

Health and safety for small- and medium-sized woodworking shops



About the Architectural Woodwork Manufacturers Association of Canada (AWMAC) — BC Chapter

Reputation and credibility are key to business success. AWMAC BC constantly strives to strengthen industry standards and improve the quality of workmanship. In partnership with members throughout British Columbia and Canada we have achieved international recognition as industry leaders. AWMAC BC supports a growing membership while setting the bar for our industry through commitment to the following mission statement and goals.

Our mission

AWMAC BC, an acknowledged leader in the architectural woodwork industry, upholds the highest standards of education, workmanship, and business practices.

Our goals

- Promoting a premium grade of workmanship through our Architectural Woodwork Standards.
- Providing opportunities for members to increase their expertise and knowledge through seminars, workshops, and apprenticeship programs.
- Promoting high ethical standards through a code of ethics and business practices.
- Maintaining a guarantee program that ensures the high quality of methods, materials, and workmanship of all members.
- Creating a forum for the exchange of ideas

About WorkSafeBC

WorkSafeBC (the Workers' Compensation Board) is an independent provincial statutory agency governed by a Board of Directors. It is funded by insurance premiums paid by registered employers and by investment returns. In administering the *Workers Compensation Act*, WorkSafeBC remains separate and distinct from government; however, it is accountable to the public through government in its role of protecting and maintaining the overall well-being of the workers' compensation system.

WorkSafeBC was born out of a compromise between B.C.'s workers and employers in 1917 where workers gave up the right to sue their employers or fellow workers for injuries on the job in return for a no-fault insurance program fully paid for by employers. WorkSafeBC is committed to a safe and healthy workplace, and to providing return-to-work rehabilitation and legislated compensation benefits to workers injured as a result of their employment.

WorkSafeBC Prevention Information Line

The WorkSafeBC Prevention Information Line can answer your questions about workplace health and safety, worker and employer responsibilities, and reporting a workplace accident or incident. The Prevention Information Line accepts anonymous calls.

Phone 604 276-3100 in the Lower Mainland, or call 1 888 621-7233 (621-SAFE) toll-free in Canada.

To report after-hours and weekend accidents and emergencies, call 604 273-7711 in the Lower Mainland, or call 1 866 922-4357 (WCB-HELP) toll-free.

Health and safety for small- and medium-sized woodworking shops

WorkSafeBC publications

Many publications are available at WorkSafeBC.com. The Occupational Health and Safety Regulation and associated policies and guidelines, as well as excerpts and summaries of the *Workers Compensation Act*, are also available on the website.

Some publications are also available for purchase in print:

Tel: 604 232-9704

Toll-free: 1 866 319-9704

Fax: 604 232-9703

Toll-free fax: 1 888 232-9714

Online ordering: WorkSafeBC.com and click on Publications; follow the links for ordering

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Contents

Introduction.....1

Part 1: Health and safety responsibilities 3

Employer responsibilities4

Supervisor responsibilities6

Worker responsibilities6

Part 2: Safety topics 7

How to use this part8

Musculoskeletal injuries (MSIs).....9

Slips and trips11

Workplace Hazardous Materials Information System (WHMIS)12

Lockout14

Safeguarding16

Personal protective equipment (PPE)17

Power tools.....19

Wood dust.....20

Paint booths.....22

Table saws23

Ladders25

Forklifts and pallet jacks (lift trucks)27

Emergencies.....29

Part 3: Forms and checklists 31

Overview.....32

Worker orientation checklist.....33

Typical orientation and training topics.....36

Training checklist38

Inspection checklist39

Machine safeguarding checklist41



WHMIS implementation plan checklist42

WHMIS education and training checklist.....44

Level 1 first aid kit.....45

Part 4: Resources 47

Architectural Woodwork Manufacturers Association of Canada (AWMAC)—BC Chapter48

WorkSafeBC resources48

WorkSafeBC bulletin: Wood dust collection system design and inspection49



Introduction

Smart employers know the importance of a safe and healthy workplace. Not only is it good for workers but it also makes good business sense. For smaller business, work-related injuries can result in hidden costs and production effects that may not be easily identified until after you have an injury. Hidden costs include hiring new staff, rescheduling remaining staff, and picking up the slack yourself.

What this booklet contains

This booklet identifies safety issues that are specific to woodworking shops and includes some basic information and safety tips to help keep your workplace safe. This booklet consists of four parts:

- Part 1: Health and safety responsibilities
- Part 2: Safety topics
- Part 3: Forms and checklists
- Part 4: Resources

In Part 2, each safety topic provides basic background information for employers, as well as specific safety tips for preventing accidents and injuries. Each topic can be used as a starting point during meetings or safety talks. Once you have covered the general information provided in this booklet, you can then discuss issues specific to your workplace and emphasize the procedures you would like to see.

Where to find additional copies

The booklet is free for printing and distribution. You can find electronic copies of the booklet online at WorkSafeBC.com or from the B.C. chapter of AWMAC (www.awma-bc.ca).

Acknowledgments

Special thanks to WorkSafeBC for its support in the development of this booklet.

Throughout this manual, you will find references to resources, such as publications and slide shows. You can find many of these resources at WorkSafeBC.com.



Health and safety responsibilities

WorkSafeBC.com

For more information,
visit the Manufacturing
industry page.

Employer responsibilities

As an employer you are responsible for ensuring the health and safety of your workers. The requirements described in the *Workers Compensation Act* (the Act) and the Occupational Health and Safety Regulation (the Regulation) include the following responsibilities:

- Correct any workplace conditions that are hazardous to the health and safety of your workers.
- Inform your workers about any remaining hazards.
- Ensure that your workers know and comply with their rights and responsibilities under the Act and the Regulation.
- Make copies of the Act and the Regulation available to workers.
- Provide and maintain protective devices, equipment, and clothing, and ensure that workers use them.
- Consult and cooperate with your joint health and safety committee (or worker health and safety representative).
- Cooperate with WorkSafeBC and its officers.
- Establish an occupational health and safety program (formal or informal).

Occupational health and safety program

- Develop and implement written safe work procedures and emergency response procedures.
- Provide worker orientation, education, training, and supervision that is specific to your workplace.
- Implement a process for identifying, assessing, and controlling hazards.
- Inspect your worksite, equipment, and work procedures regularly to help identify hazards.
- Investigate incidents, including near misses, to identify causes and prevent recurrences.
- Hold regular health and safety meetings that include workers.
- Maintain records related to health and safety such as training, first aid treatments, safety discussions, safety inspections, and incident investigations (see “Forms and Checklists,” pages 31–45).
- Determine the level of first aid required for your worksite.

Lead by example

Take the time to show workers how you want them to carry out specific tasks. If you just tell someone how you expect them to do something, they may misunderstand you based on their previous experiences (or lack of work experience).

Involve your workers

Encourage your workers to ask questions if they do not understand something, especially if they are younger or new to the job. Taking a few minutes to explain or re-explain something could prevent a costly accident. Make sure your workers know the following:

- Their rights and responsibilities
- How to perform tasks safely
- Who to ask if they have questions
- Where to get first aid if they are injured

Deal with worker concerns quickly

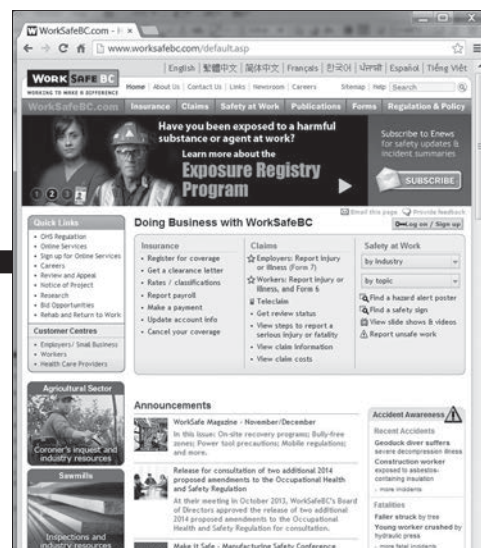
Deal with worker concerns as they arise. If something is broken, fix it. For example, if workers need a stepladder to reach items, buy it. If an extension cord is worn, replace it. Avoiding these types of minor expenses could end up being more costly if a worker is injured.

This booklet is meant to help employers understand their workplace health and safety responsibilities. It is not a definitive guide and does not replace the Occupational Health and Safety Regulation.

Occupational Health and Safety Regulation

The Occupational Health and Safety Regulation describes health and safety requirements for all workplaces under the jurisdiction of WorkSafeBC, which includes most woodworking shops. Employers are responsible for complying with the Regulation. Many sections of the Regulation also have accompanying Guidelines and Policies that will help clarify your requirements.

You can search the Regulation and the accompanying Guidelines and Policies online. Visit WorkSafeBC.com, and under “Quick Links” on the left side of the page click “OHS Regulation.” For example, to get information about smoking at work, you can enter the search term *smoking* and then select the relevant sections in which smoking is mentioned.



There have been many recent amendments to the Regulation, so it's important to refer to the online version. Visit WorkSafeBC.com to ensure that you are seeing the most up-to-date requirements.

Supervisor responsibilities

- Ensure the health and safety of workers under your direct supervision.
- Know the requirements of the Regulation that apply to the work you are supervising.
- Ensure that workers under your direct supervision are informed about all hazards in the workplace and that they comply with the Regulation.
- Consult and cooperate with the joint health and safety committee (or worker health and safety representative).
- Cooperate with WorkSafeBC and its officers.

Worker responsibilities

- Take reasonable care to protect your health and safety and that of other persons who may be affected by your actions.
- Comply with the Regulation and other legal requirements.
- Follow established safe work procedures.
- Use any required personal protective equipment.
- Refrain from horseplay or similar conduct, which may endanger others.
- Do not work if you are impaired (for example, by drugs or alcohol).
- Report accidents and other incidents (such as near misses) to your supervisor.
- Report to your supervisor or employer any of the following:
 - A hazard that might endanger others.
 - A problem with protective equipment or clothing.
 - A violation of the Regulation or other legal requirements.
- Cooperate with your joint health and safety committee (or worker health and safety representative).
- Cooperate with WorkSafeBC and its officers.

