Hand and Power Tool Safety 145

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Class Outline

Objectives
The Importance of Hand and Power Tool Safety
Hand and Power Tool Basics
Worksite Organization
Tool Maintenance and Handling
Personal Protective Equipment
Point of Operation Safety
Hand Tool Safety
Electric Tool Safety
Abrasive Wheel Tool Safety
Pneumatic Tool Safety
Fuel and Hydraulic Tool Safety
Powder Tool Safety
What Is Ergonomics?
The Importance of Good Posture
Repetition/Force/Vibration
Summary

Lesson: 1/17

Objectives

- Describe general guidelines for hand and power tool safety.
- Describe important hand and power tool basics.
- Describe the characteristics of a well-organized worksite.
- Describe correct steps for proper tool maintenance and handling.
- Identify personal protective equipment for using hand and power tools.
- Describe safety procedures for point of operation safety.
- Describe general guidelines for proper hand tool safety.
- Describe general guidelines for proper electric tool safety.
- Describe general guidelines for proper abrasive wheel tool safety.
- Describe general guidelines for proper pneumatic tool safety.
- Describe general guidelines for proper fuel and hydraulic tool safety.
- Describe general guidelines for powder tool safety.
- Describe ergonomics.
- Describe the importance of good posture.
- Describe the safety risks involved with tasks that require repetition, force, or vibration.

Figure 1. One of the most important rules to remember for hand tool safety is to use the right tool for the job.

Figure 2. All bladed tools must be kept clean and sharp.

Lesson: 2/17

The Importance of Hand and Power Tool Safety

Hand tools and **power tools**, shown in Figures 1 and 2, are common in any workplace and even in most homes. In fact, these types of tools are so common that we tend to forget they can pose safety hazards. However, it is important to know the proper safety precautions so that accidents can be avoided.

For starters, you must not operate power tools when you are ill, taking strong medications, or fatigued. Never smoke, take drugs, or consume alcohol when working with hand tools. Likewise, when working with hand or power tools, you must focus on the task at hand and avoid distractions. Avoid loud talking, running, or pushing in the work area. If you are distracted or called away from your task, stop operating the tool and do not leave it unattended.

OSHA sets forth the regulations for working with hand and power tools in 29 CFR 1910 OSHA General Industry Guidelines, shown in Figure 3. Employers and employees must work together to establish a safe working environment. This class discusses the safety risks and precautions necessary for working with hand and power tools. Even if some of these safety steps seem like common sense, it is important to review them.

Figure 1. Examples of common hand tools.

Figure 2. These power screwdrivers are examples of common power tools.

Figure 3. OSHA's requirements for hand and power tools are part of the General Industry Standard.

Lesson: 3/17

Hand and Power Tool Basics

As with any task, before you begin working, you must be familiar with the tool you are using as well as the workpiece material. Before using any power tool, consult the owner's manual. Figure 1 shows an example of a circular saw with its manual. Use the owner's manual to familiarize yourself with the location of the controls, as well as the capacity of the tool. Use the tool at its appropriate speed and capacity only. For example, if the power tool you are working with may not be used on certain workpiece materials or certain thicknesses, use the tool only within its limitations. Some tools come with charts and booklets like the one shown in Figure 2. These resources help to identify the settings of the tool you use for different workpiece materials. Make sure the tool is at its operating speed before you use it, and allow it to coast to a stop before storing. Never force a tool by applying too much pressure.

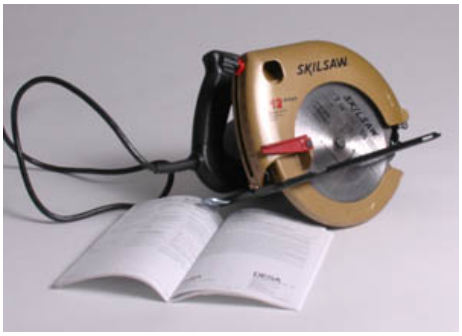

Figure 1. The owner's manual is a good starting place for learning about the tool.

You must also know about your workpiece material. If you are working with a **powder tool** or a **pneumatic tool**, such as a nail gun or staple gun, make sure that the fastener does not pass through the base component and exit through the other side. When working with workpiece materials that are too hard or brittle, the fasteners could possibly cause the workpiece to chip or shatter. These materials may also cause fasteners to **ricochet**.

