Hand and Power Tools Oil and Gas



WHAT'S AT STAKE?

There are a broad range of hand and power tools that exactly meet the requirements of the oil and gas rigorous industry applications. These tools are a common part of our lives but still pose hazards and dangers.

WHAT'S THE DANGER?

Hand Tools – Hazards

Hand tools are powered manually. Hand tools include anything from axes to wrenches. The greatest hazards posed by hand tools result from misuse and improper maintenance.
Examples:

- 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.

Power Tools – Hazards

A. Electric

Employees using electric tools must be aware of several dangers. Among the most serious hazards are **electrical burns and shocks.**

Electrical shocks, which can lead to injuries such as heart failure and burns, are among the major hazards associated with electric-powered tools. Under certain conditions, even a small amount of electric current can result in fibrillation of the heart and death. An electric shock also can cause the user to fall off a ladder or other elevated work surface and be injured due to the fall.

B. Hydraulic

Hydraulic tools use pressurized fluid to generate force. Jacks are the most common example of hydraulic tool. Employees should always take care to select the proper type of fluid for a hydraulic tool.

C. Portable Abrasive Wheel Tools

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

D. Liquid

Fuel-powered tools are usually operated with gasoline. The most serious hazard associated with the use of fuel-powered tools comes from fuel vapors that can burn or explode and also give off dangerous exhaust fumes. The worker must be careful to handle, transport, and store gas or fuel only in approved flammable liquid containers.

E. Pneumatic

Pneumatic tools are powered by compressed air and include chippers, drills, hammers, and sanders.
There are **several dangers** associated with the use of pneumatic tools. First and foremost is the danger of getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool.

F. Powder – Actuated

Powder-actuated tools operate like a loaded gun and must be treated with extreme caution. In fact, they are so dangerous that they must be operated only by specially trained employees.

HOW TO PROTECT YOURSELF

General

Five basic safety rules can help prevent hazards associated with the **use of hand and power tools:**

- Keep all tools in good condition with regular maintenance.
- Use the right tool for the job.
- Examine each tool for damage before use and do not use damaged tools.
- Operate tools according to the manufacturers' instructions.
- Provide and use properly the right personal protective equipment.

Employees and employers should work together to establish safe working procedures. If a hazardous situation is encountered, it should be brought immediately to the attention of the proper individual for hazard abatement. Employees who use **hand and power tools** and are exposed to the hazards of falling, flying, abrasive, and splashing objects, as to harmful fumes, mists, vapors, or gases must be provided with the appropriate personal protective equipment.

Employees should be trained in the proper use of all tools. Workers should be able to recognize the hazards associated with the different types of tools and

the necessary safety precautions.

General Prevention – Hand Tools

Employees should be trained in the proper use and handling of tools and equipment.

Employees, when using saw blades, knives, or other tools, should direct the tools away from aisle areas and away from other employees working in close proximity. Knives and scissors must be sharp; dull tools can cause more hazards than sharp ones. Cracked saw blades must be removed from service.

Wrenches must not be used when jaws are sprung to the point that slippage occurs. Impact tools such as drift pins, wedges, and chisels must be kept free of mushroomed heads. The wooden handles of tools must not be splintered.

Iron or steel hand tools may produce sparks that can be an ignition source around flammable substances. Where this hazard exists, spark-resistant tools made of non-ferrous materials should be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used.

More Prevention:

- Appropriate personal protective equipment such as safety goggles and gloves must be worn to protect against hazards that may be encountered while using hand tools.
- Workplace floors shall be kept as clean and dry as possible to prevent accidental slips with or around dangerous hand tools.
- The employer is responsible for the safe condition of tools and equipment used by employees. Employers shall not issue or permit the use of unsafe hand tools.

General Prevention – Power Tools

Power tools are extremely dangerous when used improperly or not maintained on a regular and consistent basis. If not done, life threatening injuries and even death can result.

To prevent hazards associated with the use of **power tools,** workers should observe the following **general precautions:**

- 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.
- Wear proper apparel for the task. Loose clothing, ties, or jewelry can become caught in moving parts.
- Remove all damaged portable electric tools from use and tag them: “Do Not Use.”

Specific Prevention – Power Tools

A. Guards

The exposed moving parts of power tools need to be safeguarded. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded.

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.

B. Electric

To protect the user from **shock and burns**, **electric tools** must have a three-wire cord with a ground and be plugged into a grounded receptacle, be double insulated, or be powered by a low-voltage isolation transformer. Three-wire cords contain two current-carrying conductors and a grounding conductor. Any time an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground. The third prong must never be removed from the plug.

Double-insulated tools are available that provide protection against electrical shock without third-wire grounding. On double-insulated tools, an internal layer of protective insulation completely isolates the external housing of the tool.

The following general practices should be followed when using electric tools:

- Operate electric tools within their design limitations.
- Use gloves and appropriate safety footwear when using electric tools.
- Store electric tools in a dry place when not in use.
- Do not use electric tools in damp or wet locations unless they are approved for that purpose.
- Keep work areas well lighted when operating electric tools.
- Ensure that cords from electric tools do not present a tripping hazard.

C. Hydraulic

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.

