lack of mechanical aids
- One-person lifts



MSI control options



*Use mechanical aids.
They ease the physical
burden placed on workers.*



*Plan placement of materials. Distributing smaller
bundles of materials closer to where they will be
used reduces manual materials handling.*



*Use the two-person lift procedure.
This reduces the weight one
worker has to lift.*

Project: _____ Address: _____

Employer: _____ Supervisor: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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CONCRETE REINFORCING Overhead reaching can increase risk of MSI

Awkward postures such as overhead reaching are common risk factors for musculoskeletal injury (MSI).

Working in an overhead reaching position for an extended time increases the risk of injury.

Overhead reaching can lead to injuries to the neck, shoulders, and back. These injuries are commonly caused by overextension of the muscle groups. Attempting to exert force through stretched muscles can result in strains and sprains.

Example of MSI risk



The worker reaches above his head and exerts force through stretched muscles of the shoulder and back.

MSI control option



A simple platform, step, or ladder brings the work into a more comfortable, safer working height, optimally below shoulder height.

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CONCRETE REINFORCING

Awkward postures, repetitive tasks involving wrists boost MSI risk

Awkward postures and repetitive tasks involving the wrists are common risk factors for musculoskeletal injury (MSI).

Tying rebar requires the wrist to bend and twist in an awkward manner. Working in awkward postures can increase the risk of MSI.

Examples of MSI risk

- Bending the wrist forward and backward
- Bending the wrist from side-to-side
- Repeating these actions over and over



Examples of awkward wrist postures

MSI control options



Use a rebar gun. It reduces awkward posture of the wrist when tying rebar.



Change technique. Reduce the number of repetitions by not over-twisting the tie. Often a half twist is enough.



Rotate tasks. Alternating between tasks works different parts of the body.

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Preventing interference with the respirator seal

Where your respirator seals with your face, nothing must come between the respirator and your skin. Eyeglass frames, head coverings, beards, sideburns, and stubble must not interfere with the seal.

You must be clean-shaven where the respirator seals with the face. Some workers think the clean-shaven rule is too strict. “Does it really matter if there’s a bit of stubble on my face?”

The answer is yes. It matters a lot. Stubble prevents the mask from forming a good seal with the face.

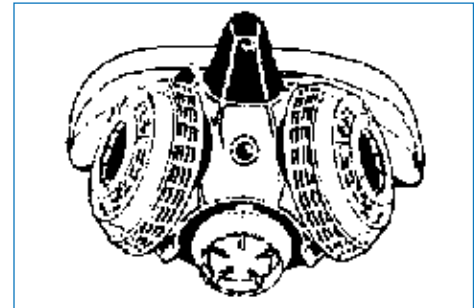
Stubble may seem small, but it is huge when you compare it with dust, mist, fibres, fume particles, and gas and vapour molecules. Stubble under the respirator seal creates plenty of room for contaminants to enter the mask.

The need to be clean-shaven applies only to those respirators that depend on a tight seal between the face and the facepiece. Loose-fitting hood or helmet respirators that do not require a tight face seal may be an appropriate alternative for workers with facial hair such as a mustaches or beards.

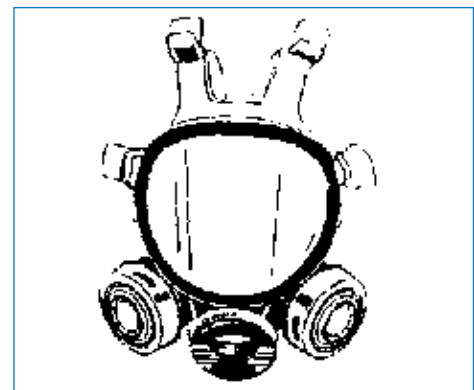
If you have prescription eyeglasses, you may need to obtain special frames to use with a full-facepiece respirator so that your glasses do not affect the seals.

Contact lenses can be worn with a full facepiece if all of the following precautions are taken:

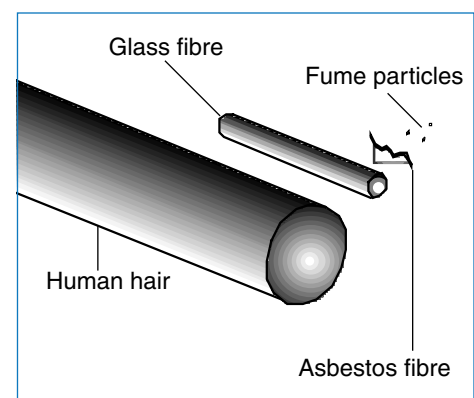
- The employer is notified that contact lenses will be worn.
- The worker puts on the respirator in an atmosphere that does not cause the eyes to irritated and that does not cause irritating gases or vapours to be absorbed by the contact lens.
- The worker does not wear contact lenses when the eyes are irritated or inflamed. If the respirator is necessary for planned work or in the event of an emergency, alternative corrective eyewear that does not interfere with the seal should be used with the respirator.



Half-facepiece respirator



Full-facepiece respirator



Relative sizes of a human hair, a glass fibre, an asbestos fibre, and fume particles. If there is enough room for a hair between the skin and the respirator, there is room for many contaminants to enter.

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Putting on your respirator

When fitting a new respirator, try on several brands and sizes. Different brands will fit slightly differently on your face. Respirator manufacturers usually have small, medium, and large facepieces available. Adjust the straps so that the respirator fits tightly but does not dig into your face or leave red marks on your skin. The respirator should feel snug but comfortable. Straps should be placed under a hard hat or hood.

Procedure for putting on a filtering facepiece respirator

Position the straps correctly—one above the ears and over the crown of the head, and the other below the ears and around the neck. If the respirator has adjustable straps, you can tighten or loosen them without removing the respirator. If there is a metal nosepiece, mould it around your nose to obtain a proper seal.



Take the time to form a proper grip over the nose.

Procedure for putting on an elastomeric half-facepiece respirator

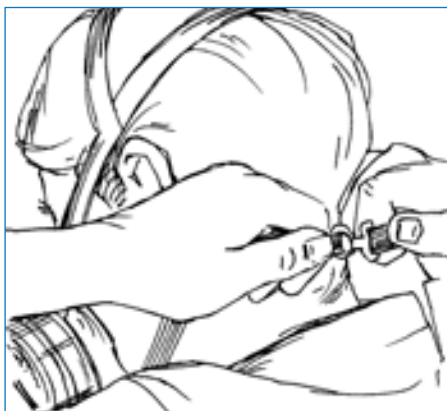
The respirator should fit tightly, but it should not be uncomfortable or leave red marks on your face.



1. Position head harness



2. Grip straps and tighten



3. Fasten buckle



4. Adjust fit

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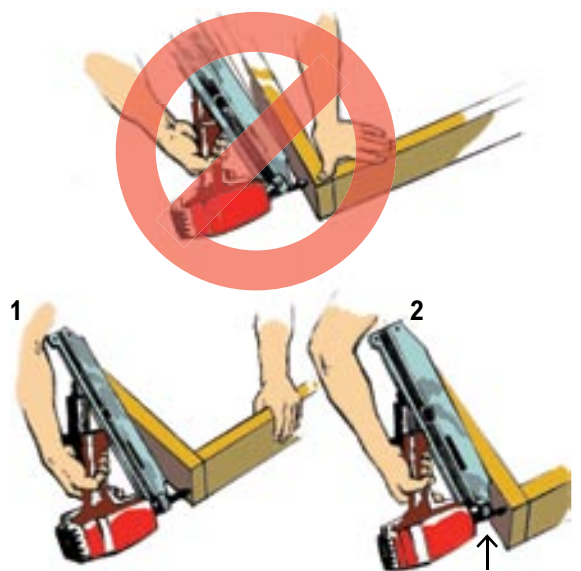
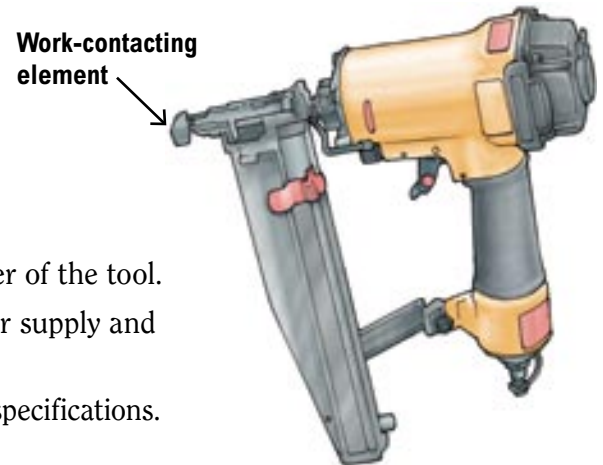


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Safe use of pneumatic nailing and stapling equipment

- Permit only trained and experienced workers to operate pneumatic nailing and stapling tools.
- Wear proper eye and hearing protection.
- Make sure the tool is maintained in safe operating condition.
- Inspect the tool before connecting to the air supply.
 - Check safety mechanisms if applicable.
 - Ensure the screws and cylinder caps are securely tightened.
 - Make sure the air pressure is as specified by the manufacturer of the tool.
- Before using, check that the tool is properly connected to the air supply and is in working order, with the safety mechanism operable.
- Do not operate the tool at air pressures above the manufacturer's specifications.
- Always handle the tool as if it contains fasteners.
- Always use a work-contacting element that limits the contact area to one as small as practicable.
- Make sure the mechanical linkage between the work-contacting element and the trigger is enclosed.
- Disconnect the tool from the air supply and exhaust all air from the tool by squeezing the trigger when
 - Not in use, or
 - Cleaning or adjusting, or
 - Clearing a blockage
- Use only fasteners recommended by the manufacturer of the tool, and follow the manufacturer's instructions when reloading.
- Do not point the tool at yourself or any other person.
- Do not squeeze the trigger unless the nosepiece of the tool is directed at a safe work surface.
- Do not transport or load the tool with your finger on the trigger.
- Do not secure the trigger in the ON position.
- Do not overreach when using the tool.
- Ensure you have the right amount of air pressure for the size and type of nail you are using. **Caution:** Too much pressure can cause a nail to go right through the material and could cause serious injury to other workers.
- Follow the manufacturer's safe operating procedures when using nailers powered by butane.



The bottom two diagrams show the safe sequence for using an air nailer.

Project: _____ Address: _____

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WHMIS hazard symbols

Classification


Classification determines whether a product falls within one or more of the hazard classes. Suppliers classify controlled products and apply hazard symbols.

Classes and symbols

WHMIS covers six classes of controlled products. The classes are assigned the letters A through F. Eight hazard symbols are used to depict the specific hazards within these classes (Class D contains three hazard symbols). **Note:** the products, substances, and materials listed in each of the following graphics are examples only.




CLASS A
COMPRESSED GASES




- > Products under pressure
 - ☞ butane, propane, acetylene, and fire extinguishers

CLASS C
OXIDIZERS




- > Products causing/contributing to the combustion of other materials
 - ☞ hydrogen peroxide, potassium nitrate, sodium chlorate

D2




- > Materials causing other toxic effect
 - immediate skin or eye irritation
 - chronic health effects on body organs, cardiovascular or nervous system
 - ☞ carcinogens (asbestos, crystalline silica, benzene) sensitizers (methyl methacrylate) embryotoxin (xylene)

CLASS E
CORROSIVE MATERIALS




- > Materials such as caustics or acids causing burns to skin or eyes
 - ☞ sodium hydroxide, bleach, hydrochloric acid, hydrofluoric acid

CLASS B
FLAMMABLE/COMBUSTIBLE MATERIALS




- > Substances capable of catching fire
 - ☞ acetone, isopropyl alcohol, stoddart solvent

D1




- > Materials causing immediate and serious toxic effect
 - ☞ arsenic, methylene chloride, formaldehyde

D3



- > Biohazardous infectious materials
 - harmful microorganisms
 - ☞ Classified as Risk Groups II, III, or IV as defined by the Medical Research Council of Canada
 - ☞ Includes commercial cultures containing infectious organisms such as HIV, Ebola, and Hepatitis B

CLASS F
DANGEROUSLY REACTIVE MATERIALS



- > Products that can undergo dangerous reaction if subject to heat, light, pressure, shock, water, air
 - ☞ hydrogen cyanide, benzoyl peroxide, chlorine dioxide

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Safe use of chainsaws in construction

- Chainsaws for construction must be equipped with a chain break and with anti-kickback chain.
- Whether a chainsaw is electric- or gasoline-powered, operators must follow the manufacturer's recommended safe operating procedures.
- Permit only trained and experienced workers to operate a chainsaw.
- Never walk around with a saw in the operating mode. Switch off the power source.
- Do not attempt to cut anything other than wood with a chainsaw.
- When operating a chainsaw, safety goggles and hearing protection must be worn at all times.
- Trousers or chaps with ballistic nylon pads sewn in provide protection to the legs.
- Hold the saw securely with both hands, with fingers and thumbs around the handles. This helps prevent the hands from being dislodged and provides control in the event of a kickback.
- Do not operate the saw when you are tired.
- Know where the bar tip is at all times.
- Don't allow the cut to bind (close) on the saw chain.
- Make sure the chain brake is functioning.

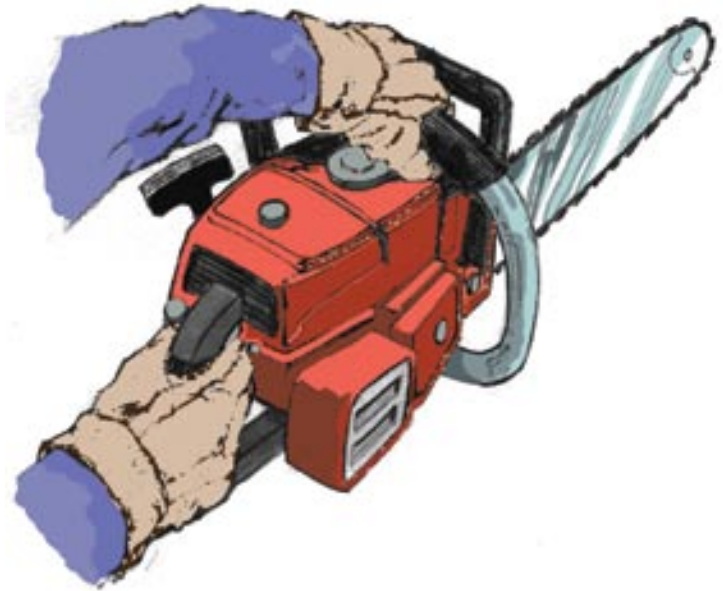


Diagram showing proper grip of a chainsaw

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Chainsaws—avoiding kickback hazards

The most common and usually most violent kickback occurs when contact is made in the “kickback” zone.