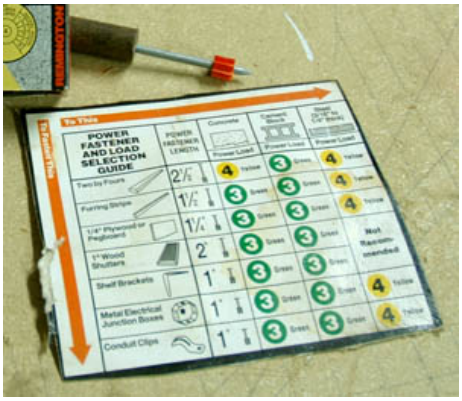

Figure 2. This chart is a helpful reference for determining tool settings according to the workpiece material.

Above all, always use the right tool for the application. Using the wrong tool for a given application could ruin the workpiece or tool, and it can even cause injury.

Lesson: 4/17

Worksite Organization

The way your workspace is organized is one of the key variables for working in a safe environment. You must be aware of your surroundings at all times. Before you begin working, you must ensure that you know the proper use and location of the **hand wash stations** and **eye wash stations**. Figure 1 shows an example of a common hand wash station. If you are unsure of your environment or if there appears to be a safety hazard, notify your supervisor. An organized work area is one of the most important factors for hand and power tool safety.

As shown in Figure 2, your workspace must be well-lit, and there must be a clear path surrounding each workstation so that employees can walk through the area without obstruction. The floor of the workplace must be kept clean and dry to prevent anyone from slipping. Always clean and put away all unneeded tools and materials. Keep cords and hoses away from heat, oil, and sharp edges. Make sure that there are no cords in any walkways. Tools must be stored in their proper place and unplugged to avoid unintentional starting.

As you are working, do not stand directly behind the tool. Remember that bystanders should remain at a safe distance from the work area. If necessary, you may need **safety screens** or **fire shields** to protect bystanders from flying debris or sparks, as shown in Figure 3. Also, if the tool you are using emits **fume** or dust, your work area must be properly ventilated.

Figure 1. Employees must know the location and proper use of the hand and eye wash stations.

Figure 2. Work areas must be organized, and walkways must be free from obstruction.

Figure 3. Fire shields are necessary to protect bystanders from applications that emit sparks.

Lesson: 5/17

Tool Maintenance and Handling

Your employer is responsible for providing you with safe tools. However, you also play a key role in tool maintenance and safety. Keep all tools clean and in good condition with regular maintenance. All blades must be sharp. For example, a dull blade on a utility knife such as the one shown in Figure 1, is less safe to work with than a sharp blade. Figure 2 shows bladed tools that have been well-maintained. Many shops have a **tool crib** or **tool room**, such as the one shown in Figure 3, where approved personnel repair, clean, and lubricate hand and power tools.

Never use damaged tools. Examine each tool for damage, such as broken, loose, or dull parts. If a tool is under **lockout** or **tagout**, do not try to operate it. Figure 4 shows an example of a device that is under lockout. Tampering with a tool or machine that has been locked out can put you, as well as the repair technician, in danger. Only approved maintenance personnel may repair locked out or tagged out tools. If you are approved to perform maintenance on a power tool, make sure it is unplugged first.

As you carry tools, use a tight grip. Make sure that all blades are secured, and if unguarded, pointing down. Never carry a power tool by the cord or hose. Never hold a finger on the switch button as you carry the tool. If you must carry tools to an elevated position, such as up ladders or stairs, you must observe the proper precautions. Rest power tools on a flat surface or in a bin secured to the ladder or **scaffolding**.

As you work, workpieces should be secured with clamps or a vise. This allows both hands to be free for operating the tool. For example, when using a saw, you must use both hands to hold and guide the device.

Figure 1. Using a dull blade like this one is a safety risk.

Figure 2. All bladed tools must be kept clean and sharp.

Figure 3. Tool cribs are usually the site of tool maintenance and repair.

Figure 4. Only trained technicians may service tools that are under lockout or tagout.

