CONTRACT SERVICES

Safety Training Course E

HAND AND POWER TOOL SAFETY

Presented by

Contract Services Administration Training Trust Fund

As part of the

Safety Pass Training Program for the Motion Picture and Television Industry

E

Second Edition
June 2018

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English:
If you do not comprehend English, and you require Safety Pass training in a language other than English, please send notification in writing to 2710 Winona Avenue, Burbank, CA 91504. Please provide your name, along with contact information, and specify the language you comprehend. Thank you.

Spanish:
Si usted no comprende inglés y requiere la capacitación Safety Pass en un idioma diferente al inglés, por favor envíe una notificación por escrito a 2710 Winona Avenue, Burbank, CA 91504. Por favor provea su nombre, junto con la información de contacto, y especifique el idioma que usted comprende. Gracias.

Korean:
영어를 이해하지 못하시고 영어가 아닌 다른 언어로 Safety Pass 훈련을 받으셔야 한다면, 서면 통지를 2710 Winona Avenue, Burbank, CA 91504로 보내주시기 바랍니다. 귀하의 성함과 연락처를 기재하시고 이해하실 수 있는 언어를 명시해주십시오. 감사합니다.

Armenian:
Եթե դուք անգլերեն չեք հասկանում և ձեզ հարկավոր է Safety Pass-ի մարզում անգլերենից տարբեր լեզվով, խնդրում ենք գրավոր ծանուցագիր ուղարկել հետևյալ հասցեով՝ 2710 Winona Avenue, Burbank, CA 91504: Խնդրում ենք ներկայացնել ձեր անունը, ինչպես նաև կապի տեղեկությունը, հատկապես նշելով ձեր հասկացած լեզուն: Շնորհակալություն:

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Safety Pass Training Program

The Entertainment Industry is committed to maintaining a safe and healthful working environment. To that end, all major studios have a safety representative on staff. In addition, all employers have a safety program in force. This Safety Pass Program has been designed to further promote safety and health and to prevent injuries, illnesses, and accidents on all productions, both on-lot and off-lot.

Studios and production companies may have more restrictive safety requirements than those mandated by local, state, or federal laws or regulations. They also may assign different duties or responsibilities to employees. Therefore, in addition to this Safety Pass training course, employees should refer to the safety manual and materials provided by their employers.

Employees must adhere to all safety rules and regulations. Failure of any employee to follow safety rules and regulations can lead to disciplinary action, up to and including discharge. However, no employee shall be discharged or otherwise disciplined for refusing to perform work that the individual reasonably believes is unsafe.

No safety training can comprehensively cover all possible unsafe work practices. Each production and its employees, therefore, should fully promote each employee's personal obligation to work safely in order to prevent accidents involving, and injuries to, the employee and to his/her fellow employees.

The Safety Pass Program derives from Federal and California Occupational Safety and Health Administration (OSHA) safety regulations. However, the material included in this workbook and its accompanying presentation should be used only as a general guideline. It is not intended as a legal interpretation of any federal, state, or local safety standard.

During the course of your employment, you may be acting as a supervisor or manager.In California, individuals with management authority and actual authority for the safety of a business practice could be convicted of a crime if they have actual knowledge of a serious concealed danger and fail to warn the affected employees and report the hazard. If a hazard exists, immediately notify the employer or studio safety department of the hazard and insure that potentially affected employees are informed of the danger and that steps are taken immediately to mitigate it.

Although the information contained in this training program has been compiled from sources believed to be reliable, the Alliance of Motion Picture and Television Producers, Contract Services Administration Trust Fund, Contract Services Administration Training Trust Fund, and the instructor make no guarantee nor warranty as to, and assume no responsibility for, the accuracy, sufficiency, or completeness of such information.

The Entertainment Industry is committed to maintaining a safe and healthful working environment.

Injury and Illness Prevention Program

This class is part of the employer's safety program.

Employers must provide workers a place of employment free from recognized hazards and must have a safety training program in place.

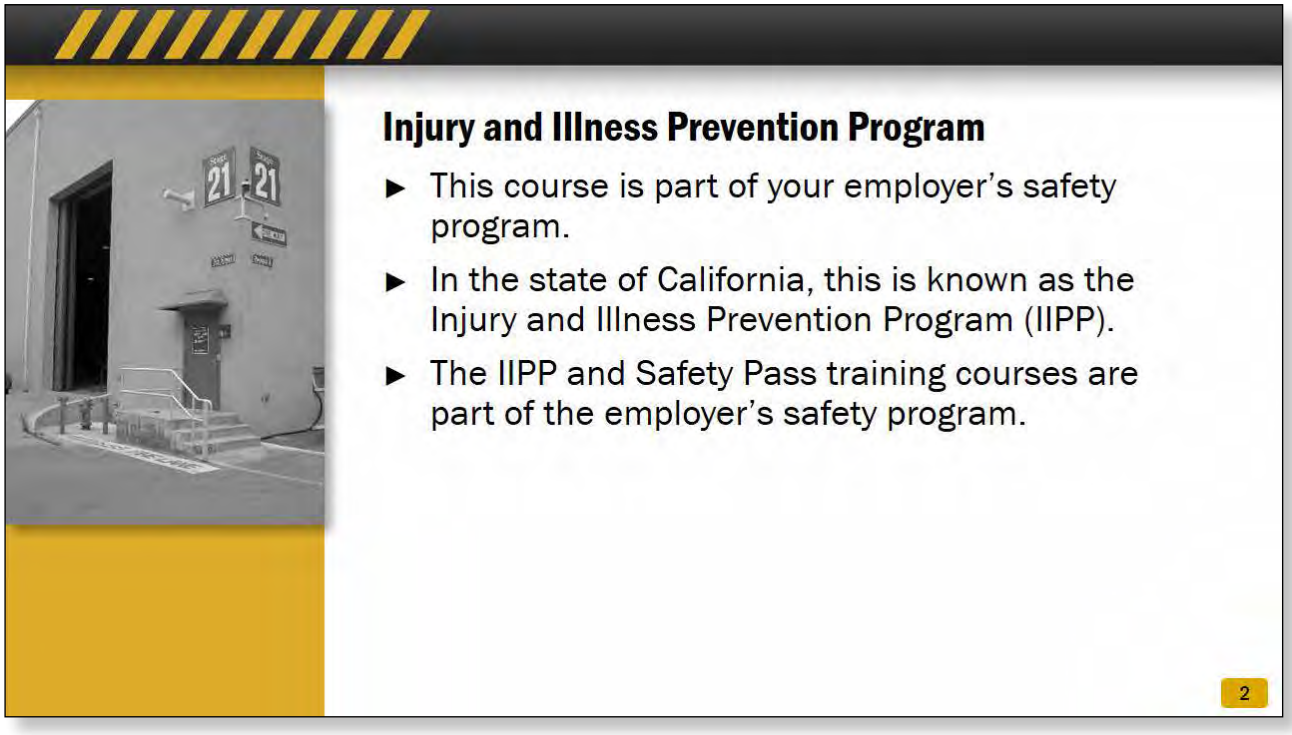
In the State of California, this is known as an Injury and Illness Prevention Program (IIPP). One of the key requirements of an IIPP is that every employee must be properly trained in safety.

The IIPP and Safety Pass training courses are part of the employer's safety program.

Contents

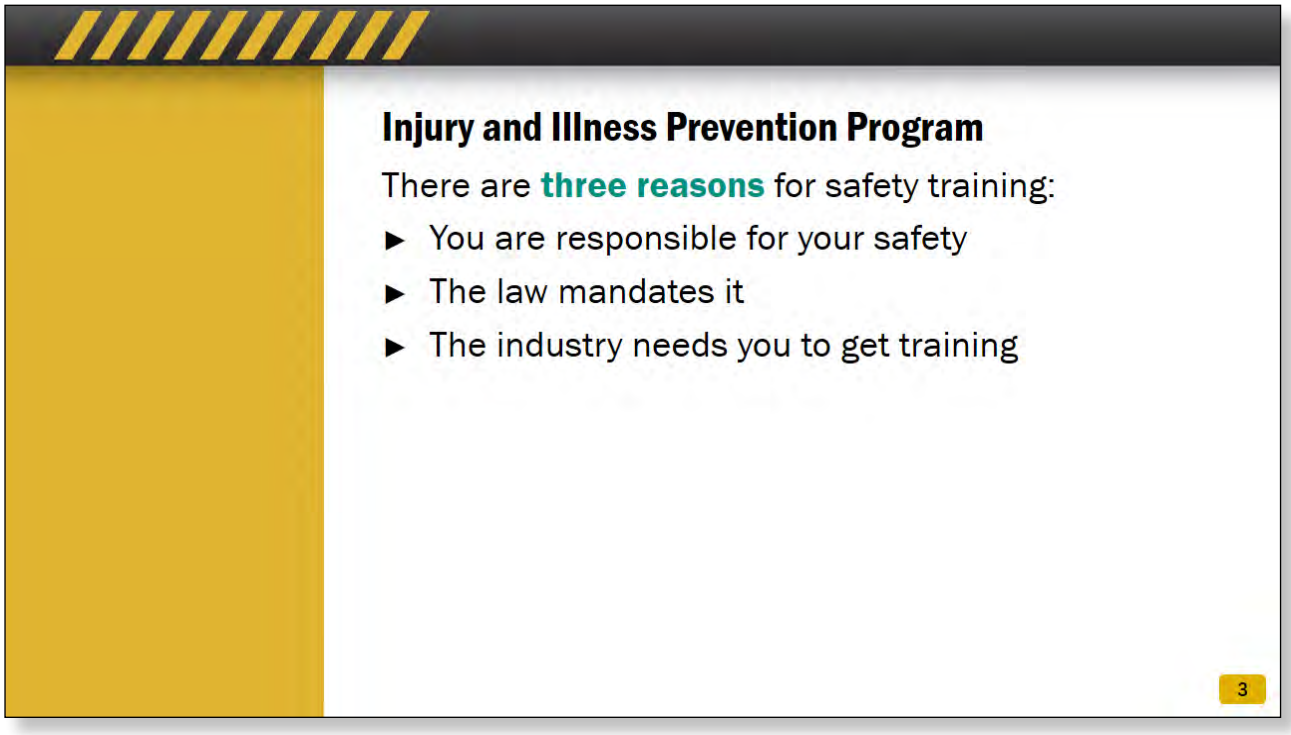
Hello, and welcome to course E, *Hand and Power Tool Safety.*

This course is part of the Safety Pass training program for the motion picture and television industry; it is presented to you by the Contract Services Administration Training Trust Fund.



This class is part of your employer's safety program. In the state of California, this is known as an Injury and Illness Prevention Program (or IIPP).

The IIPP and the Safety Pass training courses are part of your employer's safety program.

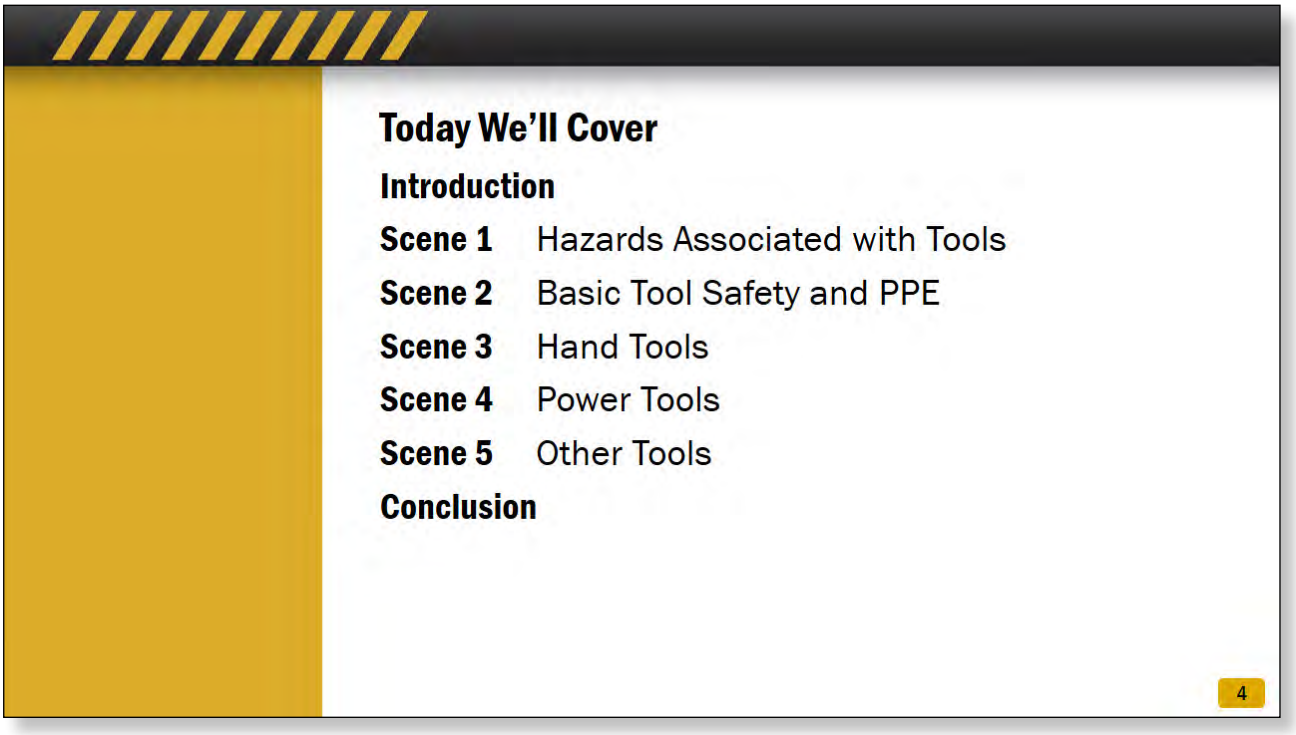


There are three reasons to get safety training.

First, you are personally responsible for your safety. You owe it to yourself and your coworkers to avoid accidents and injuries. The way you make a living and your quality of life depend on it.

Second, it is the law. Occupational safety and health standards guarantee the right to a safe workplace and require employers to train their employees in safety.

And **third**, the industry requires it. This course is part of a cooperative commitment between major motion picture and television studios and industry labor unions to deliver safety training.



Today we'll cover hazards that are associated with tools, as well as basic safety guidelines while working with hand tools, power tools, and other types of tools you may encounter at work.

Introduction

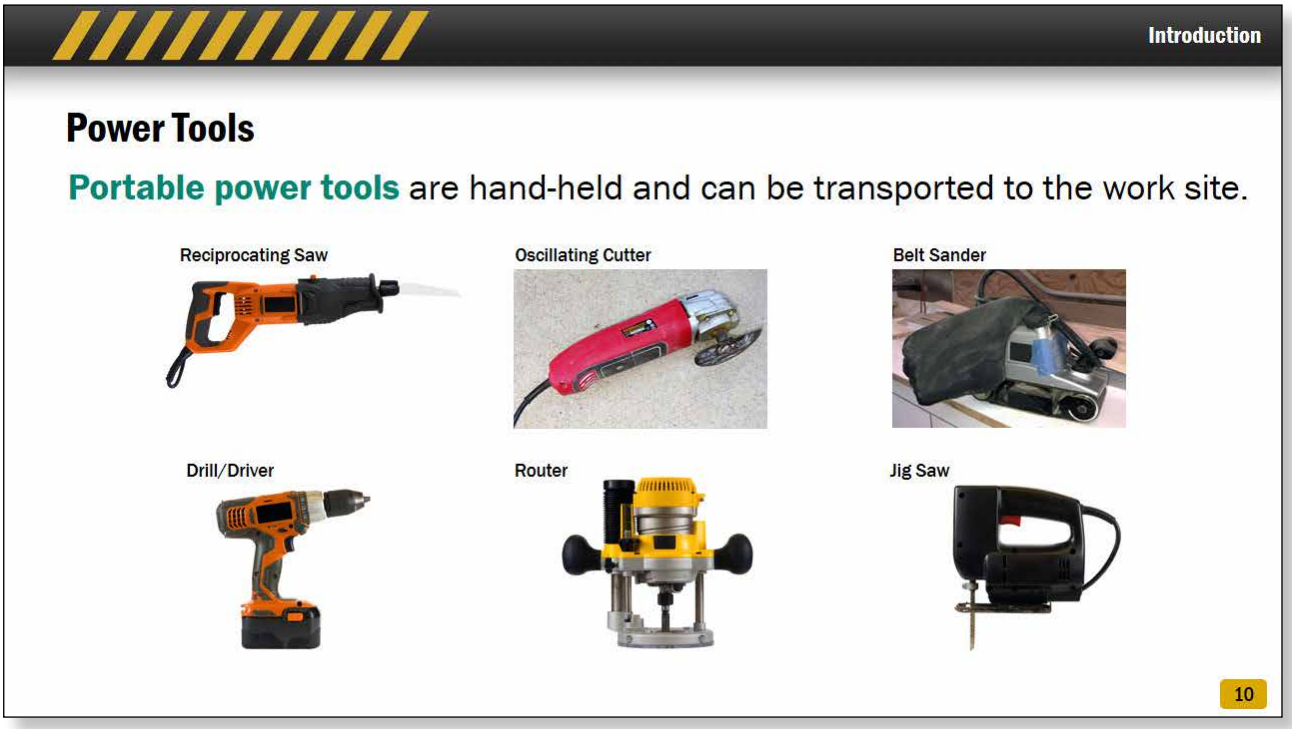
We use tools of all kinds every day in the entertainment industry. They're so commonplace that we often forget that they can sometimes be dangerous. But every year, tools cause thousands of injuries and hundreds of fatalities in the workplace. That's why it's so important to get the basics on using tools safely.

This course will address aspects of tool safety such as recognizing common tool hazards and injuries, operating your tools correctly, inspecting your tools as well as your work area, choosing the right tool for the job, and using proper personal protective equipment, or, PPE.

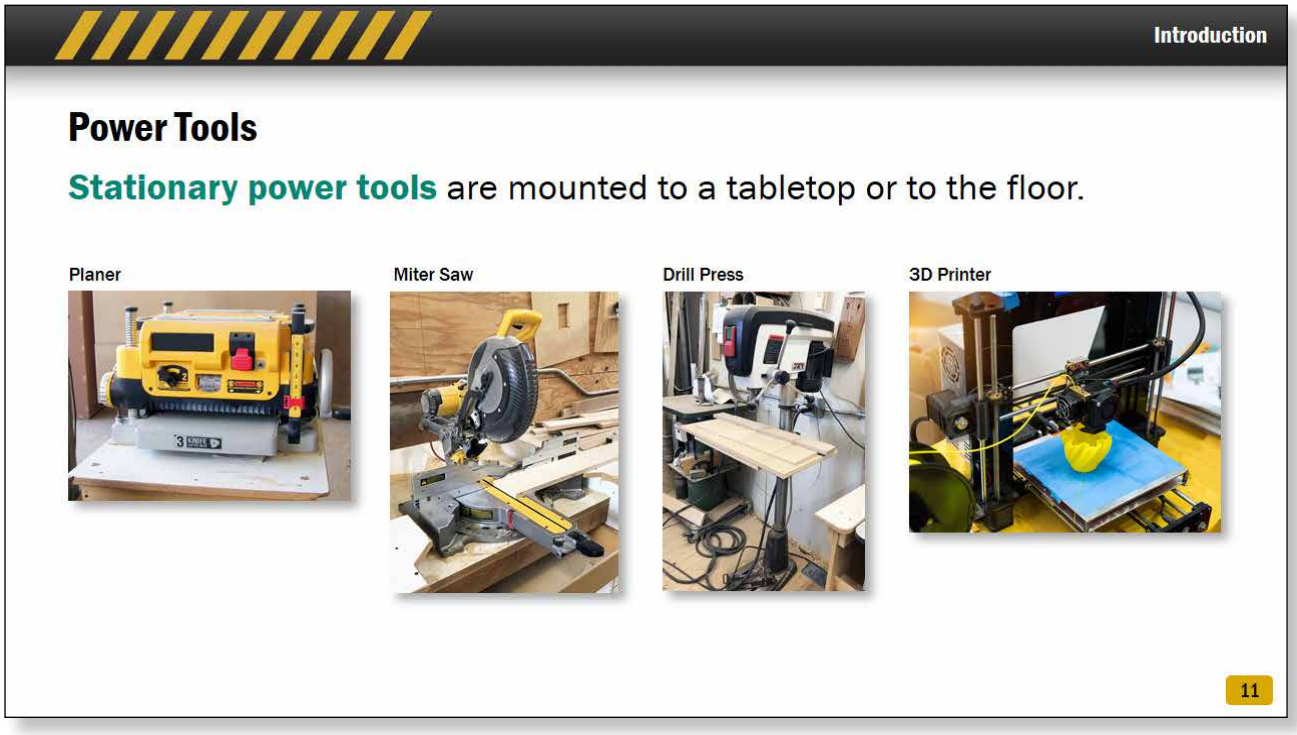
The two main types of tools we'll be talking about today are hand tools and power tools.

Hand tools, such as hammers, pliers, and screwdrivers, are powered by the human body. That may not seem like a very powerful source of energy, but hand tools can still cause injuries from sharp edges, flying fragments, pinch points, blunt force, and repetitive motion.

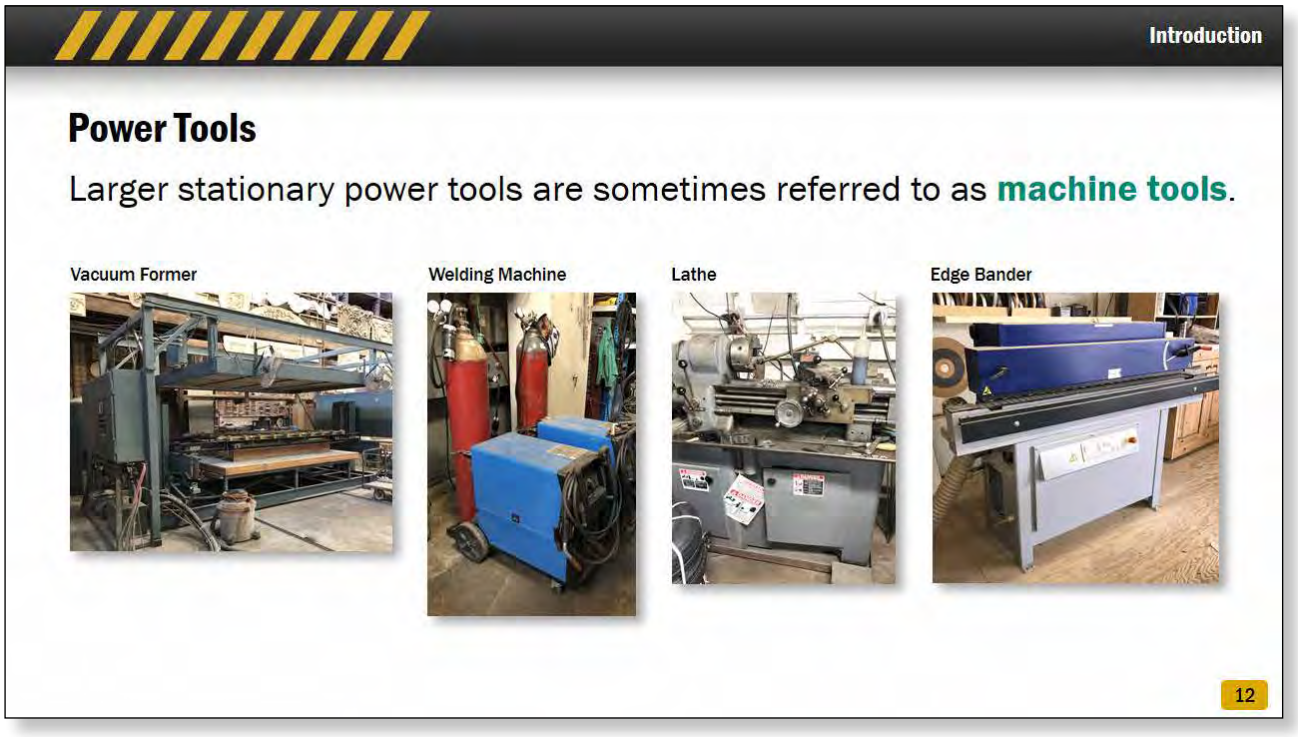
Power tools are powered by various energy sources, most commonly electricity. The increase in energy in power tools increases their risks to users. They can contain moving or rotating parts, sharp points and edges, energized parts, and pressurized fluids and gases. While running, they can create pinch points, exhaust, heat, sparks, fire, dust, and more.



Portable power tools are hand-held and can easily be transported to the work site. A few examples of portable power tools are shown here.



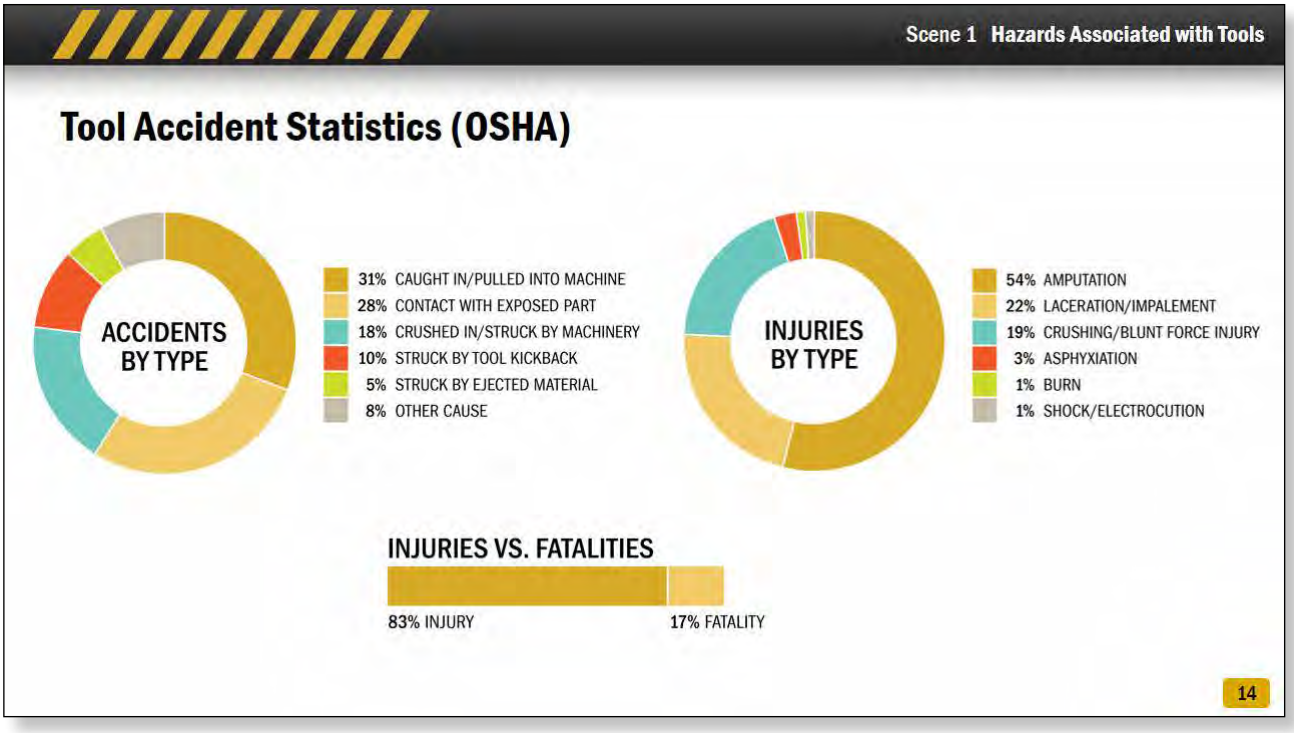
Stationary power tools are mounted to a tabletop or to the floor, such as the tools shown here.



Larger stationary power tools are sometimes referred to as **machine tools**.

Hand tools and power tools present a number of hazards that put workers at risk.

In this scene, we'll look at the statistics and causes of tool-related accidents and injuries.

