



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



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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.

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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.



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HAND AND POWER TOOL SAFETY


E

Presented by
Contract Services Administration Training Trust Fund

As part of the
Safety Pass Training Program for the Motion Picture and Television Industry

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.



Injury and Illness Prevention Program

- ▶ This course is part of your employer's safety program.
- ▶ In the state of California, this is known as the Injury and Illness Prevention Program (IIPP).
- ▶ The IIPP and Safety Pass training courses are part of the employer's safety program.

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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.

Injury and Illness Prevention Program

There are **three reasons** for safety training:

- ▶ You are responsible for your safety
- ▶ The law mandates it
- ▶ The industry needs you to get training

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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

Introduction

Scene 1 Hazards Associated with Tools

Scene 2 Basic Tool Safety and PPE

Scene 3 Hand Tools

Scene 4 Power Tools

Scene 5 Other Tools

Conclusion

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



About This Course

Tools are used every day in the entertainment industry. We often forget that they can sometimes be dangerous.

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.

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.



About This Course

This course will address:

- ▶ Recognizing common tool hazards and preventing injuries
- ▶ Operating tools correctly
- ▶ Inspecting your tools and your work area
- ▶ Choosing the right tool for the job
- ▶ Using proper personal protective equipment (PPE)

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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.



Hand Tools

- ▶ Powered manually
- ▶ Can cause injuries from sharp edges, flying fragments, pinch points, blunt force, and repetitive motion

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

- ▶ Powered by various energy sources, most commonly electricity
- ▶ Increased risks: moving and rotating parts, sharp points and edges, energized parts, pressurized fluids
- ▶ While running: pinch points, exhaust, heat, sparks, fire, dust







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.



Introduction

Power Tools

Portable power tools are hand-held and can be transported to the work site.

<p>Reciprocating Saw</p> 	<p>Oscillating Cutter</p> 	<p>Belt Sander</p> 
<p>Drill/Driver</p> 	<p>Router</p> 	<p>Jig Saw</p> 

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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.

Power Tools

Stationary power tools are mounted to a tabletop or to the floor.

