

Safe Work Practices in Residential Construction



About WorkSafeBC

At WorkSafeBC, we're dedicated to promoting safe and healthy workplaces across B.C. We partner with workers and employers to save lives and prevent injury, disease, and disability. When work-related injuries or diseases occur, we provide compensation and support injured workers in their recovery, rehabilitation, and safe return to work. We also provide no-fault insurance and work diligently to sustain our workers' compensation system for today and future generations. We're honoured to serve the workers and employers in our province.

Prevention Information Line

We provide information and assistance with health and safety issues in the workplace.

Call the information line 24 hours a day, 7 days a week to report unsafe working conditions, a serious incident, or a major chemical release. Your call can be made anonymously. We can provide assistance in almost any language.

If you have questions about workplace health and safety or the Occupational Health and Safety Regulation, call during our office hours (8:05 a.m. to 4:30 p.m.) to speak to a WorkSafeBC officer.

If you're in the Lower Mainland, call 604.276.3100. Elsewhere in Canada, call toll-free at 1.888.621.7233 (621.SAFE).

Safe Work Practices in Residential Construction

Health and safety resources

All employers — no matter how big or small — are responsible for the health and safety of their workers. To help support your health and safety needs, a wide range of information and resources is available on [worksafebc.com](https://www.worksafebc.com).

Many of our resources are available to order in hard copy from the WorkSafeBC Store at [worksafebcstore.com](https://www.worksafebcstore.com). If you have any questions about placing an order online, please contact a customer service representative at 604.232.9704, or toll-free at 1.866.319.9704.

Copyright

This resource is protected by Canadian and international intellectual property laws and treaties, including copyright and trademark laws, and is owned by the Workers' Compensation Board ("WorkSafeBC"). We encourage you to use this resource for non-commercial, personal, or educational purposes to help promote occupational health and safety, provided that you do not modify any of the content and do not remove any copyright or other notices from it. In addition, if you are a trainer and wish to use this and any other WorkSafeBC resources as part of your training, you cannot, either directly or indirectly through a course or training fee, charge participants for WorkSafeBC resources. To request copyright permission, please send an email to copyright@worksafebc.com. You can find our full copyright terms at [worksafebc.com](https://www.worksafebc.com).

Use of WorkSafeBC's intellectual property does not constitute an endorsement, express or implied, of any person, service provider, service, or product.

Use of WorkSafeBC publications and materials is at your own risk. WorkSafeBC does not warrant the quality, accuracy, or completeness of any information contained in the publications and materials, which are provided "as is" without warranty or condition of any kind.

ISBN 1712-6681

© 1998, 2005, 2020, Workers' Compensation Board (WorkSafeBC). All rights reserved.

Contents

- Introduction 1
- Frequently asked questions (FAQs) 2
- The three phases of residential construction 3

Part 1: Planning

- Planning and scheduling 6
- Health and safety responsibilities 7
- Common hazards and high-risk activities 11
- Hazard identification and risk control 12
- Electrical equipment and conductors 15
- Traffic control 21
- Hazardous materials, substances, and products. 23
- Confined spaces. 33
- Ergonomics and the prevention of musculoskeletal injury (MSI) 34
- Personal protective equipment (PPE) and clothing. 36
- First aid 44
- Delivery, storage, and access to work areas 45

Part 2: Site preparation

- Demolition and renovation. 48
- Trenches and excavations 53

Part 3: Construction

- General construction requirements 60
- Concrete formwork, falsework, and placing 61
- Framing 66
- Roof work 73

Part 4: Working at elevation

- Fall protection. 78
- Ladders 82
- Elevating work platforms 85
- Scaffolds and other work platforms 87

Part 5: Tool and equipment safety

Hand tools	102
Power tools	104
Pneumatic nailing and stapling tools	110
Chainsaws	112

Appendixes

Contact information	116
Other WorkSafeBC resources	118

Index

Introduction

This manual is meant to help anyone who needs to better understand the health and safety requirements of the residential construction industry. Please note that this manual doesn't cover every aspect of residential construction. Instead, it focuses on where you're most likely to be able to reduce the risk of injury.

This manual doesn't replace the Occupational Health and Safety Regulation

This manual is meant to give you a basic understanding of your health and safety requirements, but you should also refer to the Regulation to ensure you're meeting your legal responsibilities for workplace health and safety. You can find a searchable version of the Regulation and its accompanying guidelines and policies at worksafebc.com/law-policy.

Must versus should

In this manual, the word *must* indicates a requirement that's specified in the Regulation. The word *should* indicates a recommended action that will improve workplace safety even though it's not required by the Regulation.

Other resources

Throughout this guide you'll find references that you can consult for more information.

Reference	What does it refer to?	Where do I look for more information?
Other WorkSafeBC resources	Health and safety publication (print or digital), video, or slide show	These resources are listed on pages 118–126. To find the resources online, go to worksafebc.com/forms-resources and search for the resource name.
Regulation (or Act)	Occupational Health and Safety Regulation or associated guideline (or <i>Workers Compensation Act</i>)	Go to worksafebc.com/law-policy .
Web	Online information or tool	Go to the website or webpage listed. You may have to search for the name of the page or resource.

For contact information for WorkSafeBC, the BC Construction Safety Alliance (BCCSA), and the Employers' Advisers Office, see pages 116–117.

Frequently asked questions (FAQs)

Question	Refer to
How do I submit a notice of project?	<ul style="list-style-type: none"> • Notice of project (NOP), page 9
Who is responsible for providing first aid?	<ul style="list-style-type: none"> • First aid, page 44
Do I need a qualified safety coordinator?	<ul style="list-style-type: none"> • Prime contractors, pages 8–9
Is this the right tool for the job when working at elevation?	<ul style="list-style-type: none"> • Part 4: Working at elevation, pages 77–99
What are the fall protection requirements for working at elevation?	<ul style="list-style-type: none"> • Fall protection, pages 78–81
What are the requirements for work platforms?	<ul style="list-style-type: none"> • Elevating work platforms, pages 85–86 • Scaffolds and other work platforms, pages 87–99
What are the requirements for power tools?	<ul style="list-style-type: none"> • Power tools, pages 104–109
What are the requirements for working near energized power lines?	<ul style="list-style-type: none"> • Electrical equipment and conductors, pages 15–20
What are the requirements for demolition?	<ul style="list-style-type: none"> • Demolition and renovation, pages 48–52
Do I need traffic control?	<ul style="list-style-type: none"> • Traffic control, pages 21–22
What are the requirements for excavations?	<ul style="list-style-type: none"> • Trenches and excavations, pages 53–57
What are the requirements for hazardous materials?	<ul style="list-style-type: none"> • Hazardous materials, substances, and products, pages 23–32 • Demolition and renovation, pages 48–52
What personal protective equipment is required?	<ul style="list-style-type: none"> • Personal protective equipment (PPE) and clothing, pages 36–43

The three phases of residential construction

This manual includes information on many of the requirements for the three main phases of residential construction: planning, site preparation, and construction.

Planning consists of activities that happen before construction begins. Examples of planning activities include design, tendering, and scheduling.

Site preparation includes demolition- and excavation-related work activities.

Construction includes all the work activities related to building. The construction phase includes pre-lockup and post-lockup:

- *Pre-lockup* includes work activities that happen after demolition and excavation but up to and including the installation of windows and exterior doors.
- *Post-lockup* refers to work activities that happen after windows and exterior doors have been installed and you're able to lock up the building.

Part 1: Planning

Planning and scheduling

Failure to plan and supervise for safety have been identified as key factors that can lead to unsafe acts or conditions in the construction industry. Prevent workplace injuries, illnesses, and diseases by planning and scheduling all work activities before demolition, excavation, and construction activities begin. This will also help your company avoid financial costs, such as claims costs, increased insurance premiums, fines, and production delays.

Note: This part of the manual doesn't include every planning consideration for every contractor working in residential construction. It provides general information on the health and safety requirements for the various phases of residential construction.

Act

- General duties of employers
- Coordination at multiple-employer workplaces

Regulation

- Section 3.5, General requirement (for workplace inspections)
- Sections 3.22 to 3.25, Young or new workers
- Section 4.1, Safe workplace

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Health and safety responsibilities

Workplace health and safety is everyone's responsibility. This section provides homeowners, prime contractors, employers, contractors, supervisors, and workers with an overview of their responsibilities under the *Workers Compensation Act*.

Act

- General duties of employers, workers and others

Regulation

- Section 20.3, Coordination of multiple employer workplaces
- Sections 3.12 to 3.13, Refusal of unsafe work
- Sections 4.19 to 4.20, Impairment

Web

Webpages at worksafebc.com:

- Get a clearance letter
- Getting started (the basics)
- Refusing unsafe work
- Roles, rights & responsibilities
- Supervising for safety (online course)
- Training & orienting workers
- Young & new workers

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Homeowners as prime contractors

As the prime contractor during the construction of your own home, the health and safety requirements of the Act apply to you. You may also be required to [register with WorkSafeBC](#).

Owners (including homeowners)

Homeowners have the same responsibilities and duties as an owner of a workplace, as specified in the Act. Before starting any renovation or construction, it's recommended that owners get a clearance letter for each of their contractors to make sure they're registered and in good standing with WorkSafeBC.

If workers of two or more employers are working on a construction project at the same time, the owner (or whoever the owner engages as the prime contractor) is responsible for ensuring that health and safety activities of the employer, workers, and others are coordinated for the site.

Who is a prime contractor?

According to the Act, a *prime contractor* in a multiple-employer workplace is either of the following:

- The directing contractor, employer, or other person who has a written agreement with the owner of that workplace to be the prime contractor
- If there is no agreement, the owner of the workplace

If the owner is also the prime contractor, the owner may be required to register with WorkSafeBC. For information on registration (i.e., applying for insurance coverage), go to worksafebc.com and search for “registration.” Owners acting as prime contractors are also responsible for submitting notices of project (NOPs) to WorkSafeBC (see page 9).

If a prime contractor is appointed by an owner, there must be a written agreement between the two to establish the prime contractor as the employer responsible for workplace health and safety. See the next section, “Prime contractors.” Without a written agreement, the owner is responsible for performing the duties of the prime contractor.

Prime contractors

The prime contractor must ensure that work activities are coordinated among employers, workers, and others to ensure the health and safety of everyone in the workplace. The prime contractor must also do everything reasonably practicable to establish and maintain a system to ensure compliance with the Act and Regulation. (For a definition of *practicable*, see page 13.)

This may include appointing a qualified coordinator for the workplace. (See Part 20 of the Regulation.) Qualified coordinators have two basic duties:

- Inform contractors, subcontractors, and workers of known workplace hazards.
- Ensure all hazards are addressed during the work.

As a best practice, a qualified coordinator should be present on site during most, if not all, hours of work to ensure work activities are coordinated.

The prime contractor, as an employer, should be able to show that qualified coordinators have been instructed in their duties — at the very least, the duties specified in the Regulation.

It’s important for the prime contractor to set the expectations for workplace health and safety. The prime contractor must make it clear to the other contractors that all work must be done according to the requirements in the Act and Regulation.

What does *qualified* mean?

In the Regulation, *qualified* means “being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof.”

Due diligence

Due diligence requires taking all reasonable steps to protect workers from harm. “All reasonable steps” is based on the level of judgment and care that a person would reasonably be expected to do under the circumstances. An organization that takes all reasonable steps to protect workers from harm and actively manages health and safety is being duly diligent.

Examples of due diligence include the following:

- Identify all workplace hazards.
- Implement all necessary preventative measures.
- Communicate the hazards, preventative measures, and related information to affected workers.

The basic elements of due diligence are education, training, and supervision. Examples of supervision include the following:

- Identify and correct hazards.
- Ensure and verify worker training and education.
- Direct and instruct workers.
- Observe workers directly. Correct unsafe or unwanted behaviour.
- Respond to worker questions and concerns.

Regulation

- Sections 20.2 and 22.6, Notice of project
- Section 20.2.1, Notice of project — hazardous substances

Notice of project (NOP)

Before starting work, you may be required to submit a notice of project (NOP) to WorkSafeBC. It's free to submit an NOP. It only takes about 15 minutes and you can do it online. Go to [worksafebc.com](https://www.worksafebc.com) and search for “submit notice of project.”

In most cases, it's the owner or prime contractor who's required to submit the NOP. For a hazardous materials abatement, it's often the abatement contractor who submits a notice of project hazardous materials (NOP-H), when it's required.

For construction projects that require an NOP, you must ensure that WorkSafeBC receives it at least 24 hours before starting work. For work activities such as demolition, renovation, or salvage work that involve hazardous materials or substances, such as asbestos or lead, you must ensure that WorkSafeBC receives an NOP at least 48 hours before you start work. The NOP must be posted on site. For more information, see section 20.2 of the Regulation.

Employers (including contractors and subcontractors)

Prime contractors, contractors, and subcontractors may be recognized as employers. In cases where a contractor isn't registered, WorkSafeBC may consider the homeowner an employer.

If you're considered an employer, you're responsible for creating and managing a healthy and safe workplace. You must ensure the health and safety of all workers who are working for you, as well as any other workers at a workplace where your work is being carried out. You must also provide workers with the information, instruction, training, and supervision necessary to ensure their health and safety and that of other workers at the workplace.

For more information on your responsibilities as an employer, see "General Duties of Employers, Workers and Others" in the Act.

Supervisors

Effective supervision is a key to health and safety on construction sites. If you're a supervisor, you have rights and responsibilities for a safe workplace. For more information, see "General Duties of Employers, Workers and Others" in the Act.

Workers

If you're a worker, you have rights and responsibilities for a safe workplace. Workers are also responsible for their own safety and that of others at the workplace. For more information, see "General Duties of Employers, Workers and Others" in the Act.

Workers have three key rights

1. The right to know about the hazards in the workplace
2. The right to participate in health and safety activities in the workplace
3. The right to refuse unsafe work without being disciplined as a result

In fact, as a worker you must not carry out (or cause to be carried out) any task that would be a hazard to the health and safety of any person.

Common hazards and high-risk activities

High-risk activity	Refer to
Working at elevation	<ul style="list-style-type: none"> Part 4: Working at elevation, pages 77–99 Roof work, pages 73–75
Entering an excavation that’s more than 1.2 m (4 ft.) deep	<ul style="list-style-type: none"> Trenches and excavations, pages 53–57
Entering a confined space	<ul style="list-style-type: none"> Confined spaces, page 33
Disturbing material that contains, or may contain, asbestos	<ul style="list-style-type: none"> Asbestos, pages 49–50 Hazardous materials, substances, and products, pages 23–32
Working near or within the limits of approach to energized equipment and conductors	<ul style="list-style-type: none"> Electrical equipment and conductors, pages 15–20
Using, handling, storing, or otherwise being exposed to hazardous materials or substances	<ul style="list-style-type: none"> Hazardous materials, substances, and products, pages 23–32 Demolition and renovation, pages 48–52
Handling explosives and blasting practices	<ul style="list-style-type: none"> Hazardous materials, substances, and products, pages 23–32 Part 21 of the Regulation
De-energization, lockout, or safeguarding	<ul style="list-style-type: none"> Part 10 of the Regulation
Using mobile equipment	<ul style="list-style-type: none"> Working around energized high-voltage equipment and conductors, pages 15–18 Part 16 of the Regulation
Working where there is a risk of being struck by or crushed by material, objects, tools, or mobile equipment	<ul style="list-style-type: none"> Delivery, storage, and access to work areas, pages 45–46 Concrete formwork, falsework, and placing, pages 61–65 Framing, pages 66–72 Part 5: Tool and equipment safety, pages 101–114 Parts 16, 12, and 20 of the Regulation

Hazard identification and risk control

Identifying hazards and controlling the risks associated with them help keep workers safe from injury. There are three steps to managing health and safety risks:

1. Identify the hazards.
2. Assess the risks.
3. Control the risks.

Regulation

- Section 3.16(2), Basic requirements
- Sections 4.13, 4.28, and 4.48, Risk assessment
- Section 6.6, Assessment and classification
- Sections 6.59.1 and 6.112, Risk assessment

Web

Webpages at [worksafebc.com](https://www.worksafebc.com):

- Controlling risks
- Managing risk

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

1. Identifying hazards

Ideally, you should identify and eliminate hazards during the planning phase of a project. You can also identify hazards by doing workplace inspections. Consider the following when identifying hazards:

- Assess the equipment, materials, and tools workers are using. Consider how workers will be using them.
- Analyze the design, layout, and conditions of the work areas.
- Observe how workers are doing their tasks.
- Encourage workers to take part in hazard identification.

2. Assessing risks

Once you've identified hazards, assess the risks associated with them. Try to determine how likely an incident is and how serious it would be.

What does *practicable* mean?

According to the Regulation, *practicable* means “that which is reasonably capable of being done.”

3. Controlling risks

After you’ve identified hazards and assessed the risks, look for ways to control each hazard without delay. If possible, eliminate the hazard entirely.

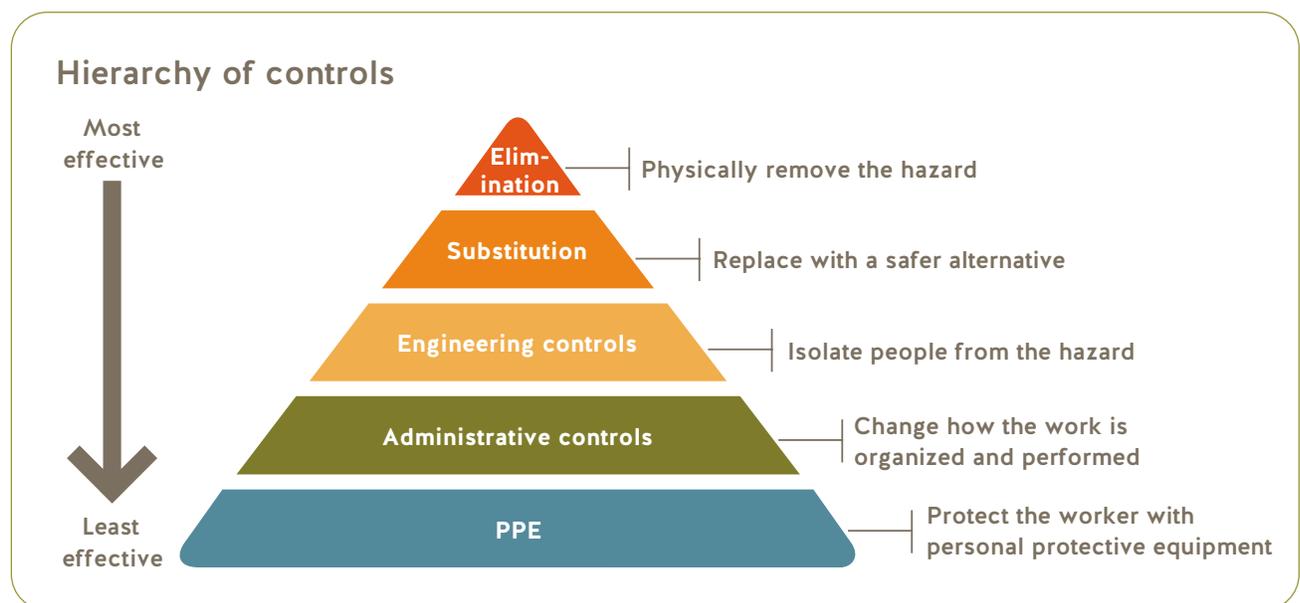
If that’s not practicable, control the risks as much as possible. For example, it may not be practicable to eliminate noise when using a cut-off saw. Instead, the employer must implement a hearing conservation program. This includes installing signs to warn workers of the noise hazard, ensuring workers wear hearing protection when working with or near cut-off saws, and ensuring hearing tests are conducted. For more information on hearing conservation programs, see Part 7 of the Regulation.

Hierarchy of controls

Some types of controls are more effective than others, although it may not always be practicable to use the more effective solution. Whenever possible, though, you must implement controls in the following order:

1. Eliminate the hazard.
2. Substitute a safer alternative.
3. Use engineering controls.
4. Use administrative controls.
5. Use personal protective equipment (PPE).

Controls from most effective to least effective



Note that while the controls are listed in order of effectiveness, you must consider all four remaining types of controls if you can't eliminate the hazard. They often work best in combination.

For example, you may need to use several of the following when cutting products containing crystalline silica to control the hazard effectively:

- Engineering controls (e.g., vacuum systems and wetting controls)
- Administration controls (e.g., exposure control plans, work procedures, signage, enclosures, and work area arrangements)
- PPE (e.g., respiratory protection, protective clothing or suits, and gloves).

Electrical equipment and conductors

A common incident in residential construction is contact with overhead or underground power lines. Injuries and fatalities can occur from incidents involving low voltages or high voltages. The resulting injuries can range from shock to severe burns.

Low voltage means “a potential difference (voltage) from 31 to 750 volts inclusive, between conductors or between a conductor and ground.”

High voltage means “a potential difference (voltage) of more than 750 volts between conductors or between a conductor and ground.”

Identifying overhead and underground power lines during the planning phase helps keep workers safe and eliminate costly delays resulting from incidents.

Regulation

- Part 19, Electrical safety
- Tables 19-1A and 19-1B (in Part 19)

Web

Webpages at worksafebc.com:

- Electricity
- Excavation

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Working around energized high-voltage equipment and conductors

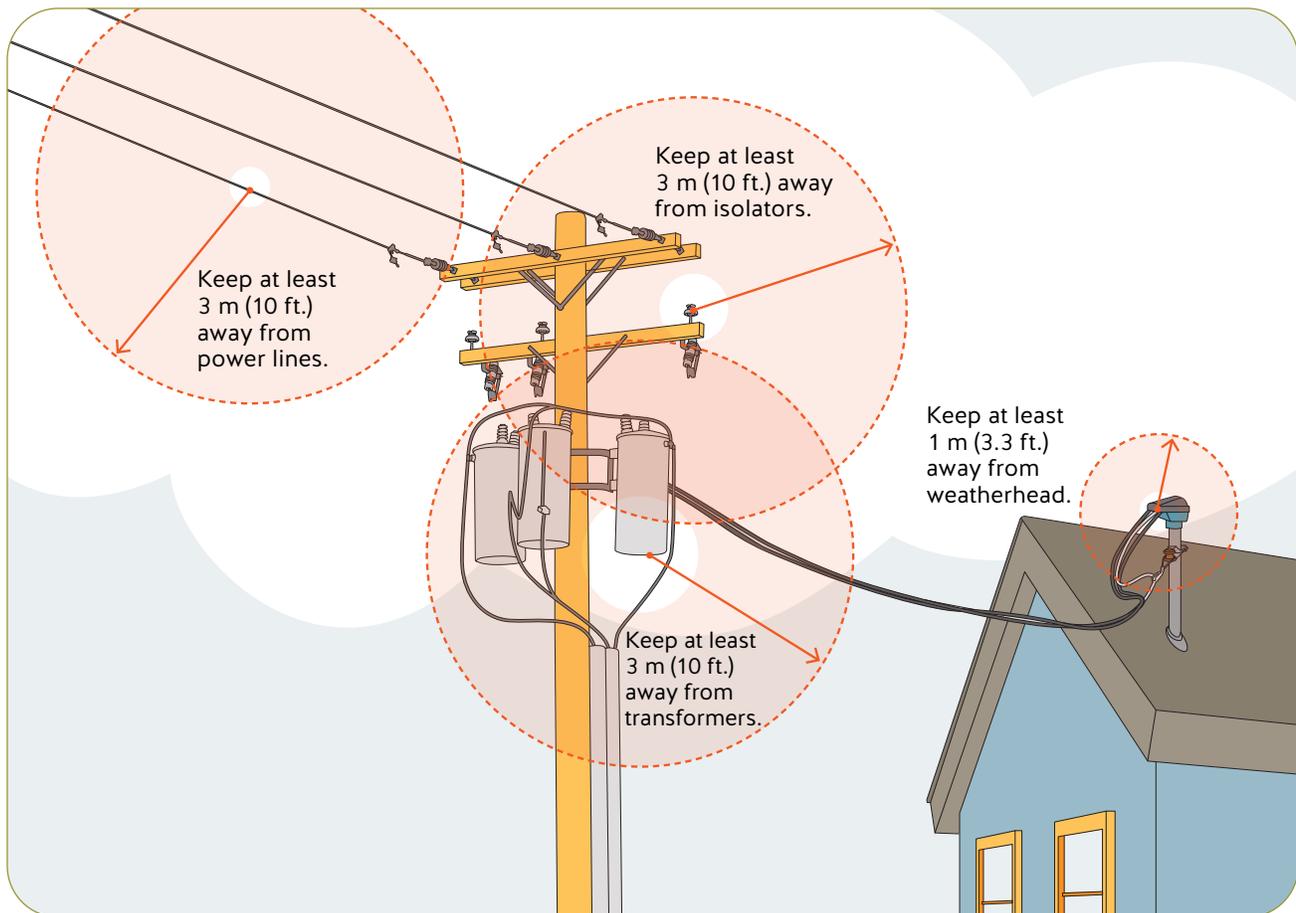
Incidents involving high voltages (over 750 V) can result in severe injuries and death. Potential hazards include contact with a body part, mobile equipment, or a tool or piece of building material being held by a worker. During land clearing, there’s a risk of trees being felled or pushed into overhead power lines.