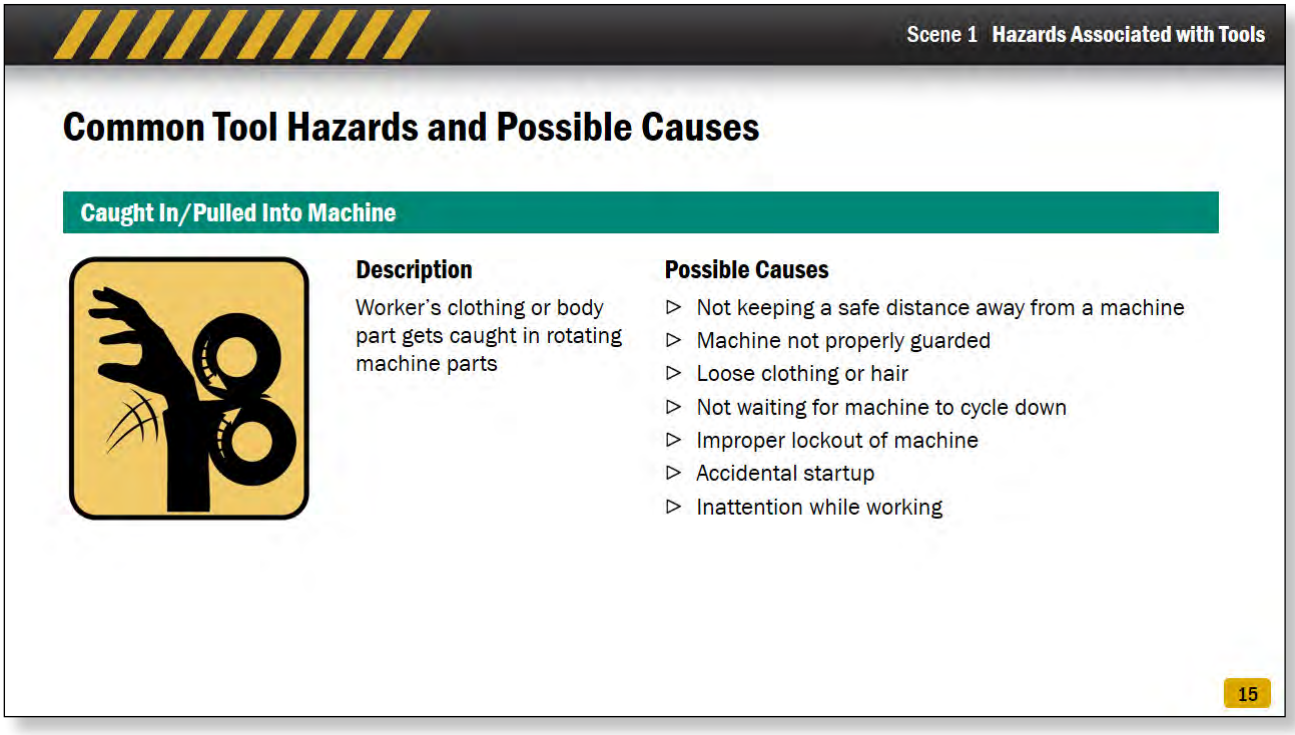


These charts show the breakdown of tool-related incidents over a five-year period.

In terms of accident types, shown in the left circle, the top three categories of accidents were: getting caught or pulled into a tool or machine; making contact with an exposed part of a tool or machine; and getting crushed or struck by a moving machine part.

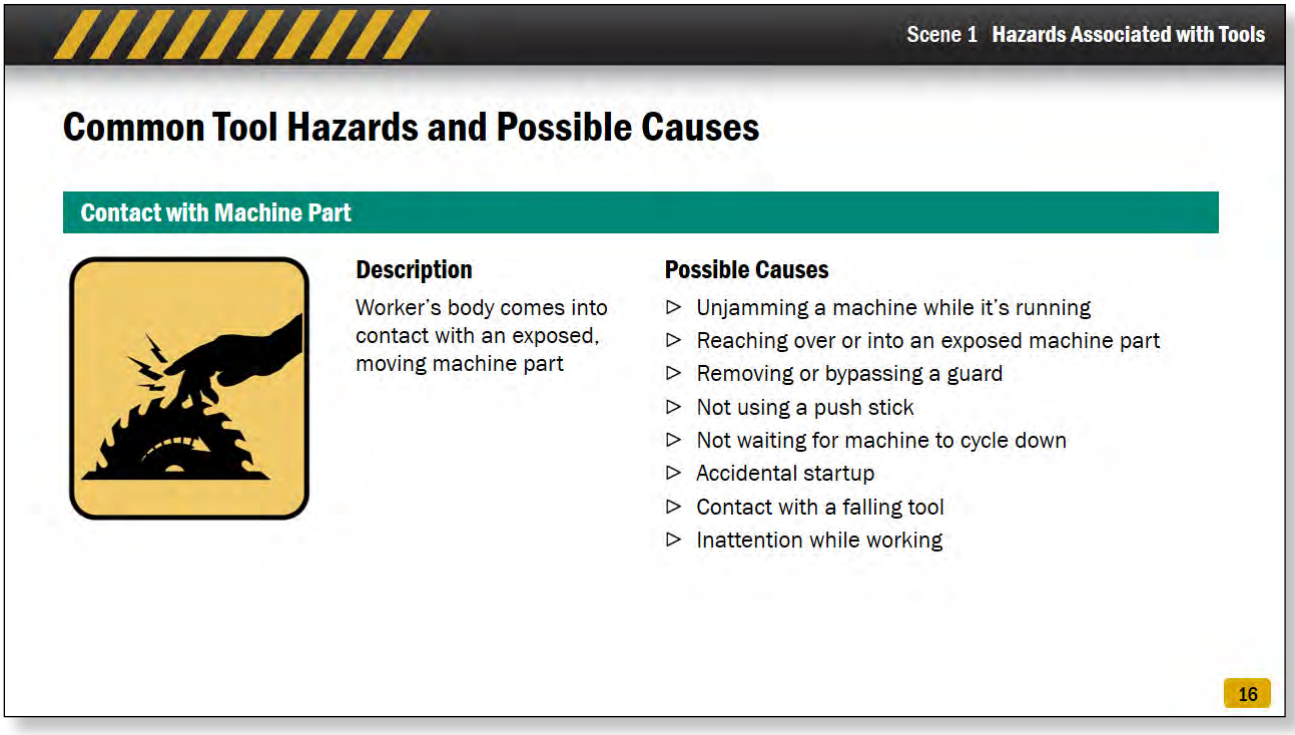
Looking at injury types in the right circle, more than half of the total injuries were an amputation of a body part. Note that of all of the injuries reported, 17% resulted in a fatality.

Let's take a look at these injuries and their causes in more detail.



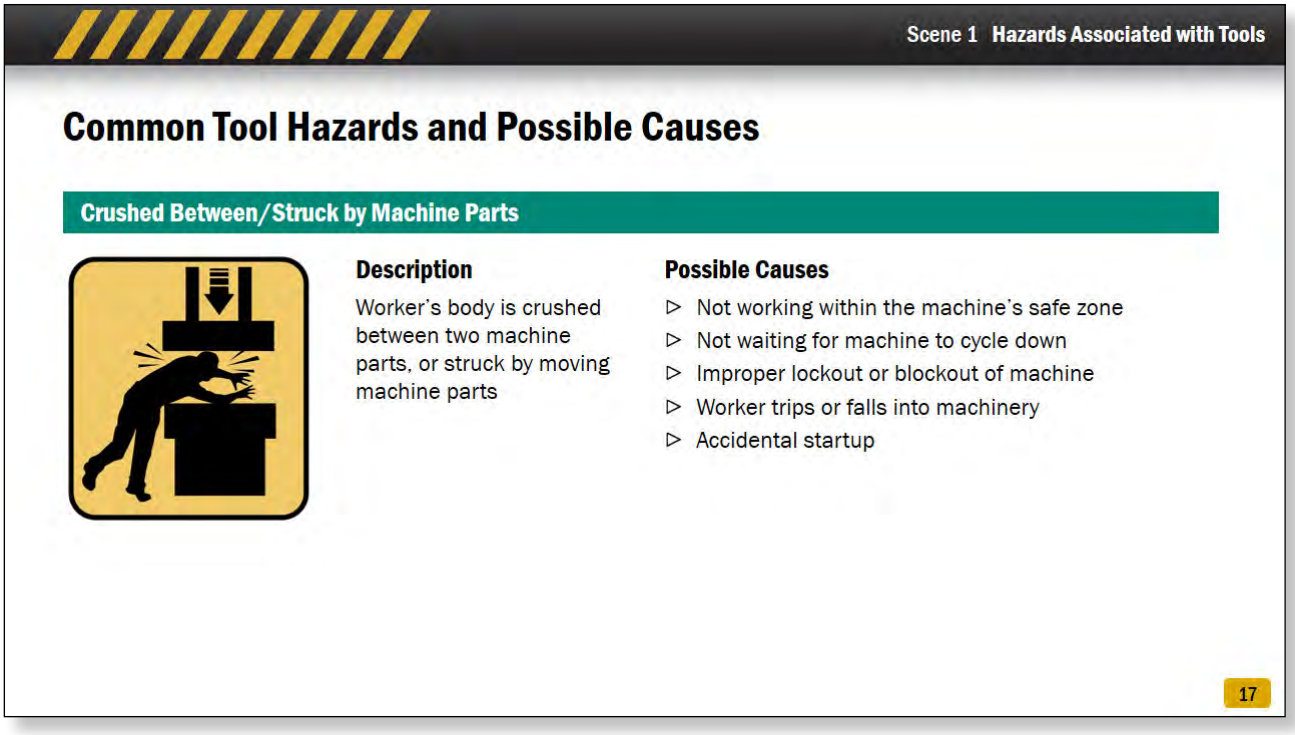
As we saw in the previous slide, a common accident occurs when a worker's clothing or body part gets pulled into an area of a tool or machine that has rotating parts, for example, a drill, a router, a circular saw, a fan, or a press with rollers.

This type of accident might occur if a worker is not keeping a safe distance away from that area of the tool, or if that area is not properly guarded. It could also be due to a worker having loose clothing or hair too close to the area, not waiting for the part to completely cycle down, using a machine that should have been locked out, accidentally starting up the tool, or simply not paying attention during work.



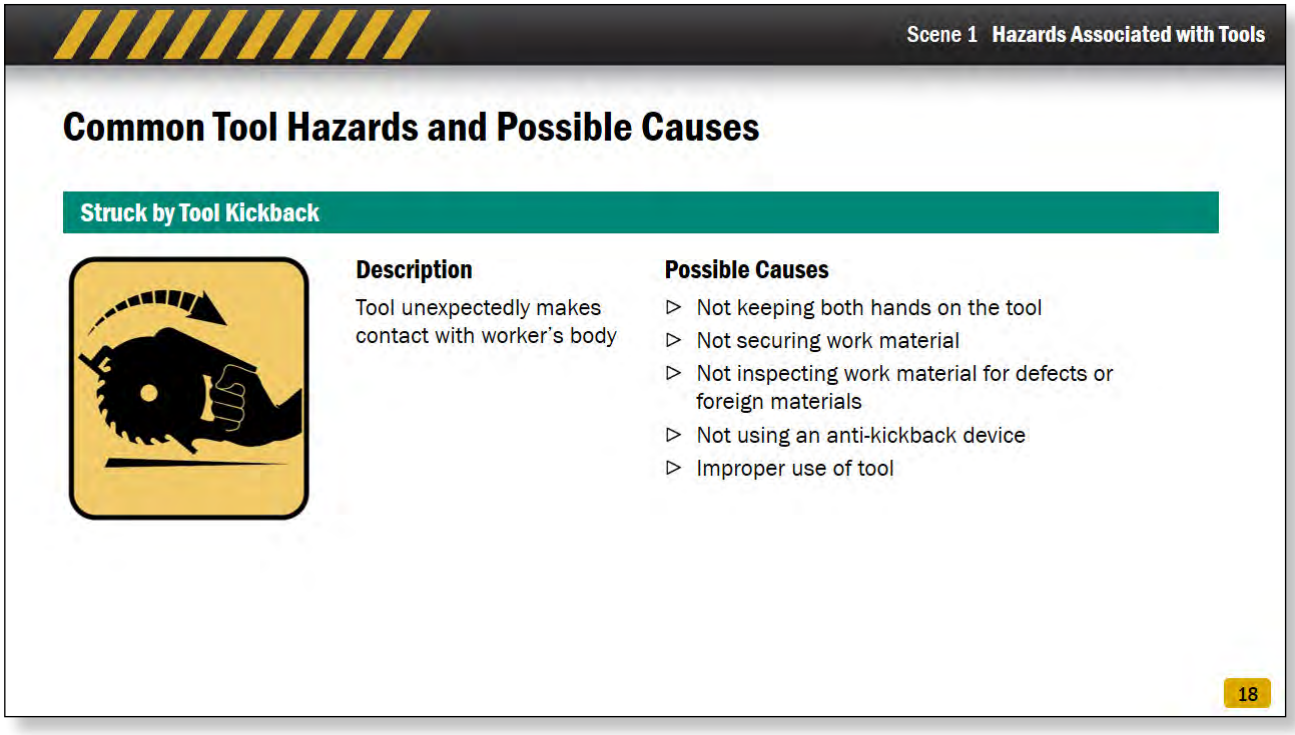
Another common accident scenario involves a worker's body part coming into contact with an exposed machine part, which can result in an amputation. In fact, it's a common way that entertainment industry workers are injured when working with power tools.

There are various causes of this type of accident, such as trying to unjam or clean a machine while it's still running, reaching over or into the exposed part, removing or bypassing a guard, using your hands to push material into the machine instead of using a push stick or push block, not waiting for the machine part to completely cycle down, accidentally starting up the tool, making unintentional contact with a falling tool, or, again, not paying attention during work.



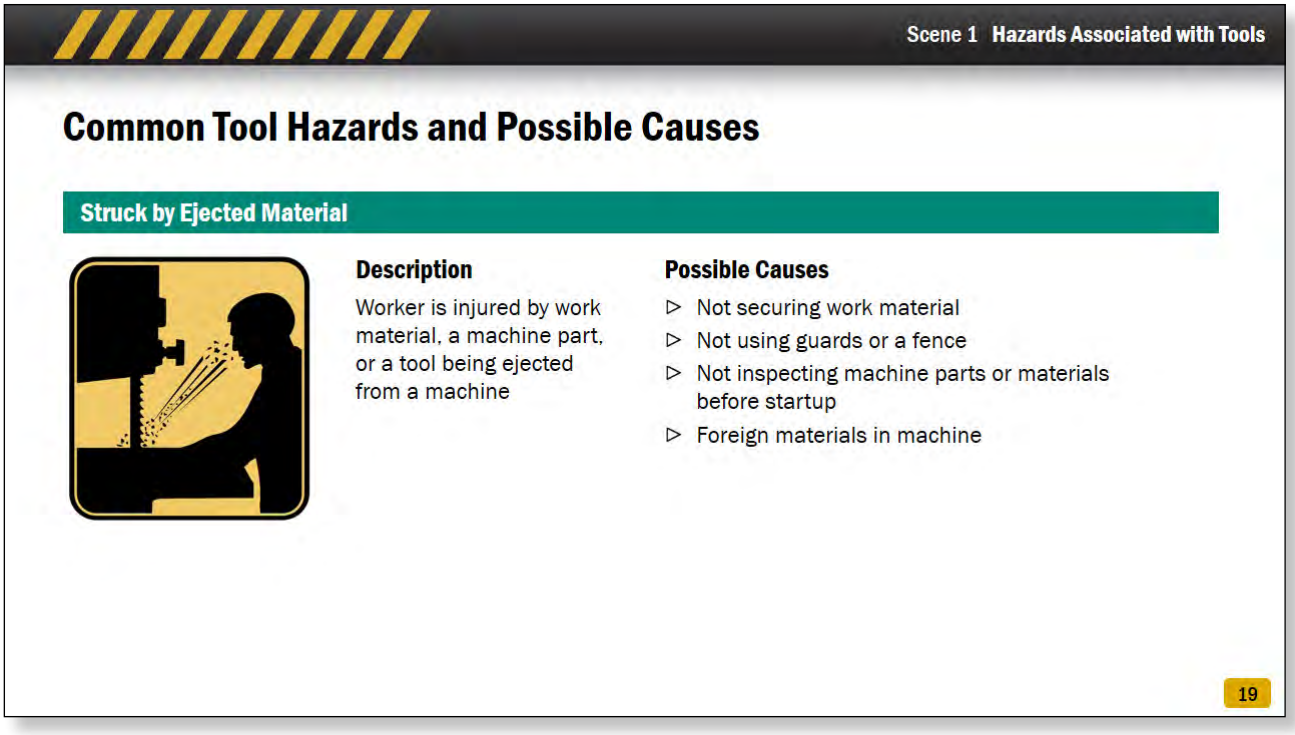
Being crushed between or struck by moving machine parts is another hazard.

This might be due to inattention to the machine's safe zone, not waiting for the machine to cycle down, using a machine that was not properly locked out or blocked out, tripping and falling onto a tool or into machinery, or accidentally starting the tool or machine. We'll talk a bit more about lockout and blockout later.



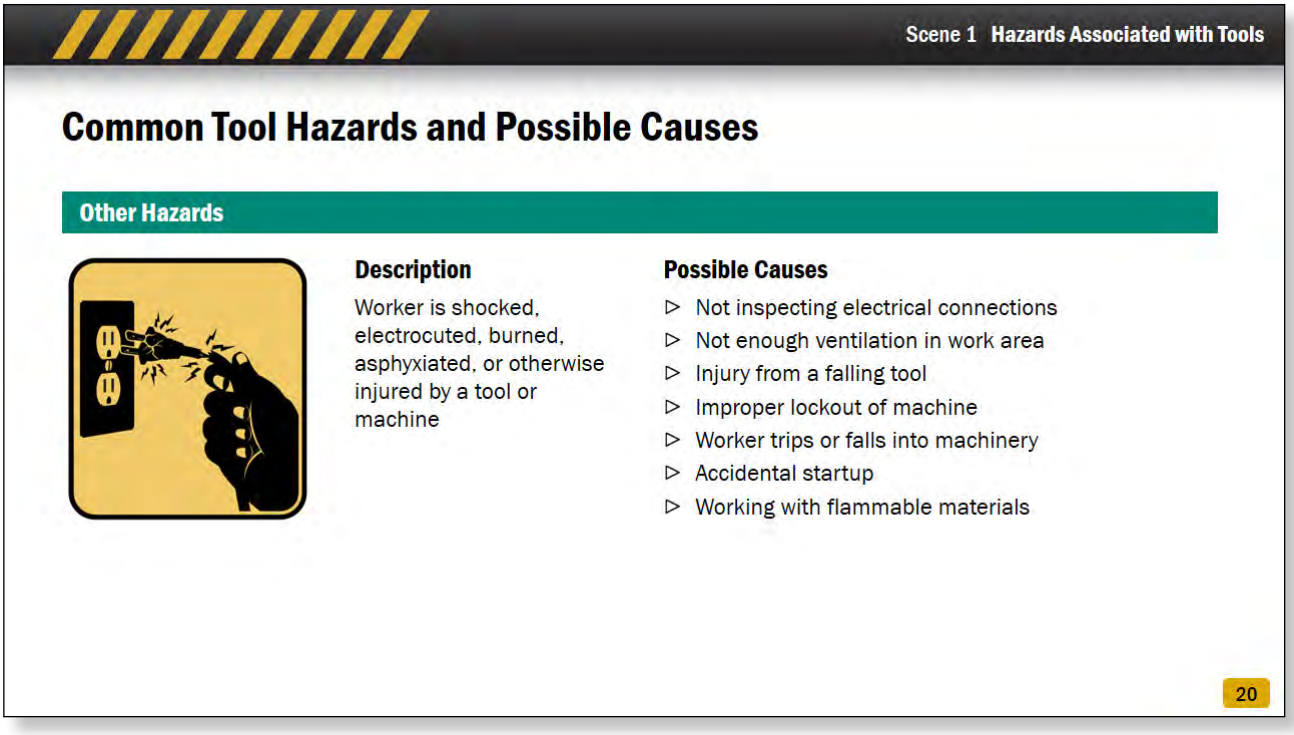
Another cause of injuries is when a tool kicks back and makes contact with a worker's body.

How does this happen? It could be that the worker doesn't have both hands on a tool when they should. The work material may not be secure, or it could contain a defect or a foreign material like a nail. The machine may have an anti-kickback device that isn't being used. Or, the worker may not be using the tool properly.



Sometimes it isn't the tool or machine itself that causes an injury, but the ejection of material from the machine.

Usually it's the work material, but it could also be small machine parts like screws or rivets, or another tool that was dropped into the machine or inadvertently left behind. To combat this hazard, secure your work material, always use guards or a fence when necessary, inspect the machine for foreign materials before you start it up, and keep them out while you're working.



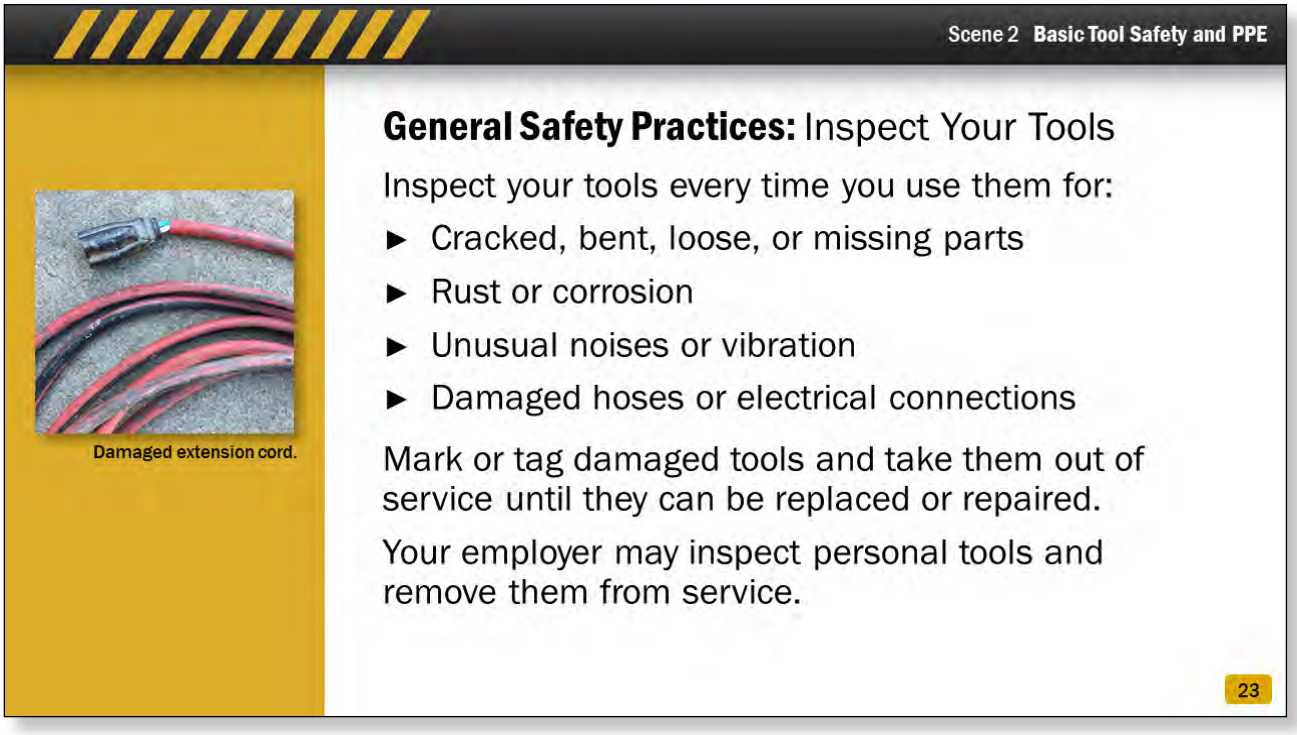
Other types of injuries that could be caused by a tool include shock, electrocution, burns, and asphyxiation.

Reasons for these include not inspecting electrical connections, working in an area that is not well ventilated, being injured by a falling tool, working on a machine that should have been locked out, tripping and falling onto a tool or into a machine, starting the tool up unexpectedly, or working with or around flammable materials.

Some injuries aren't caused by a one-time accident, but from the use of tools over time. These types of injuries include repetitive stress injuries, hearing damage from working with or near loud tools and machinery, nerve damage to the hands, fingers, and arms caused by the use of vibrating tools, and eye and lung damage or irritation from dusts, fumes, vapors, or flying particles.

We've just learned a lot about tool-related injuries.

Now, let's start to think about the ways they can be prevented by practicing basic tool safety and wearing proper personal protective equipment (or PPE).

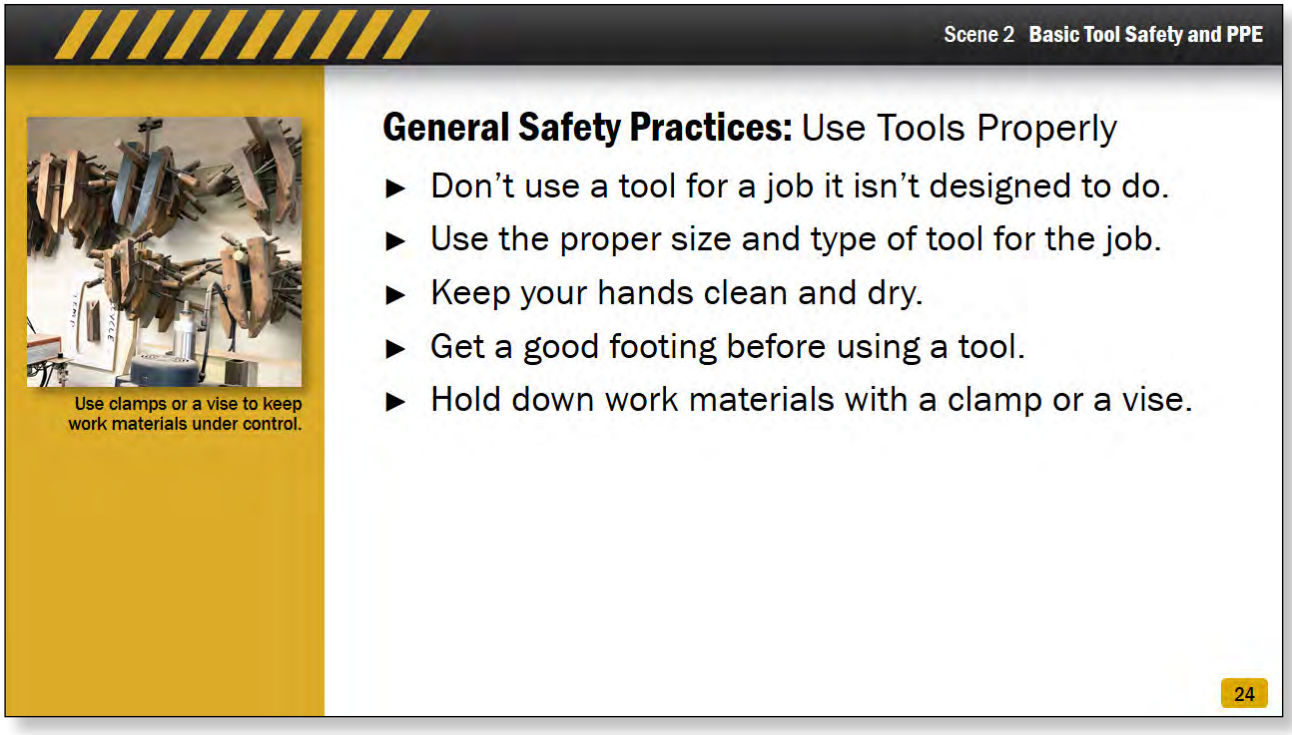


Damaged extension cord.

Here are some general safety practices to follow when using any tool or machine. Step one is to inspect your tools every time you use them. Look for cracked, bent, loose, or missing parts; rust or corrosion; unusual noises or vibration; and damaged hoses or electrical connections such as plugs, cords, and switches. If a tool is damaged, or just doesn't seem to be working correctly, mark or tag it as "out of service," and don't use it until it can be replaced or repaired by a qualified person.