2

Safety topics

How to use this part

Safety in the workplace is everyone's responsibility. This part identifies some of the most common safety issues in woodworking shops. It includes the following sections:

- Musculoskeletal injuries (MSIs)
- Slips and trips
- Workplace Hazardous Materials Information System (WHMIS)
- Lockout
- Safeguarding
- Personal protective equipment (PPE)
- Power tools
- Wood dust
- Table saws and other stationary woodworking machinery
- Ladders
- Forklifts and pallet jacks (lift trucks)
- Emergencies

Each safety topic in this part includes information that employers should know as well as safety tips that employers or supervisors can pass on to workers during safety talks. The safety tips can also be printed and used as handouts or posted near work areas.

Please remember that these safety tips are general tips only. You will still need to provide additional information that is specific for your workplace. Also, the information in this booklet is meant to help you meet the requirements specified in the Occupational Health and Safety Regulation, but it does not replace the Regulation. You will need to refer to the Regulation to determine the exact requirements that apply to your particular business.

Musculoskeletal injuries (MSIs)

Improper lifting or handling of heavy or bulky objects is a major source of sprains and strains, such as neck, back, and shoulder injuries. These injuries can affect people for the rest of their lives.

Sprains and strains, also known as musculoskeletal injuries (MSIs), are the most common type of work-related injury. These can develop as a result of repetitive movement, awkward postures, or, more often, from overexertion associated with lifting.

Employers are required to assess MSI risks by understanding the factors that can lead to injury, including the following:

- The size, shape, and weight of the object being lifted
- Whether the worker needs to bend, twist, or reach
- How long (the total time) the worker will be doing the task
- How often the worker is required to do the task

If an MSI requires medical attention or time off work, the employer must investigate the cause to prevent recurrence.

MSI signs and symptoms

Employers and workers need to be able to recognize the early signs and symptoms of MSI. The sooner treatment starts, the better. Signs and symptoms include:

- Pain
- Tingling or numbness
- Stiffness or loss of range of motion
- Difficulty moving a particular body part

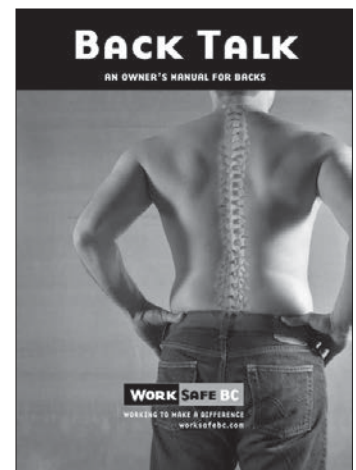
Workers must report early signs or symptoms to a supervisor, manager, first aid attendant, or safety representative. Employers must have a system in place for keeping detailed records of MSI signs and symptoms—these records could be entries in the first aid book.

Publications

Understanding the Risks of Musculoskeletal Injury (MSI): An Educational Guide for Workers on Sprains, Strains, and other MSIs

Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees

Back Talk: An Owner's Manual for Backs



Safety tips

- Avoid manually lifting, carrying, or pushing awkward or heavy objects. Instead, use mechanical devices such as cranes, hoists, dollies, or hand trucks.
- When performing repetitive lifts such as unloading wood stock from a truck, stop to stretch and rest your back every so often or vary the task with another job that uses different muscles.
- If it makes sense, work with a co-worker to share the load. Communicate clearly so that your co-worker knows what movements to expect. *The helper on a lift is often the one who gets hurt as a result of a misunderstanding.*

Safe lifting technique

When you do need to lift something manually, use the following safe lifting technique:

- Place your feet apart for good balance.
- Bend your knees so that the stronger muscles in your legs take most of the load.
- Balance the load you are carrying between both hands.
- Minimize the distance you reach when picking up the object.
- Get a good grip. Use your hands, not just your fingers.
- Hold the object as close to your body as possible, between your knees and shoulders.
- Lift smoothly and slowly.
- Don't twist your back. Pivot your feet if you need to turn while carrying something.

Working in storage areas

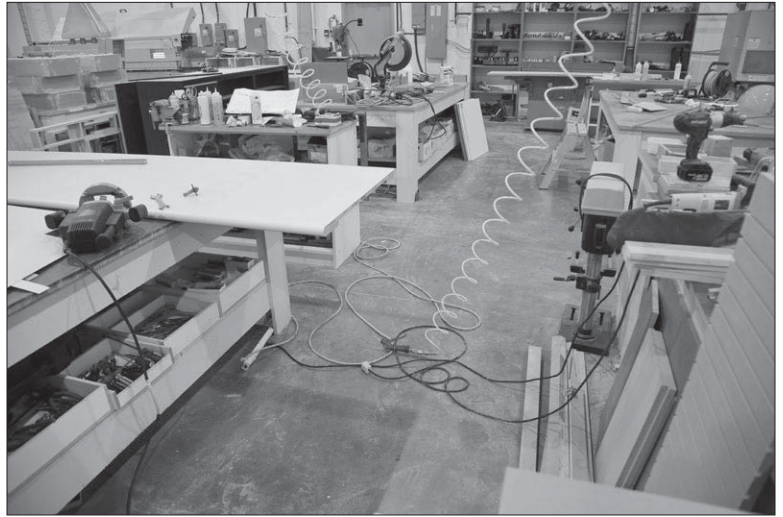
- When stacking items, stack the heaviest objects between knee and chest level to minimize lifting.
- Make sure stacked objects are stable.
- Use a ladder or stepstool to reach high items.
- Take short breaks, stretch, and vary the load by alternating heavy and light items.

Slips and trips

Slipping and falling on dirty floors or tripping over clutter can result in injury. Good housekeeping and regular clean-up may seem easy but are often overlooked as part of daily work, especially when people are busy. Most slips and trips can be avoided if workers are encouraged to take the time to do the task properly and clean up or fix potential hazards immediately (if this is reasonable, given the situation). If the worker cannot clean up or fix a potential hazard, he or she must report it to the supervisor or employer.

Safety tips

- Wear non-slip footwear that fits properly.
- Make sure pathways and aisles are free of clutter, including cuttings, sawdust, and loose lumber. Stop and move any obstacle as soon as you see it.
- Run electrical wires and cords where they won't create a tripping hazard. For example, run them around the perimeter of the room and suspend them over walkways, wherever possible.
- Clean up spills immediately.
- Put tools and other equipment away when not in use to avoid clutter in the work area.



Electrical cords and air hoses can create tripping hazards.

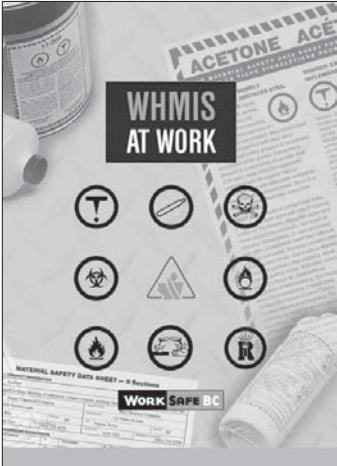


Keep aisles in storage areas clear of spills or clutter to reduce the risk of slipping and tripping.

Workplace Hazardous Materials Information System (WHMIS)

Publication

WHMIS at Work



The Workplace Hazardous Materials Information System (WHMIS) provides information about many hazardous materials used in the workplace. WHMIS calls these hazardous materials *controlled products*. Under WHMIS, workers have the right to receive information about each controlled product they use, including the identity, any hazards associated with the product, and safety precautions.

WHMIS has developed a classification system of six hazard classes. These classes are depicted by eight hazard symbols that identify the specific hazards of controlled products. After a controlled product has been classified, the following three WHMIS components are used to communicate health and safety information:

- WHMIS labels
- Material safety data sheets (MSDSs)
- WHMIS education and training programs

Responsibilities

Suppliers, employers, and workers all have specified responsibilities under the *Hazardous Products Act*.

Suppliers

Canadian suppliers are those who sell or import products. When a product is considered a controlled product according to the WHMIS legislation, suppliers must label the product or container and provide an MSDS to their customers. The purpose of the labels is to clearly identify the contents of the hazardous material. The MSDS explains what the hazards are.

Employers

Employers must establish education and training programs for workers who may be exposed to hazardous products in the workplace. Employers must also make sure that any hazardous products are labelled and that an MSDS is present for each product and readily available to workers.

Workers

Workers must participate in the training programs and use this information to help them work safely with hazardous materials. They should also inform employers when labels on containers have been accidentally removed or if labels are no longer legible.