For any work activity near high-voltage electrical equipment and conductors, owners or employers must do the following:

- Determine the location and voltage of the high-voltage electrical equipment and conductors. Contact the utility owner controlling the system — for example, BC Hydro.

- Ensure the limits of approach (minimum distances) in Tables 19-1A and 19-1B on page 17 are maintained at all times.
- Determine what activities may occur near the overhead power lines. Examples include the following:
 - Using mobile equipment, such as mobile cranes or forklifts, to deliver materials to the workplace.
 - Doing building-envelope work activities, such as siding or balcony work. The materials, tools, and equipment being used may come close to overhead power lines.
- Before workers start working near high-voltage electrical equipment or conductors, they must be informed of the location and voltage of the equipment and conductors, as well as the work arrangements and procedures to be followed.

Minimum distances (limits of approach)



Sometimes limits of approach will overlap. You must ensure that workers, tools, equipment, and machinery remain outside any limits of approach. For more information, see Part 19 of the Regulation.

Employers, prime contractors, homeowners, and workers working on residential buildings must maintain the minimum distances specified in the tables below.

Minimum approach distance for working close to exposed electrical equipment or conductors (Table 19-1A from Part 19 of the Regulation)

Voltage (phase to phase)	Minimum distance	
	Metres	Feet
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 500 kV	6	20

Minimum clearance distance for passing under exposed electrical equipment or conductors (Table 19-1B from Part 19 of the Regulation)

Cover guarding and visual identification

Cover guarding is not considered an insulator. It doesn't prevent electrical arcing between the electrical equipment and conductors and any mobile equipment or people. Cover guarding doesn't change the limits of approach.

When using visual identification for power lines, you must designate a qualified safety watcher or use range-limiting or field-detection devices acceptable to WorkSafeBC.

Voltage (phase to phase)	Minimum distance	
	Metres	Feet
Over 750 V to 75 kV	2	6.5
Over 75 kV to 250 kV	3	10
Over 250 kV to 550 kV	4	13

Risk controls must always be implemented according to the hierarchy of controls (see pages 13–14). You must consider the controls in the following order:

1. Displace or reroute the electrical equipment and conductors from the work area while the work activities are being completed, if practicable.
2. If this isn't practicable, isolate and ground (de-energize) the electrical equipment, if practicable.
3. If isolation and grounding aren't practicable, visually identify and guard the electrical equipment and conductors. Cover guards or physical barrier guards must be installed.

What if these limits can't be maintained or movement by workers or equipment could result in inadvertently entering these minimum distances? You must contact the utility owner to get an assurance in writing ([form 30M33](#)) and have it signed by a representative of the utility owner.

This form will contain useful information, such as the voltage of the power lines and the work arrangements discussed with the utility owner. The completed form must be readily available at the workplace. You can get this form from the local utility owner or worksafebcstore.com.

As mentioned previously, workers who will be near high-voltage lines must be informed of the location and voltage of the lines, as well as the work arrangements and procedures to be followed.

Contact with energized power lines

If a machine makes contact with an energized power line, equipment operators and workers on the site need to act with extreme caution. Anything in contact with the machine will be energized for some distance around the machine, especially the ground around it.

If it's a high-voltage power line, stay back at least 10 m (33 ft.). Contact the utility owner and emergency services (call 911), depending on the circumstances.

For more information on what to do if there is contact with a high-voltage line, see the WorkSafeBC book *Working Safely Around Electricity*.

Underground electrical equipment and conductors

When you dig, you run the risk of hitting buried power lines, conduits, pipelines, or other utilities. Employers, prime contractors, homeowners, and workers working on residential buildings must accurately determine and identify the locations of underground power lines before digging holes, trenches, or other excavations. Excavating, digging, and driving ground rods or other long metal objects into the ground can be dangerous around buried power lines. Fence-post holes may be deep enough to reach lines.

Before starting work, employers should contact their local utility owners and BC 1 Call to determine the locations of underground utilities at the workplace. For more information, see "Underground utilities," page 53.

Working around low-voltage equipment and conductors

Many workers are injured by contact with energized low-voltage power lines (750 V or less). Generally, workers suffer burns and physical injuries from electric shocks, or even fatal injuries. Other injuries can also result from contact with energized low-voltage power lines. For example, if a worker comes into contact with a power line while on a roof or ladder, the electric current could also cause the worker to fall.

Employers must develop safe work procedures for working near low-voltage power lines and inform workers of potential hazards and appropriate procedures. Before working close to energized low-voltage equipment, energized parts must be effectively guarded.

If uninsulated, energized parts are not guarded with approved cabinets or enclosures, then suitable barriers or covers must be provided if a worker unfamiliar with the hazards is working within 1 m (3.3 ft) of the energized parts.

The employer should contact the utility owner to determine what work arrangements and procedures need to be followed while working near low-voltage power lines. Examples of these power lines are telecommunication lines, service-drop lines to buildings, and trolley lines.

Portable electrical equipment

When planning for your workplace, plan for the safe use of portable electrical equipment, such as temporary power-supply boxes and temporary lighting. Keep in mind that using approved equipment won't eliminate every hazard if the equipment is damaged or you're using it in the rain or wet areas. Most electrical-equipment manufacturers specify that their equipment shouldn't be used in wet or damp conditions.

When working outside or in wet or damp conditions, you must use Class A-type ground-fault circuit interrupters (GFCIs) for portable electrical equipment. The GFCIs must be installed either at the receptacle or at the panel.

Your workplace may use GFCIs in combination with an Assured Grounding Program. The program can be a good inspection tool when used in conjunction with GFCIs.

The program ensures that the hot, neutral, and ground wires of electrical cords are connected to the proper terminals and are electrically continuous. To determine this, perform a continuity test on extension cords and power tools when they're put into service, every three months afterward, and following repairs. Assured Grounding Programs are described in the WorkSafeBC book [*Working Safely Around Electricity*](#). See also the guidelines in Part 19 for more information.

The temporary supply box used during construction can be an electrical hazard. It consists of several outlets used by contractors. The temporary distribution panel should be under strict control and have a lockable cover to prevent tampering by others.

Make sure temporary-lighting cords aren't trapped in doorways, where the door could pinch the cords and damage the protective shield. Replace missing or burnt-out bulbs to ensure there are no exposed connections and that there's enough lighting for safe working conditions.

Traffic control

When there's a work process or delivery of materials on or next to a roadway, the employer, prime contractor, or homeowner working on the residential building must assess the risks and then plan for these work activities and provide effective traffic control.

Temporary traffic control devices, traffic control arrangements, and traffic control persons help protect workers and move road users safely through work zones. These arrangements, procedures, and equipment must meet the requirements of Part 18 of the Regulation and the latest edition of the *Traffic Management Manual for Work on Roadways*.

Regulation

- Part 18, Traffic control

Web

- Working in and around traffic ([worksafebc.com](https://www.worksafebc.com) webpage)
- *Traffic Management Manual for Work on Roadways* (manual by the B.C. Ministry of Transportation and Infrastructure)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Consider traffic controls in the following order.

1. Elimination

Eliminate traffic by using constructed detours, alternate routes, or other methods to isolate the work zone.

2. Engineering controls

Use prescribed temporary traffic control devices and layouts to control traffic through a work zone. This allows public traffic and construction to interact without the use of traffic control persons.

3. Administrative controls

Schedule work when there's low traffic volume to minimize the amount of public traffic.

4. Traffic control persons

You can only use a traffic control person if using signs and other traffic control devices and procedures won't effectively control traffic.

Hazardous materials, substances, and products

Exposure to hazardous materials, substances, and products can lead to short-term and long-term health problems. These can include occupational diseases or conditions — for example, cancer, lung damage, sensitivities, or skin irritations.

Some hazardous materials, substances, and products are classified as designated substances. These include carcinogens, sensitizers, and those with adverse effects on the reproductive system. For more information on designated substances, see Part 5 of the Regulation.

Identifying hazardous materials

Employers, prime contractors, and homeowners working on residential buildings must identify any hazardous materials that may be disturbed before starting demolition, renovation, or salvage work activities. Examples of hazardous materials are asbestos, silica, heavy metals such as lead, toxic materials, and flammable or explosive materials.

For more information on hazardous materials, see the following sections:

- “Asbestos,” pages 49–50
- “Crystalline silica,” pages 26–27
- “Lead,” page 28
- “Demolition and renovation,” pages 48–52

Planning for hazardous materials, substances, and products

Employers, prime contractors, and homeowners working on residential buildings must also plan for the use of hazardous materials, substances, and products in the workplace. Examples include concrete sealant, epoxy, and paint.

Regulation

- Section 4.2, Safe buildings and structures
- Sections 4.13 to 4.18, Emergency preparedness and response
- Part 5, Chemical agents and biological agents
- Guideline G5.54-7, Drywall sanding requirements (see the sample exposure control plan)
- Table of exposure limits for chemical and biological hazards (in Part 5 of the guidelines, just after G5.59)
- Part 6, Substance specific requirements
- Section 20.112, Hazardous materials

Web

- Hazards & exposures ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Workplace Hazardous Materials Information System (WHMIS)

WHMIS includes information on many of the hazardous materials, substances, and products that workers may encounter during construction activities. If hazardous products are used in the workplace, the employer must establish and maintain an effective WHMIS program and train workers accordingly, as specified in Part 5 of the Regulation.

The following table lists some construction activities that could expose workers to hazardous materials or substances.

Potential hazardous materials or substances in construction

Work activity	Hazardous materials or substances
Demolition and renovation	Asbestos, lead, mercury, mould, PCBs (polychlorinated biphenyls), animal droppings, hypodermic needles, and other hazardous chemicals (e.g., in fuel tanks or paint cans)
Drilling, chipping, cutting, and finishing concrete	Crystalline silica
Sanding drywall	Crystalline silica and nuisance dusts
Installing spray foam insulation or parkade coatings, and using two-part epoxy products	Isocyanates
Installing waterproofing membrane	Sensitizers
Installing roofing membrane	Volatile organic compounds
Discharging sewage	Hydrogen sulfide and biohazards
Operating heaters or internal combustion engines indoors	Carbon monoxide, diesel-fuel particulates, and other fugitive emissions

Responsibilities

Employers may be required to develop an exposure control plan to keep worker exposure as low as reasonably achievable (ALARA). Before workers start any task that may expose them to a hazardous material, substance, or product, written procedures must be developed and implemented to eliminate or minimize the risk of exposure. These procedures must include emergency and cleanup procedures in case there is a spill or release.

Employers must ensure workers are provided with information, instruction, and training if they're working with or may be exposed to hazardous products.

The hierarchy of controls must be followed to eliminate or reduce worker exposure. For more information, see "Hierarchy of controls," pages 13–14.

For more information on responsibilities, see Parts 5, 6, and 20 of the Regulation. Refer to safety data sheets (SDSs), where applicable.

Exposure control plans

Before workers start any task that may expose them to a hazardous material, substance, or product, an exposure control plan may be required. This includes training workers and supervisors in relevant sections of the plan. An effective exposure control plan must include the following:

- A statement of purpose and responsibilities
- Risk identification, assessment, and control
- Education and training
- Written work procedures, when required
- Hygiene facilities and decontamination procedures, when required
- Health monitoring, when required
- Documentation, when required

Asbestos

Asbestos was widely used in B.C. as a building material until the early 1990s. It can be found in many older buildings. If you suspect asbestos is present, don't touch or move the material. Asbestos exposure can cause serious long-term health issues and even death. Only qualified professionals are allowed to remove asbestos.

Asbestos should be considered prior to demolition. For more information, see "Asbestos," pages 49–50, and Part 6 of the Regulation.

Crystalline silica

Crystalline silica is the basic component of sand and rock. The best-known and most abundant type of silica is quartz. Common silica-containing materials include the following:

- Concrete, concrete blocks, fibre cement board, cement, and mortar
- Masonry, tiles, brick, and refractory brick
- Granite, sand, fill dirt, and topsoil

Web

- [BCCSA silica control tool](#) (to help develop an exposure control plan)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Silica exposure is a significant risk in the construction industry. Exposure can result in serious health outcomes. Occupational silica exposure has been linked to silicosis and lung cancer, as well as pulmonary tuberculosis, chronic obstructive pulmonary disease, and autoimmune diseases.

For more information, see Part 6 of the Regulation.

Potentially hazardous activities

Silica is so common that any workplace activity that creates dust can expose workers to airborne silica. If you do any of the following activities, you're at risk of breathing silica dust:

- Grinding, cutting, or coring concrete
- Drilling or chipping concrete
- Mixing cement or grout
- Sweeping and cleaning up dust

Isocyanates

Isocyanates are used to make paints and coatings that provide weather-resistant surfaces. Isocyanates are also used to make building materials such as spray foams (e.g., spray-on insulation), concrete sealants (e.g., parkade coatings), adhesives, elastomers, and binders (e.g., epoxy).

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Isocyanates are irritants to the eyes, skin, and respiratory system. They're a known sensitizer. Workers who become sensitized can no longer be exposed without experiencing a reaction, such as acute asthmatic symptoms. The reaction can often be severe.

Products containing isocyanates have several brand or trade names. Isocyanates also have many different chemical names. Refer to the product SDS to see if it contains isocyanates.

For more information, see Part 5 of the Regulation.

Lead

Lead can be found in paints, coatings, and solder used in the construction industry. Lead can enter the body as dust or fumes and result in poisoning. It's toxic to virtually every human organ. Lead is a designated substance that may cause cancer. It can also have other serious long-term effects.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

As Part 5 of the Regulation states, designated substances include carcinogens, sensitizers, and substances with adverse effects on the reproductive system.

Lead should be considered during demolition. For more information, see “Lead,” page 51, and Part 6 of the Regulation.

Carbon monoxide

Carbon monoxide is a toxic, odourless, invisible gas. It's a product of combustion. When inhaled, carbon monoxide blocks the body's ability to absorb oxygen. Workers may not know they're in danger until it's too late because they can't see or smell the gas. Carbon monoxide also burns well when mixed with air and in certain concentrations is explosive.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Carbon monoxide is commonly a concern when working indoors or in enclosed spaces with mobile equipment, generators, or other sources of combustion. Headache and nausea are the first symptoms of carbon monoxide exposure. Prolonged exposure to high concentrations can lead to unconsciousness and death.

Employers must assess, measure, and manage worker exposure to carbon monoxide. When assessing work areas, consider the following:

- Existing ventilation sources
- Types of equipment used
- How long equipment will be used

Equipment for measuring carbon monoxide should be calibrated to the manufacturer's specifications.

Whenever possible, prime contractors, employers, and workers must ensure exhaust from any internal combustion engine operated indoors is vented outdoors.

For more information, including exposure limits, see Part 5 of the Regulation.

Propane

Propane leaks can result in fires and explosions. Propane gas is heavier than air. If it leaks, it tends to creep along the ground and collect in low spots. This pooling effect can create a serious hazard, especially if it enters storm drains, confined spaces, or nearby excavations. You'll need special considerations when using propane in confined spaces because it can displace air in the space.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

For more information, refer to the SDS and the manufacturer's instructions. Also, see Part 5 of the Regulation.

Requirements

The following requirements apply when working with propane:

- When handling, using, or storing a flammable gas or liquid, eliminate or adequately control all sources of ignition. Sources of ignition include open flames, spark-producing mechanical equipment, welding and cutting processes, smoking, and static discharge.
- Protect tanks, cylinders, bottles, and other vessels containing a substance under pressure from sparks, flames, excessive heat, physical damage, electrical contact, and corrosion.

This also applies to any associated pressure or flow regulators, and piping or conveyance systems. All of these items must also be equipped with suitable pressure-relief mechanisms.

- Don't hoist compressed-gas cylinders with a sling or magnet. Don't drop them, subject them to impact, handle them by their regulators, or use them as rollers or work supports.
- Secure compressed-gas cylinders against falling or rolling during storage, transportation, and use.
- Identify empty compressed-gas cylinders, and store them separately from other compressed-gas cylinders.

Other considerations

Other considerations when working with propane include the following:

- Check propane cylinders for damage or corrosion before use.
- Check hoses for damage and leaks. Replace them, if necessary.
- Where practicable, secure propane cylinders in a level, upright position during storage, transportation, and use.
- Ensure that your propane and burner systems have a functional regulator.
- Open cylinder valves fully when in use and close them tightly when not in use. Don't use cylinder valves to adjust the torch flame. Use pressure regulators instead.
- Keep fire extinguishers on hand.
- Don't operate any equipment if you smell propane (a rotten egg smell).
- Don't hoist propane cylinders by their valves or collars.
- Protect hoses against traffic damage.

Propane fires

In the event of a propane fire, shut off the propane gas valve if it's safe to do so and evacuate the area. If you can't shut off the gas flow safely, allow the propane gas to burn. Evacuate the area and call the fire department immediately.

Propane space heaters

- Ensure adequate ventilation. Don't close up the building tightly. You need good ventilation to remove moisture and prevent combustion products such as carbon monoxide from building up.
- Don't use propane heaters in hazardous atmospheres — for example, where there's spray painting or flammable substances being used.
- Store cylinders that aren't being used outdoors. Refer to the SDS for more information.

Storing hazardous substances and products

Employers, prime contractors, and homeowners working on residential buildings must ensure there is a designated storage area for bulk or reserve quantities of hazardous substances. The storage area must be in a location not normally occupied by workers. It must be designed and built so the contents are safely contained. Identify the storage area with signs, placards, or similar means.

Shipping containers

Shipping containers are increasingly being used as storage sheds on construction sites. Shipping containers are designed to be watertight. They're well sealed with little or no ventilation.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

In some cases, shipping containers are used for storing flammable or combustible materials. These materials may release vapours that can accumulate in the container. If the container is exposed to an ignition source, the vapours may ignite and cause a fire or explosion. Shipping containers can withstand high levels of internal pressure, which increases the risk of explosion. If a container explodes, the force can be considerable.

Even a small amount of a flammable substance can lead to a catastrophe. A leak of just 1 kg of propane is enough to cause an explosion that can forcibly rupture a closed shipping container. By comparison, a typical home barbecue uses a 9 kg propane tank.

How to reduce the risks

Hazardous substances must be stored in an adequately ventilated designated area. They must be stored so they won't readily fall, become dislodged, suffer damage, or be exposed to conditions of extreme temperature. Empty cylinders must be identified as being empty and must be stored separately from other cylinders.

As an employer or owner, you can reduce the risks by following these safe work practices when using shipping containers outside the shipping industry:

- Determine if any flammable or combustible products are kept inside the shipping container. If so, move them out of the container to a well-ventilated location.

- Post appropriate WHMIS symbols, if required.
- If it's not possible to move the flammable or combustible products, do the following:
 - Increase ventilation within the shipping container.
 - Be aware of incompatible stored items, such as flammables or combustibles with potential ignition sources.
 - Minimize the number of workers going inside or near the shipping container and the length of time they spend there.
 - Include the contents of the shipping container in your fire safety plan so first responders know what's inside the container.

Refer to the SDS for more information on storage and handling requirements.

Confined spaces

Confined spaces pose a significant risk of injury and death. Incidents in confined spaces can happen suddenly, often without warning. Incidents involving atmospheric hazards, such as toxic gases or a lack of oxygen, often result in serious injury or death to more than one person. This includes trying to rescue a worker in distress.

Regulation

- Part 9, Confined spaces
- Guidelines for Part 9
- Part 5, Chemical and biological agents

Web

- Confined spaces ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

If workers may need to enter a confined space, it's important to have a detailed rescue plan, proper equipment, and training and practice sessions (drills).

Entering into confined spaces may sometimes be necessary during construction or for inspection or maintenance. Employers must identify confined spaces at their workplaces and plan for any work requiring entry.

Confined spaces in the construction industry may include the following:

- Electrical, valve, utility, meter, and motor vaults
- Boilers
- Water tanks and reservoirs
- Pumping stations
- Storage bins
- Pits and sumps
- Storage tanks
- Manholes
- Wet wells
- Crawl spaces

For information on reducing the risks associated with confined spaces, see Part 9 of the Regulation and its related guidelines.

Ergonomics and the prevention of musculoskeletal injury (MSI)

Some of the tasks we perform at work — such as lifting, reaching, and repeating the same movements — can strain our bodies. In some situations, these tasks can result in an injury to the muscles, tendons, ligaments, nerves, blood vessels, or joints of the neck, shoulders, arms, wrists, legs, or back. This type of injury is called a musculoskeletal injury, or MSI. MSIs are also known as soft-tissue injuries.

MSIs are a common type of injury in all industries in British Columbia. MSI claims resulting from overexertion (e.g., lifting, pushing, and pulling) and repetitive motion (e.g., painting or tying rebar) account for about one-third of claims accepted by WorkSafeBC.

Regulation

- Sections 4.46 to 4.53, Ergonomics (MSI) requirements

Web

Go to [worksafebc.com](https://www.worksafebc.com) and search for “musculoskeletal injuries.” You can also visit the following [worksafebc.com](https://www.worksafebc.com) webpages:

- Lift/lower calculator
- Sprains & strains

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

MSI risk factors

The factors that contribute to the risk of MSI are called risk factors. A risk factor is something that may cause or contribute to an injury. Risk factors for MSI include force, duration, working position, vibration, repetition, and contact stress. There can be two or more risk factors at the same time, increasing the risk of injury.

Employers must identify risk factors that may expose workers to a risk of MSI, assess those risks, and determine and implement appropriate risk controls. See “Hazard identification and risk control,” pages 12–14.

Worker education

Employers must ensure that workers who may be exposed to a risk of MSI are educated to identify the risks related to the work. Workers should also learn how to recognize early signs and symptoms of MSIs and their potential health effects.

Personal protective equipment (PPE) and clothing

Personal protective equipment (PPE) is a worker's last defence against injury and death when eliminating workplace hazards is not possible. To make sure this equipment protects workers as it should, you need to know your [responsibilities for PPE](#) under the Regulation and accompanying guidelines and policies. This section is an overview of employer and worker responsibilities for providing and using PPE.

Regulation

- Part 7, Noise, vibration, radiation and temperature
- Part 8, Personal protective clothing and equipment
- Part 18, Traffic control
- Part 19, Electrical safety

Web

- Personal protective equipment (PPE) ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Employer responsibilities

Employers may be required to do a workplace evaluation to determine what PPE and clothing is required for the various phases of construction. PPE may include a personal fall protection harness, as well as respiratory, eye, foot, head, and hearing protection.

If PPE is required, employers are responsible for providing it to workers, with some exceptions, as noted below in “Worker responsibilities.”

Inspect your PPE before each use

PPE must be selected, used, and maintained in accordance with the manufacturer's instructions and applicable standards.

Workers are responsible for inspecting their PPE before each use.

Worker responsibilities

Workers are responsible for providing their own hard hats, safety footwear, general-purpose gloves, and clothing necessary for protection against the natural elements. However, if specialized gloves are necessary to protect against hand injuries — for example, when using hazardous substances — the employer must provide them.

If there is a risk of contact with moving parts of machinery, equipment, or tools, workers must follow these requirements:

- Wear clothing that fits closely to the body. Don't wear loose-fitting or frayed clothing.
- Remove accessories, such as rings, dangling neckwear, loose-fitting bracelets, or watches.
- Tie back long hair, including facial hair.

Head protection

On construction sites, there are many potential head-injury hazards, such as falling, flying, or thrown objects. In hazardous areas, workers must wear safety headgear that meets an applicable standard.

Safety headgear may require a chinstrap, the use of retroreflective strips, or a specific fluorescent colour. This is based on hazards, site conditions, and the work to be done. For example, safety headgear must have chinstraps or other effective means of retention in the following situations:

- When climbing or working higher than 3 m (10 ft.)
- When exposed to high winds or other conditions that could cause loss of the headgear — for example, during traffic control



If there's a potential for head injury, workers must wear safety headgear that meets an applicable standard. For more information, see Part 8 of the Regulation.

Hearing protection

Noise-induced hearing loss is the most common work-related disease. Though it typically happens gradually, damage is permanent. Workers can suffer from hearing loss by being exposed to a single loud noise or by repeated exposure to a consistent noise.