Contact in this zone makes the chain bunch up and try to climb out of the cutting track. This often happens when the saw tip makes contact with something beyond the cutting area, such as a tree branch, a log, or planks.

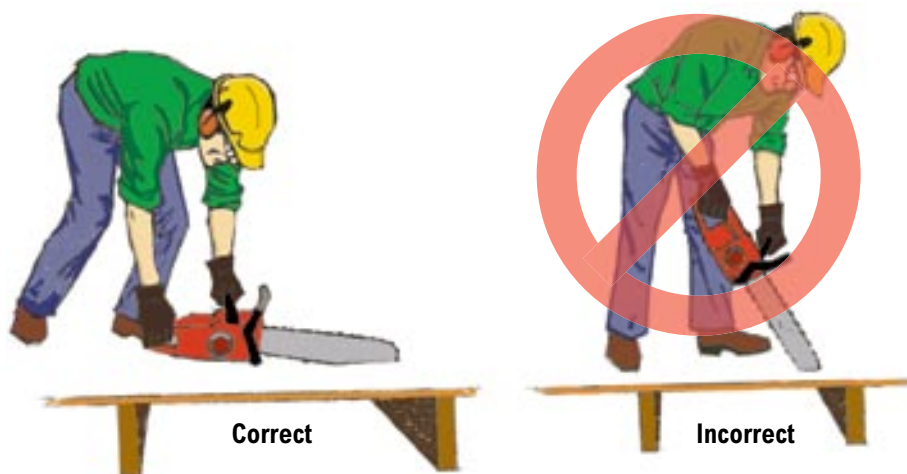


Make sure to avoid contact in the kickback zone (shown in black).



The examples above show how kickback can occur.

Take extra care when making pocket cuts. Start the cut with the underside of the chain tip, then work the saw down and back to avoid contact with the kickback zone. Consider the use of a sabre (reciprocating) saw to make pocket cuts.



Correct

Incorrect

Be particularly careful to avoid contact with nails, piping, or other objects. This is especially important when making a pocket cut through framing lumber such as a subfloor or when cutting used lumber such as shoring, lagging, or blocking timbers.

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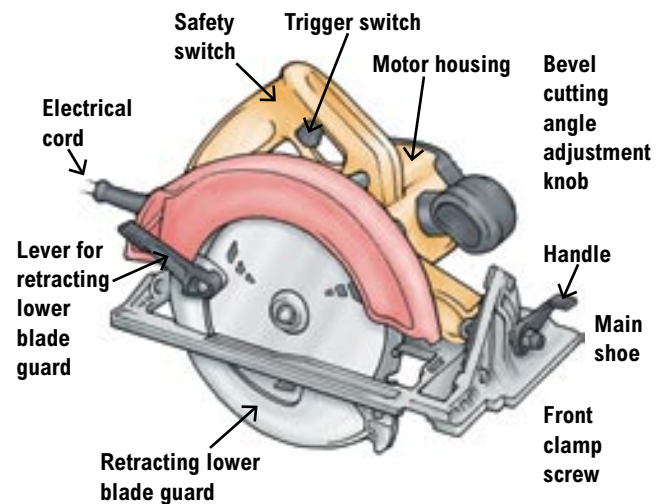


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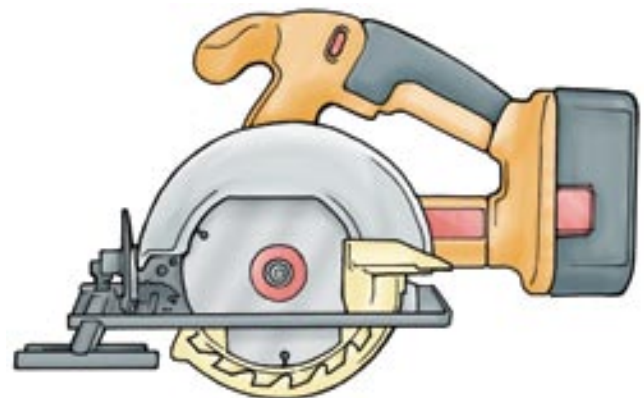


Safe use of portable circular saws

- Permit only trained and experienced workers to operate a saw.
- Wear proper eye and hearing protection, and when required, respiratory protection.
- Use sharp blades designed for your work and recommended by the tool manufacturer.
- Check the retractable lower blade guard before use. Make sure that it works correctly.
- Allow the saw to reach full power before cutting.
- Make sure the lower blade guard is fully returned before laying down the saw.
- Disconnect the power supply before adjusting or changing the blade.
- Keep all electrical cords clear of the cutting path.
- Use both hands to operate the saw.
- Keep the saw blade guards and motor clean and free of sawdust.
- Secure the work while cutting.
- Do not fix or hold the retractable lower blade guard in the open position.
- Do not place your hand under the shoe or guard of the saw while the saw is connected to the power supply.
- Do not overtighten the saw blade locking nut.
- Do not twist the saw while cutting to change direction or saw alignment unless the blade is designed for that purpose.
- Do not use a saw that vibrates or is defective.
- Do not force the saw during cutting.
- Do not cut materials without first checking for obstructions or foreign objects such as nails and screws in the cutting path of the saw.
- Do not carry portable circular saws with hands or fingers on the trigger switch.



Electrically operated portable circular saw



Battery-operated portable circular saw

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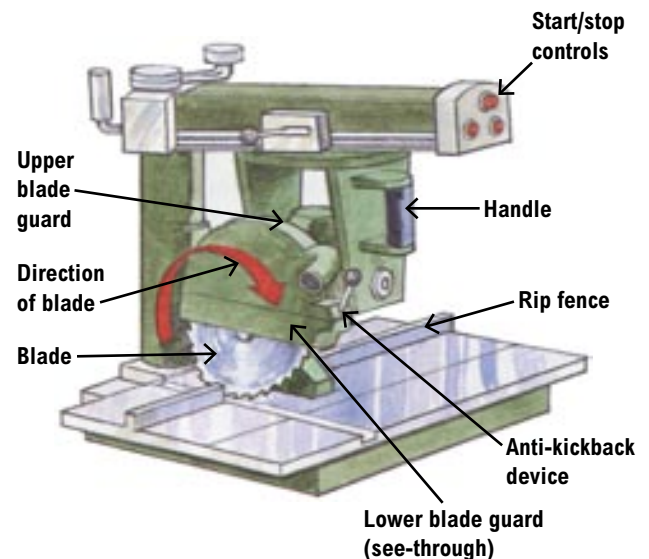


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Safe use of radial arm saws

- Permit only trained and experienced workers to operate a saw.
- Wear proper eye and hearing protection, and when required, respiratory protection.
- A radial arm saw cutting table must be of sufficient width so that no part of the saw blade overhangs the forward edge of the table. A stop may also be used to limit forward travel of the saw to prevent overhang.
- Saws must not be operated at speeds in excess of the manufacturer's recommendation.
- Only use accessories designed for the saw and recommended by the manufacturer.
- Make sure the blade guard is in place and properly adjusted.
- Stand on the handle side of the saw when cross cutting.
- Return the saw blade to behind the fence after each cut.
- Make sure the overall length of the saw table (both infeed and outfeed) is twice the length of the lumber being cut.
- Make sure during ripping that material is fed counter to the saw blade rotation.
- The motor head must be locked into position at the correct height and desired angle.
- Clamp stock to the table when making mitre, bevel, or compound mitre cuts. This overcomes the tendency of the stock to slide along the fence.
- Turn off the saw and unplug the electrical cord when making changes.
- When it is necessary to measure stock on the cutting table, the saw must be turned off until measuring is complete.
- Do not use radial arm saws for ripping unless spreader and anti-kickback devices are used.
- During operation, do not remove your hand from the operating handle unless the cutting head is behind the fence.
- Do not remove the stock from the cutting table until the saw blade has been returned to its position behind the fence.
- Do not cut "free-hand". The material to be cut must lie solidly on the cutting table against the back guide.
- Do not use any circular saw blade having a crack exceeding 1/10 of the saw diameter or any circular saw blade with cracks adjacent to the collar line.



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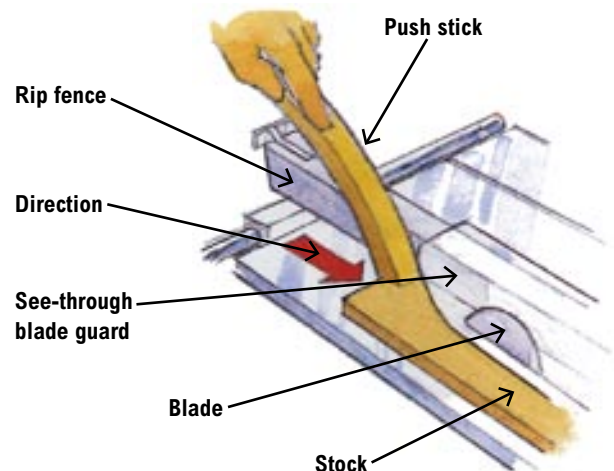
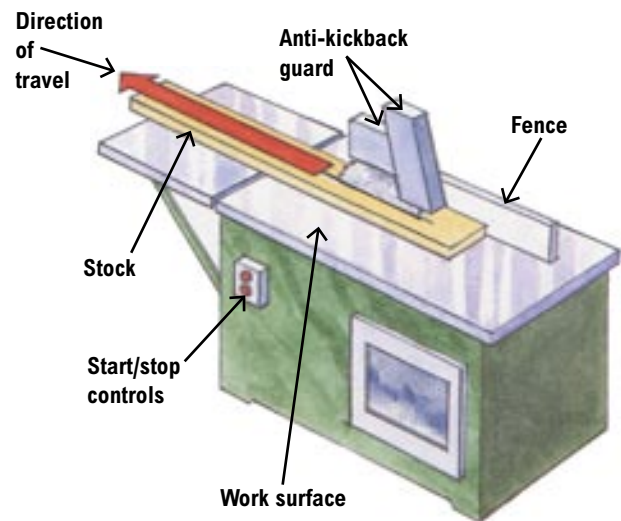


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Safe use of table saws

- Permit only trained and experienced workers to operate a saw.
- Wear proper eye and hearing protection, and when required, respiratory protection.
- Refer to and follow the table saw manufacturer's instructions for reducing the risk of kickback.
- Make sure the guard is in place and working correctly.
- Choose the proper saw blade for the type of work being done.
- Keep saw blades clean, sharp, and properly set so they will cut freely without being forced.
- Keep the work area clean. Operate the table saw in a non-congested, well-lighted area.
- Feed material into the saw blade counter to the direction of rotation.
- During cutting, keep hands out of the line of the saw cut.
- Use the saw blade guard with a spreader and anti-kickback fingers for ripping or cross cutting operations.
- Keep your body to the side of the saw blade out of the line of a possible kickback.
- Use a push stick when ripping narrow stock.
- When changing the saw blade
 1. Stop the machine.
 2. Disconnect the power supply.
 3. Place the plug end of the cord on top of the saw table.
 4. Replace the saw blade.
- Do not perform free-hand sawing. The stock must be held firmly against the mitre gauge or rip fence to position and guide the cut.
- Do not reach around or over a moving saw blade.
- Do not leave the table saw unattended while the saw blade is in motion.



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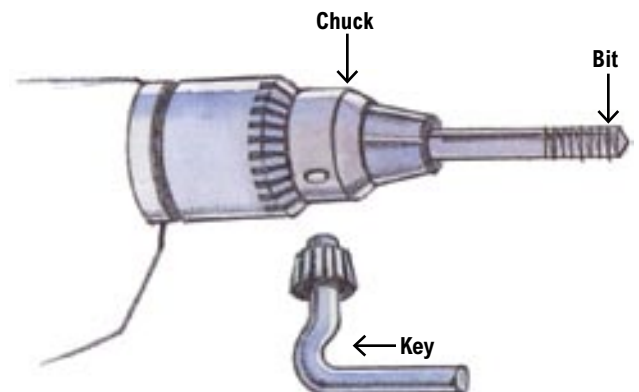
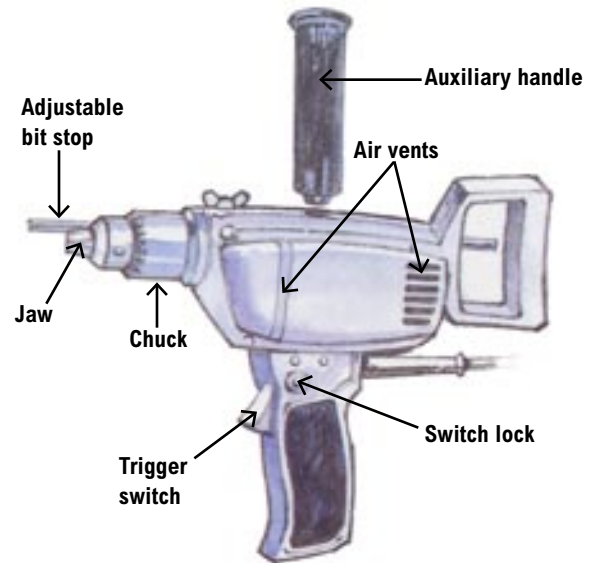


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Safe use of powered hand drills

- Wear proper eye and hearing protection.
- Keep drill vents clear to maintain adequate drill ventilation.
- Keep drill bits sharp at all times.
- Keep electrical cords clear of the drilling area.
- Secure the material being drilled to prevent movement.
- Slow the rate of feed before breaking through the surface.
- Drill a small pilot hole before drilling large holes.
- Disconnect the power supply before changing or adjusting the drill bit or other attachments.
- Remove the chuck key before connecting the drill to the power supply.
- Do not use a bent or damaged drill bit.
- Do not exceed the manufacturer's recommended maximum drilling capacities.
- Do not use high speed steel bits without cooling or lubrication.
- Do not reach under or around material being drilled.
- Do not overreach. Keep proper footing and balance at all times.
- Do not drill with one hand while holding the material with the other.



