Hand and Power Tool Safety – Quick Tips



Introduction

The wide variety of hand and portable power tools available on the market today allow us to perform more tasks more efficiently. However, if used improperly, hand and power tools can cause injury. Use protective equipment and follow proper work practices in order to operate hand and power tools safely.

HAND TOOLS

- If a chisel is used as a screwdriver, the tip of the chisel may break and fly off, hitting the user or other employees.
- If a wooden handle on a tool, such as a hammer or an axe, is loose, splintered, or cracked, the head of the tool may fly off and strike the user or other employees.
- If the jaws of a wrench are sprung, the wrench might slip.
- If impact tools such as chisels, wedges or drift pins have mushroomed heads, the heads might shatter on impact, sending sharp fragments flying toward the user or other employees.

Personal Protective Equipment

The type of personal protective equipment (PPE) you need when using hand tools depends on the tool being used and the hazard(s) created by use of the tool. At a minimum, eye protection in the form of safety glasses or goggles must be worn at all times for eye protection. The simple act of snipping copper wire with side-cutting pliers, striking a nail with a hammer or sawing wood can propel small pieces of debris into the air. A full face shield could also be used over the safety glasses or goggles to provide protection to the face if the potential hazard dictates the need.

It is also important to protect your hands from cuts, abrasion and repeated impact. Cut-resistant gloves can help protect against the effects of a misplaced blade. Wearing standard cotton or leather gloves can help prevent wood splinters or skin abrasions from handling lumber. On jobs that require long periods of hammering, impact-resistant gloves with gel or rubber palms can reduce vibration.

Safety shoes/boots can help protect your feet from injury caused by a dropped tool. In addition, safety footwear can incorporate other protection such as metatarsal guards, puncture resistant soles and electrical insulation. Choose footwear that offers adequate traction for your work site. For more information on safety footwear, refer to Quick Tips #252.

Proper Work Practices

Wrenches

Wrenches come in an endless variety of styles such as socket, open-end, combination, adjustable and torque, to name a few. Wrenches are designed to turn or hold bolts, nuts or multiple-threaded fasteners. They are sized to keep the leverage and load in an acceptable balance. The following are some basic dos and don’ts related to wrench use:

- Choose a wrench that properly fits the fastener you wish to turn. Use metric wrenches for metric bolts and Society of Automotive Engineers (SAE) inch wrenches for inch-sized bolts. By using the correct size, the wrench is less prone to slip or round off the fastener corners
- Avoid using sleeve additions (e.g. a pipe) to improve the leverage of a wrench
- Do not use open-end or adjustable wrenches for final tightening or loosening frozen fasteners—these wrenches do not have the strength of a box-end or socket wrench
- Apply penetrating oil on frozen fasteners before using a striking face box, socket or heavy-duty box wrench
- Do not expose a wrench to temperatures that could weaken tool hardness
- Always try to pull on a wrench (instead of pushing) in case the fastener loosens
- Adjustable wrenches must be adjusted tightly to the fasteners and then pulled, putting the force on the fixed end
- Never alter a wrench
- Do not over torque a fastener—use a torque wrench to tighten the fastener to the exact torque required
- Inspect wrenches periodically for damage, such as cracking, severe wear or distortion
- Always use non-sparking wrenches when in the presence of flammable vapors or dusts

Pliers

Pliers come in all shapes and sizes, such as lineman, diagonal cutting, needle nose, slip joint, locking tongue and groove. Plier uses include gripping, cutting, turning and bending. Pliers are a versatile tool, but must be used according to how they are designed. The following are plier use dos and don’ts:

- Do not increase a pliers handle length to gain more leverage, instead choose larger sized pliers
- Never subject pliers to temperatures that could decrease tool hardness
- Cut hardened wire only with pliers designed for that purpose
- Do not substitute pliers for a wrench when turning nuts and bolts
- Be sure the pliers’ jaws can grasp properly when bending rigid wire
- Do not hammer with pair of pliers
- Cut wire at right angles without bending wire back and forth against the cutting edge of a pliers
- Always use non-sparking pliers when in the presence of

Hammers

Hammers are one of the most used tools in our tool boxes. Nail, soft-face, ball-peen, chipping, sledge and setting are just a few of the hammers we use in the workplace and at home. Many hammer types are specific to a particular industry, such as bricklayers, machinists and loggers. Each kind of hammer has a head that is tailored to work best for a particular application. Hammer handles are now made stronger and more ergonomically shaped which helps to transmit less shock to the user. Here are some do’s and don’ts for hammers:

- Always use a hammer of the proper weight and size for the task

- Do not strike the surface at an angle—the hammer face should contact the striking surface squarely, so the two are parallel
- Do not use a hammer if the handle is damaged or loose
- Use a hammer face that is 1/2″ larger in diameter than the striking tool
- Never weld, heat or regrind a hammer head
- Remove from service any hammer exhibiting signs of excessive wear, cracks, mushrooming or chips
- Do not use one hammer to strike another
- Do not use the wrong hammer for the job, match the proper type of hammer to the task it is designed to perform
- Always use non-sparking hammers in the presence of flammable vapors or dust