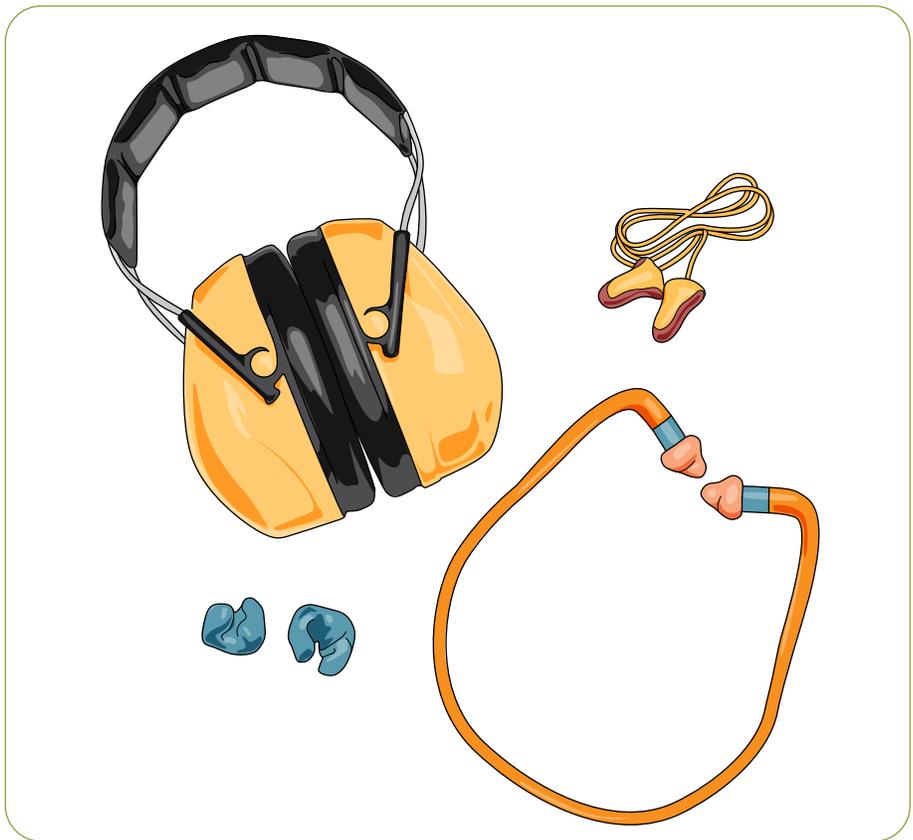
Regular exposure to sounds louder than 85 decibels (dBA) can cause permanent noise-induced hearing loss. Excessive noise damages sensitive structures in the inner ear that can't be repaired. This results in irreversible hearing loss.

Web

- Noise ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.



Select hearing protection that supports the hearing conservation program. Some factors to consider include noise levels, work activities, and user preference for fit.

Construction workers are often exposed to noise that can permanently damage hearing. If workers are exposed to noise that goes over noise exposure limits, employer requirements include the following:

- Develop and implement an effective noise control and hearing conservation program.
- Investigate options for engineered noise control. Implement one or more of those options to reduce noise exposure to or below the exposure limits.
- Post warning signs for noisy areas.
- Provide hearing protection. Make sure it fits each worker and can be worn effectively. Typically, you'll need to provide a variety of hearing protection devices.
- Ensure that workers wear hearing protection as required.
- Make sure workers are provided with an initial hearing test within the first six months and at least once a year after the initial test.

Employers should also make sure workers have their “hearing test card.” Workers should carry their cards at work.

The program and hearing protection must meet the requirements of the applicable standard. For more information on what’s required in a hearing conservation program, see Part 7 of the Regulation.

It’s important for workers to wear hearing protection when exposed to noise from loud equipment. This includes pneumatic nail guns, saws, routers, impact drivers, drills, jackhammers, chipping guns, grinders, and other power tools.

Potential noise hazards in residential construction

Work activity	Noise exposure levels (dBA) Eight-hour (or equivalent) exposures
Carpenter/framer	91
Concrete worker	92
Crane operator	90
Drywaller	89
Electrician	89
Ironworker	93
Jackhammer operator	97
Labourer	93
Mobile equipment operator	91
Roofer	95
Truck driver	88
Welder	92

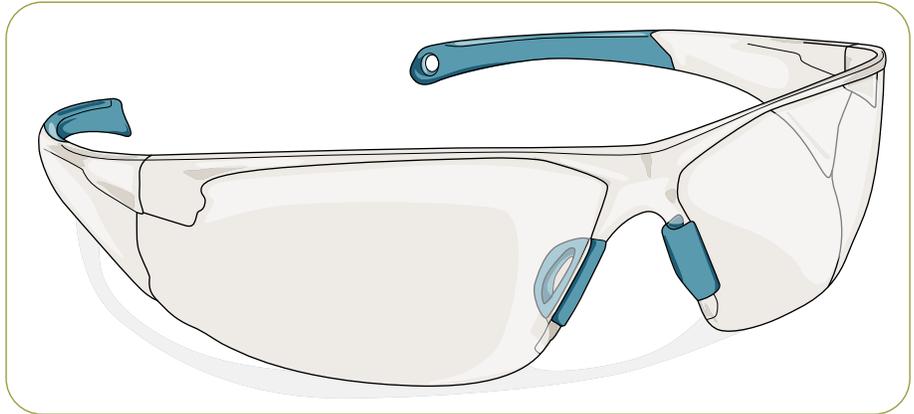
If a worker is or may be exposed to potentially harmful levels of noise, or if information indicates that a worker may be exposed to more than 82 dBA Lex, the employer must measure the noise exposure.

If workers are exposed to noise that exceeds noise exposure limits, the employer must ensure they have their hearing tested every year to monitor the effectiveness of hearing protection. You can find a list of [authorized industrial audiometric \(hearing test\) facilities](https://www.worksafebc.com) at [worksafebc.com](https://www.worksafebc.com).

Eye and face protection

Workers must wear eye and possibly face protection where hazards involving the eyes or face exist or are created as a result of conditions or activities in the area. Face protection protects the full face from injury. It's considered a secondary safeguard to protective eyewear. Where face protection is required, workers must wear it over eye protection.

Employers are responsible for providing eye and face protection.



When there are eye hazards, workers must wear properly fitting safety eyewear that is supplied by the employer and appropriate for the conditions of the workplace and tasks.

Other WorkSafeBC resources

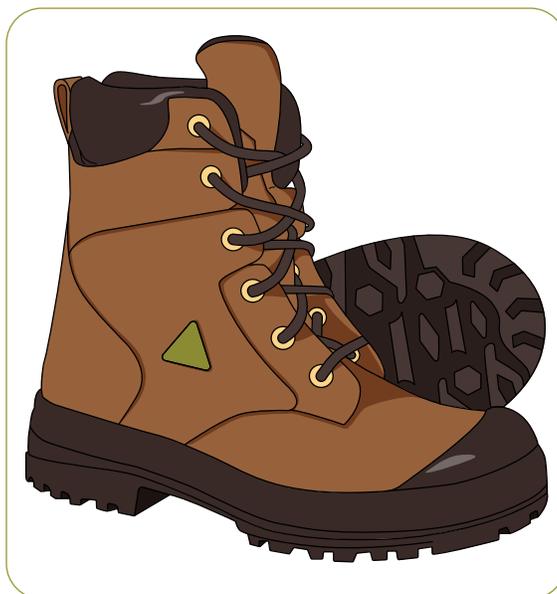
For more information on this topic, see the resources listed on pages 118–126.

Foot protection

The following requirements apply to safety footwear:

- It must be designed, constructed, and made of material that's appropriate for the protection required.
- It must allow the worker to work safely.
- It must meet an applicable standard, as required by the Regulation — for example, safety footwear with a CSA Group green-triangle symbol.

Employers may be required to conduct a workplace evaluation to determine if and what type of safety footwear is required for the work task and location. See Part 8 of the Regulation for more information.



When workers are required to wear safety footwear, it must meet an applicable standard, as required by the Regulation. It must be of an appropriate design, construction, and material so the worker can work safely.

Respiratory protection

In some workplaces, workers may be at risk of breathing in airborne contaminants, such as crystalline silica, asbestos, isocyanates, lead, or nuisance dusts. Employers must assess the workplace for breathing hazards and control worker exposure to these hazards.

If elimination isn't practicable, follow the remaining steps in the hierarchy of controls: substitution, engineering controls, administrative controls, and PPE. In many cases, you'll need to use a combination of these controls to keep worker exposures as low as reasonably achievable. See "Hazard identification and risk control," pages 12–14.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

If you can't reduce dangerous air contaminants to safe levels, you must provide your workers with training and appropriate respiratory protection. You must also ensure they use it as they were trained. Respirators must meet and be used in accordance with the requirements of a standard acceptable to WorkSafeBC and the employer's respiratory protection program.

Employers must ensure that workers have a fit test performed before first using the respirator and then at least once a year.

Workers required to wear respirators must be clean shaven where the respirator seals with the face. They must also perform a positive- or negative-pressure user seal check in accordance with the requirements of a standard, as specified in the Regulation.

For more information, see sections 8.32 to 8.45 of the Regulation.

First aid

For residential construction projects, employers and prime contractors both have responsibilities when it comes to first aid. It's important to plan for first aid and conduct a [first aid assessment](#) to determine first aid requirements for the site.

Regulation

- Sections 3.14 to 3.21, Occupational first aid, and schedule 3-A, Minimum levels of first aid
- Guideline G3.18(2), Availability of first aid attendant

Web

- First aid requirements ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

As specified in section 3.16 of the Regulation, the employer must provide the first aid equipment, supplies, facilities, first aid attendants, and services that are adequate and appropriate for both of the following:

- Promptly rendering first aid to workers if they suffer an injury
- Transporting injured workers to medical treatment

If two or more employers are operating at a workplace at the same time, the prime contractor must do the following:

- Assess the workplace as specified in sections 3.16(2) and 3.20 of the Regulation.
- Do everything reasonably practicable to establish and maintain first aid equipment, supplies, facilities, first aid attendants, and services as specified in section 3.16 of the Regulation.

The type and quantity of equipment, supplies, facilities, first aid attendants, and services must at least meet the requirements of Schedule 3-A in Part 3 of the Regulation.

Delivery, storage, and access to work areas

Delivery of materials to and on worksites can be dangerous. Employers, prime contractors, and homeowners working on residential buildings must plan for the safe delivery and storage of materials on site. Cranes, forklifts, or other delivery devices may be needed to offload and deliver materials to a specific location on site.

Regulation

- Part 4, General conditions
- Section 12.15, Restraining devices
- Part 14, Cranes and hoists
- Part 15, Rigging
- Part 16, Mobile equipment
- Section 20.4(1), Safe access
- Section 20.9, Protection from falling materials

Web

Webpages at worksafebc.com:

- Cranes
- Forklifts & materials-handling equipment

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Delivery

Make sure there's a suitable area for delivery devices to set up and operate. Consider factors such as how stable the ground is, distance to excavations, traffic control arrangements, and overhead power lines. Make sure workers will be able to work safely around the devices.

There must be suitable access for the safe delivery of equipment and materials to the specific locations where they'll be used.



Delivering drywall to the second floor through a window opening. A fall protection system may be required if guardrails have to be removed.

Storage

Preventing sprains and strains

For information on ergonomics, see “Ergonomics and the prevention of musculoskeletal injury (MSI),” pages 34–35.

Materials and equipment must be placed, stacked, or stored so they’re stable and secure. For example, always try to store sheets of drywall flat. If you have to lean them against a wall, make sure they’re adequately secured. Good housekeeping throughout all phases of construction is important for maintaining a safe, productive workplace. Keep materials and equipment out of walkways.

If you’re delivering materials to or working on a temporary floor, decking, floor-opening cover, or formwork, you must be aware of both of the following:

- The safe carrying capacity of the surface
- Precautions necessary to prevent overloading

Access

Workers must have a safe way to access work areas. Stairways must be installed with framing, treads, and handrails before construction of the next floor or deck surface. This may also include access to the basement level.

Employers, prime contractors, and homeowners working on residential buildings must also ensure work areas are arranged for the safe movement of people, equipment, and materials. This includes protecting workers and others from falling materials and materials blowing off the site.

Part 2: Site preparation

Demolition and renovation

You're responsible for the health and safety of workers if you're an employer, homeowner, prime contractor, abatement contractor, or demolition contractor. That includes protecting them from exposure to hazardous materials such as asbestos or lead. This section is an overview of high-risk work activities that may take place during demolition and renovation.

General requirements for hazardous materials

Qualified person

For a definition of *qualified person*, see "What does *qualified* mean?" on page 8.

Employers and the owner must ensure a qualified person does an inspection to identify hazardous materials before work begins on the renovation of a building or structure, or the demolition or salvage of:

- A building or a structure
- Machinery
- Equipment

The inspection must include machinery, equipment, the building or structure, and the workplace. It must identify hazardous materials, such as asbestos, lead, mercury, or PCBs (polychlorinated biphenyls).

The qualified person will prepare a report with the inspection results (i.e., a hazardous materials survey). This report must be available at the workplace.

If the qualified person identifies hazardous materials, a qualified contractor must remove and dispose of them safely. Before starting a hazardous materials abatement, the owner, prime contractor, or employer working on a residential building must ensure a notice of project is submitted to WorkSafeBC at least 48 hours before the abatement work starts. (See "Notice of project (NOP)," page 9.) This notice must be posted on the site for the duration of the abatement work.

Note: Another notice of project must be submitted before starting other construction-related work activities, such as demolition and excavation.

Once the abatement is done, a qualified person must do a post-abatement inspection. The qualified person will prepare a written confirmation (a clearance letter) to confirm removal of the hazardous materials. This report must be readily available on site.

If previously unidentified or other hazardous materials are found during demolition, all work must stop until a qualified person can do a risk assessment and the materials are safely contained or removed by a qualified contractor.

Asbestos

Asbestos exposure remains the number one killer of workers in B.C. When demolishing or renovating older homes, workers have a high risk of encountering asbestos-containing materials. Exposure to asbestos fibres can result in diseases, such as asbestosis, lung cancer, or mesothelioma. Mesothelioma is a cancer that affects the lining of the chest or abdominal cavity.

Regulation

- Sections 6.1 to 6.32, Asbestos
- Guideline G6.8, Procedures for abatement of asbestos materials during house and building demolition/renovation
- Section 20.112, Hazardous materials

Web

- Asbestos (worksafebc.com webpage)

Other WorkSafeBC resources

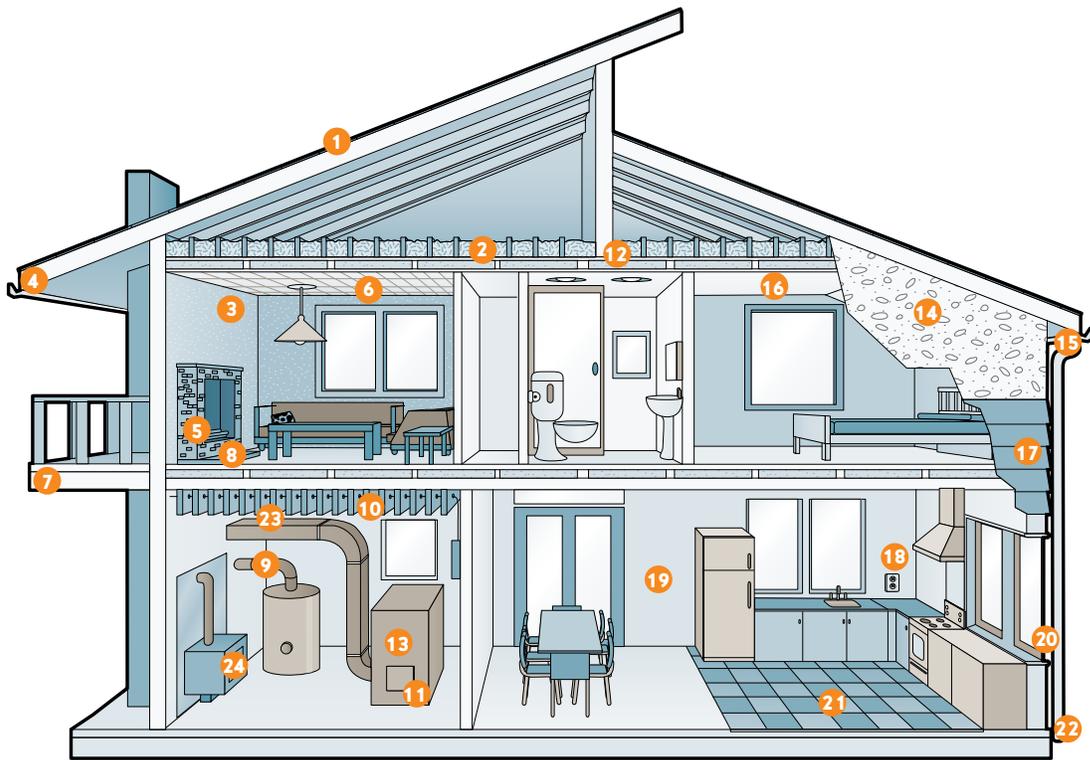
For more information on this topic, see the resources listed on pages 118–126.

Before work begins, the owner and all employers responsible for the work are responsible for ensuring a qualified person has determined whether asbestos-containing materials are in the workplace. If these materials are found, trained and qualified workers must remove and dispose of them before demolition or renovation work begins.

Stop work immediately if you find materials that could contain asbestos, or after a hazardous materials abatement has been completed. Before work can resume, a qualified person must determine if the materials contain asbestos. If they do, trained and qualified workers must remove and dispose of them before work resumes.

Effective planning, training, and supervision can help eliminate the risk of worker exposure to asbestos.

Possible sources of asbestos



- | | | | |
|---|---|--|---|
| 1 Roof felt and shingles | 9 Pipe insulation | 15 Soffit boards can be made of asbestos cement or asbestos insulating board | 20 Window putty |
| 2 Loose, blown-in insulation, such as vermiculite | 10 Main panel and fuse box; each fuse wire has an individual asbestos flash guard | 16 Textured or stipple-coated walls and ceilings | 21 Flooring: vinyl tiles and linoleum sheet flooring; flooring adhesive |
| 3 Incandescent light fixture backing | 11 Door and gasket covers | 17 Asbestos cement (transite) board siding and undersheeting | 22 Downpipes can be made of asbestos cement |
| 4 Roof gutters can be made of asbestos cement | 12 Backing behind recessed lighting | 18 Outlets and switches | 23 Insulation on electrical wires |
| 5 Artificial fireplace logs and ashes | 13 Boiler and furnace insulation | 19 Gypsum board filling compound, and patching and joint compound for walls and ceilings | 24 Heat reflector for wood stove |
| 6 Acoustic tiles | 14 Asbestos can be found in stucco | | |
| 7 Deck undersheeting | | | |
| 8 Asbestos pad under the fireplace hearth | | | |

Lead

When demolishing, salvaging, or renovating older homes, workers have a high risk of encountering lead-containing materials. Until the 1980s, lead was used in paint because it increased durability, made colours more vibrant, and helped paint dry faster. Lead-containing paint is still used for yellow lane dividers on roads and highways. There's no restriction on lead in industrial coatings.

Regulation

- Sections 6.1 to 6.32, Asbestos
- Guideline G6.8, Procedures for abatement of asbestos materials during house and building demolition/renovation
- Section 20.112, Hazardous materials

Web

- Asbestos ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Lead-containing paints and coatings don't present a hazard if they're left intact. The health risk occurs when they chip, peel, or are otherwise damaged. When lead-containing materials are disturbed (e.g., scraped, sanded, or burned), lead dust, mist, or fumes can be released into the work environment and be inhaled or ingested by workers and other people, including children.

Lead enters your body when you breathe it in (inhalation) or when you swallow it (ingestion). Lead can affect the brain and nervous system, the reproductive system, the digestive system, the kidneys, and the body's ability to make blood. Lead is also a suspected human carcinogen.

Before work begins, the owner and all employers responsible for the work are responsible for ensuring a qualified person has determined whether lead-containing materials are in the workplace. If these materials are found, they must be handled by trained and qualified workers before demolition, salvage, or renovation work begins.

Effective planning, training, and supervision can help eliminate the risk of worker exposure to lead.

Demolition requirements

If demolition could compromise the integrity of a structure or any adjoining structures, they must be supported as specified by a professional engineer (i.e., according to a demolition plan). The demolition plan must include a schedule, based on the stages of demolition, for installing the components of the support system. A copy of the support-system plan must be available at the demolition site.

Regulation

- Sections 20.111 to 20.121, Demolition
- Guideline G20.112, Hazardous materials — Asbestos
- Part 11, Fall protection

Web

- Restoration, renovation & demolition (worksafebc.com webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

While salvage is taking place before or during the demolition process, the integrity of the structure must be maintained.

If the demolition won't endanger workers and the stability of adjoining grounds and structures won't be compromised, engineered demolition plans and designs aren't required.

The following requirements also apply before demolition starts:

- Remove all hazardous materials from the site. See “General requirements for hazardous materials,” pages 48–49.
- Disconnect all utilities as per the requirements of the utility owners.
- If glass in a building or other structure could endanger workers, it must be removed before other demolition starts.
- Adequately brace any dangerous or unstable component of the building, such as a wall that will be left standing.

In addition, stairways, complete with handrails, must be left intact until workers don't need access to the level they serve. For more fall protection resources, see “Fall protection,” pages 78–81.

Trenches and excavations

This section is an overview of high-risk work activities that may take place during trenching and excavation work. It doesn't include every hazard you may encounter during this construction phase.

Definitions

Excavation — Any cut, cavity, trench, or depression in the earth's surface resulting from rock or soil removal.

Trench — An excavation of any length that's less than 3.7 m (12 ft.) wide at the bottom and more than 1.2 m (4 ft.) deep.

Adjacent to an excavation — Within a distance less than or equal to the overall depth of the excavation, measured from a vertical line through the toe of the excavation face (1 horizontal to 1 vertical).

Regulation

- Sections 20.78 to 20.95, Excavations
- Table 20-1 and figures 20-1 to 20-3 (in Part 20)

Web

- Excavation ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Underground utilities

When you dig, you run the risk of hitting buried power lines, conduits, pipelines, or other utilities. Before digging, you must determine the location of all underground utilities in the area and control any danger to workers.

Contact BC 1 Call to find out where the utilities are. A BC 1 Call report can help you determine which areas you need to avoid when excavating and how to eliminate or control risks to workers from utilities that may be on site.

Not all utility companies are members of BC 1 Call. If you're going to be digging and the owners of buried facilities aren't members of BC 1 Call, you'll need to identify and contact those owners directly.

BC 1 Call

Call or go online before you dig:

- 1.800.474.6886
- bc1c.ca

Before excavating

Before excavating or drilling with power tools or equipment, you must accurately determine the location of all underground utilities in the area and control any danger to workers from them. Excavation and digging must follow the requirements of the utility owner. Never use pointed tools to probe for underground utilities.

According to section 20.78 of the Regulation, excavation work must follow the written instructions of a qualified, registered professional (i.e., a professional engineer or geoscientist) in the following situations:

- The excavation is more than 6 m (20 ft.) deep.
- There's an improvement or structure adjacent to the excavation.
- The excavation is subject to vibration or hydrostatic (water) pressure that is likely to result in hazardous ground movement.
- The ground slopes away from the edge of the excavation at an angle steeper than a ratio of 3 horizontal to 1 vertical.



A typical residential construction excavation. Note the adjacent structures — a neighbouring house and fence. These are examples of when engineering may be required before starting excavation work.

Content of written instructions

The written instructions prepared by a professional engineer or geoscientist for an excavation must include information on the expected subsurface conditions. The instructions must also specify the support and sloping requirements for the excavation, which can be done with drawings or sketches.

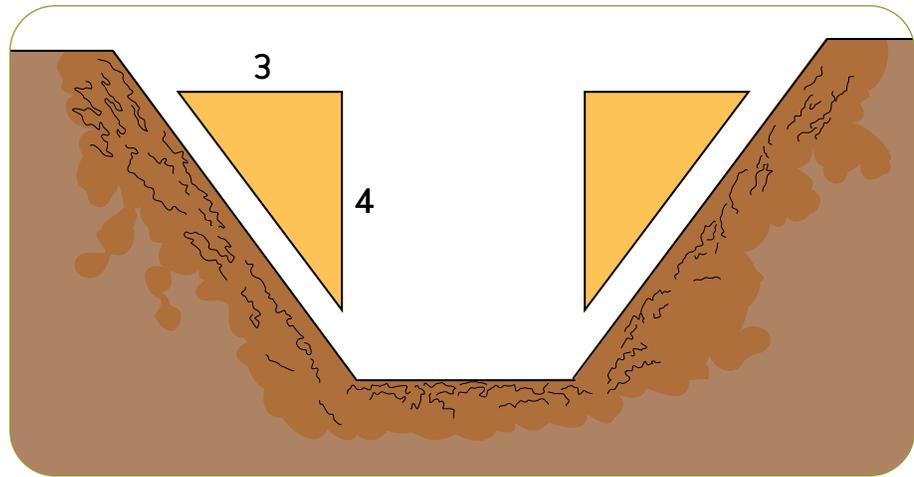
Before excavating, there must be an available on-site copy of the written instructions signed and certified by the professional engineer or geoscientist. These instructions should include the following:

- Date of issue
- Site address/location
- Drawing or sketch, overall plan, and/or clearly written instructions
- A geotechnical description of expected soil conditions or confirmation upon site review
- Limitations for machinery or equipment next to the excavation
- The time period for which certification applies
- The influence of changing weather conditions
- The name, signature, and seal of the professional engineer or geoscientist doing the certification
- Any other significant information — for example, regarding adjacent structures

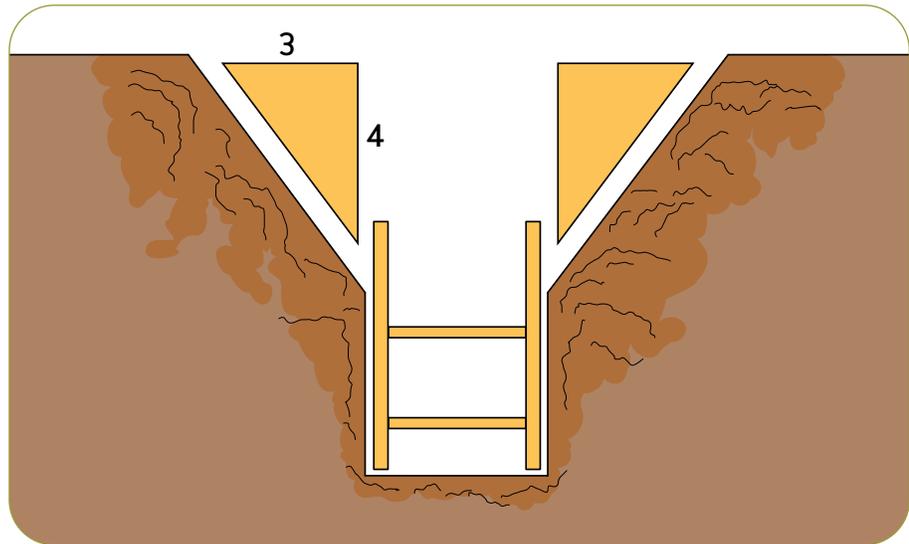
Before workers enter excavation areas

Before workers enter any excavation deeper than 1.2 m (4 ft.) or, while in the excavation, before they approach the side or bank closer than a distance equal to the depth of the excavation, the employer must ensure that the sides of the excavation are:

- Sloped as specified in writing by a qualified, registered professional,
- Sloped at angles, dependent on soil conditions, that will ensure stable faces, but in no case may the slope or combination of vertical cut and slope exceed that shown in Figure 20-1, in Part 20 of the Regulation,
- Benched as shown in Figure 20-2,
- Supported as specified in writing by a professional engineer,
- Supported as per the minimum requirements of section 20.85, or
- Supported by manufactured or prefabricated trench boxes or shoring cages, or other effective means.



