



# Hand and Power Tool Safety

# Introduction

Tools are a very common part of our everyday lives. We use hand and power tools at home and work for a variety of reasons. These tools are very useful but can also be very dangerous. Anyone that has had a wrench slip from a bolt and scraped their knuckles or hammered their finger instead of the nail knows the pain that can occur from a simple mishap. Unfortunately, more serious injuries can and do occur with the use of such tools. The purpose of this program is to provide information about some basic safety rules, procedures and safeguards associated with hand and power tools. By being more aware of the possible dangers and hazards of working with such tools and knowing how to protect yourself, you can more easily avoid or eliminate tool-related accidents.

# Hazards

Employees that use hand and power tools can be faced with many possible hazards. Serious accidents can occur if steps are not taken to identify, avoid or eliminate tool-related hazards. Some possible hazards associated with hand and power tools include:

- Scrapes, bruises, breaks, punctures and cuts.
- Hearing problems.
- Being struck by falling, flying, abrasive and/or splashing objects.
- Breathing in or coming into contact with harmful dusts, fumes, mists, vapors and/or gasses resulting in respiratory problem.
- Electrical shock and burns.
- Falling.
- Possible death.

# General Safety Precautions

- a. The safety of all employees is the driving factor behind all safety training, rules, procedures and regulations.
- b. Employers and employees should work together to establish safe working procedures.
- c. Any unsafe working condition or tool should immediately be reported to your supervisor.
- d. Unsafe working conditions must be corrected before work continues.



# General Safety Precautions

- e. Some basic safety rules that should be followed to help prevent hazards associated with the use of hand and power tools include:
- Keep tools in good working condition through regular maintenance.
  - Use the right tool for the job.
  - Inspect tools for damage before use. Damaged tools should be taken out of use until properly repaired or destroyed and discarded.
  - Never attempt to repair damaged tools yourself. Only the manufacturer or an approved repair shop should be used for repairs.
  - Use tools according to the manufacturer's guidelines.
  - Use appropriate personal protective equipment.
  - Keep floors and work areas clean and dry to prevent slips, trips and falls as well as other accidents.

# Personal Protective Equipment

Personal protective equipment is vital to the safety of employees that work with hand and power tools. The type of PPE needed is determined by the tool used and the work being performed. Your employer will provide all necessary PPE at no cost to you. You have a responsibility to use the PPE properly and when required.



# Guarding

- a. Belts, gears, shafts, pulleys, drums, flywheels, chains or other reciprocating, rotating or moving parts of equipment must be guarded if such parts are exposed to contact by employees.
  
- b. Machine guards, as appropriate, must be provided to protect the operator and others from the following:
  - Point of operation
  - In-running nip points
  - Rotating parts
  - Flying chips and sparks
  
- c. Safe guards must never be removed when a tool is being used.

# Guarding

d. Portable circular saws should be equipped with an upper guard that covers the entire blade of the saw. A retractable lower guard must cover the teeth of the saw except where it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work material.



# Controls and Switches

a. Many hand-held power tools must be equipped with a constant-pressure switch or control that shuts off the power when pressure is released. Such tools include drills, tappers, fastener drives, horizontal, vertical and angle grinders with wheels more than two inches in diameter, disc sanders, reciprocating saws, saber saws and other similar tools. These tools can be equipped with a “lock-on” control if it allows the worker to also shut off the control in a single motion using the same finger(s).

# Controls and Switches

b. Some power tools can be equipped with a positive “on-off” control switch, a constant pressure switch or a “lock-on” control. The constant-pressure control switch is considered the preferred device. Such tools include routers, planers, laminate trimmers, nibblers, shears and scroll saws.

c. Other hand-held power tools such as circular saws having a blade diameter greater than two inches, chain saws and percussions tools without means to securely hold accessories must be equipped with a constant-pressure switch.

# Hand and Power Tools

There are many different types of hand and power tools. Manufacturer's operating rules and guidelines should be consulted for each type of tool used at your worksite.

## A. Hand Tools

a. Defined as any tool that is manually powered. Axes, wrenches, hammers and screwdrivers are just some examples of hand tools. The greatest hazards posed by hand tools are a result of misuse and improper maintenance. Some examples include:

- Using a screwdriver as a chisel or using a chisel as a screwdriver. In both cases the tool can easily break causing parts to fly off, hitting the user or other employees.
- Using a hammer or an axe when the wooden handle is loose, splintered or cracked. The head of the tool can easily fly off and hit someone or something.

