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## 9.2.1 Hand Tools

The general rule for the operation of hand tools:

**WHEN OPERATING HAND TOOLS – WEAR YOUR PERSONAL PROTECTIVE EQUIPMENT (PPE).**

Do

1. Wear safety glasses or goggles.
2. Ensure that workers are properly trained in the safe use of hand tools.
3. Use good quality tools.
4. Select the right tool for the job. Substitutes increase the chance of having an accident, e.g. using jack knives that don't lock.
5. Avoid using hand tools with your wrist bent, use tools designed to allow your wrist to stay straight.
6. Pull on a wrench or pliers. Never push unless you hold the tool with your palm open.
7. Maintain tools carefully. Keep them clean and dry, and store them properly after each use.
8. Inspect tools for defects before use.
9. Keep cutting tools sharp.
10. Keep tools in good condition at all times. Replace or repair defective tools. Equipment tagged and report to immediate supervisor as out of service.
11. Replace cracked and broken handles on files, hammers, screwdrivers or sledges.
12. Replace worn jaws on wrenches, pipe tools and pliers.
13. Redress burred or mushroomed heads of striking tools.
14. Carry tools in a sturdy toolbox to and from the worksite.

15. Keep the work environment clean and tidy to avoid clutter that may cause accidents.

16. Use a heavy belt or apron and hang tools at your sides, not behind your back.

17. Follow all logout/tagout procedures.

Do Not

1. Do not use tools for jobs they are not intended to do.

2. Do not apply excessive force or pressure on tools.

3. Do not cut towards yourself when using cutting tools.

4. Do not hold the stock in the palm of your hand when using a cutting tool or a screwdriver.

5. Do not wear bulky gloves to operate hand tools.

6. Do not throw tools. Hand them directly to workers.

7. Do not carry tools in a way that interferes with using both hands on a ladder, while climbing on a structure, or when doing any hazardous work.

8. Do not carry a sharp tool in your pocket.

**Wrenches**

1. Wrenches are made in various shapes and sizes and for many uses. Use the correct wrench for the job.

Do

1. Wear safety glasses or a face shield.

2. Grip the wrench so that you will not endanger yourself in case it slips.

3. Use the correct jaw to avoid slippage.

4. Face an adjustable wrench forward. Turn wrench so pressure is against the permanent jaw.

5. Pull on a wrench; do not push.

6. Adjust your stance and pull when applying excess force.

7. Use PPE aside when work is done with wrenches overhead

8. Maintain all leverage tools and keep at the correct adjustment during use.

9. Clean and place tools and wrenches in a toolbox, rack or tool belt after use.

Do Not

1. Do not use pipe wrenches on nuts or bolts.

2. Do not use a wrench on moving machinery.

3. Do not interchange tools. Never use pliers instead of a wrench, or a wrench as a hammer.

4. Do not use a make-shift wrench.

5. Do not use worn adjustable wrenches. Inspect the knurl, jaw and pin for wear.

6. Do not insert a shim in a wrench for better fit.

7. Do not strike a wrench with a hammer, or similar object to gain more force.

**Hand Saws**

1. Saws are made in various shapes and sizes and form many uses. Use the correct saw for the job.

2. Wear safety glasses.

3. Select a saw of proper shape and size for stock being used.

4. Choose a saw handle that keeps your wrist in a natural position in the horizontal plane.

5. Check the stock being cut for nails, knots and other objects that may damage or buckle saw.

6. Start cut by placing your hand beside the cut mark with your thumb upright and pressing against blade. Start cut carefully and slowly to prevent blade from jumping. Pull upward until blade bits. Start with partial cut, then set saw at proper angle.

7. Apply pressure on the downstroke only.

8. Hold stock being cut firmly in place.

9. Use a helper, a supporting bench or a vise to support long stock if required.

10. Keep teeth and blades properly set.

11. Protect teeth of saw when not in use.

12. Keep saw blades clean.

**Hacksaws**

1. Wear safety glasses

2. Select correct blade for material being cut – refer to manufacturers recommendations.

3. Secure blade with the teeth pointing forward.

4. Keep blade rigid, and frame properly aligned.

5. Use strong, steady strokes, directed away from yourself.

6. Use entire length of blade in each cutting stroke.

7. Cut harder materials more slowly than soft materials.

8. Clamp thin, flat pieces requiring edge cutting.

9. Keep saw blades clean and lightly oiled.

**Hammers**

1. Hammers and other striking tools are widely used and often abused. Hammers are made for specific purposes in various types and sizes, with striking surfaces of varying hardness.

Do

1. Wear safety glasses or a face shield.

2. Select hammers according to their intended use. Misuse can cause the striking face to chip, possibly causing a serious injury.

3. Choose a hammer with striking face diameter approximately 2.54 cm (1in.) larger than the face of the tool being struck.

4. Strike a hammer blow squarely with the striking face parallel to the surface being struck. Always avoid glancing blows and over and under strikes.

5. Look behind and above before striking hammer.

6. Watch the object you are hitting.

7. Hold the hammer with your wrist straight and your hand tightly wrapped around the handle.

Do Not

1. Do not use a hammer with a loose or damaged handle.

2. Do not use rough handles that are cracked, broken, splintered, sharp-edged or loosely attached to head.

3. Do not use any hammerhead with dents, cracks, chips mushrooming or excessive wear.

4. Do not redress, grind, weld or reheat-treat a hammerhead.

5. Do not strike with the side or cheek of the hammer.

6. Do not use one hammer to strike another hammer.

**Wood Chisels**

1. Wood chisels are made in various shapes and sizes and for many uses. Use the correct chisel for the job.

Do

1. Wear safety glasses of face shield.

2. Use the right size of chisel for the job.

3. Choose smooth, handles that have no sharp edges and are attached firmly to the chisel.

4. Ensure that the cutting edge is sharp.

5. Check stock thoroughly for knots, staples, nails, screws or other foreign objects before chiseling.

6. Chip or cut away from yourself.

7. Keep your hands and body behind the cutting edge.

8. Place chisels safely with plastic protective caps on the cutting edges.

9. Replace any chisel that is bent or shows dents, cracks, chips or excessive wear.

10. Store chisels in a "storage roll", a cloth or plastic bag with slots for each chisel and keep them in a drawer or tray.

11. Replace broken or splintered handles.

12. Sharpen cutting edges as often as necessary.

13. Hold the chisel firmly.

Do Not

1. Do not use a wood chisel as a pry or a wedge.

2. Do not use a wood chisel on metal.

3. Do not use a grinder to redress heat-treated tools. Use a whetstone.

4. Do not use a dull chisel.

**Pliers**

1. Pliers are made in various shapes and sizes for many uses. Use the correct pliers for the job.

Do

1. Choose tools with sufficient space between the handles to prevent your palm or fingers from being pinched.

2. Pull on the pliers; do not push.

Do Not

1. Do not cut hardened wire unless pliers are specifically manufactured for this purpose.

2. Do not expose pliers to excessive heat.

3. Do not bend stiff wire with light pliers. Needle-nose pliers can be damaged by using the tops to bend large wire. Use a sturdier tool.

4. Do not use pliers as a hammer.

5. Do not extend the length of handles to gain greater leverage. Use a larger pair of pliers or a bolt cutter.

6. Do not use cushion grip handles for jobs requiring insulated handles. Cushion grips are primarily for comfort and do not protect against electric shock.

7. Do no use pliers on nuts and bolts; use a wrench.

**Cutting Tools**

1. Many types and sizes of cutters are used for selected ferrous and non-ferrous metal such as steel wire, cable rod wire rope, fencing, bolts and strapping.

Do

1. Wear safety glasses or a face shield and protective gloves when using cutters.

2. Choose the proper cutter for the job. Cutters are designed for a specific type and size of material.

3. Establish a safe area and take precautionary measures to avoid possible injury from flying metal pieces.

4. Keep cutting tools in good repair.

5. Adjust and lubricate cutter and moving parts daily if heavily used.

6. Sharpen jaws according to manufacturers' instructions.

Do Not

1. Do not use a cutting tool until you are trained in its proper and safe use.

2. Do not use cushion grip handles for jobs requiring insulated handles. Cushion grips are for comfort primarily and do not protect against electric shock.

3. Do not use cutters that are cracked, broken or loose.

4. Do not exceed the recommended capacity of a tool.

5. Do not cut diagonally.

6. Do not rock cutters from side to side when cutting wire.

7. Do not pry or twist with tool when cutting. Keep material being cut at right angles to the cutting edges of jaws.

8. Do not hammer on cutting tools to achieve greater cutting power.

9. Do not expose cutters to excessive heat.

**Clamps**

1. Clamps are versatile tools that serve to temporarily hold work securely in place. They are used for many applications including carpentry, woodworking, furniture making, welding, construction and metal working.

2. Clamp styles include C-clamps, bar clamps, pipe clamps, and hand screws.

Do

1. Select the proper clamp style and size by matching the work-holding requirements of the job with following clamp features:
   a) Strength and weight
   b) Opening (Length of Reach)
   c) Throat Depth (Depth of Reach)
   d) Ease of Adjustment
   e) Clamping Surface (Material Used and Size)

2. Ensure that the swivel at the end of the screw turns freely before using.

3. Remove clamps as soon as the job is finished. Clamps serve only as temporary devices for holding work securely in place.

4. Keep all moving parts of clamps lightly oiled and clean. Make sure there is no dirt or oil on any part that will come in contact with the work.

5. Store C-clamps by clamping them in a rack, not in a drawer.

Do Not

1. Do not use extra large clamps just for the sake of their large throats instead, use deep-throat clamps.

2. Do not use any clamp that has a bent frame or a bent spindle.

3. Do not use wrenches, pipes, hammers or pliers to tighten clamps. Use wrenches only on clamps especially designed for wrenches.

4 Do not hoist with C-clamps. Use special lifting clamps.

5 Do not use C-clamps to construct scaffolds or platforms for workers.

**Snips**

1. Snips are made in various shapes and sizes and for many uses. Use the correct snips for the job.

Do

1. Wear safety glasses or a face shield when working with snips and appropriate PPE.

2. Select the right size and type of snips for the job.

3. Use the proper tool for the job.
   a) Left cut snips are for making cuts to the left as well as straight cuts.
   b) Right cut snips are making straight cuts as well as cuts to the angle.
   c) Offset snips permit you to keep your hands above the cut while cutting directly through the center of a large sheet.

4. Use snips for cutting soft metal only. Hard or hardened metal should be cut with cutting tools.

5. Avoid springing the blades. This results from trying to cut metal that is too thick or heavy for the snips you are using.

6. Keep the nut and the pivot bolt properly adjusted at all times.

7. Oil the pivot bolt on the snips occasionally.

Do Not

1. Do not try to cut sharp curves with straight cut snips.

2. Do not extend the length of handles to secure greater leverage.

3. Do not attempt to resharpen snips in a sharpening device designed for scissors, garden tools or cutlery.

4. Do not use cushion grip handles for jobs requiring insulated handles. They are for comfort primarily and not for protection against electric shock.

**Pipe Tools**

1. Pipe tools are made in various shapes and sizes and for many uses. Use the correct tool for the job.

**Pipe Wrenches**

Do

1. Wear safety glasses or a face shield.

2. Select a pipe wrench with sufficient capacity and leverage to do the job.

3. Use a pipe wrench to turn or hold a pipe. Never use a pipe wrench to bend, raise or lift a pipe.

4. Take the bit of a pipe wrench near the middle of the jaws.

5. Adjust the pipe wrench grip to maintain a gap between the back of the hook jaw and the pipe. This concentrates the pressure at the jaw teeth, producing the maximum gripping force. It also aids ratcheting action.

6. Inspect pipe wrenches periodically for worn or unsafe parts and replace them.

7. Keep pipe wrench teeth clean and sharp.

8. Face a pipe wrench forward. Turn wrench so pressure is against heel jaw.

9. Pull, rather than push on the pipe wrench handle. Maintain a proper stance with feet firmly placed to hold your balance.

Do Not

1. Do not use a pipe wrench as a hammer, or strike a pipe wrench with a hammer.

2. Do not use pipe wrenches on nuts and bolts.

3. Do not use a pipe extender for extra leverage. Get a larger pipe wrench.

**Pipe Cutter, Reamers, Threaders**

Do

1. Wear glasses or a face shield.

2. Replace pipe cutter wheels that are nicked or otherwise damaged.

3. Use a three or four-wheeled cutter, if there is not enough space to swing the single wheel pipe cutter completely around the pipe.