Unshored trench and excavation walls must be sloped flatter than the angle of repose. However, they must not be steeper than 3 horizontal to 4 vertical, unless specified in writing by a professional engineer.



An example of combined sloping and shoring.

Other excavation requirements

- Remove or secure trees, utility poles, rocks, and similar objects adjacent to the excavation area if they could endanger workers.
- Provide a safe entry and exit. If workers are required to enter a trench deeper than 1.2 m (4 ft.), the safe entry and exit must be located within 8 m (25 ft.) of the workers and the excavation must be safely supported or sloped to the entry and exit location.
- Cover or guard excavations that are hazardous to workers. For example, use guardrails to protect workers from falling.
- Walkways across excavations must be at least 50 cm (20 in.) wide. If a walkway crosses an excavation that's more than 1.2 m (4 ft.) deep, it must have guardrails on both sides that meet the requirements of Part 4 of the Regulation.
- Keep excavated material back at least 60 cm (2 ft.) from the edge of trench excavations and 1.2 m (4 ft.) from other excavations.
- Don't allow water to accumulate in an excavation if it might affect the stability of the excavation or endanger workers.

For more information on excavation requirements, see Part 20 of the Regulation.

Part 3: Construction

General construction requirements

The following requirements apply during the construction phase, which includes pre-lockup and post-lockup:

- Ensure there is a safe way to enter and leave each work area. Workers must not use other ways that are hazardous.
- Ensure the work area is arranged to allow the safe movement of people, equipment, and materials.
- Ensure there is suitable access to deliver equipment and materials safely to where they'll be used.
- Practise good housekeeping. Don't allow waste materials to accumulate and create a hazard, such as a slipping or tripping hazard.
- Place, stack, or store materials and equipment so they're stable and secure.
- Before construction of the next floor or deck surface, ensure there is a stairway that has at least framing, treads, and a handrail. The treads on the stairway must not create a tripping or slipping hazard.
- When using a ladder for temporary access, extend the top of the ladder at least 1 m (3 ft.) above the edge of the landing, and secure it so it won't move. Set the ladder at an angle of 75 degrees, or 4 vertical to 1 horizontal (i.e., for every 4 ft. of height, the ladder should be 1 ft. out from the base of the structure).
- Temporary floors, decking, floor-opening covers, and formwork must be able to support a uniformly distributed live load of at least 2 kPa (40 psf). If the anticipated live load will be more than 2 kPa (40 psf), it must be designed and installed in accordance with the written instructions of a professional engineer and a copy of the engineer's plan and specifications must be available at the workplace. Workers must be aware of the safe carrying capacity of the surface and of precautions necessary to prevent overloading.
- When using scaffolding, follow the requirements of applicable standards, such as WCB, CSA Group, and ANSI standards.

Concrete formwork, falsework, and placing

This section is an overview of high-risk work activities that may take place during concrete formwork, concrete falsework, and concrete-placing work activities. It doesn't include every hazard you may encounter during this construction phase.

Formwork and falsework

Erection drawings and instructions

When required, employers must ensure worksite-specific plans are available at the site during erection, use, and removal of concrete formwork, falsework, and reshoring. Employers must also follow the manufacturer's drawings and instructions, if applicable.

Regulation

- Part 4, General conditions
- Part 20, Construction, excavation and demolition

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

The worksite-specific plans must be certified by a professional engineer, when required by the Regulation. They must include all the information necessary to assemble and remove the concrete formwork accurately and safely. For example, there must be details for supports, such as braces or ties, that are required for stability during all phases of erection. A professional engineer must approve all field designs, details, and changes to worksite-specific plans.

For more information, see Part 20 of the Regulation.

Other requirements

Other requirements when erecting, using, and dismantling formwork and falsework include the following:

- Ensure a qualified supervisor supervises the erection, use, and dismantling of formwork, falsework, and reshoring.
- Ensure workers are supervised and instructed on the hazards they may be exposed to and the necessary precautions for working around or on formwork, falsework, and reshoring.

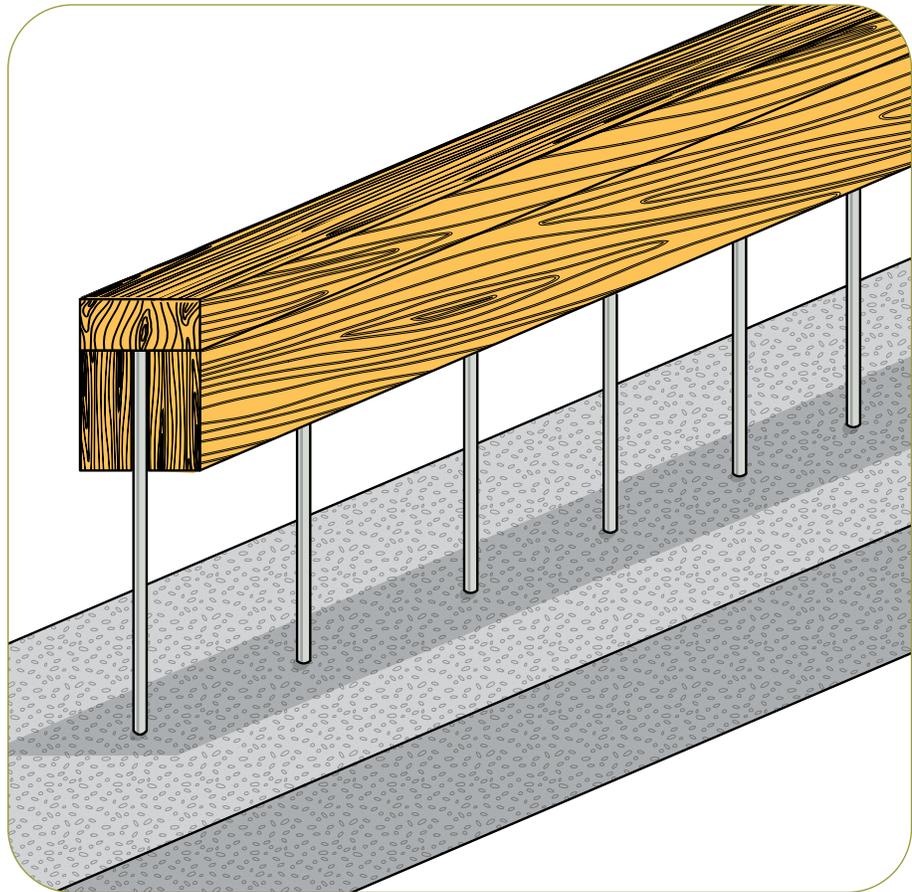
- After the wall forms have been erected, provide suitable work platforms for workers to work around the formwork (i.e., concrete placing). Safe access to the work platforms must also be provided. The top of formwork is not considered a suitable work platform. For more information, see Part 20 of the Regulation.
- When dismantling (stripping) formwork, follow the worksite-specific plan to help eliminate hazards.

Concrete reinforcing (rebar)

If rebar has been installed, employers must ensure it's adequately supported to safely withstand any loads likely to be imposed on it. The following requirements apply to rebar work:

- Consider safer alternatives to climbing and working from the rebar.
- Remove or guard protruding objects.

Rebar work often involves working above grade. For more information, see Part 4: Working at elevation, pages 77–99.



Wooden troughs are one form of rebar protection. Don't use wooden troughs as a substitute for guardrails when guardrails are required.

Regulation

- Part 4, General conditions
- Section 20.14, Temporary support
- Section 20.4, Safe access
- Part 13, Ladders, scaffolds and temporary work platforms
- Section 20.25, Concrete placing hazards
- Section 15.32, Makeshift fitting prohibition

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Concrete placing and pumping

Immediately before placing concrete or other intended loading, the employer must ensure a professional engineer inspects the concrete formwork and falsework and issues a certificate, when required by the Regulation.

Portland cement is a key ingredient in concrete mix, mortar, and grout. When wet, Portland cement is caustic and can cause chemical burns. In its dry powder form, it can cause severe eye or respiratory irritation. Employers must ensure appropriate controls are in place. See “Hazardous materials, substances, and products,” pages 23–32, for appropriate control measures.

Regulation

- Sections 20.26.1 to 20.54, Concrete pumping
- Section 20.4, Safe access
- Guideline G20.4(1), Suitable ladders, work platforms, and scaffolds
- Part 13, Ladders, scaffolds and temporary work platforms
- Sections 6.110 to 6.115.1, Respirable crystalline silica and rock dust

Web

- *BCCSA & BCMCA best practices guidelines for contractors using concrete pumps* (contact BCCSA or BCMCA)
- Concrete pumpers (worksafebc.com webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

For information on silica, see “Crystalline silica,” pages 26–27.

Work platforms

Where practicable, suitable ladders, work platforms, and scaffolds must be provided for and used by workers for work above a floor or grade. These must meet the requirements of Part 13 of the Regulation. When placing concrete, the most suitable option is a work platform.

The following are not considered adequate work platforms:

- Top plates of interior or exterior walls
- Top plates or top walers of concrete formwork
- Tops of floor or roof joists
- Bottom chords of ceiling trusses



A single-pole wood scaffold can provide a safe work platform for placing concrete.



Don't walk on the top of formwork.

Concrete pumper trucks

When using concrete pumper trucks, employers, prime contractors, and homeowners working on residential buildings need to consider the following:

- Ensure concrete pump operators are certified or working under the supervision of someone who is.
- Select the correct size of pumper truck.
- Make sure there's suitable access to and from the pump set-up location.

- Make sure there's a suitable area for the pumper truck to be set up with outriggers fully extended and deployed. Consider factors such as how stable the ground is, distance to excavations, traffic control arrangements, and overhead power lines. Make sure workers will be able to work safely around the pumper truck.

Concrete-finishing work activities

Crystalline silica is one of the most common hazards in a workplace. Silica dust can cause silicosis, a serious and irreversible lung disease. It can also cause lung cancer. Cutting, breaking, chipping, drilling, grinding, or blasting concrete or stone releases silica dust. For information on protecting workers from harmful exposure to respirable crystalline silica, see "Hazardous materials, substances, and products," pages 23–32.

Framing

This section is an overview of high-risk work activities that may take place during framing. It doesn't include every hazard you may encounter.

General requirements for framing

- Install stairways with handrails before starting construction on the next floor or deck surface. The stairway treads must not create a tripping or slipping hazard.
- Ensure that stairways are sufficiently supported to withstand expected loads. In some cases, a professional engineer may be required, such as for connection details.
- Install temporary guardrails where required, including on floors, stairway landings, ramps, and walkways that are 1.2 m (4 ft.) or more above grade. Specific exceptions are described in Part 4 of the Regulation.
- Ensure that there are suitable work platforms for workers at elevations above a floor or grade. Don't walk or work on top of interior or exterior walls, top plates, or other surfaces that aren't suitable work platforms or scaffolds. Where practicable, scaffolds and work platforms that meet the requirements of Part 13 of the Regulation must be provided for and used by workers.
- Effectively cover and identify floor and roof openings that workers could fall through, or guard them with guardrails as specified in Part 4 of the Regulation.

Regulation

- Part 4, General conditions
- Part 11, Fall protection
- Part 13, Ladders, scaffolds and temporary work platforms
- Sections 20.4 to 20.14.3, Safe work areas and safe access

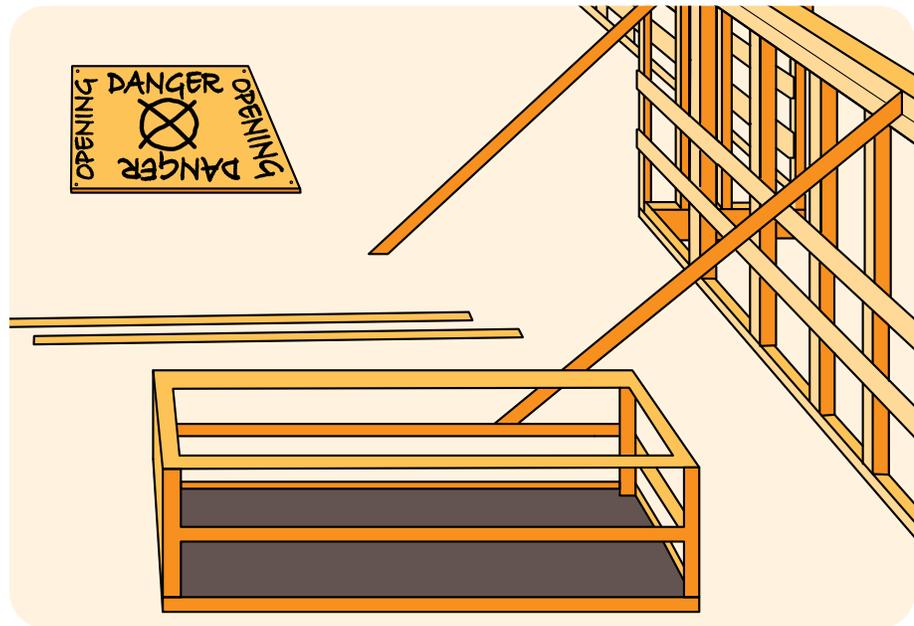
Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

For information on fall protection, see “Fall protection,” pages 78–81.



A temporary single-pole wood scaffold for working at elevations above a surface or grade. Workers can use this platform during framing when installing floor joists or roof trusses.



A floor opening with guardrails installed around it. In the background is a floor opening that has been covered, secured, and marked.

Lifting walls

It's important for employers to develop work procedures and instruct their workers in these procedures when lifting walls. For example:

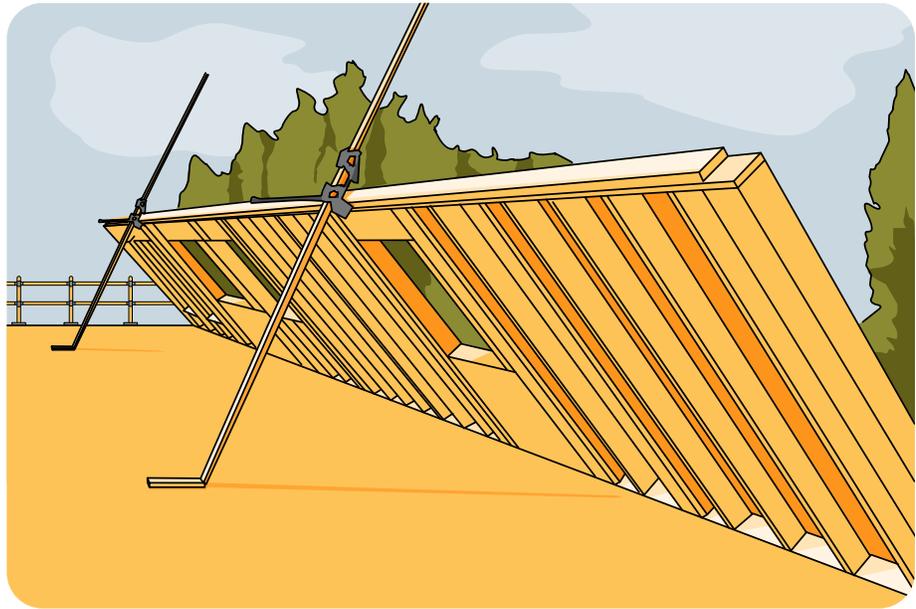
- Assign a supervisor to give instructions and direction.
- Minimize manual lifting where possible. Ensure there are enough workers to do the job safely.
- Install kickers to prevent the bottom of the wall from slipping off the subfloor.
- Ensure no workers are below the wall being lifted. Barricade or guard the danger area to prevent workers from entering. Display conspicuous warning signs all around the danger area.
- Don't lift walls in windy conditions.
- Make sure workers near the edge are protected by a fall protection system. For more information, see "Fall protection," pages 78–81.
- Install temporary braces immediately after the wall is upright.
- Install guardrails as soon as it's practicable — for example, before lifting the wall or once the wall is upright and supported.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.



These workers are protected by guardrails while they lift the walls for the next level. The wall they're lifting also has guardrails to protect workers when they start framing the next level.



A wall-jack system used to stand or raise walls into place.

Trusses

Pre-manufactured open web joists and trusses must not be erected until clear and appropriate written instructions from a professional engineer or the manufacturer of the joists or trusses are available at the workplace. These instructions must include details on safe erection procedures.

Truss installers should familiarize themselves with all written instructions, drawings, and documents provided by truss manufacturers and professional engineers. These manufacturers or engineers are required to provide instructions on how to safely erect truss materials.

Regulation

- Sections 4.54 to 4.63, Work area guards and handrails
- Part 11, Fall protection
- Part 13, Ladders, scaffolds and temporary work platforms
- Section 20.4, Safe access
- Section 20.72, Open web joists and trusses
- Guideline G20.72, Open web joists and trusses
- Guideline G20.75, Roof work — Fall protection

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

For information on fall protection, see “Fall protection,” pages 78–81.

Preparing for truss erection

Before truss erection begins, truss installers need to consider the following:

- Know the truss layout.
- Review individual truss drawings that contain information on placing, installing, bracing, and connecting trusses.
- Check truss markings to ensure proper placement according to the design.
- Supervise and instruct workers on safe truss-erection instructions and procedures. Use your available documents.
- Use workers experienced in safe truss erection, whenever possible.
- Ensure that the interior and exterior walls are aligned and adequately braced.
- Truss installers must not walk on the top plate.
- Use work platforms where practicable. Don't use roof trusses as anchor points, unless the truss manufacturer allows for it through engineering. When using manufacturer anchors, ensure you follow the manufacturer's instructions.
- Tell workers not involved in truss erection to keep clear when trusses are being handled and positioned.
- Ensure a worker trained in crane signals directs the unloading and placement of the trusses.
- Ensure workers use PPE.



When erecting trusses, use an appropriate work platform on the inside of the building. Positioning the work platform 102–112 cm (40–44 in.) below the perimeter wall will allow the wall to act as a guardrail during erection. You may need additional guardrails in window openings. Don't walk on the top plate to erect trusses.

Temporary and permanent bracing during truss erection

Open web joists and trusses are typically shipped with written instructions and design drawings. Typically, these drawings indicate requirements for permanent bracing and temporary bracing required for safe erection. If these instructions aren't included, contact the manufacturer or a professional engineer for them before erecting any trusses.

Truss-erection work shouldn't continue if any of the following conditions exist:

- Erection and bracing instructions aren't available at the site or are obviously incomplete.
- Erection and bracing instructions aren't being followed.
- Walls or skeletal structural building frames aren't adequately braced.
- Heavy loads are being applied to trusses before installing all the bracing, bridging, and decking.

According to section 20.72 of the Regulation, erection includes hoisting a partial or entire roof, floor, or other component. For example, a roof is prefabricated on the ground as a unit in one or more pieces and is then hoisted with a crane into position on the building. This operation requires written instructions from a professional engineer or the truss manufacturer. These instructions must include details on all the bracing needed for the lift and the location and construction of the lifting points, complete with rigging details as necessary for lifting the roof safely. This applies to all open web joists and trusses, including those made of wood, metal, or other materials.

Bracing must be installed to support trusses as necessary to safely withstand any loads likely to be imposed on them during the erection process.

Roof work

Falls from roofs are a common cause of injuries in residential construction. There are several activities that occur on the roof, including deconstructing the roof during demolition, constructing the roof itself, and installing the roofing material. Employers working on residential buildings must ensure their workers are protected if there's a risk of falling. For more information, see "Fall protection," pages 78–81.

Regulation

- Sections 20.74 to 20.77, Roof work
- Guideline G20.75, Roof work — Fall protection
- Sections 4.54 to 4.63, Work area guards and handrails
- Part 11, Fall protection

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Load capacity

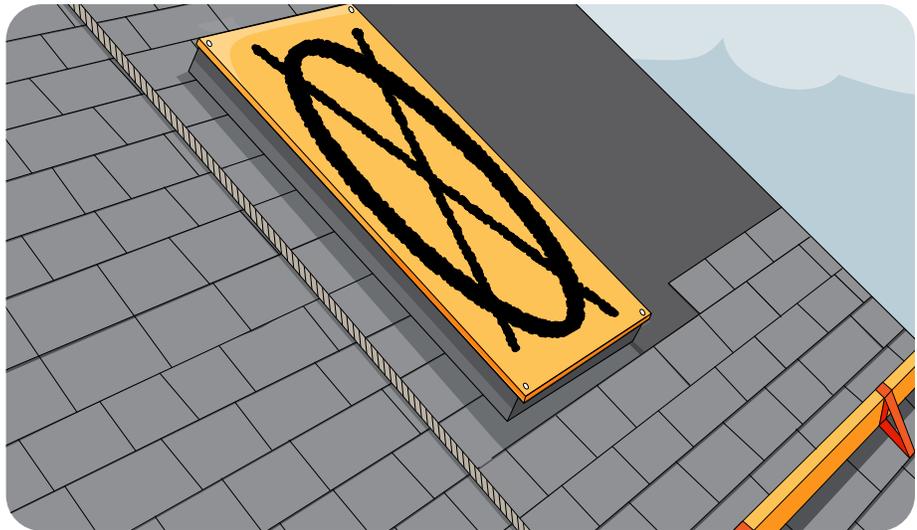
Before loading materials onto a roof, ensure that it can withstand expected loads, including concentrated loads of roofing materials, equipment, and workers. You may need information from a professional engineer.

A professional engineer will be able to determine the maximum safe load and recommend loading patterns. When loading, spread roofing materials across the work area to distribute the load and prevent a dangerous concentration of pressure on the roof.

Fall protection from roofs

Roof work often takes place at elevations where there is a potential for a fall from 3 m (10 ft.) or more above grade, or where a fall from a lesser height could result in serious injury. Employers must ensure a fall protection system is used to protect workers from hazards associated with falls from elevation.

If there are skylights, skylight openings, or other roof openings accessible to workers, guard them with appropriate covers or guardrails. Ensure that these covers or guardrails can withstand potential loads.

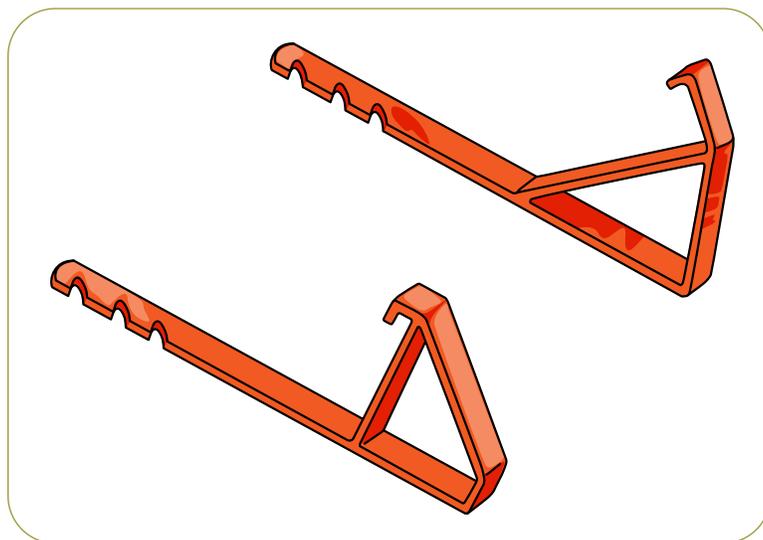


When working around skylights or other roof openings, ensure they're effectively guarded or covered to protect workers from falling.

Toe-holds, roof jacks, and crawl boards (roof ladders)

If the roof material allows for it, workers must use toe-holds if the roof has a slope of 8:12 (8 vertical to 12 horizontal) or more. Toe-holds must be at least 38 mm x 140 mm (2 in. x 6 in. nominal). They're generally installed after workers have installed the first three courses of shingles.