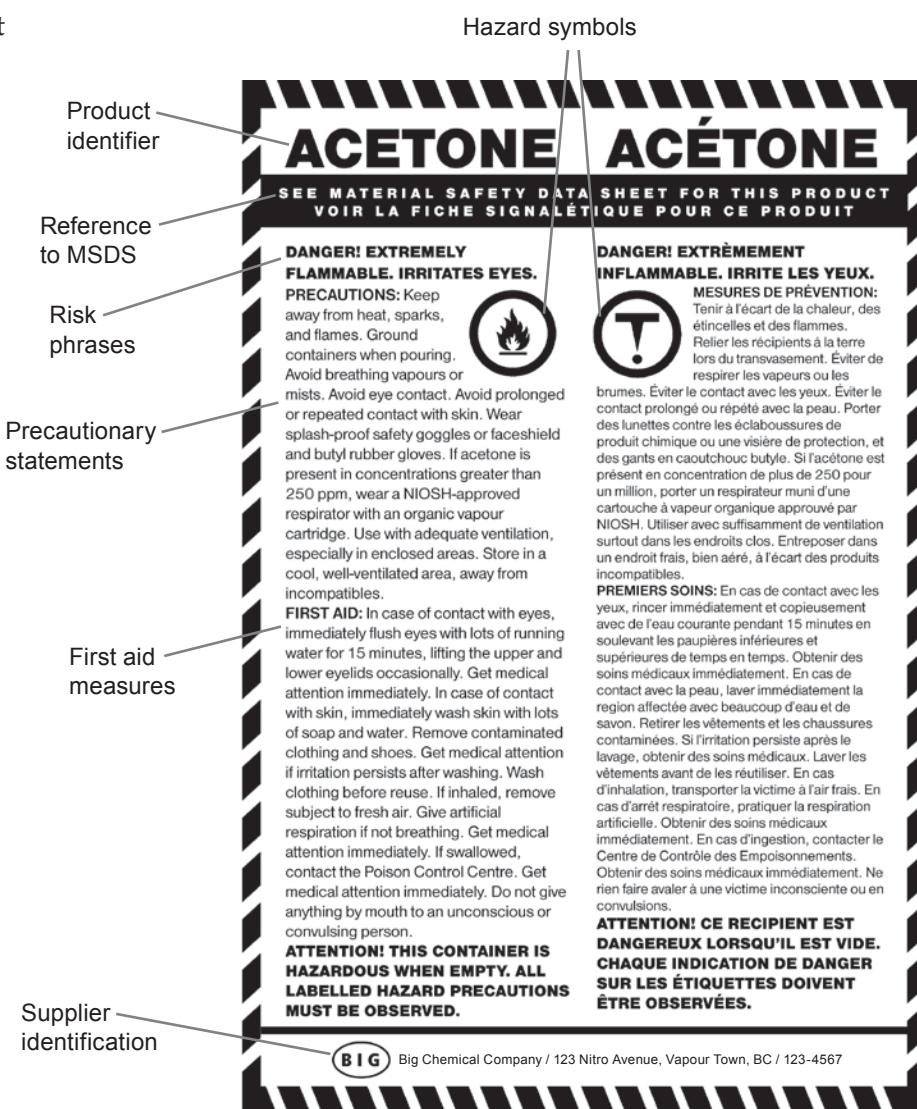
Safety tips

Before you use a controlled product, make sure you know:

- Where to get information about it
- Which hazards are related to it
- How to protect yourself when you are using it (for example, by using ventilation)
- What PPE you should wear
- What to do if there is a spill

PPE requirements

If the work involves hazardous products such as paints, finishes, adhesives, or solvents, check the MSDS and label on each container for the required PPE.



An example of a supplier label for a controlled product.

Lockout

Publication

Lockout

Slide show

*Lockout for
Woodworking*

Locking out machinery prevents someone else from starting it when a worker is cleaning, maintaining, or repairing it. Accidental startups are a common cause of woodworking injuries.

Equipment powered by electricity is most commonly either *soft-wired* (plugged-in equipment) or *hard-wired* (permanently connected equipment). Types of hard-wired lockout include locking out a switchbox, locking out a circuit breaker, and multiple-person lockout.

Safety tips

Follow these general guidelines when locking out equipment:

1. Make sure turning off the equipment will not harm another worker.
2. Make sure all moving parts have stopped before touching the machine.
3. Identify and turn off (or disconnect) all sources of energy.
4. Apply a lockout device, if applicable (for example, if it's a hard-wired machine that allows a lock to be applied).
5. Try turning on the machine to ensure that it is locked out.

Locking out hard-wired equipment

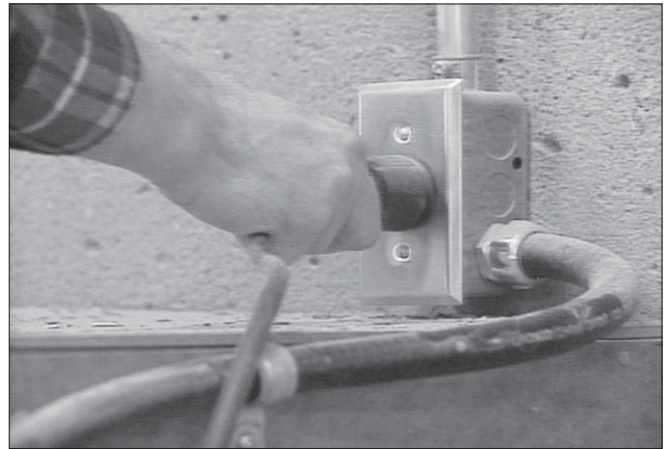
1. Identify the equipment that needs to be locked out.
2. Shut off the equipment. Make sure all moving parts have come to a complete stop before you proceed further. Make sure turning off the equipment will not create an unsafe condition for yourself or another worker.
3. Identify and de-activate the main device that isolates energy from the source—for example, the breaker in a panel is the energy-isolating device that blocks energy coming in to the panel.
4. Apply a personal lock to the energy isolating device (such as a switch on an electrical disconnect panel or an electrical breaker on an electrical breaker panel) for each energy source, and ensure that all moving parts and attachments are secured against movement.
5. Test the effectiveness of the lockout by trying to turn on the equipment. Make sure all workers are clear in case the machine starts.
6. If the machine starts, repeat the lockout procedure, checking each step carefully to ensure there are no faults with the controls.



A personal lock with an ID tag—used to prevent other workers from inadvertently switching on an electrical breaker.

Locking out soft-wired equipment

1. Identify the equipment that needs to be locked out.
2. Shut off the equipment. Make sure all moving parts have come to a complete stop before proceeding further.
3. Unplug the equipment.
4. Apply a personal lock to the plug unless the worker doing the maintenance can keep the plug in view and under control while working on the equipment.
5. Test the effectiveness of the lockout by trying to turn on the equipment. Make sure all workers are clear in case the machine starts.
6. If the machine starts, repeat the lockout procedure, checking each step carefully to ensure there are no faults with the controls.



Before changing a saw blade, pull the plug to disconnect the saw from the electric power supply.



Keep the plug in plain view and within reach while changing the blade.

Safeguarding

Publication

*Safeguarding
Machinery and
Equipment*

Slide show

*Guarding for
Woodworking*

According to the Regulation, a safeguard “means the use of a guard, a safety device, a shield, an awareness barrier, warning signs, or other appropriate means, either singly or in combination, to provide effective protection to workers from hazards.” Safeguards include fixed barrier guards, safeguarding devices, and safe work procedures. Safeguarding protects workers from two types of hazards: mechanical hazards and health hazards.

Mechanical hazards

- Parts that rotate present a risk of entanglement or snagging.
- Parts that slide or reciprocate create shearing or crushing hazards.
- Parts that rupture or fragment may cause impact injuries.

Health hazards

- Heat, noise, and vibration
- Airborne substances such as dust and wood chips
- Toxic chemicals
- Soft tissue injuries resulting from repetitive motion, awkward posture, or extended lifting

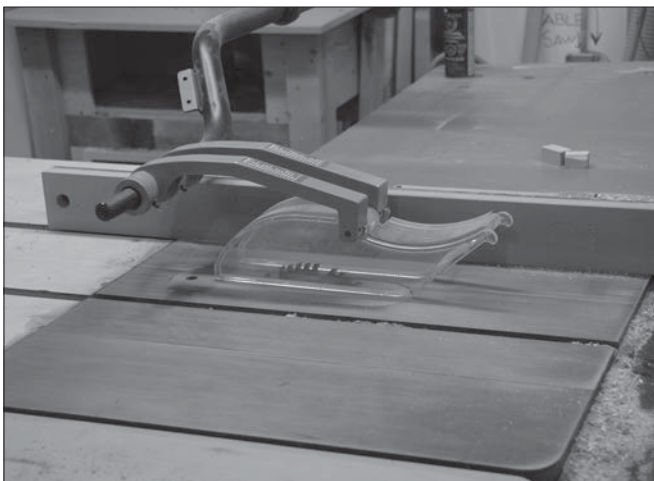


Table saw with a self-adjusting guard.

Safety tips

- Use equipment only if all the safeguards are in place.
- Make sure safeguards are set for the correct height of the stock being machined.
- Keep hands away from blades or moving parts.
- Plan hand positions.
- Use push sticks and push blocks, where required.
- Never leave moving equipment unattended.
- Never intentionally remove, impair, or render ineffective any safeguard provided by the manufacturer for the protection of workers.
- Never stand directly behind machines that can kick back wood material — stand to one side.

Personal protective equipment (PPE)

Woodworking exposes workers to a variety of hazards, including kickbacks, flying wood chips, noise, wood dust, and chemical hazards. Personal protective equipment (PPE) can help protect against these hazards.

PPE should only be used in combination with other control measures or as the last line of defence. Before considering PPE, first try to eliminate or minimize risks using other means—for example, by using less hazardous products or by modifying work processes or equipment.

Safety tips

Protective clothing

- Wear close-fitting clothing, remove any dangling jewellery and rings, and confine long hair to avoid getting caught in equipment. A snug fit also helps prevent wood dust and debris from working its way under your clothing.
- **Do not** wear gloves if there is a danger of getting them snagged. A snagged glove can pull your hand into moving equipment.
- Consider wearing a padded or heavy leather bib apron, long sleeves, and long pants to help protect your body from lacerations, abrasions, kickbacks, and other impacts with materials.
- Wear knee pads if your job requires kneeling on a hard surface.

Eye and face protection

To protect against hazards such as flying wood chips, broken saw teeth, and wood dust, wear safety glasses with sideshields and a face shield over your eye protection, if necessary.

Hearing protection

Wear earplugs or earmuffs to protect your hearing. The noise levels produced by most power woodworking equipment are high enough to damage hearing. For example, table saws produce 87–94 dBA. Levels of 85 dBA or more for an average eight hours of exposure are known to cause hearing loss.

Regulation

Part 8: Personal Protective Clothing and Equipment

Publication

Sound Advice: A Guide to Hearing Loss Prevention Programs



There are many different types of earmuffs and earplugs available. Choose an option that is comfortable and that provides adequate hearing protection for your needs.