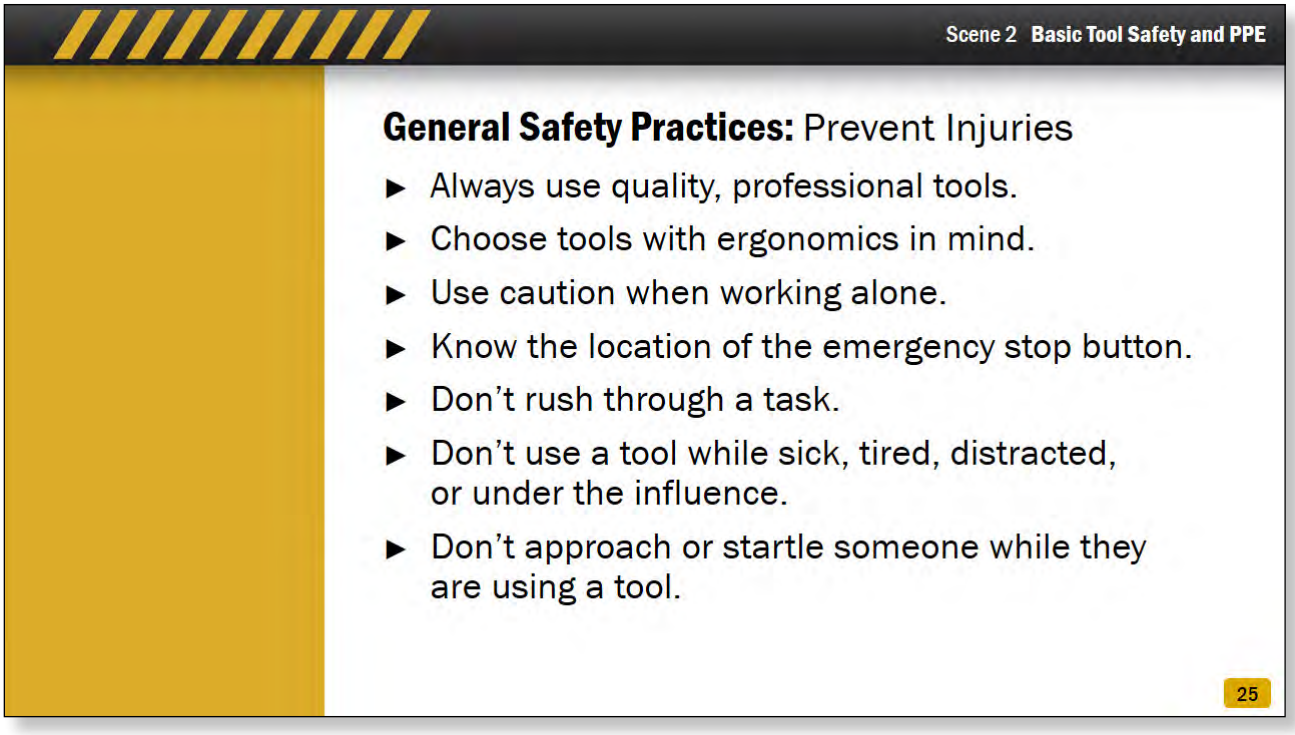
Note that if you are using personal tools, your employer may inspect them and remove them from service if they are deemed unsafe.

Unless authorized by your employer, do not bring any tools to work beyond those you are required to provide.



Next, don't use a tool for a job it isn't designed to do. Tools are designed with safety in mind—when they're being used as intended. Always use the proper size and type of tool for the job. Tools come in different sizes for a reason!

When you're working, keep your hands clean and dry. This can prevent your hands from slipping off of a tool. And, get a good footing, too—balance your body weight before starting a tool so that you will be less likely to be thrown off-balance. Finally, clamp down your work materials so that they don't kick back and injure you or someone else.



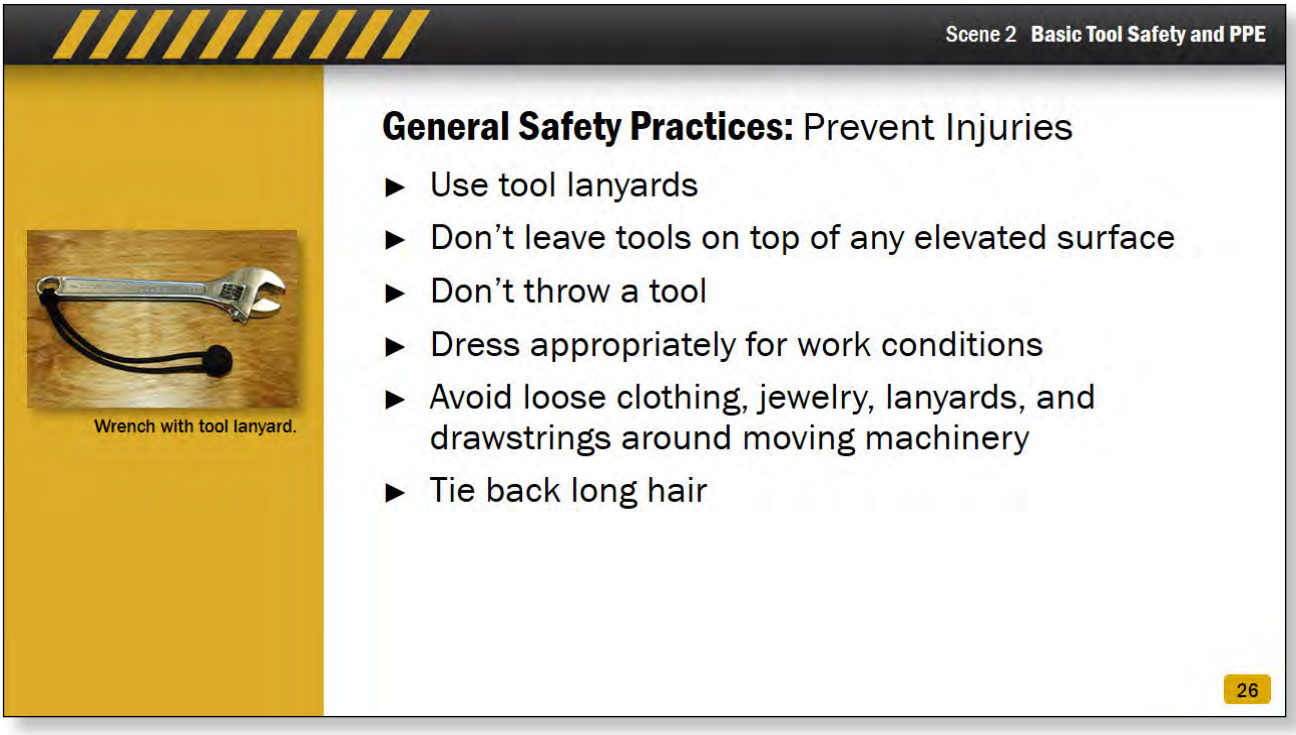
Here are more ways to prevent injuries while you're working.

Try always to use quality, professional tools, and, when possible, choose models that are designed with ergonomics in mind. This can take some stress off of your hands, neck, or back.

Use caution when working alone—if you're injured, you may not be able to summon help. Know the location of the tool's emergency stop button, in case you need to activate it quickly.

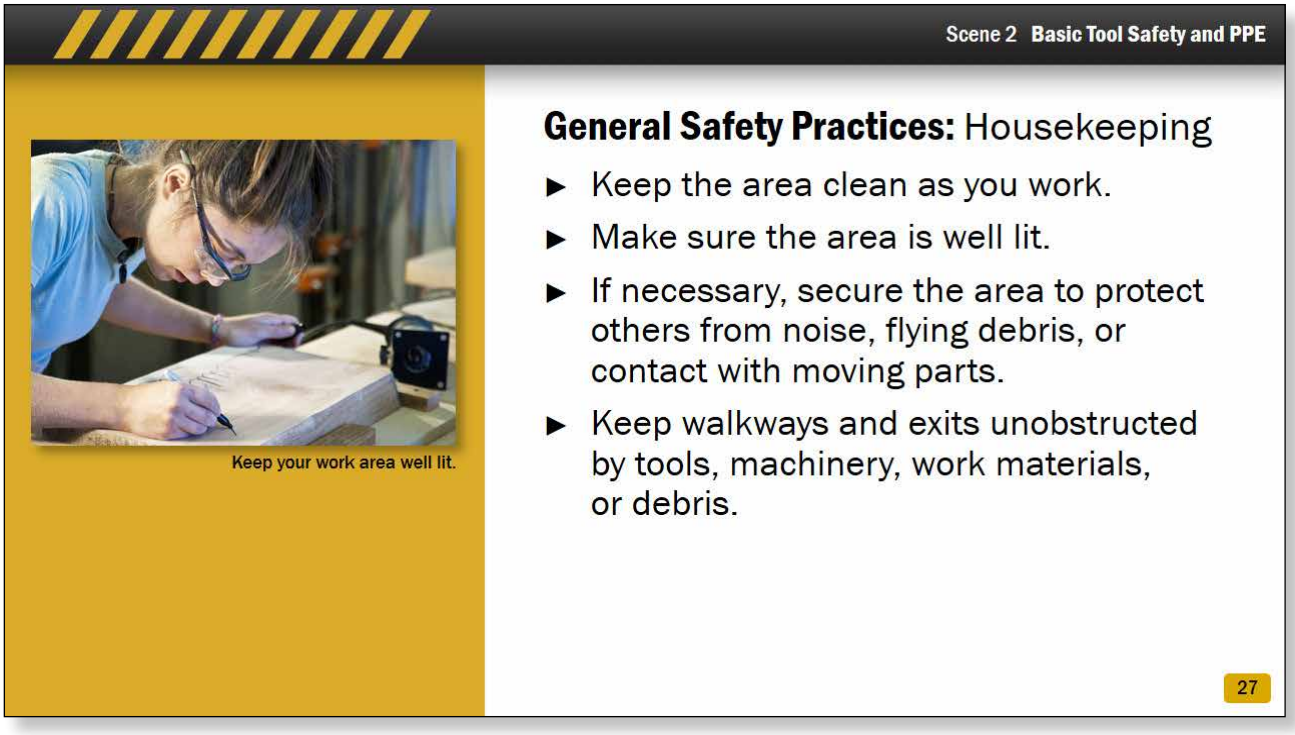
Don't rush through a task, and don't use a tool when you're sick, tired, distracted, or under the influence—any of these situations will make you more likely to cut corners on safety rules.

And, don't distract someone else while they're working. If you approach someone unexpectedly and startle them, they may injure themself with the tool.



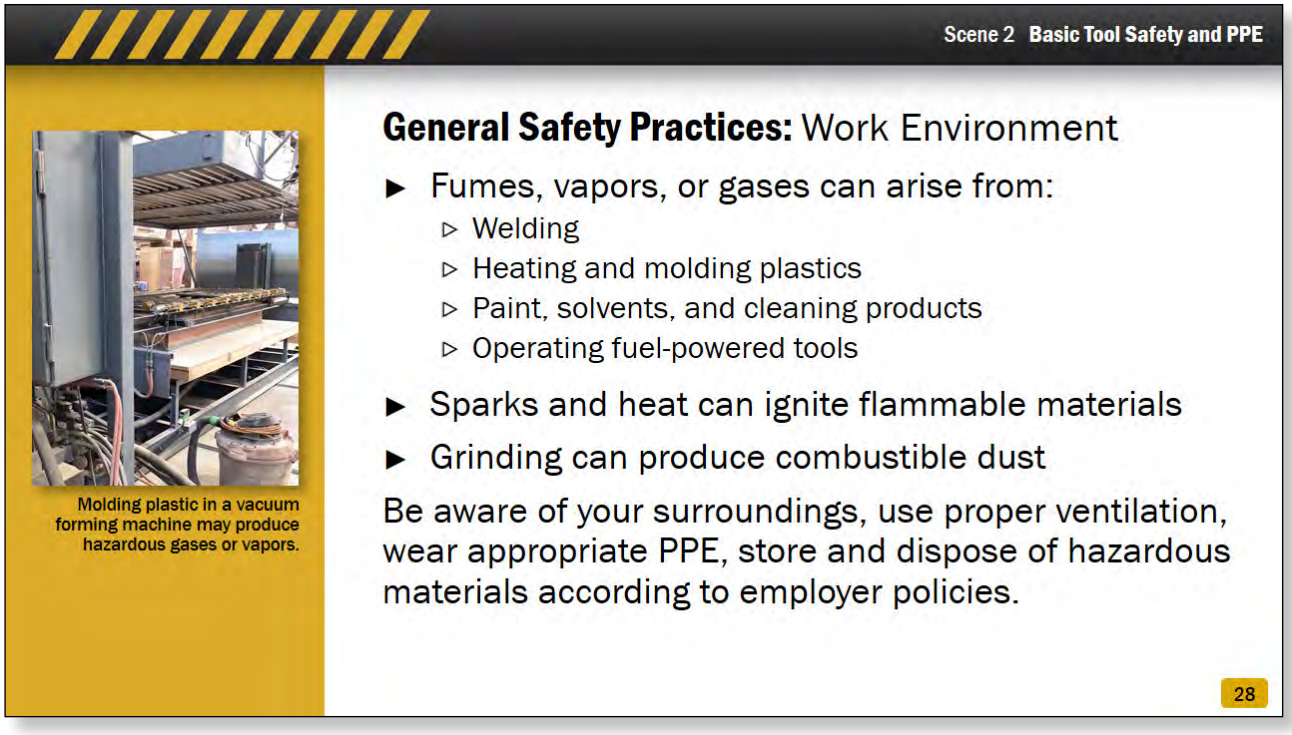
Use tool lanyards to prevent tools from falling from elevated surfaces and injuring those below. In the same vein, don't leave tools on top of elevated surfaces that can easily be disturbed, such as the top of a ladder. Don't throw a tool to someone else--pass it by hand or lower it in a bucket.

Protect your body by dressing appropriately for work conditions. But, avoid wearing anything that might get caught in a machine, such as a jewelry, lanyards, and drawstrings. Keep long hair tied back as well.



You should inspect your work area as well as your tools. Keep your area clean as you work, and make sure it's well lit. If necessary, secure the area to prevent others from being affected by noise, flying debris, or contact with moving parts.

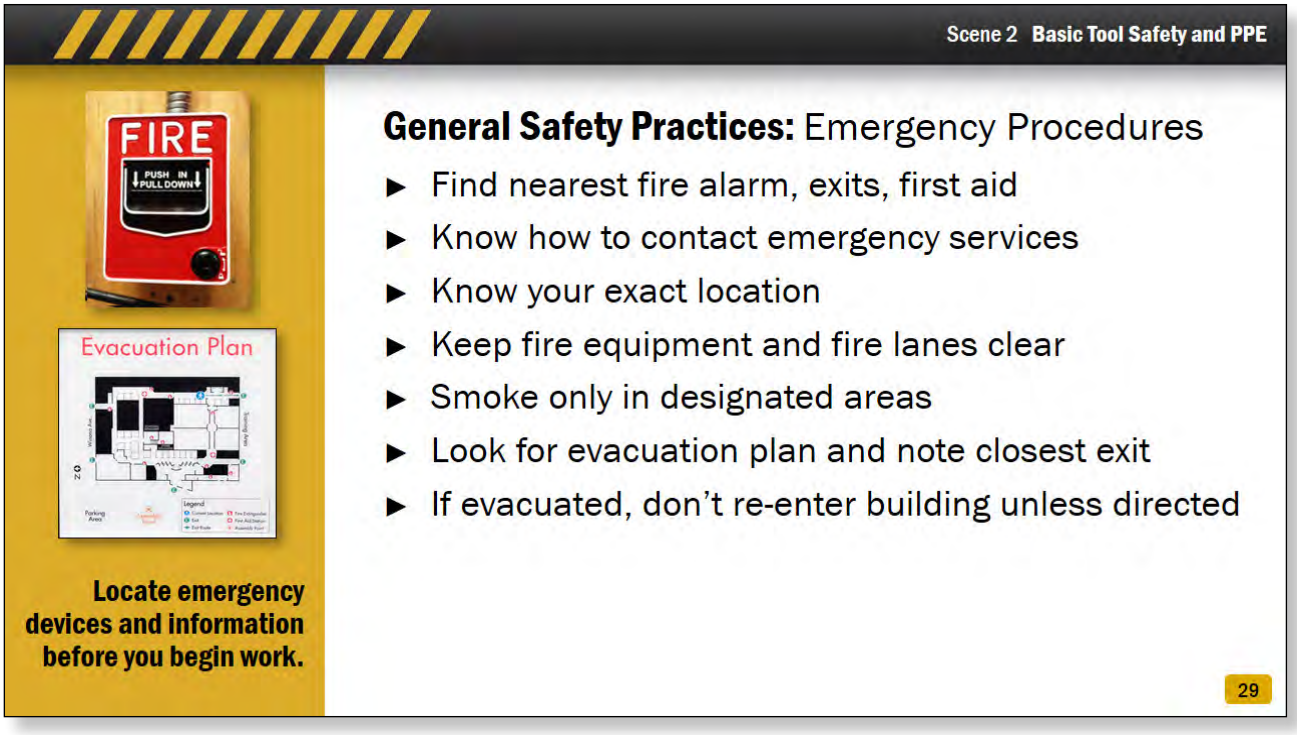
Always keep walkways and exits unobstructed by tools, machinery, work materials, or debris.



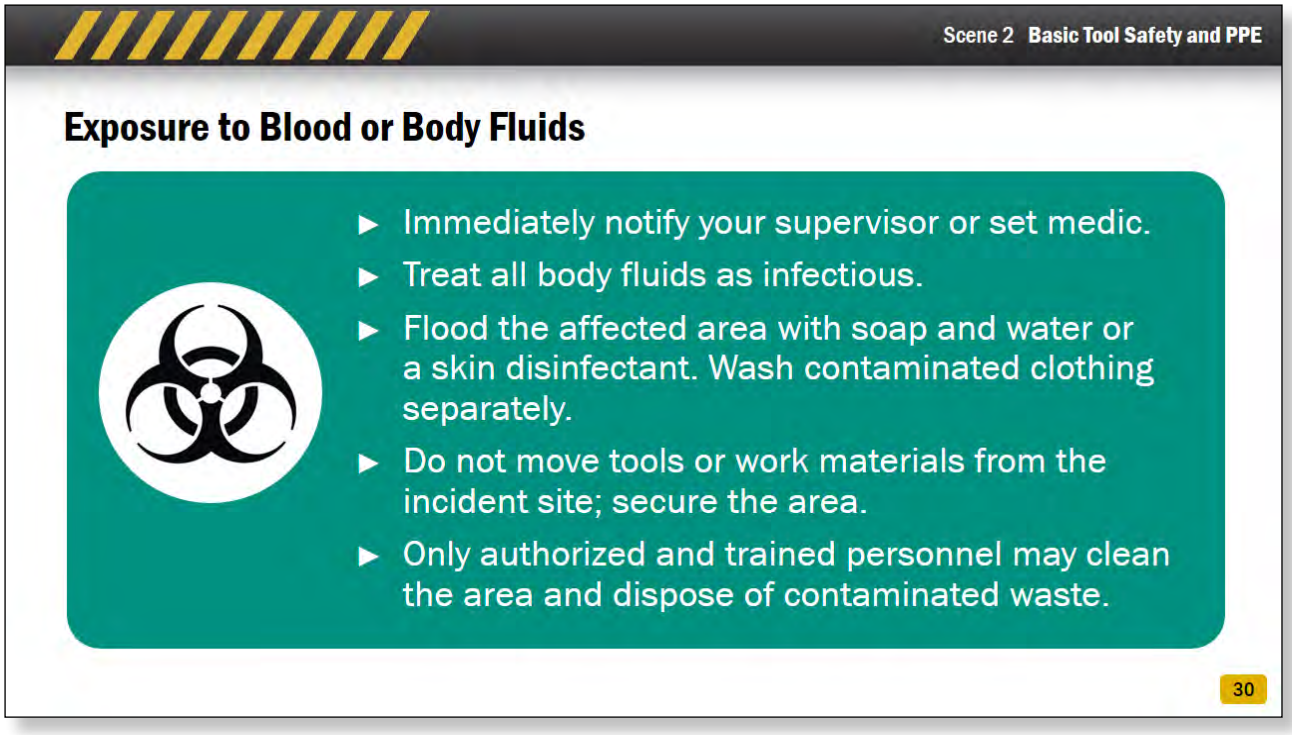
There are numerous ways that work materials and workshop practices may combine to create hazards.

For example, fumes, vapors, or gases can arise from welding; heating and molding plastics; paint, solvents, and cleaning products; or, operating fuel-powered tools. Sparks and heat could ignite flammable materials. Grinding certain metals or wood may produce combustible dust.

Be aware of your surroundings—even if you're not working with a hazardous material, someone near you might be. Make sure you have proper ventilation, wear appropriate PPE for the job, and store and dispose of paint, rags, and other hazardous materials according to your employer's policies.



When you arrive on a job site, find the location of the nearest fire alarm, emergency exits, and first-aid equipment such as an eyewash station. Know how to contact emergency services, and how to get medical aid. Be sure also that you know your exact location. Keep fire equipment and fire lanes clear and accessible at all times. Smoke only in designated areas. Look for the evacuation plan posted at each work location, and note the closest exit. In an evacuation, move quickly and calmly using stairways, not elevators. Go to the assembly area specified on the evacuation plan. Don't go back into the evacuated building until emergency workers give the all-clear signal.

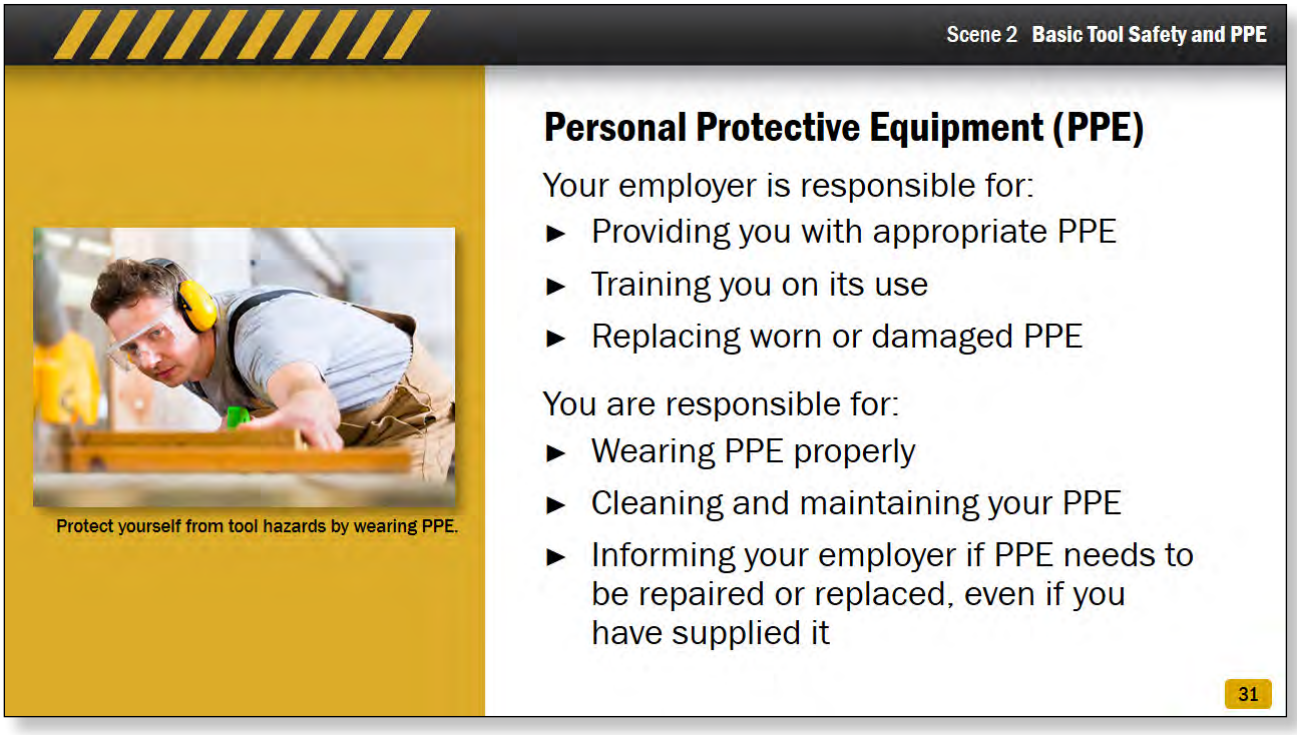


If an incident occurs, and you are exposed to another worker's blood or other body fluids, here is what you should know:

First, immediately notify your supervisor or set medic, and call 911 if necessary. Out of an abundance of caution, regard all body fluids as infectious.

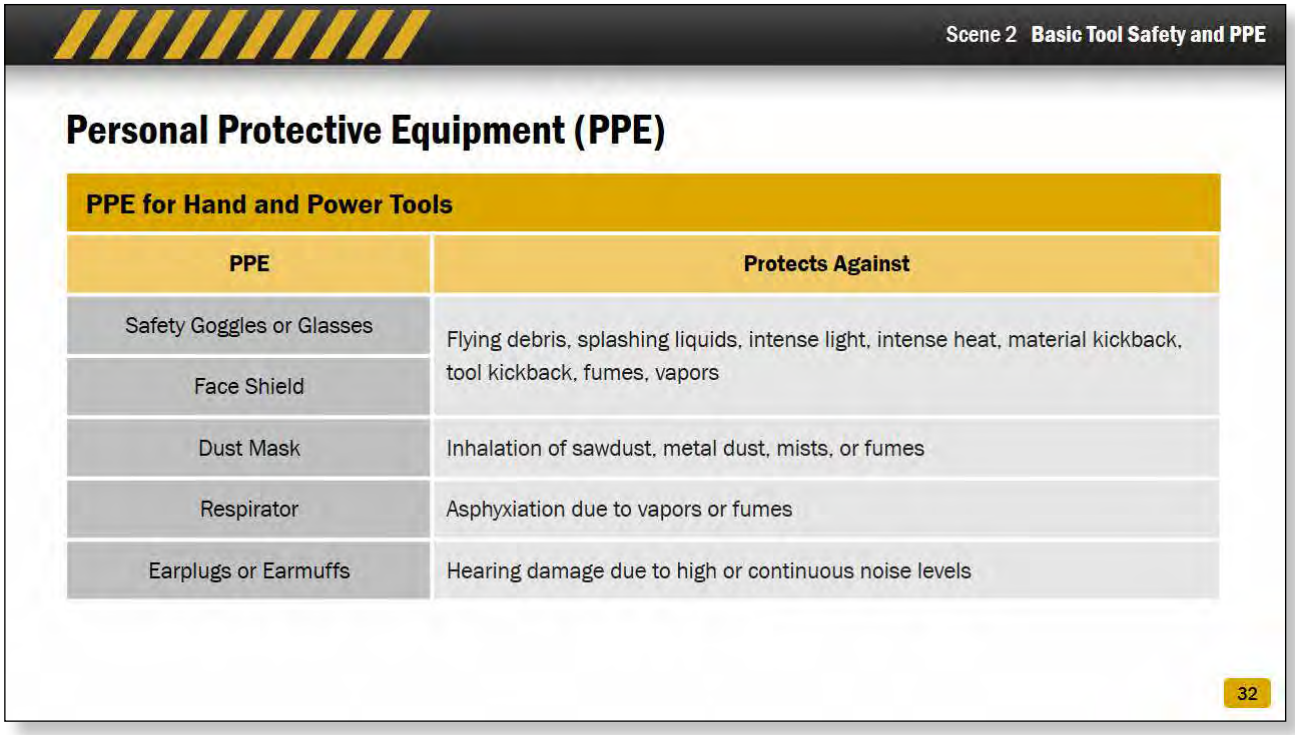
If you are exposed to blood or body fluids, flood the affected area with soap and water or a skin disinfectant, even if you were wearing PPE in that area. Report the exposure to your employer. Wash contaminated clothing separately from other laundry.

Don't move any tools or work materials from the site of the incident. Secure the area as is, and prevent further access in order to allow for a possible investigation. Don't wipe down or clean up anything yourself--only authorized and trained personnel should clean the area and dispose of any contaminated waste.