Orient toe-holds with the 6 in. side perpendicular to the roof. When attaching toe-holds to the roof using manufactured roof jacks, follow the manufacturer's instructions.



Examples of roof jacks for toe-holds.

Don't overload toe-holds

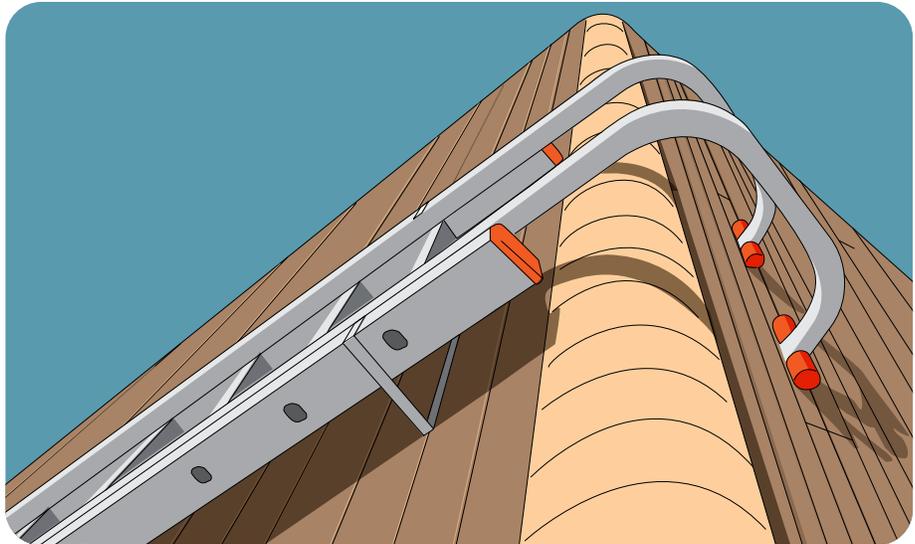
Toe-holds are intended for the positioning of workers. Don't use them to store any material other than what is reasonably required to complete the work at hand.

Another method is to construct an L shape using a 2x4 and 2x6, as illustrated below. It needs to be securely fastened to the roof in a way that's suitable for the roof and the application. It also needs to provide safe footing and be able to withstand any forces likely to be imposed on it. Toenailing a 2x6 to the roof isn't an acceptable method for securing toe-holds.

Workers can use exposed horizontal roof strapping as toe-holds as long as it provides safe footing.



A job-built toe-hold, as required by section 20.75 of the Regulation. The worker is also using a fall protection system, as required by Part 11 of the Regulation.



Crawl boards or roof ladders used for roof work must be securely fastened over the ridge of the roof or otherwise effectively anchored. Don't use eavestroughs for support.

Part 4:

Working at elevation

Fall protection

Working above a floor or grade is part of the job for construction workers. Falls from elevations, such as roofs, raised floors, ladders, scaffolds, and work platforms, are a common cause of injuries in residential construction.

Employers working on residential buildings must ensure a fall protection system is used to protect their workers when work is being done at a height of 3 m (10 ft.) or more above grade, or where a fall from a lesser height could result in serious injury.

Regulation

- Sections 4.54 to 4.63, Work area guards and handrails
- Part 11, Fall protection, and associated guidelines
- Section 20.4, Safe access
- Guideline G20.4(1), Suitable ladders, work platforms, and scaffolds
- Guideline G20.75, Roof work — Fall protection

Web

Webpages at worksafebc.com:

- Fall protection
- Slips, trips & falls

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Types of fall protection

Fall protection systems must be considered in the following order: guardrails, fall restraint, fall arrest, and other procedures acceptable to WorkSafeBC. This is the hierarchy for fall protection.

1. Guardrails

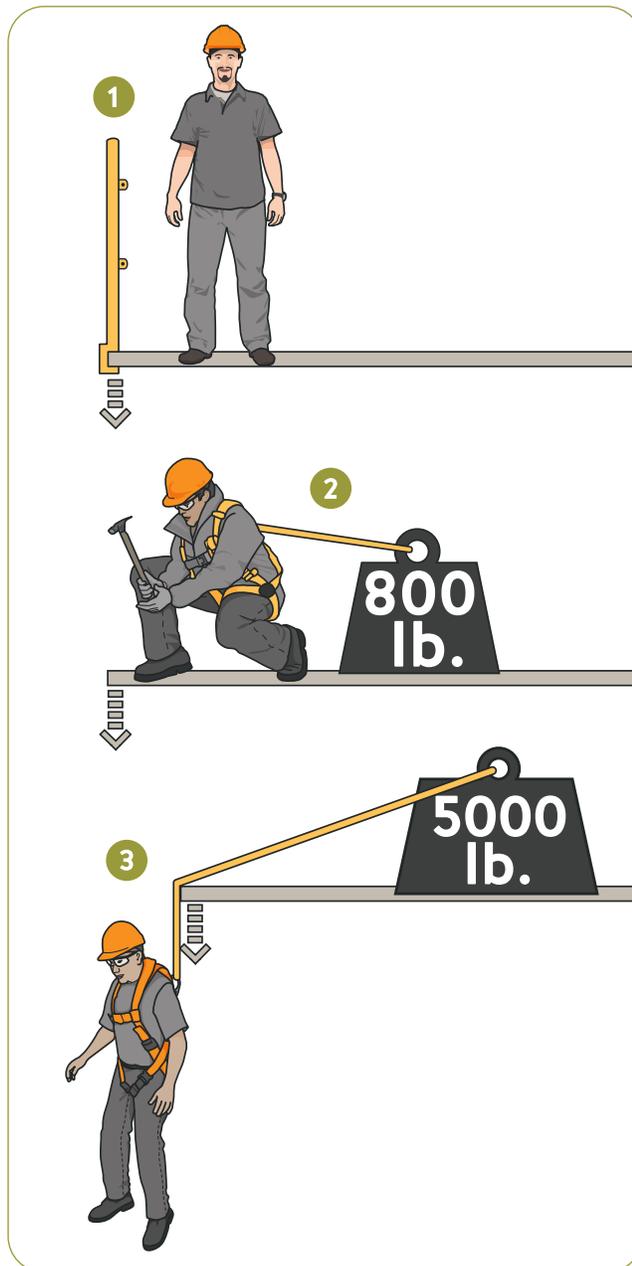
An area accessible to workers must have guards or guardrails installed if any of the following is 122 cm (4 ft.) or more above grade or above the adjacent floor:

- A raised floor
- An open-sided floor
- A mezzanine, gallery, or balcony
- A work platform
- A ramp, walkway, or runway

Specific exceptions are described in section 4.56 of the Regulation.

A guardrail is a guard with a top rail that's 102–112 cm (40–44 in.) above the work surface and a midrail approximately midway between the underside of the top rail and the top of the toeboard, if one is provided, or the work surface if no toeboard is provided.

Where practicable, properly constructed guardrails built as a system and appropriately attached to a structure are the first system of fall protection you must use. If guardrails aren't practicable, the next fall protection system that must be used is fall restraint.



1. Guardrails 2. Fall restraint 3. Fall arrest.

Fall-restraint anchors

An anchor for fall restraint must be able to support at least 3.5 kN (800 lb.) or four times the maximum arrest force.

2. Fall restraint

Fall-restraint systems prevent workers from falling from a work position or from travelling to an unguarded edge from which the worker could fall.

Fall protection equipment typically consists of an anchor, lifeline, lanyard, harness, and connection devices, such as carabiners or rope grabs. Fall protection equipment must meet and be used according to an applicable CSA Group or ANSI standard that was in effect when the equipment was manufactured.



1. Personal fall protection harness. 2. A synthetic webbed anchor strap and a metal roof anchor (ridge anchor). 3. A shock-absorbing lanyard. 4. A vertical lifeline with an attached rope grab and lanyard.

Fall-arrest anchors

An anchor for fall arrest must be able to support at least 22 kN (5,000 lb.) or two times the maximum arrest force.

3. Fall arrest

If guardrails and fall-restraint systems aren't practicable, the next fall protection system that must be used is fall arrest. Fall-arrest systems are designed to catch falling workers before they strike the surface below. They consist of fall-arrest harnesses, shock-absorbing lanyards, and lifelines connected to an adequate anchor point.

4. Other procedures acceptable to WorkSafeBC

As an employer, if you've considered the first three options and none are practicable, or they will result in a hazard greater than if the system was not used, you must ensure that work procedures are followed. The work procedures must be acceptable to WorkSafeBC and minimize the risk of injury to a worker from a fall. You must have a written site-specific fall protection plan when using other procedures acceptable to WorkSafeBC.

For more information, see guideline G11.2(5)-3. It provides a full description of all the acceptable procedures.

Planning for fall protection

Written site-specific fall protection plan

You can download a template for your site-specific fall protection plan at [worksafebc.com/fall-protection-plan](https://www.worksafebc.com/fall-protection-plan).

Planning for fall protection is required for all employers working on residential buildings who will have workers working at elevation. Requirements when planning for fall protection include the following:

- Establish a plan for work at elevation. Work at 7.5 m (25 ft.) or more above grade requires a [written site-specific fall protection plan](#). Written site-specific fall protection plans are also required when using other work procedures acceptable to WorkSafeBC.
- Before workers enter an area where there's a risk of falling, make sure they're instructed in the fall protection system for the area and the procedures they need to follow.
- Workers who will be installing guardrails and additional anchor systems must use fall protection.

In addition to the requirements above, consider the following safe work practices:

- Frame walls with a guardrail system before they're raised to protect workers from fall hazards on the next level (see illustration on page 69).
- Calculate the total fall distance, including factors such as shock-absorbing lanyard deployment and harness stretch.
- Avoid swing-fall hazards when using a fall-arrest system. Place anchors and reduce slack in lifelines to avoid swing-fall hazards. For more information, see the WorkSafeBC book *An Introduction to Personal Fall Protection Equipment*.

Ladders

All types of ladders are used extensively in residential construction. Falls, including falls from ladders, are one of the leading causes of injury in residential construction.

Regulation

- Part 13, Ladders, scaffolds and temporary work platforms
- Section 20.4, Safe access

Web

- Ladders (worksafebc.com webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

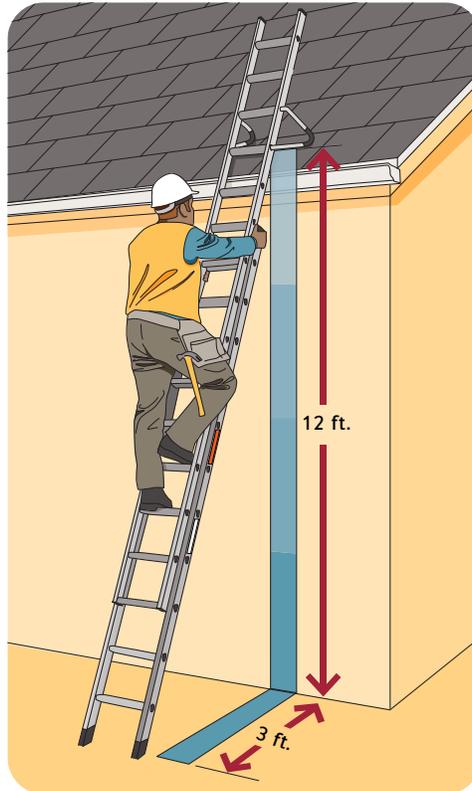
General requirements for safe ladder use

Use the right ladder for the job — for example, an extension ladder, stepladder, or platform ladder. Conduct a risk assessment to make sure the ladder has the proper reach and weight capacity, and that it meets the standard required for the workplace. See the guideline for section 13.4 of the Regulation (“Ladder ratings and selection”) for information on matching the ladder to the load.

Requirements for safe ladder use include the following:

- Select and use ladders that meet CSA Group or ANSI standards, or another standard acceptable to WorkSafeBC (such as WCB standard *LDR 1-2004 – Job Built Ladders*). The following are some examples of requirements in the standards:
 - Don’t splice short sections of ladders together to make longer ladders.
 - Don’t use ladders as scaffolding planks.
 - Don’t paint or coat ladders. This may cover or mask deficiencies or damage.
 - Don’t work from the top two rungs of straight or extension ladders, or the top two steps of stepladders, unless permitted by the manufacturer.
- Always follow the manufacturer’s instructions for the type of ladder you’re using.

- Inspect ladders before use. Don't use damaged ladders. Remove ladders from service if they have missing labels; loose, broken, or missing rungs; split or bent side rails; or other defects that could endanger workers.



Set up extension ladders at a 75-degree angle (4 vertical to 1 horizontal). In this illustration, the ladder is about 12 ft. vertical and 3 ft. horizontal, which is a 75-degree angle. The ladder attachment at the top stabilizes the ladder.



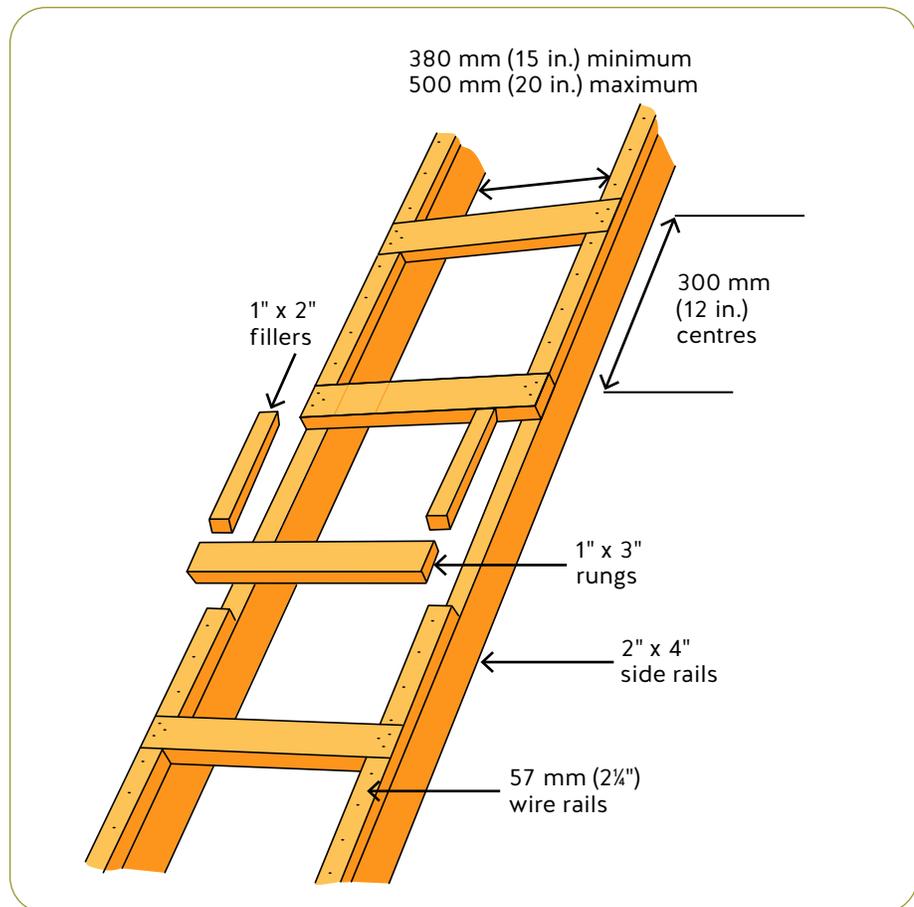
When working from a stepladder, keep two feet on the same step, and support your body with the ladder (using your knees or chest) to maintain three points of contact.

- Set ladders on a firm, level surface.
- When using an extension or straight ladder, set the top of the ladder against a bearing surface that's strong enough to support it.
- When using an extension or straight ladder to access a landing, extend the top of the ladder at least 1 m (3 ft.) above the top edge of the landing. The ladder must be sufficiently secured in place to ensure it's stable when workers get on or off it.
- When using an extension or straight ladder, set the ladder at an angle of 75 degrees, or 4 vertical to 1 horizontal (i.e., for every 4 ft. of height, the ladder should be 1 ft. out from the base of the structure).
- If a ladder isn't being used for access, sufficiently secure it in place so it's stable.

- Maintain three points of contact at all times when climbing (two hands and one foot or two feet and one hand).
- Maintain the limits of approach when working around energized electrical equipment and conductors. (See “Electrical equipment and conductors,” pages 15–20, and refer to the manufacturer’s instructions.)
- Ensure ladders are set up in safe areas. Avoid using ladders in doorways, passageways, or other areas where they might interfere with other work activities.
- When climbing ladders, don’t carry heavy or bulky objects, or any other object that might make ascent or descent unsafe.

Job-built ladders

Wooden job-built ladders are useful on residential construction sites. Typically, they can be built with materials readily available in the workplace. These wooden ladders must be built as specified in WCB standard *LDR 1-2004 – Job Built Ladders*.



A job-built ladder.

Elevating work platforms

Workers operating elevating work platforms, such as self-propelled boom lifts and scissor lifts, may be exposed to the following hazards:

- Falling or tipping over because of slopes, uneven terrain, curbs, holes, or objects on the ground
- Contact with overhead obstructions, such as power lines

Regulation

- Part 13, Ladders, scaffolds and temporary work platforms
- Section 20.4, Safe access

Web

- Scissor lifts ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

General requirements for elevating work platforms

- Select and use elevating work platforms that meet CSA Group or ANSI standards. The following are some examples of requirements in the standards:
 - Ensure that the supporting surface is firm and level. Make sure the wheels are in contact with the ground before elevating or repositioning the platform.
 - Don't stand on guardrails.
 - Don't exceed the working load limit of the elevating work platform with tools, equipment, or workers.
 - Maintain full control of the equipment, and comply with the laws governing its operation at all times.
- Follow the manufacturer's safe operating instructions.
- Ensure only workers who are properly trained operate the elevating work platform. Proper training follows an applicable CSA Group or ANSI standard. These standards provide information for the training and retraining of equipment operators and list the topics that must be covered during training.
- Inspect equipment before use and as required during use to ensure it's operating safely.

- Report to your supervisor or employer any defects or conditions that could affect the safe operation of the equipment. Don't use damaged equipment.
- Before operating equipment, be aware of overhead obstructions and hazards, such as high-voltage power lines. Stay clear of them, and maintain the limits of approach when working around or passing under energized electrical equipment and conductors. (See "Electrical equipment and conductors," pages 15–20, and refer to the manufacturer's instructions.)
- Always wear fall-arrest protection in elevating work platforms. For specific requirements for fall protection on elevating work platforms, see Part 13 of the Regulation.
- 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 within easy reach of the operator. These devices must be labelled STOP and coloured red.

Scaffolds and other work platforms

Types of scaffolds and other work platforms include manufactured (access) frame, wood frame, trestle, ladder-jack, pump-jack, and rolling (baker's) scaffolds. Each of these work platforms have their own requirements. Always follow the manufacturer's instructions.

Regulation

- Part 13, Ladders, scaffolds and temporary work platforms
- Section 20.4, Safe access
- Sections 4.54 to 4.63, Work area guards and handrails

Web

- Scaffolds ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

For more fall protection resources, see “Fall protection,” pages 78–81.

Definitions

Scaffold — Any temporary elevated work platform and its supporting structure used for supporting workers, materials, or equipment.

Work platform — An elevated or suspended temporary work surface used for supporting workers and including a scaffold and boatswain's chair.

General requirements for scaffolds and other work platforms

Select and use scaffolds and work platforms that meet CSA Group or ANSI standards, or another standard acceptable to WorkSafeBC (i.e., WCB standard *WPL 1-2004 – Design, Construction and Use of Wood Frame Scaffolds*). The following are some examples of requirements in the standards:

- Ensure scaffolds are erected, modified, and dismantled by qualified workers or under their direct supervision.
- Vertical supports must be able to support the combined weight of the scaffolding and anything on it.

General requirements for scaffolds and other work platforms also include the following:

- Always follow the manufacturer’s instructions for the type of scaffold or work platform you’re using. A copy of these instructions must be available on site.
- Select the right tool for the job. Depending on the task, you may need to use a scaffold, work platform, elevating work platform, or ladder.
- Ensure scaffolds and work platforms are inspected and are safe and able to withstand the load, regardless of who erected the scaffold. Don’t use damaged equipment.
- Erect scaffolds so the vertical members are plumb with the ledgers and the bearers are level.
- Place vertical supports on bearing plates or sills that rest on a solid surface and can support the weight of the scaffold.
- Only use components that are compatible with the scaffold or work platform. Don’t use pallets, boxes, concrete blocks, bricks, or other unstable material to support scaffolds.
- Ensure safe access is provided to every work platform.
- Ensure that work platforms are strong enough to bear the loads placed on them. Secure work platforms to the supporting equipment, structure, or surface to which they’re attached.
- Ensure that scaffold platforms are at least 50 cm (20 in.) wide, except for work platforms used with ladder jacks, pump jacks, or similar systems. These platforms must be at least 30 cm (12 in.) wide.
- Install guardrails on the open sides of scaffolds where required by the manufacturer’s instructions and the Regulation. You may not need to install guardrails if the platform is next to a structure that provides protection equivalent to guardrails and the open space between the platform and the structure is 30 cm (12 in.) or less.
- Secure scaffolds to a building or structure if the height of the scaffold is greater than three times its minimum base dimension or in any other circumstances if required for stability.

Engineering may be required

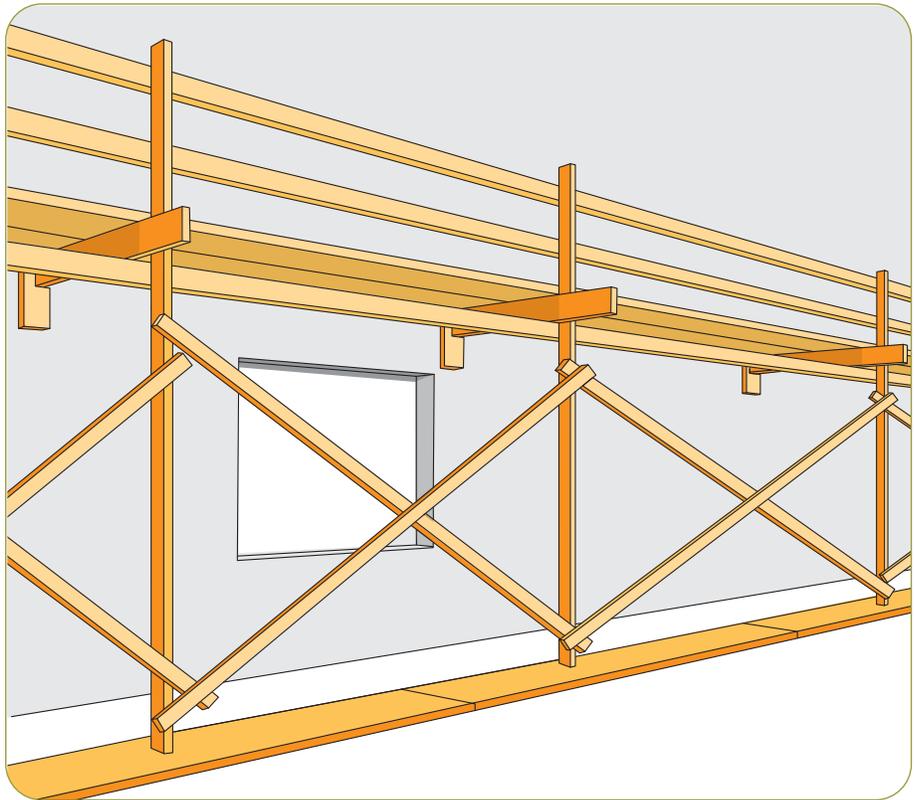
Engineering may be required for your scaffold or work platform — for example, for scaffolds cantilevered from a structure, or scaffolds enclosed by a tarp or any other cover. For more information, see Part 13 of the Regulation.

Wood frame scaffolds

Wood frame scaffolds must be constructed and used according to WCB standard *WPL 1-2004 – Design, Construction and Use of Wood Frame Scaffolds*. The standard provides information on the use of single-pole and double-pole wood scaffolds. This section will focus on single-pole wood scaffolds only because they're more commonly used in residential construction.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.



A single-pole wood scaffold. Don't overload scaffold planks, use them as sills, or subject them to any condition that could affect their integrity.

All wood scaffolding must be constructed using No. 2 or better lumber — either Douglas fir-larch, hemlock-fir, spruce-pine-fir, or coast Sitka spruce. Hand-select scaffolding materials to eliminate split, warped, or otherwise defective lumber.