Planer



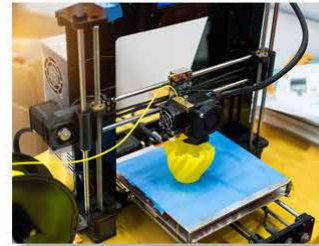
Miter Saw



Drill Press



3D Printer



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

Power Tools

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

Vacuum Former



Welding Machine



Lathe



Edge Bander

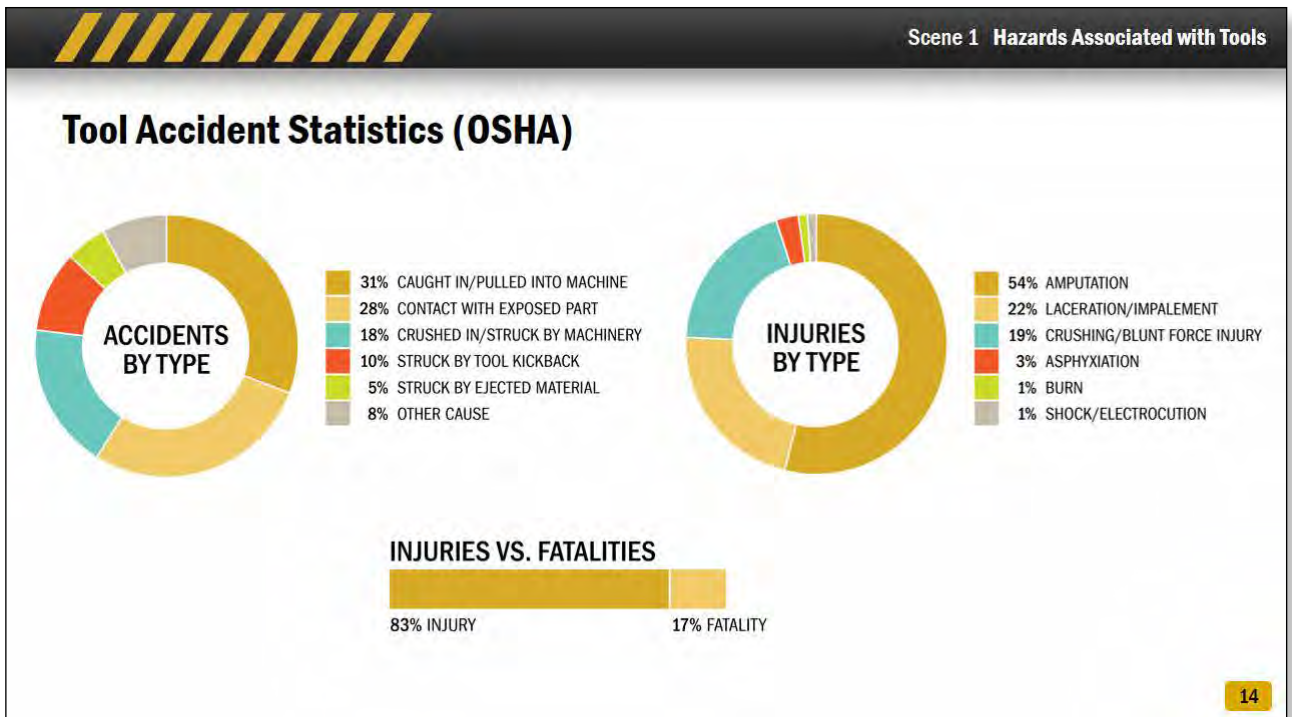


Larger stationary power tools are sometimes referred to as **machine tools**.



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.

Common Tool Hazards and Possible Causes

Caught In/Pulled Into Machine



Description

Worker's clothing or body part gets caught in rotating machine parts

Possible Causes

- ▷ Not keeping a safe distance away from a machine
- ▷ Machine not properly guarded
- ▷ Loose clothing or hair
- ▷ Not waiting for machine to cycle down
- ▷ Improper lockout of machine
- ▷ Accidental startup
- ▷ Inattention while working

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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.

Common Tool Hazards and Possible Causes

Contact with Machine Part



Description

Worker's body comes into contact with an exposed, moving machine part

Possible Causes

- ▷ Unjamming a machine while it's running
- ▷ Reaching over or into an exposed machine part
- ▷ Removing or bypassing a guard
- ▷ Not using a push stick
- ▷ Not waiting for machine to cycle down
- ▷ Accidental startup
- ▷ Contact with a falling tool
- ▷ Inattention while working

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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.

Common Tool Hazards and Possible Causes

Crushed Between/Struck by Machine Parts



Description

Worker's body is crushed between two machine parts, or struck by moving machine parts

Possible Causes

- ▷ Not working within the machine's safe zone
- ▷ Not waiting for machine to cycle down
- ▷ Improper lockout or blockout of machine
- ▷ Worker trips or falls into machinery
- ▷ Accidental startup

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.

Common Tool Hazards and Possible Causes

Struck by Tool Kickback



Description

Tool unexpectedly makes contact with worker's body

Possible Causes

- ▷ Not keeping both hands on the tool
- ▷ Not securing work material
- ▷ Not inspecting work material for defects or foreign materials
- ▷ Not using an anti-kickback device
- ▷ Improper use of tool

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.

Common Tool Hazards and Possible Causes

Struck by Ejected Material



Description

Worker is injured by work material, a machine part, or a tool being ejected from a machine

Possible Causes

- ▷ Not securing work material
- ▷ Not using guards or a fence
- ▷ Not inspecting machine parts or materials before startup
- ▷ Foreign materials in machine

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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.

Common Tool Hazards and Possible Causes

Other Hazards



Description

Worker is shocked, electrocuted, burned, asphyxiated, or otherwise injured by a tool or machine

Possible Causes

- ▷ Not inspecting electrical connections
- ▷ Not enough ventilation in work area
- ▷ Injury from a falling tool
- ▷ Improper lockout of machine
- ▷ Worker trips or falls into machinery
- ▷ Accidental startup
- ▷ Working with flammable materials

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.