4. Choose a cutting wheel suitable for cutting the type of pipe material required:
   a) Thin wheel for cutting ordinary steel pipe;
   b) Stout wheel for cutting cast iron;
   c) Other wheels for cutting stainless steel, plastic and other materials

5. Select the proper hole diameter and correct tap size to tap a hole. The hole should be sized so that thread cut by the tap will be about 75% as deep as the thread on the top.

6. Use lubricant with metals other than cast iron.

7. When working overhead with others – establish safe zone and/or use PPE.

Do Not

1. Do not permit chips to clog flutes. The chips prevent the tap from turning.

2. Do not attempt to thread hardened steel. This can chip or damage the die.

3. Do not thread any rod or other cylindrical object that is larger in diameter than the major diameter of the die thread.

4. Do not use a spiral reamer on a rotating pipe. The reamer may snag and cause serious injury.

**Gear Pullers**

1. Gear pullers are made in various shapes and sizes and form many uses. Use the correct tool for the job.

Do

1. Wear safety glasses or a face shield and PPE.

2. Select the proper gear puller for each pulling job. Always use a gear puller of the required size or larger.

3. Ensure that the gear puller is aligned with the shaft. This assures a straight pull.

4. Take care to remove a stubborn gear or bearing by striking the head of the center screw squarely. If after two-sharp blows, the gear or bearing remains stuck, select a larger puller and proceed to remove the gear or bearing.

5. Cover work with a cloth to stop flying parts.

6. Lubricate the center screw with machine oil before use.

7. Clean the gear puller after use and store it in a dry place.

8. If heat is required to the part, use proper safety precautions, e.g. fire extinguisher

Do Not

1. Do not use air-powered tools on gear pullers.

2. Do not use any puller with functioning parts that show excessive wear, dents or cracks. Inspect the center screw for signs of galling or seizing.

3. Do not heat any gear puller. It will lose its strength and break under pressure if heated.

4. Do not cut or grind any part of a gear puller.

## 9.2.2 Housekeeping & Storage

### General

1. It is imperative to keep the work site as tidy as practical. Waste materials and debris must be removed from work and access areas on a regular basis. Waste material must not be thrown from one level or another, but must be carried, lowered, or deposited in a proper disposal chute and container.

2. Materials must be stacked 9.2, piled, or otherwise stored to prevent tipping and collapsing. If in boxes or packages, materials should be labeled to identify their contents.

3. Each area will be responsible for the clean up of their own material.

### Tools and Maintenance

1. All new power tools shall be C.S.A. approved, and all existing equipment which needs to be repaired, moved, or sold, must be brought up to CSA standards, and workers must be trained in their proper use.

**2.** It is the responsibility of the **Southwest Regional School Board** to supply and maintain shop tools and other power equipment in good repair. It is the employees' responsibility to use such tools properly, and to report any defects to their immediate supervisor.

3. Large tools should be set up out of the way, so as not to create a hazard.

### Fire Extinguishers

1. Portable extinguishers are classified according to their ability to handle specific types of fire.

2. Fire extinguishers must be readily accessible, properly maintained, regularly inspected, annually services/monthly inspected by custodians, and promptly refilled after use.

## 9.2.3 Powered Hand Tools

**Basic Electrical Safety**

1. Inspect tools, power cords and electrical fittings for damage prior to each use. Repair or replace damaged equipment. (Logout/tagout)

2. Do not wear gloves or loose clothing while using revolving power tools.

**Tools**

1. Switch tools OFF before connecting them to a power supply.

2. Disconnect power supply before making adjustments.

3. Ensure tools are properly grounded or double-insulated. The grounded tool must have an approved 3-wire cord with 3-prong plug. This plug should be plugged in a properly grounded 3-pole outlet.

4. Do not by pass the switch and operate the tools by connecting and disconnecting the power cord.

5. Do not use electric tools in wet conditions or damp locations unless tool is connected to a ground fault circuit interrupter (GFCI).

6. Do not clean tools with flammable or toxic solvents.

7. Do not operate tools in an area containing explosive vapors or gases (test where necessary).

**Power Cords**

1. Keep power cords clear of tools during use.

2. Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.

3. Replace open front plugs with dead front plugs. Dead front plugs are sealed and present less danger of shock or short circuit.

4. Do not carry electrical tools by the power cord.

5. Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.

**Checklist**

**Inspect Cords & Plugs**

1. Check power cords and plugs daily. Discard if worn or damaged. Have any cords that feel more than comfortably warm checked by an electrician.

**Eliminate Octopus Connections**

1. Do not plug several power cords into one outlet. Use power bards with circuit breakers.

**Pull the Plug, Not the Cord**

1. Do not disconnect power supply by pulling or jerking cord from the outlet. Pulling the cord causes wear and may cause a shock.

**Never Break Off The Third Prong On A Plug**

1. Replace broken three-prong plugs and make sure the third prong is properly grounded.

**Never Use Extension Cords as Permanent Wiring**

1. Any equipment used on a regular basis must have a permanent power supply.

2. Keep power cords away from heat, water and oil. They can damage the insulation and cause a shock.

3. Do not allow vehicles to pass over unprotected power cords. Cords should be put in conduit or protected by placing planks alongside them.

**Drills**

Do

1. Wear safety glasses or a face shield and PPE.

2. Keep drill vents clear to maintain adequate ventilation.

3. Keep drill bits sharp at all times.

4. Keep all cords clear of the cutting area during use.

5. Disconnect power supply before changing or adjusting bit or attachments.

6. Tighten the chuck securely. Remove chuck key before starting drill.

7. Secure workpiece being drilled to prevent movement.

8. Slow the rate of feed just before breaking through the surface.

9. Drill a small pilot hole before drilling of large holes.

10. Be aware of existing plumbing and electrical systems in walls (check floor plans).

Do Not

1. Do not use a bent drill bit.

2. Do not exceed the manufacturer's recommended maximum drilling capacities.

3. Do not use a hole saw cutter without the pilot drill.

4. Do not use high speed steel (HSS) bits without cooling or lubrication.

5. Do not reach under or around stock being drilled.

6. Do not overreach. Keep proper footing and balance at all times.

**Working with Small Pieces**

1. Clamp stock so work will not twist or spin.

2. Do not drill with one hand while holding the material with the other.

**Choosing the Proper Bit or Attachment**

1. Select the bit or attachment suitable to the size of the drill and the work being done.

2. Use only bits and attachments that turn true.

3. Ensure that the bit or attachments are properly seated and tightened in the chuck.

4. Follow manufacturer's instructions when selecting and using a bit or attachment, especially with unfamiliar drills or work.

5. Use auxiliary (second) handle for larger work or continuous operation.

**Belt Sanders**

Do

1. Wear safety glasses or a face shield and PPE.
2. Wear an appropriate cartridge respirator for dusty operations.
3. Disconnect power supply changing sanding belt, making adjustments, or emptying dust collector.
4. Install sanding belts that are the same width as the pulley drum.
5. Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum.
6. Secure the sanding belt in the direction indicated on the belt and the machine.
7. Inspect sanding belts before using them. Replace those belts that are worn or frayed.
8. Keep hands away from sanding belt.
9. Use two hands to operate sanders; one on trigger switch, the other on the front knob handle.
10. Keep all cords clear of sanding area during use.
11. Clean dust from motor and vents at regular intervals.

Do Not

1. Do not exert excessive pressure upon the moving sander.
2. Do not use sander without exhaust system or dust collector when over ¼ full (must be checked)
3. Do not work on unfixed stock, unless it is heavy enough to stay in place. Secure the stock or use a “stop block” to prevent movement.
4. Do not overreach. Keep proper footing and balance at all times.
5. Do not cover the air vents.

**Sabre Saws, Jig Saws & Reciprocating Saws**

1. Wear safety glasses or a face shield and PPE.

2. Disconnect power supply before changing or adjusting blades.

3. Use lubricants when cutting metals.

4. Position the saw before cutting and avoid re-entry with a moving blade.

5. Do not insert a blade into, or withdraw a blade from a cut or lead hole while the blade is moving.

6. Do not put down a saw until the motor has stopped.

**Cutting**

1. Secure and support stock as close as possible to the cutting line to avoid vibration.

2. Keep the base or shoe of the saw in firm contact with the stock being cut.

3. Select the correct blade for stock being cut and allow it to cut steadily, do not force it.

4. Use blades designed for various materials as recommended by manufacturer. Blades are available ranging from 2-12 teeth/cm (7-32/in.). For rough cutting of softwood and composition board, use a blade with 2 teeth/cm (7/in). For all-round work with most types of wood, a blade with 4 teeth/cm (10/in) is satisfactory.

5. Do not start cutting until the saw reaches its full power.

6. Do not force saw along or around a curve. Allow the machine to turn with ease.

7. Do not reach under or around the stock being cut.

**Starting an External Cut**

1. Place the front of the shoe on the stock.

2. Make sure that the blade is not in contact with the stock or the saw will stall when the motor starts.

3. Hold the saw firmly down against the stock and switch it on.

4. Feed the blade slowly into the stock maintaining an even forward pressure.

**Starting an Inside Cut**

1. Drill a lead hole slightly larger than the saw blade. With the saw switched off, insert the blade in the hole until the shoe rests firmly on the stock.

2. Do not let the blade touch the stock until the saw has been switched on.

**Chain Saws**

**General**

Chain saw are used for many jobs in construction. Since this tool was primarily meant for use in the logging industry, it can be an unfamiliar tool to some workers. Workers must be trained in its safe use before using a chain saw.

This training must include a minimum of the following elements:

1. The proper personal protective equipment to be worn is as follows. Steel-toe boots, ballistic pants or leggings, hardhat with shield, and hearing protection.

2. Fueling of the saw must be done in a well-ventilated area and not while the saw is running or hot.

3. An approved safety container must be used for contained fuel used along with a proper spout or funnel for pouring.

4. The correct methods of starting:
   a) Hot Start – While holding cord, throw saw away from upper body to initiate start.
   b) Cold Start – Saw on ground, secured with one foot while pulling on cord.

5. Ensure that the chain brake is functioning properly and adequately stops the chain.

6. The chain must be sharp, have the correct tension and be adequately lubricated.

7. When carrying/transporting a chainsaw the bar guard must be in place, the chain bar must be toward the back and the motor must be shut off.

8. The chainsaw must not be used for cutting above shoulder height.

Chainsaws will comply with CSA Standards.

**Circular Saws**

1. Circular saws are designed for right-hand operation: left-hand operation will demand more care to operate safely.

**Checklist**

Do

1. Wear safety glasses or a face shield and PPE.
2. Wear approved cartridge respirators when exposed to possibly harmful or nuisance dusts.
3. Use a sharp blade that is designed for your work.
4. Check the retracting lower blade guard frequently to make certain it works freely. It should enclose the teeth as completely as possible, and cover the unused portion of the blade when cutting.
5. Allow the saw to attain full power before cutting.
6. Ensure the retracting lower blade guard is fully returned before laying the saw down.
7. Disconnect power supply before adjusting or changing the blade.
8. Keep all cords clear of cutting area.
9. Keep upper and retracting lower blade guard clean and free of sawdust.
10. Keep motor free from accumulation of dust and chips.
11. Select the correct blade for stock being cut and allow it to cut steadily, do not force it.
12. Check saw for proper blade rotation.
13. Secure material being cut to avoid movement.

Do Not

1. Do not hold or fix the retracting lower guard in the open position.
2. Do not place hand under the shoe or guard of the saw.
3. Do not over tighten the blade locking nut.

4. Do not twist the saw to change, cut or check alignment.

5. Do not use a saw that vibrates or appears unsafe in any way.

6. Do not force the saw at any time during cutting.

7. Do not cut materials without first checking for obstructions or foreign objects, such as nails and screws.

8. Do not carry saw with finger on the trigger switch.

9. Do not overreach. Keep proper footing and balance at all times.

**Planers**

1. Wear safety glasses or a face shield and PPE.

2. Use blades of the same weight, and set at exactly the same height.

3. Ensure blade-locking screws are tight.

4. Remove adjusting keys and wrenches before turning power on.

5. Disconnect the planer from the power supply before making any adjustments to the cutter head or blades.

**Secure Work**

1. Support stock in a comfortable position for doing the job safely and accurately.

2. Disconnect power supply to dump out chips.

3. Do not put finger or any object in deflector to clean out chips while planer is running.

**Cutting**

1. Check stock thoroughly for staples, nails, screws or other foreign objects from using planer.

2. Start a cut with the infeed table (front shoe) resting firmly on the stock, and cutter head slightly behind the edge of the stock.