Publication

Breathe Safer: How to Use Respirators Safely and Start a Respirator Program

Foot protection

Wear approved slip-resistant safety boots to help protect ankles, soles, and toes.

Respiratory protection

If workers are exposed to respiratory hazards, such as wood dust or chemicals, they may be required to wear a respirator that provides an adequate level of protection. Workers must be equipped with the right respirator and type of cartridge for the job (typically an elastomeric half-face respirator with P100 cartridges, at a minimum). Workers must also be clean shaven where the respirator seals with the face and fit tested to ensure a proper fit.

For more information on respirators, cartridges, and respirator programs, see the WorkSafeBC publication *Breathe Safer*.

Respirator programs

A respirator program is required any time respirators are used in the workplace. A program will help ensure that workers use and care for respirators correctly. An effective program includes written procedures that describe:

- How to conduct fit tests
- When and how to use respirators
- How to inspect, clean, and store respirators



Half-facepiece respirator with cartridges.

Power tools

The electrical service in workplaces is strong enough to cause serious injury or kill. Teach workers about electrical safety when training them to use equipment and tools.

In addition, workers need to know how to de-energize power tools to avoid accidental startup.

Publication

*Working Safely
Around Electricity*

Safety tips

Before using portable power tools

- Inspect tools, power cords, and electrical fittings for damage, wear, or exposed wiring before each use. Repair the equipment if you have been trained to do so. Otherwise, tag the equipment for repair and do not use it.
- Locate the breakers and fuse boxes in case there is an emergency. Make sure nothing is blocking access to them.
- Check to see if all circuit breakers and fuse boxes are labelled so it is easy to determine which appliances or plugs they feed.

Working with portable power tools

- Don't use power tools with the guards removed.
- Always unplug tools when they are not in use. Pull on the plug, not the cord.
- Don't pull out a plug when your hands are wet or when you are touching metal.
- Use power cords that are rated for the equipment you are using.
- Use ground fault circuit interrupters (GFCIs) on all plugs located outdoors. Never use two-pronged extension cords outdoors.
- Keep power bars mounted on their sides to help keep them dry.
- Always de-energize and lock out equipment and tools before working on them. Ensure all moving parts have come to a complete stop.
- If someone suffers from an electrical shock, get them emergency medical care immediately. An electrical shock can burn internal organs without burning the skin.

Warning!

Unusually warm or hot outlets may be a sign of unsafe wiring. Unplug any cords to these outlets and do not use them until a qualified electrician has checked the wiring.

Wood dust

Airborne wood dust presents an exposure hazard to workers. Activities likely to produce high dust levels include:

- Machining operations, particularly sawing, routing, and sanding
- Using compressed air to blow dust off furniture or equipment
- Emptying the bag from a dust extraction system

Respirable dust

Activities such as sanding, cutting, dry sweeping, or blowing dust with compressed air can produce elevated levels of airborne dust.

Overexposure to airborne wood dust can:

- Irritate the eyes, nose, and throat
- Impair the function of the lungs
- Increase the risk of certain types of cancers

Some workers may also develop asthma from exposure to Western red cedar dust. That's why it is important to prevent exposures by using a wood dust collection system (see page 21) and respirators (see page 18).

Between 1980 and 2005, there were 197 dust explosions in the U.S., causing 109 fatalities and 600 injuries.

Combustible dust

Combustible dust is wood dust that presents an explosive hazard when it builds up beyond safe levels in the air. Wood dust is considered an explosive hazard when it settles on surfaces throughout the shop to a depth of more than $\frac{1}{8}$ " on more than 5% of the surface area of the shop. The smaller the wood particle generated, the higher the risk.

A spark or flame can cause fine dust in the air to ignite in a primary explosion. The ignition source can be as simple as a worker changing a light bulb, a worn drive bearing on equipment, or a static electrical charge from air passing through ventilation piping.

Safety tips

- Choose work methods or processes that minimize the generation of dust.
- Generally, you shouldn't use compressed air to blow dust off clothing or work surfaces. Employers should provide a means for workers to vacuum clothing.

- Where there is airborne dust, employers must provide appropriate PPE to workers and launder gloves and coveralls regularly.
- Machines and processes must have effective dust pickup at the source.
- Orbital sanders and similar sanders must have vacuum pickups off the sanders or must be used with downdraft dust collection tables or in a booth designed to remove wood dust effectively.

Sanders generate the greatest amount of dust without ducting.

Wood dust collection systems

The best way to control wood dust is to use local exhaust ventilation and collect the dust at the point of generation. Collection systems must be designed, installed, and maintained according to National Fire Protection Association (NFPA) standards, local building codes, and direction from local fire authorities.

Dust collection systems must be designed, installed, and maintained by a qualified person who has been provided with a layout of the shop space, including the locations of machines and processes that will be utilized, along with their specifications. If this has not been done already, then a hazard analysis of the dust collector should be conducted and documented.

Recirculation of discharged air into the shop is only permitted with written approval by WorkSafeBC (Engineering department) when allergenic wood dust of any kind or non-allergenic hardwood dust are present.

If the dust collection system does not effectively control the wood dust, workers will need to use appropriate respiratory protection.

Cleaning program

Employers must have an effective, regular cleaning program in place to ensure that wood dust, especially fine particles, does not build up to a depth greater than $\frac{1}{8}$ " thick over 5% of the shop area. Dust must be removed through effective means, such as vacuuming with a hose running to an outside dust collector. Sweeping sawdust toward floor-mounted air pickups and wetting dust will help reduce the amount of dust in the air.

For more information on design and inspection of wood dust collection systems, see the WorkSafeBC bulletin on pages 49–52.



Don't use compressed air to blow dust off clothing or work surfaces unless you meet the requirements in section 4.42 of the Regulation.

Paint booths

Paint booths help minimize worker exposures. In many cases, paint booths are necessary when dealing with toxic or flammable coatings and solvents. They also help minimize unpleasant odours that can affect neighbouring businesses. Planning the design and construction of a paint booth will save a lot of headaches down the road.

When moving into a new shop or renovating an old one, consider the logistical requirements of a paint booth. Ask the following questions:

- Do you have space to install a paint booth?
- Can you install an exhaust stack? Is the proposed exhaust stack location too close to adjacent air intakes?
- Can you install a grille for makeup air? If you don't have enough makeup air, your exhaust fan will not work properly.

Safety tips

- Ensure that the paint booth is designed in accordance with engineering principles. *Industrial Ventilation, A Manual of Recommended Practices* provides good guidance on the design of paint booth ventilation systems.
- Air in a paint booth should typically move from behind the worker, past the surface being painted, and out through the exhaust system.
- If spray painting, air flow rates must be at least 30 m/min. (100 fpm) for booths with a cross-section area less than 14 m² (150 sq. ft.) and at least 15 m/min. (50 fpm) for larger booths.
- If spray painting, in most cases the booth must be equipped with an arrestor filter near the exhaust intake to prevent the fouling of exhaust system components, including the fan.
- If using flammable solvents and paints, eliminate or control all sources of ignition. This may include ensuring that all electrical systems and motors are approved for hazardous locations, as specified by the *Electrical Safety Regulation*, and that equipment such as spray guns has been electrically bonded.
- Store paints, solvents, and used rags in sealed metal containers.
- Even with the use of a paint booth, respiratory protection may still be required (for example, when applying sensitizers, such as isocyanates).
- Develop and follow a written system of regular maintenance to ensure that the booth continues to work well.

Table saws

Woodworking is inherently dangerous. Table saws are the most common piece of equipment involved when serious accidents occur. Many of these saws are hand fed and used to cut materials of varying dimensions. This means the operator's hands are frequently close to the blade during the cutting process. An unguarded 10" circular saw blade turning at approximately 225 km/h leaves a lot of potential for serious injury.

Guards are designed to prevent accidental contact with the blade—they protect against unforeseen and unpredictable circumstances such as kickbacks or inadvertent hand movements. The point of operation is where the stock is cut, shaped, bored, or formed by the tool (for example, the saw blade or knife head). In practice, safeguarding the point of operation often requires a combination of solutions. For table and panel saws, this means the use of blade guards and safety devices such as push sticks and jigs, plus possibly warning signs.

Safety tips

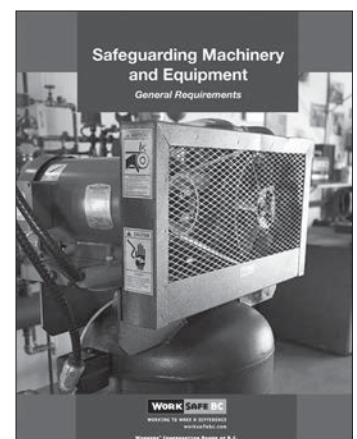
- Ensure that only trained and experienced workers operate saws.
- Wear proper eye and hearing protection, and when required, respiratory protection.
- Refer to and follow the saw manufacturer's instructions for reducing the risk of kickback.
- Make sure the guard is in place and working correctly.
- Choose the proper saw blade for the type of work being done.
- Keep saw blades clean, sharp, and properly set so they will cut freely without having to force the material into the saw.
- Keep the work area clean. Operate the table saw in a non-congested, well-lit area.
- During cutting, keep hands out of the line of the saw cut as much as possible.
- Use the saw blade guard for all operations. In ripping operations, or any other operation where there is a risk of kickback, use anti-kickback fingers and a splitter, spreader, or riving knife designed to prevent kickback.

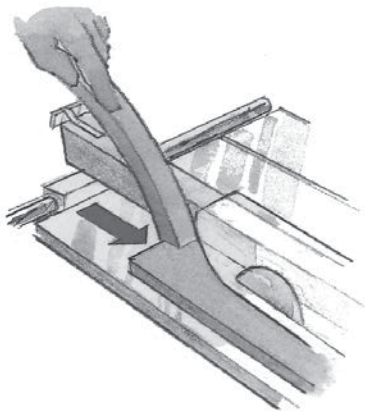
Serious consequences

On average, there are more than 40 amputations in the woodworking industry each year. Most involve table saws and some involve panel saws. In most of these incidents, the saws are not equipped with point-of-operation safeguarding (blade guards and other devices).