# Hand and Power Tools

- Using a wrench that has weakened or sprung jaws from being used improperly in the past. The wrench can slip off the bolt or nut and cause you to scrape your hand and knuckles, cause you to fall from an elevated worksite or fly out of your hands and hit someone or something.
- Using chipping tools, such as chisels and wedges, which have mushroom heads. This is a condition where the head of the tool is flared out due to excessive use. Pieces of the head can break off and hit the user or others nearby.



# Hand and Power Tools

- b. Saw blades, knives or other tools should be directed away from aisle areas and other people working in close proximity.
- c. Knives, scissors and other blades must be kept sharp. Dull blades are more dangerous than sharp blades.
- d. Cracked saw blades must be removed from use and discarded.
- e. Appropriate PPE, e.g. safety goggles and gloves, should be worn to prevent injuries and accidents.
- f. Iron and steel hand tools can produce sparks that can be an ignition source around flammable substances. Where these hazards exist, use spark-resistant tools made from brass, plastic, aluminum or other non-ferrous materials.

# Hand and Power Tools

## B. Power Tools

- a. Power tools are classified according to their power source: electric, pneumatic, liquid fuel, hydraulic and powder-actuated.
- b. Power tools should be fitted with guards and safety switches.
- c. Power tools can be extremely dangerous when used improperly.
- d. Some general safety rules for power tool use include:
  - Never carry a tool by the cord or hose.
  - Always disconnect from the receptacle by pulling the plug and not the cord or hose.
  - Protect cords and hoses from heat, oil and sharp edges.
  - Disconnect tools when not in use, before servicing and cleaning and when changing accessories.

# Hand and Power Tools

- Secure work with clamps and/or a vise.
- Avoid accidental starting. Do not hold your finger on power switch while carrying an energized tool.
- Follow manufacturer's guidelines for lubricating and changing accessories.
- Wear proper apparel for the job. Loose clothing, ties and jewelry can become caught in moving parts.
- Remove all damaged electrical tools from use and tag "Do Not Use".

## 1. Electric Tools

- a. Using electrical tools can be very dangerous.
- b. Hazards include burns, shocks and even death.

# Hand and Power Tools

- c. The most common injuries are burns and shocks.
- d. Specific training on electrical safety should be provided to employees who use electric tools.

## 2. Pneumatic Tools

- a. Pneumatic tools are powered by compressed air and include tools such as chippers, drills, hammers and sanders.
- b. The main danger is getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool.
- c. Always check to ensure the tools are securely fastened to the air hose.



# Hand and Power Tools

- d. Precautions should be taken with the hose to keep it from being damaged or to prevent someone from tripping over the hose.
- e. A safety clip or retainer must be installed to prevent attachments from being ejected during operation.
- f. Eye protection is required, head and face protection is strongly recommended. Hearing protection is required if working with loud, noisy tools.
- g. When using a jackhammer, heavy rubber grips will reduce fatigue and strains. Operators should also wear safety glasses, safety shoes and a face shield.



# Hand and Power Tools

- h. Pneumatic tools that shoot nails, rivets, staples or similar fasteners and operate at pressures more than 100 psi must be equipped with a safety device that prevents discharge unless the muzzle is pressed against the work surface.
- i. Never point compressed air guns toward anyone.
- j. Screens should be utilized to protect nearby workers from being struck by flying fragments.



# Hand and Power Tools

## 3. Powder-Actuated Tools

Such tools operate like a loaded gun and are extremely dangerous. Only specially trained employees should operate powder-actuated tools. If you are required to use powder-actuated tools, your company will provide specific training in this area.

## 4. Hydraulic Power Tools

The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters and other fittings must not be exceeded.

# Abrasive Wheels and Tools

a. Portable abrasive grinding, cutting, polishing and wire buffing wheels create special safety problems because they may throw off flying fragments.

b. Abrasive wheel tools must be equipped with guards that:

- Cover the spindle end, nut and flange projections.
- Maintain proper alignment with the wheel.
- Do not exceed the strength of the fastenings.

c. Abrasive wheels must be inspected for damage and be sound or ring-tested before being mounted. A stable or undamaged wheel will give a clear metallic tone or ring when tested.