3. Use two hands to operate planer; one on the trigger switch, the other on the front handle.

4. Keep all cords clear of cutting area.

5. Do not overreach. Keep proper footing and balance at all times.

6. Do not set planer down until blades have stopped turning.

**Routers**

1. Router motors operate at extremely high speeds (up to 25,000 rpm) and turn in a clockwise direction.

2. Wear eye protection or a face shield and PPE.

3. Disconnect power supply before making adjustments or changing bits.

4. Ensure that the bit is securely mounted in the chunk and the base is tight.

5. Before switching on the motor put the base of the router on the work, template or guide, ensuring that the bit can rotate freely.

6. Secure stock, never rely on yourself or a second person to support or hold the material. Sudden torque or kickback from the router can cause damage or injury.

7. Check stock thoroughly for staples, nails, screws or other foreign objects before using router.

8. Hold both hands on router handles at all times until motor has stopped.

9. Keep all cords clear of cutting area.

10. Do not overreach. Keep proper footing and balance at all times.

**Cutting**

1. When inside routing start motor with bit above stock, and when full power is reached, lower bit to required depth.

2. When routing bevels, moldings and other edge work, the router bit must contact to stock to the left of starting point in correct cutting direction.

3. Feed the router bit into the material at a firm controlled speed.

    a) With softwood, the router can sometimes be moved as fast as it can go.
    b) With hardwood, knotty and twisted wood, or with large bits, cutting may be very slow.

4. The sound of the motor indicates safe cutting speed. When the router is fed in the material too slowly, the motor makes a high-pitched whine. When the router is pushed too hard, the motor makes a low growling noise.

5. When the type of wood or side of the bit necessitates going slow, make two or more passes to prevent the router from burning out or kicking back.

6. To determine the depth of cut and how many passes to make, test the router on a scrap of lumber similar to the work.

7. Do not set router down until exposed router bit has stopped turning.

**Explosive Actuated Fastening Tools**

1. Permit only trained, competent and authorized persons who are familiar with the regulations governing the use of the tool to operate explosive actuated fastening tools.

2. Use CSA Standard Z166 "Safety Code for Explosive Actuated Tools" as a guide for safe operation and maintenance of tool.

3. Wear safety glasses, or a face shield, and a hard hat.

4. Wear hearing protection.

5. Brace yourself at all times when working on ladders or scaffolds to maintain good balance.

6. Keep tool pointed in a safe direction.

7. Do not carry loaded tools from job to job.

8. Do not permit bystanders in the immediate vicinity of the work. It may be necessary for the working area to be shielded to protect against possible ricochet.

**Care and Servicing of Tools**

1. Clean and maintain tools in accordance with the manufacturer's instructions.

2. Check tools prior to use to ensure they are in good working order.

3. Remove defective tools from service until repaired (lockout/tagout).

4. Store tools and cartridges in a locked container when not in use.

**Use of Tools**

1. Use the tool at right angles to the work surface.

2. Check the chamber before using to see that the barrel is clean and free from any obstruction.

3. Do not use the tool where flammable or explosive vapors, dusts or other such substances are present (tested for).

4. Do not place your hand over the front (muzzle) end of a loaded tool.

**Use of Projectile**

1. Use only projectiles (nails, studs, etc.) recommended by the tool manufacturer.

2. Ensure that the base material has no holes or openings and is of sufficient consistency that a projectile would pass right through.

3. Do not leave loaded tool until immediately before use.

4. Do not leave loaded tool unattended.

5. Do not force a projectile into a working surface that is harder than the projectile being used. If the base material is unknown, use a hand hammer to drive the projectile, using it as a center punch.

**Use of Charge Cartridges**

1. Use only cartridges recommended by the tool manufacturer.

2. Check that the colour of the cartridge is appropriate for work being done. Charge cartridges are colour-coded for strength.

3. Make the first trial fixing with the weakest or lowest strength charge cartridge.

4. Provide adequate ventilation in confined spaces where explosive actuated tools are used.

5. Hold the tool in fixing position for no less than 15 seconds when a tool misfires. Keep the tool pointed in a direction that will not cause injuries. Unload cartridge with the utmost caution.

6. Exercise caution when using tools near live electrical circuits. Ensure fastenings do not penetrate live circuits that are buried or hidden in the base material.

7. Keep cartridges locked up when not in use.

8. Do not attempt to force a cartridge into a tool.

9. Do not discard unfired cartridges carelessly.

10. Do not carry cartridges loose or in a pocket. Carry them in the manufacturer's package.

**Air Powered**

1. Air-powered tools include nailing and stapling guns, grinders, drills, jack hammers, chipping hammers, riveting hammers and wrenches.

**Air Hoses**

1. Avoid tripping hazards created by hoses laid across walkways or curled underfoot.

2. Install quick disconnects of a pressure release type. Attach the male end of connector to the tool not the hose.

3. Turn off air pressure to hose when not in use or when changing power tools.

4. Check hoses regularly for cuts, bulges and abrasions. Replace if defective.

5. Blow out air line before connecting tool, hold hose firmly and blow away from yourself and others.

6. Choose air-supply hoses that have a minimum working pressure rating of 1035 kPa (150 psig) or 150% of the maximum pressure produced in the system, whichever is higher.

7. Do not use compressed air to blow debris or to clean dirt from your clothes, or those of others.

8. Do not operate at pressure above manufacturer's rating.

**Operation**

1. Wear safety glasses or face shield and, where necessary, safety shoes and hearing protection.

2. Post warning signs and shields in areas where tools are used and others may be exposed to flying chips, dust, and excessive noise.

3. Exercise care to prevent hands, feet or body from injury in case the machine slips or the tools break.

4. Reduce operator fatigue. Support heavy tools by means of counter balance wherever possible.

**Air Cleaning**

1. Cleaning with compressed air is dangerous

2. Compressed air may be used if no alternate method of cleaning is available. Nozzle pressure **MUST** remain at below 207 kPa (30psi). Personal protective equipment and effective chip guarding techniques must be used.

## 9.2.4 Ladders

**Portable Ladders**

**General**

1. Falls from portable ladders are a major source of serious injury. Be aware of possible hazards and take proper precautions to prevent falling.

Do

1. Inspect ladder before and after each use.

2. Reject and tag ladder that has defects. Have ladder repaired or destroyed.

3. Use ladder designed for your task. Consider strength, type and CSA approval, i.e. fiberglass for electrical work. Length of ladder to 24-30 ft.

4. Get help when handling a heavy or long ladder.

5. Keep ladder away from electrical wires.

6. Tie off ladder at the top and secure bottom to prevent its slipping.

7. Set up barricades and warning signs when using ladder in a doorway or passageway.

8. Clean muddy or slippery boot soles before mounting ladder. Avoid climbing with wet soles. Ensure that footwear is in good condition.

9. Place ladder feet ¼ of ladder's working length away from the base of the structure.

10. Extend ladder at least 1 m (3 ft) above the landing platform.

11. Locate ladder on a firm footing using slip-resistant feet or secure blocking, or have someone hold the ladder.

12. Rest both side rails on top support, and secure ladder to prevent slipping.

Do Not

1. Do not use ladder in a horizontal position as a scaffold plank or runway.

2. Do not carry objects in your hands while on ladder. Hoist materials or attach tools to a belt.

3. Do not work from top three rungs. The higher a person goes on a ladder, the greater the possibility that the ladder will slip out at the base.

4. Do not use makeshift items such as a chair, barrel or box, as a substitute for a ladder.

5. Do not use a portable ladder when other equipment is available. Replace ladder with a fixed stairway or scaffold.

**Extension Ladders**

1. Where a ladder cannot be tied off at the top, station a person at the foot to prevent slipping. This is only effective for ladders up to 5 m (16ft.) long. The person at the foot of the ladder should face the ladder with each hand on a side rail and with one foot resting on the bottom rung.

Do

1. Place ladder feet ¼ of ladder's working length away from the base of the structure.

2. Erect ladder so that a minimum of 1 m (3 ft.) extends above landing platform. Tie top at support points.

3. Raise and lower ladder from the ground. Ensure that locking ladder hooks are secure before climbing.

4. Erect extension ladder so that the upper section rests on the bottom section.

5. Place ladder on firm, level surface and ensure a secure footing.

6. Maintain the minimum overlap of sections as shown on ladder label. Refer to safety regulations.

7. Maintain 3-point contact at all times when working, e.g. 2 feet 1 hand/2 hands 1 belt.

Do Not

1. Do not use ladder near electrical wires.

2. Do not overextend. Maintain minimum overlap of sections.

3. Do not climb higher than the fourth rung from the top ladder.

4. Do not use ladder on ice, snow or slippery surface without securing ladder's feet.

5. Do not extend top section of ladder from above or be "bouncing" on ladder.

**Stepladders**

Do

1. Face stepladder when climbing up or down. Keep body centered between side rails.
2. Maintain a firm grip. Use both hands in climbing.
3. Keep stepladder close to work.
4. Open stepladder spreaders and shelf fully.
5. Check stability. Ensure that all four ladder feet are on firm, level and dry ground.
6. When ascending, descending or standing, you must always face the ladder.

Do Not

1. Do not overreach. Move stepladder when needed.
2. Do not "shift" or "walk" stepladder when standing on it.
3. Do not stand, climb, or sit on stepladder top or pail shelf.
4. Do not overload. Stepladders are meant for one person, except for when designed for two.
5. Do not use stepladder to brace or support a work platform or plank.
6. Do not use stepladder on slippery surface.
7. Do not use stepladder on boxes, unstable bases or scaffolds to gain additional height.
8. Do not climb the back of a stepladder.
9. Do not push or pull stepladder sideways. It is less stable in those directions.
10. Do not use ladder in passageways, doorways, driveways or other locations where a person or vehicle can hit it. Erect suitable barriers or lock doors shut and use signage.

**Inspection**

1. Inspect ladders for:
    a) Missing or loose steps or rungs (they are loose if they can be moved by hand).
    b) Loose nails, screws, bolts or other metal parts.
    c) Cracked, split, worn or broken rails, braces, steps or rungs.
    d) Rough or splintered.
    e) Damaged or worn non-slip feet.
    f) Twisted or distorted rails.
    g) Corrosion, rust, oxidization and excessive wear, especially on treads.
    h) Sharp edges on rails and rungs.

2. Inspect stepladders for:
    a) Wobble.
    b) Loose or bent hinge spreaders.
    c) Loose hinges.

3. Inspection extension ladders for:
    a) Loose, broken or missing extension locks;
    b) Defective locks that do not seat properly when ladder is extended;
    c) Sufficient lubrication of working parts;
    d) Defective cords, chains and ropes;
    e) Missing or defective pads or sleeves

Do

1. Inspect ladders before each use.

2. Tag defective ladders and take out of service to be repaired

3. Check fiberglass ladders regularly for cracks and exposed fiberglass

4. Check all nuts, bolts, spreaders and locks for tightness and good repair.

5. Check all ladders for distortion by sighting along the rails. A ladder that is twisted or distorted is hazardous.

6. Replace worn or frayed ropes on extension ladders.

7. Lubricate pulleys on extension ladders regularly.

8. Check the condition of ladders that have been dropped or have fallen before using them again.

Do Not

1. Do not make temporary or makeshift repairs.

2. Do not try to straighten or attempt to use bent or bowed ladders.

**Fixed Access Ladders**

1. Offset the hazards of falling by installing and properly using safety climbing devices according to safety regulations.

Do

1. Maintain three-point contact by keeping two hands and one foot, or two foot and one hand on ladder at all times.

2. Face ladder and use both hands to grip the rungs firmly.

3. Place feet firmly on each rung.

4. Wear footwear with heels. Ensure that footwear is in good condition.

5. Clean muddy or slippery boot soles before mounting ladder. Avoid climbing with wet soles.

6. Inspect fixed ladders for:
    a) Loose, worn and damaged rungs or side rails.
    b) Damaged or corroded cage guard, bolts and rivet heads.
    c) Damaged or corroded handrails and brackets on platforms.
    d) Broken or loose anchorages.
    e) Defects in climbing devices, including loose or damaged carrier rails or ropes.
    f) Slippery surfaces from oil and ice.
    g) Cutter obstructing the base of ladder or platform.