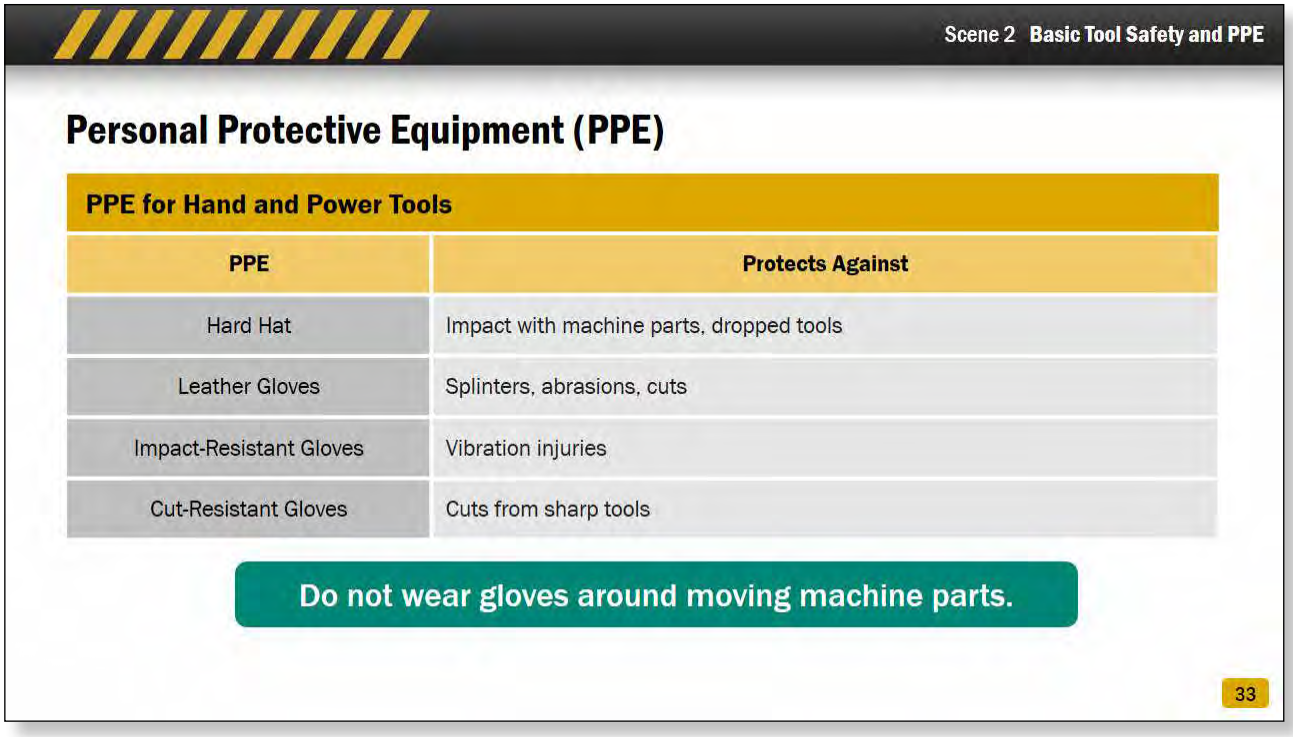
Let's talk more about PPE.

Along with implementing other workplace controls that protect you from work hazards, your employer is responsible for providing you with appropriate PPE for the work at hand, training you on its use, and replacing worn or damaged PPE.



What are the main types of PPE for tool hazards?

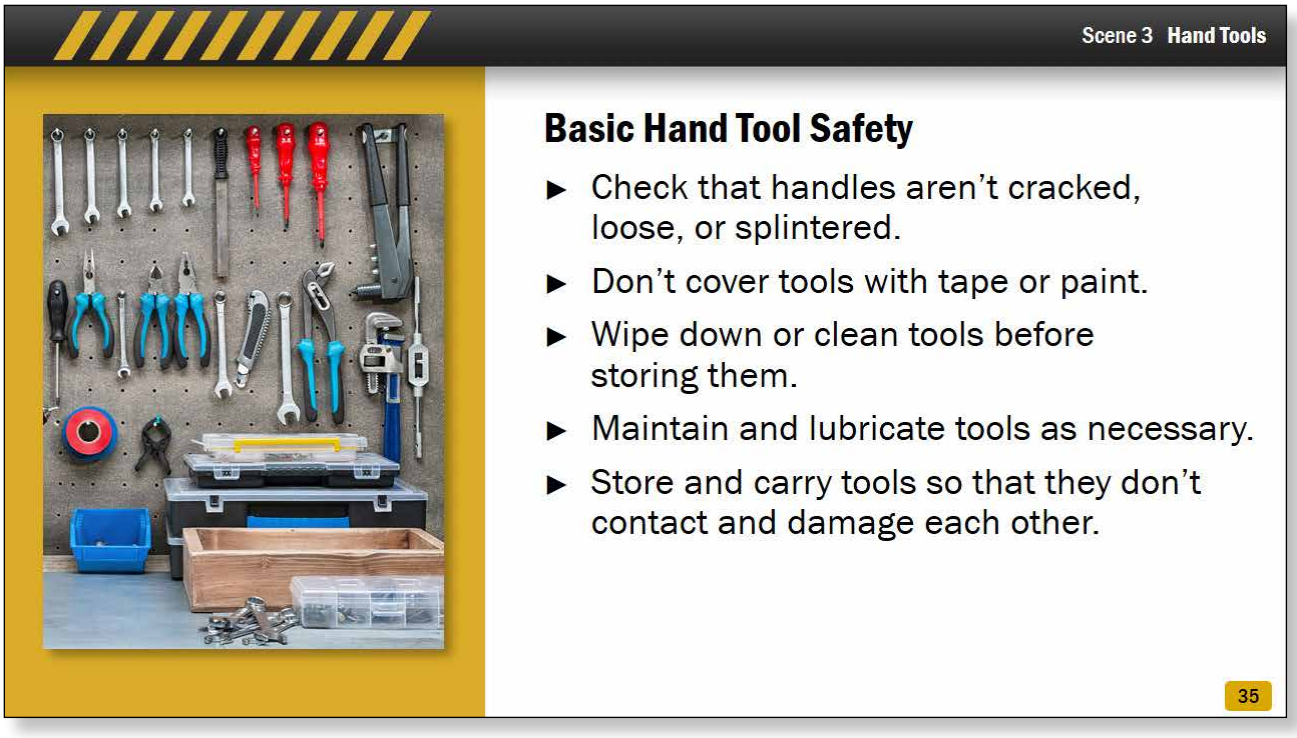
Eye protection is a must for most types of work. This includes safety goggles, safety glasses, and face shields. Note that safety goggles must fit over a worker's regular prescription glasses, and that a face shield may sometimes need to be worn in conjunction with safety glasses. Dust masks and respirators prevent lung damage and asphyxiation. Earplugs or earmuffs must be worn when noise levels reach hazardous levels.



Hard hats guard against impact with machine parts, and dropped materials or tools. Specialized gloves protect from injuries ranging from cuts on the hand to electric shock.

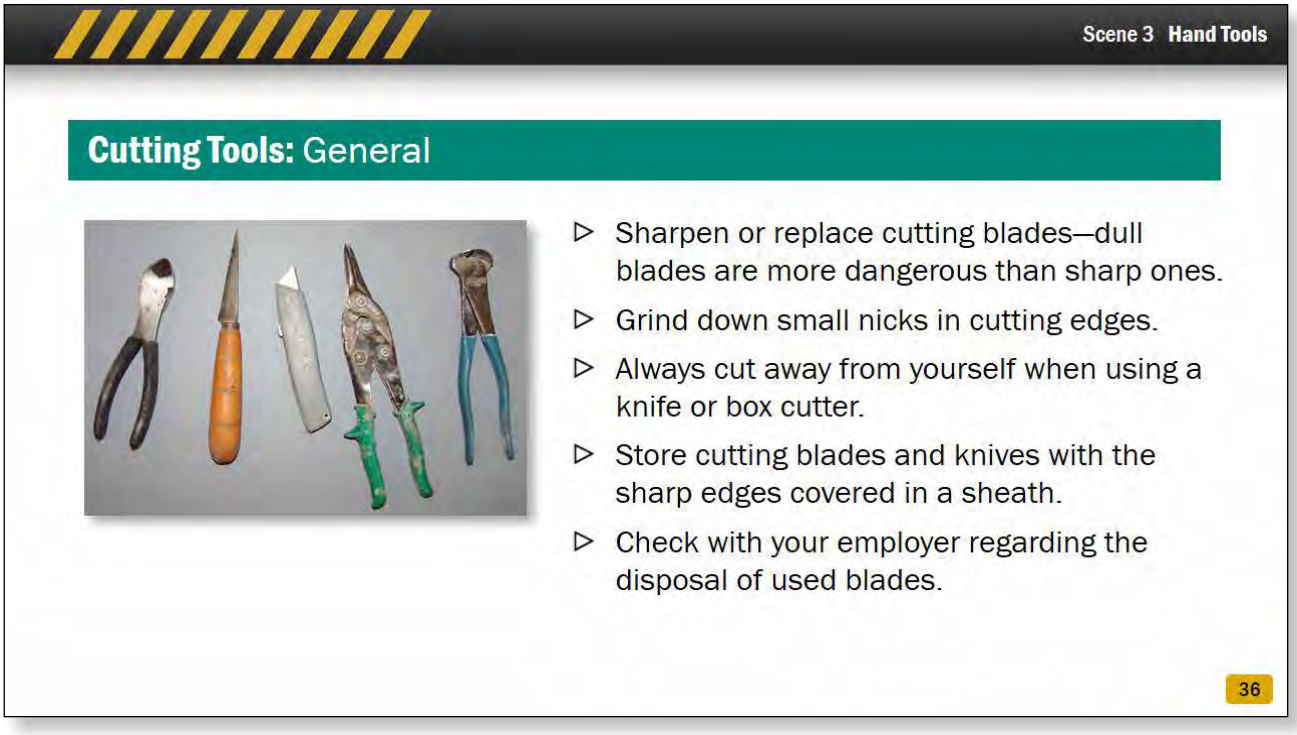
However, do not wear gloves around tools or machines with moving machine parts, as the glove, and then your body, can get pulled into the machinery.

Now that we've gone over basic tool safety and PPE, let's talk about hand tools.



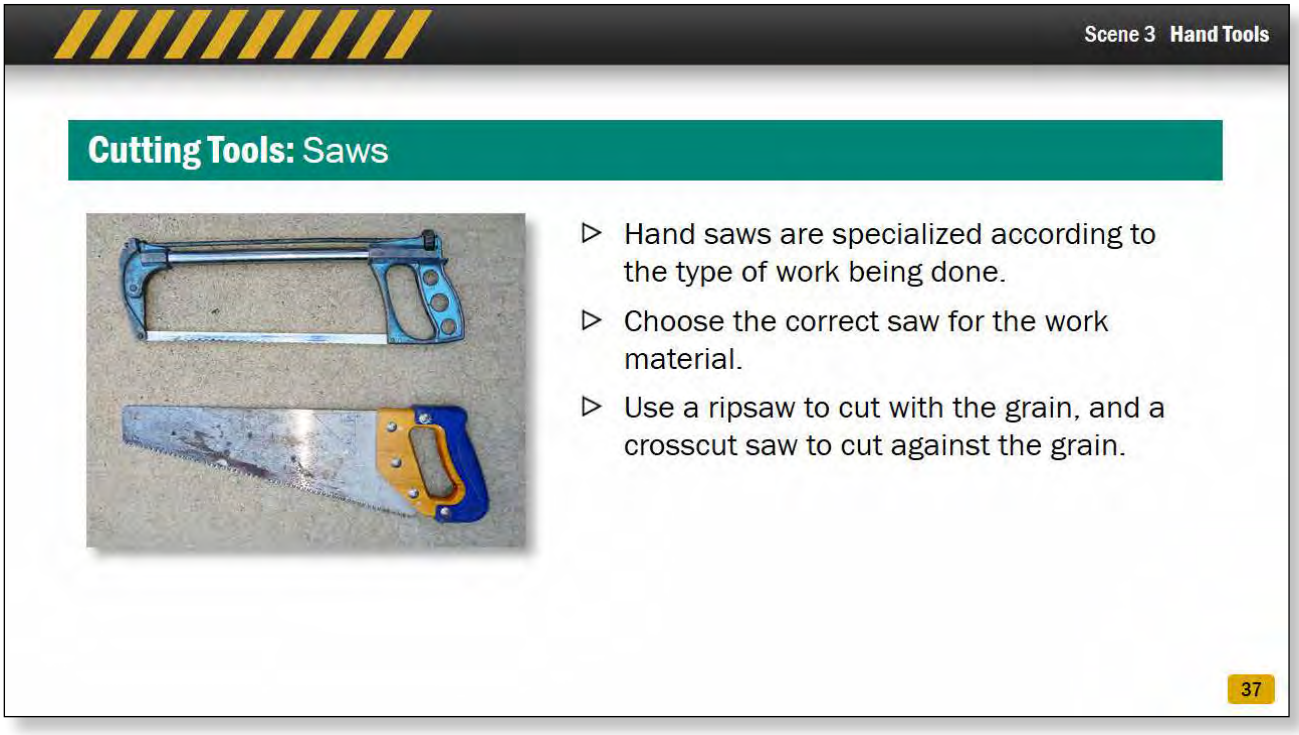
Here are some basic tips when using hand tools:

Always check that a tool's handle isn't cracked, loose, or splintered. Don't wrap tool handles with tape, which may prevent you from seeing a crack or other damage. Wipe down your tools before you put them away, and lubricate them as necessary. Store and carry tools in a way that prevents them from contacting and damaging each other.

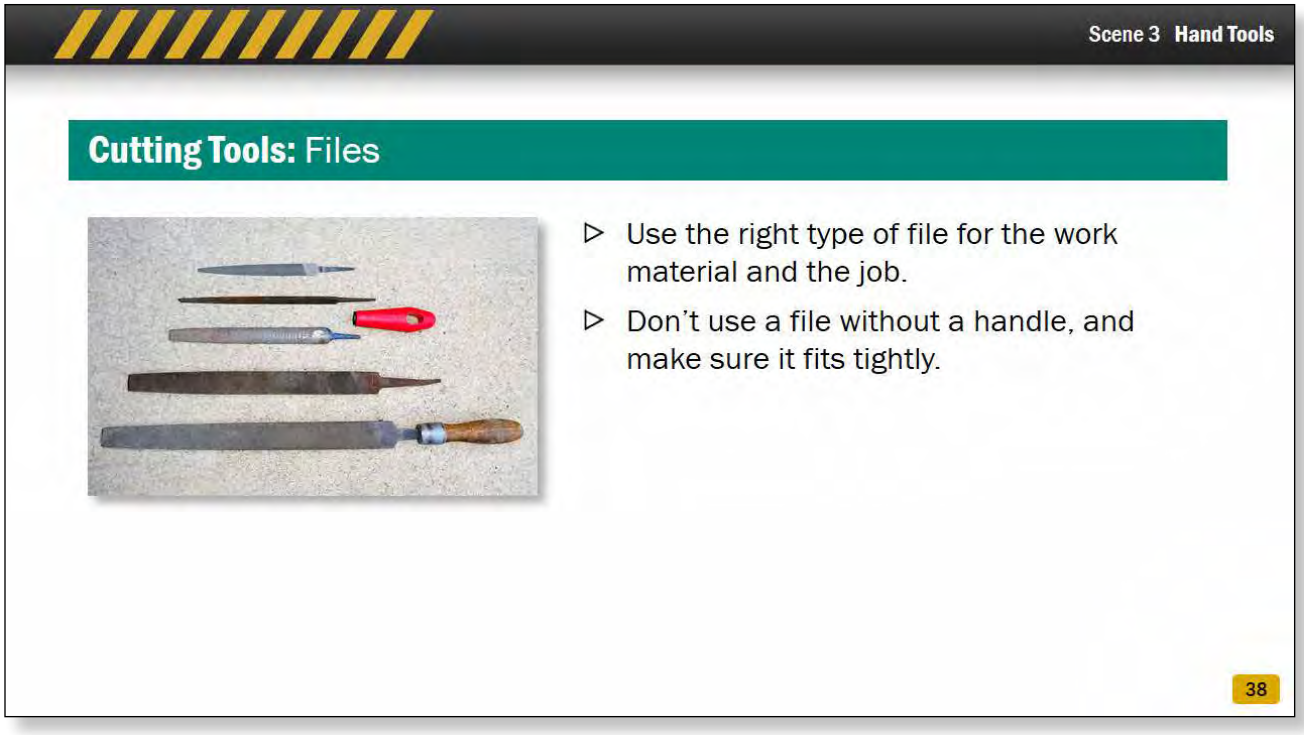


Let's start with cutting tools.

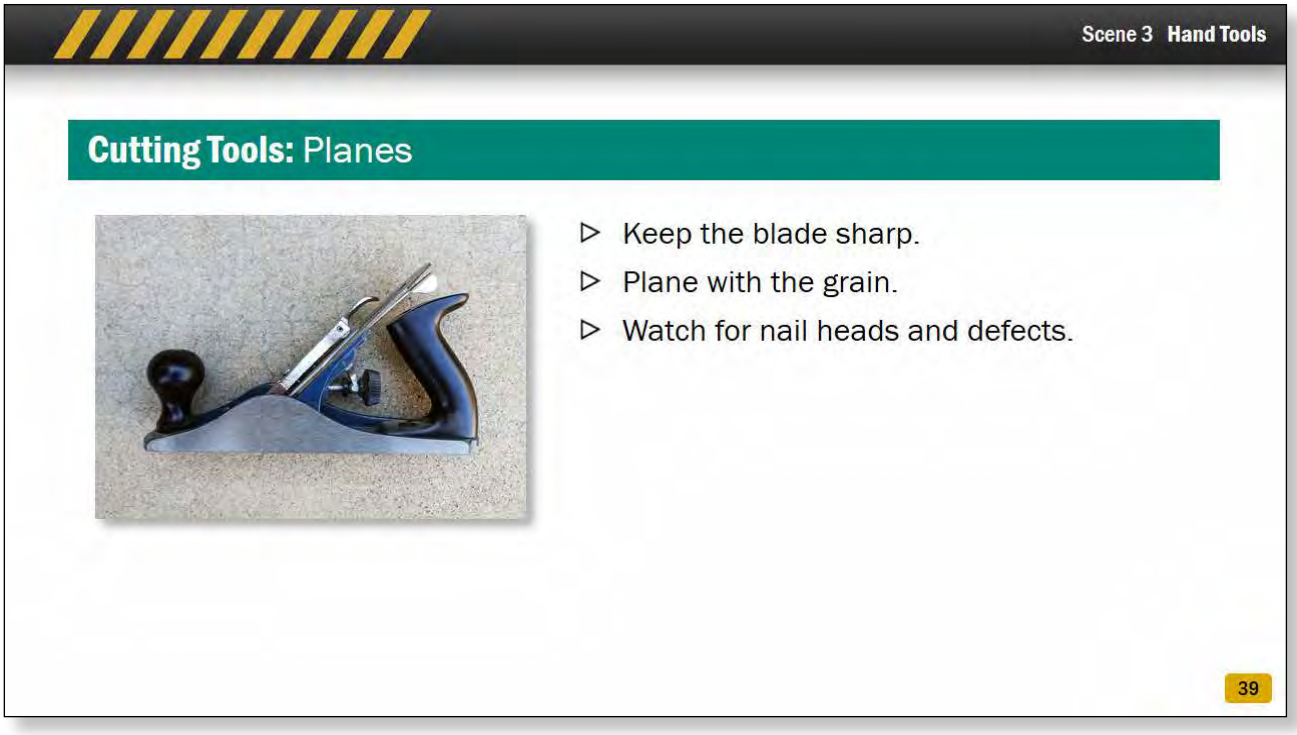
In general, keep your cutting edges sharp—a dull blade can be more dangerous than a sharp blade, because you will need to apply more pressure to the tool. If a cutting edge develops a nick, grind it down. Cut away from yourself, especially when using a knife or a box cutter. Protect yourself from cuts by storing tools with sharp edges in sheaths when not in use. And, check with your employer or safety rep regarding proper disposal of used blades.



Hand saws are specialized for different tasks, such as rough cuts, finishing work, plunge cuts, holes, or angles. You should also make sure that you're using the correct saw for what you're cutting, whether it's wood, metal, drywall, plastic, or another material. When cutting wood, use a ripsaw to cut with the grain, and a crosscut saw to cut against the grain.

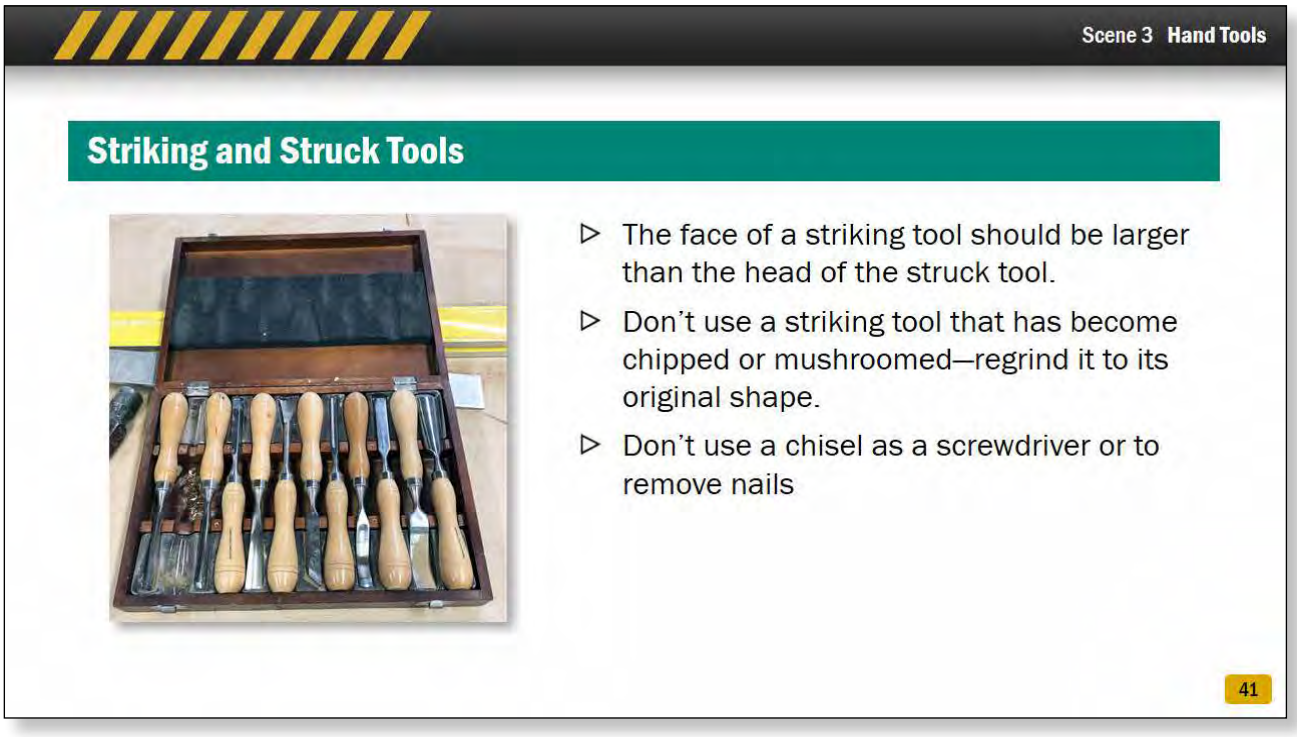


Files also come in different types. Make sure you're using the correct style for what you are filing. Don't use a file without a handle, and make sure it fits tightly.

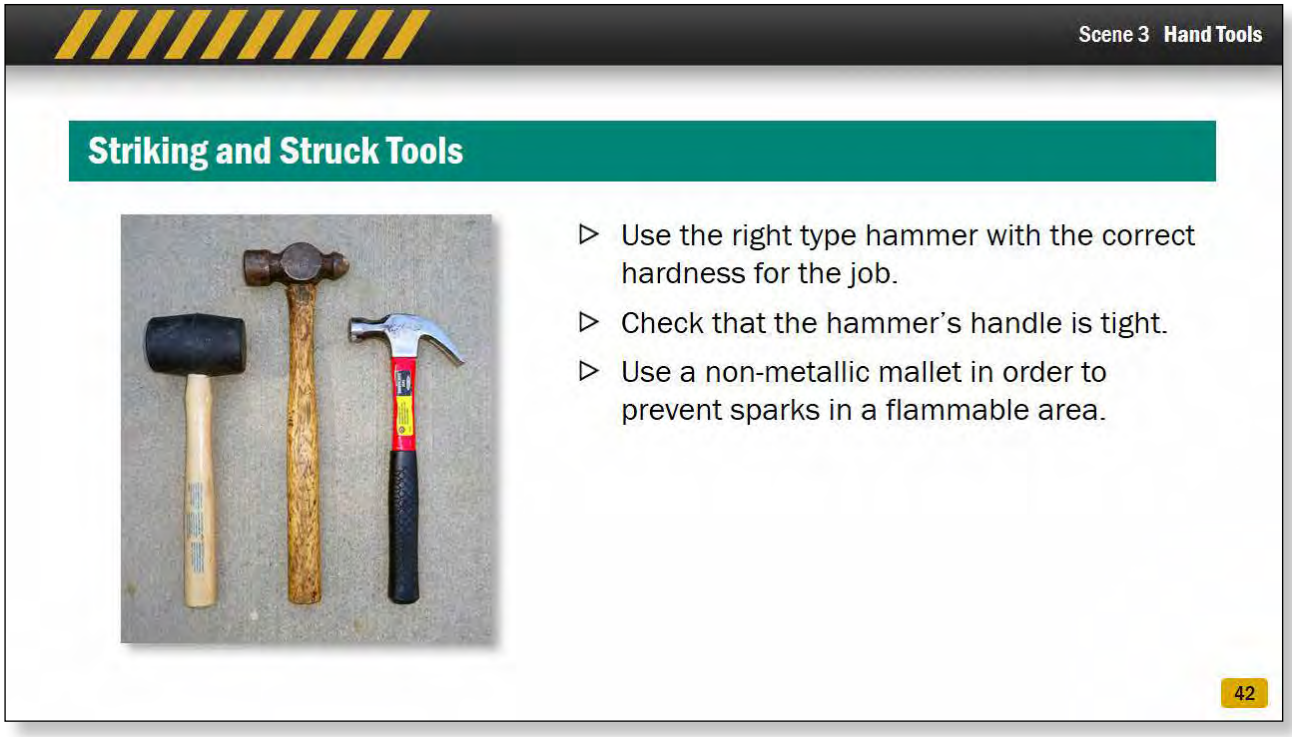


Keep the blade sharp on a planing tool. Plane in the direction of the wood's grain, and watch for nail heads and defects in the wood, which can damage your blade.