# Hand and Power Tools

- d. Never stand in the plane of rotation of the wheel.
- e. Abrasive wheels should be equipped with a safety guard to protect workers from the moving wheel surface and also from flying fragments in case of wheel breakage.
- f. Eye protection must always be used.
- g. Turn off power supply when not in use.
- h. Never clamp a hand-held grinder in a vise.



# Jacks

- a. Manufacturer's load limits must be permanently marked in a prominent place on the jack and should never be exceeded.
- b. Jacks should have a stop indicator that stops it from jacking up too high.
- c. Jacks should never be used to support a lifted load. Once the load has been lifted, it should immediately be blocked up.
- d. To set up a jack, make sure:
  - The base is on firm, level ground,
  - The jack is correctly centered,
  - The jack head bears against a level surface,
  - And the lift force is evenly applied.

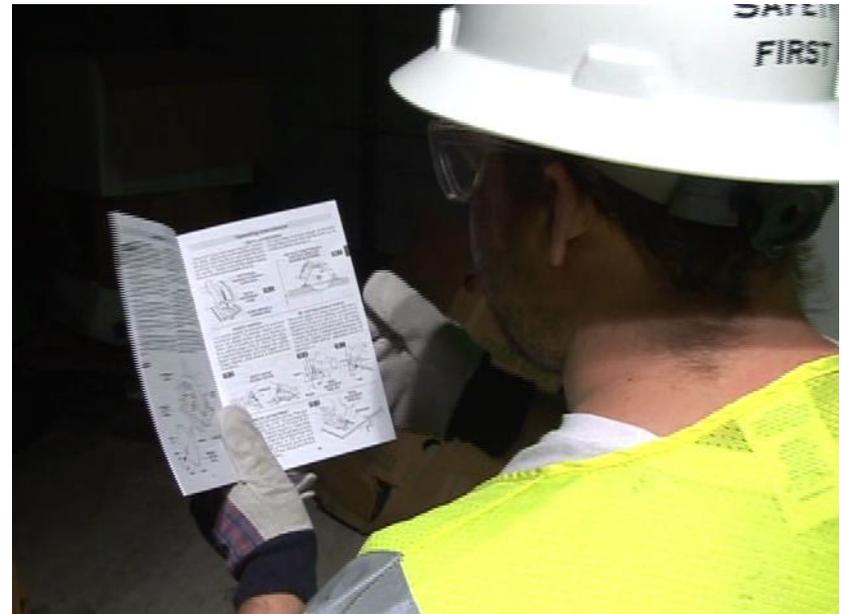
# Jacks

- e. Proper maintenance of jacks is necessary for safety. Lubricate regularly and inspect according the following schedule:
- At least once every six months for jacks that are used continuously or intermittently at one site.
  - Jacks sent out of the shop should be inspected when sent out and upon its return.
  - When submitted to abnormal loads or shock, a jack should be inspected before use and immediately thereafter.
- f. Hydraulic jacks exposed to freezing temperatures must be filled with an adequate amount of antifreeze to keep from freezing.



# Training

Employees must be trained in the use and care of all hand and power tools used. Employees should be able to recognize the hazards associated with the different types of hand and power tools and know the necessary safety precautions. Training requirements for each tool will be determined by your employer.



# Medical Emergency

If an accident occurs, report it to your supervisor as quickly as possible. Seek medical attention immediately if an injury has occurred. Time is important when your health or that of your coworker's is at stake. Even if the injury is minor, report it and let trained medical professionals determine the proper care. Your company will provide detailed instructions on who to call and where to report accidents and injuries.





# Quiz

Click on the link below to take a 5-Question Quiz.

<https://secure.rutherfordcountyttn.gov/insquiz/powerhandtools.aspx>

Once you have linked to the quiz, please enter your Social Security Number at the top. You will need to enter it according to the example shown (ex. 999-99-9999 with hyphens included).

Once finished with the questions, please click the submit button and your training will be recorded.

Note: It takes 90 days for newly hired employees to be loaded to the training database. In this case print out the quiz and submit to your supervisor or safety training point of contact.