Publication

Safeguarding Machinery and Equipment





Use a push stick when ripping narrow stock.

- Keep your body to the side of the saw blade, out of the line of a possible kickback.
- Use a push stick when ripping narrow stock.
- Hold the stock firmly against the mitre gauge or rip fence to position and guide the cut.
- Do not reach around or over a running saw blade.
- Do not leave the table saw unattended while the saw blade is in motion.
- Make sure there is minimal clearance between the guard and the top of the material. This will help increase the effectiveness of the guard.
- Only remove the guard in specific circumstances. Develop and implement specific safe work procedures for operations that require that the guard be removed.
- If the use of a guard on woodworking machinery is clearly impracticable for a specific operation, the guard may be removed, but an appropriate pushstick, jig, feather board or similar device must be used to prevent the operator from encroaching into the cutting area. Upon completion of the operation the guard must be replaced.

Changing saw blades

Before changing a saw blade, shut off the machine and follow the appropriate de-energization and lockout procedure so you can be sure the machine won't accidentally start up while you're working on it. See "Lockout," pages 14–15.

Ladders

Many workers are injured each year as a result of falls from ladders. Employers need to ensure that appropriate ladders are available for the specific tasks that workers are required to perform. Workers also need basic training on which ladders to use for which task.

Regular inspection of ladders should be included as part of regular safety inspections. Broken ladders need to be identified and kept out of service until repaired.

Safety tips

- Inspect the ladder before using it to ensure that no parts are broken, cracked, or missing.
- Make sure you place the ladder on a firm, level surface.
- Make sure the areas around the base and the top of the ladder are clear of obstructions. Avoid contact with wiring or electrical cords, especially when using a metal ladder.
- Try to position the ladder away from doorways and walkways to prevent collisions.
- Wear slip-resistant footwear and ensure that the ladder rungs are free of oil, grease, or other slippery substances.
- Climb with both hands. If you need a tool or materials, climb first and then have someone pass the item to you.
- When you are on the ladder, keep your centre of gravity between the side rails.

Stepladders

- Ensure that the spreaders are engaged and properly locked in place before climbing.
- Never stand on the top two steps of a stepladder.
- If possible, brace yourself with your free hand.

Publication

StartSafe Safety Tip 3: Stepladder Use



Extension ladders

- Follow the 4-to-1 rule: For every 4 ft. of vertical, set the base 1 ft. out from the wall.
- Never lean the ladder against flexible or movable objects.
- Make sure that the safety feet are intact and undamaged.
- Keep three points of contact with the ladder at all times.
- Don't climb past the third rung from the top.
- If possible, have a spotter to support the ladder from the bottom.
- If you must place the ladder in front of a door, lock the door or block off the feet of the ladder so they can't move.

Forklifts and pallet jacks (lift trucks)

Forklifts, powered or manual pallet jacks, and similar equipment (commonly known as *lift trucks*) are commonly used in medium and large woodworking shops.

Training requirements

- Employers must ensure all workers are properly trained before they operate forklifts or pallet jacks.
- Workers must demonstrate competency in operating the equipment to a qualified supervisor or instructor.
- Lift truck operators must take a refresher course at least every two years, or whenever there is an accident or incident resulting from operator error.
- Employers are responsible for assessing each lift truck operator's performance on an ongoing basis.
- If workers are required to refuel a lift truck with propane or change or recharge batteries, training should include these tasks.
- When planning training, employers must assess the risk of the specific workplace. Factors to consider include the nature of the travel surface, slope of the surface, and activities to be undertaken.

Safety tips

- Make sure all operators have been properly trained before operating a forklift or pallet jack.
- Do not operate the forklift unless it's running properly. If it isn't working properly, get it fixed first. Never carry a passenger or elevate a person on forks, pallets, or loads.
- Never stand or pass under an elevated load. Don't let anyone else do it either.
- Check the load capacity of the forklift before loading.

Regulation

Guideline G16.7(j)-1,
Lift Truck Operator
Training

Publication

*Safe Operation of Lift
Trucks*

Driving

- Make sure you have a clear line of vision on all sides and that the work area is free of obstructions. If you can't see past the load, travel in reverse.
- Carry loads at the lowest possible position.
- Forklifts can tip. Never make a turn on a sloped surface.
- When carrying a load on a slope, drive in reverse when going down the slope and forward when going up.
- Drive at a speed that will allow for a safe stop.
- Yield the right-of-way to pedestrians.
- For a quick emergency stop, lower the load.

When the job is done

- Lower the forks to the floor.
- Set the brake, and then put the controls in low gear or park.

Pallet jacks

- Wear safety footwear.
- Push, don't pull. It puts less strain on your back and it's easier to stop.
- For a quick stop, lower the load.

Emergencies

Employers need to have written emergency procedures in the event of fire, earthquake, or serious workplace incidents. The procedures need to include information such as who to call, what to do, where to go, and where first aid equipment is located.

Central to any safe workplace is having a plan for dealing with emergencies. New workers should receive training on emergency procedures within their first few days on the job. All workers should have refresher training from time to time.

Training requirements

After training, workers should be able to answer the following questions:

- Where are emergency phone numbers posted?
- Where are fire extinguishers and how and when should they be used?
- Where are the fire alarms and fire exits?
- What is the evacuation plan for the building?
- What should you do during an earthquake?
- Where is the first aid equipment located?
- In case of evacuation, where outside the building is the assembly point and who should you report to?
- What other specialized equipment may be needed in case of an emergency and how is it used?

First aid requirements

It is important to get first aid promptly if an injury occurs. If the injury is serious, call an ambulance immediately. Workers need to know how and where to get first aid at work. Employers must have written procedures that tell workers:

- How to get help if injured on the job
- Who to report injuries to
- Whether there is a first aid attendant, first aid room, or first aid kit available, and where they can be found
- How to call for emergency transportation to a medical facility

What is a serious incident?

Serious incidents include the following:

- A fatality or serious injury
- A major release of a hazardous substance
- A major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system, or excavation
- A blasting accident that causes personal injury, or any other dangerous incident involving explosives, whether or not there is an injury

Fire safety tips

- Review your building's evacuation procedures from time to time. Make sure you know what to do if there is a fire.
- Know the location of fire extinguishers and escape routes.
- If you spot an unintended fire, sound the nearest alarm and call 9-1-1.
- Use a fire extinguisher only if you have been trained to do so.

All woodworking shops are considered moderate-risk workplaces. To determine your first aid requirements, use the following tables, which apply to moderate-risk workplaces. First aid requirements are based on the number of workers per shift, so the requirements may vary depending on the shift.

20 minutes or less surface travel time to hospital

Number of workers per shift	Supplies, equipment, and facility	Level of first aid certificate for attendant	Transportation
1	Personal first aid kit	N/A	Transportation at employer's expense
2–5	Basic first aid kit	N/A	Transportation at employer's expense
6–25	Level 1 first aid kit	Level 1	Transportation at employer's expense
26–75	Level 2 first aid kit Dressing station	Level 2	Transportation at employer's expense

More than 20 minutes surface travel time to hospital

Number of workers per shift	Supplies, equipment, and facility	Level of first aid certificate for attendant	Transportation
1	Personal first aid kit	N/A	Transportation at employer's expense
2–5	Level 1 first aid kit	Level 1	Transportation at employer's expense
6–15	Level 1 first aid kit ETV* equipment	Level 1 with Transportation Endorsement	Transportation at employer's expense
16–50	Level 3 first aid kit Dressing station ETV* equipment	Level 3	ETV*
51–100	Level 3 first aid kit First aid room ETV* equipment	Level 3	ETV*
101–300	Level 3 first aid kit First aid room Industrial ambulance equipment	Level 3	Industrial ambulance

* Emergency Transportation Vehicle

3

Forms and checklists

WorkSafeBC.com

Some checklists are available as documents that you can download and modify to suit your specific workplace.

This part includes the following sample forms and checklists that you can use as a starting point for a health and safety plan specific to your workplace:

- Worker orientation checklist33
- Typical orientation and training topics.....36
- Training checklist38
- Inspection checklist.....39
- Machine safeguarding checklist41
- WHMIS implementation plan checklist42
- WHMIS education and training checklist44
- Level 1 first aid kit45

Worker orientation checklist

Employee name: _____

Position (tasks): _____

Date hired: _____ Date of orientation: _____

Person providing orientation (name and position): _____

Company name: _____

Topic	Initials (trainer)	Initials (worker)	Comments
1. Supervisor name: _____ Telephone #: _____			
2. Rights and responsibilities (a) General duties of employers, workers, and supervisors			
(b) Worker right to refuse unsafe work and procedure for doing so			
(c) Worker responsibility to report hazards and procedure for doing so			
3. Workplace health and safety rules a) _____ b) _____ c) _____ d) _____			
4. Known hazards and how to deal with them a) _____ b) _____ c) _____ d) _____			
5. Safe work procedures for carrying out tasks a) _____ b) _____ c) _____ d) _____			
6. Procedures for working alone or in isolation			

Topic	Initials (trainer)	Initials (worker)	Comments
7. Measures to reduce the risk of violence in the workplace and procedures for dealing with violent situations			
8. Personal protective equipment (PPE)—what to use, when to use it, where to find it, and how to care for it a) _____ b) _____ c) _____			
9. First aid (a) First aid attendant name and contact information			
(b) Locations of first aid kits and eye wash facilities			
(c) How to report an illness, injury, or other accident (including near misses)			
10. Emergency procedures (a) Locations of emergency exits and meeting points			
(b) Locations of fire extinguishers and fire alarms			
(c) How to use fire extinguishers			
(d) What to do in an emergency situation			
11. Where applicable, basic contents of the occupational health and safety program			
12. Hazardous materials and WHMIS (a) Hazardous materials (controlled products) in the workplace			
(b) Hazards of the controlled products used by the worker			
(c) Purpose and significance of hazard information on product labels			
(d) Location, purpose, and significance of material safety data sheets (MSDSs)			
(e) How to handle, use, store, and dispose of hazardous materials safely			
(f) Procedures for an emergency involving hazardous materials, including clean-up of spills			
13. Where applicable, contact information for the occupational health and safety committee or the worker health and safety representative			