Lesson: 6/17

Personal Protective Equipment

As always, **personal protective equipment** (PPE) is an integral part of accident prevention. First, any application requires you to wear approved eye protection like the examples in Figure 1. You must also wear the appropriate clothing that prevents safety risks for your application.

For most hand and power tool applications, you must avoid wearing loose, baggy clothing or open-toed shoes. It is always preferable to wear hard-toed shoes with non-skid soles. Most applications require you not to wear gloves, since there is the risk of getting them caught in the **point of operation**. Long hair must be pulled back and secured in a cap. Some applications require you to wear a **hard hat** such as the one shown in Figure 2, or a **face shield**. If your application emits dust, debris, or fumes, you must also wear a **respirator** or breathing mask. Some applications with hand or power tools pose a hearing hazard. In that case, you must wear **earplugs** or **earmuffs**. Figure 3 shows an example of a common type of disposable earplugs. Lastly, do not wear any jewelry when working with hand and power tools.

If you are working on an application that poses a fire hazard, avoid wearing loose, baggy clothing, or anything that is highly **flammable**. To protect against burns, wear coveralls, high-top shoes, leather aprons, and leather gloves. Avoid wearing synthetic clothing or anything that a spark can ignite.

Figure 1. It is mandatory to wear protective eyewear in most work areas.

Figure 2. Some working environments require all employees to wear hard hats.

Figure 3. These disposable ear plugs are worn to protect hearing.

Lesson: 7/17

Point of Operation Safety

As illustrated in Figure 1, the **point of operation** is the point at which the tool encounters the workpiece. A **pinch point** is any place where two components meet that can cause an injury if you come into contact with the area. Never place anything in the path of the tool, and keep hands, hair, and clothing away from the point of operation and pinch points.

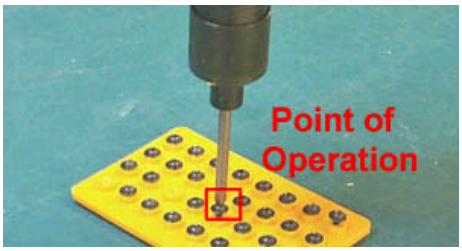

Figure 1. The point of operation is the point at which the tool contacts the workpiece.

OSHA regulates the industry standards for guarding the point of operation on different tools. Power tools with hazardous moving parts need to be safeguarded. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if employees are exposed to contact. For example, many types of saws are required to have guards above and below the **base plate** or **shoe**. An upper guard must cover the entire blade of the saw, while a retractable lower guard must cover the teeth of the saw, except when it makes contact with the work material. When the tool is released from the workpiece, the lower guard must automatically return to its original position. Figure 2 shows how the blade of the circular saw is protected with a safety guard. Never remove a safety guard while the tool is in use.

Figure 2. Safety guards must never be removed while a tool is in use.

OSHA also requires many different types of hand-held tools to be equipped with a **sensor switch**. For example, hand-held powered circular saws with a blade diameter greater than 2 in. (5.08 cm.), and electric, hydraulic, or pneumatic chain saws do not work if pressure is released from the tool.

Lesson: 8/17

Hand Tool Safety

A hand tool is any type of tool that is not powered by an external source. OSHA states that "each employer shall be responsible for the safe conditions of tools and equipment used by employees, including tools and equipment which may be furnished by employees." However, you also play a key role in proper hand tool safety.

Perhaps the most important thing to remember when using a hand tool is to use the right tool for the job. Using the wrong tool can damage your workpiece or tool or even cause injury. For example, if you use a **chisel** as a **screwdriver**, its tip may break and fly off and strike another individual. Likewise, using an adjustable **wrench** on a **nut** can break the teeth of the wrench jaws.

Make sure hand tools are clean and free of dirt, debris, and damage. For example, if the jaws of a wrench are damaged, or sprung, it might slip. Figure 1 shows an example of a wrench with damaged jaws. If impact tools, such as chisels, wedges, and pins have **mushroomed heads**, as shown in Figure 2, the heads could shatter on impact and create flying debris. If a tool has a wooden handle, make sure it is free of splinters. Check to see that all tools are securely attached to their handles. Figure 3 shows examples of worn, damaged tools that must be discarded. Replace any saw blades and make sure that all edges for cutting tools are sharp.