7. Report any defects promptly/tag for repair.

8. Wait until the other person has exited before ascending or descending.

9. Raise or lower tools and materials using a handline.

Do Not

1. Do not carry tools or materials in your hand while climbing. Carry small tools in a tool pouch.

2. Do not jump from ladder. Check footing before descending ladder.

3. Do not hurry up or slide down ladder.

## 9.2.5 Respiratory Protection & Hearing

**General**

1. When respiratory protection is needed only equipment approved by NIOSH shall be used. Make sure that they fit properly – must be fit tested when purchased and quick test on each wearing.

2. Individuals who wear respirators must not have facial hair or wear appliances that would disrupt the seal of the respirator to their face.

3. Make sure that the proper filter cartridges are used for the job (solids, liquids, gases, vapors).

4. All respirators should be inspected before and after use.
    a) Examine the face piece for damage, cracks and dirt.
    b) Examine the head straps or harness for breaks by stretching the elastic parts to expose cracks or other damage.
    c) Check for broken and bent buckles.
    d) Inspect inhalation and exhalation valves for damage or improper seating.
    e) Quick fit test on each wearing.

5. Air Contaminants

    a) Solid: Dust from grinding
    b) Liquids: Cleaning fluids, solvents
    c) Gasses: Hydrogen, acetylene propane
    d) Vapors: Smoke, paint solvents

6. Dual element respirators are available that can be fitted with a very large range of cartridges and filters for different requirements.

**Hearing Protection**

1. Hearing protection is required in high noise levels above 85 decibels. To lessen the severity of high-pitched sounds hearing protection should be worn.

2. When selecting ear protection:
    a) Choose the style or type of protection that will protect you in the job you are doing.
    b) Earplugs should be pliable, fit each ear tightly and be kept clean and free from damage.
    c) Earmuffs make it easier to hear certain signals in noisy environment.

## 9.2.6 Rolling Scaffolds

**General**

1. All rolling scaffolds will be equipped with braking and locking devices.

2. Locking devices shall be set in place when work is being done on the scaffold.

3. All ground areas shall be cleaned prior to moving scaffold around areas. Secure or remove material on scaffold.

4. A rolling scaffold shall not be moved on an inclined surface unless adequate precautions are taken to prevent tipping, sliding, acceleration or any dangerous or sudden movement.

5. Do not ride scaffolds.

6. Do not attempt to move rolling scaffold without sufficient help. Watch for holes in floor and ground and overhead obstructions.

7. The working platform height of a rolling scaffold must not exceed three times the smallest base dimension unless guyed or otherwise stabilized.

8. All rolling scaffolds must be horizontally braced at 15 ft. intervals to the top.

## 9.2.7 Scaffolds – Metal

**General**

1. There are various types of metal scaffolds and they all have a right and wrong way to be erected.

2. The misuse of scaffolding is the cause of numerous serious injuries. Every worker who designs or constructs a scaffold should be competent and know what the manufacturer's specifications are for that type of scaffold and inspect the scaffold each day prior to use.

3. The scaffold type that will be best suited for the job and capable of withstanding 4 times the loads to be imposed on it must be determined before the job begins. Ensure that:

    a) The location in which the scaffold is to be constructed is level or is capable of presenting secure footing by use of a mudsill or some other device.

    b) Scaffolds must be erected with all braces, pins, screw tacks, base plates and other fittings installed as required by the manufacturer.

    c) Workers erecting or dismantling a scaffold more than 3 meters (10 feet) high must be tied off with a safety harness and a lanyard.

    d) Scaffolds must be equipped with guardrails, plus toe boards where required.

    e) Scaffold platforms must be at least 46 centimeters (18 inches) wide and if over 10 ft. high must be fully decked to a guardrail or full width.

    f) Scaffolds must be stable and secured either by guylines or to the building every third lift, or use outriggers.

    g) Scaffold planks must be secured by cleats.

    h) Before erecting staging make a hazard assessment before hand. (Example: power lines, transformer, inclines, etc.)

    i) Scaffold planks and platforms must be of good quality and clean of all foreign objects.

    j) Erected scaffolds should be plumb.

    k) Scaffolds must be equipped for proper access.

    l) Scaffolds over 15 meters (50 feet) must be designed by a professional engineer.

m) Wheels or caster on rolling scaffold must be equipped with braking devices and secured to the frame.

Horizontal Rail – 0.92 meters to 1.07 meters above the platform.

Intermediate Rail– horizontal rail midway between scaffold platform and top rail.

Toe Board – horizontal member at platform level not less than 140 mm in height above the platform level.

## 9.2.8 Woodworking Machines

**Band Saw**

1. Band saw machines can be dangerous if not used properly. Read the owner's manual carefully. Make sure you understand instructions before use.

Do

1. Wear safety glasses or a face shield and pipe.
2. Ensure all safeguards are in place.
3. Ensure the blade runs freely in and against the upper and lower guide rollers.
4. Ensure the machine has been properly oiled.
5. Ensure the blade is under properly tension.
6. Ensure the band saw is securely anchored to the floor to reduce vibration, unless a portable unit.
7. Ensure all band wheels are enclosed.
8. Ensure that the band saw is equipped with automatic tension control, unless manufactured without it.
9. Keep the floor around a band saw free of obstructions.
10. Adjust guard height with minimum clearance of material.
11. Feed with hands and arms to side of stock.
12. Use band saw blades that are sharp, properly set and otherwise suitable for the job.
13. Hold stock firmly and flat on the table. This prevents the stock from turning and drawing your fingers against the blade.
14. Release cuts before long curves when doing intricate scroll-type work.
15. Provide adequate lighting at the machine table. A light fixture with a flexible connection can provide essential lighting.

Do Not

1. Do not attempt to back the stock away from the blade while the saw is in motion if work binds or pinches on the blade.

2. Do not stop the band saw by thrusting stock against the cutting edge or side of blade immediately after the power has been shut off.

3. Do not remove sawdust or cuttings from the table by hand. Use a stick or brush.

4. Do not leave the saw running, unattended. Turn off the power and make sure the machine has stopped running.

**Wood Turning Lathes**

1. Wood turning lathes can be dangerous if not used properly. Learn the machine's applications and limitations.

Do

1. Only permit experienced and trained lathe operators to operate lathe.

2. Wear safety goggles or face shields at all times.

3. Use stock free of defects.

4. Hold tools firmly with both hands against the tool rest.

5. Hold the stock securely on the fireplace.

6. Use only those tools that have been furnished or approved.

7. Use sharp, well-maintained chisels and gouges.

8. Operate lathe at low speed with moderate depth of cut or prevent flying splinters during roughing operations. Speed of the lathe depends on type of wood, diameter or stock, nature of work being done and type of tool used.

9. Adjust tool rests parallel and as close as possible to the stock and high enough so that tools will cut into the wood slightly above the center of the work being turned.

10. Remove tool rest when sanding or polishing.

11. Hold sandpaper in the fingers and pressed lightly against a small area at the top of the rotating shaft when hard sanding. This will keep the sandpaper from catching and pulling your hand around the stock.

Do Not

1. Do not wear gloves, loose clothing. Clothing should be worn snugly, shirts tucked in.

2. Do not use makeshift tools.

3. Do not use stock containing checks, slits, cracks or knots.

**Joints/Planers**

1. Jointer/planers can be dangerous if not used properly. Make sure you understand instructions before operating a jointer/planer.

Do

1. Wear safety glasses or goggles and PPE.

2. Permit only experienced and trained personnel to operate jointers.

3. Use only sharp, balanced and joined knives.

4. Replace oil square cutting heads with round heads as they are much safer.

5. Ensure start and stop buttons are within easy and convenient reach of the operator.

6. Before starting machine the operator should check:
    a) Knives for proper clearance, depth of cut, sharpness and balance, secure fastening.
    b) Fence anchored in the proper position.
    c) Guard (sing or overhead) for freedom of movement and return over the cutting head.
    d) Jointer for proper lubrication.
    e) Parts or accessories for proper working condition.

7. Ensure swing guard pushes beside the stock as it passes over the cutting heads and returns against the fence after the stock is removed.

8. Remove all wrenches and tools used in the set up from the table.

9. Provide a minimum clearance of at least 3 feet greater than the length of the longest stock being worked.

10. Construct hold-down push blocks to perform beveling as well as surface operations.

11. Use hold-down (double handled) push blocks. These keep hands well away from the cutting head.

12. Maintain an adequate amount of downward and forward force with push blocks as the knife blades on a revolving cutting head can take the stock from an operator's hands.

Do Not

1. Do not leave machine running unattended. Shut off the power and make sure that the cutting head has stopped revolving.

2. Do not make cuts of deeper than 1/16" in one pass.

3. Do not joint (edge) stock of pieces less than 12" long, 3/4 " wide and less than ¼" thick.

4. Do not surface stock less than 12" long, ¾" wide and more than 6" wide or less than 5/8" thick.

5. Do not pass hands over cutters.

6. Do not remove dust or particles of wood from table by hand. Use a stick or brush.

**Shaper**

1. Shapers can be dangerous if not used properly. Make sure you understand instructions before use.

Do

1. Wear safety glasses or face shield.

2. Permit only experienced and trained personnel to operate wood shapers.

3. Remove all wrenches and tools used in the set up from the table.

4. Ensure all guards are in proper position.

5. Check, before operating, to see that the spindle top and knives are correctly adjusted and securely fastened and that the spindle is free before turning on the power.

6. Bring spindle up to operating speed slowly during start-up by applying power in a short series of starts and stops.

7. Use jig fixtures and hold down push blocks. Fasten the work securely in a jig. When a table guide pin is used ensure it is adjusted and will not slip.

8. Remove all other blades when one blade is removed from the shaper spindle. This will prevent the other blades from being hurled from the spindle if the machine is started.

9. Turn off the power, lock out machine when performing set-ups or any other operation on or about the spindle.

10. Shape only one piece of stock at a time.

11. Use extra care in machining stock that contains cross grains or knots. These may pull the operator's hands into the knives, or may cause kickbacks.

12. Shape stock only longer than 10".

Do Not

1. Do not leave machine running on. Make sure that the power is shut off and that the cutter head has stopped revolving.

2. Do not rest your hands near the edge of the stock being cut.

3. Do not tamper with guards or make them inoperative in any way.

4. Do not back up the stock (check to see that the direction of rotation is as expected). Always feed against rotation of the cutter.

5. Do not take deep cuts or feed the stock too rapidly.

6. Do not distract the operator during a shaping operation.

7. Do not remove sawdust or cuttings around knives by hand. Use a stick or brush.

8. Do not clear the table when the cutter is rotating.

9. Do not allow stock or finished work to accumulate on the table.

10. Do not stand in line with the stock being fed.

**Sanders**

1. Sanders can be dangerous if not used properly. Make sure that you understand instructions before use.

Do

1. Wear goggles and dust respirators when operating sanders.

2. Keep hands away from the abrasive surface.

3. Inspect abrasive belts before using them. Replace those belts that are worn, frayed or excessively worn in spots.

4. Sand on the downward side of the disc.

5. Adjust work rest on all manually fed sanders to provide minimum clearance between the belt and the rest. It should be secured to support the work.

6. Hold small pieces of stock in a jig or holding device.

7. Install abrasive belts that are the same width as the pulley drum.

8. Adjust abrasive belt tension to keep the belt running the same speed as the pulley-drum.

9. Guard feed rollers to allow boards to pass, but keep operator's fingers/arms out.

10. Locate guards on a belt sanding machine at all:
    a) In-running nip point.
    b) Power transmission and feed roll parts.
    c) The unused portion of the abrasion belt on the operator's side of the machine to prevent human contact.

Do Not

1. Do not operate sander without exhaust system operating on stationary machine.

2. Do not operate sander unless adequately guarded.

3. Do not operate sander unless work rest is properly adjusted.

**Push Sticks**

1. Push sticks or push blocks should be used when operating standard woodworking machinery, including table saws, band saws, radial saws, jointer/planers and shapers.

2. These sticks protect the hand while allowing good hand control of the stock as it is pushed through the cutting head or blade.

3. Push blocks for Jointers/Planers should be constructed for two-handed positioning.

4. Hold-down push blocks should be designed to:
   a) Be rigid.
   b) Protect both hands.
   c) Allow two-handed, firm, steady pressure to be applied.

