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Power Tool Safety

Loss Control Bulletin

Power tools get jobs done with efficiency and reduced effort, but with power comes responsibility. Portable power tools are one of the greatest time and energy savers around. Since they are so readily available and useful, people tend to forget that they are powered and have the potential to amputate, break bones, electrocute, and cause fatalities. Appropriate training, safe work practices, and power tool maintenance are key to preventing accidents.

Too often, employers assume workers know the safe way to use a power tool or how to operate power equipment. Unfortunately, this assumption can have tragic results. Safety education is the best way of preventing injuries.

Only trained workers should use power tools on the job. Training should include reviewing the instruction manual, how to inspect the tools before each use, and following the manufacturer's maintenance schedule.

Hazards

When using hand power tools over and over every day, you can injure your hand, wrist, or arm. This can occur if you hold a tool tightly for a long period of time or keep twisting the handle. Painful problems that could hinder your ability to use tools properly could include carpal tunnel syndrome, trigger finger, and white finger.

Selecting The Best Tool For The Job

Use the right tool for the job. Wrenches are not hammers. Knives are not screwdrivers.

- Wrenches should not be used when the jaws are sprung to the point that slippage occurs.
- Impact tools should be kept free of mushroomed heads. (Mushroomed head occurs when the head of the tool is flared out due to excessive use. This is dangerous, as pieces can fly off and cause injury.)
- Wooden handles on tools should be kept free of splinters and cracks and should not be used if they become loose.
- Look for a tool that needs less force when using it. For jobs that do not require heavier tools, look for a tool that weighs less and puts less stress on your hand.
- Look for a tool that is balanced and doesn't tip forward or backward when held.
- Look at the handle: it should be comfortable in your hand — not too thick, too small, or too short. It should be easy to use with your right and your left hand and the tool handle should not conduct electricity or heat. (Working with a cold handle can make some repetitive stress injuries worse.) The handle should not hurt your hand when you hold tight. You do not want sharp edges or finger grooves. If available, get a non-slip handle with a cover made of soft materials. Ridges on a handle can hurt your hand. If you need to use a lot of force on the job, the handle should be long enough for your whole hand — not just your fingers (you want a "power grip," not just a "pinch grip"). You can use a long handle as a lever to add to the force of a tool and reduce the stress on your hand. Consider using a larger handle if you will be wearing gloves while using the tool. For some tools, the handle should have a spring return; this re-opens the tool for you after you use it.
- If appropriate for the job, a bent angle or adjustable angle on some tools can help you keep your wrist straight. When you work overhead, you may need different tools that allow the wrist to be kept straight. You may want to get a rubber or plastic sleeve for the handle to make it safer.
- A power tool should have a long trigger that allows use of more than one finger at a time.
- Get a power tool with reduced vibration and noise levels. Too much vibration can damage the nerves in your hand and cause "white finger." If a tool vibrates, you have to grip it harder which can hurt your muscles.
- If more than one person will use a tool, try to find one that's comfortable for everyone to hold. You may need different tools for left-handed and right-handed workers and for workers with varying hand sizes.

- Try not to use tools with your wrist bent. An ergonomically designed tool with a curved handle may let you keep your wrist straight. If a tool stand is provided, use it to support the weight of the tool to minimize awkward postures.

Always use a power tool when you can. A power tool can cut the wear on your hand. Always try to rest your hands during the day. Even a perfect tool can hurt you if you use it over and over. Lay down the tool or put it in a holster when you don't need it.

Tool Inspection And Other Considerations

Employers are responsible for the safe condition of all tools in the workplace, including those furnished by their employees. Employers must ensure that maintenance of power tools is performed on a regular basis and according to the manufacturer's specifications. A written preventative maintenance program is the best solution for managing these responsibilities.

When maintaining and inspecting power tools, keep the following tips in mind:

- Check the power switch to ensure that it is OFF prior to plugging the tool in.
- Use properly sized fittings and parts for the power tools.
- When you use a hand tool, keep the tool sharp and in good condition. Keep tool cutting edges sharp and clean. This can help decrease the force you must use on the tool — and reduce the stress on your hands and wrists.
- Remove the adjustment keys and tools before operating the power tool.
- Always use safety guards and control switches to prevent accidental contact and activation. Failure to use all safety guards and devices can result in serious injury and substantial financial liability for employers.
- Damaged electrical power tools must be removed from service immediately and tagged "Do not use". Remember that the employer is ultimately responsible for seeing that defective tools are removed from the job site, replaced, and/or repaired.
- Safe electrical work practices for power tools prevent electric shock and other injuries.
- Follow these electrical safety rules:
- All electric tools must be double insulated or grounded with a grounding prong. If the prong is missing, do not use the tool.
- Electric cords must never be used for hoisting, lowering, or carrying tools. Replace cords that have damaged insulation.
- Do not cover damage with electrical tape.
- Check that power cords are intact (no nicks, frays, or kinks) to prevent shock and fire hazard.
- Keep tools turned off and unplugged when not in use.
- Unplug tools at the outlet, not by pulling the cord from the wall.
- Coil power cords out of walkways to prevent trips and falls.
- Avoid using power cords in wet areas.

Pneumatic Tools

- All pneumatic tools must be secured to the air supply hose or whip to prevent disconnecting.
- Never carry tools by the hose.
- Clips or retainers must secure all attachments used on these tools to prevent them from being expelled from the tool.
- A muzzle safety must be used on pneumatic nailers or staplers when they operate at or above 100 pounds per square inch (PSI) to prevent the tool from activating unless it is in contact with the work surface.
- Do not tie safety triggers back to facilitate fast application.
- Compressed air should not be used for cleaning purposes except where pressure is reduced to less than 30 PSI, and then only with effective chip guarding and personal protective equipment.