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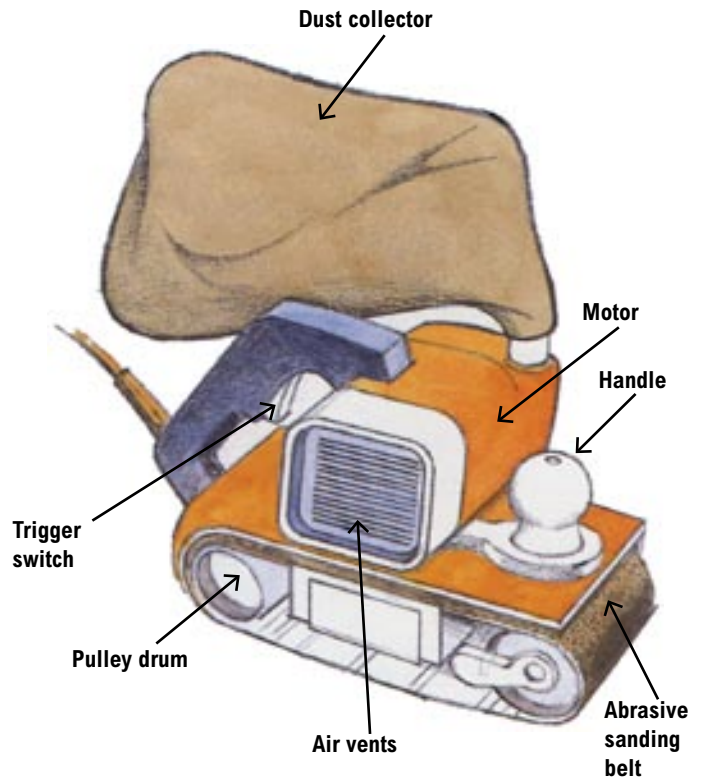


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Safe use of powered hand belt sanders

- Wear proper eye and hearing protection, and when required, respiratory protection.
- Disconnect the power supply before changing the sanding belt, making adjustments, or emptying the dust collector.
- Use sanding belts that are the same width as the pulley drum.
- Make sure the sanding belt is installed in the direction indicated on the belt and sander.
- Inspect the sanding belt before using them. Replace worn or frayed belts.
- Keep hands away from the sanding belt. Use both hands to operate the sander—one on the trigger switch, and the other on the front knob handle.
- Keep all cords clear of the sanding area during operation.
- Clean dust from the motor and vents at regular intervals.
- Do not exert excessive pressure upon the moving sander.
- Do not use a sander without an exhaust system or dust collector. Empty the collector when $\frac{1}{4}$ full.
- Do not work on unsecured material that can be thrown by belt motion. Secure the material or use a stop block.



Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

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ELECTRICAL WORK

Overexertion can increase risk of MSI

Overexertion is a common risk factor for musculoskeletal injury (MSI).

Electricians perform many strenuous tasks. Some of these tasks include handling heavy materials and pulling wire. Performing physically demanding tasks all day can increase the risk of musculoskeletal injury (MSI).



Examples of MSI risk

- Lifting and carrying heavy loads
- Pulling wire and cable

Contributing factors:

- Not using available mechanical aids
- Lack of mechanical aids
- One-person lifts

MSI control options



Coordinating the effort makes pulling wire easier.



Using manual handling devices and tuggers eases the physical burden placed on workers.



Using hand tools or spare bits of pipe eases stress to the hands while pulling wire.

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ELECTRICAL WORK

Heavy tool belts pose MSI risk

Overexertion from wearing heavy tool belts is a common risk factor for musculoskeletal injury (MSI).

Electricians perform a variety of tasks that require the use of many tools. Carrying these tools all day in a tool belt can cause fatigue and increase the risk of musculoskeletal injury (MSI).



Example of MSI risk

- Heavy, unbalanced tool belts

MSI control options



Using tool carts or bags eases the physical burden placed on workers.



Using shoulder straps distributes the load of the tool belt.



Balancing tool belts distributes weight evenly.



If workers know what tools are needed, they can store unnecessary tools elsewhere.

Project: _____ Address: _____

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ELECTRICAL WORK

Overhead reaching can increase risk of MSI

Overhead reaching is a common risk factor for musculoskeletal injury (MSI).

Working for an extended time in an overhead reaching position increases the risk of injury to workers. Overhead reaching involves awkward postures that may lead to injuries to the neck, shoulders, and back. These injuries are commonly caused by overextension of the muscle groups. Attempting to exert force through stretched muscles can result in strains and sprains.



Example of MSI risk

- Working at ceiling level

MSI control options



Ladders raise your body position so you are closer to the work surface.



Pausing briefly allows the arms, neck, and shoulders to rest.



Rotating through different tasks provides opportunities to rest parts of the body.

Project: _____ Address: _____

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ELECTRICAL WORK

Bending over at the waist poses MSI risk

Bending over at the waist is a common risk factor for musculoskeletal injury (MSI).

Electricians may work in a variety of awkward postures. One such posture involves bending over at the waist for long periods. Working in awkward postures can increase the risk of MSI.



Examples of MSI risk

- Bending over at the waist
- Maintaining bent posture for long periods
- Reaching away from the body

MSI control options



By sitting on a stool, workers avoid bending over at the waist.



Rebar tying machines with extension arms allow workers to tie conduit while standing upright.

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ELECTRICAL WORK

Contact stress poses MSI risk

Contact stress to the knees or hands is a common risk factor for musculoskeletal injury (MSI).

Electricians perform tasks that place large forces on small areas of the body. Some common tasks involving contact stress include working at or near the ground, and pulling wire. Contact stress can increase the risk of MSI.



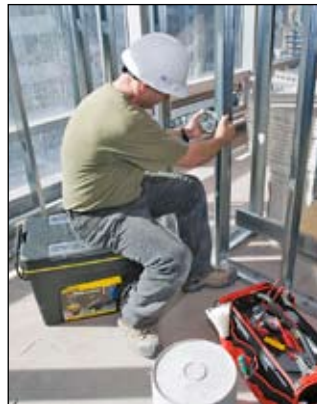
Examples of MSI risk

- Kneeling on the ground
- Pulling wire and cable
- Gripping hand tools

MSI control options



Knee pads, foam, or gunny sacks can protect knees from hard surfaces and sharp objects.



Sitting on a stool eliminates the need to kneel.



Rotating through different tasks provides opportunities to rest parts of the body.



Using hand tools or spare bits of pipe eases stress to the hands while pulling wire.

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Health hazards of asbestos

What is asbestos?

Asbestos is a strong, fire-resistant mineral fibre. In the past, asbestos was used for insulation against heat and noise, as well as for fire protection. Asbestos was also added to materials such as cement and plaster to give them more structural strength.

What are the hazards of asbestos?

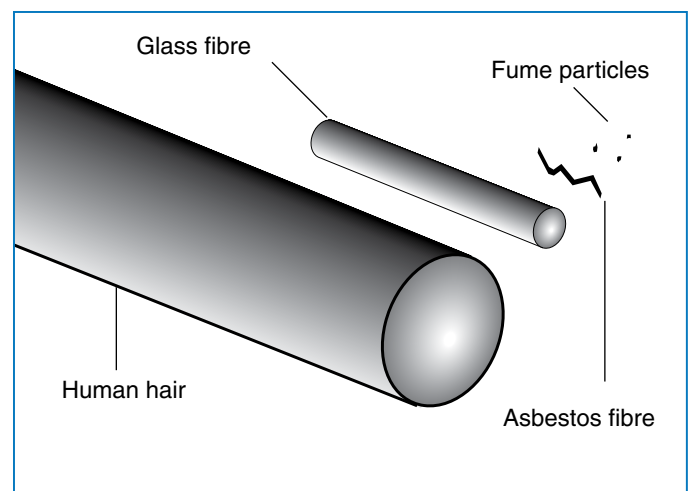
Renovating or demolishing houses containing asbestos products can release asbestos fibres. These fibres are extremely fine and can stay in the air for hours.

Breathing in asbestos fibres may cause serious health problems, including lung disease and cancer.

Asbestosis is the name given to scarring and stiffening of the lungs caused by inhaling asbestos dust over many years. Asbestosis makes breathing difficult and may lead to fatal diseases such as pneumonia and heart disease.

Exposure to asbestos can also cause lung cancer and mesothelioma, a cancer of the linings of the lungs and abdomen.

Asbestos-related diseases usually develop many years after a person has been exposed to asbestos. The risk of developing these diseases increases with the amount of asbestos in the air you inhale and the length of time you are exposed. Smokers are at an increased risk.



Asbestos fibres are extremely fine. The diagram above shows the relative sizes of a human hair, a glass fibre, an asbestos fibre, and fume particles.

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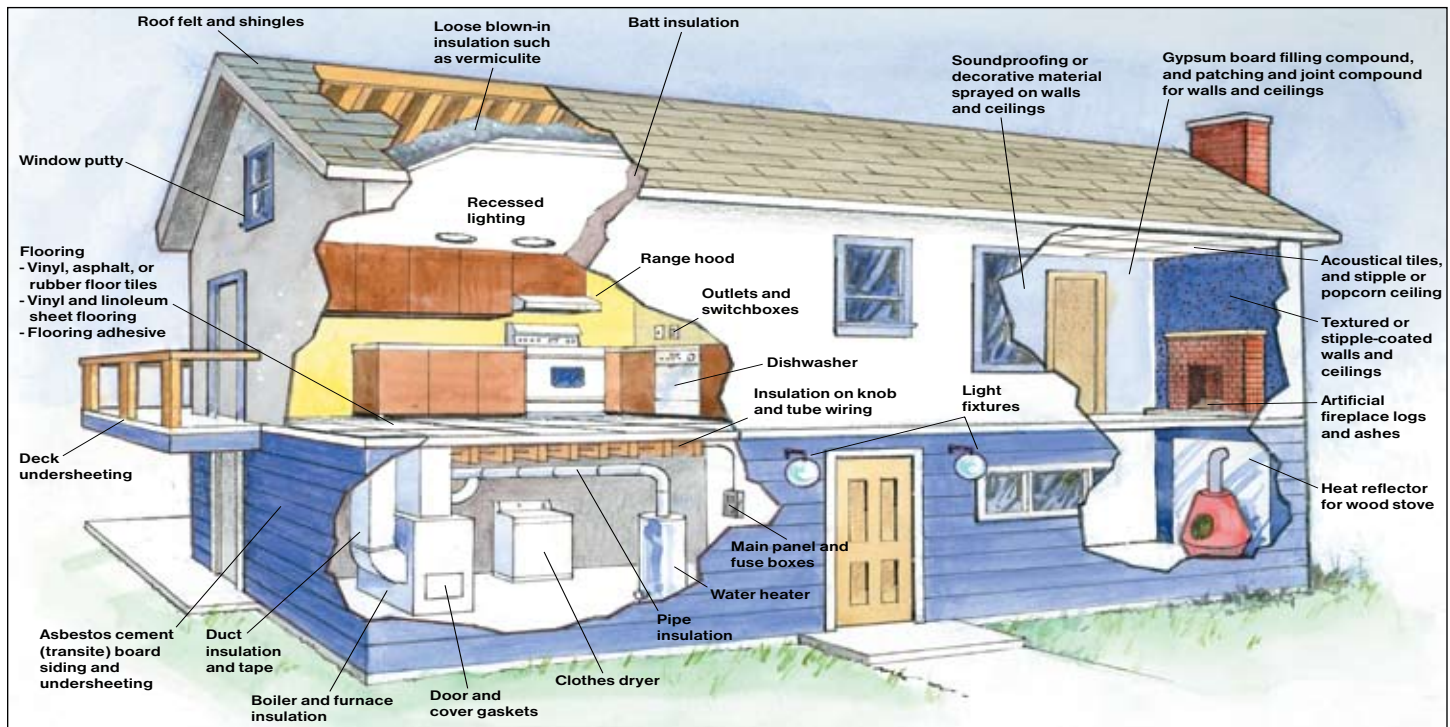
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Asbestos removal

Most workers who have died from overexposure to asbestos fibres have been in the construction trades.

Until the late 1980s, more than 3,000 products containing asbestos were used in house construction. When renovating or demolishing older homes, there is a high probability of encountering asbestos-containing materials. The following illustration shows asbestos-containing materials that were once commonly used in residential construction.



Exposure to asbestos fibres may result in asbestosis, lung cancer, or mesothelioma (cancer affecting the lining of the chest or abdominal cavity).

Employers and owner/builders are responsible for determining if materials containing asbestos are present at the jobsite before work begins. Asbestos-containing materials must be removed and disposed of by trained and qualified workers before renovation or demolition work begins.

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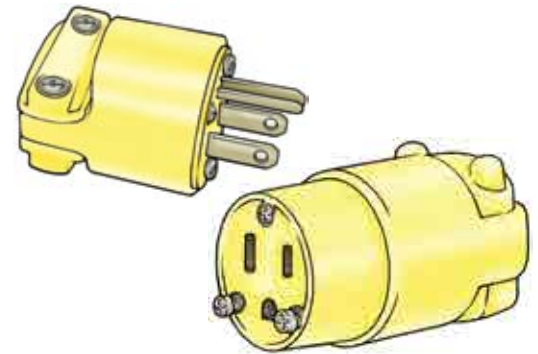


Power tools and cords

Use only electrical equipment that is Canadian Standards Association (CSA) approved. However, use of approved equipment does not eliminate all dangers if the equipment is damaged or is used in adverse conditions, such as in rain or wet areas. Cord-connected portable equipment and supply cords must be maintained in good repair and be suitable for each condition of use. For example, the outer jacket of a cable cord may appear undamaged but may conceal a broken ground conductor. Also, most electrical equipment manufacturers specify that their equipment should not be used in damp or wet conditions. Class A type ground fault circuit interrupters (GFCI) must be used for portable electrical equipment when working outside or in wet or damp conditions.