Some types of iron or steel tools may cause sparks upon impact. If you are using a tool that causes sparks, do not use it in the vicinity of flammable substances. If you must work around flammable substances, use a spark-resistant, nonflammable tool.

Figure 1. Do not use wrenches with damaged jaws.

Figure 2. These tools have "mushroomed heads" as a result of frequent use and must not be used anymore.

Figure 3. The handles and tools in these examples pose a safety risk, so the tools must be discarded.

Lesson: 9/17

Electric Tool Safety

One of the biggest concerns when working with **electric tools** is the risk of **electric shock**. In addition to the risk of death from exposure to high voltages, electric shock can cause falls and serious burns. To reduce the risk of electric shock, follow electrical safety guidelines.

Before using electric components, check to make sure that electric cords are free from damage, wear, frays, oil, flammable materials, or water, such as the cord on the tool in Figure 1. You must also keep all cords away from sharp edges and excessive heat to protect their insulation. Never use a metal tool or any other object to check to see if an electrical circuit is "hot." In addition, never overload electric circuits. Plugging too many items into the same electrical source can cause overheating and fires.

Figure 1. The cord on this tool is in good condition.

All electric tools must be **grounded** and must not be used on damp or wet surfaces unless the tool is approved for such an application. Do not stand in water or on damp or wet surfaces when working with electric power tools. When possible, stand on a surface that is not a **conductor**, such as a rubber mat, shown in Figure 2. If you are using an electric power tool and you feel a tingling sensation, discontinue use immediately and notify your supervisor. When working outside, use only extension cords that are approved for outdoor use. It is always a good idea to use a **GFCI** when using power tools outdoors. When power sources are distant, use one long extension cord, not several short ones.

Figure 2. Standing on a non-conductive surface reduces the risk of electric shock.

Once the job is complete, make sure you unplug the tool. Even when an electric component is turned off, a charge still exists within the component if it is still plugged in. However, never pull the cord or hose to disconnect either from a socket. Pulling on a cord can cause damage to the cord as well as the tool. Also, do not wrap the cord around the tool. Store electric components in a dry place.

If there should be an electrical fire, shut off the power and use a **fire extinguisher**. If you cannot get to the power switch or cord to disable the electricity, generally the fire will short out the electrical circuit and disable the circuit breaker. You must however, grab the fire extinguisher to put out the fire. Never attempt to put out an electrical fire with water. This can cause a fatal shock.

Lesson: 10/17

Abrasive Wheel Tool Safety

Figure 1 shows an example of a type of abrasive wheel tool. Grinding, cutting, polishing, and wire buffing create special safety problems since they may discharge particles. Even worse, they may become disengaged from the **mounting**. OSHA General Industry Regulations standardize safety precautions for abrasive wheel tools with specific directions for each class of abrasive wheel tool.

Figure 2 shows an example of an abrasive wheel without any defects. Before an abrasive wheel is mounted, it should be inspected closely and **sound-tested** or **ring-tested** to be sure it is free from cracks or defects. Figure 3 shows an employee ring-testing an abrasive wheel. Many types of grinding wheels will emit a high-pitched ringing sound when tapped with a light, non-metallic tool. When wheels are cracked or damaged, the sound will be dull or "dead." Do not use damaged or "dead" abrasive wheels. If a wheel is defective, it could fly apart in operation. When mounting, the wheel must be tightened with a nut without distorting the **flange**, and the wheel must be able to move freely.

Most types of abrasive wheels require safety guards to cover the **spindle**, nut, and flange. These safety guards protect workers from any debris emitted by the application, but they also protect employees from the movement of the wheel itself. OSHA writes that "the safety guard must be mounted so that it maintains proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard."

Never clamp a hand-held abrasive wheel tool in a **vise**. This makes the guard ineffective and puts everyone in the area in danger. Because the wheel could possibly disintegrate during start-up, employees must hold the abrasive wheel tool with both hands and must never stand in front of the wheel while it accelerates.

Figure 1. OSHA regulates the use of abrasive wheel tools based on the type and size of tool.