**Mitre Saws**

1. Mitre saws can be dangerous if not used properly. Make sure you understand the instructions before use.

Do

1. Wear safety glasses or face shield. If work is dusty, use a respirator or dust mask.

2. Keep one hand on the trigger switch and handle and use the other hand to hold the stock against the fence.

3. Keep hands out of the path of the blade.

4. Keep guards in place and in working order.

5. Remove adjusting keys and wrenches.

6. Use a crosscut or combination blade.

7. Ensure that the blade rotates in the correct direction.

8. Ensure that the blade and arbor collars are secure and clean. Recessed sides of collars should be against blade.

9. Keep blade tight, clean, sharp and properly set so that it cuts freely and easily.

10. Allow motor to reach full speed before cutting.

11. Follow instructions for lubricating and changing accessories.

12. Keep work area clean. Cluttered areas and benches invite accidents.

13. Keep work are well lit.

14. Unplug tools before servicing and when not in use.

15. Check for damage. Repair or replace damaged parts.

16. Keep motor air slots clean and free of chips.

17. Use only accessories designed for the specific saw and job.

Do Not

1. Do not cut stock of pieces smaller than 20cm (8 inches) in length.

2. Do not cut "free hand". The stock should lie solidly on the table against the fence.

3. Do not reach around or behind saw blade while it is running.

4. Do not remove your hand from the trigger switch and handle until the blade is fully covered by the lower blade guard.

5. Do not overreach. Keep proper footing and balance at all times.

6. Do not force saw. The saw cuts better and safer at the rate for which it was designed.

7. Do not operate electric tools near flammable liquids or in gaseous or explosive atmospheres. Sparks may ignite fumes.

**Table Saws**

1. Table saws can be dangerous if not used properly. Read the owner's manual carefully. Learn the applications and limitations use. Refer to general safeguards.

Do

1. Wear safety glasses or face shield.

2. Pay particular attention to the manufacturer's instructions on reducing the risk of kickback.

3. Use a guard high enough to cover the part of the blade rising above the stock and wide enough to cover a tilted blade.

4. Choose proper blades for the type of work being performed.

5. Keep blades clean, sharp and properly set so that they will cut freely without being forced.

6. Keep guards in place and in working order.

7. Keep area clean. Only operate machines in a non-congested, well lighted area.

8. Keep hands out of the line of a saw blade.

9. Use guard with a spreader and anti kickback fingers for all ripping or cross cutting operations.

10. Keep the body and face to one side of the saw blade out of the line of a possible kickback.

11. Use a push stick when ripping narrow stock. Refer to ripping applications in the instruction manual.

12. Move the rip fence out of the way when cross cutting. Never use it as a cut-off gauge.

13. Provide adequate support to the rear and sides of a saw table for wide or long stock.

14. Exercise extreme care when waxing or cleaning the table. Shut off or lock out saw before waxing the table.

Do Not

1. Do not perform free-hand sawing operations. Hold stock firmly against the mitre gauge or rip fence to position and guide the cut.

2. Do not reach around or over moving blades.

3. Do not leave saw running attended.

## 9.2.9 Portable Extension Cords

**General**

1. All portable extension cords must be of the outdoor type, rated for 300 volts and have an insulated grounding conductor.

2. Defective cords and insufficient rating must not be used.

3. C.S.A. approved male and female cord caps shall be on all extension cords.

4. Extension cords used in hazardous areas or damp locations should be protected by approved ground fault protection.

5. Portable extension cords are just that “Portable” and shall not be used for permanent use.

6. Never break off the third prong on a plug, this will make the cord ungrounded.

7. Do not allow vehicles to pass over unprotected power cords. Cords should be put in conduit or protected by placing planks along side of them.

8. Unplug the cord by pulling the cord cap not the cord.

9. All extension cords must be repaired by qualified electricians or under their supervision, e.g. apprentice.

10. Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.

## 9.2.10 Portable Grinders

### General

1. An abrasive wheel brake can cause a serious injury.

2. Guards must be provided and adjusted to protect you. Replace damaged guards.

3. Clean and service grinders according to manufacturers' recommendations. Record all maintenance for grinders.

4. Ensure that a machine will not operate when unattended by checking dead-man (constant pressure) switch.

5. Wear safety glasses, goggles, and face protection to protect against flying particles. Gloves, aprons, safety boots, and respiratory protection are advisable, depending on the work.

### Speeds

1. Maximum speed in revolutions per minute (RPM) is marked on every wheel. Never exceed this speed.

2. Check that the wheel speed marked on the wheel is equal to or greater than the maximum speed of the grinder.

3. Measure speed of governor controlled air driven grinders after 20 hours of use or every week, which ever comes first. Measure speed after any repairs.

### Check-List

Do

1. Check that grinders do not vibrate or operate roughly.

2. Use racks or hooks to store portable grinders.

3. Stand away from the wheel when starting grinders.

4. Inspect all wheels for cracks and defects before mounting.

5. Ensure mounting flange surfaces are clean and flat.

6. Use mounting blotters supplied.

7. Run newly mounted wheels at operating speed for one minute before grinding.

8. Wear eye, ear and face protection.

Do Not

1. Do not use grinders near flammable materials.

2. Do not clamp portable grinders in a vise for grinding hand-held work.

3. Do not use liquid coolant with portable grinders.

4. Do not force wheels onto a grinder or change mounting hole sizes.

**Bench and Pedestal Grinders**

1. Fasten pedestal and bench grinders securely.

2. Ensure all the guards are in place and secure before using a grinder.

3. Adjust tool rests to within 3 mm (1/8 in) of wheels. Never adjust rests while wheels are moving. Work rest height should be on horizontal center line of the machine spindle.

4. Maintain 6 mm (1/4in) wheel exposure with a tongue guard or a movable guard.

5. Stand to one side of the grinder until the operating speed is reached.

6. Bring work in contact with the grinding wheel slowly and smoothly, without bumping.

7. Apply gradual pressure to allow the wheel to warm up evenly. Use only the pressure required to complete a job.

8. Move the work back and forth across the face of the wheel. This prevents grooves forming.

9. Wheels are made only for grinding certain items. Do not grind rough forgings on a small precision grinding heel.

10. Dress wheels regularly. Do frequent light dressings rather than heavy dressings.

11. Support dressing tool to apply leverage without undue effort. With revolving cutter dressing tools use the lugs as anchors.

12. Replace worn wheels if they cannot be dressed.

**Check-list**

Do

1. Ensure the grinder speed does not exceed the operating speed marked on the wheel.
2. Visually inspect wheels for possible damage before mounting.
3. Wear eye, ear and face protection. Safety boots and respiratory protection are advisable depending on the work. Wear gloves where necessary.

Do Not

1. Do not use a wheel that has been dropped.
2. Do not grind wood, plastics and non-iron metals on ordinary wheels.
3. Do not leave grinding wheels standing in liquids. This causes balance problems.
4. Do not grind on the side of a regular wheel.
5. Do not tighten the mounting nut excessively.

## 9.2.11. Area Lighting

**General**

1. All areas where workers must work, pass through, or be present, including areas of access or egress, must be adequately lit. (20 ft. candles or better measured at 30" off floor) Dark areas should not be entered without the assistance of portable lighting or flashlights. No open flame to be used as lighting.

2. If temporary power and lighting are required on job sites, they must be NMWU Cable #12 gauge copper, illumination must be shielded from mechanical damage. Lighting and power branch circuits must be kept separate.

3. When working in Hazardous Areas, CSA approved lighting must be provided (e.g. explosion roof, vapour proof, waterproof).

## 9.2.12. Metalworking Machines

### General

1. Metalworking machines can be dangerous if used improperly. Read the owner's manuals carefully. Make sure you receive complete instructions and are properly trained before using any tool or machine.

Do

1. Use the appropriate safety equipment for the job. Wear CSA certified safety glasses or goggles, eyeglasses have impact resistant lenses only; they are not safety glasses.

2. Wear dust masks when required.

3. Wear hearing protection when required. If you have trouble hearing someone speak from one metre (three feet) away, the noise level from the machine is too high. Damage to hearing may occur.

4. Wear CSA certified footwear with an appropriate sole.

5. Ensure that the guards are in position and in good working condition. Adequately guard the machine before operating.

6. Ensure that all stationary equipment is anchored to the floor.

7. Check and adjust all safety devices before each job.

8. Ensure all machines have a start/stop button within easy reach.

9. Ensure that keys and adjusting wrenches have been removed from the machine before turning on the power.

10. Ensure that all cutting tools and blades are lean and sharp so that they cut freely without being forced.

11. Stop the machine before measuring, cleaning or making any adjustments. Any maintenance on machines will initiate lockout procedures.

12. Know how to stop the machine in an emergency.

13. Use a brush or rake to remove cuttings. Do not handle them by hand because they are very sharp.

14. Keep hands away from the cutting head and all moving parts.

15. Avoid awkward operations and hand positions. A sudden slip could cause the hand to move into the cutting tool or blade.

16. Return all portable tooling to the proper storage place after use.

17. Clean all tools after use.

18. Keep work area clean, well swept, and well lit. Floors should be level and non slip.

19. Ensure there is enough room around equipment to do the job safely.

20. Obtain first aid immediately for all injuries.

21. Dispose of oily rags in proper containers.

Do Not

1. Do not remove cuttings by hand from the machine while it is running.

2. Do not leave machines running unattended. Turn power off.

3. Do not free a stalled cutter without first turning off the power.

4. Do not distract an operator. Horseplay can lead to injuries and should be strictly prohibited.

5. Do not wear loose clothing that can become entangled in moving parts. Confine long hair.

6. Do not clean hands with cutting fluids.

7. Do not use rags near moving parts of machines.

8. Do not use compressed air to blow debris or to clean dirt from clothes.

**Metal Saw (Cold)**

1. Metal saws can be dangerous if used improperly. Read the owner's manual carefully. Make sure you understand instructions and are properly trained before operating a metal saw.

2. Cold cutting saws include hand and powered hacksaws, band saws, and horizontal and vertical circular saws.

3. Hot cutting saws use an abrasive disc or large toothless (friction) circular saw.

Do

1. Wear safety glasses.

2. Ensure that saw has a start/stop button within easy reach.

3. Ensure that guards are in place.

4. Guard long material at both ends to prevent anyone from coming in contact with it.

5. Ensure that blade is completely stopped before removing stock.

6. Use cutting or lubricating fluid when cutting metals.

7. Check blades regularly for wear or damage.

8. Keep saw blades clean and sharp.

9. Select the correct blade and saw speed for the material being cut. Follow the manufacturer's instructions.

10. Use the stop gauge supplied with most cut-off saws when several pieces of the same length are required.

11. Secure all work in a vise. Extend the length to be cut beyond the cutting blade.

12. Support long stock with a floor stand.

13. Keep working surface clean of scraps, tools and materials.

14. Keep floor around saw free of oil and grease.

Do Not

1. Do not mount, measure or remove work unless the saw is stopped.

2. Do not apply extra force to the saw blade.

3. Do not leave saw running unattended.

**Metal Saws (Hot)**

1. Hot metal saws can be dangerous if used improperly. Read the owner's manual carefully. Make sure you understand instructions and are properly trained before operating a hot metal saw.

2. Hot metal saws, often referred to as cut-off saws or chop saws, use an abrasive cut-off wheel. The machine may be dry or wet, low or high speed, and either hand operated or automatic.

Do

1. Wear safety glasses.

2. Wear hearing protection.

3. Handle and store wheels as directed by manufacturer.

4. Inspect all wheels for possible damage before mounting.

5. Check machine speed against the established maximum safe operating speed marked on the wheel.

6. Ensure that mounting flanges are equal and the correct diameter (at lease ¼ of the wheel diameter).

7. Use mounting blotters when they are supplied with wheels.

8. Clamp work firmly in place when using non-reinforced cut-off wheels

9. Use a properly designed safety guard covering at lease one half of the grinding wheel.

10. Allow mounted wheels to run at operating speed, with guards in place, for one minute before cutting.

11. Bring wheel into contact with the work without bumping on impact.

12. Turn off coolant before stopping the wheel to avoid an out of balance condition.

13. Keep working surface clean of scraps, tools and materials.

14. Keep floor around saw clean and free of oil and grease.

15. Ensure that saw has a start/stop button within easy reach.

Do Not

1. Do not use a cracked wheel or one that has been dropped or damaged.

2. Do not force a wheel onto the machine or alter the size of the mounting hole. If the wheel does not fit the machine, get one that will.

3. Do not exceed the maximum operating speed marked on the wheel.

4. Do not use mounting flanges whose bearing surfaces are not equal, clean, flat and free of burrs.

5. Do not tighten the mounting nut excessively.

6. Do not grind on the side of the wheel.

7. Do not start the machine until the wheel guard is in place.

8. Do not stand directly in front of the cut-off wheel when starting a machine.

9. Do not jam, bend or pinch the wheel.

10. Do not force cutting so that the motor slows

11. Do not cut without proper ventilation.

## 9.2.13. Vehicle Safety

### General

1. Follow the common sense rules of good driving:

    a) Do not tailgate.
    b) Observe the speed limit
    c) Stay alert, expect the unexpected
    d) Use vehicle mirrors.
    e) Drive defensively.