How to fill out the worker orientation checklist

The orientation checklist on pages 33–34 covers the topics specified in section 3.23(2) of the Regulation. Checklist topics #3, 4, 5, and 8 include blank lines so you can add topics specific to your workplace. Once a topic has been discussed or demonstrated, the trainer and the employee should initial the item. If the topic is irrelevant, mark “N/A” in the Comments column. Also indicate in the Comments whether any follow-up is necessary. Here’s a brief explanation of each item on the checklist:

1. Provide workers with written contact information for their supervisors. If possible, introduce supervisors to workers immediately.
- 2a. Go over the responsibilities specified in sections 115–117 of the *Workers Compensation Act*. Make a copy of the *Act* and the Occupational Health and Safety Regulation available to workers, or point them to the online version at WorkSafeBC.com.
- 2b. Inform workers that it is their duty to refuse to perform work if they believe it may be dangerous to themselves or others, and that they cannot be punished for doing so. See sections 3.12–3.13 of the Regulation.
- 2c. Inform workers that hazards should be reported immediately, and identify who they should report hazards to (for example, their supervisor or a safety coordinator). See section 3.10 of the Regulation.
3. Go over general rules, which include following work procedures, using personal protective equipment, and operating equipment safely.
4. Inform workers about any known hazards that apply to them and tell them how to deal safely with these hazards. For example, train them to wear respirators while sanding.
5. Demonstrate specific tasks (for example, cleaning equipment or using ladders) and safe work procedures (for example, locking out equipment before cleaning or repairing it).
6. Tell workers about person check procedures for working alone or in isolation. Teach them safety strategies such as keeping the back door locked. See sections 4.21–4.23 of the Regulation.
7. Warn workers about any potential for violence. Tell them how to prevent incidents (for example, remain calm with abusive customers) and how to deal with incidents (for example, do not attempt to restrain shoplifters or robbers). See sections 4.27–4.31 of the Regulation.
8. If workers need to use PPE (for example, respirators while painting), tell them what equipment to use and teach them how to use it properly. See Part 8 of the Regulation.
9. Make sure workers know what to do if they or someone else is injured. They need to know where to find first aid supplies and who to report the injury to. All injuries must be reported.
10. Explain evacuation procedures. Show workers emergency exits, meeting points, locations of fire alarms and fire extinguishers, and how to use extinguishers.
11. Explain what an occupational health and safety program is and go over it with workers. Tell them where they can find a written copy of the program. See sections 3.1–3.3 of the Regulation.
12. Workers need to know about hazardous products such as paints, solvents, or cleaning products. Train them how to handle and dispose of such products safely, and where to find more information (for example, on product labels and MSDSs). If workers are uncertain about proper procedures, they should always talk to a supervisor.
13. Where applicable, introduce workers to committee members or the worker representative and identify the location of the joint health and safety committee minutes. Tell them why there is a committee or representative, and provide the workers with contact information.

Typical orientation and training topics

The following table describes key orientation topics. Each topic includes examples of areas for discussion during training, as well as references that you can use for more information. This table is not comprehensive—your orientation should include topics that are specific to your workplace, which may not be described here. That’s why it’s important to do a hazard assessment in your workplace. An assessment will help identify any other necessary health and safety topics for training.

The Resources column in the following table includes three types of resources. Regular text is used for references to the Occupational Health and Safety Regulation and web resources. *Italicized text* is used for references to other publications (booklets and guides). **You can find a searchable version of the Regulation as well as electronic versions of publications online at WorkSafeBC.com.**

Topic	Things to discuss	Resources
Worker rights and responsibilities	<ul style="list-style-type: none"> Following the Regulation and other health and safety rules Using PPE when required Right to refuse unsafe work 	<ul style="list-style-type: none"> Regulation: Part 3, Rights and Responsibilities Regulation: Sections 115–117 of the <i>Workers Compensation Act</i>
Falls from elevation (including ladder safety)	<ul style="list-style-type: none"> Fall protection system Fall protection procedures Proper use of fall protection equipment Ladder safety Inspection and maintenance of ladders and fall protection equipment 	<ul style="list-style-type: none"> Regulation: Part 11, Fall Protection <i>An Introduction to Personal Fall Protection Equipment</i>
Lockout (for machinery and power tools)	<ul style="list-style-type: none"> Define lockout Types of lockout When to lock out Review procedures for specific equipment 	<ul style="list-style-type: none"> Regulation: Part 10, De-energization and Lockout <i>Lockout</i>
Lifting and moving objects or people (sprains and strains)	<ul style="list-style-type: none"> Demonstrate safe lifting technique Use of specialized equipment for lifting or moving materials or people Storage priorities (heavier items at lower heights and lighter items higher up) 	<ul style="list-style-type: none"> Regulation: Sections 4.46–4.53 <i>Handle With Care: Patient Handling and the Application of Ergonomics (MSI) Requirements</i> <i>Understanding the Risks of Musculoskeletal Injury (MSI): An Educational Guide for Workers on Sprains, Strains, and other MSIs</i> <i>Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees</i>
Guarding (for machinery and power tools)	<ul style="list-style-type: none"> Types and purposes of guards Inspection and use of guards Requirement to leave guards in place 	<ul style="list-style-type: none"> Regulation: Sections 12.1–12.6 <i>Safeguarding Machinery and Equipment</i> <i>Safeguarding in Manufacturing</i>

Topic	Things to discuss	Resources
Forklifts and other mobile equipment	<ul style="list-style-type: none"> • Maintaining eye contact with equipment operator • Speed limits and locations of travel lanes • Equipment inspection and maintenance • Load limits and procedures for safe operation • Operators must demonstrate competency in using equipment 	<ul style="list-style-type: none"> • Regulation: Part 16, Mobile Equipment • <i>Safe Operation of Lift Trucks</i>
Confined spaces (for example, working in tanks, silos, vats, rail cars, hoppers, or sewers)	<ul style="list-style-type: none"> • Location of any confined spaces in the workplace, and the hazards they pose • Who may or may not enter a confined space • Required procedures for entering a confined space 	<ul style="list-style-type: none"> • Regulation: Part 9, Confined Spaces • <i>Hazards of Confined Spaces</i> • <i>Confined Space Entry Program: A Reference Manual</i>
Personal protective equipment (PPE)	<ul style="list-style-type: none"> • When and how to use specific PPE • Where to find PPE • Limitations of protection • Storage, maintenance, and inspection 	<ul style="list-style-type: none"> • Regulation: Part 8, Personal Protective Clothing and Equipment
WHMIS	<ul style="list-style-type: none"> • Reading and understanding labels • Reading and understanding MSDSs • Location of MSDSs • Hazards of products being used • Control measures and appropriate PPE 	<ul style="list-style-type: none"> • Regulation: Sections 5.3–5.19 • OHS Guidelines: G5.3-1–G5.15 • <i>WHMIS: The Basics</i>
First aid and emergency procedures	<ul style="list-style-type: none"> • Names and locations of first aid attendants • Locations of first aid kits • Locations of fire exits • Locations of fire extinguishers and how to use them 	<ul style="list-style-type: none"> • Regulation: Sections 3.14–3.21 • Online First Aid Assessment Tool www2.worksafebc.com/calculator/firstaid/
Violence	<ul style="list-style-type: none"> • Procedures for identifying and dealing with aggressive customers, clients, or patients • Procedures for preventing and dealing with shoplifting and robbery incidents • Procedures for handling money • Procedures for opening and closing 	<ul style="list-style-type: none"> • Regulation: Sections 4.27–4.31 • <i>Preventing Violence, Robbery, and Theft</i> • <i>Preventing Violence in Health Care</i> • <i>Home and Community Health Worker Handbook</i> • <i>Take Care</i>
Working alone	<ul style="list-style-type: none"> • Procedures for person checks • Work activities that may place workers at risk of injury, and which should not be performed when working alone • Procedures for late-night work (10:00 p.m. to 6:00 a.m.) • Procedures described under “Violence” (see previous topic) 	<ul style="list-style-type: none"> • Regulation: Sections 4.20.1–4.23 • OHS Guidelines: G4.20.1–G4.22.2 • <i>A Workbook for Employers and Workers: Preventing Violence</i>

Training checklist

This checklist provides some typical topics that are meant to be used as a starting point. You should customize this checklist so it is specific to your workplace.

Employee name: _____

Trainer (name and position): _____

Topic	Initials (trainer)	Initials (worker)	Comments	Date
Operating a forklift				
Accessing first aid				
Using a fire extinguisher				
WHMIS (for handling chemicals with warning labels), including:				
• Which products are covered under WHMIS and the hazards associated with them				
• Which personal protective equipment (PPE) you need to use				
• How to store chemicals safely				
• How to clean up spills				
• Where to get more information				
How to safely operate:				
• Table and panel saws				
• Shapers				
• Edge banders				
• Chop saws				
• Planers				
• Jointers				
How to lock out equipment safely				
Procedures for working alone (for example, delivery and installation)				
How to use, maintain, and store respirators				
Manual lifting safe work practices				

Inspection checklist

Use this sample to develop a unique checklist for your regular safety inspections. Go over every aspect of your workplace to identify possible hazards. Add or delete items as necessary for your particular workplace.