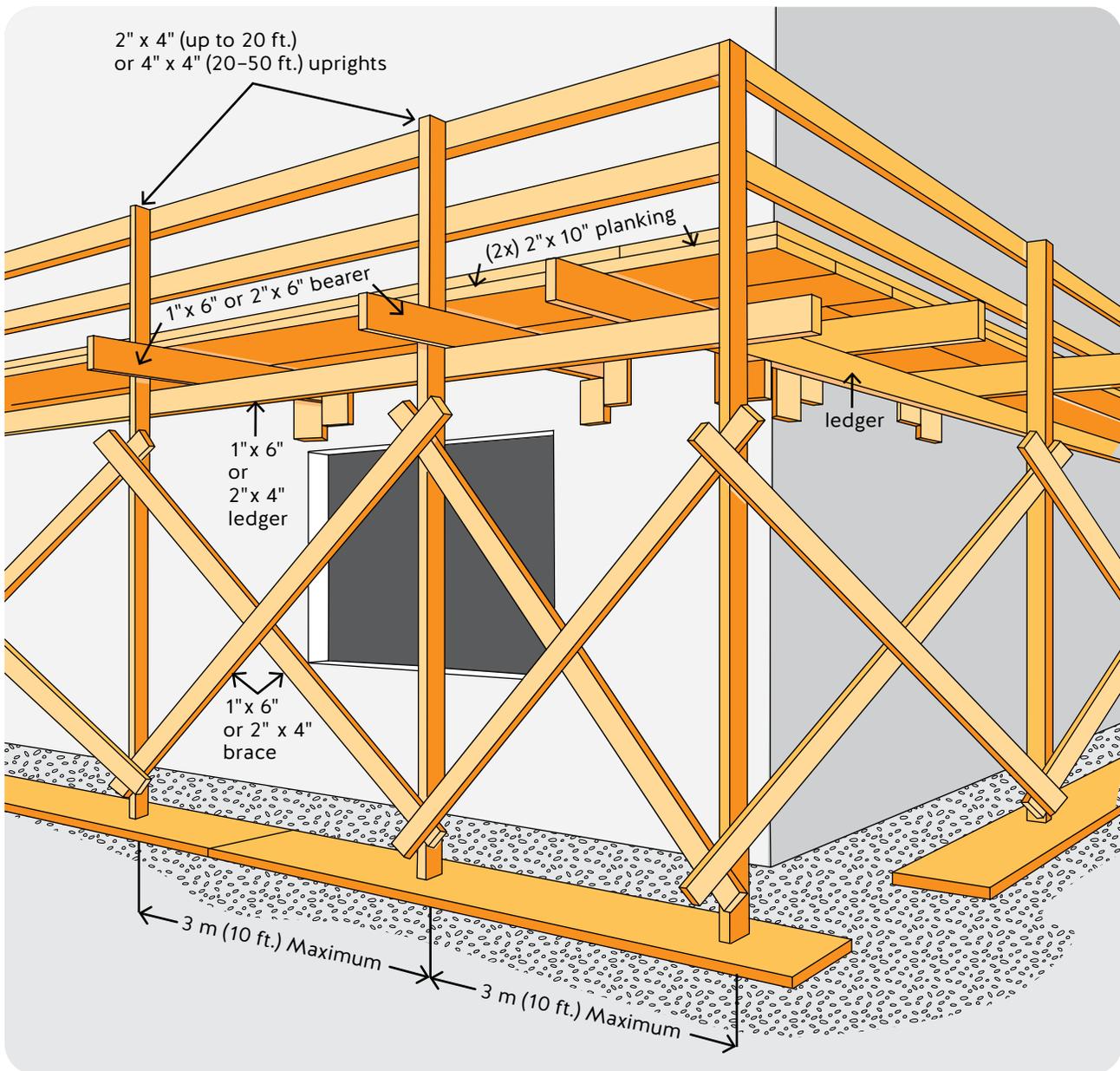
Single-pole wood scaffolds — light duty

The spacing of vertical supports and bearers for a light-duty, single-pole wood scaffold must not exceed 3 m (10 ft.). The inner ends of bearers must be supported by bearer blocks and securely fastened to wall scabs. Refer to the following table.

Scaffold component	Nominal dimensions (inches)*
Uprights <ul style="list-style-type: none"> Up to 6 m (20 ft.) 6–15 m (20–50 ft.) 	2 x 4 4 x 4
Bearers <ul style="list-style-type: none"> 900 mm (3 ft.) maximum span 1.5 m (5 ft.) maximum span 	1 x 6 2 x 6
Ledgers (ribbons)	1 x 6 or 2 x 4
Braces	1 x 6 or 2 x 4
Wall scabs and bearer blocks	2 x 6
Minimum work platform width	2 x 10 (two boards)
Guardrails <ul style="list-style-type: none"> Top, up to 2.4 m (8 ft.) span Top, 2.4–3 m (8–10 ft.) span Intermediate 	2 x 4 2 x 6 2 x 4
Toeboards	1 x 4
Scaffold planks	As required by section 7 or 8 in WCB standard WPL 1-2004 – <i>Design, Construction and Use of Wood Frame Scaffolds</i>

* Dimensions are nominal sizes for surfaced dry lumber. The actual dimensions in millimetres are as follows:

- 2 x 4 = 38 mm x 89 mm
- 4 x 4 = 89 mm x 89 mm
- 4 x 6 = 89 mm x 140 mm
- 1 x 6 = 19 mm x 140 mm
- 2 x 6 = 38 mm x 140 mm
- 2 x 10 = 38 mm x 235 mm



A single-pole wood scaffold set up to provide a safe work area for exterior (building-envelope) work activities at elevation above a floor or grade. You may be required to double some lumber planks, one on top of the other. For more information, see WCB standard WPL 1-2004 – *Design, Construction and Use of Wood Frame Scaffolds*.

Scaffold planks

General requirements that apply to scaffold planks include the following:

- Inspect all scaffold planks before use.
- Ensure that lumber or manufactured scaffold planks used for work platforms consist of at least two planks placed side by side to provide a work surface with a minimum nominal width of 50 cm (20 in.). For ladder-jack and pump-jack platforms, the required width for manufactured planks is 30 cm (12 in.).
- Ensure scaffold planks are secured against separation from the supporting equipment, structure, or surface to which they're attached.
- Scaffold planks should completely cover the area between front and rear vertical supports or the rear guardrail.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Plank specifications

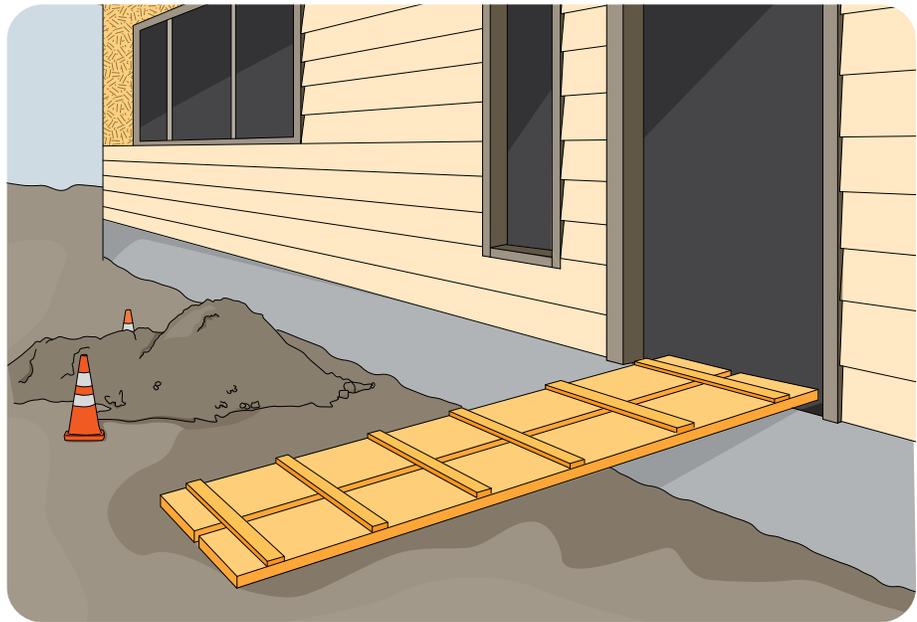
Sawn-wood planks must be hand-selected only from Douglas fir-larch, hemlock-fir, spruce-pine-fir, or coast Sitka spruce. Lumber used for planks must be graded and marked to the National Lumber Grades Authority (NLGA) *Standard Grading Rules for Canadian Lumber*.

Manufactured scaffold planks are available in various lengths and duty ratings. They must be installed and used according to the manufacturer's specifications.

For information on grade and size specifications, see the WorkSafeBC resource *Scaffold planks*.

Ramps and platforms

Safe access must be provided for workers. Sloping platforms must not exceed 1 vertical to 5 horizontal. They must have cleats spaced no more than 400 mm (16 in.) apart or a non-skid surface.

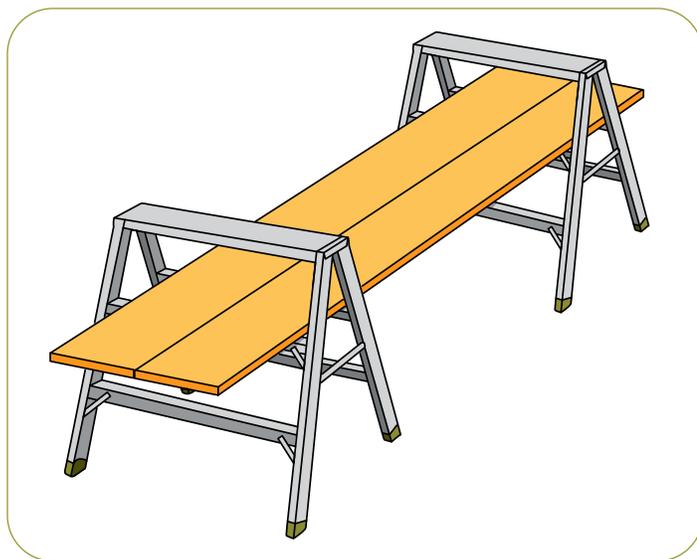


When using sloping platforms for access, make sure they're at least 500 mm (20 in.) wide.

Trestle scaffolds

General requirements that apply to trestle scaffolds include the following:

- Set up and use trestle scaffolds following an applicable standard and the manufacturer's instructions. (Always follow manufacturer's instructions.)
- Don't add extensions to the trestle legs.
- Don't use stepladders for trestle scaffolds.



A trestle scaffold.

Ladder-jack scaffolds

General requirements that apply to ladder-jack scaffolds include the following:

- Set up and use ladder-jack scaffolds according to an applicable standard and the manufacturer's instructions. (Always follow manufacturer's instructions.) Ensure that a copy of the instructions is available on site for workers' reference.
- Only use ladder-jack scaffolds on heavy-duty ladders (CSA Grade 1 or ANSI Type I, with a maximum length of 6 m/20 ft.).
- Ensure the weight limits of the ladder-jack scaffold aren't exceeded.
- Ensure ladders used for the ladder-jack scaffold are sufficiently secured so it's stable.
- Workers on ladder-jack scaffolds must be protected by a fall protection system. (For more information, refer to the manufacturer's instructions.)

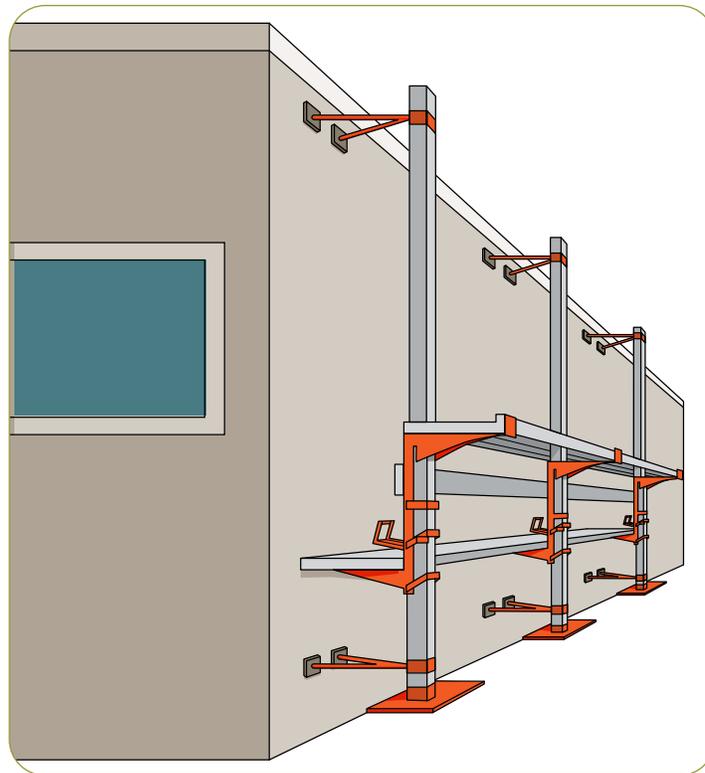


A ladder-jack scaffold system. The manufacturer's instructions may specify that a fall protection system is required at any height.

Pump-jack scaffolds

Requirements that apply to pump-jack scaffolds include the following:

- Erect, operate, and maintain pump-jack scaffolds as per the manufacturer's instructions. Ensure that a copy of these instructions is available on site for workers' reference.
- Secure metal poles as specified by the manufacturer.
- Ensure there's at least one brace up to 7.3 m (24 ft.). Above that height, make sure bracing spans are no more than 4.9 m (16 ft.) from top to bottom.
- Don't use metal poles that are more than 15.2 m (50 ft.) high, unless certified by an engineer.
- Place poles on mud sills or other adequate, firm foundations.
- Ensure the weight limits of the pump-jack scaffold system aren't exceeded.
- Ensure the work platform is secured to the pump-jack brackets and is at least 30 cm (12 in.) wide.
- Ensure workers use fall protection. (For more information, see "Fall protection," pages 78–81, and refer to the manufacturer's instructions.)



Set up and use pump-jack scaffolds as per the manufacturer's instructions.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Manufactured (access) scaffolds

Manufactured (access) scaffolds must be assembled and used as per the manufacturer's instructions and the CSA Group or ANSI standard to which the scaffold was designed. Other requirements include the following:

- Inspect the scaffold before use.
- Set up the scaffold on a firm and level base. The supporting surface where the scaffold is going to be erected must be capable of withstanding the loads likely to be imposed by the set-up and use of the scaffold.
- Ensure the components used in the scaffold structure are compatible and capable of supporting the combined weight of the scaffold and any intended loads.
- Provide an appropriate means of access to each work platform. Some manufacturers include hatches in their scaffold platforms that allow workers to climb up the inside of the end frame.
- Install guardrails where required. If the opening between the scaffold and the adjacent structure is wider than 30 cm (12 in.), guardrails must be installed. If it isn't practicable to use guardrails, there must be another form of fall protection.
- Scaffold planks should completely cover the area between front and rear vertical supports or the rear guardrail. (For more information, refer to the manufacturer's instructions.)
- If the height of the scaffold is more than three times the base dimension, secure the scaffold to the structure.
- If the scaffold is enclosed by a tarp or any other cover, construct, erect, and use the scaffold according to the instructions of a professional engineer.



Ladders must not be used to extend the height of a scaffold. Instead, add another section of scaffold to extend the height.

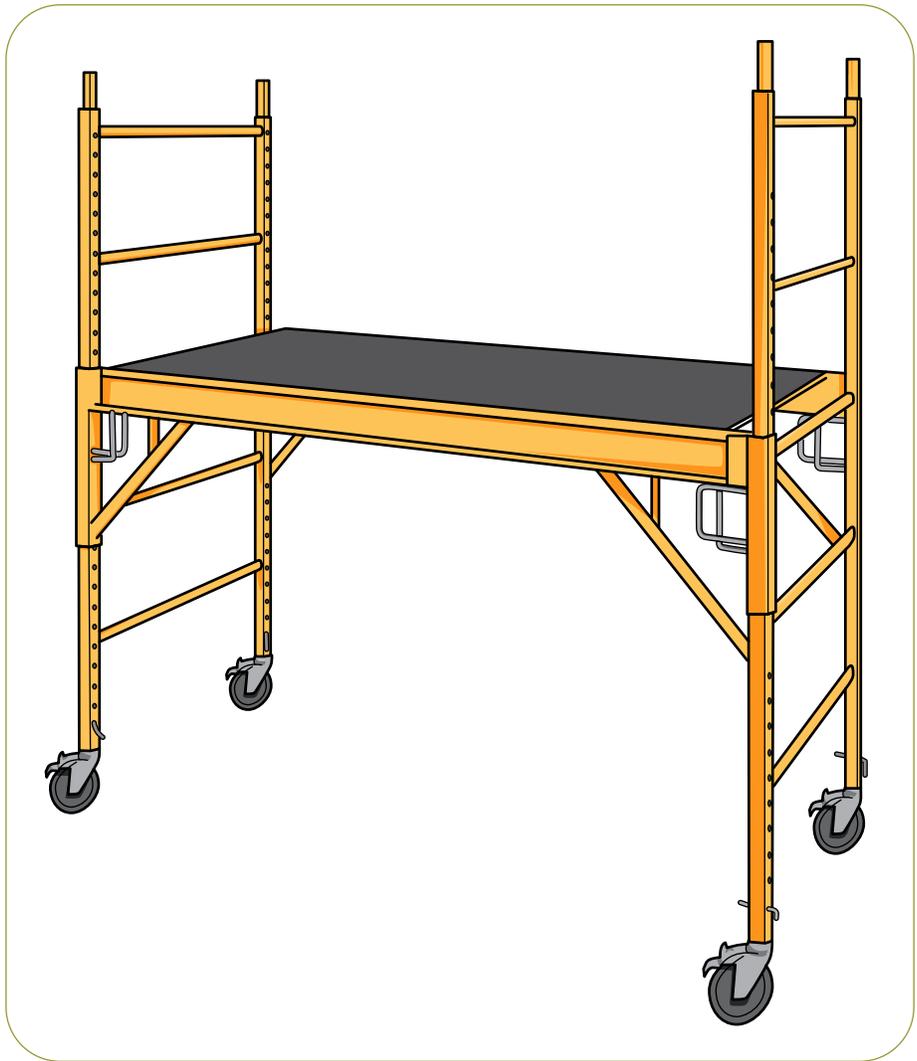
Rolling scaffolds

The following are additional requirements that apply to rolling scaffolds (also known as baker's or mobile scaffolds):

- Ensure that the floor or surface on which the scaffold moves is level and free from pits, holes, depressions, and obstructions. (For more information, refer to the manufacturer's instructions.)
- Don't stay on the scaffold if you're moving it.
- Ensure that at least two of the four scaffold wheels are swivel casters. Install the caster's height-adjusting pins or screws so the casters can't fall out of the scaffold's supporting legs. (For more information, refer to the manufacturer's instructions.)
- Ensure the wheels have locking devices.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.



Rolling scaffolds (also known as baker's or mobile scaffolds) can be hazardous if they're not designed, maintained, assembled, and used according to applicable standards. Set up and use rolling scaffolds as per the applicable standard and the manufacturer's instructions.

Part 5:

Tool and equipment safety

Hand tools

Powered and non-powered hand tools are used widely in residential construction. Frequent and prolonged use of hand tools can lead to musculoskeletal injuries (MSIs), such as strains and sprains. MSIs are also known as soft-tissue injuries. Selecting a well-designed tool that's right for the job can help minimize the risk of injury. For information on ergonomics, see "Ergonomics and the prevention of musculoskeletal injury (MSI)," pages 34–35.

Risk factors

Consider the following risk factors when using hand tools:

- **Force** — The force required will increase when using heavier tools, poorly maintained tools, or the wrong tool for the job. There may be sudden changes in torque or force (torque reaction) when using power tools such as drills. For example, when a drill bit penetrates a material, it will move from requiring a lot of force to none.
- **Duration of use** — MSI risk increases when muscles are tensed in one position for long periods of time.
- **Awkward working positions** — Jobs where access is difficult or where there is limited space can lead to awkward postures.
- **Vibration** — Tools such as chipping hammers, grinders, and some percussive tools can produce significant levels of vibration.
- **Repetition** — Using the same muscles repeatedly or for long periods of time can increase the risk of MSIs.
- **Contact stress** — Force concentrated on a small area of the body can pinch or crush tissue and cause discomfort. An example would be hand tools that dig into the palm of the hand.

Selecting the right tool

Select tools that allow workers to complete tasks effectively while minimizing exposure to risk factors. For example:

- Select tools that are intended for the job. For example, use a hammer to strike a nail, not a pair of pliers.
- Select tools that prevent workers from using awkward postures or positions.

- Select tools that fit the hand, protect against unnecessary contact with the tool (such as pressing into the palm or rubbing the forearm), and provide good control. Avoid ridged or grooved handles, if possible.
- Select lighter tools. Consider suspending heavier tools to minimize forces on arms and shoulders.
- Select well-maintained tools and attachments. Blunt or dull tools require more force to use.
- Select tools that reduce the force that workers need to apply. For example, consider using pneumatic nail guns instead of nailing by hand.
- Select power tools with foam or rubberized grips to help minimize vibration.
- Select tools that can be operated with either hand. This will reduce repetition and accommodate left- and right-handed workers.

Regulation

- Part 12, Tools, machinery and equipment
- Sections 4.46 to 4.53, Ergonomics (MSI) requirements

Web

Webpages at [worksafebc.com](https://www.worksafebc.com):

- Hand tools
- Tools, machinery & equipment

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Power tools

Power tools commonly used in residential construction include portable circular saws, table saws, chainsaws, quick-cut (cut-off) saws, sabre (reciprocating) saws, chop saws, grinders, drills, and other power tools.

Regulation

- Part 12, Tools, machinery and equipment

Web

Webpages at [worksafebc.com](https://www.worksafebc.com):

- Power tools
- Tools, machinery & equipment

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

General safe work practices

Workers must be provided with information, instruction, and training before using power tools. Follow the manufacturer's instructions when selecting and using power tools.

Other considerations when working with power tools include the following:

- Inspect the tool before use. Don't use damaged tools.
- Wear personal protective equipment and clothing, including eye protection, face protection, hearing protection, and respiratory protection, as required.
- Disconnect (lock out) power sources from tools before making any changes or adjustments.
- Don't put power tools down while they're still running.
- Keep your hands away from hazardous points of operation, such as rotating blades or pinch points.
- Ensure safeguards are installed and fully functioning. Don't circumvent safeguards. Use them as required.
- Keep the work area clean.
- Don't operate power tools in explosive atmospheres, such as where there are flammable liquids, gases, or dust. Power tools create sparks, which may ignite dust or fumes.

- When using large hammer drills, the drill bits can suddenly stop or reposition if they strike something, and the drill's torque can twist your wrist severely.

Safe work practices for specific tools

This section lists some safe work practices for working with electric tools, power saws, table saws, quick-cut (cut-off) saws, and abrasive-wheel grinders. This section doesn't include every single tool or safe work practice. Always refer to the manufacturer's instructions for any tool you're using.

Electric tools

Considerations when working with electric tools include the following:

- Make sure tools are properly grounded or double insulated. Grounded tools must have a three-wire cord with a three-prong plug that's plugged into a properly grounded three-pole outlet. Don't break off a plug's third (ground) prong.
- Always turn off the power by using the tool's on-off switch. Don't disconnect the power supply by pulling or jerking the cord from the outlet. Pulling the cord rather than the plug can result in electric shock.
- Suspend power cords over walkways or working areas wherever possible to eliminate tripping hazards.
- Don't allow vehicles or equipment to run over unprotected power cords. If left unprotected, cords can be damaged even though they may appear to be intact.
- Don't use light-duty power cords for heavy load applications.
- Don't carry electric tools by the power cord.
- Don't tie knots in power cords. Knots can cause short circuits and electric shocks.
- Don't overload a circuit.

Power saws

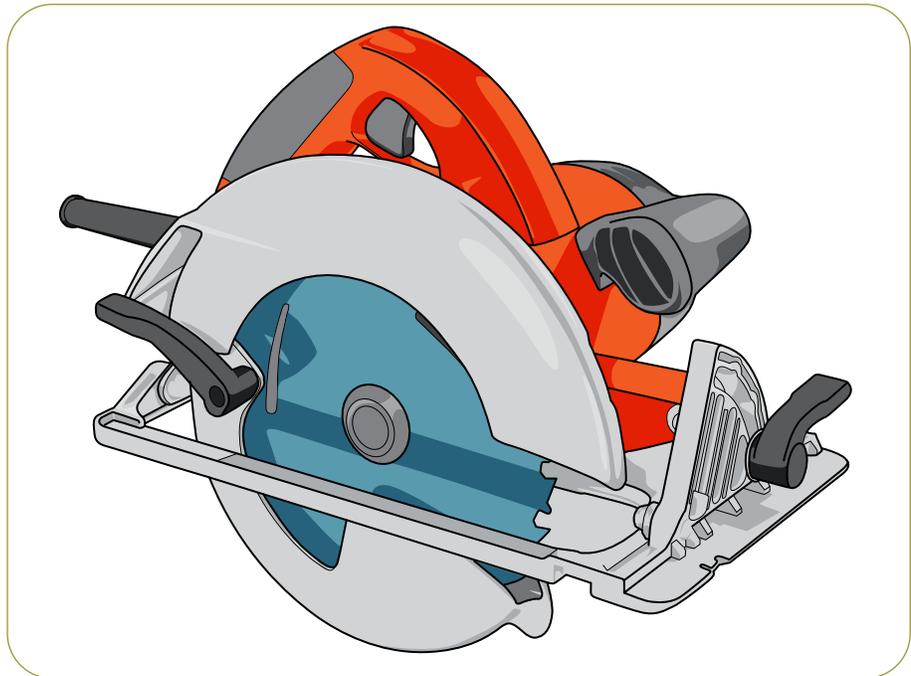
Power saws include circular saws, sabre (reciprocating) saws, and mitre saws. Considerations when working with power saws include the following:

- Secure the material to be cut to prevent binding and kickback.
- Don't pinch material onto a running saw blade. Always let material fall after a cut.
- Use the right blade for the material you're cutting. Make sure the blade is sharp and installed correctly.