2. Before driving, check the load:

    a) For even distribution of weight.

3. Before towing equipment, check to ensure that:

    a) The hitch and ball are properly connected.
    b) The safety chain is secured in place.
    c) Material is at a level where it will not spill during cornering or stopping.
    d) All brake and running lights are working.

4. Other vehicle checks include:

    a) Horn, front lights, and windshield wipers.
    b) Oil and water levels.
    c) Tire pressure (including equipment in tow).

5. Allow for safe stopping distances. A heavily loaded vehicle will not stop quickly.

6. Vehicles should be equipped with a first aid kit and dry chemical extinguisher.

### Vehicle Parking

### General

1. Parking and movement of vehicles in the confinement of parking lots, yards and job sites pose a hazard. Employees and the public at large are often pedestrians in parking areas, and quite often workers are moving in and out of the premises.

**Practice**

1. Where possible, all vehicles parked in Board lots will be parked so they can be driven forward when leaving the parking area.

2. All vehicles parked in other than Board parking lots or areas should be parked so they can be driven forward when leaving the parking area.

3. Vehicles should not be parked in front of large equipment doors, or within 3 metres of any building entry/exit door or fresh air intake/fire hydrant.

4. When backing into confines areas, or when backing a vehicle with limited rear visibility, a person to guide the backing operation should be used.

## 9.2.14. Grinding Wheels

### General

1. To avoid injuring yourself or damaging equipment, follow these safety instructions.

### Wheel Marking

1. Use only wheels with the type of wheel and maximum speed in revolutions per minute (rpm).

### Inspection

1. Upon receipt of all wheels, examine for any signs of damage. Use "Ring Test" to check wheels.

2. Ring tests do not apply to small wheels 10 cm (4 in) diameter and smaller.

| | |
|---|---|
| Support heavy wheels on a clean hard floor. | Suspend light wheels from hole by small pin or finger. |

3. Tap wheels gently with a non-metallic tool, such as a plastic screwdriver handle or wooden mallet.

4. A sound wheel will emit a ring. Reject any wheel that sounds dead or cracked.

### Selection of Wheels

1. Selecting the right wheel for the job is of critical importance for safety. A wheel is dangerous when used for work it was not designed for. Booklets from wheel and machine manufacturers provide technical information on wheel use.

### Handling

1. All abrasive wheels are fragile.

2. Handle wheels carefully. Avoid dropping or bumping.

3. Provide a soft surface to roll wheels on if they cannot be carried.

4. Transport wheels in containers designed to provide support for the wheels.

5. Do not pile other items such as tools on top of wheels.

**Storage**

1. Store wheels in racks or bins with dividers for different type of wheels.

2. Place straight or tapered wheels on end in a cradle or chocked position to prevent rolling.

3. Store thin wheels on a flat surface.

4. Stack cylinder and straight cup wheels on the flat side with cushioning material, such as cardboard.

5. Never store wheels near excessive heat, in contact with oil or moisture, or in drawers with loose tools.

**Bench and Pedestal Wheel Mounting**

1. Grinding Machine wheel use and maintenance should conform to manufacturer's recommendations.

    a) Ensure you have the correct type and size wheel for the machine by checking the markings on both. The machine spindle speed must not be greater than the speed marked on the wheel.

    b) Examine the wheel for cracks or chips. Replace a faulty wheel.

    c) Do not force a wheel onto the machine spindle or change the size of the mounting hole.

    d) Maintain even pressure from both flanges against the sides of the wheel. Check flanges with a straight edge. Worn or warped flanges must not be used.

    e) Maintain a clearance (undercut relief) of at least 3 mm (1/8 in) to prevent pressure on the wheel near the hole.

    f) Check the surface of the abrasive wheel and flanges to ensure that no particles are present.

    g) Use paper blotters between wheel and flanges to take up slight wheel surface roughness.

    h) Ensure mounting pilot(s) is rounded with length about 2/3 width of the wheel.

    i) Extend the threaded section well inside of the loose flange.

j) Tighten grinding wheels just enough to prevent them from slipping. Over tightening the spindle nuts or clamping screws can damage the wheel and grinder parts. With multiple screw mounting flanges tighten the bolts uniformly. Start by barely tightening a screw, "snug-up" opposite screw and, in a crisscross manner, continue until all mounting screws are uniformly tight. Use a torque wrench to apply not more than 20 to 27 joules (15 to 20 foot-pounds).

k) Place the thread of the central spindle in a direction that allows the nut to tighten because of the force of the work being done.

l) Replace all guards.

m) Warn all persons in the area of the wheel to stand clear.

n) Stand to one side and test the wheel. Start up and run the wheel for at least one minute. If any undue vibration occurs, switch off immediately and make adjustments.

**Straight Wheels**

Inspect and conduct "ring test" before mounting a wheel.

Check flanges for distortion or abrasion. When flanges are distorted or warped, contact area is reduced.

Flanges must not be reversed.

Do not use flat washers, or other filler materials in place of flanges.

The fixed and loose flanges should have the same diameter and have undercut relief. The minimum flange size is 1/3 the wheel diameter.

**Cup Wheels**

Use a flat unrelieved flange with a threaded hole mounting. This prevents strain on the bond that anchors the bushing to the wheel cup.

**Cone and Plug Wheels**

The common cause of breakage is that the spindle threads are either too short or too long for the tapped hole in the wheel.

**Depressed Centre Wheels**

Replace worn or bent reusable adapters. A damaged adapter will not mount properly.

Do not reuse "throw-away" adapters.

Ensure grinder spindle shoulder runs true. The adapter must tighten against this shoulder. Use spacers provided with adapters if the spindle is too long.

The wheel will wobble if the shoulder is not square with the spindle, or if the adapter does not tighten against the shoulder. This can result in wheel breakage.

## 9.2.15. Electrical Rubber Gloves

**General**

1. All gloves must be suitable for authorized and qualified personnel, adequately rated for at least 10Kv.

2. Only personnel who are familiar with the use of and storage of these gloves shall use them.

3. Always make sure your hands are clean of oil or any other substance that could break down the rubber in these gloves.

4. Gloves must be stored and maintained in a serviceable condition, and remain in their protective carrying case when not in use.

5. Gloves shall be tested by an approved testing facility every 6 months.

6. Damaged gloves shall not be worn.

## 9.2.16. Electric Welding – Maintenance and Inspection

### General

1. Ensure that the welding equipment has required power supply capacity and is grounded. Only qualified electricians should install and repair electrical equipment.

2. Provide properly sized fuses or circuit breakers for overload protection. Size for the machine current requirements.

3. Locate main power terminals inside welding machine cover. Ensure terminals are accessible only with tools.

### Maintenance Personnel

1. Inspect regularly and keep records. Check oil level and moisture content in oil-cooled transformers.

2. Prevent overheating. Check with portable ammeters to ensure that load current has not increased beyond the capacity of the welding machine, cable or torch.

3. Clean equipment according to manufacturer's recommendations.

4. Ensure welding set has adequate ventilation and internal cooling fans, if present, are operating properly.

### Welders

1. Check daily all external connections. Report defective electrode holders and guns, insulation overheating or suspected defects.

2. Ensure all connections are tight and contact areas are clean.

3. Check welding leads for damage.

4. Report and clean up all fuel leaks in engine driver equipment. Ensure exhaust gases are vented.

5. Avoid spilling fuel when filling tanks (clean up spills).

6. Connect cables sized for maximum welding amperage.

**Electrode Holders Inspection**

1. Check for:

    a) Loosened metallic screws in the holder.

    b) Burned or cracked insulation that exposes electrical conductors.

    c) Overheating and damage at cable connections.

2. Secure the “welding return” and “welding ground” cables to the work with a bolt for strip conductor. For stranded conductors use a cable lug or a grounding clamp. Cable strands are unlikely to hold firm for long periods under the head of a bolt

3. Ensure welding lead and return are sized for maximum welding amperage.

## 9.2.17. Gas Welding and Cutting – Cylinder Storage

### General

1. Store oxygen and fuel gas cylinders at least 6 m (20 ft.) apart, or separate by a 1.5 (5 ft.) high wall with a half-hour fire resistance rating. Place outside on fireproof surface. When inside storage is necessary, ensure that the room is well ventilated.

2. Keep cylinders away from open flames (including welding or cutting torches), electric arcs, molten slag, sparks and radiators. Exposure to the sun for long periods can cause a dangerous rise in pressure within a cylinder. Cylinders are not designed for temperatures about 54 degrees C (130 degrees F).

3. Keep cylinders at least 6 m (20 ft.) from flammable materials such as paint, oil or solvents.

### Checklist

1. Identify storage areas. Clearly post "no smoking" signs within those areas.

2. Keep all cylinders and fittings where they cannot be contaminated by oil or grease.

3. Secure acetylene cylinders upright, whether full or empty, so they will not fall.

4. Ensure all cylinders are marked clearly. If not, refuse delivery.

5. Keep full and empty cylinders apart to prevent accidental part filling of an empty cylinder by back feeding.

6. Close valves of empty cylinders. Fit protection caps. Mark cylinders empty or "MT". Return cylinders promptly to the supplier.

7. Protect cylinders from extremes of weather, ice, snow and direct sunlight.

8. Avoid placing cylinders where they could become part of an electrical circuit and, through arching, cause a fire.

9. Store cylinders away from elevators, stairs, doorways and aisles.

**Handling Cylinders**

1. Handle cylinders with hands and clothing that are free of grit, grease and oil. This prevents slipping and also prevents grit or grease getting onto the nozzle of valve.

2. Keep cylinders in trolleys built for them. When not using such a trolley to move cylinder, detach cylinder regulators and fit with valve protection cap.

3. Dragging or sliding cylinders can cause damage. Roll cylinders on their bottom edge.

4. If moved by crane, place cylinders in a proper cradle or trolley. Fit with a valve protection cap.

5. Chain or wire rope slings allow cylinders to slip. Even rubber-covered slings can slip.

6. If an acetylene cylinder has been accidentally left on its side, set it upright for at least one hour before using it.

7. When cylinders are frozen to the ground, do not pry them loose. Use warm but not boiling water to loosen and pull out by hand.

**Checklist**

Do

1. Handle all cylinders as if they were full.

2. Protect cylinders from damage.

3. Secure cylinders to a firm support.

4. Tighten valve protection caps by hand.

5. Move cylinders with caps on.

6. Transport cylinders in an upright position, secured on a vehicle or trolley designed for that purpose, with appropriate signage.

Do Not

1. Do not strike an electric arc on a cylinder.

2. Do not transfer gas from one cylinder to another.

3. Do not use a sling or an electromagnet to move cylinders.

4. Do not refer to acetylene as “gas”, or oxygen as “air”. Always use the proper name.

5. Do not hoist a cylinder by the protection cap.

6. Do not use cylinders as rollers or supports.

7. Do not drop cylinders. They could burst or the valves could break off or become damaged.

8. Do not place an acetylene cylinder on its side.

9. Do not rely on cylinder’s colour. Check cylinder stencil and tag.

**Welding, Cutting, Burning**

1. Work involving welding, cutting and burning can increase the fire and breathing hazard on any job.

2. Always ensure that adequate ventilation is supplied during welding, cutting and burning.

3. Where workers and others are exposed to the hazards created by welding, cutting and burning they must be alerted to these and/or protected from them by the use of “screens”.

4. Never start work without proper authorization.

5. Always have fire fighting or prevention equipment on hand before starting work.

6. Check work area and surrounding for combustible material and possible flammable vapours before starting work.

7. Check cables and hoses to protect them from slag or sparks.

8. Hoses should be equipped with flame arrestors.

9. When working overhead creates a hazard, use fire resistant materials to control or contain slag and sparks.

10. Eye protection shall be worn at all times during work operations, shields and glasses tinted to specifications required.

## 9.2.18. Office Safety

Most office accidents result from slips, trips and falls, lifting objects, being caught in or between things, and punctures or cuts.