Figure 2. Abrasive wheels must be carefully inspecting for defects before they are mounted.

Figure 3. If the abrasive is cracked or damaged, you will hear a "dead" sound. If it is not defective, you will hear a ringing sound.

Lesson: 11/17

Pneumatic Tool Safety

A **pneumatic tool** is powered by compressed air. Examples of pneumatic tools include drills, hammers, nail guns, and sanders. Figure 1 shows a pneumatic nail gun. OSHA requires that each pneumatic tool must have a **tool retainer** installed on each piece of pneumatic utilization equipment. The retainer protects the tool from being ejected during operation. Also, "the hose and hose connections used for conducting compressed air to utilization equipment shall be designed for the pressure and service to which they are subjected." In other words, the equipment you use for the hose and its corresponding equipment must be designed specifically for the pneumatic tool you are using.

Figure 1. A type of pneumatic tool.

For air hoses more than 1/2 in. (1.27 cm.) in diameter, a safety excess flow valve must be installed at the air supply to reduce pressure in the event of hose failure. Pneumatic tools that shoot nails, rivets, staples, or similar fasteners and operate at pressures greater than 100 psi must have a safety device to keep fasteners from being accidentally ejected, unless the **muzzle** is pressed against the work surface. See Figure 2, which shows a pneumatic nail gun with a safety device around the muzzle. Airless spray guns that spray fluids such as paint at 100 psi or greater must have safety devices that prevent accidental pulling of the trigger.

Figure 2. This pneumatic nail gun has a safety device so that nails are not ejected by accident.

Generally speaking, you must take the same precautions with pneumatic tool air hoses as you do with electric cords. Keep hoses away from heat, oil, and sharp objects. Also keep hoses away from the walkways to avoid a tripping hazard. Never carry a pneumatic tool by its hose or disconnect the hose by yanking on it. Before using a pneumatic tool, be sure that the tool is securely attached to the hose so that the two cannot be disconnected. Noise is also a concern for pneumatic tool applications. You must wear earplugs or earmuffs.

Using **jackhammers** poses special safety concerns. The vibration from jackhammers can cause muscle fatigue and strain. This can be reduced by using heavy rubber grips. Workers must wear safety glasses, safety shoes, and a face shield when working with jackhammers. Also, jackhammers must be lubricated regularly.

Lesson: 12/17

Fuel and Hydraulic Tool Safety

Fuel-powered tools are usually operated with gasoline. The most serious hazards associated with these types of tools are the inhalation of fumes and the risk of explosion. In environments where fuel-powered tools are used, effective **ventilation** is mandatory. To reduce the chance of fire or explosion, do not use these tools near flames or flammable materials, and store gas in approved containers only. Always turn off a tool and allow it to cool before refueling. There must also be fire extinguishers on site and readily available in case of fire, as shown in Figure 1.

Hydraulic tools are powered by a fluid. The fluid used to power hydraulic tools must be approved and fire-resistant. It also must retain its same operating characteristics at the highest temperature to which it is exposed. For example, if a hydraulic tool is used in a very hot environment, the fluid must retain its same characteristics, even with the extreme temperature change. Any limitations set forth by the manufacturer on the fluid or equipment must not be exceeded.

Figure 1. Fire extinguishers must be easily accessible in any work area.

Lesson: 13/17

Powder Tool Safety

Figure 1 shows an example of a **powder tool**. A powder tool works like a loaded gun. A powder tool is often used to shoot nails into a workpiece. Only approved, trained employees may operate powder tools because they pose many safety risks. To use them, you must follow the manufacturer's recommendations and wear eye, ear, and face protection. In addition, most manufacturers of powder tools require employees to wear hard hats because of the **ricochet** possibility. Some manufacturers also require signs to be posted in areas where the tools are used.

Figure 1. Powder tools pose so many safety risks that only approved personnel may operate them.

The **muzzle** end of the tool must have a protective shield or guard that prevents any fragments or particles from flying astray. Select an appropriate powder level that will get the work done without exerting excessive force. Load the tool only just before it is to be used, and do not leave a loaded tool unattended. Keep away from the end of the gun, and never point the tool at anyone.