Safe work procedures

- Inspect tools, power cords, and electrical fittings for damage prior to each use. Repair or replace damaged equipment.
- Switch tools off before connecting to a power supply.
- Disconnect the power supply before making adjustments.
- Make sure tools are either properly grounded or double-insulated. Grounded tools must have a three-wire cord with a three-prong plug. This plug must be plugged into a properly grounded three-pole outlet.
- Do not break off the third (ground) prong on a plug.
- Test electrical tools and cords for effective grounding with a continuity tester before use.
- Replace open-front plugs with dead-front plugs. Dead-front plugs are sealed and pose less danger of electric shock or short circuit (see diagram at right).
- Do not bypass the tool's ON/OFF switch by connecting and disconnecting the power cord.
- Suspend power cords over walkways or working areas wherever possible to eliminate tripping hazards.
- Do not use extension cords as permanent wiring. They must only be used to temporarily supply power to an area that does not have a power outlet.
- Do not allow vehicles or equipment to pass over unprotected power cords. Cords should be put into electrical conduits or protected by placing them between two pieces of lumber of suitable strength.
- Keep power cords away from heat, water, and oil.
- Do not use light-duty power cords for heavy load applications.
- Do not carry electrical tools by the power cord.
- Do not disconnect the power supply by pulling or jerking the cord from the outlet. Pulling the cord rather than the plug may result in electric shock.
- Do not tie knots in power cords. Knots can cause short circuits and electric shocks. Loop the cords or use a twist lock plug.
- Do not clean tools with flammable solvents.
- Do not operate electrical tools in an area containing high levels of explosive vapours or gases.
- Do not overload the circuit by plugging several power cords into one outlet.



Extension cord plugs must not have an open front, and must be a three-prong type.

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Hand signals for hoist and crane operations

If hand signals are used between a signaller and the operator of a crane or hoist to control hoisting operations, the following signals should be used:

STOP



Arm extended, palm down, move hand horizontal.

HOIST



With forearm vertical, finger pointing up, move hand in small horizontal circles.

LOWER



With arm extended down, move forefinger; pointing down, move hand in circles.

RAISE BOOM



Arm extended, fingers closed, thumb pointing upward.

LOWER BOOM



Arm extended, fingers closed, thumb pointing downward.

RAISE THE BOOM AND LOWER THE LOAD



With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.



Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down, and rotate hand.

LOWER THE BOOM AND RAISE THE LOAD



With arm extended, thumb down, flex fingers in and out as long as load movement is desired.



Arm extended, fingers closed, thumb down, other arm vertical, forefinger upward and rotate hand.

EXTEND BOOM



Both fists in front of body, with thumbs pointing outward.

RETRACT BOOM



Both fists in front of body, with thumbs pointing toward each other.

SWING



Arm extended, point in direction of swing of boom.

MOVE SLOWLY



Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal (hoist slowly shown as example)

DOG (STOP) EVERYTHING



Clasp hands in front of body.

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Hearing protection for residential construction

Residential construction workers are often exposed to on-the-job noise that can permanently damage hearing.

It is important to wear hearing protection when exposed to noise. Sources of noise include air nailers, chop saws, chainsaws, circular saws, routers, screw guns, drills, and power planers.

The employer is responsible for providing protection. Earmuffs or earplugs are acceptable.

As communication with co-workers may be critical, hearing protectors that do not block out too much sound should be worn, such as

- Custom-molded earplugs with vents
- Banded earplugs (earplugs on a band)
- Class B earplugs or earmuffs
- Electronic earmuffs or earplugs

Many types of hearing protectors are available. Several factors determine which is the best protector for an individual worker. The two most important factors are comfort and noise exposure level.

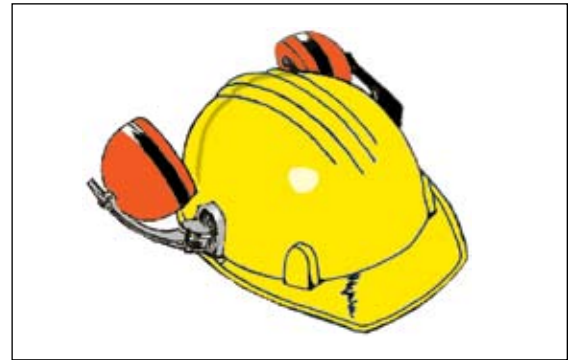
Other considerations when choosing a hearing protector include

- Physical requirements on the job (climbing, bending, lying down)
- Hearing levels of the workers
- Temperature in the workplace
- Use of other personal protective devices
- Physical characteristics of the worker—for example, size and shape of head or ear canals

To monitor the effectiveness of hearing protection, construction workers must have their hearing tested every year by persons authorized by WorkSafeBC. A coloured record card is issued to each worker as proof of a hearing test.

A hearing test includes discussion of

- The test results and what they mean
- What follow-up by the worker may be required
- Hearing protection—an in-depth look at use, care, fit, maintenance, suitability, preferences, etc.



There are many options for hearing protection on a construction site.

Project: _____ Address: _____

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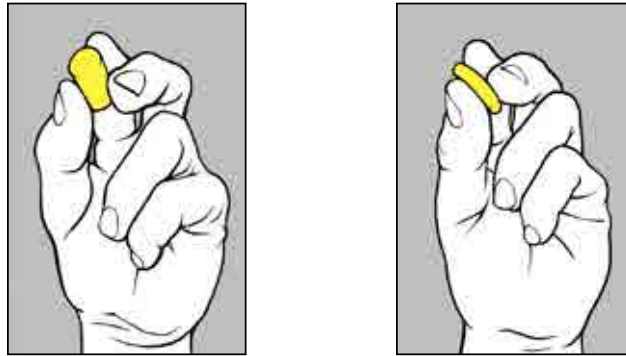


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Proper use of foam earplugs

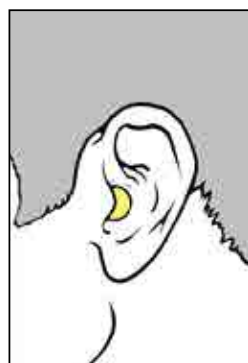
1. Using clean hands, roll and compress the entire earplug into a thin cylinder.



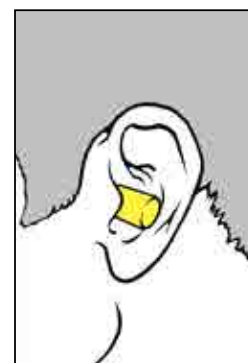
2. To make insertion easier, pull back and up on the outer part of the ear.



3. Insert the earplug into the ear canal, and hold it in place for a few seconds until it expands and blocks out noise.



Properly inserted



Not properly inserted

Project: _____ Address: _____

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Noise—how loud is it?

This guide lists average noise exposure levels for various construction jobs and lists recommended hearing protection devices for those exposure levels. **Note:** An individual worker's exposures may vary from these exposures.

Noise-induced hearing loss results from a combination of high sound levels and extended periods of exposure to sounds above 85 dBA.

Protect your hearing when performing these jobs.

Noise exposure levels

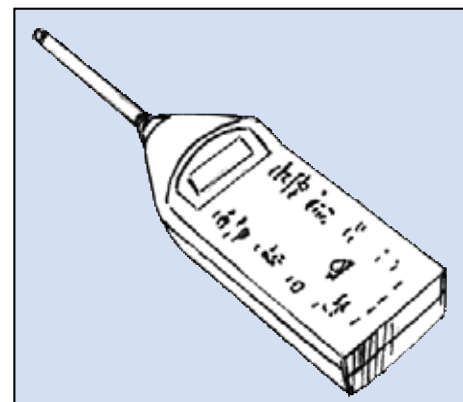
These are all eight-hour (or equivalent) exposures.

Construction job	Noise level (dBA)
Carpenter, Framers	91
Concrete worker	92
Crane operator	90
Drywaller	89
Electrician	89
Ironworker	93
Jackhammer operator	97
Labourer	93
Mobile equipment operator	91
Roofer	88
Truck driver	88
Welder	92

Hearing protection devices (HPD)

Hearing protection should be selected based on

- Noise exposure
- Communication demands
- Hearing ability
- Use of personal protective devices
- Temperature and climate
- Physical characteristics of the job or worker



An integrating sound level meter averages noise levels over time.

Recommended HPD for various noise levels

Noise level	Recommended HPD
Less than 90 dBA	Class C, Grade 1
Less than 95 dBA	Class B, Grade 2
Less than 100 dBA	Class A, Grade 3
Less than 110 dBA	Earplugs + earmuffs

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Propane safety

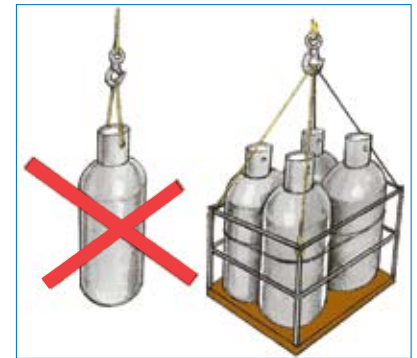
Propane leaks can cause serious fires and explosions. Propane gas, which is heavier than air, may leak and accumulate to create a dangerous environment, as it tends to creep along the ground and collect in low spots.

Propane space heaters

- When using propane space heaters, do not close up a house tightly. Good ventilation is necessary to remove moisture and to prevent a build-up of propane gas.
- Do not use propane heaters where spray-painting of flammable paints is being done.
- Cylinders that are not being used should be stored outdoors.

General propane safety

- Check propane cylinders for damage or corrosion prior to use.
- All propane and burner systems must be provided with a functional regulator.
- Propane cylinders must be secured in a level, upright position during storage, transportation, and use.
- Never apply a flame to cylinders to increase their pressure.
- Do not operate any equipment if the odour (rotten egg smell) of propane is present.
- Do not hoist propane cylinders by their valves or collars.
- Prior to use, propane hoses must be
 - Checked for damage and replaced if necessary
 - Protected from traffic damage
 - Checked for leaks at their connections (use a liquid soap test—bubbles will appear if a leak is present)
- When using tar kettles or tankers, propane cylinders must be kept at least 3 metres (10 feet) away.
- Propane cylinder valves must be opened fully when in use and closed tightly when not in use. Cylinder valves must not be used to adjust the torch flame. Pressure regulators are used for this purpose.
- Before shutting off the burner, close the cylinder valve and let the remaining gas burn out of the hose before closing the burner valve.
- During propane use, fire extinguishers must be available. It is required that one dry chemical extinguisher for every two torches be provided.



In the event of a propane fire

- Shut off the propane gas valve if safe to do so.
- Evacuate the area.
- If the propane gas flow cannot be shut off safely
 - Allow the propane gas to burn
 - Evacuate the area, and call the fire department immediately

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WHMIS—Material Safety Data Sheets

A Material Safety Data Sheet (MSDS) is a technical bulletin that provides specific hazard information, safe handling information, and emergency procedures for a controlled product. Since the MSDS contains detailed health and safety information specific to each controlled product, it should be used as a key source of information for developing training programs and safe work procedures. It is also a valuable reference source of health and safety information for workers, health and safety committees, and emergency service personnel.

The MSDS must be made available and accessible to workers.

USES OF MSDS

- Provides detailed information on the hazards of a controlled product
- An important element for developing safe work procedures and control measures
- A key element of worker education and training

Some employers use an electronic database to store MSDSs. In this case, it is essential that workers are trained in accessing such a database to retrieve an MSDS. Employers may wish to consider having a printed copy of each MSDS available for workers in case electronic files are not accessible (e.g., the system is down).

The *Controlled Products Regulation* lists 54 items of information in nine recommended sections on an MSDS, but does not require a standard format. MSDSs may be in different formats, and sections can be arranged in a different order.

MATERIAL SAFETY DATA SHEET (MSDS)

- A technical document providing information on a controlled product, for example:
 - ☞ hazardous ingredients
 - ☞ hazards (fire, explosion, reactivity)
 - ☞ health effects of exposure (acute and chronic)
 - ☞ hazard evaluation related to storage and handling
 - ☞ measures to protect workers
 - ☞ emergency procedures
- Must be current (no more than 3 years old), complete, and readily available to workers

RULES FOR COMPLETING MSDS

- Must not be more than 3 years old
- 9 recommended sections
- 54 items of information
- Specific hazardous ingredients must be disclosed (No “trade secrets proprietary” allowed unless a claim has been registered)
- Any abbreviations used must be defined
- Information must be specific
- No blanks
- No contradictory information

No Standard Format under WHMIS

Project: _____ Address: _____

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WHMIS—The workplace label

The purposes of WHMIS labels are to

- Alert workers to the main hazards of controlled products
- Provide instructions for safe handling of controlled products
- Direct workers to the Material Safety Data Sheets (MSDSs) for more information

The two types of WHMIS labels are the supplier label and the workplace label. Other means of identification may be used where appropriate (such as warning signs, colour codes, or placards).

Workplace labels are required on containers of controlled products produced on site, and on secondary containers where the product has been transferred from the original container.

Workplace labels are applied to

- Secondary containers
- Containers of products received in bulk
- Employer-produced products
- Containers with missing or illegible supplier labels

The format of workplace labels is flexible and may be in the language of choice in the workplace.

WORKPLACE LABEL

› Contains the following:

- ↻ Product name
- ↻ Safe handling procedures
- ↻ Reference to the MSDS

WORKPLACE LABEL EXAMPLE

ACETONE

Flammable

- Keep away from heat, sparks, and flames
- Wear butyl rubber gloves and safety goggles
- Use with local exhaust ventilation

Material Safety Data Sheet Available

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

Name: (please print)	Signature:	Company:
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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WHMIS—The supplier label

The purposes of WHMIS labels are to

- Alert workers to the main hazards of controlled products
- Provide instructions for safe handling of controlled products
- Direct workers to the Material Safety Data Sheets (MSDSs) for more information

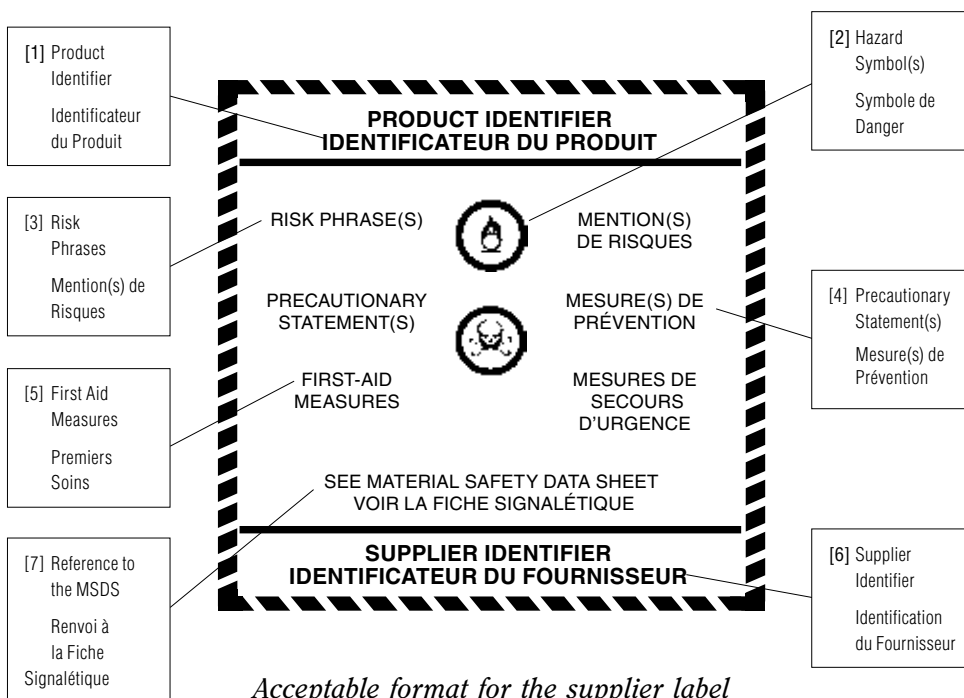
The two types of WHMIS labels are the supplier label and the workplace label. Other means of identification may be used where appropriate (such as warning signs, colour codes, or placards).