**Filing Cabinets**

- Close cabinet drawers when not in use.
- Do not open more than one drawer at a time.
- Place cabinets so that the drawers do not open into the aisles.
- Load cabinets starting from the bottom for stability.
- Secure cabinets to wall or floor.
- Use handles to close drawers to avoid catching fingers.
- Avoid overfilling cabinets to prevent paper and staple cuts.
- Do not keep heavy objects on top of tall filing cabinets.

**Floors and Stairs**

- Clean up spills and tracked-in rain or snow.
- Pick up objects off the floor. Even paper, pencils and rubber bands can cause trips and falls.
- Use slip-resistance preparations on linoleum, tile or other polished floor surfaces.
- Secure carpets and rugs.
- Use handrails on stairs.
- Remove stairway distractions such as mirrors, decorations or posters.
- Walk on the right.
- Do not run, especially near corners.
- Install mirrors at blind, busy corners.
- Do not store boxes, equipment, or supplies outside doorways or in aisles.
- Do not carry loads that obstruct vision.

**Office Equipment**

- Use fingertip guards when handling paper.
- Store pencils and pens down or flat in drawers.
- Sheath scissors, letter openers, razor blades or other sharp tools before storing.

**Use Paper Cutters Safely**

- Keep knife blades in locked position.
- Use proper guards.
- Maintain firm grip on blade handle.

- Do not cut too many papers at once.
- Use staple removers to remove staples.
- File sharp edges off metal furniture.
- Use proper ladder or step stool to reach high places. Do not use a box, desk or rolling chair.

**Office Machines**

- Use proper guards on machines.
- Observe directions and cautions when adjusting machinery.
- Call service for repairs.
- Disconnect and report frayed electrical cords or plugs.
- Unplug equipment when not in use or before making adjustments.

## 9.2.19. Manual Materials Handling

Lifting boxes or other materials:

- Store boxes at waist height.
- Do not bend over and try to lift box all at once.
- Raise box upright.
- Put one knee against box.
- Pull box up the leg.
- Rest box on edge of knee of other leg.
- Stand upright.
- Walk with your back upright while carrying the box.

**Transferring Weight**

Use toe test – if you cannot move it, you need assistance, e.g. dolly.

**Tools**

Select the suitable:

- For the task.
- To your body size, shape, strength.
- Ensure that tools are in good repair.
- Fasten handles securely.
- Finish handle surfaces so that they are smooth.
- Repair or replace worn or damaged handles.
- Keep cutting tools sharp.
- Put tools away when job is finished.
- Store tools where they do not create a hazard.
- Protect cutting edges.

**Refueling Equipment**

- Shut off engine and allow to cool.
- Fill the fuel tank before starting job.
- Position yourself comfortably so that you can refuel without slipping.
- Remove the fuel cap slowly, holding it at the semi-locked position until pressure is released.
- Allow the nozzle to empty by keeping it in the filler opening for a few moments after shutting off fuel flow.
- Replace the fuel cap after checking to see that it's venting is not clogged.
- Store fuel in sturdy, approved containers identified according to WHMIS requirements, but not in school.
- Have fire extinguisher or other fire-fighting equipment nearby.
- Do not smoke or have open flame while refueling. Gas fumes are heavier than air and will drift downward from the container. The vapour, not the liquid, burns.
- Do not spill any fuel or equipment. If you do, wipe up and allow any residue to dry before starting engine.
- Do not run if your clothing catches fire. Stop, drop and roll. Quickly remove the burning garment, or drop to the ground and roll slowly, or wrap yourself in a blanket.

## 9.2.21. Sports and Sporting Activities

Sports and sporting activities are known to be high risk. They can result in serious accidents to staff and students. The following guidelines are intended to prevent accidents:

- Develop emergency plans with specific assigned duties and names and telephone numbers of persons to be contacted.
- Conduct all sports under the supervision of a competent person.
- Ensure that first aid supplies are easily accessible and a trained first aider is always present for all trips/activities.
- Cease outdoor activities if lighting storms occur or appear imminent.
- Monitor students carefully when activities occur in either cold or hot conditions.
- Properly install, maintain and inspect all equipment regularly.
- Ensure suitable clothing is worn.
- Ensure all sporting equipment meets the established standards.
- Ensure that all equipment and areas continue to be safe during all activities.
- Place soft barriers and padded mats where falling and running into objects are likely to happen.
- Regularly check all hanging objects and wall-mounted gym fixtures to ensure that they are well secured and inspected annually by a competent person.
- Clean all floors and ensure they are free of hazards.
- Ensure adequate lighting for the activity areas.
- Stop all activities immediately if the equipment or the area become dangerous and may likely injure someone.

**Off-Site Activities**

- Follow school and Board Policy and Procedures.
- Obtain parental consent for each student for all off-site activities.
- Communicate to parents and students specific expectations for all off-site activities.
- Provide adequate supervision for the students' activity, transportation and accommodation.
- Take attendance and roll call regularly to ensure that all participants are accounted for and during the entire trip/activity.
- Ensure that first aid supplies are easily accessible and a trained first aider is always present for all trips/activities.
- Develop and implement emergency plans with specific assigned duties, names and telephone numbers of persons to be contacted.

## 9.2.23. Working in Outside Environments

Working in hot environments can be uncomfortable and also may adversely affect our health. How hot we feel depends on temperature, humidity, wind speed, and type of work.

**Health Problems**

**Heat Stroke**: The most serious heat illness is heat stroke. Signs of heat stroke include dry, hot skin due to failure of sweating and complete or partial loss of consciousness. Heat stroke can be fatal and requires prompt first aid and medical attention.

**Other Health Disorders:**

Less severe health problems include:

- **Heat Edema** – swelling of the ankles.
- **Heat Rashes** – tiny red spots on the skin that causes a prickling sensation during heat exposure.
- **Heat Cramps** – sharp pains in muscles resulting from failure to replace salt loss from sweat.
- **Heat Exhaustion** – weakness, dizziness, visual disturbances, intense thirst, nausea, headache, vomiting, diarrhea, muscle cramps, breathlessness, palpitations, and tingling and numbness of the hands and feet.
- **Heat Syncope (Fainting)** – caused by loss of body fluids through sweating and by lowered blood pressure, due to pooling of blood in the legs while working in a standing position.

If you notice any of the above symptoms, go to a cool place.

**Preventing Health Problems**

- **Acclimatization** – people who work regularly in hot environments develop a certain degree of tolerance (acclimatization) for heat. Most of the acclimatization occurs in the first three or four days, and complete acclimatization may require seven to eleven days.
- **Clothing** – loose cotton clothing provides adequate protection in hot humid conditions.
- **Work/Rest Schedule** – a schedule of work-rest periods is generally recommended for working in hot conditions.

- **Drinking Water** – you should drink plenty of cool 10-15 degrees C water or fruit drink every 15 to 20 minutes even though you may feel thirst. Thirst is an adequate indictor of the body' need for water.

**Working in Cold Environments**

- Working in cold weather can be dangerous to the unprepared, and to people without adequate protective clothing. Two types of cold hazards are common: **hypothermia** and **frostbite**.

- Hypothermia can be fatal. It results from the cooling of the deep inner body or "core" to a temperature below 34.5 degrees C due to prolonged exposure to cold. Persons exhausted during physical work are more prone to hypothermia. The victim can become listless, confused and make little or no effort to keep warm.

- The hypothermia victim should be immediately warmed, either by being moved to a warm room or by the use of blankets. In severe cases of hypothermia, immediate medical care is necessary.

- **Caution**: Consumption of alcohol does not increase tolerance for cold. Instead, it increases the risk of hypothermia.

- Frostbite is freezing of the body tissues as a result of extremely cold temperatures or contact with extremely cold metallic objects such as an automobile or fence.

**Effect of Wind**

At any temperature, one feels colder when it is windy. The combined effect of cold and wind speed is expressed as "wind chill" or "equivalent chill temperature". For exposed skin, continuous exposure should not be allowed when ECT is –32 degrees C or lower.

**Protective Clothing**

Multiple layers of lightweight loose-fitting clothing provide better protection against the cold compared to single thin layer clothing. Eye protection must be separated from respiratory channels (nose and mouth) to prevent exhaled moisture from fogging and frosting eye shields. For work in wet conditions, the outer layer of clothing should be waterproof. Clothing should be kept clean. Dirt destroys its insulating ability. Clothing must be dry.

Gloves should be used below 4 degrees C for light work and –7 degrees C for moderate work. For work below –17.5 degrees C, mittens should be used. Felt-lined, rubber bottomed, leather-topped boots with removable felt insoles are best suited for heavy work in cold.

More than 50 percent of body heat can be lost through the head when the rest of the body is covered. Wool knit cap or a liner under a hard hat reduces excessive heat loss.

**Ultraviolet Rays**

In summer months, outdoor work may cause damage to the skin and eyes due to ultraviolet radiation exposure. UV rays are an invisible part of sunlight. Besides direct exposure to sunlight, harmful UV ray exposures are possible due to reflections from water, sand and concrete.

**Effect on Skin**

UV rays cause darkening of the skin, skin burns and erythema (reddening of the skin). Prolonged exposure increases the risk of skin cancer.

Certain substances increase the risk of damage due to UV radiation. These are known as photosensitizing agents. Such agents include certain medications, tranquilizers, cosmetics, plants, weeds, and coal-tar creosote.

**Effect on the Eyes**

The eyes are particularly sensitive to UV radiation. A short exposure can result in painful, but temporary conditions such as watering, blurred vision and pain.

**UV Index**

The Environment Canada Weather Service rates the UV intensity as UV index on a scale of 0 to 10.

**UV Index Table**

| **Index** | **Category** | **Implications** |
|---|---|---|
| 9 – 10 | Extreme | Sunburns and skin damage can occur in less than 15 minutes. Minimize exposure. |
| 7 – 9 | High | Sunburns and skin damage can occur quickly. Minimize sun exposure if possible. |
| 4 – 7 | Moderate | Take precautions to limit exposure to the sun. |
| L4 | Low | Minimal precautions necessary for normal activity. |

- Avoid midday sun.

- Wear clothing that is tightly woven to block sunlight.
- Wear broad-brimmed hat that will shade your face, neck, and ears.
- Apply waterproof sunscreen with a sun protection factor of 15 or higher to all exposed skin.
- Wear UV filtering sunglasses.

## 9.2.24. Ergonomics

**Repetitive Motion Injuries**

- Contributing Factors
- Static body positions that cause muscle tension, require energy, and reduce the flow of blood to the muscles.
- Repetitive motions that cause tiredness, pain and possible overuse injuries.
- Uncorrected vision, glare, or shadows that force workers to use awkward body positions to see work properly.
- Workstations that are too high or low and have needed objects placed too far away from workers.
- Improperly adjusted chairs that place pressure on the underside of legs, back of knees and impair blood circulation.
- Hard floors that cause feet and legs to ache if workers walk or stand for long periods.

**Preventing Repetitive Motion Problems**

The key to preventing posture problems is to avoid long periods working on one position and repeating the same motions.

- Ensure that chairs and work surfaces are adjusted properly and there is enough space to work in a comfortable position.
- Eliminate glare by properly positioning lights and desks. Eliminate shadows by using task lamps. Adjust window curtains and blinds as conditions vary through the day.
- Vary tasks to change body position and mental activities. Good work/rest schedules help.

**Computer Workstations**

Check List:

- Computer workstations must be flexible enough to accommodate the individuals using them.

- Use this checklist to identify possible problems at Computer workstations.

**Computer Equipment**

- Top surface of the keyboard space bar is no higher than 6.5 cm (2.5 in.) above the work surface.
- During keyboard use, the forearm and upper arm form an angle of 80-100 degree, with the upper arm almost vertical. The wrist is relaxed and not bent. Wrist rests are available.
- If used primarily for text entry, keyboard is directly in front of the operator.
- Keyboard is detachable and moveable.
- Top of the screen is about eye level.
- Viewing distance is 30 to 60 cm. (12 to 14 ins.)
- Screen is free of glare or shadows.
- Images on the screen are sharp, easy to read and do not flicker.

**Chair**

- Chair has five wheels or castors suitable for the floor surface.
- Chair swivels.
- Backrest is adjustable for both height and angle.
- Backrest supports the inward curve of the lower back.
- Chair is adjustable to make the height appropriate for the individual and the work surface height. A footrest may be required for a correctly adjusted workstation.
- Chair is adjusted so there is no pressure on the backs of the legs, and feet are flat on the floor or on a footrest.
- Chair is adjustable from the sitting position.
- Chair upholstery is a breathable fabric.

- Footrests are used if feet do not rest flat on the floor.