Powder tools must not be used near flammable substances. Before using a powder tool, it must be inspected to make sure it is clean and obstruction free and that all parts can operate freely. Make sure that all guards and other parts are in place, as outlined by the manufacturer. Bystanders must remain at a safe distance from the work area.

You must also be familiar with the workpiece material. Make sure the fastener will not pass through to the other side of the workpiece. Hard and brittle materials can chip, or even worse, cause the fastener to ricochet. According to OSHA, materials cannot be driven more than 3 in. (7.62 cm.) from "an unsupported edge or corner of materials like brick or concrete." When working with steel, fasteners should not be any closer than 1/2 in. (1.27 cm.) from an unsupported corner edge without a special jig or fixture.

Lesson: 14/17

What Is Ergonomics?

Ergonomics is the science of designing materials to maximize employee comfort, while increasing productivity. Ergonomics is a concept for designing manufacturing tools, office furniture, and other devices in the workplace. The adjustable table in Figure 1 is an example of an ergonomic device. Ergonomics also outlines what you can do to work more comfortably and safely.

There are many different areas of ergonomics. Some of the most important areas relating to hand and power tool use include maintaining good posture, avoiding injury from repeating tasks, minimizing vibration, and avoiding use of excess force. Following ergonomic guidelines outlined by your supervisor can help you avoid sustaining an injury both at work and at home. However, one of the disadvantages of ergonomics is that it can be difficult to implement. What is comfortable and ergonomically sound for one employee may be completely uncomfortable and an ergonomic safety risk for another. For example, an ergonomically sound worktable that has been set up for one employee might put a taller employee at risk for injury, as shown in Figure 2. If you feel uncomfortable at your workstation or you are uncomfortably reaching or straining, notify your supervisor so that arrangements can be made.

Figure 1. This adjustable table is an example of an ergonomic device.

Figure 2. This workstation is comfortable and ergonomic for one employee, but a safety risk for the other.

Lesson: 15/17

The Importance of Good Posture

Good **posture** is important in any situation. When using hand and power tools, it is especially significant. Standing in an awkward position, constantly reaching or twisting your body, bending, kneeling, or working with an overhead object can trigger pain and injury, as illustrated in Figure 1. The muscle groups that perform work affect your posture. If you are standing in an awkward position, your tasks can be more demanding because you will be exerting yourself more than you would with correct posture.

Often, poor posture occurs when employees strain to see their work, or their work is at a distance from them, and they must constantly reach to get to it. Posture is also an issue when working with small, intricate objects or projects that require an employee to work in hard-to-reach places. If you are having trouble reaching or seeing your work, notify your supervisor so that arrangements can be made for you. Even if you have the right working conditions, remember to stand up straight as Figure 2 illustrates. Bad posture causes many physical aches and pains and can lead to permanent injury.

Figure 1. Repeatedly assuming awkward positions during your shift could be an ergonomic concern.

Figure 2. Good posture helps to prevent many ergonomic injuries.

Lesson: 16/17

Repetition / Force / Vibration

Repeating the same task over and over again is not necessarily dangerous. However, if you continue to perform the same task repeatedly without resting, your muscles may become strained. The muscles that you use continue to contract and can pull and become sore. You are especially at risk for this type of injury if you use excessive force or assume an awkward position when you are performing your task.

Other factors that contribute to injury from repetition include using the wrong tool for the job, using a tool that does not fit your hand, and over-gripping the tool. Select tools with a comfortable grip that allow you to keep your wrist in a neutral position, as shown in Figure 1. If necessary, notify your supervisor to make arrangements so that you do not need to strain while working. If your job requires repetitive tasks, make sure that you sit or stand up straight and use proper posture. You must also rest your muscles appropriately. By following these guidelines, you help reduce the risk of injury and increase comfort as you carry out your responsibilities.

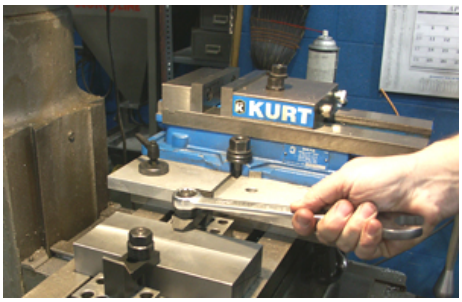

Figure 1. Keep a neutral wrist and do not over-grip tools.