Suppliers must provide supplier labels on containers of all controlled products sold or imported for use in the workplace.

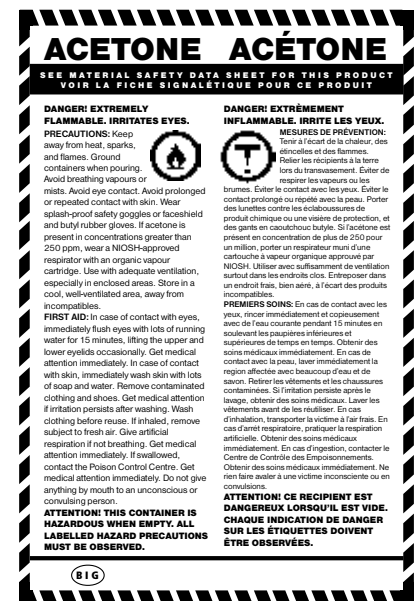
- Supplier labels will show seven types of information within the WHMIS hatched borders.
- The written information must be shown in both English and French.
- The label must stand out from the container itself and from other markings on the container (for example, the size of the label should be appropriate for the size of the container).

SUPPLIER LABEL

- Contains the following:
 - ✦ Product name
 - ✦ First aid measures
 - ✦ Hazard symbols
 - ✦ Supplier identifier
 - ✦ Risk phrases
 - ✦ Reference to MSDS
 - ✦ Precautionary measures
- All information must be disclosed in English and French within a hatched border



Acceptable format for the supplier label



Supplier label example

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

Name: (please print)	Signature:	Company:
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Manager's remarks: _____

Manager: _____ Supervisor: _____

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The right to refuse unsafe work

If a worker has reasonable cause to believe that to carry out any work process would create an undue hazard to the health and safety of any person, he/she has the right to refuse to take such action.

Under such circumstances, the following order of actions must take place:

1. The worker must immediately report the circumstances of the unsafe condition or matter to the supervisor or employer.

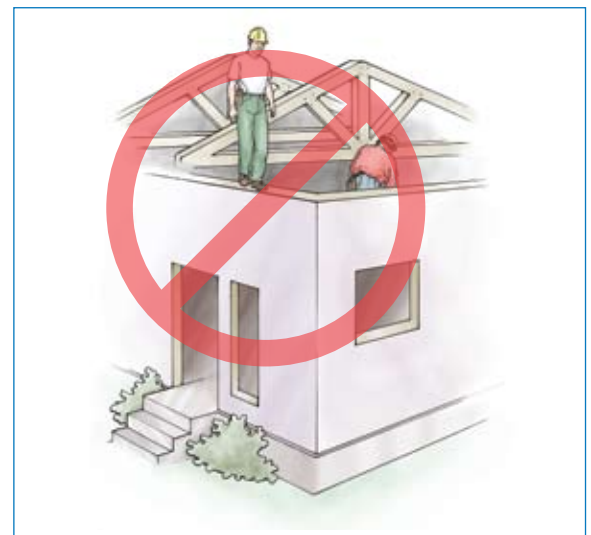
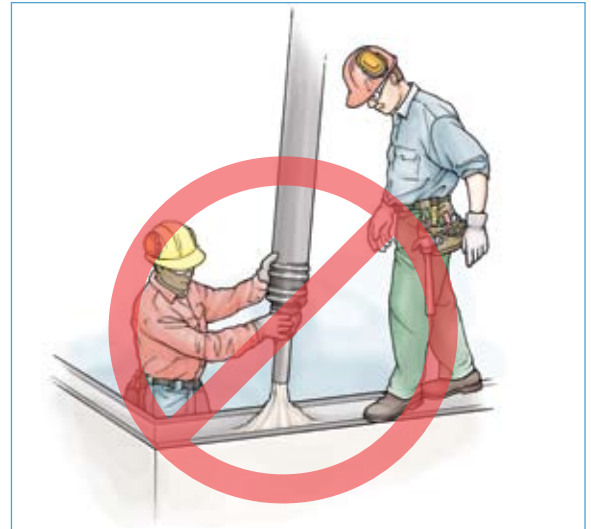
The supervisor or employer receiving the report must investigate the matter and

- Ensure that any unsafe condition is remedied
or
- If in his/her opinion the report is not valid, must so inform the person who made the report

2. If this does not resolve the matter, and the worker continues to refuse to carry out a work process, the supervisor or employer must further investigate the matter. This investigation must be carried out in the presence of the worker who made the report and in the presence of

- A worker representative of the joint health and safety committee
or
- A worker who is selected by a trade union representing the worker
or
- If there is no joint committee or the worker is not represented by a trade union, any other reasonably available worker selected by the worker who made the report

3. If this does not resolve the matter, and the worker continues to refuse to carry out a work process, both the supervisor or employer and the worker must immediately notify a WorkSafeBC officer, who will investigate the matter and take whatever actions are necessary.



No worker is to be disciplined for acting in compliance with these steps. Temporary assignment to alternative work at no loss in pay to the worker until the matter is resolved is not considered to be disciplinary action.

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

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Name: (please print)	Signature:	Company:
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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Silica dust—**are you at risk?**

Many common construction work tasks generate harmful levels of crystalline silica dust if proper controls are not followed. When silica dust builds up in your lungs, you are at risk of developing a serious lung disease called silicosis, which can lead to death. Silicosis is not curable, but it is preventable. The more you know about silica dust, the better prepared you will be to adequately protect yourself.

What is silica?

Silica is the basic component of sand and rock. The best-known and most abundant type of crystalline silica is quartz. Some common silica-containing materials include:

- Concrete, concrete block, cement and mortar
- Masonry and tiles
- Brick, refractory brick
- Composite products such as Hardiplank
- Granite, sand, fill dirt, top soil
- Asphalt containing rock or stone
- Abrasive used for blasting

Construction workers may be exposed to silica when working with these materials.

Are you exposed to silica dust?

If you do one of the following activities, you are at risk of breathing silica dust:

- Chipping, sawing, grinding, hammering, and drilling of rock, concrete, or masonry
- Crushing, loading, hauling, and dumping of rock
- Sawing, hammering, drilling, grinding, and chipping of concrete or masonry structures
- Demolition of concrete or masonry structures
- Power cutting or dressing stone
- Facade renovation, including tuckpoint work
- Abrasive blasting and hydroblasting of concrete
- Clean-up activities such as dry sweeping or pressurized air blowing of concrete or sand dust
- Tunneling, excavation, and earth moving of soils with high silica content

How is silica disease prevented?

The key to silica disease prevention is to prevent the dust from getting into the workplace air. If you are exposed to silica dust, ask your employer to explain the dust controls that will be used to protect you.



Worker grinding concrete using local exhaust ventilation



Worker cutting concrete using water for dust control



Worker drilling concrete inside an enclosure equipped with a “negative air” unit

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Learn about the dangers of breathing silica dust

Crystalline silica is found in concrete, masonry, sandstone, and most rock. The cutting, breaking, crushing, drilling, grinding, or abrasive blasting of these materials without proper controls will produce fine silica dust. When silica dust builds up in your lungs, you are at risk of developing a serious and irreversible lung disease called silicosis.

Silicosis

Silicosis is a disease caused by the prolonged breathing of crystalline silica dust. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. Crystalline silica exposure has also been linked to lung cancer.

A worker may develop any of three types of silicosis, depending on the concentrations of silica dust and the duration of exposure:

- **Chronic silicosis:** develops after 10 or more years of exposure to crystalline silica at relatively low concentrations
- **Accelerated silicosis:** develops 5 to 10 years after initial exposure to crystalline silica at high concentrations
- **Acute silicosis:** symptoms develop within a few weeks, or 4 to 5 years, after exposure to very high concentrations of crystalline silica

Symptoms of silicosis

Initially, workers with silicosis may have no symptoms; however, as the disease progresses a worker may experience:

- Shortness of breath
- Severe cough
- Weakness

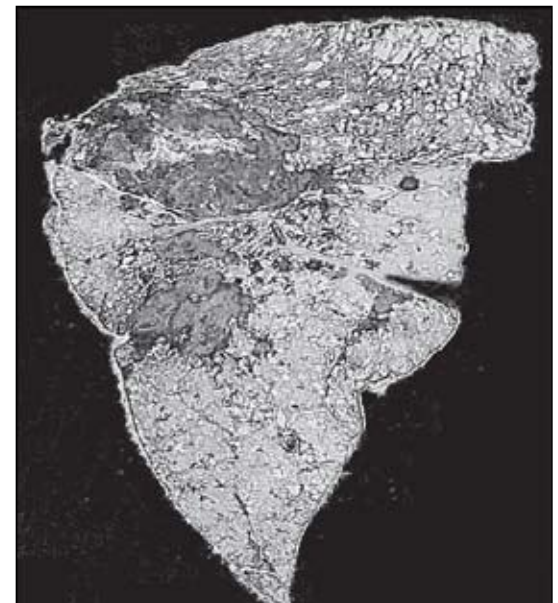
These symptoms can worsen over time and lead to death.

Preventing exposure

If you are exposed to silica dust, learn about the control methods that can protect you. Talk to your supervisor and ask how you will be protected when performing dusty work. You should also talk to your family doctor, who can recommend medical monitoring for silicosis.



Healthy lung



Silicosis lung

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Silica dust control during wall and ceiling grinding

Grinding concrete surfaces generates high levels of silica-containing dust. Breathing in this fine dust can cause a serious and irreversible lung disease called silicosis.

Controlling the dust

Local Exhaust Ventilation (LEV) is available to control the silica dust at its source. Attachments include shrouds (suction casings that surround the wheel/stone), hose attachments, and HEPA vacuum systems. The dust is collected within the shroud and drawn into the vacuum, where it is filtered and discharged.

To protect yourself you should:

- Establish a barrier around your work area to restrict unprotected workers from entering
- Whenever possible, use LEV systems to capture and control the dust at its source
- Check to make sure that the vacuum system you are assigned is approved for use with silica dust, and is operating properly
- Inspect the shroud on your grinder to make sure it is in good condition and able to form a seal between the grinder wheel and the wall/ceiling surface; very little visible dust should be released at the shroud; if dust is released, the vacuum may not be working properly
- Clean the vacuum and change the filters on a regular basis; when cleaning vacuum systems, safe work procedures must be followed
- When grinding a ceiling, use a tripod designed for this work
- When wall grinding, use an elevated work platform so you can operate the grinder at or below shoulder height
- Always wear proper respiratory protection when working around silica dust
- Always inspect and monitor the effectiveness of your equipment
- Report problems to your supervisor

When the work is completed, vacuum settled dust from floors and other surfaces. Do not use compressed air to blow dust from your clothing or your equipment.



Wall grinding with LEV



Diamond grinder with vacuum attachment



Ceiling grinder

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Silica dust control during tuckpoint grinding

Grinding mortar generates high levels of silica-containing dust. Breathing in this fine dust can cause a serious lung disease called silicosis. Mortar dust can also contain lead.

Controlling the dust

Specially designed angle grinders and orbital cutting saws are available for tuckpoint grinding. These grinders are equipped with Local Exhaust Ventilation (LEV), which captures the silica dust within a shroud at its source, and draws it into a vacuum where it is filtered in a HEPA filter and discharged. Attachments include shrouds (suction casings that surround the wheel), hose attachments, and vacuum systems (HEPA equipped). The new designs allow for good visibility when cutting.

Hand tools (chisels, wire brushes, pointing trowels, mortar rakes) will not typically produce harmful levels of fine silica dust.

To protect yourself you should:

- Establish a barrier around your work area to restrict unprotected workers from entering
- Wear proper respiratory and eye protection, and wear coveralls when visible dust is present in the air
- Use LEV systems to capture and control the dust at its source, whenever possible
- Look for safety and efficiency features on a tuckpoint grinder such as an adjustable two-sided shroud, viewing window, easy wheel access, and hose position opposite the trigger
- Check to make sure that the vacuum system you are assigned is approved for use with silica dust (100 series HEPA filtered), and is operating properly
- Inspect the shroud on your grinder to make sure it is in good condition
- Construct a partial or full enclosure to contain the dust and control its discharge through approved filters when an LEV grinder is not available
- Avoid side-to-side movements of the grinder; the grinder wheel should rotate toward the inlet to the vacuum
- Clean the vacuum and change the filters on a regular basis; when cleaning vacuum systems, safe work procedures must be followed
- Report problems to your supervisor

Never blow dust from the cracks or walls; use a vacuum.



Tuckpoint grinding with LEV



Tuckpoint grinder with LEV



Orbital/oscillating cutting saw with LEV

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Controlling dust when cutting fibre-cement board

Cutting fibre-cement board (e.g., Hardiplank/Weatherboard) without the appropriate controls can expose workers to harmful levels of crystalline silica dust. Breathing in this fine dust can cause a serious and irreversible lung disease called silicosis.

Dust control options

Every effort should be made to use cutting methods that minimize airborne silica dust. Three such methods are:

- Handheld and stationary electric or pneumatic shears
- “Score-and-snap” method (tungsten carbide tipped scoring knife specially designed for this work)
- Circular saw equipped with a dust collector shroud and vacuum system (HEPA filtered) that captures the fine silica dust

Wet methods are not typically used when cutting and shaping fibre-cement board.