All jacks including lever and ratchet jacks, screw jacks, and hydraulic jacks must have a stop indicator, and the stop limit must not be exceeded. Also, the manufacturer’s load limit must be permanently marked in a prominent place on the

jack, and the load limit must not be exceeded.

Proper maintenance of jacks is essential for safety. All jacks must be lubricated regularly. In addition, each jack must be inspected according to the following schedule: (1) for jacks used continuously or intermittently at one site inspected at least once every 6 months, (2) for jacks sent out of the shop for special work inspected when sent out and inspected when returned, and (3) for jacks subjected to abnormal loads or shock inspected before use and immediately thereafter.

D. Portable Abrasive Wheel Tools

Abrasive wheel tools must be equipped with guards that: (1) cover the spindle end, nut, and flange projections; (2) maintain proper alignment with the wheel; and (3) do not exceed the strength of the fastenings.

Before an abrasive wheel is mounted, it must be inspected closely for damage and should be sound- or ring-tested to ensure that it is free from cracks or defects. To test, wheels should be tapped gently with a light, non-metallic instrument. If the wheels sound cracked or dead, they must not be used because they could fly apart in operation. A stable and undamaged wheel, when tapped, will give a clear metallic tone or “ring.”

An abrasive wheel may disintegrate or explode during start-up. Allow the tool to come up to operating speed prior to grinding or cutting. The employee should never stand in the plane of rotation of the wheel as it accelerates to full operating speed. Portable grinding tools need to be equipped with safety guards to protect workers not only from the moving wheel surface, but also from flying fragments in case of wheel breakage.

E. Liquid Powered

Before refilling a **fuel-powered tool** tank, the user must shut down the engine and allow it to cool to prevent accidental ignition of hazardous vapors. When a fuel-powered tool is used inside a closed area, effective ventilation and/or proper respirators such as atmosphere-supplying respirators must be utilized to avoid breathing carbon monoxide. Fire extinguishers must also be available in the area.

F. Pneumatic

Pneumatic tools must be checked to see that the tools are fastened securely to the air hose to prevent them from becoming disconnected. A short wire or positive locking device attaching the air hose to the tool must also be used and will serve as an added safeguard.

In general, the same precautions should be taken with an air hose that are recommended for electric cords, because the hose is subject to the same kind of damage or accidental striking, and because it also presents tripping hazards.

When using pneumatic tools, a safety clip or retainer must be installed to prevent attachments such as chisels on a chipping hammer from being ejected during tool operation.

Pneumatic tools that shoot nails, rivets, staples, or similar fasteners and

operate at pressures more than 100 pounds per square inch (6,890 kPa), must be equipped with a special device to keep fasteners from being ejected, unless the muzzle is pressed against the work surface.

Airless spray guns that atomize paints and fluids at pressures of 1,000 pounds or more per square inch (6,890 kPa) must be equipped with automatic or visible manual safety devices that will prevent pulling the trigger until the safety device is manually released.

Eye protection is required, and head and face protection is recommended for employees working with pneumatic tools.

Screens must also be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.

Compressed air guns should never be pointed toward anyone.
Use of heavy jackhammers can cause fatigue and strains. Heavy rubber grips reduce these effects by providing a secure handhold. Workers operating a jackhammer must wear safety glasses and safety shoes that protect them against injury if the jackhammer slips or falls. A face shield also should be used.

Working with noisy tools such as jackhammers requires proper, effective use of appropriate hearing protection.

G. Powder – Actuated

When using **powder-actuated tools**, an employee must wear suitable ear, eye, and face protection. The user must select a powder level high or low velocity that is appropriate for the powder-actuated tool and necessary to do the work without excessive force.

The muzzle end of the tool must have a protective shield or guard centered perpendicular to and concentric with the barrel to confine any fragments or particles that are projected when the tool is fired. A tool containing a high-velocity load must be designed not to fire unless it has this kind of safety device.

Safety precautions that must be followed when using powder-actuated tools include the following:

- Do not use a tool in an explosive or flammable atmosphere.
- Inspect the tool before using it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions and has the proper shield, guard, and attachments recommended by the manufacturer.
- Do not load the tool unless it is to be used immediately.
- Do not leave a loaded tool unattended, especially where it would be available to unauthorized persons.
- Keep hands clear of the barrel end.
- Never point the tool at anyone.

When using powder-actuated tools to apply fasteners, several additional procedures must be followed:

- Do not fire fasteners into material that would allow the fasteners to pass

through to the other side.
- Do not drive fasteners into very hard or brittle material that might chip or splatter or make the fasteners ricochet.
- Always use an alignment guide when shooting fasteners into existing holes.
- When using a high-velocity tool, do not drive fasteners more than 3 inches (7.62 centimeters) from an unsupported edge or corner of material such as brick or concrete.
- When using a high velocity tool, do not place fasteners in steel any closer than 1/2-inch (1.27 centimeters) from an unsupported corner edge unless a special guard, fixture, or jig is used.

FINAL WORD

While hand and power tools can be dangerous, the majority of these injuries are caused by careless use or improper maintenance. With proper training, inspection and maintenance schedules, you can reduce the risk of tool-related injuries in your workplace.