Floors and walkways	Yes	No
Are aisles clear of materials and equipment?		
Are doorways clear of materials or equipment?		
Are floors clear of slipping and tripping hazards?		
Are floors kept dry and free of debris?		
If supplies or materials are stored on the floor, are they away from doors and aisles and stored safely?		
Stairs, ladders, and platforms	Yes	No
Are ladders safe and in good condition?		
Are stairwells clear of materials, debris, and equipment?		
Are stairs and handrails in good condition?		
Are stairs provided with anti-slip strips or surfaces?		
Lighting and environment	Yes	No
Are lighting levels in work areas adequate?		
Are work areas free of glare?		
Is task lighting provided in areas of low light?		
Are signs and fixtures securely fastened to the wall?		
Is air quality good?		

Storage	Yes	No
Are supplies and materials stored properly on shelves?		
Does your storage layout minimize lifting problems?		
Are trolleys or dollies available to move heavy items?		
Are racks and shelves in good condition?		
Electrical	Yes	No
Are electrical cords in good repair?		
Is there clear access to electrical panels and electrical disconnects?		
Are plugs, sockets, and switches in good condition?		
Are portable power tools in good condition?		
Equipment and machinery	Yes	No
Are equipment and machinery kept clean?		
Is equipment operating safely?		
Are start-stop switches clearly marked and in easy reach?		
Is machinery adequately safeguarded?		
Is there enough work space?		
Is the dust collection system functional?		
Are lockout procedures in place?		

Fire and other emergencies	Yes	No
Are fire extinguishers clearly marked?		
Are fire extinguishers properly installed on walls?		
Have fire extinguishers been inspected within the last year?		
Are flammable liquids properly stored?		
Are emergency phone numbers close to phones?		
Are smoke and fire alarms in place?		
Is there safe access for workers?		
Are emergency exits clearly marked?		
Are emergency lights in working condition?		
Have sprinkler systems been inspected?		
First aid	Yes	No
Is the first aid kit accessible and clearly labelled?		
Is the first aid kit adequate and complete?		
Is the first aid kit clean and dry?		
Are emergency phone numbers and first aid procedures available?		
Do workers know where to go in an emergency and who to call for first aid?		
Are injury report forms readily available (Form 7)?		
Are first aid forms readily available?		
Garbage	Yes	No
Are bins located at suitable points?		
Are bins emptied regularly?		

Hazardous materials (WHMIS)	Yes	No
Are material safety data sheets (MSDSs) available and current for all hazardous materials?		
Are containers clearly labelled with either a supplier label or a workplace label?		
Are hazardous materials properly stored?		
Are hazardous materials disposed of properly?		
General worker questions	Yes	No
Do workers know where to find personal protective equipment (for example, disposable gloves or eye protection)?		
Do workers know how to use personal protective equipment?		
Do workers use personal protective equipment properly?		
Eye/face protection		
Footwear		
Gloves		
Protective clothing		
Aprons		
Respirators		
Other		
Safe work practices	Yes	No
Do workers use proper safe lifting technique?		
Do workers know the procedures for working alone?		

Machine safeguarding checklist

Use this checklist to analyze all of the moving machinery in your workplace.

Guarding requirements	Yes	No
Do the guards prevent workers' hands, arms, and other body parts from making contact with dangerous moving parts?		
Are the guards firmly secured and not easily removable?		
Do the guards ensure that no objects will fall into the moving parts or explode out?		
Do the guards permit safe, comfortable, and relatively easy operation of the machine?		
Can the machine be oiled or greased without removing the guards?		
Does the machine automatically shut down when a guard is removed?		
Can the existing guards be improved?		
Mechanical hazards	Yes	No
The point of operation		
Is there a point-of-operation guard provided for the machine?		
Does it keep the operator's hands, fingers, and body out of the danger area?		
Is there evidence that the guards have been tampered with or removed?		
Could you suggest a more practical, effective guard?		
Could changes be made on the machine to eliminate the point-of-operation hazard entirely?		
Power transmission apparatus		
Are there any unguarded gears, sprockets, pulleys or flywheels on the apparatus?		
Are there any exposed belts or chain drives?		
Are there any exposed parts, such as set screws, key ways, or collars?		
Are the start and stop controls within easy reach of the operator?		
If there is more than one operator, are separate controls provided?		
Other moving parts		
Are guards provided for all hazardous moving parts of the machine, including auxiliary parts?		

Education and training	Yes	No
Do operators and skilled trades workers have the necessary education and training in how to use the guards?		
Does the education include examples of workers in your workplace or elsewhere who might have lost their life or their limbs from lack of machine guarding?		
Have production workers and skilled trades workers been trained in where the guards are located, how they provide protection, and what hazards they protect against?		
Have production workers and skilled trades workers been trained in how and under what circumstances guards can be removed?		
Have workers been trained in the procedure to follow if guards are damaged, missing, or inadequate?		
Do skilled trades workers have the necessary education and training in how to build the safety aspects of guards?		
Protective equipment and proper clothing	Yes	No
Is protective equipment required?		
If protective equipment is required, is it appropriate for the job, in good condition, kept clean and sanitary, and stored carefully when not in use?		
Is the operator dressed safely for the job (no loose fitting clothing or jewelry)?		
Machinery maintenance and repair	Yes	No
Have skilled trades workers received up-to-date instructions on the machines they service?		
Do skilled trades workers lock out the machine from all of its energy sources before beginning repairs?		
Is the maintenance equipment itself properly guarded?		

Source: CAW Health and Safety Department, *Blowin' in the Wind—Machine Guarding Prevents Death* (used with permission)

WHMIS implementation plan checklist

Activity	Time needed	Assigned to	Date completed
Assign responsibility for WHMIS implementation			
1.			
2.			
3.			
Establish an inventory of controlled products			
Determine which products used or produced are classified as controlled products under WHMIS.			
WHMIS labels and MSDSs			
Obtain MSDSs for controlled products already in the workplace.			
Develop a process for requesting and receiving MSDSs for new purchases.			
Develop methods to store MSDSs so that they are readily available to workers.			
Develop a process to ensure that supplier labels are on or available for all new controlled products received.			
Develop a process to create and provide workplace labels and other means of identification.			
Determine hazards			
Identify and evaluate the hazards of controlled products in the workplace (for example, consider the quantities to be used and stored, and the work processes where these products are used).			
Workplace controls			
Based on the hazard evaluation, determine where the following workplace controls may need to be established or upgraded: <ul style="list-style-type: none"> • Substitution of a less hazardous product • Engineering controls such as local exhaust ventilation and process modification • Administrative controls such as work procedures and work scheduling • Personal protective equipment and clothing 			
Integrate these controls into the overall health and safety program.			

Activity	Time needed	Assigned to	Date completed
Emergency procedures			
Review first aid procedures and upgrade them if required.			
Review spill control procedures and upgrade them if required.			
Review firefighting procedures and upgrade them if required.			
Notify the local fire department of the location, types, and quantities of controlled products used and stored.			
Worker education and training			
Complete the "WHMIS Education and Training Checklist" (see page 44).			
Evaluate WHMIS program			
Establish periodic review process for the following: <ul style="list-style-type: none"> • Check to ensure that no MSDS is more than three years old. • Check that all items on the MSDS have been completed. • Check the condition and presence of labels for all controlled products. • Monitor workplace controls to ensure their effectiveness. • Review the WHMIS education and training program. 			

WHMIS education and training checklist

Activity	Assigned to	Date completed
Development		
Consult the joint occupational health and safety committee (or worker representative) on the development, implementation, and review of the program.		
Identify all controlled products used in the workplace.		
Evaluate the hazards of each controlled product.		
Identify WHMIS instructors, from either internal or external sources.		
Train instructors (if internal) or evaluate their qualifications (if external).		
Identify workers that should be instructed—those who work with or near controlled products.		
Establish a process to identify new workers and contractors who require instruction.		
Evaluate labels and MSDSs to be used in the education program. Check for clarity, accuracy, and completeness.		
Evaluate safe work and emergency procedures to be used in the WHMIS education and training program.		
Instruction		
Provide a general introduction to WHMIS (for example, discuss responsibilities, labels, and MSDSs).		
Provide instruction on how to identify controlled products.		
Provide instruction on control measures and safe work procedures.		
Provide instruction on emergency procedures.		
Provide instruction on accessing information on controlled products.		
Evaluate the need for additional or specialized instruction to workers (for example, to those with language or learning difficulties), and provide this instruction where required.		
Provide instruction to workers whenever new products are received or new hazard information becomes available.		
Follow-up activities		
Evaluate worker understanding of WHMIS. Provide further education and training as required.		
Review the effectiveness of the education and training program at least once a year. Reviews must be done in consultation with the joint occupational health and safety committee or worker representative.		

Level 1 first aid kit

These items must be kept clean and dry and must be ready to take to the scene of an accident. A weatherproof container is recommended for all items except the blankets. Blankets should be readily available to the first aid attendant.

3	blankets
24	14 cm x 19 cm wound cleaning towelettes, individually packaged
60	hand cleansing towelettes, individually packaged
100	sterile adhesive dressings, assorted sizes, individually packaged
12	10 cm x 10 cm sterile gauze dressings, individually packaged
4	10 cm x 16.5 cm sterile pressure dressings with crepe ties
2	7.5 cm x 4.5 m crepe roller bandages
1	2.5 cm x 4.5 m adhesive tape
4	20 cm x 25 cm sterile abdominal dressings, individually packaged
6	cotton triangular bandages, minimum length of base 1.25 m
4	safety pins
1	14 cm stainless steel bandage scissors or universal scissors
1	11.5 cm stainless steel sliver forceps
12	cotton tip applicators
1	pocket mask with a one-way valve and oxygen inlet
6	pairs of medical gloves (preferably non-latex)
	first aid records and pen

4

Resources

Architectural Woodwork Manufacturers Association of Canada (AWMAC)—BC Chapter

Tel: 604 298-3555

Web: www.awmac.com

Email: info.bc@awma.com

WorkSafeBC resources

Go to WorkSafeBC.com for these and many other health and safety resources.