To protect yourself you should:

- Use one of the methods described above for cutting fibre-cement board
- Inspect the dust control equipment before you start work and report any problems to your supervisor
- Make sure that the dust control system is minimizing the release of dust – very little dust should be released when these methods are working properly
- Follow safe work procedures when cleaning and/or maintaining the equipment
- Vacuum (HEPA filtered) or wet wipe settled dust from equipment, work, and other surfaces when the work is completed
- Always wear an approved respirator when working around silica dust (the type chosen will depend on the cutting method and dust controls used)
- Wear approved safety glasses when power cutting cement board

Do not use compressed air to blow dust from your clothing or your equipment.



Protected worker cutting fibre-cement board using a circular saw with dust controls



Worker cutting fibre-cement board outdoors, with a hand-held shear



Cutting fibre-cement board with a hand-held shear

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Silica dust control when drilling concrete

Drilling into concrete releases a fine sandy dust, which contains crystalline silica. Breathing in this dust can cause a serious lung disease called silicosis. Electricians, plumbers, sprinkler installers, and other mechanical trades who regularly and routinely drill into concrete are at risk of developing this disease.

Controlling the dust

Hammer drills are available with attached dust removal systems. These draw dust from the drill end, down the attachment assembly, and collect it in a HEPA filter.

Dust caps are simple but effective devices that fit on the end of the drill and capture and collect concrete dust. When the cap is full, the dust is emptied into a receptacle for disposal.

Placing the hose from a HEPA equipped vacuum near the location of the drill is also a very effective means of capturing the dust.

Wet control methods are also an effective means to reduce dust while drilling.

To protect yourself, you should:

- Establish a barrier around your work to restrict unprotected workers from entering the area
- Select drills equipped with dust capture/removal attachments when available
- Learn how to operate and maintain the dust removal devices in accordance with the manufacturers' instructions
- Inspect the dust control devices before use to ensure they are in good condition
- Clean the attachments on a routine basis to maintain effective dust control and prolong the life of the components
- Wear a disposable N95 respirator or a half-face respirator equipped with 100 series (HEPA) filters when using a dust removal system or cap system
- Wear a full-face respirator equipped with a 100 series (HEPA) filter and disposable coveralls when drilling many holes, and dust controls are not available or practical
- Use a vacuum approved for concrete dust to clean up any spilled dust on your clothes, equipment, or other surfaces

Do not use compressed air to blow dust off your clothing, equipment, or tools.



Drilling using a dust cap



Drill with dust removal system

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Silica dust control during stairwell grinding/chipping

Grinding, and other finishing tasks associated with concrete surfaces in stairwells, generate extremely high levels of hazardous silica dust. Breathing in this fine dust can cause a serious lung disease called silicosis.

Controlling the dust

Local Exhaust Ventilation (LEV) equipped with HEPA filters must be used to control the silica dust at its source whenever practical. Attachments include shrouds (suction casings that surround the wheel/stone), hose attachments, and vacuum systems. Custom-designed shrouds can be fabricated for grinding into corners or against walls and inside edges.

Enclosure structures must be considered when concrete dust cannot be effectively control with the LEV or wetting systems. Partial or full enclosures are usually required during stairwell grinding/chipping. Enclosure structures are designed to contain the dusty air and control its discharge through a negative air unit equipped with a filter system approved for use with silica.

Grinders equipped with water spray attachments are available and should be considered when LEV units are not practical for concrete finishing operations.

To protect yourself you should:

- Use HEPA LEV systems to capture and control the dust at its source whenever possible
- Check with your supervisor to determine if an enclosure structure will be erected and how this is to be done
- Check to make sure that the vacuum system you are assigned is approved for use with silica dust, and is operating properly
- Inspect the shroud on your grinder to make sure it is in good condition; very little visible dust should be released at the shroud; if dust is released, the vacuum may not be working properly
- Clean the vacuum and change the filters on a regular basis; when cleaning vacuum systems, safe work procedures must be followed
- A full-face respirator equipped with 100 (HEPA) series filters will usually be required when grinding and chipping in stairwells
- Coveralls should be worn when finishing in stairwells
- Always inspect and monitor the effectiveness of your equipment
- Report problems to your supervisor

When the work is completed, vacuum settled dust from floors and other surfaces. Do not use compressed air to blow dust from your clothing or your equipment.



*Poly enclosure with HEPA
“negative air” unit*



Stair grinding with LEV



*Grinder with HEPA LEV
attachment*

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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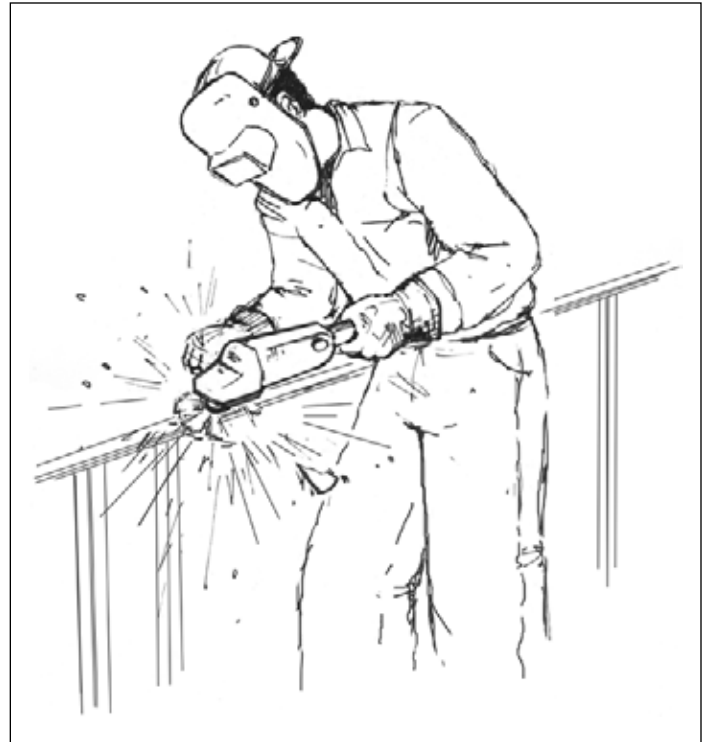


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Safe use of abrasive tools

- Make sure the grinder has an adequate protective guard.
- Ensure that grinder stones and discs are matched to the RPM rating of the grinder. A low-RPM stone or disc may shatter on a high-RPM grinder.
- Wear a proper face shield and eye protection during all grinding operations. Use a respirator when required.
- Check grinder stones and discs daily for nicks, cracks, or other defects. Replace them immediately if they are damaged.
- Handle grinders carefully. If dropped, inspect the grinder and stone/disc right away for damage.
- Abrasive wheels may shatter if handled incorrectly. They must be stored carefully, handled gently, and installed properly. Always test start the new wheel where it can do no harm.
- Do not use the side of the wheel for grinding unless it is designed specifically for such use.
- Make sure to turn off a portable grinder and wait until all motion has stopped before setting it down.



A low-RPM stone or disc may shatter on a high-RPM grinder.

Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Eye and face protection

Canadian Standards Association (CSA) approved eye or face protection must be worn whenever there is a danger to the eye or face. Safety eyewear is an essential piece of personal protective equipment, but all too often workers wear the wrong kind or, even worse, don't wear it at all.

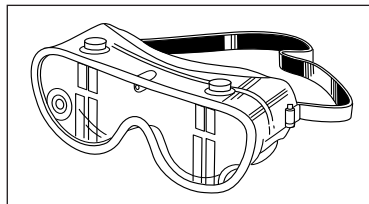
Types of protection

Whether you are exposed to flying particles from drilling or scaling, UVA/UVB rays, welding light and electrical arcs, each task and worksite is unique and will require careful selection of proper eye protectors. Working with your supervisor you must determine your eye protection needs.

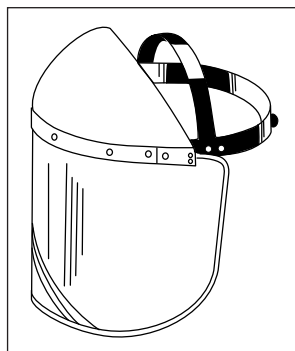
Safety glasses provide minimum protection and are for general working conditions where dust, chips, or flying particles may present a hazard. They are available in a variety of styles and provide side protection in the form of shields or wraparound arms. Lenses should have an anti-fog treatment.



Goggles provide higher impact, dust, and acid or chemical splash protection than safety glasses. Moulded goggles are suitable when workers are continually exposed to splash or fine dust, and should have indirect venting. For less fogging when working with large particles, direct-vent goggles are recommended.



Face shields protect the full face from injury and they offer the highest impact protection and shelter from spraying, chipping, grinding, chemicals, and blood borne hazards. A face shield is considered a secondary safeguard to protective eyewear; it should never be worn without safety glasses or goggles.



Welding goggles prevent exposure to harmful radiation, when arc welding, gas welding, or burning. These protectors come in various shades, so wear the right one for the job. Never wear Oxyacetylene welding goggles when arc welding.



Prescription Safety Glasses

If you wear prescription glasses, check whether they qualify as safety eyewear.

- Glasses must be CSA approved.
- Glasses must have side shields.
- Lenses must be made out of polycarbonate or plastic
- Look for manufacturer's logo moulded or etched into the top outside edges of the lenses.
- Look for "Z87" on the temple pieces.

Proper fit and care is critical

In order to get the maximum benefit from safety eyewear, your glasses need to fit and must be kept clean and when not in use stored in a place where they are not being harmed.

Don't take it off

Choosing the right safety eyewear is important, but remember it can't protect you if you're not wearing it. **Wear eye or face protection!**

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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General welding and cutting requirements

Whenever possible, move objects to a safe place before heating, cutting, or welding. Remove or effectively screen all fire hazards where the welding job is to take place.

Keep passageways, ladders, and stairs clear of hoses, cables, and other equipment.

Do not cut or weld any steel drum or other vessel that might have contained flammables until it has been steam purged and tested. Flushing with water is not sufficient.

Do not apply heat to the inside surface of any piping or vessel unless it is

- Open to the atmosphere to prevent pressure buildup
- Adequately tested for gases and oxygen content

Where it is necessary to catch falling sparks and slag, use glass-fibre blankets or fire-retardant welding tarpaulins. Keep an appropriate type of fire extinguisher available at all times.

Make sure there is sufficient general ventilation. Where welding fumes and gases can accumulate, use local exhaust ventilation to remove the contaminants.

In poorly ventilated areas, gases can accumulate and displace the air, causing an oxygen-deficient atmosphere. *Proper ventilation is required when using inert gases while welding.*

All workers engaged in welding or burning operations must wear

- Flame-retardant work clothing, preferably made of cotton or wool fibres
- Leather gauntlet-type gloves and arm protection
- An apron made of leather or other suitable material for heavy work
- Face protectors and safety eyewear to guard against harmful radiation or particles of molten metal, including when chipping and grinding welds



- Substantial safety footwear made of leather or another equally firm material

Where possible, recently welded or flame cut work should be marked “HOT” to prevent other workers from being burned.

Before entering a tank, bin, or any other confined space, follow confined space entry procedures.

Never take gas cylinders into a confined space (Exception Compressed air cylinders for self-contained breathing apparatus).

Protect load-bearing ropes or cables from the effects of welding operations.

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Hand signals for tower crane operations

If hand signals are used between a signaller and the operator of a tower crane to control hoisting operations, the following signals should be used:

STOP



Arm extended, palm down, move hand horizontal.

HOIST



With forearm vertical, finger pointing up, move hand in small horizontal circles.

LOWER



With arm extended down, move forefinger; pointing down, move hand in circles.

TROLLEY OUT



Both fists in front of body, with thumbs pointing outward.

TROLLEY IN



Both fists in front of body, with thumbs pointing toward each other.

SWING



Arm extended, point in direction of swing of boom.

DOG (STOP) EVERYTHING



Clasp hands in front of body.

Project: _____ Address: _____

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Manager: _____ Supervisor: _____

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Hypothermia

One of the major hazards you face when working in the cold is losing your body heat. If your body becomes so cold that it can no longer produce more heat than it loses, you are becoming a victim of hypothermia. With hypothermia, your vital organs and body systems begin to lose their ability to function.

Hypothermia often happens so slowly that you don't realize you're in danger. That's why it's important to be able to recognize the early signs. If untreated, hypothermia can lead to death.

Danger signs of hypothermia

It is important to treat hypothermia in its early stages. If no action is taken, the condition may worsen and become moderate or severe hypothermia. Always stay on the lookout for early signs of hypothermia in both your co-workers and yourself.

Review the following three stages to help you recognize the danger signs.

Mild hypothermia

- Bouts of shivering
- Grogginess, poor judgment, muddled thinking, and abnormal behaviour
- Normal breathing and pulse

The onset of hypothermia may be *delayed*, so watch for early signs.

If you suspect hypothermia, monitor your condition or that of your co-workers, even *after* you have left work.

Moderate hypothermia

- Violent shivering, or shivering has stopped altogether
- Inability to think and pay attention (for example, victim cannot understand what is being said)
- Slow, shallow breathing, slurred speech, or poor body co-ordination (for example, a stumbling gait)
- Slow, weak pulse

Severe hypothermia

- Shivering stopped
- Unconsciousness
- Little or no breathing
- Weak, irregular, or non-existent pulse
- Dilated (wide open) pupils, so that the victim may appear dead but is still alive



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Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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How to reduce the risks of hypothermia

Hypothermia can happen even on a mild winter's day or on a damp day in fall or spring. Proper clothing and adequate insulation work together to trap the warm air around the body. The basic principle for preventing hypothermia is to stay warm and dry and be prepared for a sudden emergency.

Guidelines that work

- **Wear warm head covering.** Most body heat is lost through the head.
- **Wear layered clothing.** Layers allow warm air to stay trapped but do not trap perspiration next to the skin. The first layer of clothing should allow the skin to breathe by allowing sweat to escape. Underwear, socks, and glove liners made of polypropylene or knitted silk allow sweat to escape from next to the skin.
- **The second layer of insulating clothing should be one that absorbs perspiration but does not allow heat to escape.** Wool is an ideal fabric because it will stay warm even when wet.
- **The third layer of clothing should also trap body heat as well as keep water or dampness out.** Quilted coats filled with down or one of the new lightweight micro-fibres that trap heat are ideal, provided they are waterproof.
- **Drink plenty of non-alcoholic fluids.** Doing this will help prevent dehydration and exhaustion, which can lead to hypothermia. Heated drinks can be helpful, but limit your intake of coffee and tea.
- **Pace yourself during vigorous activity.** Take regular breaks to get away from the cold environment.
- **When possible, heat the working environment.** For instance, heated cabs or shelters help protect construction workers from cold and damp environments.



