



CONN-OSHA Quarterly

CONNECTICUT DEPARTMENT of LABOR DIVISION of OCCUPATIONAL SAFETY and HEALTH

What is the most misused tool in a tool box?

By Jeff Carter-Occupational Safety Consultant

After the last cup of Saturday morning coffee you decide you can't put off painting the door any longer. It's easier to paint it off the jam so you reach into your tool box for a slotted No. 8 screwdriver and a 16 ounce hammer. With numerous blows from the hammer you use the screw driver to drive the pins from the hinges and lay the door on saw horses. The hinge plates were painted filling the screw slots with paint. Not to worry. Again, with the aid of the hammer and screw driver you clean the paint from the slots of nine No. 10 screws. The paint can lid is liberated from the can with the screwdriver and without a stick in sight the same tool is used to stir the paint. Knowing the value of a good tool, you wipe the screw driver clean of wet paint.

Is there any wonder when you try to drive the nine No. 10 screws with the No. 8 screwdriver it slips from the slot and buries itself in the palm of the hand? Being criticized for scratching the newly painted door is almost as painful.

1910.242, the general requirements for hand and portable powered tools and equipment states, in part, it is the employer's responsibility for the safe condition of tools and equipment, including those furnished by employees. This requirement includes the condition of the above mentioned screw driver, as well as the split handle of a hammer or the worn jaws of a pipe wrench that may slip and cause an employee to lose balance and fall from a step ladder.

The shop compressor usually delivers between 120 to 140 pounds per square inch (PSI) to operate equipment or tools used in the shop, but compressed air used for cleaning must be reduced to 30 PSI. High air pressures can deliver particulate such as chips with enough force to imbed in the eyes or lift skin off a person if directed toward an open wound. In fact, cleaning with air is effective due to the volume and speed of the air and not the pressure. A leaf blower used to clean lawns in the fall delivers a large quantity of fast moving air, at just over atmospheric pressure, and is effective enough to blow all the oak leaves into piles. Air pressure can be reduced by regulating it to 30 PSI or by purchasing specifically designed air guns. These guns are sometimes embossed with words such as "30 PSI Max" or some styles of guns can be externally identified by radically drilled holes in the nozzle. The holes allow air to bleed off should the nozzle



come in contact with the body. Beware of taped off holes or nozzles replaced with fittings to allow for extended reach.

Portable circular saws with a blade greater than 2 inches must have the blade guarded above and below the shoe. The lower guard must be self adjusting as the saw is pushed through the material and once through, return automatically and instantly to cover the lower portion of the blade. The saw also needs a constant pressure switch requiring finger pressure to close the switch, and once finger pressure is removed the switch must open shutting off the saw. Gasoline powered chain saws require the same operating means. Powered hand tools such as drills, tappers, fastener drivers, horizontal, vertical and angle grinders with discs greater than 2 inches, and saws without spinning blades; reciprocating, saber, scroll and jig saws must have a constant pressure switch but may be equipped with a lock-on device as long as the device can be disengaged with one motion of the same finger that turned it on.



1910.304(g)(6)(vi)(C)(3) requires all hand-held motor-operated tools to have the noncurrent-carrying metal parts grounded. These tools can be identified by a 3-prong plug with the equipment grounding conductor attached to the metal housing of the tool. The equipment grounding conductor is needed to conduct fault current back to the breaker and open the breaker stopping the flow of current.

Thermal magnetic circuit breakers are found in most distribution centers (breaker boxes). They incorporate an electromagnet which responds instantaneously to large surges in current (short circuits) and a bimetallic strip responding to less extreme but longer-term over-current conditions. The circuit breaker contacts are held closed by a mechanical latch.

If there is a short circuit, such as insulation break down on the ungrounded current carrying conductor (hot wire) the hot wire can come in contact with the tool's metal housing. This creates minimal resistance in the circuit, resulting in a large amount of current flowing through the equipment grounding conductor. The pulling force of the magnet increases proportionally with the current flow. As the current

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in the electromagnet increases beyond the rating of the circuit breaker, the electromagnet's pull overcomes the spring tension. This releases the latch thereby opening the contacts and stopping the flow of current. Circuit breakers are designed to open if an over current of 5 times its handle rating occurs. For a 20 amp breaker, 100 amps are required to open a breaker instantaneously due to a short circuit. "Instantaneously" is defined as one-tenth of a second.

1910.304(g)(5) requires a permanent, continuous and effective path to ground for this reason. Loose connections, broken wires, grounding through the yokes of a duplex outlet in an armored cable installation, or loose or corroded fittings and conduit in an EMT installation may not have the ampacity to flow 5 times the handle rating of fault current.

