OSHA mandates that students spend a specific amount of time in each module of this course. In order to comply with OSHA’s requirement, additional resources related to this module’s content are provided below. You should also consider reviewing the Fact Sheet for this module, which is located at the end of this resource list.

When the minimum required time for this module has elapsed, you will be allowed to proceed to the next module.

**CAUTION: When closing resource links, take care to not close your course browser window, as that will stop the module timer.**

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## Module 13: Hand and Power Tools

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Module 13: Hand and Power Tools

In this module, we cover information that will enable workers to recognize hazards and best practices associated with hand and power tools.

Module Objectives

Terminal Objective

Given current OSHA and industry information regarding construction worksite illnesses, injuries, and/or fatalities, the student will be able to recognize hazards and best practices associated with hand and power tools.

Enabling Objectives

Specifically, the student will be able to:

1. Identify hazards to which workers may be exposed when using hand and power tools.
2. Identify at least three basic hand and power tool safety rules.
3. Identify at least two precautions that are essential to safe use of hand tools, electrically powered tools, abrasive wheels and tools, pneumatically powered tools, liquid fuel tools, hydraulically powered tools, and powder-actuated tools.
4. Name at least two guarding techniques or principles that apply to hand and power tools.

What Hazards Are Associated With Hand And Power Tools?

Hand and power tools have the potential to cause severe injuries or even death when not used or maintained properly.

Hazards associate with hand and power tools include:

- Struck-by hazards from flying, falling, impact, or abrasive objects
- Electrical shock or electrocution
- Caught-in hazards with tools that have moving parts
- Exposure to harmful dusts, fumes, mists, vapors, or gases
- Tripping or slipping hazards
- Contact with sharp edges, or protruding objects that cause cuts, punctures, or contusions

Exposures to hand and power tool hazards can o due to:

- Using the wrong tool for the job
- Using a tool the wrong way
- Using damaged or broken tools
- Using tools that are dull
- Using spark-producing tools near flammable sources
- Using power tools with moving parts that are not properly guarded
- Using electrical tools that are not properly grounded
- Not wearing appropriate PPE

What Are The Basic Hand And Power Tool Safety Rules?

There are five basic safety rules that can help prevent hazards associated with the using hand and power tools, including:

- Always keep all tools in good condition with regular maintenance.
- Use the right tool for the job.
- Examine each tool for any damage before using it and if the tool is damaged do not use it.
- Follow manufacturers’ instructions when using tools and use them the right way. This includes using the guards that are part of a tool.
- Always wear the right personal protective equipment and make sure you use it properly.

When using tools like saws, knives, or other types of tools, direct the tool away from other employees working close by and away from any aisles where people will pass.

Cutting tools must be kept sharp. Dull cutting tools can be a greater hazard than sharp ones. If a saw blade is cracked or broken, it must be removed from service.
What Are Essential Precautions For Safe Use Of Hand And Power Tools?

Some protective measures are applicable regardless of the type of tool being used. Some tools require protective measures that are specific to those types of tools.

Precautions for All Hand and Power Tools

General precautions that apply to all tools include the following practices:

- Keep the floors in the work clean and free from any debris that could cause tripping or slipping.
- Keep work areas well lit.
- Use the proper PPE, such as safety glasses, respiratory protection, and gloves, for protection from falling, flying, abrasive, and splashing objects or materials and from harmful dusts, fumes, mists, vapors, or gases.
- Keep all cutting tools sharp.
- Keep all tools clean and well-maintained.
- Inspect all tools for defects and remove any broken or damaged tools from service.
- Use tools only for the purposes for which they were designed and use tools the right way.

Precautions for Power Tools

To prevent hazards associated with the use of power tools follow precautions, including the following practices that apply to all power tools:

- Disconnect tools from power source when not in use, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters.
- Keep all people not involved with the work at a safe distance from the work area.
- Secure work with clamps or a vise so that both hands are free to operate the tool.
- Avoid accidental starting; do not hold fingers on the switch button while carrying a tool that is still attached to its power source.
- Power tools must be fitted with guards and safety switches.
- Be sure to maintain good footing and balance when operating power tools.
- Wear proper clothing for the task; do not wear loose clothing, ties, or jewelry when working in an area or a tool that has moving parts.
- Safeguard exposed moving parts of power tools, including belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment.