**Work Surface**

- Work surface height is adjustable.
- Leg room is sufficient to change position of legs without getting up.
- Work surface is large enough to hold work materials.
- Commonly used items are close to and in front of the operator.
- Infrequently used items are stored.

**Visual Environment**

- Lighting does not produce glare or shadows on the screen.
- Lighting allows workers to read characters easily on the screen and source document.
- Wall colour is neutral and not too bright.
- Shiny surfaces and objects are covered or removed.
- Windows have blinds or curtains to prevent glare.
- Computer monitors are located away from windows, or the screens are at a 90 degree angle to windows.
- Ceiling fluorescent lights are oriented lengthwise to the sides of the computer and are fitted with diffusers or parabolic louvers.
- Room lighting is uniform and slightly dimmer than usual office lighting.
- General work areas have indirect or diffuse lighting.
- Adjustable task lights are available over source documents.

## Working in a Sitting Position

### Good Body Position

- There is no one single body position recommended for sitting.
- Every worker can sit comfortably by adjusting the angles of the hips, knees, ankles, and elbows.
- The following are general recommendations. Occasional changes beyond given ranges are acceptable and sometimes beneficial.
- Keep the joints such as hips, knees and ankles open slightly more than 90 degrees.
- Keep the upper body with 30 degrees of upright positions.
- Always keep the head aligned with the spine.
- Keep upper arms vertical to 20 degrees forward.
- Keep elbows at an angle between 90 and 120 degrees.
- Keep forearms between horizontal and 20 degrees up.
- Support the forearms.
- Keep the wrists straight and aligned with the forearms.
- Place the working object so that it can be seen at viewing angle of 10 to 30 degrees below the line of sight.
- Keep the shoulders low and relaxed.
- Keep elbows tucked in.
- Tuck chin in and do not bend forward when looking down and forward.
- Change positions frequently within recommended ranges.
- Cross legs alternately.
- Avoid side bending.

- Avoid forward bending.
- Do not slouch.
- Do not sit for more than 50 minutes at a time.

**What to Avoid While Sitting**

- Poor arrangement of the workstation fosters an awkward body position.
- A poor body position hinders breathing and blood circulation and contributes to injuries affecting people's ability to move.
- Avoid sitting on a chair that is too high.
- Avoid bending the head forward. This prevents neck injury.
- Avoid sitting without lumbar support. This prevents back injury.
- Avoid working with arms raised. This prevents neck and shoulder pain.
- Avoid bending wrists. This prevents muscle cramps.
- Avoid working with unsupported forearms. This prevents shoulder pain.
- Avoid cramming thighs under worktable. This reduces blood circulation.
- Avoid working with legs dangling. This destabilizes the body and causes tiredness.
- Avoid pressure on under side of thighs. This reduces back flow of blood and can cause swelling of legs.
- Do not sit on a chair that has poor support, it can overturn, injuring you.

**Avoid Sitting On a Chair That is Low**

- It disrupts blood circulation in lower legs, causing swelling.
- It puts pressure on internal organs.
- It creates too much pressure on buttocks and causes discomfort.

**Do Not Work With A Worktable That Is Too High**

- It prevents use of proper lumbar support and can cause back injury.
- It over-stretches the spine and can cause back injury.
- It forces the head to bend forward and can cause neck injury.
- It stresses shoulder and causes pain.
- It tires the whole body.

**Selection and Adjustment of Chairs**

Choose a Chair With:

- A backrest that is shaped to support the lower back.
- A seat height and depth that does not put pressure on back of thighs and knees.
- A seat that curves downwards at the front edge.
- A stable base.
- A swivel mechanism.
- Armrests that do not prevent the chair from being drawn up to the work surface or interfere with natural movement.
- Breathable fabric on the seat.
- Controls that can be used while seated.
- Tighten the chair backrest so that it does not give away with body weight.
- Readjust the chair throughout the day to help vary body position.

**To Adjust Chair and Work Surface**

- Stand in front of the chair. Adjust the height so the highest point of the seat is just below the kneecap.

- Sit so that the clearance between the front edge of the seat and the lower part of the legs just fits a clenched fist.

- Adjust the backrest of the chair so that it supports the V hollow of the lower back.

- Adjust work surface to about the height of elbows with the arms hanging straight by the sides.

- Raise the chair to get the proper arm and upper body position if using a fixed height work surface.

- Adjust chair height so elbows are about the same height as the work surface.

- Use a footrest if the feet cannot rest flat on the floor or if there is pressure on the back of the legs. The footrest should be adjustable and support the whole foot.

**Work Surface**

- Make adjustments so work surface is the correct working height.

- Ensure that the work surface is large enough to hold materials.

- Avoid cramping legs under work surface.

- Do not store materials under work surface.

- Avoid over-reaching and twisting.

- Store frequently used items in the most convenient place.

**Exercises To Do At The Work Station**

- Many office workers have jobs where they sit or stand for long periods. Working in one position can lead to muscle pain and strain.

**Tall Stretch**:

- Interlock fingers, palms up, stretch arms above the head until they are straight. Do not arch the back.

**Toe In, Toe Out:**

- Place feet should width apart, heels on the floor. Swing toes in then out.

**Shoulder Roll**:

- Roll the shoulders – raise them pull them back then drop them and relax. Repeat in the opposite direction.

**Side Stretch:**

- Drop left should reaching left hand toward the floor. Return to starting position. Repeat on right side.

**Back Curl:**

- Grasp shin; lift leg off the floor. Bend forward, reaching nose toward the knee.

**Ankle Flex and Stretch:**

- Hold one foot off the floor, leg straight. Alternately flex ankle and extend. Repeat with the other leg.

- Sit forward on the chair so that your back is not touching the chair's back. Place feet flat on the floor. With a straight leg lift one foot a few inches off the floor. Hold momentarily, return it to the floor and repeat with the other leg.

### 9.2.22 Indoor Air Quality Complaint Procedure

**Emergency: Contaminated Air**
If there is a contamination of the air which is perceived to be a serious and immediate health hazard to the building occupants then the Principal or person in charge shall make decisions on possible evacuation and shall consider: if the contaminant is coming from the outside, would the occupants be safer inside or outside, the supervision required during and after exiting, special health needs of those exiting the building, notifying their supervisor, the parents, transportation, and necessary emergency response organizations.

This protocol is developed to provide a consistent, effective response to air quality complaints from individuals who are present in schools.

## Objective

- ✓ To comply with legislation
- ✓ To specify responsibilities but not detail investigation procedures
- ✓ To compliment the OH&S complaint procedure
- ✓ To define a concluding evaluative procedure
- ✓ To provide a perspective on air quality testing
- ✓ To sequence activities in a flow chart

## Reference Legislation

Occupational Health and Safety Act - Chapter 7 of the Acts of 1996

Draft of Provincial IAQ Legislation

## Roles & Responsibilities in Addressing IAQ Complaints

### Complainant

- ✓ Provide information relative to the IAQ complaint to the Principal. The JOH&SC would appreciate the complaints to be in writing so that there is a clear understanding of the problem.

- ✓ It is important to have other investigations, by physicians and by the complainant themselves, going on concurrently, to try to identify the etiology of the health effects outside the school environment.

### Principal

If at any stage the problem is solved or the concern satisfied, then the only further action required of the Principal is to notify those involved at that point and record the incident and solution in a permanent site IAQ file with all other records related to the incident. The following are not necessarily done in the order listed.

- ✓ Confer with complainant and investigate. "Occupant" Interview" must be completed. "Occupant Diary" may also be given to complainant.
- ✓ Communicate with maintenance and custodial personnel any actions within their areas of responsibilities, which can be taken to address complaint.
- ✓ Submit written maintenance requests to address facilities conditions relating to complaints.
- ✓ Begin a further investigation of the complaint in consultation with the Joint Occupational Health & Safety Committee.
- ✓ Isolate and change location (if necessary) of activities to improve experienced IAQ.
- ✓ Document signs and symptoms relating to complaints including: location, date identification of key people involved and remedial action taken.
- ✓ Send written notification to the Occupational Health and Safety Officer and/or Manager of Facility Maintenance which shall include all records and documents relating to the complaint.
- ✓ Monitor, follow up, and record corrective action. Review the effectiveness of the corrective actions in consultation with the JOH&SC and the complainant.
- ✓ Maintain a file or files of all IAQ related correspondence, surveys, minutes and other notes relating to IAQ issues or complaints at the school site.

**Joint Occupational Health & Safety Committee**

- ✓ Accept and discuss written employee IAQ complaints that have been submitted by individuals.
- ✓ Participate with the Principal in the investigation, the review of documentation, records and remedial action taken.
- ✓ Submit written recommendations as deemed necessary by the JOH&SC to the Person with Authority to Address the Complaint (PAAC).

**Occupational Health and Safety Officer and Manager of Facility Maintenance**

- ✓ Respond to the Principal.
- ✓ Arrange for a facilities inspection to be conducted by a competent person with respect to the complaint or recommendation. The inspection is to be accompanied by a JOH&SC member. It is recommended that the JOH&SC be notified in advance if samples are to be taken.
- ✓ If an individual complains of a symptom or symptoms which they think are caused by the building, then the PAAC will give them the form "Referral of Individual Relating Indoor Air Quality to Symptoms" to complete and take to their physician.
- ✓ A written report of the inspector is to be distributed by the PAAC to the Principal to be posted in the workplace.
- ✓ Initiate actions, to address recommendations suggested by the inspector and ensure the completion of actions.
- ✓ Accept, present alternatives, or refuse with the reasons for the refusal must be submitted to the Manager of Facility Maintenance in writing, to recommendations submitted by the JOH&SC. This written response must be delivered to the JOH&SC in less than 21 days of receiving the recommendations.
- ✓ Review the complaint, the inspection, corrective action, and results and submit a written concluding evaluation to the Principal and the JOH&SC.

## Inspection by a Competent Person

- ✓ An internal or external resource person shall be used.
- ✓ The nature of the observed complaints and conditions shall determine the necessary competencies of the resource person as determined by the PAAC.
- ✓ The nature of the investigation and procedures shall be determined by the resource person and the results of the investigation shall be submitted in writing to the PAAC. Detailed investigation procedures are not contained here.

## [Please Post on Occupational Health and Safety Bulletin Board]

# Occupational Health and Safety
# Tri County Regional School Board Complaint Procedure
# (Including Air Quality Concerns)

If any employee has a health and safety concern/recommendation, the following procedures are available:

{Please note this does not concern routine maintenance items. The Principal will ensure that all maintenance requests are submitted and processed in the normal manner and the custodian is made aware of any concerns for cleanliness within the facility}

- Step 1: report your concern or recommendation to your immediate supervisor. If your concern(s) are not dealt with to your satisfaction, proceed to step two.

- Step II: Contact your Joint Occupational Health and Safety Committee/Representative with a description of the concern/recommendation (it would be appreciated if this was done in writing). The complaint is then reviewed and efforts are made to resolve the complaint at the meeting of the JOHSC or at the meeting between the JOHSC/Representative, Principal, and complainant. If the JOHSC/Representative agrees with the concern or recommendation, they will forward their written recommendation to the Principal. They Principal may respond to the recommendation or if outside their authority, refer the recommendation to the Person with Authority to Address the Complaint (PAAC).

- Step III: The JOHSC/Rep. shall submit a 21 Day Notice to the Manager of Facility Maintenance indicate acceptance of the recommendation shall receive a response to the recommendation. The response shall indicate acceptance of the recommendations or give reasons for the disagreement with any recommendations or where it is not reasonably effective.

## Evaluation

PAAC will: assess the incident, review the result of the investigation by the competent person, determine actions reasonably practical to address the complaint, communicate in writing to the Principal and JOH&SC. This concludes the response to the complaint. If the investigations and corrective actions do not establish the cause of the complaint, the complaint may not be related to IAQ. All symptoms commonly attributed to IAQ problems may also be caused by other factors, are not necessarily due to air quality deficiencies and may require different solutions.[1]

## Air Quality Testing

For the purpose of this document, normal investigation procedures may include measurement of comfort levels (temperature and relative humidity), efficiency of air circulation ($CO_2$ levels). Testing for contaminants such as VOCs, microbes, formaldehyde, particulate levels, etc.. may not be useful in determining the cause of symptoms and should only be used following investigative procedures that include visual inspection of the site, assessment of mechanical equipment and the general operation and maintenance of the building. Testing may be used to reveal an unidentified contaminant, to confirm the existence of a specific suspected condition, or to verify that clean up procedures have been effective. Authorization for testing must be received from the office of the PAAC.