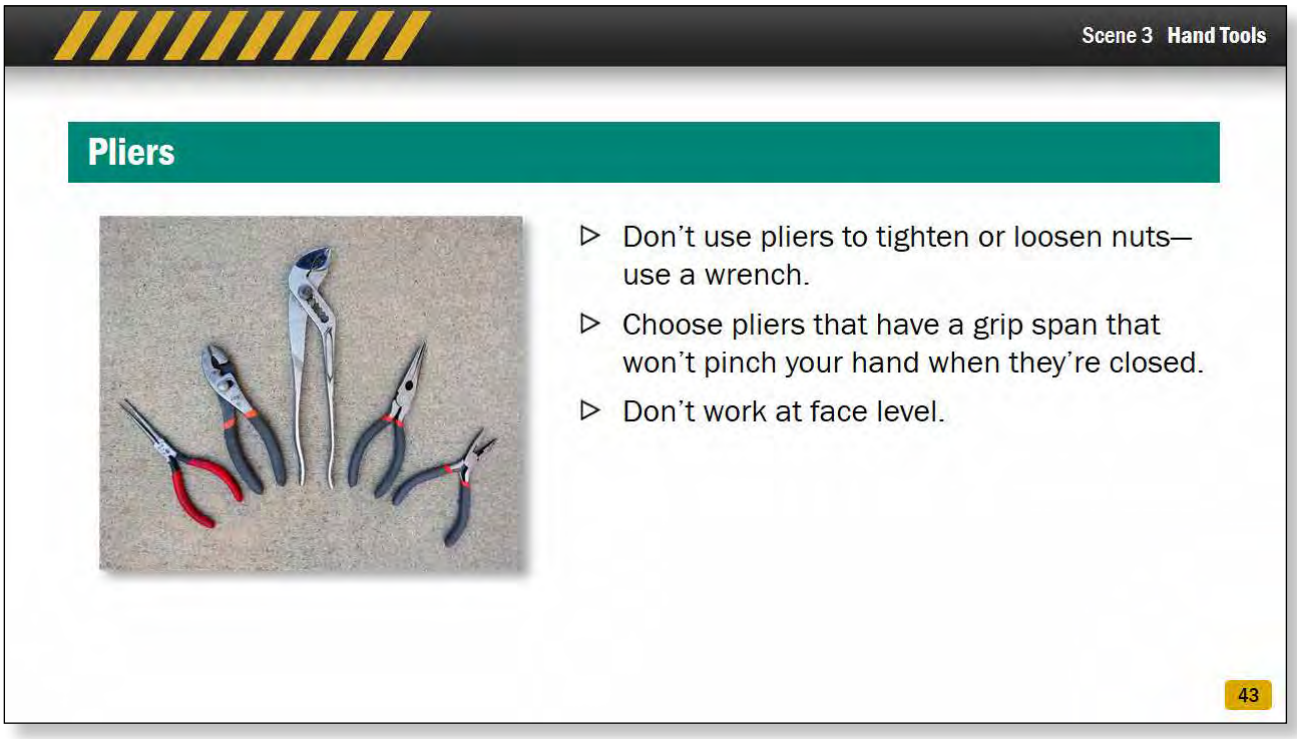
When using snips, keep your free hand away from the blades of the tool. Wear PPE to protect your eyes from flying fragments as you're working.



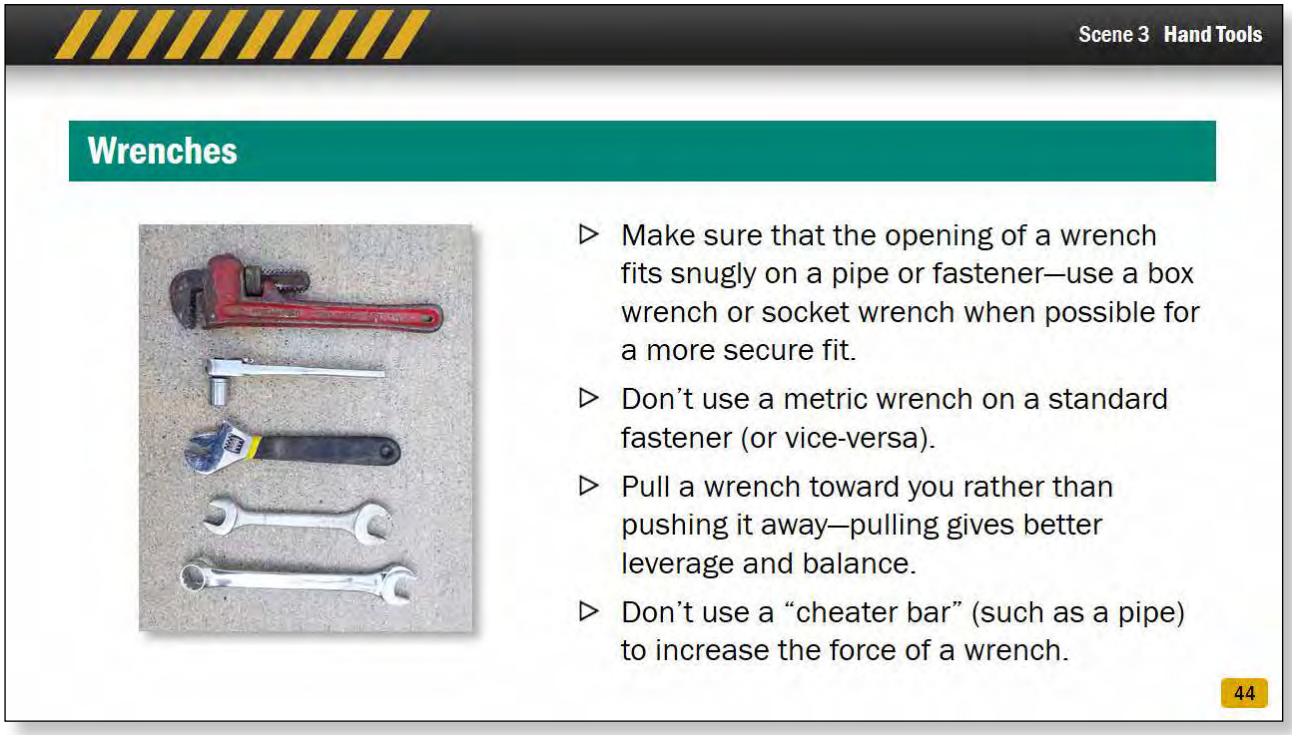
When it comes to striking and struck tools, such as hammers and chisels, it's important to match the sizes of the tools. The face of the striking tool should be larger than the head of the struck tool. When a hammer or a chisel becomes chipped or mushroomed, don't use it until it's reground to its original shape. Don't use a chisel as a screwdriver, or to remove nails.



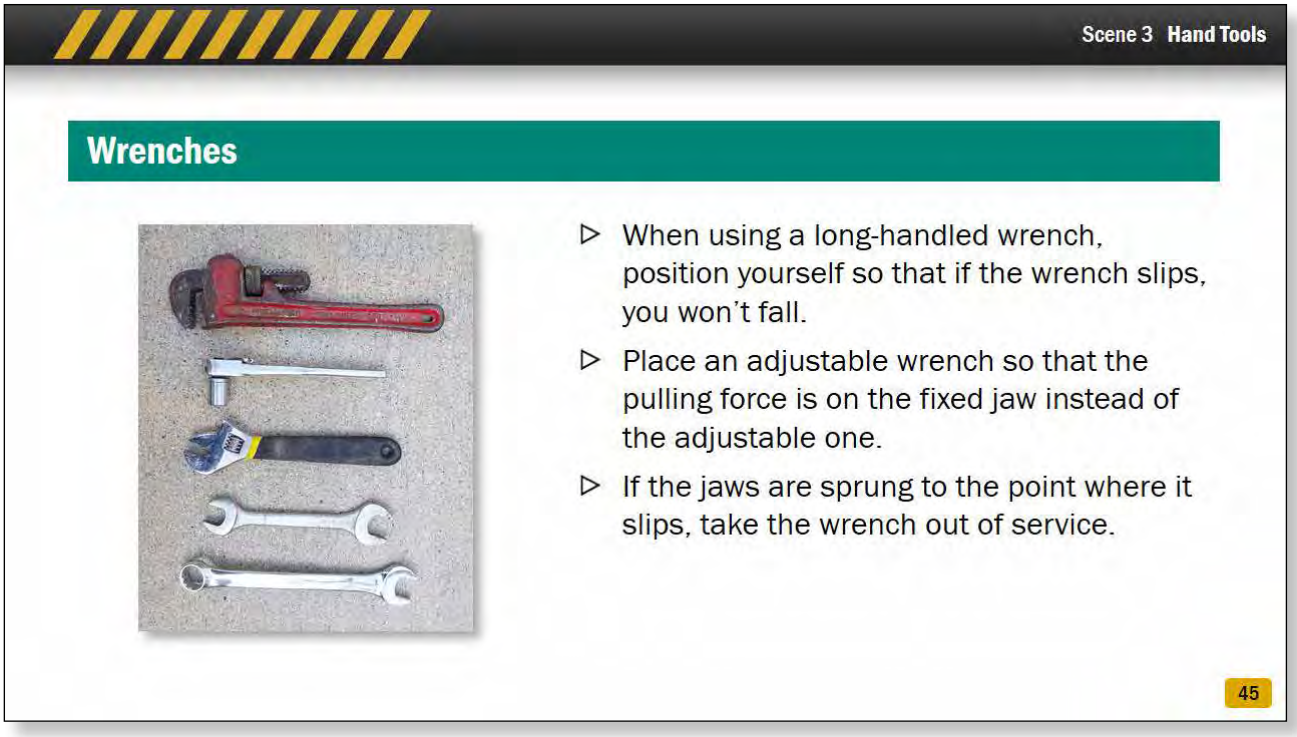
There are many hammers and mallets available, so choose one that is the right type and the correct hardness for the job, and be sure to check that the handle is tight. Use a non-metallic mallet in order to prevent sparks in a flammable area.



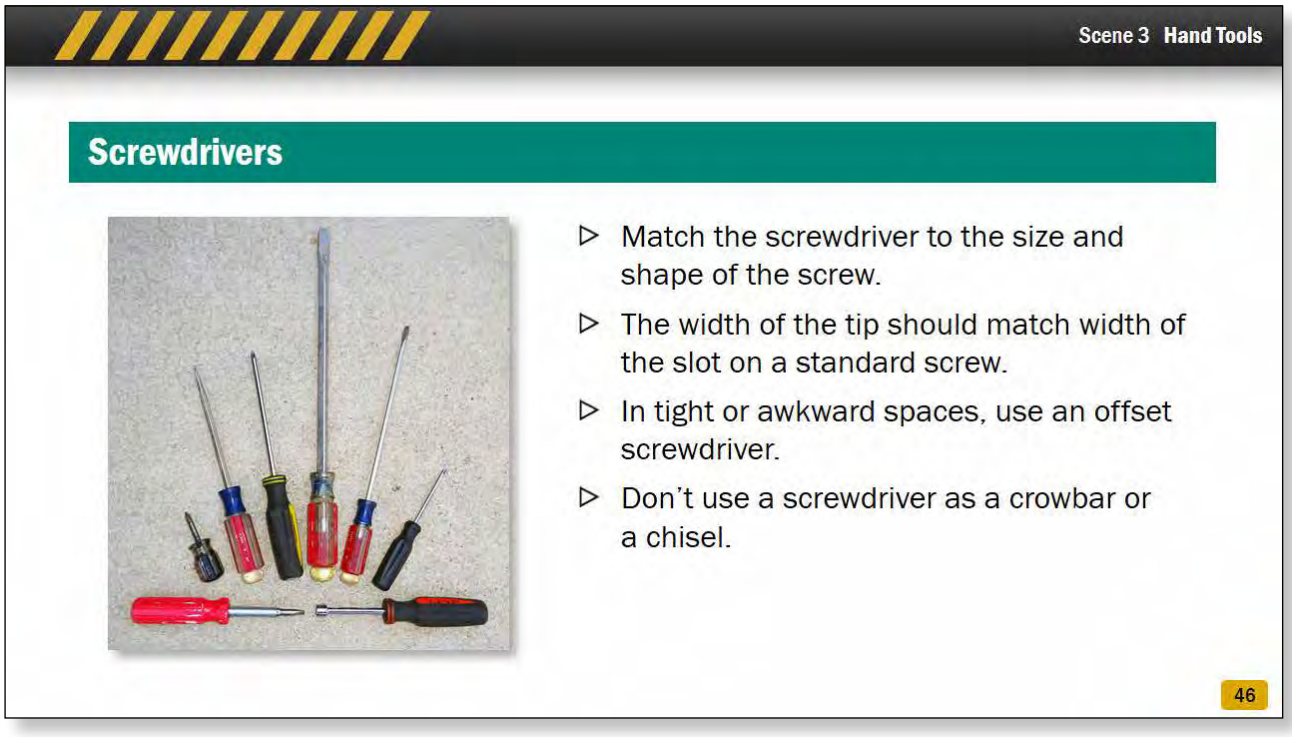
Pliers are for gripping, twisting, or cutting. Don't use them to tighten or loosen nuts—use a wrench. Choose pliers that have a grip span large enough that they won't pinch your hand when they're closed. Prevent eye injuries by avoiding working at face level.



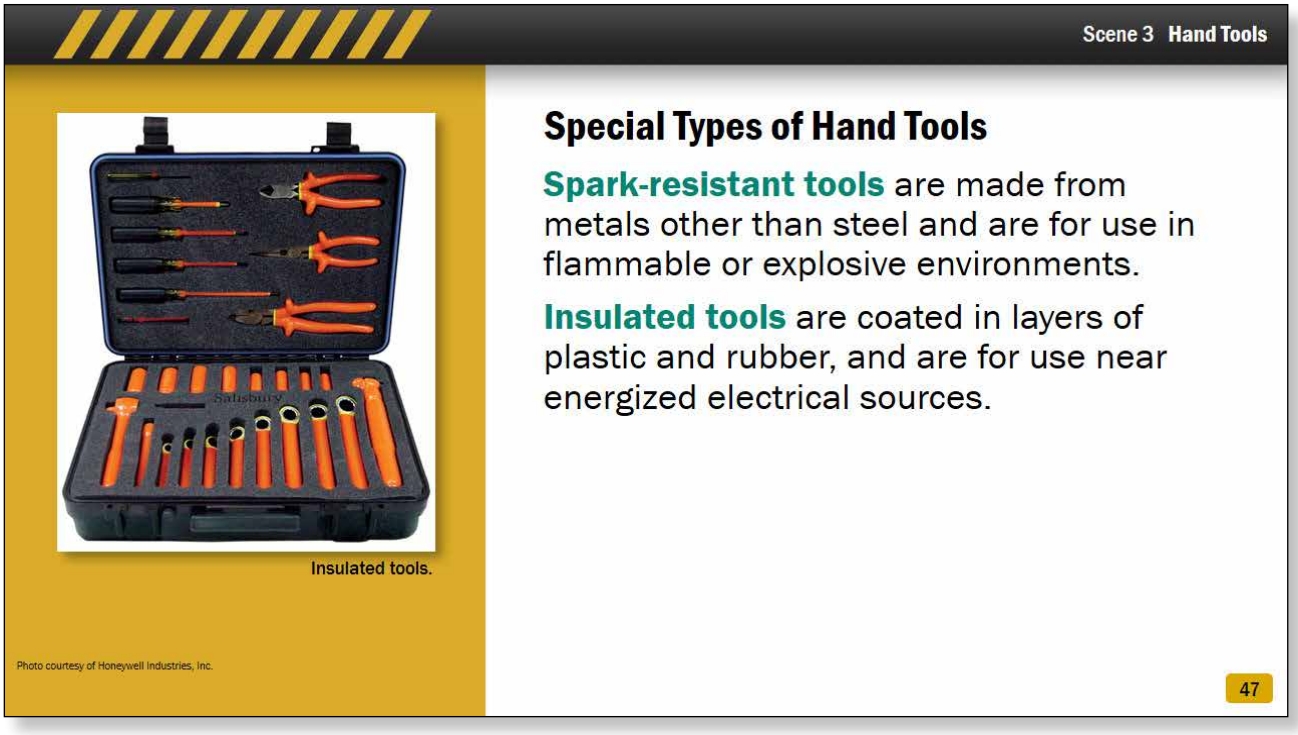
Wrenches are used to loosen and tighten pipes, nuts, and bolts. Make sure that the opening of the wrench fits snugly on the pipe or fastener. Use a box wrench or socket wrench when possible for a more secure fit. Don't use a metric wrench on a standard fastener, or vice-versa. Pull a wrench toward you rather than pushing it away. This gives you better leverage and protects your hands in case the wrench slips. Don't use a "cheater bar" such as a pipe over the wrench handle to increase the force of a wrench—use a longer wrench instead.



When you do use a long-handled wrench, position your body so that if the wrench slips, you won't fall. Place an adjustable wrench so that the pulling force is on the fixed jaw of the tool, instead of the adjustable jaw. If the jaws of a wrench are sprung to the point where it constantly slips, take the wrench out of service.



Screwdrivers come in a wide range of sizes and styles. Always match the driver to the screw head, whether it's standard, Phillips, hexagonal, or another shape. On a slotted screw, make sure the width of the screwdriver tip is the same as the width of the slot. Use an offset screwdriver for more control in tight or awkward spaces. And, never use a screwdriver as a crowbar or a chisel.



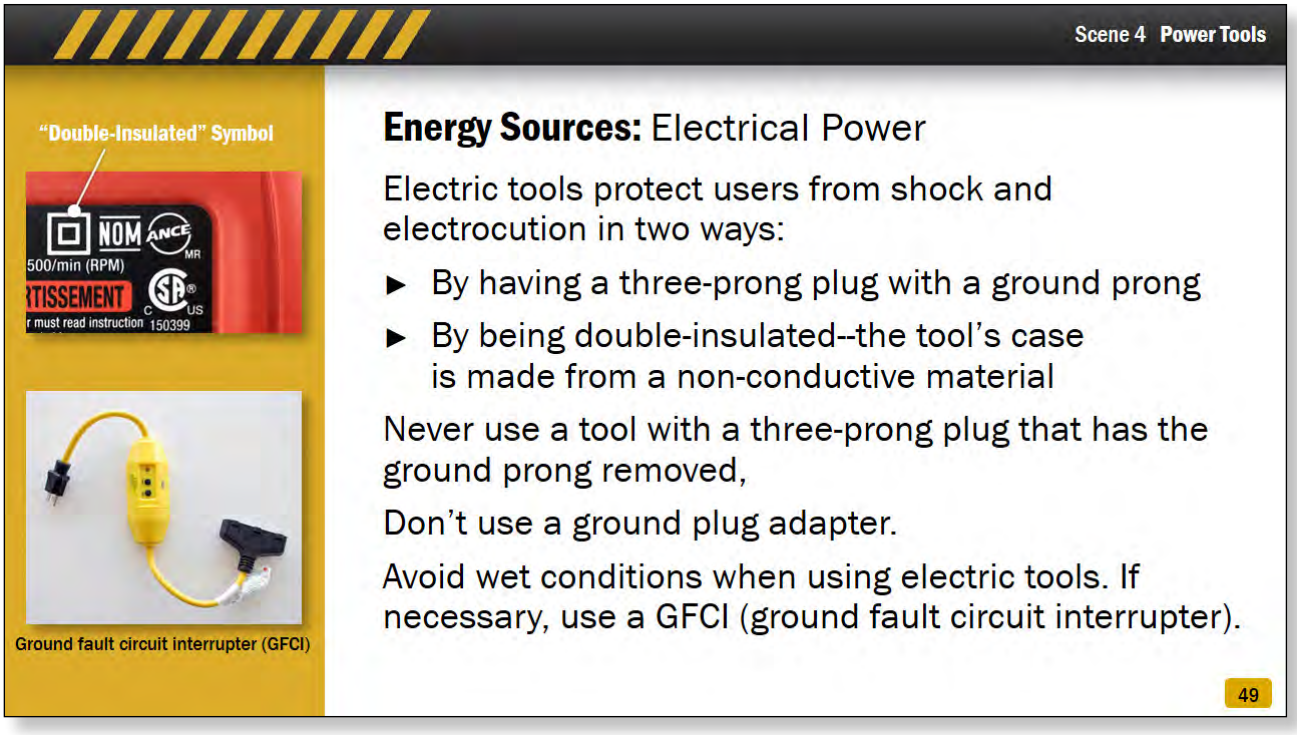
Some hand tools are designed for use in certain conditions.

Spark-resistant tools are made from metals other than steel, such as brass, bronze, copper, or aluminum. Any sparks created by these tools are less dangerous in flammable environments than sparks from steel tools.

Insulated tools are coated in layers of plastic and rubber, and protect against conductivity from energized electrical sources.

As we have previously mentioned, power tools are energized by a power source.

This scene will review those sources of power, discuss machine guarding and lockout/tagout, and provide both general and specific safety information for common power tools.

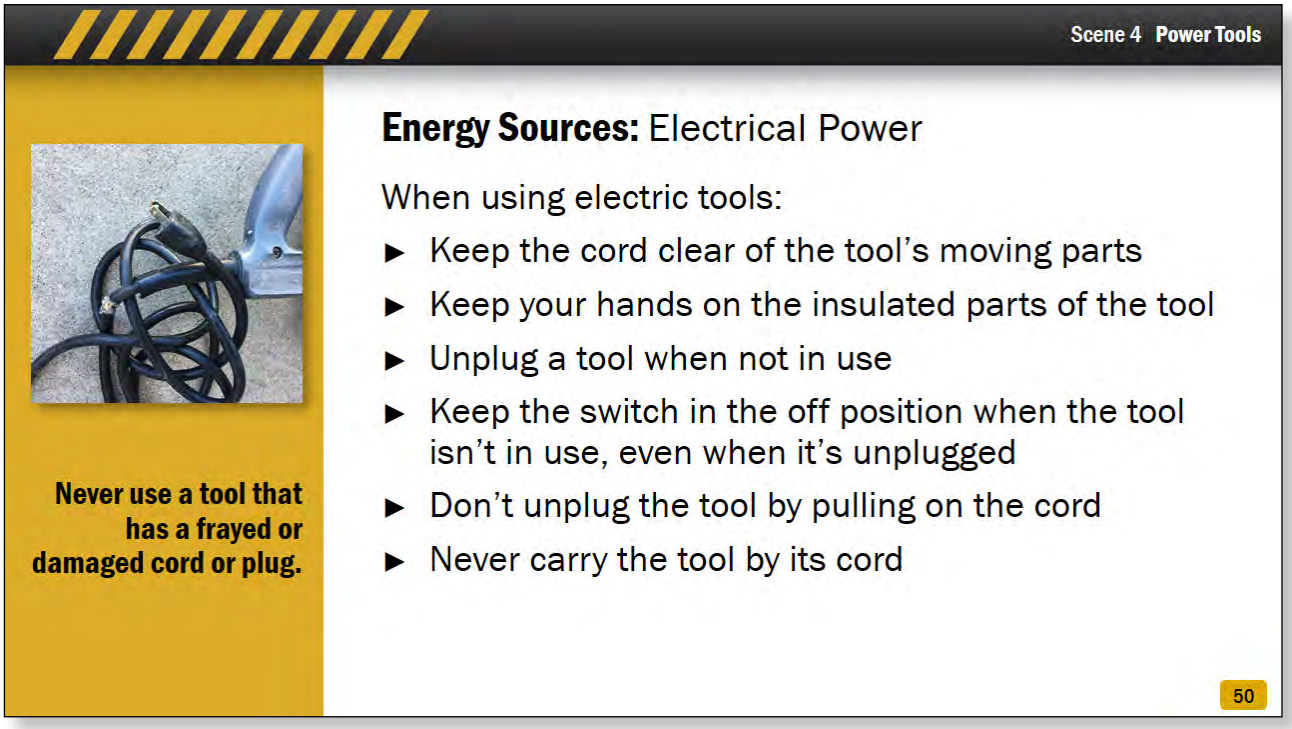


One of the most common sources of energy for power tools is electrical power. The main hazard of working with electricity is electrical shock.

Power tools are designed to protect you from this in two ways: by having a three-prong plug that contains a pin which grounds the tool, or, by being double-insulated, which means that the tool's case is made from a non-conductive material.

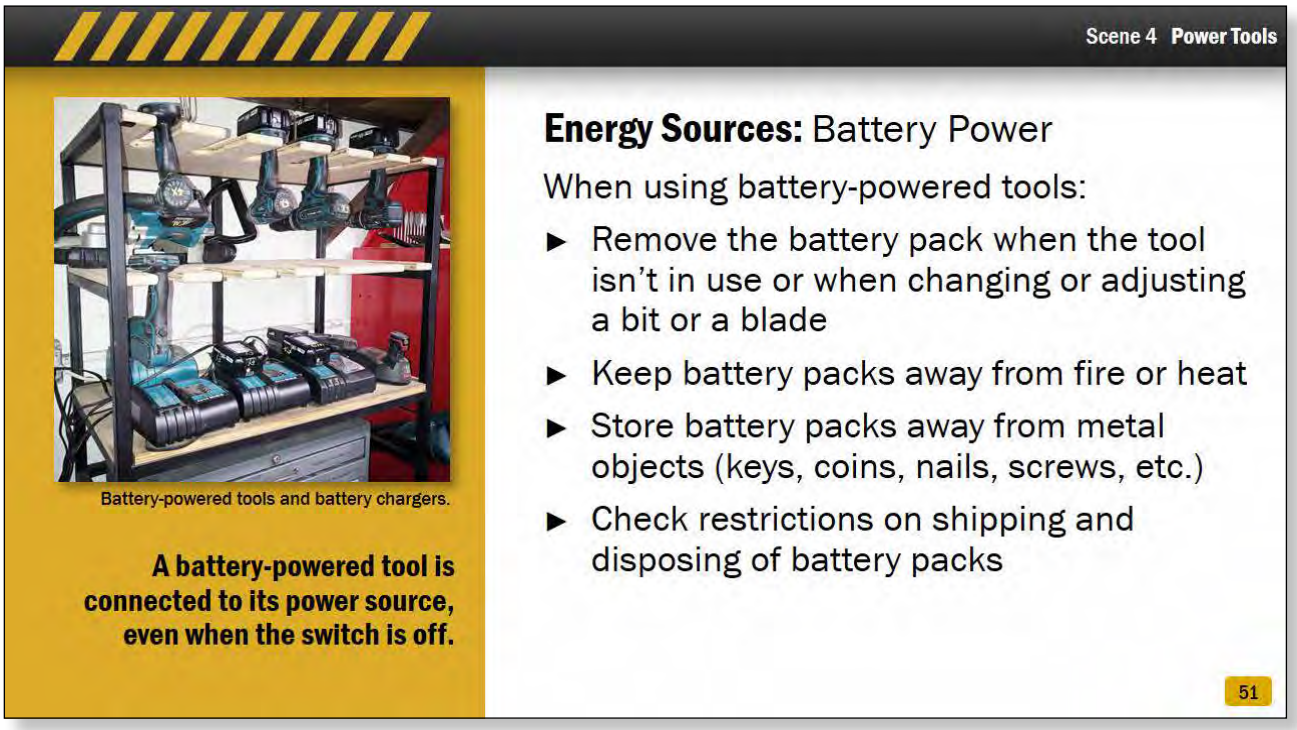
Double-insulated tools will be marked with the symbol at left. Never use a tool that has the ground prong removed, and don't use a ground plug adapter to plug a three-pronged plug into a two-prong outlet.

Avoid wet conditions when using electric tools. If it's necessary to work in those conditions, use a ground fault circuit interrupter (or, GFCI).



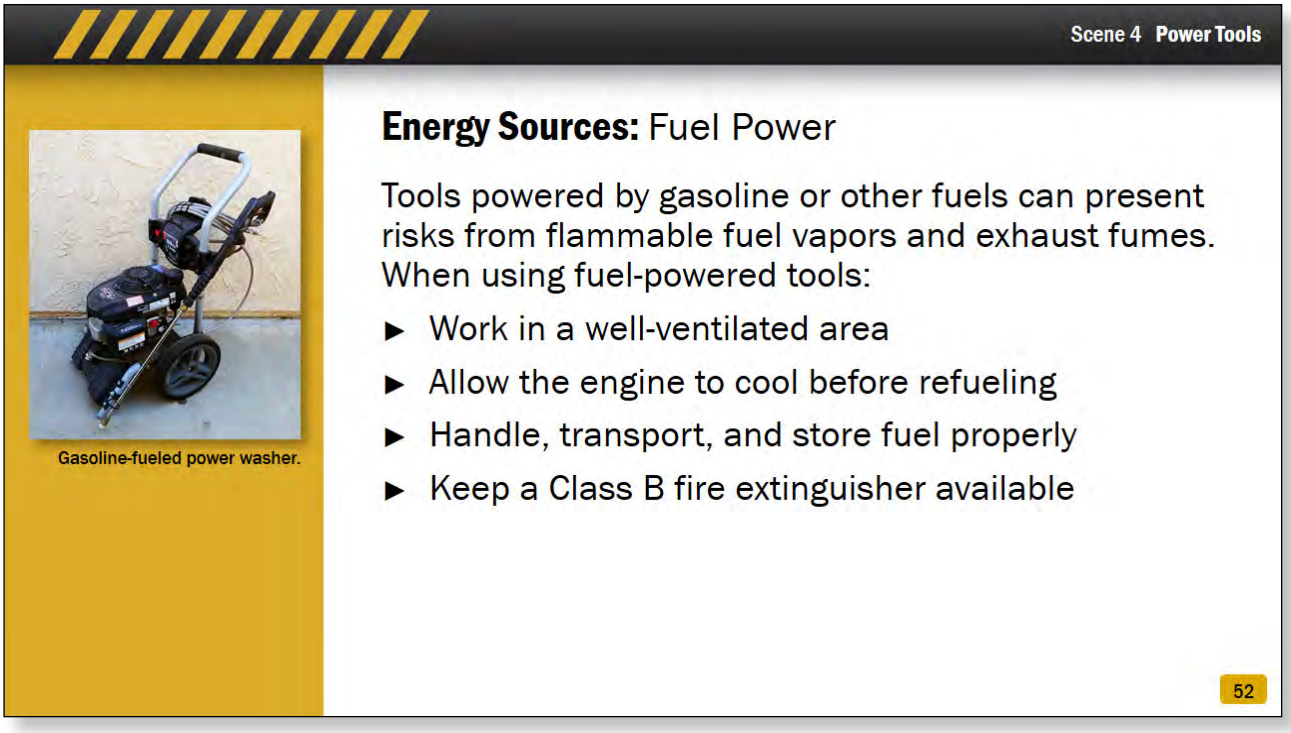
There are some basic safety rules you should follow when working with corded electrical tools.