- Before cutting materials, check for obstructions or foreign objects, such as nails or screws, in the cutting path.
- Before cutting materials, ensure the worker is positioned in a safe location to prevent contact with hazardous points of operation, pinch points, and kickback.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.



An electrically powered, portable circular saw.

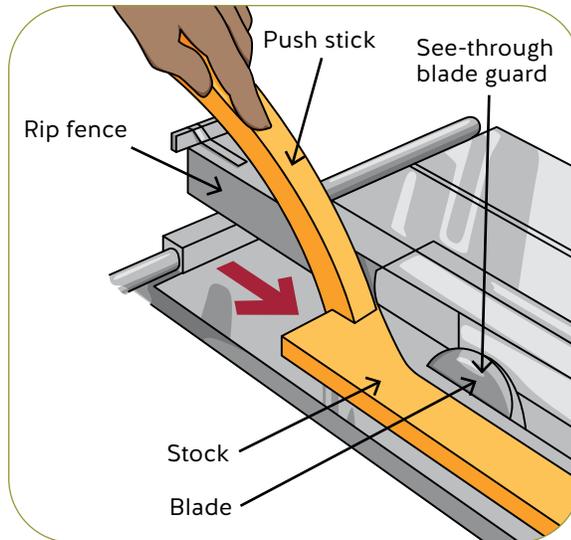
Table saws

Considerations when working with table saws include the following:

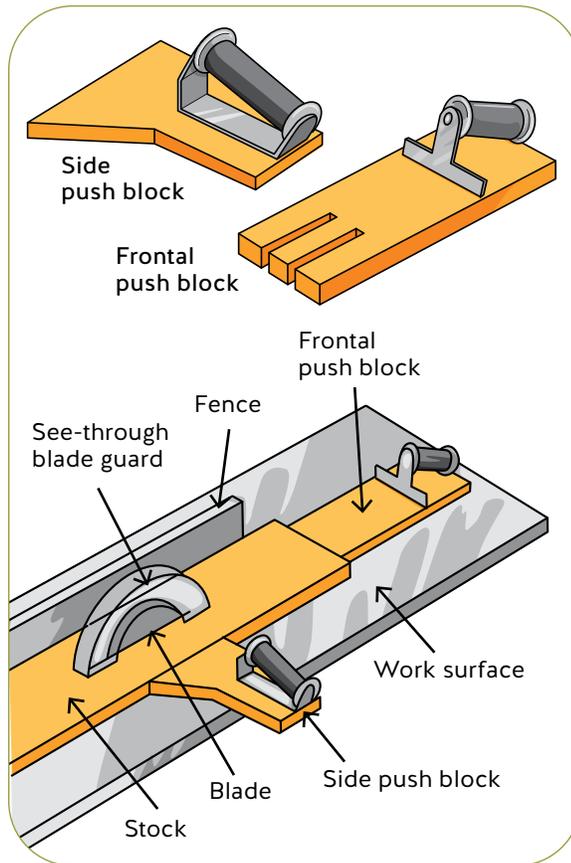
- Keep your hands clear of the saw cut while operating the saw.
- Keep your body to the side of the saw blade, out of the line of a potential kickback.
- Ensure the saw blade doesn't extend more than 6 mm ($\frac{1}{4}$ in.) above the top surface of the material being cut.
- Use the saw-blade guard with a spreader and anti-kickback fingers for ripping or cross-cutting operations.
- Always use a push stick.
- Don't perform free-hand sawing.
- Don't reach around or over a moving saw blade.
- Don't leave the table saw unattended while the saw blade is moving.

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.



Using a single push stick.



Using two push blocks for a single application.

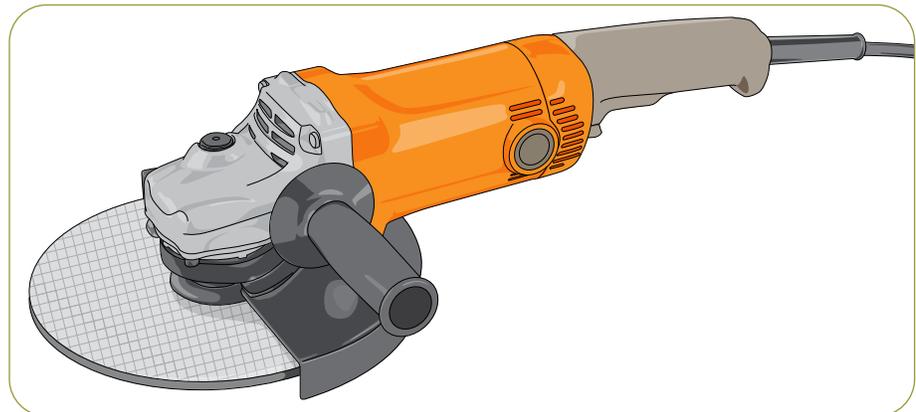
Quick-cut (cut-off) saws

Considerations when working with quick-cut (cut-off) saws include the following:

- Shut off the engine before refuelling. Refuel in a well-ventilated area, preferably outside. Clean up gas spills immediately so vapours won't come into contact with any form of ignition.
- Ensure the saw blade comes to a complete stop before placing the saw on the ground. Saw blades rotate at high speed. A saw blade can continue to rotate after you shut off the power supply.
- Exhaust fumes from combustion engines contain carbon monoxide. If a worker may be exposed to exhaust fumes, appropriate controls must be in place. For more information, see "Hazardous materials, substances, and products," pages 23–32.
- Dust generated as a result of cutting must be controlled. For example, cutting concrete or masonry generates crystalline silica dust that can be breathed in. For more information, see "Hazardous materials, substances, and products," pages 23–32.
- Hot sparks when cutting ferrous metals, such as sheet metal or solid steel, can create a fire hazard. Ensure appropriate controls are in place to protect the worker, other workers in the area, and the surrounding work area.

Abrasive-wheel grinders

Portable and fixed grinding wheels are designed to operate at very high speeds. When they shatter, the fragments can travel at 500 km/h (300 mph) and cause serious injury. Workers using grinders should be trained to use them safely and should know about rpm (revolutions per minute) limitations.



Electrically powered, portable abrasive-wheel grinder (angle grinder).

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Considerations when working with abrasive-wheel grinders include the following:

- Use only abrasive wheels that match the diameter and speed (rpm) rating of the grinder. A low-rpm abrasive wheel may shatter on a high-rpm grinder.
- Inspect grinding stones and abrasive wheels for nicks, cracks, and other defects. Replace them immediately if they're damaged.
- Don't use the side of the wheel for grinding unless it's designed for such use.
- Before setting a portable grinder down, turn it off and wait until it stops completely.
- Ensure guards are in good working order and are being used. Refer to the manufacturer's instructions for the appropriate guard to be used with the proper type of blade, stone, or wheel.

Pneumatic nailing and stapling tools

Workers using nail guns and stapling tools are at risk of injuring themselves and nearby workers. Most incidents are hand and finger injuries, but there can be serious injuries if a nail is shot into a worker's chest, face, eye, head, or abdomen.

Regulation

- Part 12, Tools, machinery and equipment

Web

- Tools, machinery & equipment ([worksafebc.com](https://www.worksafebc.com) webpage)

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Safe work practices for pneumatic nailing and stapling tools

Workers must be provided with information, instruction, and training before using pneumatic nailing and stapling tools. Follow the manufacturer's instructions when selecting and using tools.

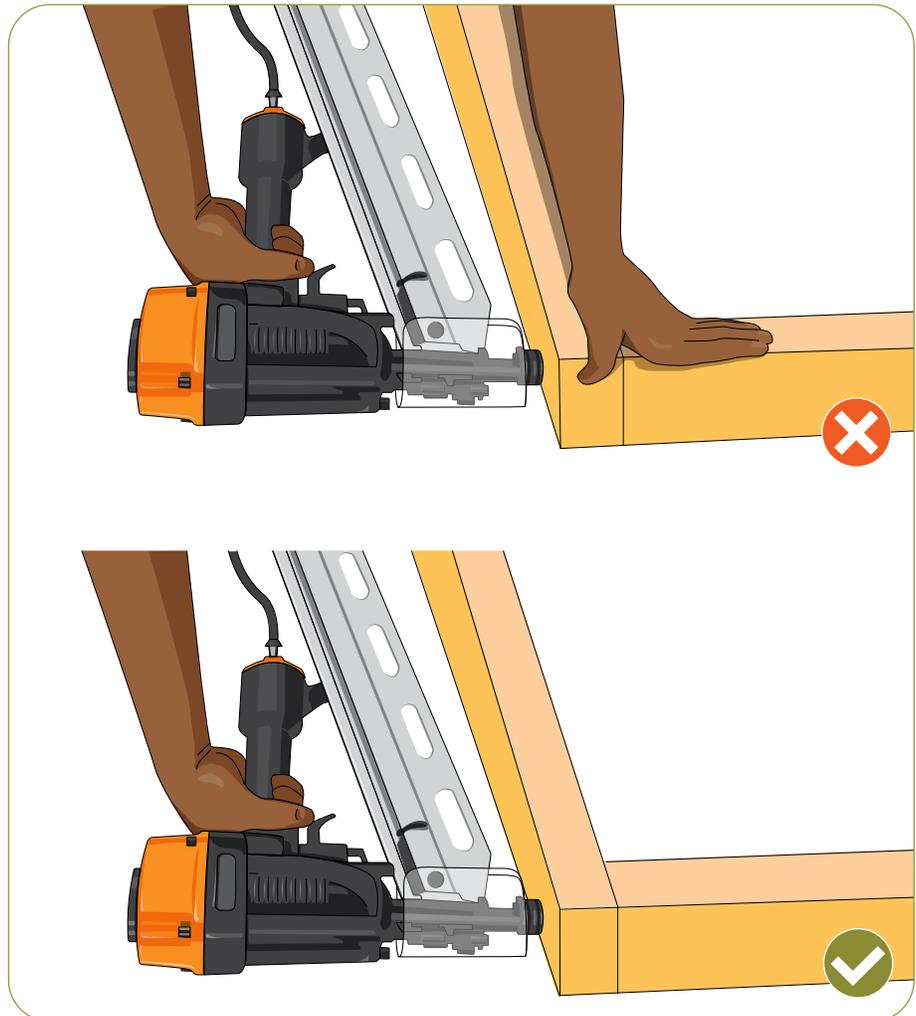
Considerations when working with pneumatic nailing and stapling tools include the following:

- Make sure the tool is maintained in safe operating condition.
- Inspect the tool and equipment components before use.
Don't use damaged tools or equipment.
- Wear eye and hearing protection.
- Before use, make sure the tool is connected tightly to the air supply.
- Don't operate the tool at air pressures above the manufacturer's specifications.
- Always assume the tool contains fasteners.
- Before adjusting or servicing the tool, you must disconnect the air supply.
- Don't point the tool at yourself or anyone else.
- Don't squeeze the trigger unless the point of operation is directed at a safe work surface.
- Keep your finger off the trigger between tasks, such as when walking around.

- The trigger of a pneumatic nailing or stapling tool must not be taped or otherwise secured in the “on” position, or held in the “on” position while moving between tasks.
- Don’t overreach when using the tool.
- Don’t use compressed air to blow dust or debris from your clothing. Air can be forced through your skin and into blood vessels. This can lead to a serious injury that may require surgery.

Sequential trip versus contact trip

Consider using sequential trip instead of contact trip. With contact trip, you depress the trigger and then place the gun’s nose against the nailing surface. Every time the gun’s nose hits a surface, a nail fires. With sequential trip (or restricted trip), you place the gun’s nose against the nailing surface and then pull the trigger. This prevents the accidental release of a nail and the chance of a second nail firing if the gun recoils.



When using a pneumatic nail gun, make sure you hold the material you’re nailing at a safe distance from the point of contact.

Chainsaws

Workers using chainsaws are at risk of injuring themselves or nearby workers. Most incidents are hand and finger injuries, but there can be serious injuries with chainsaws.

Regulation

- Part 12, Tools, machinery and equipment

Web

Webpages at worksafebc.com:

- Power tools
- Tools, machinery & equipment

Other WorkSafeBC resources

For more information on this topic, see the resources listed on pages 118–126.

Safe work practices for chainsaws

Workers must be provided with information, instruction, and training before using chainsaws. Follow the manufacturer's instructions when selecting and using chainsaws.



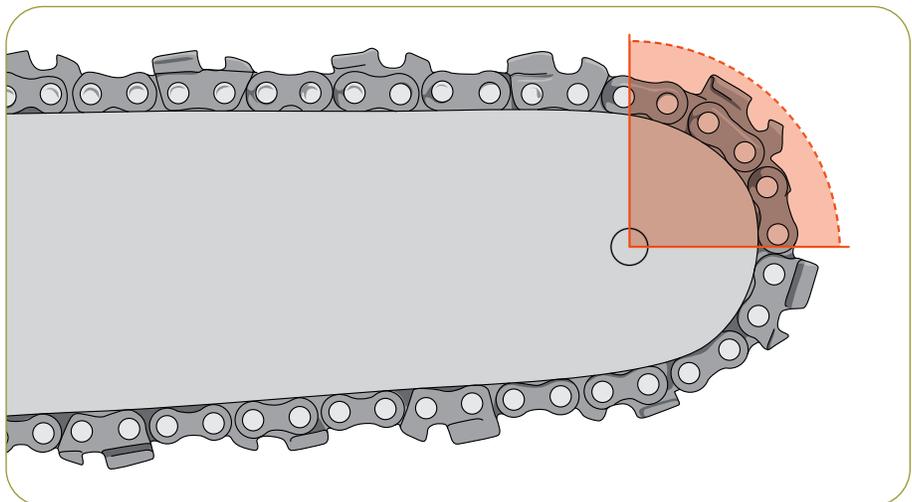
A gas-powered chainsaw.

Considerations when working with chainsaws include the following:

- Ensure the chainsaw has been maintained.
- Always inspect the chainsaw before use. Don't use the chainsaw if it's damaged.
- Wear eye and face protection, hearing protection, and protective leg devices (chaps).
- Make sure the chainsaw has a chain break and low-kickback chain. Ensure the chain brake is functional. If the brake doesn't stop the chain, don't use the saw.
- Don't try to cut anything other than wood with a chainsaw.
- Hold the saw securely with both hands. Wrap your fingers and thumbs around the handles. This grip helps prevent your hands from being dislodged and provides control in the event of a kickback.
- Know where the bar tip is at all times.
- Don't allow the material to bind (close) on the saw chain.
- Never walk around with a running saw.
- Don't operate the saw on a ladder.
- Don't use the saw above shoulder height.

Kickback

The most common hazard associated with using chainsaws is a violent kickback, which can result in serious injury. Kickback can occur when the nose or tip of the guide bar touches an object or when wood closes and pinches the saw chain during the cut. Kickback may result in a lightning-fast reverse reaction, kicking the guide bar up and back toward the operator.



Avoid contact with the kickback zone (highlighted in red).



Before using a chainsaw, make sure the cutting area is clear. Secure the material you're cutting. The black circle in the image on the right shows a point of contact, which can lead to kickback.

Appendixes

Contact information

Worksafebc.com

WorkSafeBC provides a number of services and materials that will help you meet your health and safety requirements:

- Go to [worksafebc.com/forms-resources](https://www.worksafebc.com/forms-resources) for forms, publications, videos, and other resources.
- Go to [worksafebc.com/law-policy](https://www.worksafebc.com/law-policy) for a searchable version of the Regulation and its accompanying guidelines and policies.

Construction-specific resources

For other publications and resources that may be of interest, go to [worksafebc.com](https://www.worksafebc.com) and search for “construction.”

WorkSafeBC Prevention Information Line

The Prevention Information Line can answer your questions about health and safety, including responsibilities, first aid, reporting incidents, and finding an officer in your area. Anonymous calls are accepted.

Call 604.276.3100 in the Lower Mainland or 1.888.621.7233 (1.888.621.SAFE) toll-free in Canada.

BC Construction Safety Alliance (BCCSA)

BCCSA is the safety association for B.C.’s construction industry. BCCSA is a non-profit organization funded by the industry. It provides more than 40,000 employers with free safety training, consultation services, and resources to help them improve safety for approximately 180,000 workers in B.C.

BCCSA contact information

Phone: 604.636.3675

Web: [bccsa.ca](https://www.bccsa.ca)

Email: info@bccsa.ca

Employers' Advisers

The Employers' Advisers Office is a branch of the B.C. Ministry of Labour, independent of WorkSafeBC. Employers' advisers are funded by the WorkSafeBC premiums collected from employers. At no additional cost, advisers provide impartial advice, assistance, representation, and training to employers about workers' compensation legislation, decisions, appeals, and policies.

Employers' advisers have a right to access WorkSafeBC information on your behalf, but they can't file reports for you. Employers' advisers also conduct educational seminars for employers on topics such as occupational health and safety requirements, claims management, disability management, and assessments.

You can visit the [Employers' Advisers Office website](#) or contact a regional office for help. You can reach all Employers' Advisers regional offices using the following numbers:

- Phone: 604.713.0303 in the Lower Mainland
- Toll-free: 1.800.925.2233 from anywhere in Canada

Other WorkSafeBC resources

To find the resources listed in this section, go to [worksafebc.com/forms-resources](https://www.worksafebc.com/forms-resources) and search for the resource name.

Planning and scheduling

- [Training and orientation for young and new workers: A guide for residential construction employers](#) (information sheet)
- [Construction project checklist: Overview of safety requirements for general construction](#) (checklist)

The checklist summarizes the basic safety requirements for construction that are specified in the Regulation and the Act. It's meant to help employers, prime contractors, and homeowners working on residential buildings comply with these requirements.

Health and safety responsibilities

- [Construction Compliance: Field Officer Guide](#) (infoflip)
- [Health and safety responsibilities: Construction](#) (toolbox meeting guide)
- [Managing Safety from the Supervisor's Perspective](#) (infoflip)
- [The Supervisor](#) (video and discussion guide)
- [Supervisor safety resources](#) (resource guide)

Hazard identification and risk control

- [Risk assessment checklist for ladder safety](#) (checklist)
- [Safety controls: Levels of effectiveness](#) (bulletin)

Electrical equipment and conductors

- [Call before you dig](#) (toolbox meeting guide)
- [Electrical Safety](#) (web book)
- [Form 30M33: Assurance of Compliance with Occupational Health and Safety Regulation, Part 19](#) (form)
- [Overhead high-voltage electricity](#) (toolbox meeting guide)
- [Prevention of Damage to Buried Facilities in British Columbia](#) (book)
- [Working Safely Around Electricity](#) (book)

Traffic control

- [Distracted attention – mobile phone use and walking](#) (bulletin)
- [Worksite Dangers for Traffic Control Persons](#) (video)

Hazardous materials, substances, and products

- [Exposure Registry Program](#) (form 41M1)
- [Eye exposure to Portland cement and similar products can cause severe burns](#) (bulletin)
- [Occupational disease resources for the construction industry](#) (resource guide)
- [Polychlorinated biphenyl \(PCB\) exposure during building maintenance and demolition](#) (risk advisory)
- [Volatile organic compound exposure during roof installation](#) (risk advisory)
- [WHMIS 2015: The Basics](#) (book)

Crystalline silica

- [Exposure control plan for chip hammering and jackhammering](#)
- [Exposure control plan for cutting concrete](#)
- [Exposure control plan for cutting fibre cement board](#)
- [Exposure control plan for cutting, grinding, and polishing stone containing crystalline silica \(quartz\)](#)
- [Exposure control plan for drilling concrete](#)
- [Learn about the dangers of breathing silica dust](#) (toolbox meeting guide)

Isocyanates

- [Isocyanates in industry](#) (bulletin)

Lead

- [Exposure control plan for the removal of lead-containing paint, using hand tools](#)
- [Safe Work Practices for Handling Lead](#) (book)

Carbon monoxide

- [Carbon monoxide in industry](#) (bulletin)
- [Workers poisoned by carbon monoxide while using heater](#) (hazard alert)

Propane

- [Preventing explosions in shipping containers used outside the shipping industry](#) (bulletin)
- [Propane safety](#) (toolbox meeting guide)

Storing hazardous substances and products

- [Preventing explosions in shipping containers used outside the shipping industry](#) (bulletin)
- “Reusing shipping containers creates risk of explosion” (*WorkSafe Magazine*, March/April 2017)
- [Storage of explosive or flammable materials in shipping containers](#) (risk advisory)

Confined spaces

- [Confined Space Entry Program: A Reference Manual](#) (book)
- [Confined spaces can be deadly spaces](#) (toolbox meeting guide)
- [Hazards of Confined Spaces](#) (book)
- [Precious Time: The Cody McNolty Story](#) (video)

Ergonomics and the prevention of musculoskeletal injury (MSI)

- [Assessing the risk of sprains and strains](#) (information sheet)
- [Lifting in the Workplace](#) (video)
- [Preventing Musculoskeletal Injury \(MSI\): A Guide for Employers and Joint Committees](#) (book)
- [Understanding the Risks of Musculoskeletal Injury \(MSI\): An Educational Guide for Workers on Sprains, Strains, and Other MSIs](#) (book)
- [Worksheet “A”: MSI Risk Factor Identification](#) (form)
- [Worksheet “B” MSI Risk Factor Assessment](#) (form)

Personal protective equipment (PPE) and clothing

- [Basic personal protective equipment and clothing](#) (toolbox meeting guide)

Hearing protection

- [How loud is it? – Construction](#) (bulletin)
- [Hearing protection for residential construction](#) (toolbox meeting guide)

- [Noise control and hearing conservation program: Small employer sample](#) (information sheet)
- [Selecting hearing protection](#) (information sheet)
- [Sound Advice: A Guide to Hearing Conservation Programs](#) (book)
- [When you use foam earplugs...](#) (sign)

Eye and face protection

- [Eye and face protection](#) (toolbox meeting guide)
- [Grinders: What's the Right Eye Protection?](#) (slide show)
- [Safety eyewear for workers who wear glasses or contact lenses](#) (information sheet)

Respiratory protection

- [Breathe Safer: How to Use Respirators Safely and Start a Respirator Program](#) (book)
- [Facial hair and respirators](#) (information sheet)
- [Respirator responsibilities – workers](#) (information sheet)

First aid

- [Sample Exposure Control Plan for Biological Agents for Occupational First Aid Attendants \(OFAAs\)](#)
- [First aid assessment flow chart](#)
- [First Aid Assessment Worksheet](#)

Delivery, storage, and access to work areas

- [15 tips to reduce sprains and strains in construction](#) (information sheet)
- [Drywall delivery safety access hatch](#) (information sheet)
- [Drywall Handling](#) (video)
- [Preventing explosions in shipping containers used outside the shipping industry](#) (bulletin)
- [Safe drywall delivery options for prime contractors](#) (information sheet)
- [Stairway landings, ramps, and walkways](#) (toolbox meeting guide)

Demolition and renovation

Asbestos

- [Ten simple steps to complying with asbestos abatement](#) (information sheet)

- [Asbestos: Frequently asked questions \(for homeowners\)](#) (pamphlet)
- [Asbestos in Construction](#) (video series: [workers](#), [contractors](#), [homeowners](#))
- [Asbestos removal](#) (toolbox meeting guide)
- [Health hazards of asbestos](#) (toolbox meeting guide)
- [Occupational disease resources for the construction industry](#) (resource guide)
- [Safe Work Practices for Handling Asbestos](#) (book)

Lead

- [Exposure control plan for the removal of lead-containing paint, using hand tools](#)
- [Safe Work Practices for Handling Lead](#) (book)

Demolition requirements

- [Asbestos hazards in demolition, renovation, and salvage](#) (bulletin)
- [Natural gas service must be disconnected before demolition of houses and other structures](#) (bulletin)
- [Occupational disease resources for the construction industry](#) (resource guide)
- [Renovation and restoration projects: Low bid may not meet environmental or workplace safety requirements](#) (bulletin)

Trenches and excavations

- [Additional excavation requirements](#) (toolbox meeting guide)
- [Call before you dig](#) (toolbox meeting guide)
- [Excavation safety resources: Locating underground facilities and services](#) (resource guide)
- [Excavation safety resources: Understanding the risks and planning for worker safety](#) (resource guide)
- [Trenches and excavations – general requirements](#) (toolbox meeting guide)

Concrete formwork, falsework, and placing

- [Backshoring vs. reshoring in drop head slab formwork systems – detailed background](#) (bulletin)
- [Backshoring vs. reshoring in drop head slab formwork systems – overview](#) (bulletin)
- [You're a Pro: Falls from Formwork](#) (video)

Concrete reinforcing (rebar)

- *Concrete reinforcing: Awkward postures, repetitive tasks involving wrists boost MSI risk* (toolbox meeting guide)
- *Concrete reinforcing: Bending over at the waist poses MSI risk* (toolbox meeting guide)
- *Concrete reinforcing: Contact stress to hands can increase risk of MSI* (toolbox meeting guide)
- *Concrete reinforcing: Contact stress to shoulders poses MSI risk* (toolbox meeting guide)
- *Concrete reinforcing: Overexertion can increase risk of MSI* (toolbox meeting guide)
- *Rebar tying tool* (information sheet)