If the tool has a worn drive train, improperly lubricated bearings, if you are cutting through unusually tough material or the bit or saw blade is dull, the tool may become overloaded. In this case the breaker could open due to less extreme but longer-term over-current conditions. As current flows through the bimetallic strip a small amount of heat is produced. As the current increases so does the heat. The bimetallic strip, composed of two different metals bonded together will expand, but at different rates causing the strip to bend. The strip is attached to a series of levers and latches. When the strip moves the lever far enough it unlocks the spring loaded handle opening the electrical contacts and stopping the current flow.



The only alternative to an equipment grounding conductor is double insulation. Double insulated tools are designed by electrically insulating all current carrying parts from the outer housing. Additional design features include a switch to break the ungrounded current carrying conductor, or the black or hot wire. Because these tools do not have polarized plugs, a double pole switch is utilized to open both conductors simultaneously.

Generally, portable grinding wheels are guarded unless they are 2 inches or smaller in diameter, are cone, plug, or threaded hole pot balls, or if the wheel is used for internal work and the work offers protection. Internal work does not mean a welder inside a vessel using an angle grinder grinding out the root pass of the weld. In this case the worker is not protected from an exploding wheel. The guard must protect the spindle end, nut and outer flange unless depressed center grinding wheels such as Type 6, 11, 27 and 28 are used, or where the work provides a suitable measure of protection. Regardless of specific guarding requirements, the employer's hazard assessment required by 1910.132(d) should require the use of eye protection.

A Powder-actuated tool, often called a "Hilti" or "Ramset" is a nail gun used in construction and manufacturing to join materials to hard substrates such as steel and concrete.

Powder-actuated technology was developed during the Second World War when high velocity fastening systems were used to temporarily repair damage to ships. In the case of hull breach, these tools fastened steel plates over damaged areas.

Powder-actuated tools come in either low velocity or high velocity types. Low velocity tools introduce a piston into the chamber. The propellant acts on the piston, which then drives the fastener into the substrate. A powder-actuated tool is considered low velocity if the average test velocity of the fastener does not exceed 492 feet per second. In high velocity tools the propellant acts directly on the fastener. Although high velocity tools may not be made or sold in the United States, some are still used in shipbuilding.

Operators and assistants must wear eye protection. Head and face protection is used based on working conditions.

On low velocity tools, spall shields shall be provided by the manufacturer. The tool will be designed to prevent accidental discharge and require two separate and distinct operations by the operator to fire the tool. The power of the tool can be varied generally by choosing loads of increasing power identified by color coding. The color coding is standardized throughout the industry.

Low velocity tool load are limited to 300 feet per second

Powder Load Identification

POWER LEVEL	LOAD COLOR	
1	GRAY	LOWER POWER  HIGHER POWER
2	BROWN	
3	GREEN	
4	YELLOW	
5	RED	
6	PURPLE	

fastener speed measured at 6.5 feet from the muzzle.

Before and during use the operator must inspect the tool, and if found defective, cease to use it. Tools are not loaded until use, and shall not be unattended while loaded. In case of a misfire the tool must be held in the operating position for 30 seconds or more should there be a delayed firing. Do not fire into very brittle or soft materials, or closer than 3 inches from the edge of the material as it may break away from the material and ricochet. Do not attempt to fire into spalled material caused by an unsuccessful fastening. Never use this tool in an explosive or flammable atmosphere.

So, what is the most misused tool in your tool box?

Connecticut Department of Labor - OSHA 38 Wolcott Hill Road Wethersfield, CT 06109	To receive the <i>Quarterly</i> electronically, contact gregory.grayson@dol.gov . In the subject line type "subscribe" and provide your e-mail address. You may also reach us by phone at (860) 263-6900 or visit our website at http://www.ctdol.state.ct.us/osha/osha.htm
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CONN-OSHA has a new Consultation Manager... James H. Pierce



James joined the State of Connecticut Department of Labor Division of Occupational Safety and Health (CONN-OSHA) family in 1992 as an occupational hygienist and for 18 years he served both the private sector and the public sector as an industrial hygienist. In addition to his duties as an Occupational Health Consultant, James has represented CONN-OSHA in various endeavors that involved other state agencies such as the Connecticut Department of Environmental Protection, the Connecticut Department of Public Health, Homeland Security, and the Connecticut Department of Agriculture.

He received a Bachelor's Degree majoring in environmental biology with a minor in chemistry from Eastern Connecticut State University.

In his new position, James will act as the private sector consultation manager. We congratulate him on his promotion, it is well deserved.