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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Working safely with mobile equipment

Excavators, dump trucks, and other mobile equipment play key roles on many construction sites. However, mobile equipment can pose a risk to nearby workers, especially when the operator cannot see them. By following the safe work practices listed below, you can help reduce the risk of injury when working with mobile equipment.

Safe work practices

Operators

- Ensure that workers are clear of the equipment before operating it.
- When operating mobile equipment, carry the load no higher than necessary to avoid limiting your vision.
- Avoid using cell phones while operating mobile equipment.

Nearby workers

- Before starting work, ensure that you are aware of all mobile equipment operating in and around the site.
- Wear high visibility apparel when working with or near mobile equipment.
- Do not take shortcuts across areas where mobile equipment is working.
- Keep in eye contact with the operator when working near moving machinery or equipment.
- If you use a cell phone, be aware that it can distract your attention from hearing or seeing mobile equipment as it moves around the site.



Lastly, remember that working safely in and around mobile equipment is a shared responsibility between both the operator and workers on the ground. Never assume you have the right of way.

Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Bench grinders

Bench grinders can cause serious injury if used incorrectly. By following the safe work practices listed below, you can help reduce the risk of injuring yourself or others while using these powerful tools.

Safe work practices

- Never remove wheel guards from a grinder. They offer protection in case of wheel failure, and protect hands and fingers from injury.
- When work is hand-held, the grinding machine must have an adjustable rest. The upper edge of the adjustable rest must be at or above the centerline of the abrasive wheel and within 3 mm ($\frac{1}{8}$ in.) of the cutting surface.
- Ensure that grinder stones and discs are matched to the RPM rating of the grinder. A low-RPM stone or disc may shatter on a high-RPM grinder.
- Never grind non-ferrous materials (metals not containing iron) unless the wheel is designed for such use.
- Ensure you dress (sharpen) the wheel often.
- Do not grind on the side of the wheel unless it is designed for such use.
- Do not stand directly in front of a grinding wheel when you start it. Before you begin grinding, allow the wheel to run at operating speed for at least one minute.
- Do not use a wheel that vibrates.
- Do not force or jam work into the wheel.
- Do not use a cracked or dropped wheel.



Personal protective equipment

- Always wear hearing, eye, and face protection that is appropriate for the type of grinding work you're doing.
- Respiratory protection may be required if your grinding work puts you at risk of inhaling harmful substances (e.g., dust, metal fumes, or chemicals).
- Secure loose clothing, and remove ties, rings, watches, and other jewellery.
- If you're not sure what type of personal protective equipment you need, ask your supervisor or employer.

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Hand-held grinders

Hand-held grinders can cause serious injury if used incorrectly. By following the safe work practices listed below, you can help reduce the risk of injuring yourself or others while using these powerful tools.

Safe work practices

- Always handle and use equipment with care.
- Follow the manufacturer's recommendations for use, maintenance, and personal safety (including guards).
- Keep combustible materials away from the grinding area. Sparks may cause a fire.
- Never remove manufacturers' guards from grinders while operating.
- Ensure grinding wheels/discs are in good condition. Inspect them for chips, cracks, and loose retainers prior to use.
- Grinding generates dust. Protect yourself with proper respiratory protection and ventilation.
- Always check the machine's rated speed against the recommended maximum safe operating speed marked on the wheel or disc.

Personal protective equipment

- Always wear hearing, eye, and face protection that is appropriate for the grinding work you're doing.
- Respiratory protection may be required if your grinding work puts you at risk of inhaling harmful substances (e.g., dust, metal fumes, or chemicals).
- Secure loose clothing, and remove ties, rings, watches, and other jewellery.
- If you're not sure what type of personal protective equipment you need, ask your supervisor or employer.



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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Self-propelled boom lifts

Workers operating self-propelled boom lifts face a risk of injury from

- Falling or tipping over due to slopes, uneven terrain, curbs, holes, or objects on the ground
- Contact with overhead obstructions, including power lines

By following the safe work practices listed below, you can help reduce the risk of injuring yourself or others while using this equipment.

Safe work practices

- Inspect the equipment before you use it, and as required during use, to ensure it is operating safely. Review and update the log book.
- Test equipment before using it to make sure that all safety devices are working properly.
- Report defects and conditions affecting the safe operation of the equipment to your supervisor or employer.
- Any repairs or adjustments necessary for the safe operation of the equipment must be made before the equipment is used.
- Before operating any equipment, be aware of and stay clear of all overhead obstructions and hazards, including high voltage lines.
- Ensure that the supporting surface is firm, level, and clear of depressions or obstructions. Make sure that the wheels are contacting the ground before elevating or repositioning the unit.
- Always wear fall protection when required.
- Maintain full control of the equipment and comply with the laws governing the operation of the equipment at all times.



Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Self-propelled scissor lifts

Self-propelled scissor lifts can cause serious injury if used incorrectly. Both the users and the owners of these lifts are responsible for ensuring safe use. By following the safe work practices listed below, you can help reduce the risk of injuring yourself or others while using these lifts.

Safe work practices

- Review the manufacturer's safe operating procedures before use.
- Inspect the equipment before you use it, and as required during use, to ensure it is operating safely. Review and update the log book.
- Test equipment before using it to make sure that all safety devices are working properly.
- Report defects and conditions affecting the safe operation of the equipment to your supervisor or employer.
- Any repairs or adjustments necessary for the safe operation of the equipment must be made before the equipment is used.
- Stay clear of all overhead obstructions and hazards, including power lines.
- Use only lifts with controls that are protected from inadvertent operation.
- Ensure that each set of operating controls on the lift has an emergency stop device that is within easy reach of the operator and is clearly labelled **STOP**.
- Maintain full control of the lift and comply with the laws governing its operation at all times.



Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Compressed gas cylinders

Compressed gas cylinders are used in a variety of tasks (e.g., welding, cutting, or heating metal). While the tasks and gases may vary, the hazards and safe operation and handling practices for gas cylinders are similar. By following the safe work practices listed below, you can help reduce the risk of injuring yourself or others while using and handling this equipment.

Safe work practices

- Ensure cylinders are properly marked to indicate their rated pressure and the type of gas they contain.
- Never rely on the colour of the cylinder for identification. Colour coding is not reliable because cylinder colours may vary with the supplier.
- Store cylinders upright and in a dry, well-ventilated area away from doors, stairs, elevator shafts, traffic, and heat sources. **Acetylene cylinders should always be kept upright.**
- Ensure cylinders are not secured to equipment that could become part of an electrical circuit.
- Post a “No Smoking” sign near the storage area.
- Keep full cylinders separated from empties.
- Always properly secure cylinders to keep them from falling during storage, transportation, and use.
- Use proper moving equipment like dollies or lifting cradles, or ask for assistance if equipment is not available. Gas cylinders can be very heavy, and they can be very dangerous if handled incorrectly.
- Never slide, drag, or drop cylinders.
- Remove the regulator and replace the cap, if applicable, before moving cylinders.
- Always keep the valve keys or wrenches with the cylinders so they can be closed quickly if needed.
- Never use a leaky cylinder. Notify your supervisor and the supplier.
- Always follow the manufacturer’s instructions for safe operation.



Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Heat exhaustion

Working in the heat and doing heavy physical work can affect the body's cooling system. If your body is unable to cool itself, you can experience heat stress. If heat stress is not treated in the early stages, more serious conditions, such as heat exhaustion, can develop. In heat exhaustion, your body loses too much water and salt as sweat.

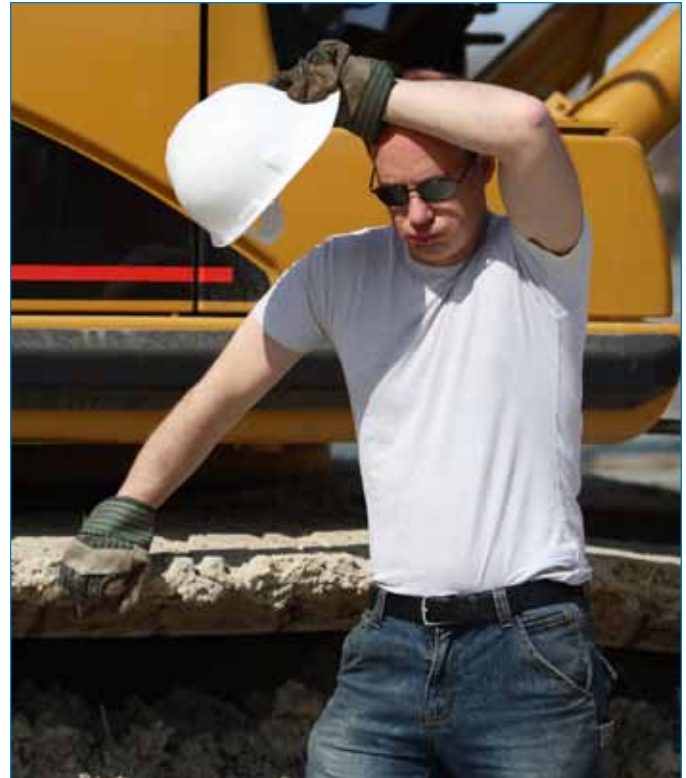
Signs and symptoms

- Shallow breathing
- Increased breathing rate
- Weak, rapid pulse
- Cool, pale, clammy skin
- Sweating
- Weakness, fatigue, dizziness
- Headache and nausea
- Fainting
- Muscle cramps

The signs and symptoms are the same as those seen in mild shock. Sweating is an important sign, because it is often the only way to tell apart heat exhaustion from a life-threatening condition called heat stroke. If untreated, heat exhaustion may progress to heat stroke. Workers suffering from heat exhaustion should be transported to medical aid.

Treatment

- Move the worker to a cooler environment. If possible, lay the worker down, and remove or loosen tight-fitting clothing.
- Cool the worker by sponging with cool water and fanning. Take care not to cool the worker too much. If the worker begins to shiver, stop cooling.
- In most cases, the patient's symptoms will improve dramatically within 30 minutes. These patients should still be transported to medical aid.



Prevention

- Acclimatize your body (gradually expose yourself to heat and work).
- Drink plenty of water (one glass every 20 minutes).
- Wear clean, light-coloured, loose-fitting clothing made of breathable fabric.
- Take rest breaks in a cool or well-ventilated area. Take more breaks during the hottest part of the day or when doing hard physical work. Allow your body to cool down before beginning again.

Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Heat stroke

Heat stroke is a life-threatening condition in which the body's core temperature rises above 41°C. At core body temperatures over 41°C, sweating stops and the body is unable to get rid of heat, causing body temperature to continue to rise. The person's mental functions may become disturbed. Without immediate first aid, heat stroke can result in loss of consciousness, permanent brain damage, and death.

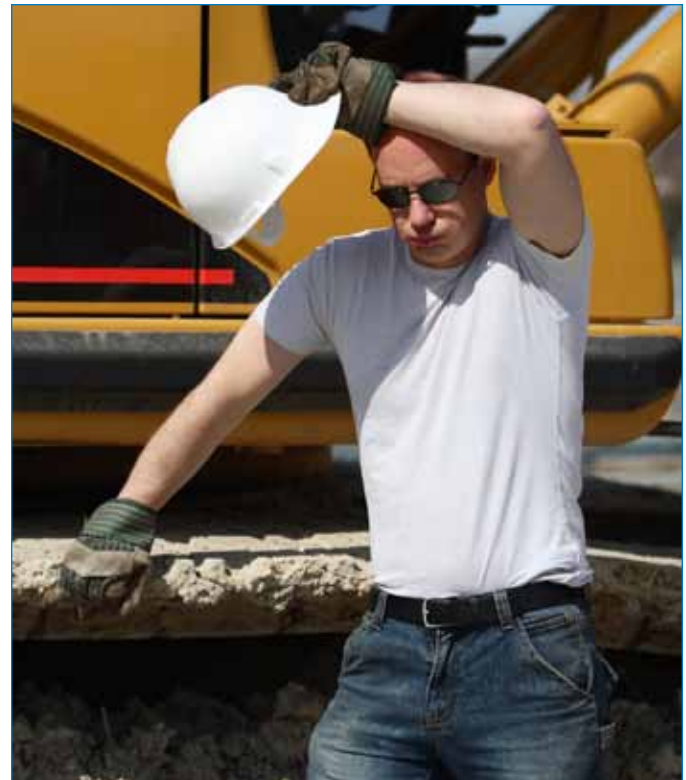
Signs and symptoms

- Hot, dry, flushed skin
- Seizures
- Absence of sweating
- Increased breathing rate
- Agitation, confusion
- Irregular pulse
- Decreased level of consciousness
- Shock
- Headache
- Cardiac arrest
- Nausea and vomiting

The presence of hot, dry, flushed skin without any evidence of sweating can help you tell the difference between heat stroke and other heat-related illnesses. Heat stroke can occur quickly and without warning, or it may be preceded by heat exhaustion. People should not work alone or unsupervised in conditions that may cause heat stress illnesses.

Treatment

- Move the worker to the coolest place available.
- Maintain airway, breathing, and circulation as required, and monitor patient until help arrives.
- Remove all outer clothing, and apply cold water to the worker by either dousing or applying wet, cool sheets. Spraying or sponging the entire body with cold water is also effective. Fanning will also help.
- Notify the first aid attendant, call 911, and/or arrange for immediate transportation to medical aid. Continue to cool the worker during transport.



Prevention

- Acclimatize your body (gradually expose yourself to heat and work).
- Drink plenty of water (one glass every 20 minutes).
- Wear clean, light-coloured, loose-fitting clothing made of breathable fabric.
- Take rest breaks in a cool or well-ventilated area. Take more breaks during the hottest part of the day or when doing hard physical work. Allow your body to cool down before beginning again.
- Schedule work to minimize heat exposure. Do the hardest physical work during the coolest part of the day.