Screwdrivers

Screwdrivers are intended for turning a variety of threaded fasteners, such as machine or wood screws, in or out of materials. Screwdriver tips come in a variety of different shapes and sizes. The slotted and Phillips tips are the most common; however, torx, hex, square and various others are also used. It is important to match the type of screwdriver you use to the type of job you're doing. The following are some common screw driver use dos and don'ts:

- Never use a screwdriver as a pry bar, chisel, punch, stirrer or scraper.
- Always use a screwdriver tip that properly fits the slot of the screw
- Throw away screwdrivers with broken or worn handles
- Never expose screwdrivers to temperatures that could reduce tip hardness
- Turn power off and use electrically insulated screwdrivers when working on or around electrical components
- Straighten tips or redress rounded edges with file
- Never use pliers on a screwdriver for extra leverage; only use a wrench on screwdrivers specifically designed to accept them
- Use magnetic or screw-holding screwdrivers to start fasteners in tight areas
- Always use non-sparking screwdrivers in the presence of flammable vapors or dusts

PORTABLE POWER TOOLS

PPE

Power tools present more hazards than hand tools due to the speed at which they operate and the potential for the user to come into contact with the power source (electrical, pneumatic , hydraulic etc.). There are differences between the PPE suggested for use with hand tools and the PPE suggested for safe power tool use.

Eye protection, such as safety glasses or goggles, is especially important when using power tools. The speed at which drills, saws, grinders, sanders and routers operate can propel small particles much faster and farther than hand tools. Others working around the area where power tools are used should also wear protective eyewear. Certain power tools may require using a face shield, in addition to safety glasses or goggles. For example, a face shield is suggested while using a grinder, due to the amount of hot metal particles generated. A face shield is considered a secondary form of eye protection and should always be used in conjunction with a primary from of protection – safety glasses or goggles. OSHA's Eye and Face Protection eTool describes the role of a face shield as PPE this way, "When worn alone, face shields do not protect employees from impact hazards. Use face shields in combination with safety spectacles or goggles, even in the absence of dust or potential splashes, for additional protection beyond that offered by spectacles or goggles alone."

Standard cotton or leather work gloves can protect your hands from minor scrapes and cuts while working with various materials. Cut-resistant gloves are not designed for, or capable of providing protection against a moving blade or bit. The best way to prevent injury from moving parts is to keep your hands on the tools' handles and keep all guards in place. Anti-vibration gloves minimize the vibration created by hammerdrills and rotary hammerdrills.

Safety footwear is recommended when using power tools. Safety shoes with a nonslip, electrically insulated sole and a protective toe cap will provide protection against dropped objects and misdirected electricity.

The higher sound levels generated by some power tools, especially if used over extended periods of time, may require the use of earplugs or earmuffs. Power sanding and grinding operations may require the use of a particulate respirator. Each situation must be analyzed to determine the type of PPE that is required for the safe use of each type of power tool.

Along with PPE, proper attire is also important while using power tools. Tie back or cover long hair and don't wear loose or torn clothing. Hair and clothing that strays too far from the body can get caught in power tools. Because of this potential, loose jewelry should be avoided as well.

Proper Work Practices

Under 29 Code of Federal Regulation (CFR), 1910.242(a) employers are required to keep all tools in good repair. It states, *"Each employer shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees."*

Before using any power tool, it's crucial to read and follow all the safety precautions covered in the owner's manual for the tool. In OSHA's Hand and Power Tool publication, they offer the following general guidelines for safe power tool use:

- Never carry a tool by the cord or hose
- Never yank the cord or the hose to disconnect it from the receptacle
- Keep cords and hoses away from heat, oil, and sharp edges
- Disconnect tools when not using them, 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, freeing both hands to operate the tool
- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool
- Maintain tools with care; keep them sharp and clean for best performance
- Follow instructions in the user's manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance when operating power tools
- Remove all damaged portable electric tools from use and tag them: "Do Not Use"

Commonly Asked Questions

Q: Does OSHA regulate the use of hand and/or power tools?

A: Hand and power tools are addressed in 29 CFR 1910, Subpart P and 29 CFR 1926.300, Subpart I, Hand and Portable Powered Tools and Other Hand-Held Equipment. Design, guarding and maintenance requirements are covered.

Q: What size extension cord should I use for my power tool?

A: Consult your owner’s manual or power tool supplier for the recommended wire gauge size for your application. Higher amperage tools require heavier gauge (higher amperage rated) extension cords. Also longer runs require a heavier gauge extension cord. For more information on general extension cord safety visit the Electrical Safety Foundation International’s (ESFI’s) resource library.

Sources

29 CFR 1910, Subpart P; OSHA General Industry Standards.

OSHA’s Safety and Health Topics page on Hand and Power Tools

OSHA’s Hand and Power Tool Booklet 3080 2002 (Revised)

Canadian Centre for Occupational Health and Safety’s hand tool fact sheets

Electrical Safety Foundation International’s resource library

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