Concrete placing and pumping

- *Concrete pouring and pumping* (toolbox meeting guide)

Framing

- *Floor and roof openings* (toolbox meeting guide)
- *Framing – setting trusses* (toolbox meeting guide)
- *An Introduction to Personal Fall Protection Equipment* (book)
- *Stay on top – resources: Preventing serious injury & falls from elevation* (information sheet)

Lifting walls

- *Lifting in the Workplace* (video)
- *Lifting walls* (toolbox meeting guide)

Trusses

- *Framing – setting trusses* (toolbox meeting guide)
- *Long Span Trusses* (video)
- *Preparing for truss erection* (toolbox meeting guide)
- *Roof more than 4 in 12 but less than 8 in 12* (toolbox meeting guide)
- *Temporary bracing during truss erection* (toolbox meeting guide)

Roof work

- *Flat roofs or roofs up to 4 in 12 slope* (toolbox meeting guide)
- *Floor and roof openings* (toolbox meeting guide)
- *Roof jacks and toeholds* (toolbox meeting guide)
- *Roof more than 4 in 12 but less than 8 in 12* (toolbox meeting guide)
- *Roofs 8 in 12 slope or more* (toolbox meeting guide)
- *Working on a roof? Don't overload it!* (hazard alert)

Fall protection

- [Anchors](#) (toolbox meeting guide)
- [Fall Protection](#) (web book)
- [Fall Protection Can Save Your Life](#) (video)
- [Fall restraint or fall arrest?](#) (toolbox meeting guide)
- [An Introduction to Personal Fall Protection Equipment](#) (book)
- [Preventing Falls in Residential Construction](#) (web book)
- [Swing-fall hazards](#) (toolbox meeting guide)
- [Using anchors in fall protection systems](#) (bulletin)
- [Using the right lanyard](#) (toolbox meeting guide)
- [Written site-specific fall protection plan](#) (toolbox meeting guide)

Ladders

- [Construction safety series](#) (toolbox meeting guides)
- [Is this the right tool for the job? Stepladder safety in construction](#) (toolbox meeting guide)
- [Job-built ladders](#) (toolbox meeting guide)
- [Ladder Safety in Construction](#) (web book)
- [Risk assessment checklist for ladder safety](#) (checklist)
- [Trestle scaffolds; shore and lean-to scaffolds](#) (toolbox meeting guide)
- WCB standard [LDR1-2004 – Job Built Ladders](#)

Elevating work platforms

- [Self-propelled boom lifts](#) (toolbox meeting guide)
- [Self-propelled scissor lifts](#) (toolbox meeting guide)
- [Worker on Scissor Lift Electrocuted](#) (slideshow)

Scaffolds and other work platforms

- [Scaffolding safety checklist](#) (checklist)
- [Scaffold requirements](#) (toolbox meeting guide)
- [Some Ideas Are Ridiculously Dangerous: Scaffold Safety](#) (video)
- [Trestle scaffolds; shore and lean-to scaffolds](#) (toolbox meeting guide)

Wood frame scaffolds

- [Bearer connections at wall](#) (toolbox meeting guide)
- [Wood scaffold erection guidelines](#) (toolbox meeting guide)
- WCB standard [WPL 1-2004 – Design, Construction and Use of Wood Frame Scaffolds](#)

Scaffold planks

- [Manufactured scaffold planks](#) (toolbox meeting guide)
- [Scaffold planks](#) (toolbox meeting guide)
- [Testing procedure for scaffold planks](#) (toolbox meeting guide)

Pump-jack scaffolds

- [Pump jack scaffolding requirements](#) (toolbox meeting guide)

Rolling scaffolds

- [The hazards of baker's scaffolds](#) (bulletin)
- [Manufactured scaffold planks](#) (information sheet)
- [Rolling scaffolds](#) (toolbox meeting guide)

Hand tools

- [Balanced tool belts can start your back off in the right position](#) (information sheet)
- [Hand tool ergonomics](#) (information sheet)
- [Selecting hand tools in construction trades](#) (information sheet)
- [Suspending tools prevent back, arm, and shoulder fatigue](#) (information sheet)

Power tools

- [Hammer drill support arm](#) (information sheet)
- [Power tools and cords](#) (toolbox meeting guide)

Power saws

- [Circular Saw Guarding](#) (video)
- [Circular Saw Kickback](#) (video)
- [Safe use of portable circular saws](#) (toolbox meeting guide)

Table saws

- [Safeguarding table and panel saws: Crew handout for workers](#) (safety talk)
- [Safeguarding table and panel saws: Crew talk for employers and supervisors](#) (safety talk)
- [Safeguarding table and panel saws: Checklist for employers and supervisors](#) (checklist)
- [Safe use of table saws](#) (toolbox meeting guide)

Abrasive-wheel grinders

- [Angle Grinders](#) (video)
- [Grinders: What's the Right Eye Protection?](#) (slide show)
- [Hand-held grinders](#) (toolbox meeting guide)
- [Safe use of abrasive tools](#) (toolbox meeting guide)

Pneumatic nailing and stapling tools

- [Safe use of pneumatic nailing and stapling equipment](#) (toolbox meeting guide)

Chainsaws

- [Chainsaws](#) (information sheet)
- [Chainsaws – avoiding kickback hazards](#) (toolbox meeting guide)
- [Safe use of chainsaws in construction](#) (toolbox meeting guide)

Index

Page numbers in *italic* indicate an image or table. Page numbers in ***italic*** indicate resource materials.

A

abatement, hazardous materials, 9, 48, 49

access to work areas

delivery of materials, 45, 60

by ladder, 60, 83

in OHS Regulation, 45, 63

with pumper truck, 64

ramps and platforms, 62, 88, 93, 94, 97, **122**

resources, **121-22**

safety, 45, 46, 57, 60, 63, 66, 93

See *also* scaffolding; stairways

anchors, 71, 75, 80, 80, 81, **124**

asbestos, 25, 26, 49-50, 50, **122**. See *also* hazardous material

B

baker's scaffolds. See rolling scaffolds

BC 1 Call, 53

BC Construction Safety Alliance (BCCSA)

about, 116

concrete pump guidelines, 63

silica control tool, 27

biological hazards, 24, 25, 33

breathing hazards, 42-43, 104, **121**. See *also* hazardous materials

bricks, 26

C

cancer. See occupational diseases

carbon monoxide, 25, 28-29, 108, **119**

cement, 26, 27. See *also* asbestos; fibre cement board; Portland cement

chainsaws, 112, 112-14, 113-14, **126**

chemical agents, exposure limits, 24, 33

chipping hammers, 102, **119**. See *also* power tools

circular saws, 105-6, 106, **126**

clearance letters, 7

climbing tasks, 37, 62, 84, 97. *See also* musculoskeletal injury (MSI)

clothing and accessories, on construction site, 37. *See also* personal protective equipment (PPE)

compressed air, 111

compressed-gas cylinders, 30

concrete, working with

- finishing work, 65
- formwork and falsework, 61–62, 63, **123**
- hazardous substances, 25, 26, 27, 65, 108
- noise hazards, 40
- in OHS Regulation, 62, 63
- placing and pumping, 63–64, **123**
- reinforcing, 62, 62–63, **123**
- resources, **119, 123**

confined spaces

- and carbon monoxide, 25, 28–29
- in OHS Regulation, 33
- and propane, 29, 30
- resources, **120**
- working in, 33

construction

- general requirements, 60
- health and safety resources, **118**
- in OHS Regulation, 61
- three phases of, 3
- See also* hazardous materials; hazards; health and safety; *specific phases of work*; *specific tools*

contractors

- abatement, 9, 48–49
- clearance letters, 7
- demolition, 48
- health and safety responsibilities, 7–8
- See also* employers; prime contractors

coordinators, qualified, 8

cover guarding, 17

cranes and hoists, 16, 40, 45, **125**

crawl board, 75

crystalline silica, 14, 25, 26–27, 63, 65, 108, **119**. *See also* hazardous materials

cut-off saws, 13, 108

D

delivery of materials, 16, 45, 46, 60, **121-22**

demolition

and hazardous materials, 9, 23, 25, 28, 48-51

integrity of structure, 52

notice of project, 9, 48

in OHS Regulation, 52

requirements, 52

resources, **122**

design. *See* planning (construction)

designated substances, 23, 28

drills, 102, 105, **119, 126**. *See also* power tools

drywall

delivery, 46

hazardous material, 24, 25

in OHS Regulation, 24

resources, **121-22**

storage, 46

due diligence, definition, 9

dust

crystalline silica, 25, 27, 63, 65, **119**

and drywall, 25

explosive, 104

lead, 28, 51

and power tools, 104

from quick-cut saws, 108

respiratory protection, 42

See also specific substances

E

electric tools, 105. *See also* power tools

electrical equipment and conductors

assurance of compliance form (30M33), 18

grounding, 17, 19-20, 105

hierarchy of controls, 17-18

- high voltage, 15–18
- low voltage, 15, 19–20
- minimizing risk, 17–20
- minimum distances, 16, 16–18
- in OHS Regulation, 15, 17, 36, **118**
- portable, 19–20
- power tools, 105
- safety resources, **18, 20, 118**
- underground, 18, 53–54, **118, 122**
- wet or damp conditions, 19
- working at elevation, 84, 85, 86

See *also* power cords; power lines; power tools; utilities

elevation, working at

- fall protection, 60, 62, 78–81
- ladders, 60, 82–84
- in OHS Regulation, 64
- overhead power lines, 84, 85, 86
- planning for, 81
- resources, **123**
- scaffolding, 60, 87–99
- work platforms, 62, 64, 71, 85–88

See *also* fall protection; ladders; roof work; scaffolding; work platforms, elevated

emergency preparedness and response, 24, 25

employers

- exposure control plan, 25–26
- first aid, 44
- health and safety, ii, 10, **118**
- hearing protection, 39–40
- multi-employer worksites, 7–8
- personal protective equipment, 36, 41, 42, **120–21**
- resources for, **116–17**
- resources for training and orientation, **118**
- responsibilities under OHS Regulation, 6, **118**
- responsibilities under the Act, 6, 7, 10, **118**

Workplace Hazardous Materials Information System, 24–25

See *also* homeowners; prime contractors; *specific hazards and tools*; *specific jobs and stages of construction*

- Employers' Advisers, contact information, 116–17
- enclosed spaces. *See* confined spaces
- engineers, professional
 - concrete formwork and falsework, 61, 63
 - demolition, 52
 - excavations, 54–55
 - load for roof, 73
 - load for temporary floors, 60
 - scaffolding, 88, 96, 97
 - stairways, 66
 - trusses, 70, 72
- epoxy products, 25, 27
- ergonomics
 - and concrete reinforcing, **123**
 - hand tools, 102–3, **125–26**
 - in OHS Regulation, 34
 - resources, **120**
- excavation
 - definitions, 53
 - engineering requirements, 54, 54–55
 - notice of project, 48
 - in OHS Regulation, 53, 54, 55, 57
 - resources, **122–23**
 - safety requirements, 57
 - support and sloping requirements, 55, 56, **123**
 - underground utilities, 18
- explosive materials
 - carbon monoxide, 28
 - hazards, 23, 104, 108
 - and power tools, 104
 - propane, 29, 30, 31, **120**
 - storage, 31–32, **120, 121**
 - See also* fires; hazardous materials
- explosives and blasting, 11
- exposure control plans, hazardous materials, 25–26, 42
- eye and face protection
 - and chainsaws, 113
 - overview, 41, **41**
 - pneumatic nailing and stapling tools, 110

and power tools, 104
resources, **121, 126**

F

facial hair, 37, 43, **121**

fall protection

anchors, 71, 75, 80, 80, 81, **124**

in demolition, 52

excavations, 57

ladders and scaffolds, 82–84, 95, 96, 97

in OHS Regulation, 52, 66, 70, 73, 75, 81

resources, **81, 123, 124**

roof work, 73–75, 74, 75

safety systems, 78–81, 79, 80, 86

working at elevation, 46, 60, 62, 66, 68, 68, 71, 86

fibre cement board, 26, **119**

fire safety plan, 32

fires

flammable materials, 29, 30, 31–32

power tools, 104, 108

shipping containers, 31–32, **120**

See *also* explosive materials

first aid, 44, **121**

flooring, temporary, 46, 60, 63

foot protection, 37, 41, 42

forklifts, 16, 45

framing, 66–72, 81, **123**

G

gas

in confined space, 33

disconnecting utilities, **122**

flammable, 29, 104, 108

See *also* carbon monoxide; propane

geoscientists, and excavations, 54–55

granite, 26

grinders, 102, 108, 108–9, **121, 126**. *See also* power tools
ground-fault circuit interrupters (GFCIs), 19
grounding, electrical, 17, 19–20, 105
guardrails and handrails
 excavations, 57
 fall protection, 46, 66, 68, 71, 78–79, 79
 lifting walls, 68, 69, 81
 in OHS Regulation, 66, 70, 73, 88
 roof work, 73
 scaffolding, 88, 90, 93, 97, **125**

H

hand tools, 102–3, **125–26**. *See also* power tools
hazardous materials
 anchors, fall-protection, 71, 75, 80, 80, 81, **124**
 abatement, 9, 48, 49
 in construction activities, 25
 in demolition, 9, 23, 25, 28, 48–51
 discovered after work begins, 49
 exposure control plans, 25–26, 42
 notice of project, 9, 48
 in OHS Regulation, 23, 24, 25, 26–27, 28, 29, 49
 in planning phase, 23–32, 42
 in renovation, 9, 23, 25, 43–51, 50
 resources, **119–20, 122**
 site preparation, 48–52
 storage, 29–30, 31–32, **120**
 use of, 23–25, 26–28
 See also specific materials
hazards, common, 11
 hierarchy of controls, 13, 13–14, 17–18, 21–22, 78
 identifying and controlling, 12–14, 15–16, 19, 25–26, 32, **118**
 and personal protective equipment, 36–43
 and qualified coordinators, 8
 See also hazardous materials; workplace inspection; specific hazards; specific jobs and stages of construction; specific tools
head protection, 37, 38

headaches, from carbon monoxide exposure, 28

health and safety

- OHS Regulation, 1, 7, 8, 9
- resources, **1, 116–26**
- responsibilities, ii, 7–10
- Workers Compensation Act*, 6–8, 10, **118**

hearing protection

- and chainsaws, 113
- conservation program, 38–40
- noise hazards, 40
- in OHS Regulation, 13, 40
- pneumatic nailing and stapling tools, 110
- and power tools, 40, 104
- resources, **120–21**

hearing test facilities, 40

heaters, 25, 30

hierarchy of controls

- electrical hazards, 17–18
- fall protection, 78
- hazards, 13, 13–14
- traffic control, 21–22

high-voltage electrical equipment, 15–18, **118**

homeowners

- as employers, 10
- as prime contractors, 7–8
- responsibilities under Act, 7–8
- responsibilities under OHS Regulation, 9
- See *also* employers

hydrogen sulfide, 25

I

impairment, 7

infectious diseases, **121**

insulation (electrical), 17, 19, 50, 105

insulation (home), 25, 27, 50

isocyanates, 25, 27–28, **119**

J

job-built ladders, 84, 84, **124**
joists, 70, 72. *See also* trusses

K

kickback, of chainsaws, 113, 113–14, 114

L

ladder-jack scaffolds, 93, 95, 95. *See also* scaffolding

ladders

- and chainsaws, 113
- general requirements, 60, 82–84, 83
- job-built, 84, 84
- and ladder-jack scaffolds, 93, 95
- in OHS Regulation, 63–64, 82
- resources, **124**
- risk assessment, **118**
- roof ladder, 75
- and scaffolding, 82, 98
- See also* scaffolding

lead, 25, 28, 51, **119**, **122**. *See also* hazardous materials

lifting tasks, 34, **120**, **123**. *See also* musculoskeletal injury (MSI)

lighting, temporary, 19–20

load safety

- ladders and scaffolds, 82, 88, 95, 96, 97
- rebar, 62
- roofs, 73
- stairways, 66
- temporary floor or formwork, 46, 60, 63
- trusses, 72
- work platforms, 85, 88

low-voltage electrical equipment, 15, 19–20

lumber, for scaffolding, 89, 90, 93

M

manufactured (access) scaffolds, 97. *See also* scaffolding

masonry, 26

mercury, 25

mitre saws, 105–6

mobile equipment

- hazards of, 11, 15–16, 17, 28, 40
- in OHS Regulation, 45

mobile scaffolds. *See* rolling scaffolds

mortar, 26

mould, 25

multi-employer worksites, 6, 7–8

musculoskeletal injury (MSI)

- about, 34–35
- and concrete reinforcing, **123**
- and hand tools, 102–3, **125–26**
- in OHS Regulation, 34
- resources, **120**

N

National Lumber Grades Authority, 93

nausea, symptom of carbon monoxide exposure, 28

noise, as hazard, 13, 38–40, 40, 104, 110, 113, **120–21**

notices of project (NOP), 8, 9, 48

O

occupational diseases, 23, 27, 28, 38, 49, 65, **119**

Occupational Health and Safety Regulation

- information about, ii, 1, 116
- notice of project, 9
- requirements for construction, general, 61, **118**
- requirements for input from professional engineers, 52, 54–55, 60, 61, 63, 66, 70, 72, 73, 88, 96, 97
- requirements for risk assessment, 12
- requirements for safe workplaces, 6, 8, **118**
- Workplace Hazardous Materials Information System, 24–25

See also *Workers Compensation Act*

P

paint and coatings, 27, 28, 51, **119**, **122**

PCBs, 25, **119**

personal protective equipment (PPE)

- and chainsaws, 113

- employer responsibilities, 36–37, 39–40, 41, 42

- in hierarchy of controls/workplace hazards, 13–14

- in OHS Regulation, 36, 43

- and power tools, 40, 104

- resources, **120–21**

- worker responsibilities, 37, 43

See also eye and face protection; fall protection; foot protection; head protection; hearing protection; respiratory protection

planning (construction)

- confined spaces, 28–29, 33

- definition, 3

- fall protection, 81

- hazardous materials, 23–32, 42. See also hazardous materials; *specific materials*

- identifying hazards and risks, 12–14, 15–16, 19, 32. See also electrical equipment and conductors; workplace inspection

- importance of, 6

- in OHS Regulation, 6

- personal protective equipment, 36

- resources, **118**

- traffic control, 21–22

pneumatic nailing and stapling tools, 103, 110–11, **111**, **126**. See also power tools

Portland cement, 63, **118**

post-abatement inspection, 48

post-lockup, definition, 3

power cords

- grounded, 19–20

- protection, 20, 105

- resources, **126**

- tripping hazards, 105

power lines

- contact with, 18

- high-voltage, 15–18

- low-voltage, 19
- minimum distances, 16, 16–18
- underground, 18, 53
- visual identification, 17
- working at elevation, 84, 85, 86

See *also* electrical equipment and conductors

power saws, 105–8

power tools

- hazards, 104–9
- hearing protection, 40, 104
- resources, **126**
- testing, 20

See *also* hand tools; *specific tools*

power-supply box, 19–20

practicable, definition, 13

pre-lockup, definition, 3

Prevention Information Line, ii, 116

prime contractors

- definition, 8
- first aid, 44
- responsibilities under Act, 7–8
- responsibilities under Regulation, 8, 9

See *also* employers

propane, 29–30, 31, **120**. See *also* gas; hazardous materials

pump-jack scaffolds, 93, 96, 96, **125**. See *also* scaffolding

pumper trucks (for concrete), 64

Q

qualified coordinators, duties, 8

qualified, definition, 8

quick-cut (cut-off) saws, 13, 108

R

ramps and platforms, 62, 66, 78, 88, 93–94, 94, 97, **122**. See *also* work platforms, elevated rebar, 62, 62–63, **123**

reciprocating saws, 105–6

renovation

hazardous materials, 9, 23, 25, 43–51, 50

notice of project, 9

requirements, 52

resources, **122–23**

repetitive motions, 34, 102, 103, **123**. *See also* musculoskeletal injury (MSI)

residential construction, three phases, 3. *See also* specific phases and activities

resources, for construction industry, **116–17**. *See also* WorkSafeBC

respiratory protection, 42–43, 104, **121**. *See also* hazardous materials

risks. *See* hazardous materials; hazards; hierarchy of controls; planning (construction)

rolling scaffolds, 98–99, 99, **125**

roof jacks, 74, 74–75, 75, **124**

roof ladder, 75

roof work

fall protection, 73–75, 74, 75

hazardous materials, 25, 50, **119**

lifting, 72

load capacity, 73

noise, 40

in OHS Regulation, 70, 73, 75

resources, **123, 124**

See also electrical equipment and conductors; elevation, working at; fall protection; trusses

S

sabre (reciprocating) saws, 105–6

salvage

hazardous materials, 9, 23

notice of project, 9

and structural integrity, 52

sand, 26

saws, 13, 105–8, 106, 107, 112, 112–14, 113–14, **126**. *See also* power tools

scaffolding

definition, 87

general requirements, 60, 64, 66, 87–88

and ladders, 82, 98

manufactured, 94, 94–97, 95, 96, 98

- in OHS Regulation, 63–64, 66
- planks, 89, 90, 92, 93, 97, **125**
- ramps and platforms, 93–94, 94
- resources, **125**
- rolling scaffolds, 98–99
- wood frame, 64, 67, 89, 89–93, 90, 91, 92
- See also ladders; work platforms, elevated
- scheduling, importance of, 6
- shipping containers, as storage sheds, 31–32, **120**
- site preparation, 3. See also demolition; excavation; renovation; salvage
- soft-tissue injury. See musculoskeletal injury (MSI)
- sprains and strains. See musculoskeletal injury (MSI)
- stairways, 52, 60, 66
- stepladder. See ladders
- storage
 - of construction materials, 46, 60
 - of hazardous materials, 29–30, 31–32
 - resources, **120, 121–22**
- structural integrity, and demolition, 52
- subcontractors. See employers
- supervisors, 10, **118**

T

- table saws, 106–7, 107, **126**
- tiles, 26
- toe-holds, 74, 74–75, 75, **124**
- tool belts, **125**
- tools
 - in OHS Regulation, 103
 - risk factors, 102
 - selecting, 102–3, **126**
 - See also hand tools; power tools; *specific tools*
- topsoil, 26
- traffic control, **21**, 21–22, 36, 37, **119**
- trenches, 18, 53–57, **123**
- trestle scaffolds, 94, 94, **124**. See also scaffolding

tripping hazards
 power cords, 105
 resources, **78**
 stairways, 60, 66
 waste material, 60
 See also fall protection

trusses, 70–72, 71, **123, 124**

U

unconsciousness, and carbon monoxide exposure, 28

underground utilities, 18, 53–54, **118, 122**

unsafe work and conditions, ii, 7, 10

utilities
 during demolition, 52, **122**
 underground, 18, 53–54, **118, 122**
 See also electrical equipment and conductors; power lines

V

ventilation
 and carbon monoxide, 29, 30
 of storage areas, 31–32

volatile organic compounds, 25

W

wall-jack system, 70

walls, lifting, 68, 69, 70, 81, **123**

waste materials, 60

water, and excavations, 54, 57

wood frame scaffolding, 89, 89–93, 90, 91, 92, **125**

work platforms, elevated
 around concrete formwork, 62, 64, 64
 definition, 87
 during framing, 66, 67
 general requirements, 85–86, 87–88
 guardrails, 71, 78–79, 79, 88

in OHS Regulation, 63–64, 66

resources, **125**

and truss erection, 71, 71

See also elevation, working at; fall protection; scaffolding

workers

asbestos, 49

confined spaces, 33

exposure control plans, 25–26

facial hair, 37, 43, **121**

hearing protection, 39–40, 40

identifying hazards, 12

musculoskeletal injury, 35, **120**

respiratory protection, 42–43, 104, **121**

responsibilities under the Act, 7

rights and responsibilities, 7, 10

safe access to work area, 46, 57, 60, 93

selecting tools, 102–3

unsafe work and conditions, ii, 7, 10

wearing glasses or contact lenses, **121**

young or new, 6, **118**

See also elevation, working at; fall protection; personal protective equipment (PPE)

Workers Compensation Act

about, 1

health and safety responsibilities, 6–8, 10, **118**

multi-employer workplaces, 6

planning and scheduling, 6

responsibilities of employers and workers, 7, 10

Workplace Hazardous Materials Information System (WHMIS), 24–25, 32, **119**

workplace inspection

for delivery of materials, 45

to determine need for PPE, 36, 41

for first aid requirements, 44

identifying hazards, 12, 15–16, 29, 42, 48–49

in OHS Regulation, 6, 44

prior to renovation, demolition or salvage, 48

WorkSafeBC

- about, ii
- assurance of compliance form (30M33), 18
- clearance letters, 7
- contact information, 116
- and electrical safety, **18**
- and fall protection, 81
- and musculoskeletal injuries, 34
- notice of project, 8, 9, 48
- registration with, 7–8, 10
- resources, **1, 118–26**
- standards for ladders, 82
- standards for scaffold planks, 93
- standards for scaffolding, 87