Power tools such as this pneumatic sander may create noise that is above safe levels for workers without hearing protection.

Other Types of Tool-Related Injuries

Some injuries result not from accidents, but from the use of tools over time.

- ▶ Repetitive stress injuries
- ▶ Hearing damage from loud tools
- ▶ Injuries caused by continuous use of vibrating tools
- ▶ Eye and lung damage and irritation

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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.

General Safety Practices: Inspect Your Tools

Inspect your tools every time you use them for:

- ▶ Cracked, bent, loose, or missing parts
- ▶ Rust or corrosion
- ▶ Unusual noises or vibration
- ▶ Damaged hoses or electrical connections

Mark or tag damaged tools and take them out of service until they can be replaced or repaired.

Your employer may inspect personal tools and remove them from service.

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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.**



Use clamps or a vise to keep work materials under control.

General Safety Practices: Use Tools Properly

- ▶ Don't use a tool for a job it isn't designed to do.
- ▶ Use the proper size and type of tool for the job.
- ▶ Keep your hands clean and dry.
- ▶ Get a good footing before using a tool.
- ▶ Hold down work materials with a clamp or a vise.

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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.

General Safety Practices: Prevent Injuries

- ▶ Always use quality, professional tools.
- ▶ Choose tools with ergonomics in mind.
- ▶ Use caution when working alone.
- ▶ Know the location of the emergency stop button.
- ▶ Don't rush through a task.
- ▶ Don't use a tool while sick, tired, distracted, or under the influence.
- ▶ Don't approach or startle someone while they are using a tool.

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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 themselves with the tool.



Wrench with tool lanyard.

General Safety Practices: Prevent Injuries

- ▶ Use tool lanyards
- ▶ Don't leave tools on top of any elevated surface
- ▶ Don't throw a tool
- ▶ Dress appropriately for work conditions
- ▶ Avoid loose clothing, jewelry, lanyards, and drawstrings around moving machinery
- ▶ Tie back long hair

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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.



Keep your work area well lit.

General Safety Practices: Housekeeping

- ▶ Keep the area clean as you work.
- ▶ Make sure the area is well lit.
- ▶ If necessary, secure the area to protect others from noise, flying debris, or contact with moving parts.
- ▶ Keep walkways and exits unobstructed by tools, machinery, work materials, or debris.

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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.



Molding plastic in a vacuum forming machine may produce hazardous gases or vapors.

General Safety Practices: Work Environment

- ▶ Fumes, vapors, or gases can arise from:
 - ▷ Welding
 - ▷ Heating and molding plastics
 - ▷ Paint, solvents, and cleaning products
 - ▷ Operating fuel-powered tools
- ▶ Sparks and heat can ignite flammable materials
- ▶ Grinding can produce combustible dust

Be aware of your surroundings, use proper ventilation, wear appropriate PPE, store and dispose of hazardous materials according to employer policies.

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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.



Locate emergency devices and information before you begin work.

General Safety Practices: Emergency Procedures

- ▶ Find nearest fire alarm, exits, first aid
- ▶ Know how to contact emergency services
- ▶ Know your exact location
- ▶ Keep fire equipment and fire lanes clear
- ▶ Smoke only in designated areas
- ▶ Look for evacuation plan and note closest exit
- ▶ If evacuated, don't re-enter building unless directed

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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.

Exposure to Blood or Body Fluids



- ▶ Immediately notify your supervisor or set medic.
- ▶ Treat all body fluids as infectious.
- ▶ Flood the affected area with soap and water or a skin disinfectant. Wash contaminated clothing separately.
- ▶ Do not move tools or work materials from the incident site; secure the area.
- ▶ Only authorized and trained personnel may clean the area and dispose of contaminated waste.

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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.



Protect yourself from tool hazards by wearing PPE.

Personal Protective Equipment (PPE)

Your employer is responsible for:

- ▶ Providing you with appropriate PPE
- ▶ Training you on its use
- ▶ Replacing worn or damaged PPE

You are responsible for:

- ▶ Wearing PPE properly
- ▶ Cleaning and maintaining your PPE
- ▶ Informing your employer if PPE needs to be repaired or replaced, even if you have supplied it

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.