For example, keep the cord clear of the tool's moving parts, so that you don't cut or damage it. If the tool is insulated, keep your hands on the insulated parts. Unplug a tool when it's not in use, or when you are changing or adjusting a bit or a blade. Keep the tool's switch in the off position when it's not in use, even if the tool is unplugged. Unplug the tool by the plug and not by pulling on the cord, and never carry a tool by its cord. Finally, never use an electric tool that has a frayed or damaged cord or plug. This applies to extension cords as well.



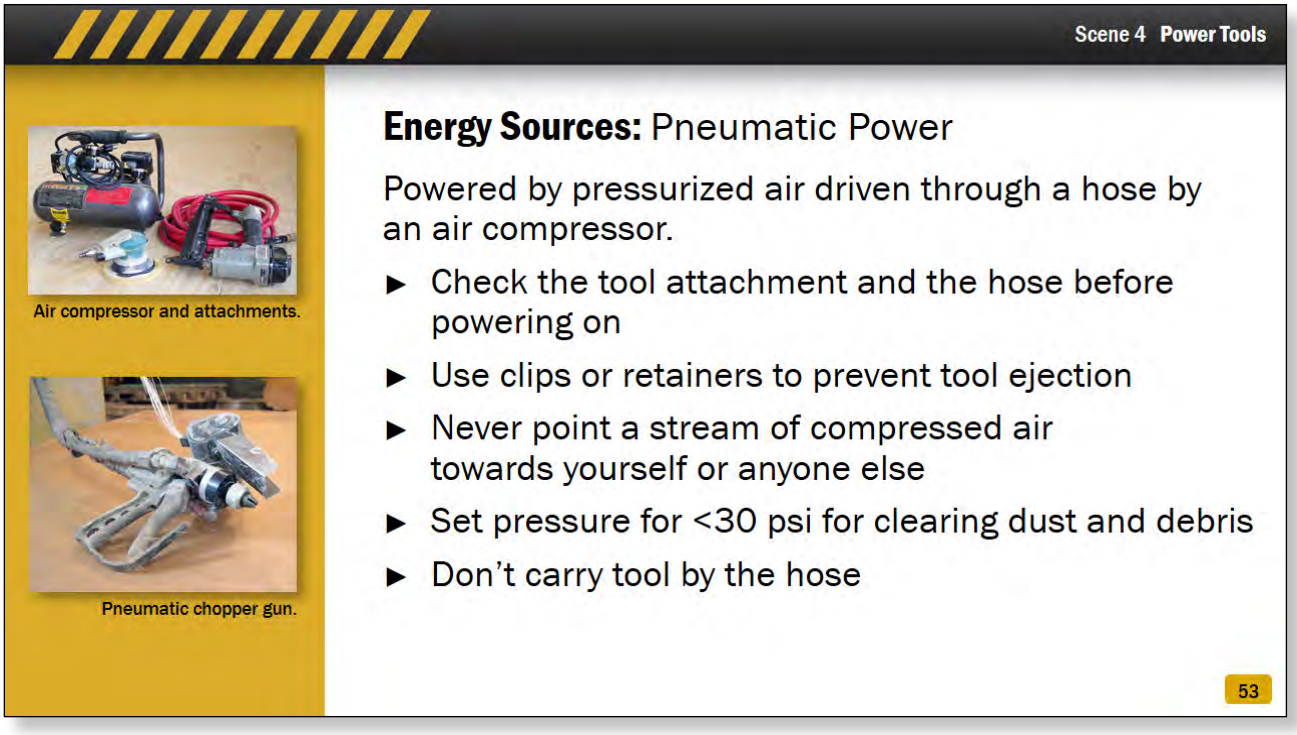
Battery power is another common source of energy for power tools. Keep in mind that a battery-powered tool is connected to its power source even when the switch is off, just as an electric tool is when it's plugged into a socket. Remove the battery pack when the tool isn't in use, or when changing or adjusting a bit or a blade, and keep the switch off even if the tool isn't attached to the pack.

Don't use battery-powered tools, or charge their battery packs, near fire or heat. Store the packs away from heat and metal objects such as coins, screws, or keys. Check with your employer for restrictions on disposing of battery packs. Do not throw them away with household waste



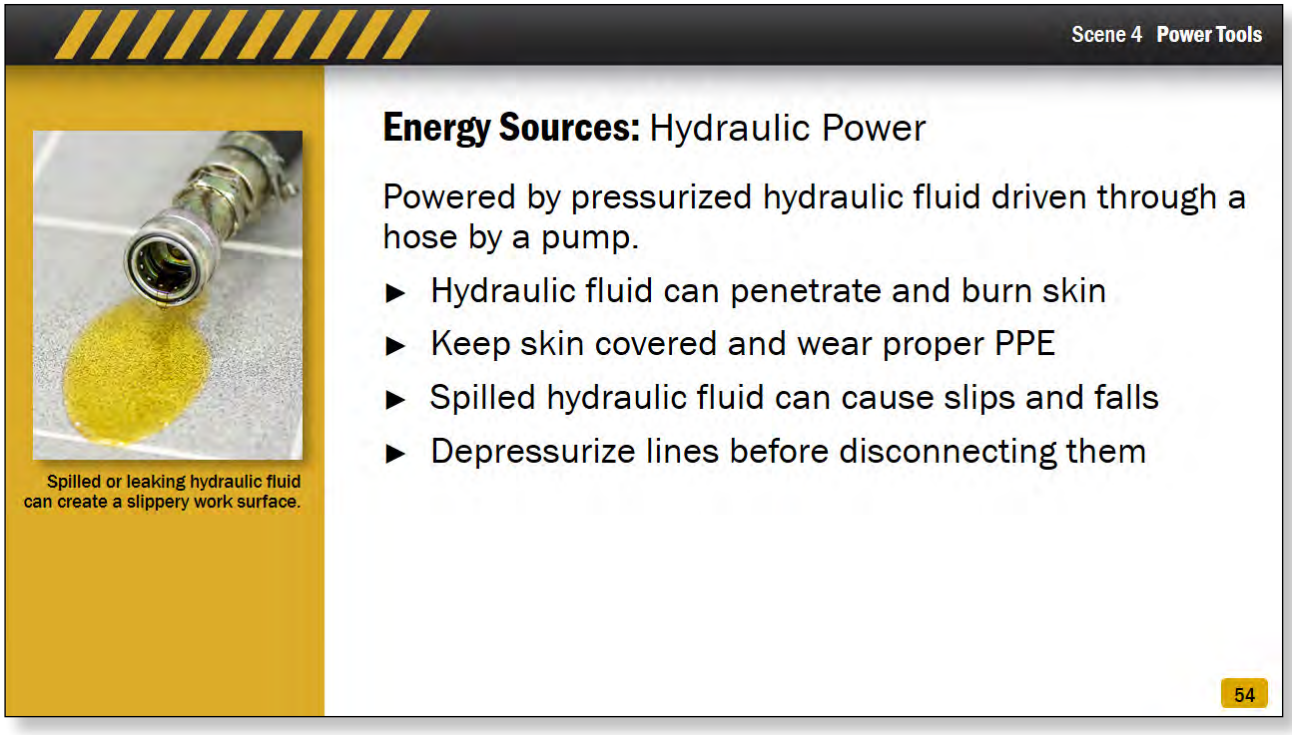
Gasoline-fueled power washer.

Some tools are powered by fuel, such as gasoline or diesel fuel. These tools can present risks such as fires from flammable vapors, and asphyxiation from exhaust fumes. Work in a well-ventilated area when using fuel-powered tools, and allow the engine to cool before refueling. Fuels should be handled, transported, and stored properly, and, keep a Class B fire extinguisher available in case of a fire.



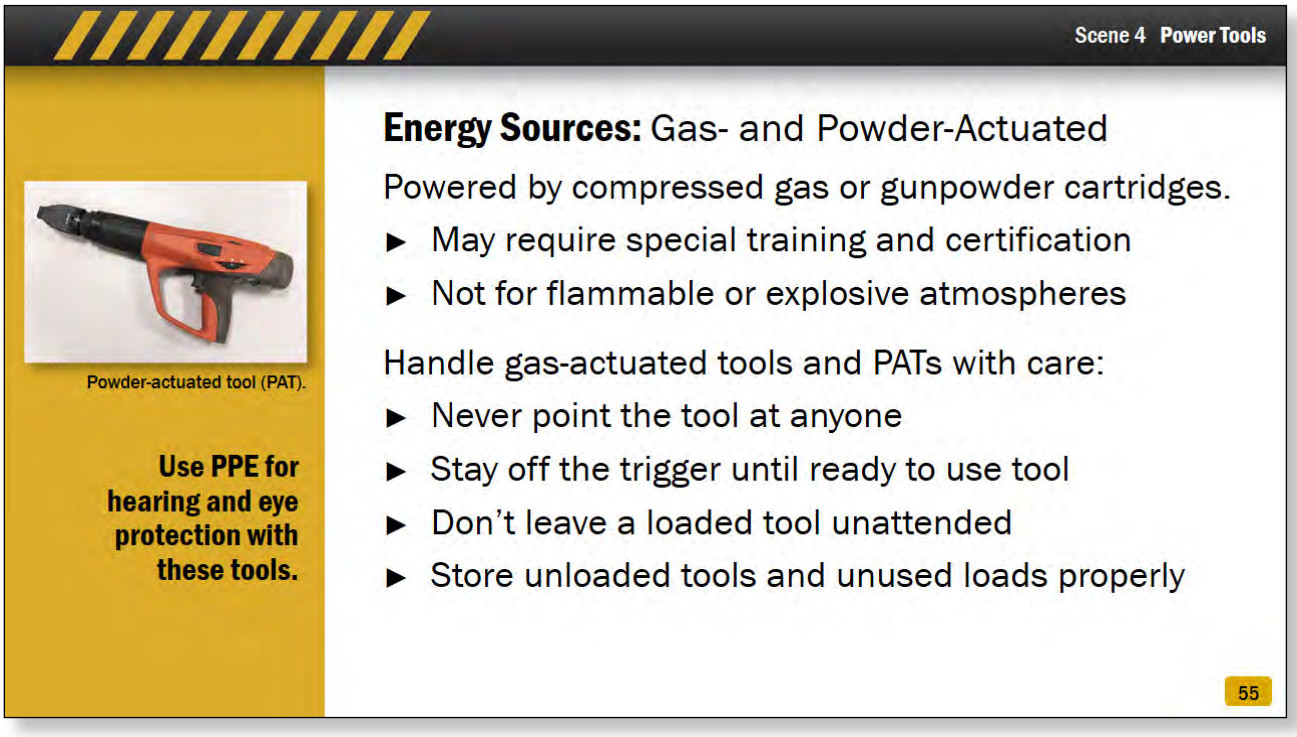
Pneumatic tools are powered by pressurized air driven through a hose by an air compressor. The compressor itself is typically fuel-powered.

Check the tool attachment and the hose for damage and tight connections before powering on the compressor. Use clips or retainers to prevent the tool from being ejected due to air pressure. Never point a stream of compressed air towards yourself or anyone else. Pressurized air that enters the eyes ears, or mouth, or that punctures the skin, can cause organ damage or air bubbles in the bloodstream. Set air pressure for less than 30 psi for clearing dust and debris from equipment or work surfaces. Finally, don't carry a pneumatic tool by the hose.



Hydraulic tools are powered by hydraulic fluid driven through a hose by a pump. Check hoses and seals for damage before powering on the pump. A leak in a hydraulic line can penetrate the skin and cause injection injuries. Hydraulic fluid can also cause burns, due to its high temperature.

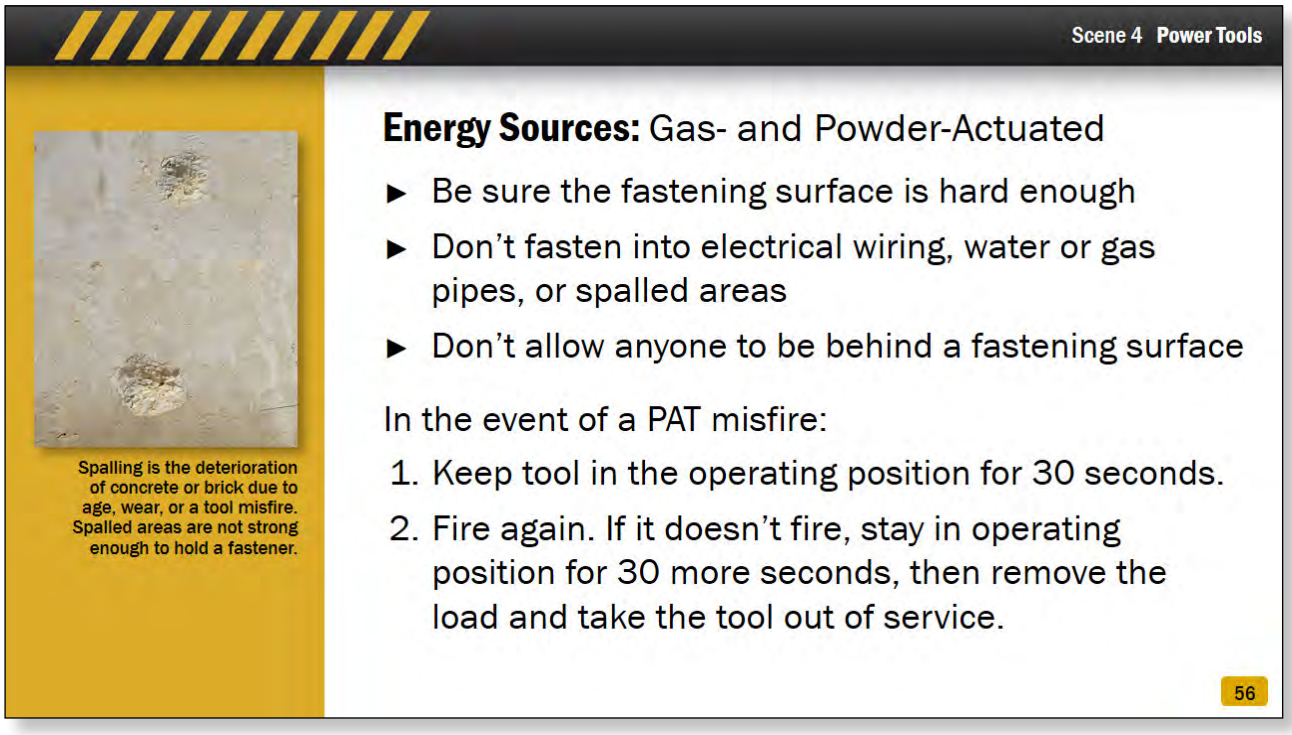
Always keep your skin covered and wear proper PPE when using hydraulic tools. Spilled hydraulic fluid can create a slippery work surface, leading to slips and falls. Clean up spills promptly and safely. When you're finished working with a hydraulic tool, turn off the power unit and depressurize the lines before disconnecting any tool attachments.



Gas-actuated tools and powder-actuated tools are cordless tools for driving fasteners into hard surfaces. Gas-actuated tools are powered by fuel cells containing compressed gas, while powder-actuated tools, or PATs, use special gunpowder cartridges. These tools can be dangerous, and employers may require special training and certification for their operation. Due to their energy sources, they can't be used in explosive or flammable atmospheres.

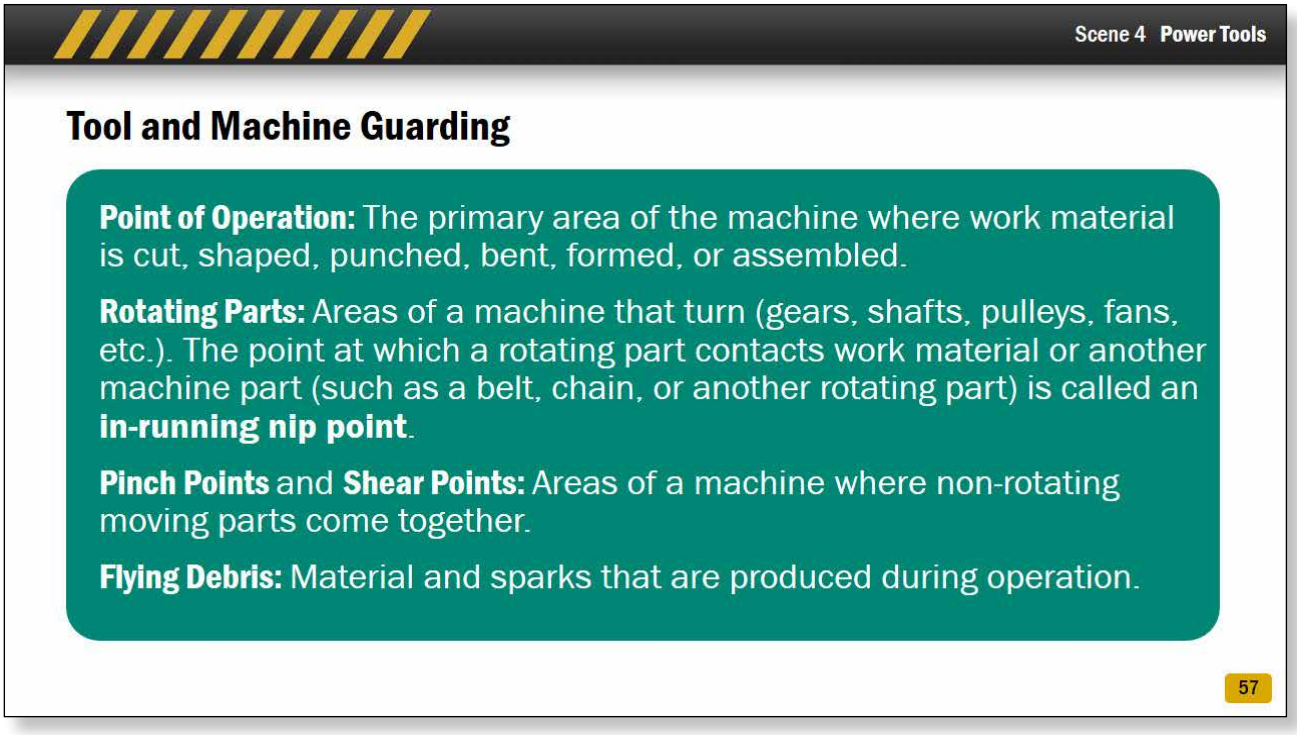
Gas-actuated tools and PATs are similar to handguns and should be treated that way. Never point the tool at anyone at any time, even if it's not loaded. Keep your finger off and away from the trigger until you're ready to use the tool. Don't leave the tools unattended when they're loaded. Unload them for storage and keep the tools as well as the fuel cells or cartridges locked up when not in use.

These tools can also be very loud, so PPE for hearing protection as well as eye protection should be worn by anyone working with or around them.



When using gas-actuated tools and PATs, be sure the fastening surface is hard enough that fasteners will not shoot through it, but not so hard that fasteners cannot be driven into it. Don't fasten into areas of walls that contain electrical wiring, water or gas pipes, or spalling. Spalling is the deterioration of concrete or brick due to age, wear, or a tool misfire. Spalled areas are not strong enough to hold a fastener. Finally, don't allow anyone to stand or work behind the fastening surface.

In the event of a PAT misfire, keep the tool in the operating position for 30 seconds before trying to fire it again. If it doesn't fire a second time, keep the tool in the operating position for 30 more seconds, then carefully remove the load according to manufacturer instructions and take the tool out of service.



Power tools and machines contain hazards which must be guarded. The main types of hazards on any tool or machine are point of operation hazards, rotating parts, pinch points and shear points, and/or flying debris.

The point of operation is the primary area of the machine where work material is being cut, shaped, punched, bent, formed, or assembled. Some examples of points of operation would be the bit of a drill, the blade of a saw, or the needle of a sewing machine.

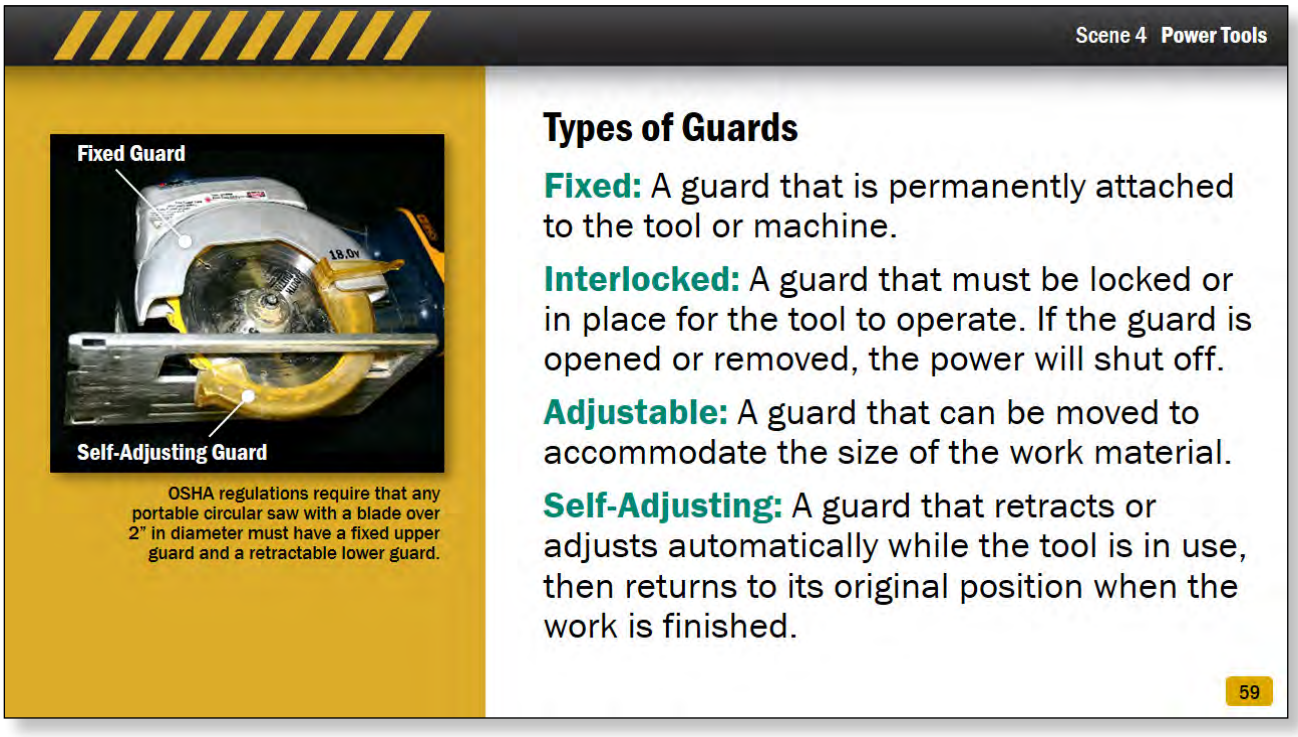
Rotating parts are areas of a machine that turn, whether they are at the point of operation or in another area. This could include gears, rollers, belts, shafts, pulleys, or fans.

The point at which a rotating part contacts the work material or another machine part and could pull in a worker's clothing or body is called an in-running nip point.

Pinch points and shear points are areas of a machine where non-rotating moving parts come together and could pinch or cut a worker's body.

Flying debris includes material that is produced as a result of the work being done, such as sawdust, sparks, or metal dust.

Tool and machine guards must follow certain criteria. Their most important function is to prevent workers from making contact with moving parts. They must be secured to the machine and not be easily removed. They must protect against items falling into a machine. They must not create any new hazards while they are in use. And, they cannot interfere with the use of the machine or prevent the machine from being safely lubricated.



There are four types of guards:

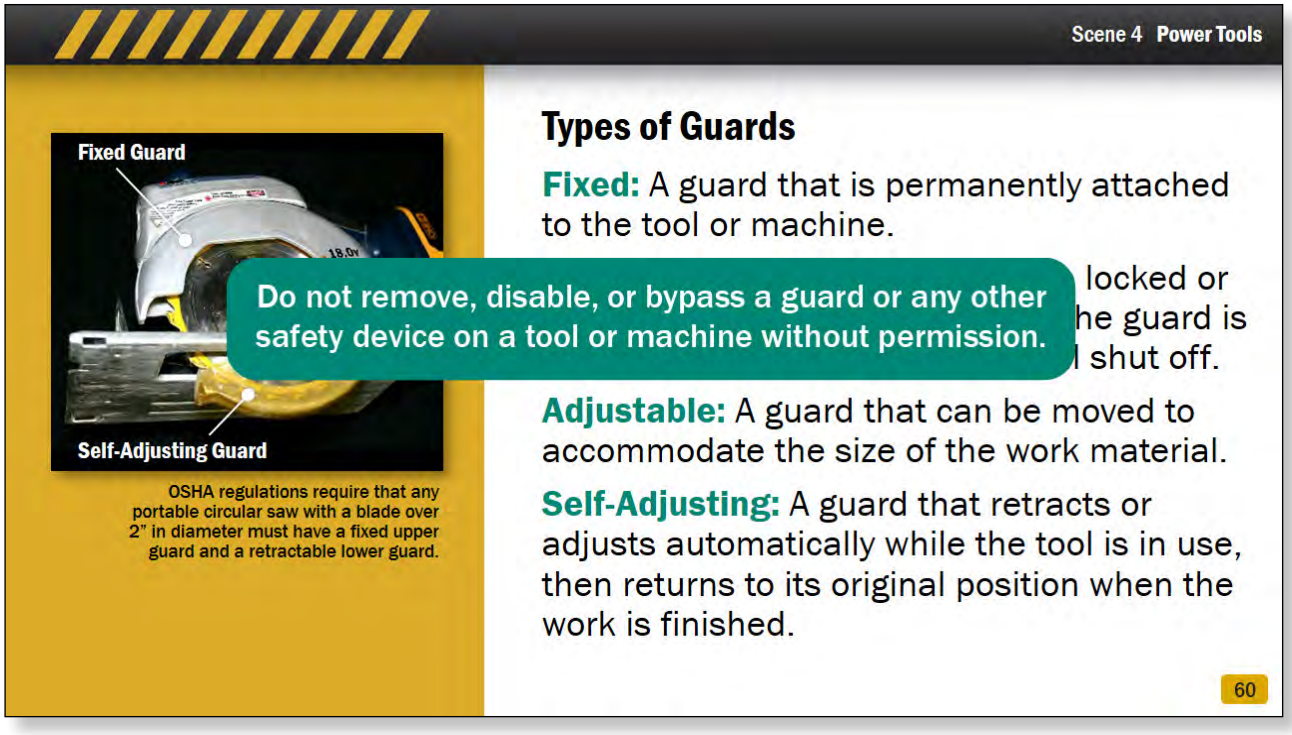
A **fixed** guard is permanently attached to the tool or machine.

An **interlocked** guard must be locked or in place for the tool to operate. If the guard is opened or removed, the power will shut off.