Publications

- *3 Steps to Effective Worker Education and Training*
- *Back Talk: An Owner's Manual for Backs*
- *Breathe Safer: How to Use Respirators Safely and Start a Respirator Program*
- *Lockout*
- *Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees*
- *Safe Operation of Lift Trucks*
- *Safeguarding Machinery and Equipment*
- *Small Business Primer: A Guide to WorkSafeBC*
- *Sound Advice: A Guide to Hearing Loss Prevention Programs*
- *StartSafe Safety Tip 3: Stepladder Use*
- *Understanding the Risks of Musculoskeletal Injury (MSI): An Educational Guide for Workers on Sprains, Strains, and other MSIs*
- *WHMIS at Work*
- *Working Alone: A Handbook for Small Business*
- *Working Safely Around Electricity*

Slide shows

- *Guarding for Woodworking*
- *Housekeeping in Woodworking*
- *Lockout for Woodworking*



Wood dust collection system design and inspection

The hazards of wood dust

Wood dust emitted from sawing, planing, sanding, and other operations can cause a variety of health effects when inhaled. Depending on the type of wood used, the effects can range from allergies to nasal cancer.

Wood dust is also flammable and combustible. Fine dust accumulations may explode if an ignition source (e.g., open flame, friction, or sparks) is present.

A dust collection system can reduce the risks

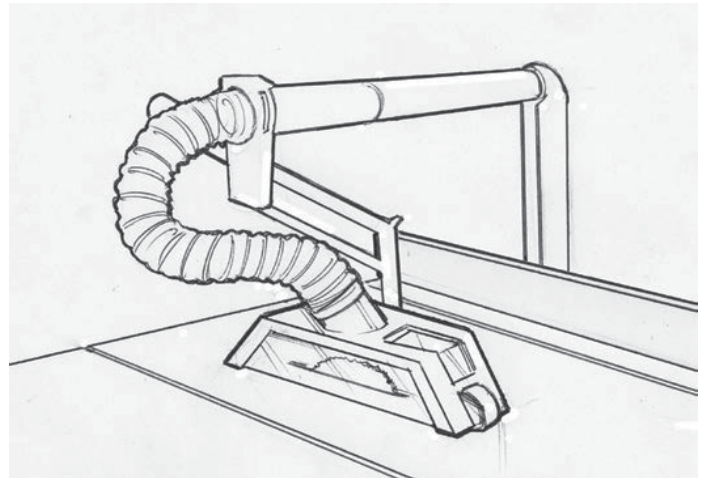
A properly designed wood dust collection system will reduce worker exposure and help prevent accumulations of dust around operating equipment. A typical system consists of a capture hood, a fan, ducting, and a filter.

Dust collection systems can be purchased or designed and constructed for a particular operation or piece of equipment. Equipment suppliers can provide some guidance. However, a professional mechanical engineer (P.Eng.) who specializes in dust control systems can ensure that a system is properly designed for a particular operation to maximize efficiency and safety.

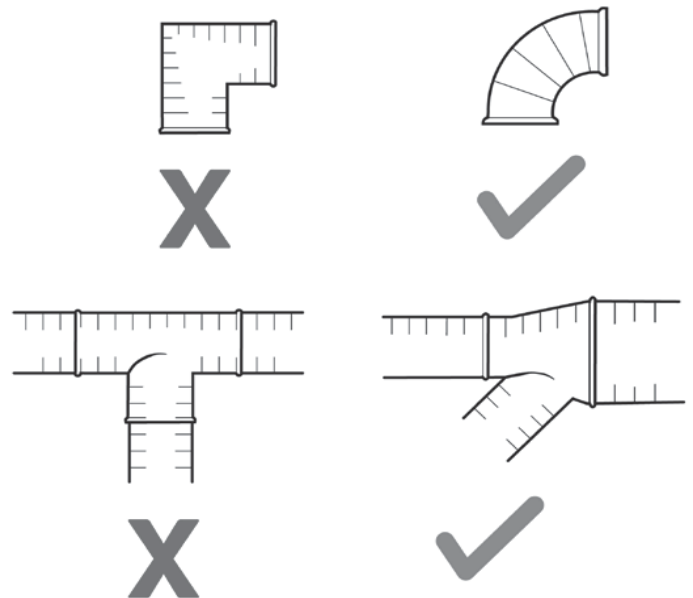
Ensuring a collection system works well

The following recommendations can help ensure that a wood dust collection system works efficiently:

- Place the collection hood as close as possible to the point of dust generation.
- Ensure that the hood encloses the dust-producing operation as much as possible and does not interfere with the process.
- Position the collection hood to take advantage of any inertia the dust might have (e.g., on the bottom of a saw blade designed to cut on the downstroke).
- Minimize the length of ducting used and avoid sharp bends or connections.



Dust collection system for a table saw



Avoid sharp bends or connections in ducting

An efficient dust collection system will help ensure that money spent on equipment and power is not wasted. It will also make the workplace cleaner and healthier, and it can help produce a better product.

For more information

A good reference for anyone who regularly designs, uses, or maintains wood dust collection systems is *Industrial Ventilation: A Manual of Recommended Practice*, published by the American Conference of Governmental

Industrial Hygienists (ACGIH). The manual contains many good diagrams of common wood dust collection hoods that can be used for a variety of processes and pieces of equipment.

Inspection checklist

Once a wood dust collection system is up and running, regular inspections of the system need to be conducted. The following checklist lists some of the things that should be considered when inspecting a collection system.

Description	Not applicable	Yes / Good condition	No / Needs repair	Comments
Records				
Manuals are made available to anyone who uses or maintains the system.				
The system is balanced regularly, and balancing reports are kept.				
Records of regular inspections and maintenance are kept.				
Collection hood				
The hood is placed as close to the point of dust generation as possible.				
The area around the hood is enclosed as much as possible.				This will help to ensure that as much of the dust as possible is collected.
The hood is placed to capture dust in its ejection path.				Think of a collection hood working like a baseball glove capturing a ball. The ball acts like fast-moving particulate. To capture the ball, you want to place your glove in line with the natural path of the ball.
Ducting				
Round, smooth bore (not corrugated) metal ducting is used.				PVC or synthetic ducting/pipe should not be used because it increases the risk of static electricity.
Ducting is grounded.				
Ducting is in good condition, free from leaks, significant corrosion, and visible damage.				
The air velocity inside the main duct is at least 20 metres per second (4,000 feet per minute) and 23 m/s (4,500 fpm) for heavier dust.				
The velocity in the main duct is higher than in the branches.				The air velocity should be at least 23 m/s (4,500 fpm) in the main horizontal ducting and about 21 m/s (4,200 fpm) in the branches.
The radius of any bend in a duct is at least 1.5 times the duct diameter.				
Flex duct length is minimized at connection points to the hood and/or collector.				Ideally, flex duct length should be less than 60 centimetres (2 feet).

Description	Not applicable	Yes / Good condition	No / Needs repair	Comments
Ducting (continued)				
Ducting is free from accumulations of dust and debris.				Having access and inspection points in the duct is the best way to confirm the absence of accumulated material. Alternatively, tapping on the side of the duct may indicate accumulated material is sitting on the bottom (if the sound from the tapping doesn't carry). In this case, the ducting may need to be cleaned. Before tapping the duct, make sure there are no accumulations of dust on top of it.
At least five duct diameters of straight ducting are present before it enters the fan housing.				This might help to maximize the efficiency of the fan up to 25 percent.
Blast gates are used to balance the ventilation system.				Mark the location of the blast gate knives directly on the blast gates to allow for quick rebalancing of the system if necessary.
All duct hangers are in good condition and free from visible damage or corrosion.				
Dust collector				
You have considered installing inline pressure monitors before any hoods and just before the dust collector.				Pressure monitors will help you verify that your system is working as expected. A sudden increase in pressure might mean it is time to change a filter or unclog a duct. Similarly, a drop in pressure may mean a tear in a filter or a hole in a duct.
Dust from hardwood and allergenic softwood is not recirculated.				You can only recirculate ventilation system dust from hardwood and allergenic softwood if you have written approval from WorkSafeBC.
If the dust collector recirculates discharge air, you are using a filter with the highest dust-collection efficiency possible.				Wood dust is an as low as reasonably achievable (ALARA) substance. Dust levels must be kept as low as possible.
Return air from cyclones is filtered before entering the workplace.				
Dust collector components are free of corrosion.				
You have considered installing fabric filter differential pressure (DP) monitors.				DP should be monitored daily, as it is the first indication that <ul style="list-style-type: none"> • The dust collector is plugging and resulting in lower dust capture or <ul style="list-style-type: none"> • The filter fabric is damaged or becoming loose
The filter fabric is in good condition with no visible rips or tears.				
The reconditioning system is working.				
Bags are emptied of dust regularly to avoid buildup.				
The explosion vents are in good condition and clear of debris.				

Description	Not applicable	Yes / Good condition	No / Needs repair	Comments
Dust collector (continued)				
The spaces around doors, enclosures, and clamps are properly sealed (i.e., air does not leak out).				
All motors and pulleys are in good condition and free from accumulated dust and debris.				
Fans and pulley systems are working properly with no unusual noise or vibration.				
Fan blades are free from accumulated debris.				
The fan housing and blades are free of damage.				Damage may indicate that something other than wood dust is being picked up.
The fan is running in the right direction.				Fans can be connected backward, reducing their effectiveness.
All guards are in place and in good condition around moving parts.				
Maintenance/monitoring				
The process is monitored to see if the dust is being captured by the hood.				
Ducts are checked for damage at least once per week.				
Collection hoods are checked for airflow at least once per week. You have ensured that woodworking equipment has been locked out. Capture velocity at the point of dust generation typically ranges from 5 m/s (1,000 fpm) to 10 m/s (2,000 fpm).				If you do not have an anemometer (a device used to measure airflow), try taking a pinch of wood dust and letting it fall near the point of dust generation. If most of the dust falls directly onto the ground without being drawn into your hood, you probably do not have enough airflow.

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Phone: 604 273-7711

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