Project: _____ Address: _____

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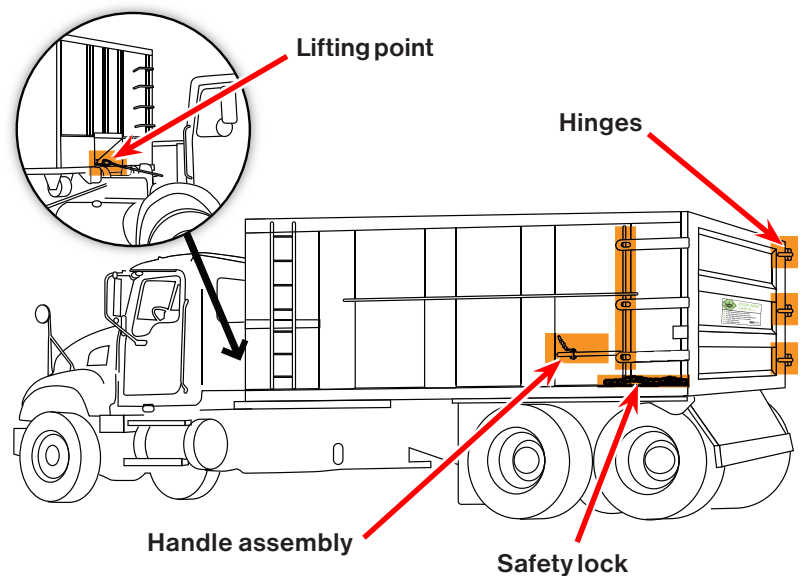


Avoiding hazards when working with roll-off waste containers

Drivers who load and transport roll-off waste containers are at risk of injury from containers that have been poorly maintained or improperly loaded.

Before loading the container onto the truck

- Back the truck slowly up to the container, and keep the lifting point centred between the rails of the truck.
- Walk around the container and inspect the condition of hinges, doors, opening devices, the door-locking mechanism, and the load hook-up point. Ensure that all door safety chains are in place and usable.
- Check the load's height, which could interfere with tarping.
- Estimate the load's weight and distribution to ensure they are acceptable.
- Call your supervisor for instructions if you have any concerns about the container's condition or its load.
- Place the tarp over the container while the container is still on the ground to avoid working at heights.



Loading the container onto the truck

- Attach the hook to the container, and ensure that the safety clip on the hook is locked in place.
- Lift the container slowly, and lower the truck bed to reduce the angle at which the bin is being lifted.
- Adjust the steering to ensure the truck is pulled straight under the bin.
- Stop lifting if the container seems too heavy or unbalanced.
- Once the container is on the truck, secure it properly with the safety chains.

Preparing to empty the container

- Once the truck is in position to dump, check for objects that have shifted during travel and may fall.
- Stand in a safe position off to one side of the container to open the door handle. The handle may be under pressure and may spring out. **Do not stand in front of it.**
- Stay in a safe position while you open the door. The door may swing out.
- After opening the door, use the chains to pull it fully open and to secure the door to the side of the container.

Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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Maintain three-point contact with mobile equipment

Falls from mobile equipment are one of the major causes of injury in the B.C. road-building industry.

Many of these falls occur when workers are mounting or dismounting mobile equipment.

Many knee, ankle, and back injuries result from jumping from equipment onto uneven ground or objects.

By following the safe work practices listed below, you can help reduce the risk of injury when mounting or dismounting mobile equipment.

- When entering or exiting mobile equipment, always maintain three points of contact. This means keeping two hands and one foot—or two feet and one hand—on the equipment at all times.
- Equipment must be stationary before mounting or dismounting.
- Never jump from mobile equipment.
- Face the equipment while mounting or dismounting.
- Use the manufacturer's handhold and foothold design to mount or dismount the equipment. Use the steps, running boards, traction strips, footholds, and handgrips.
- Don't use wheel hubs, machine tracks, or door handles for mounting or dismounting the equipment.
- Keep handholds and footholds clear of mud, snow, grease, and other materials that can increase the risk of slips, trips, and falls.



Project: _____ Address: _____

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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WORKING TO MAKE A DIFFERENCE
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Hypothermia

Loss of body heat is one of the major hazards that road building and maintenance workers face when working in the cold. If your body becomes so cold that it can no longer produce more heat than it loses, you are becoming a victim of hypothermia. With hypothermia, your vital organs and body systems begin to lose their ability to function.

Hypothermia often happens so slowly that you don't realize you're in danger. That's why it's important to be able to recognize the early signs. If untreated, hypothermia can lead to death.

Danger signs of hypothermia

It is important to treat hypothermia in its early stages. If no action is taken, the condition may worsen and become moderate or severe hypothermia. Always stay on the lookout for early signs of hypothermia in both your co-workers and yourself.

Review the following three stages to help you recognize the danger signs.

Mild hypothermia

- Bouts of shivering
- Grogginess, poor judgment, muddled thinking, and abnormal behaviour
- Normal breathing and pulse
- The onset of hypothermia may be *delayed*, so watch for early signs. If you suspect hypothermia, monitor your condition or that of your co-workers, even *after* you have left work.

Moderate hypothermia

- Violent shivering, or shivering has stopped altogether
- Inability to think and pay attention (for example, victim cannot understand what is being said)
- Slow, shallow breathing, slurred speech, or poor body co-ordination (for example, a stumbling gait)
- Slow, weak pulse

Severe hypothermia

- Shivering stopped
- Unconsciousness
- Little or no breathing
- Weak, irregular, or non-existent pulse
- Dilated (wide open) pupils, so that the victim may appear dead but is still alive



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Working safely with mobile equipment

Excavators, dump trucks, graders, rollers, and other mobile equipment play key roles in the road building industry. However, mobile equipment can pose a risk to nearby workers, especially when the operator cannot see them. By following the safe work practices listed below, you can help reduce the risk of injury when working with mobile equipment.

Safe work practices

Operators

- Ensure that workers are clear of the equipment before operating it.
- When operating mobile equipment, carry the load no higher than necessary to avoid limiting your vision.
- Avoid using cell phones while operating mobile equipment.

Nearby workers

- Before starting work, ensure that you are aware of all mobile equipment operating in and around the site.
- Wear high visibility apparel when working with or near mobile equipment.
- Do not take shortcuts across areas where mobile equipment is working.
- Keep in eye contact with the operator when working near moving machinery or equipment.
- If you use a cell phone, be aware that it can distract your attention from hearing or seeing mobile equipment as it moves around the site.



Lastly, remember that working safely in and around mobile equipment is a **shared** responsibility between both the operator and workers on the ground. Never assume you have the right of way.

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

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Manager's remarks: _____

Manager: _____ Supervisor: _____

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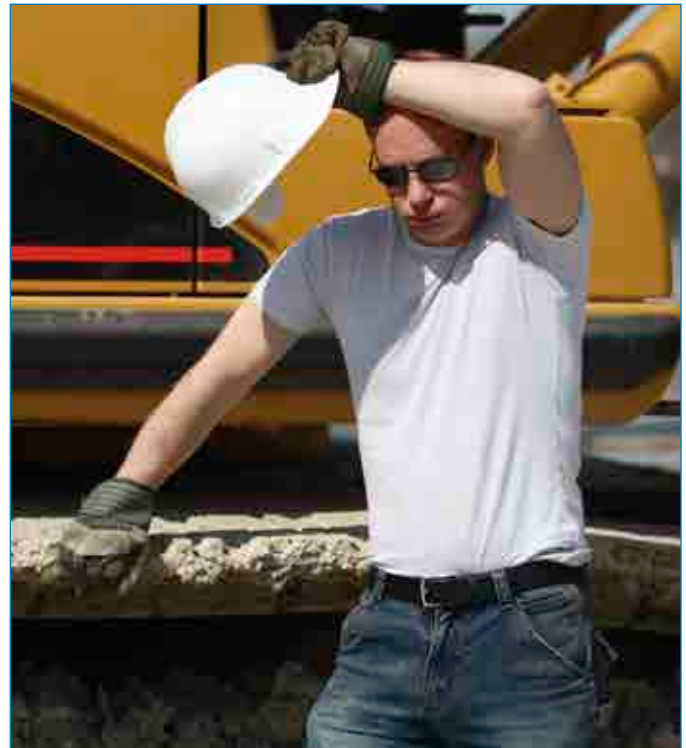
Heat exhaustion

Workers in road building and maintenance may be at risk of heat stress because much of their work occurs in the summer. Working in the heat and doing heavy physical work can affect the body's cooling system. If your body is unable to cool itself, you can experience heat stress. If heat stress is not treated in the early stages, more serious conditions, such as heat exhaustion, can develop. In heat exhaustion, your body loses too much water and salt as sweat.

Signs and symptoms

- Shallow breathing
- Increased breathing rate
- Weak, rapid pulse
- Cool, pale, clammy skin
- Sweating
- Weakness, fatigue, dizziness
- Headache and nausea
- Fainting
- Muscle cramps

The signs and symptoms are the same as those seen in mild shock. Sweating is an important sign, because it is often the only way to tell apart heat exhaustion from a life-threatening condition called heat stroke. If untreated, heat exhaustion may progress to heat stroke. Workers suffering from heat exhaustion should be transported to medical aid.



Treatment

- Move the worker to a cooler environment. If possible, lay the worker down, and remove or loosen tight-fitting clothing.
- Cool the worker by sponging with cool water and fanning. Take care not to cool the worker too much. If the worker begins to shiver, stop cooling.
- In most cases, the patient's symptoms will improve dramatically within 30 minutes. These patients should still be transported to medical aid.

Prevention

- Acclimatize your body (gradually expose yourself to heat and work).
- Drink plenty of water (one glass every 20 minutes).
- Wear clean, light-coloured, loose-fitting clothing made of breathable fabric.
- Take rest breaks in a cool or well-ventilated area. Take more breaks during the hottest part of the day or when doing hard physical work. Allow your body to cool down before beginning again.

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Heat stroke

Workers in road building and maintenance may be at risk of heat stress because much of their work occurs in the summer. If left untreated, heat stress can lead to disorders such as heat stroke. Heat stroke is a life-threatening condition in which the body's core temperature rises above 41°C. At core body temperatures over 41°C, sweating stops and the body is unable to get rid of heat, causing body temperature to continue to rise. The person's mental functions may become disturbed. Without immediate first aid, heat stroke can result in loss of consciousness, permanent brain damage, and death.

Signs and symptoms

- Hot, dry, flushed skin
- Seizures
- Absence of sweating
- Increased breathing rate
- Agitation, confusion
- Irregular pulse
- Decreased level of consciousness
- Shock
- Headache
- Cardiac arrest
- Nausea and vomiting

The presence of hot, dry, flushed skin without any evidence of sweating can help you tell the difference between heat stroke and other heat-related illnesses. Heat stroke can occur quickly and without warning, or it may be preceded by heat exhaustion. People should not work alone or unsupervised in conditions that may cause heat stress illnesses.

Treatment

- Move the worker to the coolest place available.
- Maintain airway, breathing, and circulation as required, and monitor patient until help arrives.
- Remove all outer clothing, and apply cold water to the worker by either dousing or applying wet, cool sheets. Spraying or sponging the entire body with cold water is also effective. Fanning will also help.
- Notify the first aid attendant, call 911, and/or arrange for immediate transportation to medical aid. Continue to cool the worker during transport.



Prevention

- Acclimatize your body (gradually expose yourself to heat and work).
- Drink plenty of water (one glass every 20 minutes).
- Wear clean, light-coloured, loose-fitting clothing made of breathable fabric.
- Take rest breaks in a cool or well-ventilated area. Take more breaks during the hottest part of the day or when doing hard physical work. Allow your body to cool down before beginning again.
- Schedule work to minimize heat exposure. Do the hardest physical work during the coolest part of the day.

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DRYWALL WORK

Overhead reaching can increase risk of MSI

Awkward postures such as overhead reaching are common risk factors for musculoskeletal injury (MSI). Overhead reaching for an extended time increases the risk of injury to the neck, back, and shoulders. These injuries are commonly caused by overextension of the muscle groups. Attempting to exert force through stretched muscles can result in strains and sprains.



Examples of MSI risk

- Installing drywall to ceiling, including screwing, taping, mudding, and sanding
- Working with drywall sheets in an overhead position

MSI control options



Wear stilts.



Work from scaffolding.



Use handle extensions with auto-feed screw guns, sanding blocks, or taping tools.

- Use a pneumatic or manual panel lifter for overhead installation of drywall.
- Lift only one sheet at a time.
- Ask another worker for help with lifting long sheets of drywall overhead.
- Use mechanical devices such as pneumatic drywall finishing machines to apply finishing compound.

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FLOORING

Contact stress can increase risk of MSI

Contact stress is a common risk factor for musculoskeletal injury (MSI).

Contact stress happens when continuous force or rubbing is concentrated on a sensitive body area. For example, when a worker kneels to install flooring, the tissue over the knees can be pinched or compressed, resulting in discomfort and pain.

The pressure created by contact stress can bruise muscles and soft tissue. It can also restrict blood flow and damage nerves.



Examples of MSI risk

- Prolonged kneeling on a hard floor while installing flooring
- Using your knee as a hammer

MSI control options



Use comfortable, high quality knee pads to cushion and protect the knees.



Use a kneeling pad to cushion and protect the knees.



Use knee pads with rollers to move around and reduce friction.

- Use a mortar spreading machine.
- Set up the saw on a workbench to avoid kneeling.
- Alternate kneeling work with a standing task to take a break from kneeling.
- Don't use your foot or knee as a hammer.

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MASONRY WORK

Bending over at the waist can increase risk of MSI

Awkward postures such as bending over at the waist are common risk factors for musculoskeletal injury (MSI).

Working in a bent-over position for an extended time increases the risk of injury. Bending forward can lead to injuries to the neck and back. These injuries are commonly caused by overextension of the muscle groups. Attempting to exert force through stretched muscles can result in strains and sprains.



Examples of MSI risk

- Cutting masonry block on the ground
- Picking up materials (blocks, bricks, or mortar bags) from ground level
- Laying bricks or blocks at ground level or below the knees

MSI control options



Raise saw to waist height using a table, saw horses, or other stable materials.



Store materials on scissor lifts or stack pallets to raise materials to between knee and chest height.



Use scaffolding with adjustable height. Adjust the height to keep materials between knee and chest height.



Use a hand to support your upper body weight when you need to bend forward.

- Stack blocks so that you can pick them up by the flange.
- Use lighter bags of mortar (maximum 23 kg/51 lb) when you can.
- Use a mechanical mortar mixer and try using a mortarboard stand to reduce forward bending.
- When lifting blocks or bricks, keep them close to your body.

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