Lesson: 17/17

Summary
Hand and power tools are so common both in the workplace and at home that we tend to forget about the safety hazards they pose. However, it is important to review the basics. Before you begin working, consult the owner's manual and make sure you are familiar with how the tool functions. Worksite organization is also important. All walkways and work areas must be neat, clean, and dry so that employees can move about freely.

Tools must remain clean and in good condition with regular maintenance, and all blades must be kept sharp. All applications require you to wear eye protection and some may require you to wear ear protection, a hard hat, face shield, and special flame-resistant clothing.

The point of operation is the point at which the tool comes in contact with the workpiece. Many tools have safety devices that protect them from the point of operation. Never remove any safety guard from a tool unless authorized to do so.

Perhaps the most important rule to remember when using a hand tool is to use the right tool for the job. Also, you must follow the work practices that are specific to each type of tool. For example, when working with electric tools, you must follow electrical safety guidelines to avoid risks for electric shock. When using abrasive wheel tools, you must ring-test the abrasive to ensure it is not damaged. The safety precautions you must take with pneumatic tool air hoses are similar to those for electric cords. Fuel-powered tools require effective ventilation. The fluid that powers hydraulic tools must be fire-resistant. Because they require special safety considerations, powder tools may only be used by approved employees.

Hand and power tool safety also uses ergonomics. Ergonomics is the science of designing materials to maximize employee comfort, while increasing productivity. Ergonomics emphasizes the importance of good posture, worksite organization, and avoiding injury when performing repetitive tasks.

Figure 1. Examples of common hand tools.

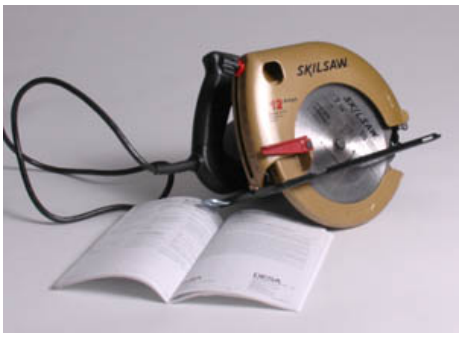

Figure 2. The owner's manual is a good starting place for learning about the tool.

Figure 3. These tools have "mushroomed heads" as a result of frequent use and must not be used anymore.

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Class Vocabulary

Base Plate	The bottom of a tool such as a circular saw that must be guarded except for when the tool is in use.
Chisel	A sharp metal tool that is used to cut or chip workpiece materials. Chisels must remain clean and sharp.
Conductor	A material that is very effective at conducting electricity. When using electric tools, do not wear or stand on objects that are conductors.
Earmuffs	Full-ear coverings connected by a headband that require a perfect seal around the ear. Hair, facial hair, or facial movements may disrupt this seal.
Earplugs	Ear wear that protects hearing. Earplugs are inserted inside the ear to muffle outside noises.
Electric Shock	The flow of electricity through the body. Severe electric shock can be fatal.
Electric Tool	A power tool that is powered by electricity. Electric tools require observing electric safety guidelines.
Ergonomics	The study of designing devices to decrease operator discomfort or fatigue and increase productivity.
Eye Wash Station	A designated station in an easily accessible area in which employees may flush their faces with water in the event of an emergency.
Face Shield	A rigid, transparent plastic sheet that covers the worker's entire face to protect against dust or splashes. Because face shields do not protect against impacts, they are often worn with goggles.
Fire Extinguisher	A portable device that uses a rapid spray of chemicals to put out small fires.
Fire Shield	A flame-resistant, tarp-like device that is used to isolate a work area and protect bystanders and nearby equipment from applications that throw sparks.
Flammable	An object that can quickly catch fire if it comes in contact with sparks or fire.
Flange	A flat or raised metal disk that helps deflect mounting stresses from the hole in a grinding wheel.
Fuel-Powered Tool	A tool that is powered by fuel, usually gasoline. Fuel-powered tools require proper ventilation.
Fume	A cloud of particles suspended in a gas. Applications that emit fumes require proper ventilation.
GFCI	Portable ground fault circuit interrupters. A type of switch that is disabled if the electricity should come into contact with water. GFCIs should be used whenever there is a chance for electricity to come into contact with water.
Grounded	Safely connected to a neutral body, like the earth, which can absorb a stray electrical charge. Electric tools must be grounded to help prevent electric shock.
Hand Tool	A tool that is "powered" by an operator, such as a hammer or screwdriver. Hand tools must be kept clean and sharp in order to avoid injury.
Hand Wash Station	A designated station in an easily accessible area in which employees may wash their hands.
Hard Hat	A lightweight, protective head covering, usually made of plastic, used to protect the head from impacts, bumps, and electrical shock.
Hydraulic Tool	A tool that is powered by a liquid. Hydraulic tools must be used within their proper specifications.
Jackhammer	A powerful pneumatic tool that is used to chisel or hammer away at surfaces. Because of their vibrating motion, jackhammers require special safety considerations.
Lockout	A safety procedure required by OSHA that takes steps to dissipate all stored energy during maintenance