An **adjustable** guard can be moved to accommodate the size of the work material.

A **self-adjusting** guard retracts or adjusts automatically while the tool is in use, then returns to its original position when the work is finished.

OSHA regulations require that any portable circular saw with a blade over 2" in diameter must have a fixed upper guard and a retractable lower guard.



Do not use a tool or machine that has missing or disabled guards, and do not remove, disable, or bypass a guard or any other safety device on a tool or machine without permission.

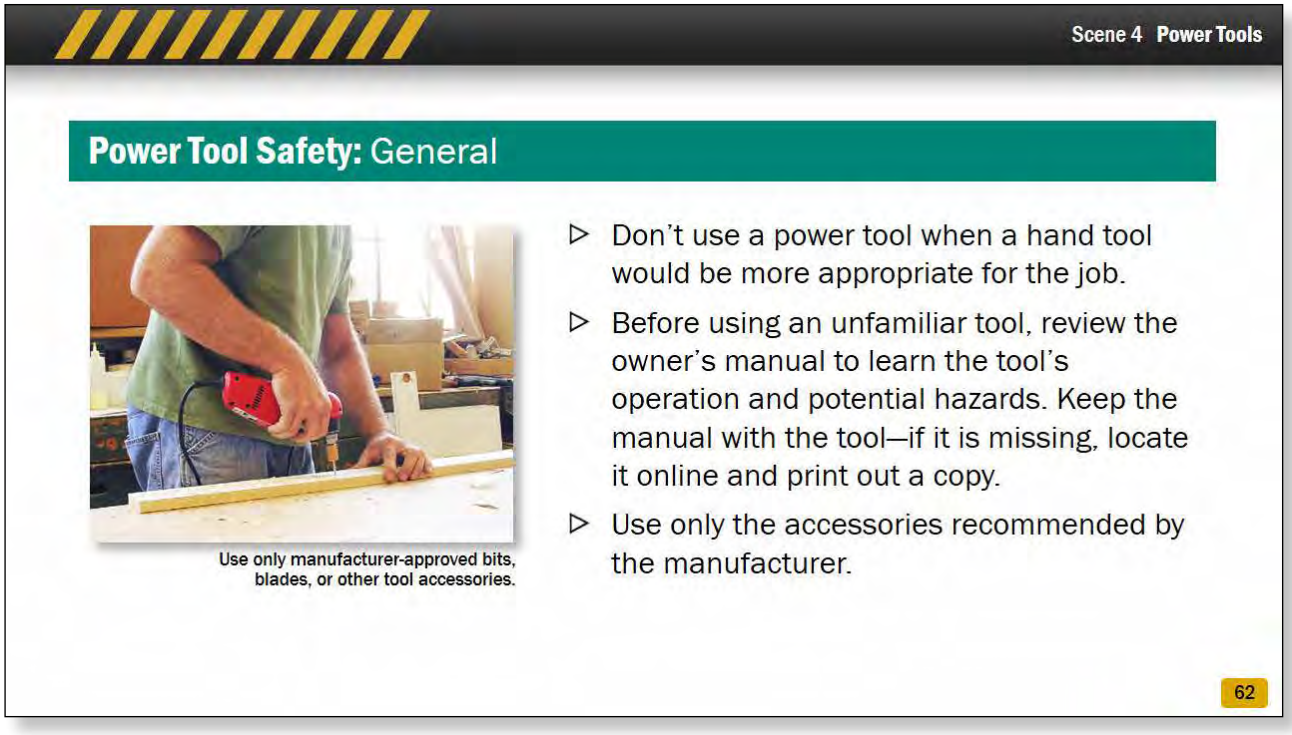
Another way that you are guarded from being injured by a power tool is through the switch that controls the way the tool is energized or disconnected from a power source. You're probably already familiar with these types of switches:

A **constant-pressure switch** is powered only while the switch is being pressed. Power to the tool is shut off when the pressure is released.

A **lock-on control switch** is powered by a constant-pressure switch, which can be locked into the "on" position. A tool with this type of switch must also have a device that releases the lock with a single motion of the same finger (or fingers) used to turn it on.

With an **on-off control switch,** the tool is powered by moving the switch to the "on" or "off" position, and power to the tool will remain on or off until the switch is pressed again.

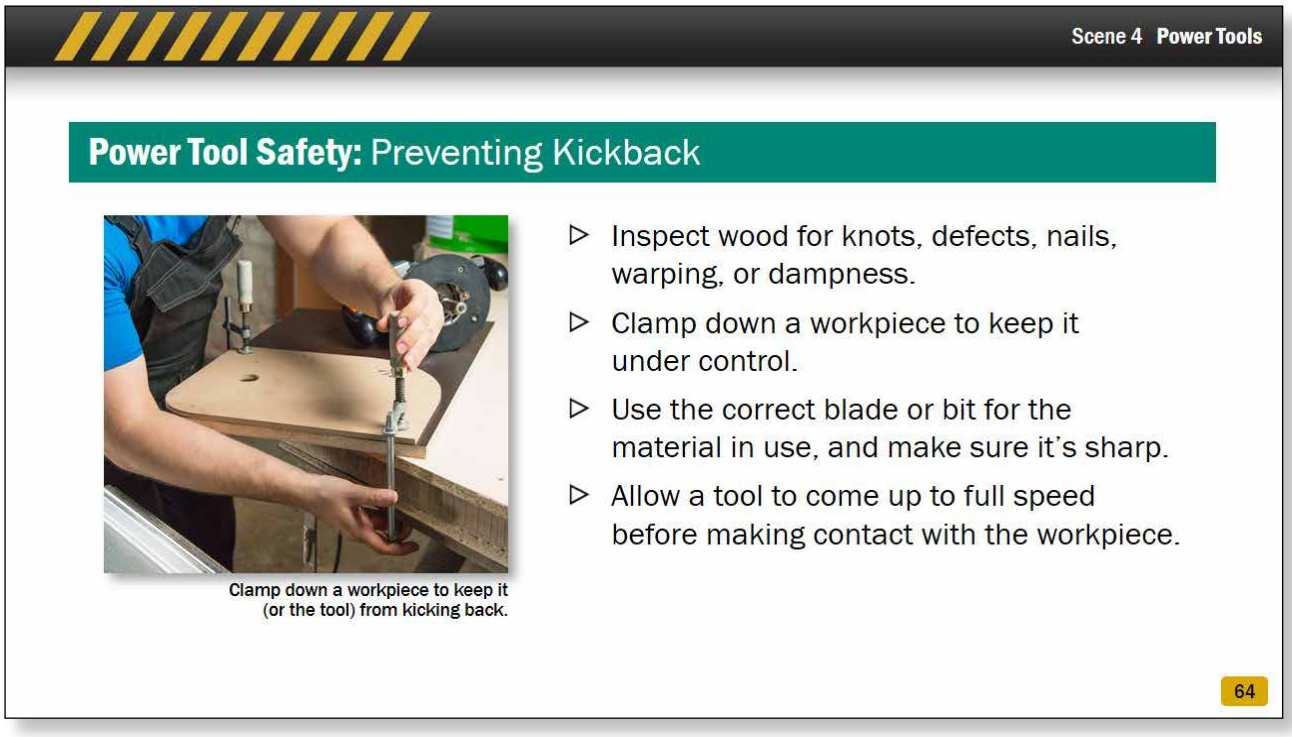
An **emergency stop button**, or "E-stop," interrupts one or more of a machine's functions, but it may not cut off all of the power to the machine. An E-stop should be within reach of the operator, and if it's activated, the machine will remain disabled until the button is reset.



Let's talk about general safety when you're using power tools. First, try to avoid using a power tool when a hand tool would be more appropriate for the job. Simply put, power tools cause far more injuries than hand tools do.

Before using a new tool, review the owner's manual to familiarize yourself with the tool's operation and potential hazards. Keep the manual with the tool. If it is missing, locate a replacement online and print out a copy. And, use only the accessories recommended by the manufacturer.

When you're carrying a power tool, get into the habit of ensuring that the switch is in the "off" position and keeping your finger away from the switch. While you're working, be aware of your body position, any hazardous area of the tool or machine, and the distance between them. Keep both hands on a tool while you are working (if appropriate).



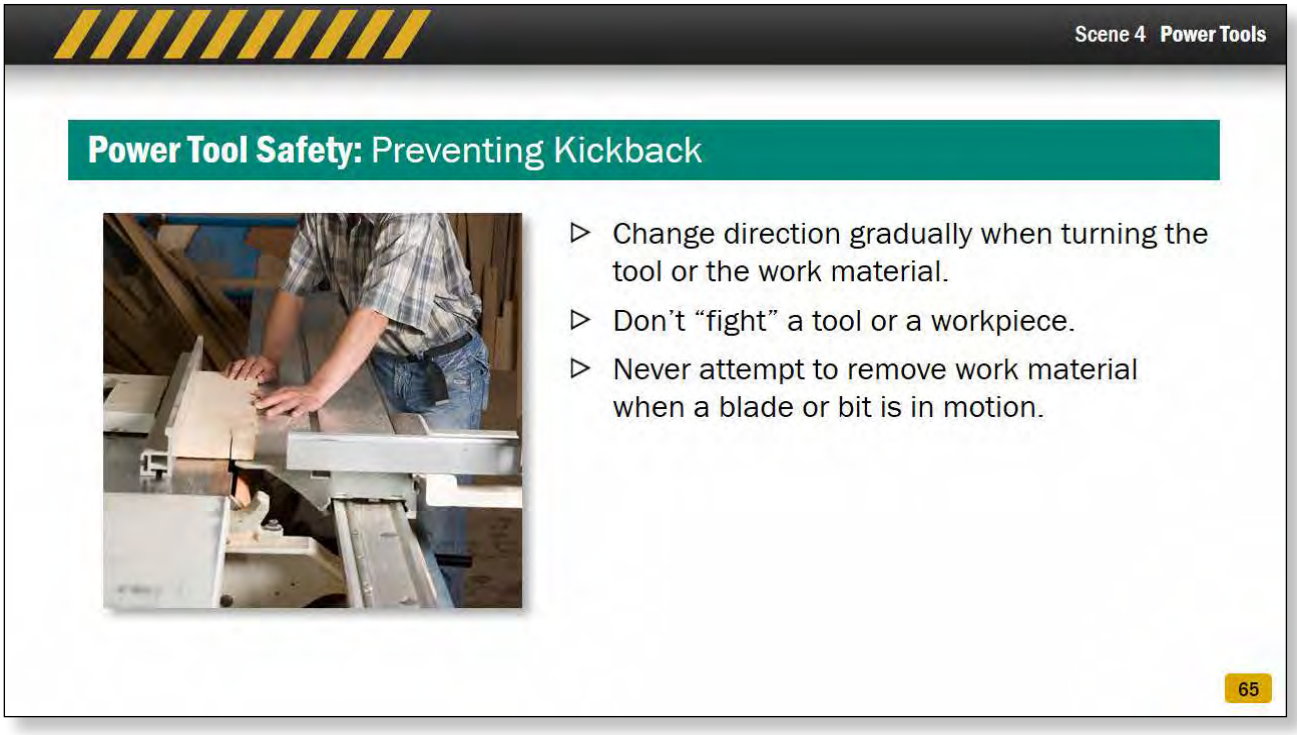
Tool or work-material kickback can contribute to shop accidents. You can cut down on the problem by developing these work practices:

Inspect wood for knots, defects, nails, warping, or dampness--some of it may be unusable.

Clamp down a workpiece to keep it under control and prevent it, or the tool, from kicking back.

Make sure you're using the correct blade or bit for the material in use, and make sure it's sharp.

Allow the blade or bit to come to full speed before making contact with the workpiece.



Change direction gradually when you're turning the tool or the workpiece.

Don't "fight" a tool or a workpiece, or use excessive force—let the tool do the work.

Finally, never attempt to remove work material when a blade or bit is in motion.

A dirty tool is probably not a safe tool. Keep motors and moving parts free from the accumulation of dust and debris. Clean, lubricate, and maintain tools according to manufacturer instructions, and keep them in their original case or in a storage cabinet when not in use.

In our industry, one of the top tool-related injuries is a laceration or amputation caused by a table saw. New technology, which applies a brake to the saw if its blade comes into contact with the operator's body, may reduce this type of injury over time. Meanwhile, here's how you can reduce your chance of becoming a statistic:

First and foremost, don't remove a table saw's guard or reach over or near a moving saw blade.

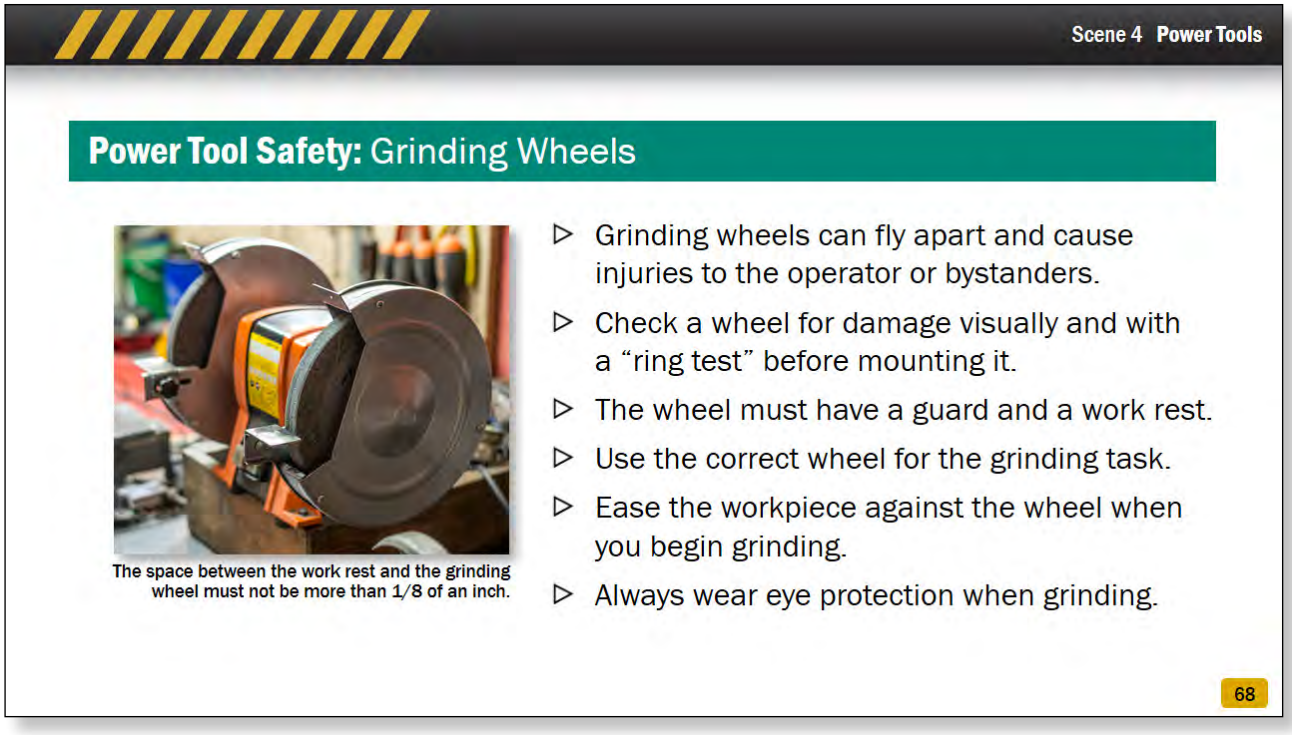
Set the blade to a safe height for the work, taking into consideration the hardness of the wood and the type of cuts being done.

Use a push stick or a push block instead of your hands to move work material into a machine.

Use clamps, fences, guides, featherboards, jigs, splitters, anti-kickback devices, or any other available method of keeping work material under control.

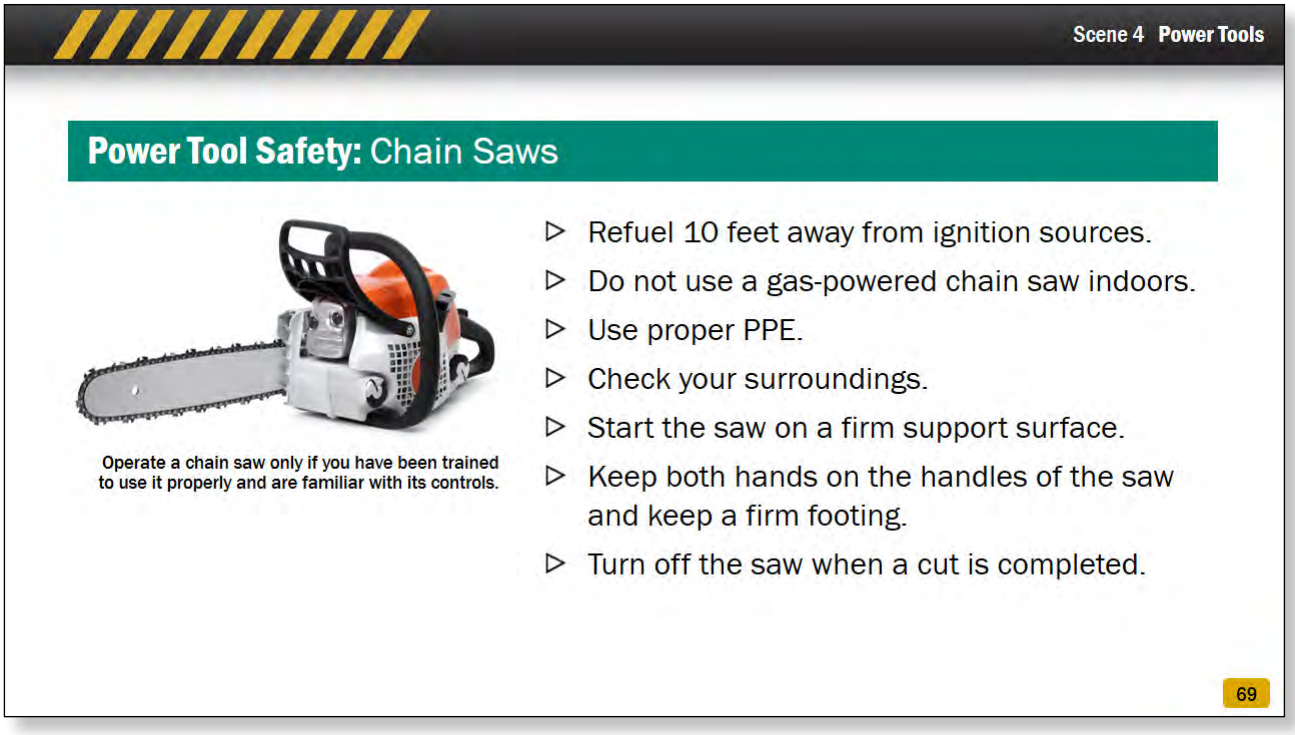
Protect your eyes with safety glasses or other PPE for eye protection.

And, any time you're using a table saw, stay focused and be alert to the possibility that even though you're working safely, the work material may still kick back.



If you use a grinding wheel, there are a few things you need to know. A cracked grinding wheel can break and fly apart during use, which could severely injure the operator or a bystander. Before mounting a wheel on the machine, inspect it for cracks or damage, both visually and through a "ring test." A ring test is performed by tapping the wheel gently with a non-metallic object such as a plastic screwdriver handle. An undamaged wheel will produce a clear, ringing sound. A cracked wheel will give a dull sound. Never put a damaged wheel on a grinder.

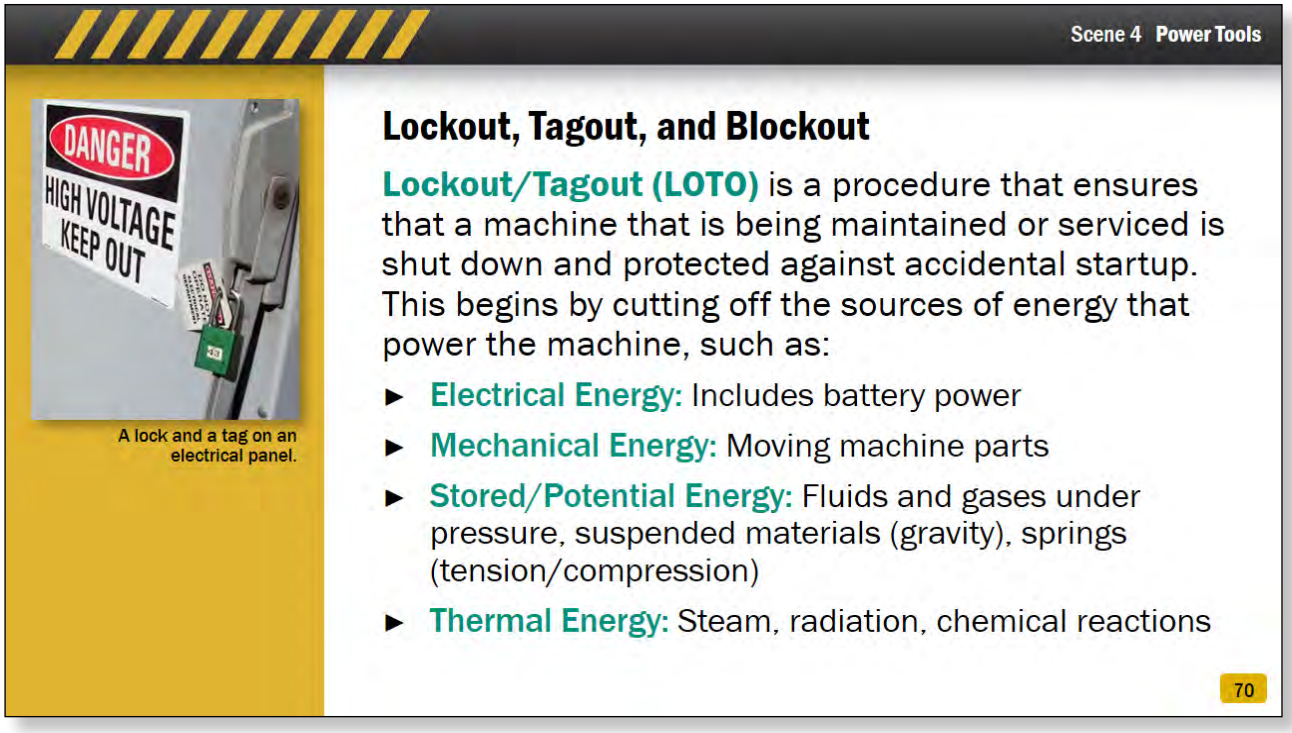
The wheel must be protected by a guard and a work rest which cannot be farther than one-eighth of an inch away from the wheel. Grinding wheels are made of different materials and may be marked with restrictions for use on certain types of work, for example, wet grinding or face grinding. Use the correct wheel for the grinding task at hand. When you're starting to grind a workpiece, ease it against the wheel at first, to avoid damaging the wheel through pressure or heat. Always wear eye protection when grinding.



Chain saws are powerful tools that can cause serious injuries if not used properly.

You should only operate a chain saw if you have been trained to use it properly, and are familiar with its controls. If you're using a fuel-powered chain saw, refuel it at least 10 feet away from any ignition sources, and do not smoke. Do not use a fuel-powered chain saw indoors or in an unventilated area, as it will produce harmful carbon monoxide fumes while it's in operation.

Use PPE to protect your hands, eyes, ears, and exposed body parts. Before starting the saw, check that your surroundings are clear of debris, electrical hazards, or other personnel. Start the saw with the brake engaged on a firm support surface or on the ground. While you're working, keep both hands on the handles of the saw and keep a firm footing. Don't cut above shoulder height. Don't cut above shoulder height. Turn off the saw when a cut is completed, and keep the saw away from your body until the chain stops.



You may have noticed the term "locked out" being used in this course. This refers to the safety procedure called lockout/tagout, which ensures that a machine that is being maintained or serviced has been completely shut down and is protected against accidental startup by another worker. This begins by cutting off all of the sources of energy that power a machine, such as:

Electrical energy, which also includes battery power and static electricity.

Mechanical energy, which comes from moving machine parts.

Stored or potential energy, such as fluids and gases under pressure, suspended materials that may fall due to gravity, and machine parts such as springs that are being compressed or are under tension.

Or, **thermal energy** such as steam, radiation, or chemical reactions.

Scene 4 Power Tools

Never remove a lock, tag, or block that another person has placed on a machine.

Lockout, Tagout, and Blockout

Lockout is the placement of a locking device on a switch, panel, cover, door, valve, or any other location that prevents re-energizing of the machine. The lock can be removed *only* by the person who placed it.

Tagout is the placement of a warning tag in conjunction with a lock. The tag is marked with the reason for the lockout, the date and time of the lockout, and contact information for the person who placed the lock. A tag can be removed *only* by the person who placed it.

Blockout is the use of a block, bar, pin, or other physical device that prevents a machine part from moving or cycling. Blockout can be used with, but not in place of, LOTO.

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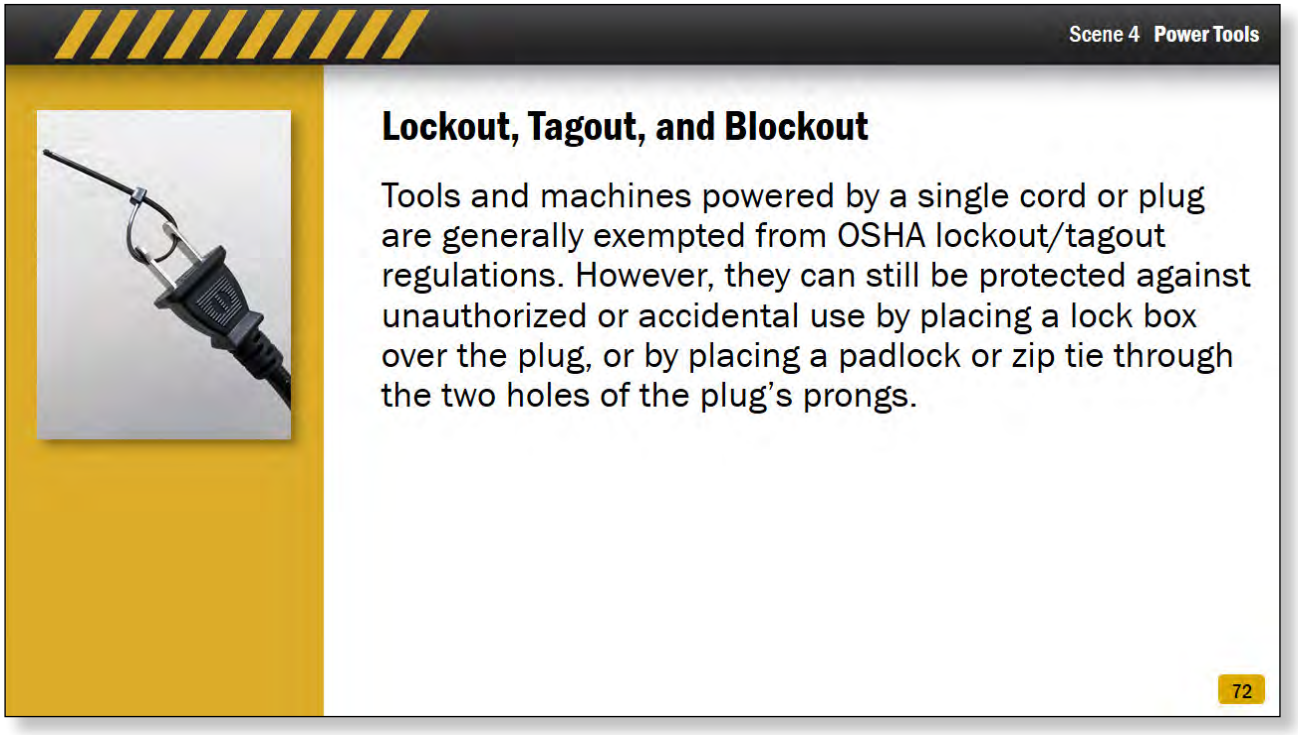
Once the energy sources to a machine have been cut off, the tool must be prevented from startup through the use of locks, tags, and sometimes blocks, until the work is finished.

Lockout is the term for the placement of a locking device on a switch, panel, cover, door, valve, or any other location that prevents re-energy of the machine. The lock can be removed *only* by the person who placed it.