Electric Tools

Employees using electric tools need to be aware of dangers related to them, including serious dangers of shocks and burns. Additional precautions include:

- Electric tools that are damaged must be removed from service and tagged “Do Not Use."
- To protect a worker from shock, electrical tools must:
  - have a three-pronged plug that is used with a grounded receptacle;
  - be double-insulated; or
  - be powered by a low-voltage isolation transformer
- Never remove the third prong (grounding pin) from a three-prong plug. An adapter may be used to accommodate a two-prong receptacle, but it must be attached to a known ground.
- Do NOT:
  - pull cords to disconnect tool from outlet
  - use cords to hoist or lower tools
  - carry portable tools by the cord
  - run cords across walkways and traffic areas
- Keep cords and hoses away from heat, oil, and sharp edges.
- Store electrical tools in a dry place and do NOT use in damp or wet locations, unless they are approved for that purpose.
- Use Ground Fault Circuit Interrupter (GFCI) or Assured Equipment Ground Conductor (AEGC) program.

Abrasive Wheels and Tools

Portable, abrasive, grinding, cutting, polishing, and wire buffing wheels rotate at high speeds and can throw off flying fragments. Additional precautions for these tools include the following:

- Equip with guards that:
  - cover the spindle end, nut, and flange projections;
  - maintain proper alignment with the wheel; and
  - do not exceed the strength of the fastenings.
- Before an abrasive wheel is mounted:
  - Inspect it for damage; and
  - Sound- or ring-test it to ensure that it is free from cracks or defects.
- Follow manufacturer recommendations for operating speeds.
- Allow the abrasive wheel to accelerate to operating speed before beginning grinding or cutting work to prevent disintegration or explosion during start-up.
• Do not stand in front of the grinding wheel as it comes up to speed; use eye and/or face protection.
• Properly adjust the work rest on grinding tools and use it to support the work and prevent it from being jammed.

**Pneumatic Tools**
Pneumatic tools, such as nailers, chippers, drills, sanders, and staplers, are powered by compressed air. There are several dangers associated with the use of these kinds of tools, but the greatest danger is getting hit by one of the tool’s attachments or by some kind of fastener that the worker is using with the tool.

Use the same precautions with the air hose as with electric cords – do not use it to lift the tool, do not let it become a tripping hazard, and do not use it to carry the tool.

Additional precautions include the following practices:

• Check that the tool is fastened securely to the air hose to prevent them from being disconnected and use a positive locking device as an added safeguard.
• Pneumatic tools that shoot nails, rivets, staples, or similar fasteners must be equipped with a special device to keep fastener from being accidently ejected.
• Screens must be set up to protect nearby workers from being struck by flying fragments.
• Do not use compressed air for cleaning off clothing and never point compressed air guns at anyone.

**Fuel-Powered Tools**
The most serious hazard associated with using fuel-powered tools is the fuel vapors that can burn or explode and give off dangerous exhaust fumes. Additional precautions include the following practices:

• Handle, transport, and store gas or fuel in approved flammable liquid containers only.
• Shut down the engine and allow it to cool before refilling a fuel-powered tool tank.
• Provide satisfactory ventilation or appropriate respiratory protection when using these tools inside a closed area.

**Powder-Actuated Tools**
Powder-actuated tools, such as nail guns and rivet guns, act very similar to a loaded gun and need to be treated with extreme caution. Only employees who are specially trained and licensed can use them. Additional precautions include the following practices:

• Wear suitable ear, eye, and face protection.
• Select either a high-velocity or low-velocity powder level that is appropriate for the tool and task without applying excessive force.
• Test the tool each day before loading to ensure the safety devices are working properly.
• Inspect tool before each use to make sure that it is clean, the moving parts operate freely, the barrel is free from obstructions, and the proper shield, guard, and attachments are in place.
• Immediately remove from service any defective tool and do not use until properly repaired.
• Do not load tools until just prior to use.
• Never point the tool (loaded or empty) at any employee.
• Keep hands clear of the open barrel end.
• Never leave loaded tools unattended.
• Do not drive fasteners into very hard or brittle materials; and, avoid driving into easily penetrated materials unless they are backed by an impenetrable backing.
• Do not drive fastener into a spalled area.
• Do not use tools in an explosive or flammable atmosphere.
• Use manufacturer-recommended correct shield, guard, or attachment on tools.
• Store tool unloaded and in a locked box.

**What Guarding Techniques Or Principles Apply To Hand And Power Tools?**
The following guarding techniques or principles apply to hand and power tools:

• Guard exposed moving parts of power tools.
• Guard belts, gears, shafts, pulleys, sprockets, spindles, flywheels, chains, or other moving parts.
• Never remove a guard when a tool is in use.
• Guard the point of operation, in-running nip points, and rotating parts.
• Guard the operator and others from flying chips and sparks.

Appropriate guards must be in place to prevent operator from coming in contact with saw blades.