Pneumatic Nail Gun Safety Tips

Nail guns drive nails and staples into building materials. Injuries or fatalities can result from improper use.

Hazards

The operator and coworkers are at risk. Eyes, hands and fingers are especially at risk. Nails can:

- Splinter or blow out fragments from the material.
- Puncture the back of the material.
- Fire completely through the material and strike workers behind the nailing surface.
- Pose contact hazards, such as nails striking electrical wires.

Common Tool Types

Sequential tools: Require nose (workpiece contact) to be depressed before the trigger is pulled.

- Two-step sequence makes accidental firing less likely.
- Can be used for most nailing tasks.

Contact tools: Tool fires anytime the trigger and nose (workpiece contact) are both depressed.

- Trigger can be held down to allow "bump firing".
- Use for nailing on flat surfaces.

CAUTION:

- If trigger is depressed, the tool will fire anytime the nose is depressed; can also cause unwanted double firing of nails.

Safe Work Practices and PPE

- Follow manufacturer's tool labels and operating manual.
- Wear safety glasses with side shields.
- Never defeat or modify safety features.
- Keep fingers away from trigger when not driving nails.
- Sequential tools have reduced risk of accidental and double firing.
- Avoid line of fire hazards in front of and behind material; position yourself (especially your free hand) out of the line of fire. Never point nail gun at anyone. Watch for coworkers behind the nailing surface.
- Disconnect the gun to perform maintenance, move to another work area, or clear jams.
- Train on safe operating procedures, proper body placement and correct PPE use.
- NOTE: The tool must meet applicable OSHA guarding standards.



OSHA 3863-4-09

Hazard Corner...

A Power Drill CAN Kill

Ellen Burgum, Occupational Safety Officer

A young father of two was working on HVAC equipment one night when he was fatally electrocuted by a faulty power drill. The hazardous condition could not be seen; it was hidden within the metal casing of the Craftsman electric drill. During the fatality investigation, close examination discovered the hazardous condition. The metal encased Craftsman drill had been modified with a 19-foot replacement cord with a two-prong plug. Inside the drill, a frayed bare wire was against the metal casing. The metal casing became energized and, without an equipment ground in place, the electricity followed the path of least resistance to ground. The electrical current entered the worker's hand and came out his foot to meet the ground on which he stood.

What went wrong? The replacement of the cord and plug! This change, which was unknown to the HVAC worker, left the power tool without an equipment ground. Had this power tool been equipped with an equipment

ground, this father would have gone home to his two young children that night.

There are still old drills with metal housing and original cords in use. When they were made, manufacturers were not required to provide an equipment ground, so they will have a two-prong plug. While that two-prong will fit into a grounded polarized outlet, the hazard is still there. Discard them: the risk to your or someone else's life is too great.



CONNECTICUT-OSHA ~ Training Update...

Safe Driving May 25, 2010 The goal of this session is to increase awareness of the need for and the benefits of safe driving. The focus of this session will be on the four skills that experts feel have the most promise of preventing crashes if implemented. This class will be held from 10:00 am—12 noon

Trenching & Excavation Safety May 27, 2010 This workshop will provide an overview of 29 CFR 1926.650-652 excavations, including the role of the competent person. The session is designed to assist participants in identifying hazards associated with excavations and related activities. This class will be held from 10am-12 noon.

Powered Industrial Trucks July 13, 2010 This workshop includes the basic requirements of the OSHA 29 CFR 1910.178 Powered Industrial Truck Standard which affects both General Industry and Construction material handling operations. This class will be held from 10 am-12 noon.

Construction Site Safety July 30, 2010 Construction managers, first line supervisors, and construction employees will be provided with an overview of four areas of concern on the construction site. Program contents include: fall protection, scaffolding and ladders, electrical hazards, and trenching safety. This class will be held from 9:00 am—12 noon

Breakfast Roundtable This discussion group meets the third Tuesday of every month from 8:15 am to 9:45 am. Pre-registration is required. To be placed on the e-mail distribution list, contact John Able at able.john@dol.gov

Classes are free and held at 200 Folly Brook Boulevard, Wethersfield, CT in Conference Room A/B. To register, contact John Able at able.john@dol.gov or Catherine Zinsser at zinsser.catherine@dol.gov. **Pre-registration is required.** A Photo I.D. is required to allow entry into a public building. For more training information, visit the CONN-OSHA web site www.ctdol.state.ct.us/osha/osha.htm

Fatality & Casualty Reporting

State & Town: CONN-OSHA (860) 263-6946 (local) or 1-866-241-4060 (toll-free)
Private Employers: Report to Federal OSHA at 1-800-321-OSHA(6742)