Fuel-Powered Tools

- Proper fueling procedures, including equipment shutdown, must be followed when using fuel-powered tools.
- Adequate ventilation and personal protective equipment must be used in order to protect employees from toxic fumes given off by this type of equipment.

Hydraulic Tools

- All fluids used in hydraulic tools must be fire resistant.
- All manufacturers' operating procedures must be followed.

Explosive-Actuated Fastening Tools

- All operators must be trained in the use of these tools.
- Conduct daily tests to verify that all safety devices are working.
- Operators must always use the correct shield or guard for the tool and wear the proper protective equipment.
- Defective tools must be removed from service immediately. Tools must never be loaded until just before use.
- Never point a tool at a person.
- Never leave a loaded tool unattended.
- Never use a tool in an explosive or flammable environment.
- These tools must never be used on very hard or brittle materials such as cast iron. When working with soft materials, use a backing to avoid over-penetration.

Abrasive Wheel Tools

- When you are using abrasive wheel tools make sure all proper guards are in place and correctly adjusted.
- Adjust tool work rests so that the maximum clearance between the rest and the wheel does not exceed 1/8 inch.
- Wear sufficient eye protection for the job.
- Make sure the wheel is rated for the speed of the motor. Inspect wheels for defects using the "ring test." Hold the wheel with one finger through the center hole and strike it with a wooden or hard plastic screwdriver handle at a point 45 degrees from the vertical centerline and between one or two inches from the outer rim. A wheel in good condition will give a clear, metallic ring; a wheel that is damaged will not.

Switches

The following hand-held tools may be equipped with only a positive on/ off switch:

- Platen sanders
- Disc sanders
- Grinders with wheels that are two inches or less in diameter
- Routers, planers
- Laminate trimmers
- Shears
- Scroll, saber, or jig saws with blade shanks that are 1/4 inch wide or less

All other tools must be equipped with a spring-loaded switch that turns off when finger pressure is released.

Bench and Floor-Mounted Power Tools - Guarding

- All exposed belts, chains, gears, drums, flywheels, and any other reciprocating or moving parts must be guarded.
- Machine guards such as barrier guards, proximity sensors, or two-handed tripping devices must be in place when any machine is in use.
- Guards must also be provided to protect employees from flying chips, sparks, abrasives, splashing, etc.
- Ventilation fans must be guarded unless they are at least seven feet above the floor. Fan guards must have maximum openings no larger than 1/2 inch.
- The point of operation, where work is actually performed or material is processed, shall be guarded if it exposes an employee to injury. Some examples of machines requiring this type of guarding are shears, alligator cutters, power presses, milling machines, forming rollers, and calendars.
- All machines at a fixed location must be securely anchored to prevent walking or moving by contact.

Woodworking Tools

- All woodworking tools must have a disconnect switch that can either be locked or tagged out in the OFF position.
- All circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute must be etched or otherwise permanently marked with the correct operating speed.
- All circular saws must be guarded above and below the base plate and the shoe.
- Guards must immediately return to the covering position at the end of the cut.
- Radial saws must have the upper portion of the blade, including the saw arbor, completely enclosed by a hood. The full diameter of the lower exposed portion of the blade must be guarded. The guarding device must automatically adjust itself to the thickness of the stock and remain in contact with the stock during the cut. The portion of a circular, hand-fed ripsaw above the material being cut must be completely enclosed by a hood.

Work Area

Good work habits ensure power tool safety, which also includes housekeeping and safe work practices. Please keep in mind the following:

- Use the correct tool for the job.
- Keep the work area clean, organized, and well lit.
- Stay alert when you use power tools.
- Be aware of where you place your hands at all times, and keep them away from moving parts.
- Tie back hair, wear snug clothing, and remove jewelry that could get caught in tools. Items such as rings, jewelry, or loose clothing should not be worn when operating power tools.
- Clamp, secure, and support work materials to a solid surface.
- Do not hold materials by hand or against your body while working on them.
- While working on scaffolds or ladders, rest the power tool in a bin that is secured to the ladder and/or rest it on a flat surface.
- Let tools power up completely before contact with stock material.
- Do not touch tool parts until they come to a complete stop and are completely cool.
- Do not force the tool against the material or to do the work.
- Use vises and clamps to hold small objects.
- Store unused tools in a clean, dry place.

Personal Protective Equipment

Power tools may send bits of material falling, flying, or even splashing at a very fast rate. Personal Protective Equipment needed when using power tools includes:

- Clothing that is well fitted - no dangling or ragged edges
- Safety glasses and/or face shields to protect the eyes and face from flying debris
- Goggles to keep splashing liquids out of the eyes
- Hearing protection to minimize exposure to noisy tools
- A respirator to protect against inhaling fumes and particulates
- Snug-fitting gloves
- Anti-vibration gloves to prevent tissue damage from vibrating tools
- Safety shoes to protect feet from falling materials and tools

One tool cannot do all jobs. Using a tool for a job it was not designed for can increase the difficulty of the job. Although many tools available in stores are labeled as “ergonomic” tools, you are the one who can tell if a tool is comfortable and easy to use.

How you use a tool is as important as which tool you use. The proper power tool can help improve productivity and ensure the job gets completed correctly. Using a power tool can make your work go more smoothly and easily. With good training, proper maintenance, and safe work habits, power tools boost work efficiency while maintaining worker safety.