work. Never try to operate a machine that is under lockout.

Mounting The device on which an abrasive wheel rests. The abrasive wheel must be able to move freely without obstruction on the mounting.

Mushroomed Head A condition that occurs commonly to chipping tools where the head of the tool is flared out due to excessive use. Using tools with mushroomed heads is dangerous because pieces can fly off and hit the employee or other bystanders.

Muzzle A safety guard that protects employees from coming into contact with dangerous parts of the tool. For example, a muzzle covers a nailgun until it is pressed against a workpiece.

Nut A component, usually made of metal, with a threaded hole that mates with a bolt. Using the proper tool for tightening nuts is an important safety precaution.

Personal Protective Equipment Any example of various safety equipment that workers wear or use to prevent injury in the workplace. Safety glasses are common personal protective equipment.

Pinch Point Any place where two components meet that can cause an injury if you come into contact with the area.

Pneumatic Tool A tool that is powered by compressed air.

Point Of Operation The area where the tool comes into contact with the workpiece. Employees must never place anything in the path of the point of operation.

Posture Sitting or standing in a proper upright position. Many ergonomic injuries are avoided by assuming proper posture.

Powder Tool A tool that is powered by gunpowder. Because they require special safety considerations, only approved personnel may use powder tools.

Power Tool A tool that is powered by an external source, such as electricity or compressed air. Power tools must receive regular maintenance and be properly handled to avoid injury.

Respirator A breathing device worn to prevent inhalation of hazardous substances.

Ricochet To rebound from a surface. Employees must make provisions to ensure that fasteners can not ricochet off a surface.

Ring-Tested Another term used to describe a sound test for grinding wheels.

Safety Screen A protective screen that isolates a work area to protect bystanders and nearby equipment. Safety screens are similar to fire shields.

Scaffolding A raised platform on which employees can work at elevated heights.

Screwdriver A type of hand tool that tightens and loosens screws. Screwdrivers contain a grip on one end and a blade on the other end that corresponds to the head on the screw.

Sensor Switch A safety device used on power tools. Sensor switches can have different designs, but the most common type allows the tool to operate while pressure is applied and does not allow the tool to operate when pressure is released.

Shoe Another term used to describe the base plate of a tool.

Sound-Tested A test performed on an abrasive wheel to ensure that it is not cracked. If the wheel "rings" when a non-metallic object is lightly tapped on it, then it is not cracked.

Spindle The component of a tool that spins. For safety, spindles must be properly tightened and able to move freely without obstruction.

Tagout The visible labeling of a machine or equipment indicating that it is locked out and should not be used by unauthorized workers.

Tool Crib A designated area where extra tools and accessories are kept. The tool crib is also typically where tools can be serviced or repaired.

Tool Retainer A safety device that grips a tool to ensure that it is properly attached to its power source.

Tool Room Another term for the tool crib.

Ventilation A means of providing fresh air.

Vise A workholding device with two jaws that grip and hold a workpiece in place.

Wrench A type of hand tool that tightens and turns bolts and nuts. Wrenches contain fixed or moving jaws or a round attachment that grips the nuts or bolts.