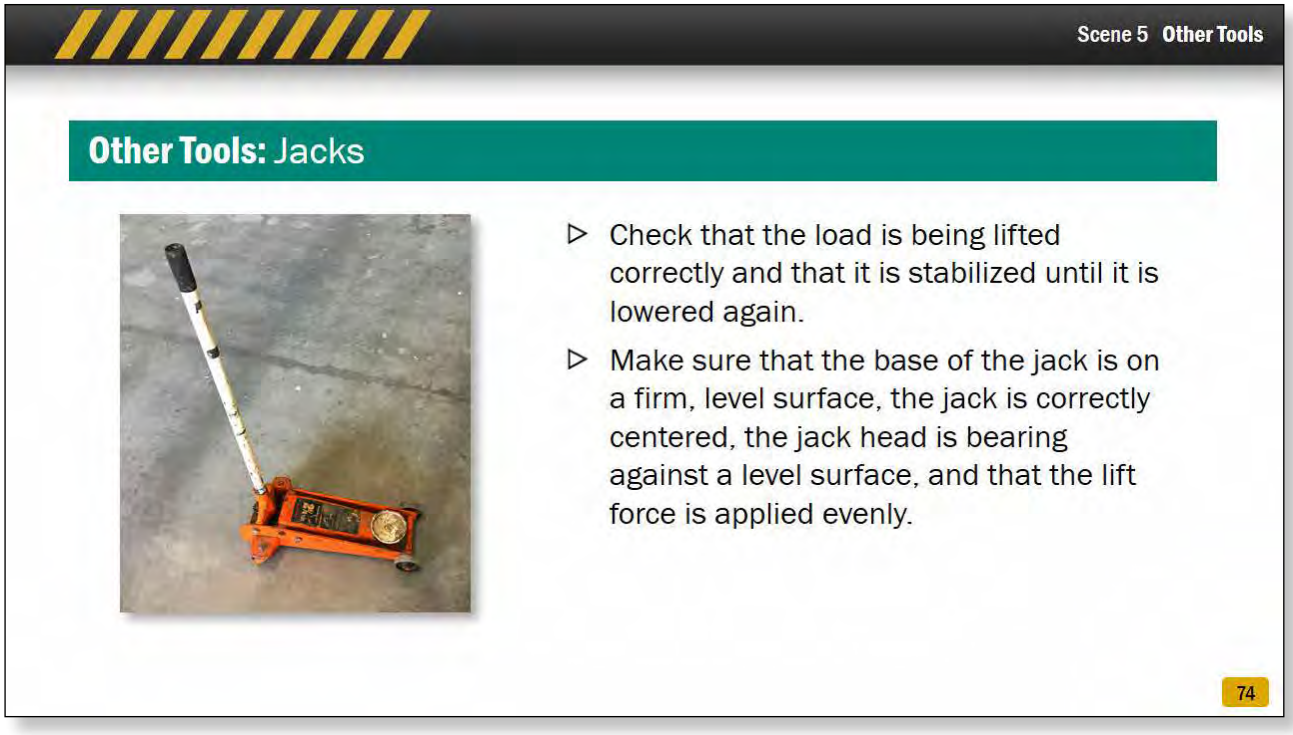
Tagout is the placement of a warning tag in conjunction with a lock. The tag is marked with the reason for the lockout, the date and time of the lockout, and contact information for the person who placed the lock. A tag can be removed *only* by the person who placed it.

Blockout is the use of a block, bar, pin, or other physical device that prevents a machine part from moving or cycling. Blockout can be used with, but not in place of, lockout/tagout.



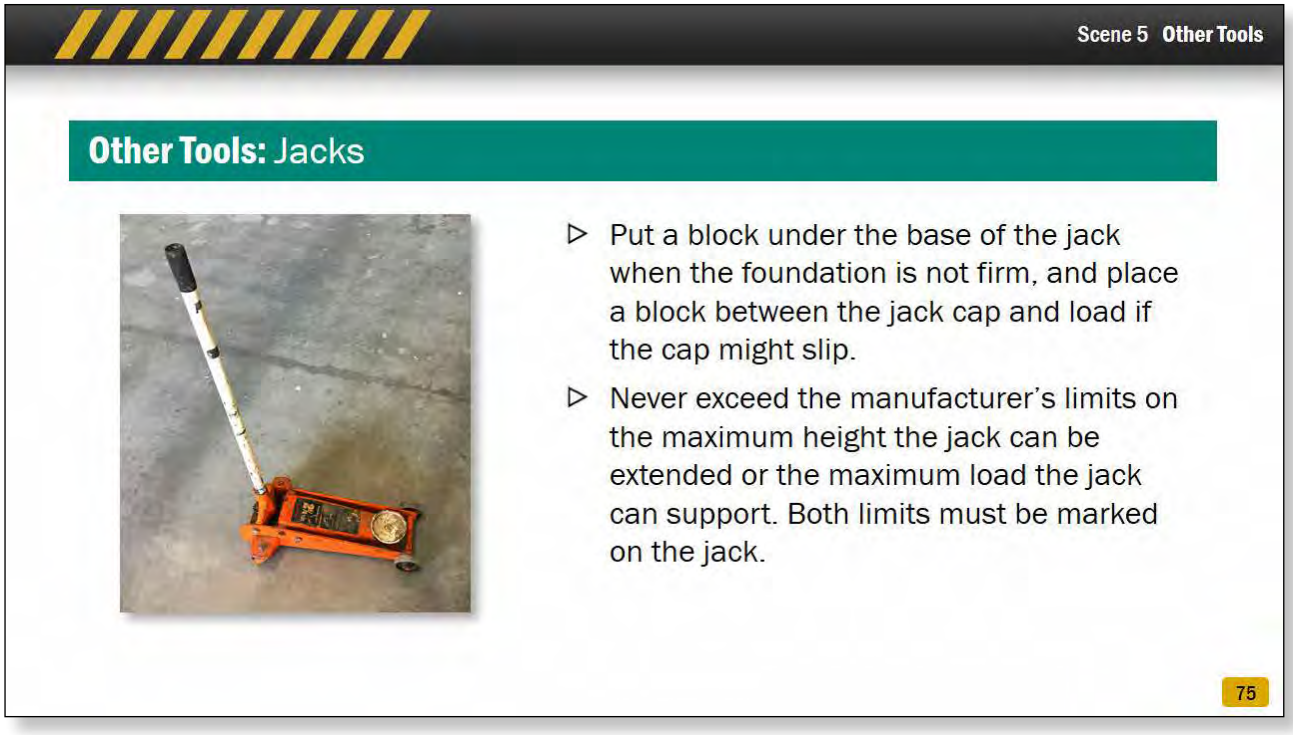
Tools and machines powered by a single cord and plug are generally exempted from OSHA lockout/tagout regulations. However, you can still protect your tools against unauthorized or accidental use by placing a lock box over the plug, or by placing a padlock or zip tie through the two holes of the plug's prongs. Always ask before removing any device that has been placed on a tool to prevent its use.

In this scene, we'll discuss a few more tools you may see on the job.



One type of tool you may use is a **hydraulic jack.**

To use jacks safely, it's crucial to make sure that the load is being lifted correctly, and that it is stabilized with a stand until it's lowered. Make sure that the base of the jack is on a firm, level surface, the jack is correctly centered, the jack head is bearing against a level surface, and that the lift force is applied evenly.

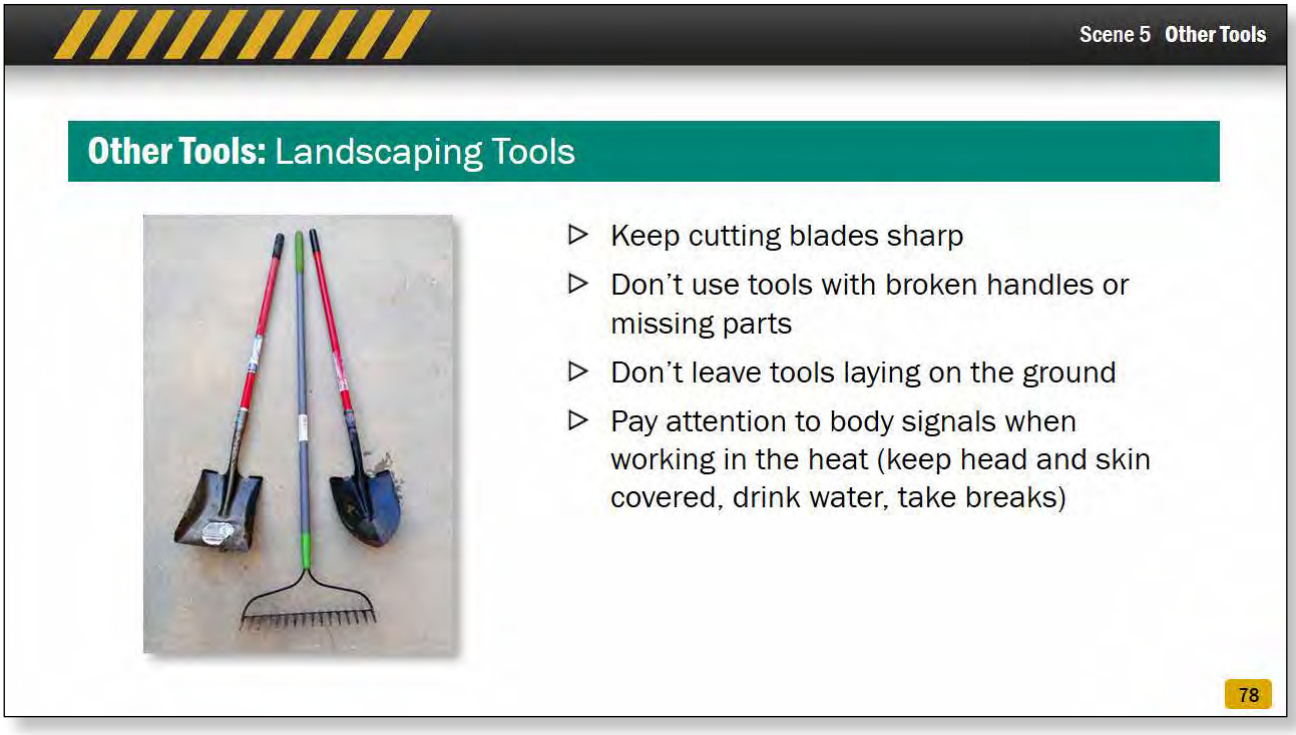


Put a block under the base of the jack when the foundation is not firm, and place a block between the jack cap and load if the cap might slip.

Never exceed the manufacturer's limits on the maximum height the jack can be extended, or the maximum load the jack can support. Both limits must be marked on the jack.

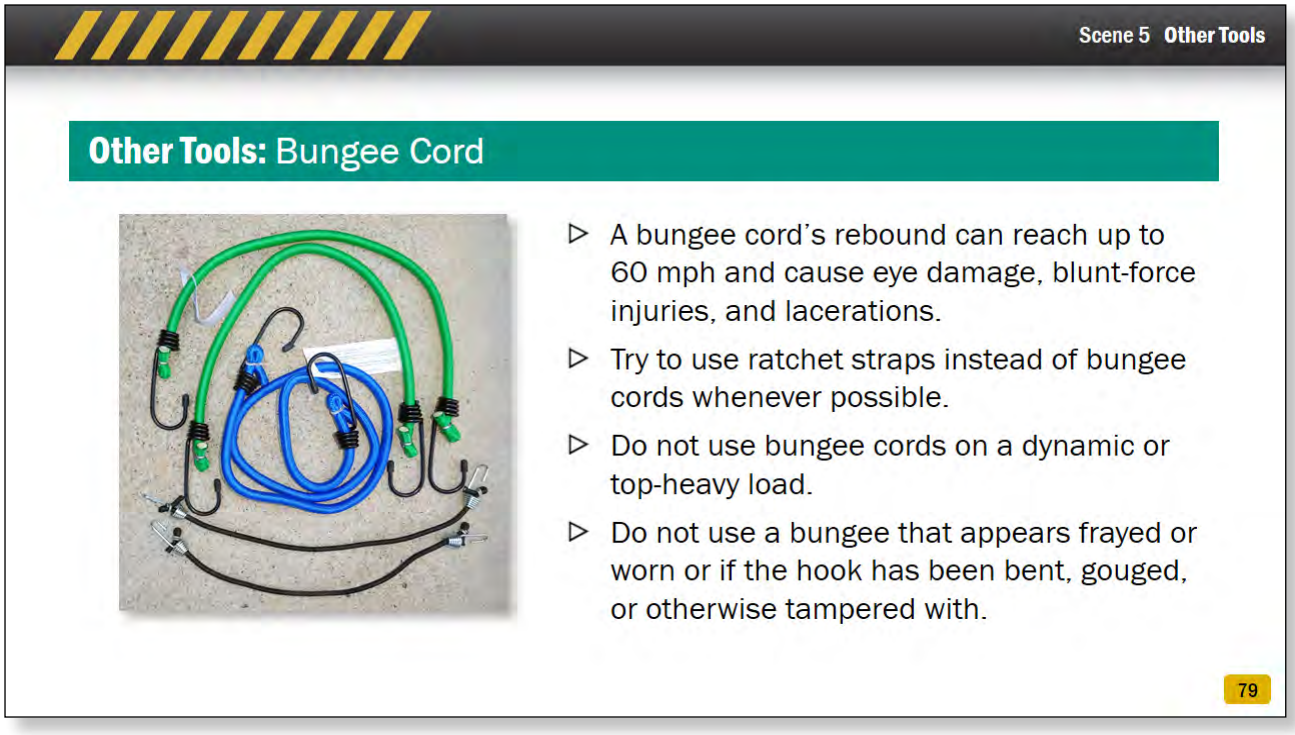
Lawn mowers may be used only by authorized persons who have been trained on their safe operation and use. Lawn mower hazards include spinning blades, debris buildup, exhaust vapors, rollover, and projectiles.

These hazards can be mitigated by inspecting the area for debris and clearing it before mowing, keeping the blades sharp, staying away from the blades unless the machine is fully stopped, avoiding rough and unstable surfaces, and pointing the discharge away from people, windows, and other glass (or fragile) structures.



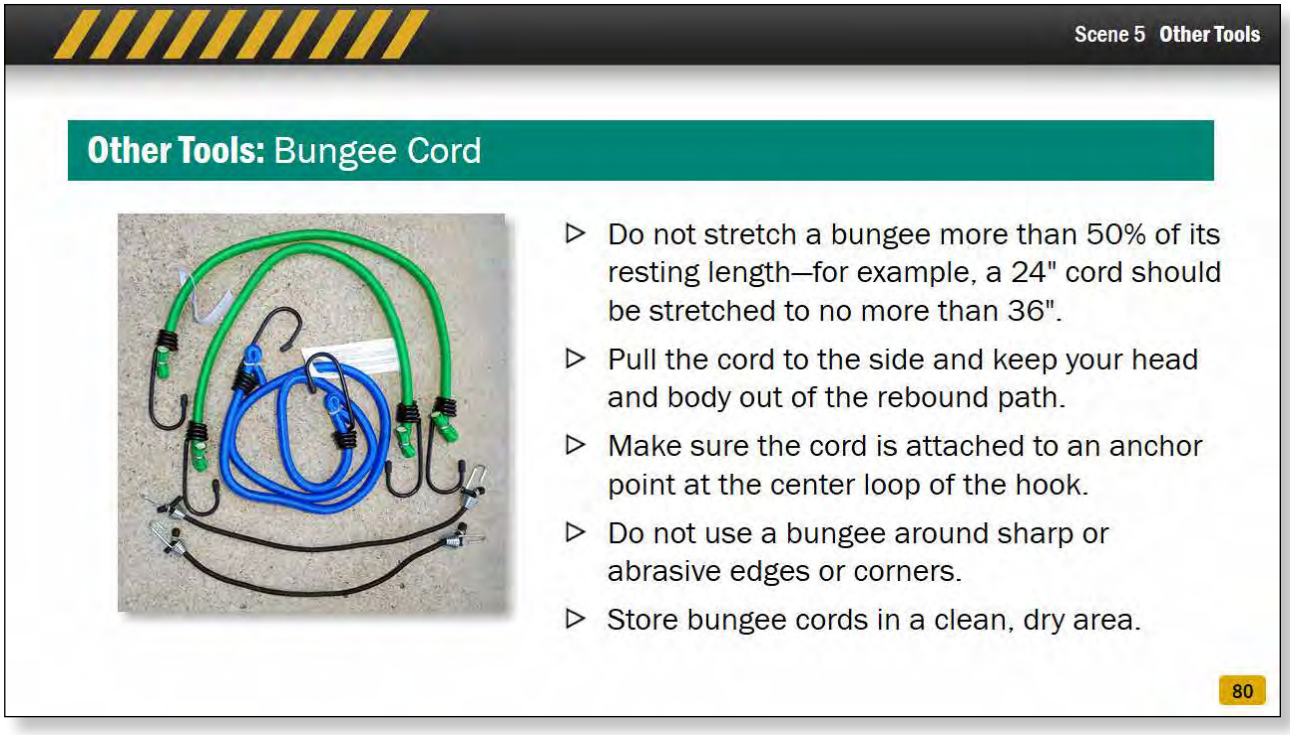
Landscaping tool safety is definitely "down to earth." Keep the cutting blades sharp, don't use tools with broken handles or missing parts, and don't leave landscaping tools on the ground where they can be stepped on or tripped over.

Pay attention to body signals when working in the heat. Keep your head and skin covered, drink lots of water, and take regular rest breaks in a shaded area.



Bungee cords are items you may use every day without realizing that they can be dangerous.

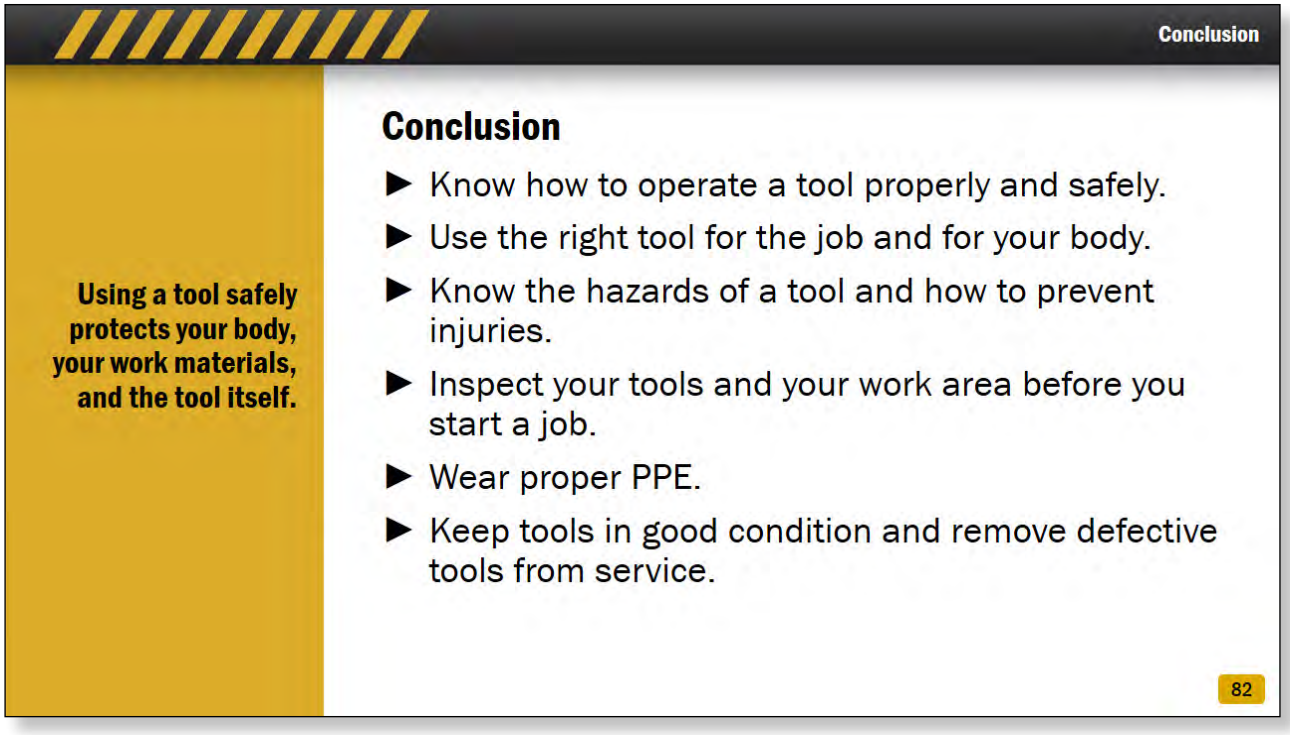
When bungee cords are stretched, the elastic materials in the core build up tension. If the tension is inadvertently released, or if the cord fails, the rebound can reach up to 60 mph and easily cause blunt-force injuries, lacerations, and eye damage. For that reason, it is recommended that ratchet straps be used instead of bungee cords whenever possible. Do not use bungee cords on dynamic or top-heavy loads. If bungee cords must be used, inspect them before each use, and don't use a cord that appears frayed or worn or if the hook has been bent, gouged, or tampered with.



Do not stretch a bungee cord more than 50% of its resting length. For example, a 24-inch cord should be stretched to no more than 36 inches.

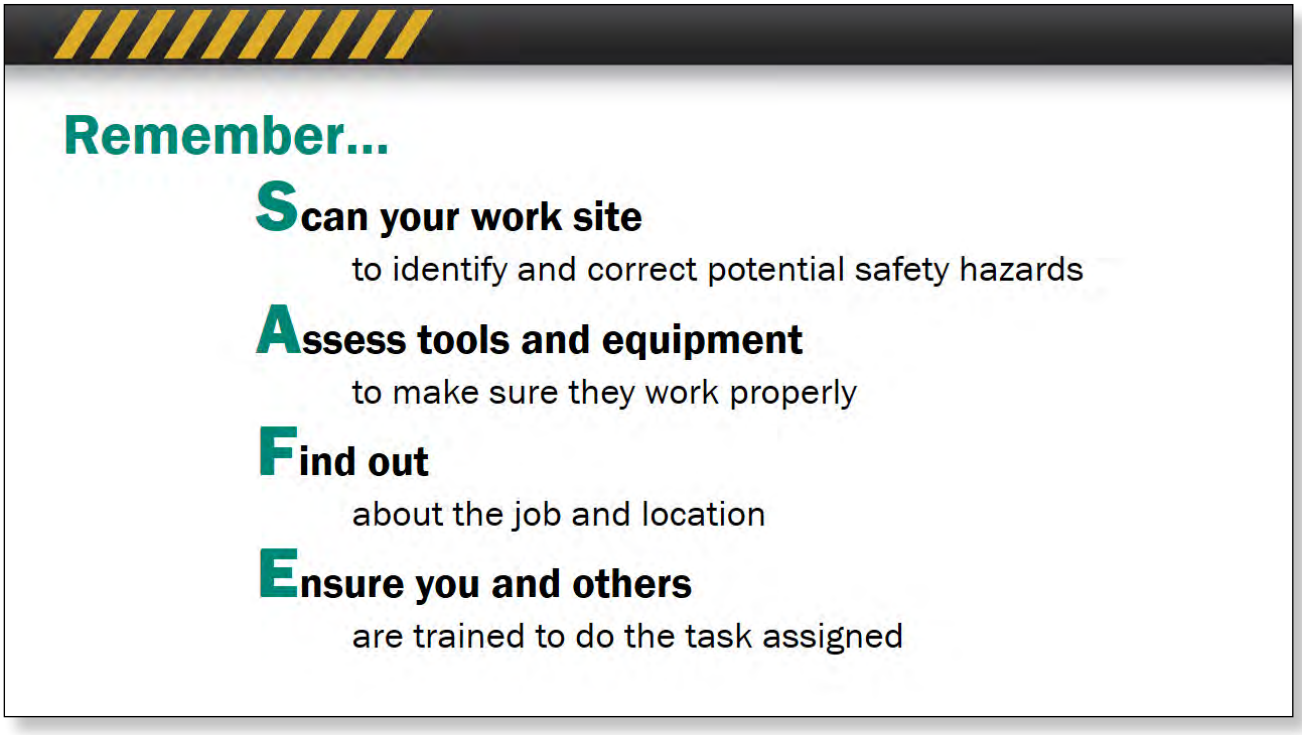
When attaching the cord, pull to the side and keep your head and body out of the rebound path. Make sure the cord is attached to an anchor point by the center loop of the hook, not the tip of the hook. Do not use a bungee around sharp or abrasive edges or corners that can eventually cut, break, or damage the cord. Store bungee cords in a clean, dry area.

Let's wrap up what we've learned about tool safety today.



Using a tool safely protects your body, your work materials, and the tool itself.

Know how to operate a tool properly and safely. Use the right tool for the job and for your body. Know the hazards of a tool and how to prevent injuries. Inspect your tools and your work area before you start a job. Wear proper PPE. And finally, keep tools in good condition and remove defective tools from service.



And remember…

Scan your work site to identify and correct potential safety hazards.

Assess tools and equipment to make sure they work properly.

Find out more about the job and the location.

And, **ensure** you and others are trained to do the task assigned.

Appendix A

References and Resources

Cal/OSHA Regulations (CCR Title 8)

For up-to-date Cal/OSHA standards use search term: **Title 8 Index – State of California**

Hand and Portable Powered Tools and Equipment, CCR Title 8, §3555-3564.

Personal Safety Devices and Safeguards, CCR Title 8, §3384. Hand Protection.

Plastic Processing Machinery, CCR Title 8, §4600-4601.

Points of Operation and Other Hazardous Parts of Machinery, CCR Title 8, §4184-4188.

Points of Operation and Other Hazardous Parts of Machinery, CCR Title 8, §4296-4310.

Federal OSHA Regulations (CFR Title 29)

For up-to-date Federal OSHA standards use search term: **Regulations (Standards – 29 CFR) Occupational Safety**

Hand and Portable Powered Tools and Other Hand-Held Equipment, CFR Title 29, §1910.241-244.

Additional Resources

Chain Saw Safety. OSHA QuickCards. Occupational Safety and Health Administration. https://www.osha.gov/pls/publications

Hand and Power Tools. OSHA Informational Booklets. Occupational Safety and Health Administration. https://www.osha.gov/pls/publications

Nail Gun Safety: A Guide for Construction Contractors. NIOSH Publications. National Institute for Occupational Safety and Health. https://www.cdc.gov/niosh/docs/2011-202/

Safety is Specific: Guidelines for the Safe Operation of Widely Used Portable and Stationary Power Tools. Power Tool Institute, Inc., 2007. http://www.powertoolinstitute.com/pti-pages/ed-publications.asp

Straight Talk About Nail-Gun Safety. NIOSH Publications. National Institute for Occupational Safety and Health. https://www.cdc.gov/niosh/docs/2013-149/

Working Safely with Chain Saws. OSHA QuickCards. Occupational Safety and Health Administration. https://www.osha.gov/pls/publications

Industry Safety Resources

Safety Bulletins

Safety bulletins are researched, written, and distributed by the Industry Wide Labor-Management Safety Committee for use by the motion picture and television industry. The Industry Wide Labor-Management Safety Committee is composed of guild, union, and management representatives active in industry safety and health programs.

These safety bulletins are guidelines recommended by the safety committee. They are not binding laws or regulations. State, federal, and/or local regulations, where applicable, override these guidelines. Modifications in these guidelines should be made, as circumstances warrant, to ensure the safety of the cast and crew.

The committee and these safety bulletins are representative of the commitment of both labor and management to safe practices in the motion picture and television industry. The members of the committee and all those who contributed to its work have devoted a great deal of time and effort to these guidelines because of the importance of safety to our industry.

Current safety bulletins are available on the CSATF website:

http://www.csatf.org/bulletintro.shtml

24-Hour Industry Safety Hotline

The 24-hour industry safety hotline number directs callers to an automated system that will assist them in reaching the desired Studio Safety Hotline.

888-7-SAFELY

A list of the Studio Safety Hotlines can also be found on the CSATF website:

http://www.csatf.org/studio_safety_hotlines.pdf

Safety is everyone's responsibility.