Personal Protective Equipment (PPE)

PPE for Hand and Power Tools

PPE	Protects Against
Safety Goggles or Glasses	Flying debris, splashing liquids, intense light, intense heat, material kickback, tool kickback, fumes, vapors
Face Shield	
Dust Mask	Inhalation of sawdust, metal dust, mists, or fumes
Respirator	Asphyxiation due to vapors or fumes
Earplugs or Earmuffs	Hearing damage due to high or continuous noise levels

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.

Personal Protective Equipment (PPE)

PPE for Hand and Power Tools

PPE	Protects Against
Hard Hat	Impact with machine parts, dropped tools
Leather Gloves	Splinters, abrasions, cuts
Impact-Resistant Gloves	Vibration injuries
Cut-Resistant Gloves	Cuts from sharp tools

Do not wear gloves around moving machine parts.

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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.



Basic Hand Tool Safety

- ▶ Check that handles aren't cracked, loose, or splintered.
- ▶ Don't cover tools with tape or paint.
- ▶ Wipe down or clean tools before storing them.
- ▶ Maintain and lubricate tools as necessary.
- ▶ Store and carry tools so that they don't contact and damage each other.

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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.

Cutting Tools: General



- ▷ Sharpen or replace cutting blades—dull blades are more dangerous than sharp ones.
- ▷ Grind down small nicks in cutting edges.
- ▷ Always cut away from yourself when using a knife or box cutter.
- ▷ Store cutting blades and knives with the sharp edges covered in a sheath.
- ▷ Check with your employer regarding the disposal of used blades.

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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.

Cutting Tools: Saws



- ▷ Hand saws are specialized according to the type of work being done.
- ▷ Choose the correct saw for the work material.
- ▷ Use a ripsaw to cut with the grain, and a crosscut saw to cut against the grain.

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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.

Cutting Tools: Files



- ▷ Use the right type of file for the work material and the job.
- ▷ Don't use a file without a handle, and make sure it fits tightly.

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.

Cutting Tools: Planes



- ▷ Keep the blade sharp.
- ▷ Plane with the grain.
- ▷ Watch for nail heads and defects.

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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.

Cutting Tools: Snips



- ▷ Keep your free hand away from the blades.
- ▷ Protect your eyes from flying fragments.

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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.

Striking and Struck Tools



- ▷ The face of a striking tool should be larger than the head of the struck tool.
- ▷ Don't use a striking tool that has become chipped or mushroomed—reground it to its original shape.
- ▷ Don't use a chisel as a screwdriver or to remove nails

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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.

Striking and Struck Tools



- ▷ Use the right type hammer with the correct hardness for the job.
- ▷ Check that the hammer's handle is tight.
- ▷ Use a non-metallic mallet in order to prevent sparks in a flammable area.

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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



- ▷ Don't use pliers to tighten or loosen nuts—use a wrench.
- ▷ Choose pliers that have a grip span that won't pinch your hand when they're closed.
- ▷ Don't work at face level.

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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



- ▷ Make sure that the opening of a wrench fits snugly on a 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—pulling gives better leverage and balance.
- ▷ Don't use a "cheater bar" (such as a pipe) to increase the force of a wrench.

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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.

Wrenches



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

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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



- ▷ Match the screwdriver to the size and shape of the screw.
- ▷ The width of the tip should match width of the slot on a standard screw.
- ▷ In tight or awkward spaces, use an offset screwdriver.
- ▷ Don't use a screwdriver as a crowbar or a chisel.

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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.



Insulated tools.

Photo courtesy of Honeywell Industries, Inc.

Special Types of Hand Tools

Spark-resistant tools are made from metals other than steel and are for use in flammable or explosive environments.

Insulated tools are coated in layers of plastic and rubber, and are for use near energized electrical sources.

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.

“Double-Insulated” Symbol



Ground fault circuit interrupter (GFCI)

Energy Sources: Electrical Power

Electric tools protect users from shock and electrocution in two ways:

- ▶ By having a three-prong plug with a ground prong
- ▶ By being double-insulated--the tool's case is made from a non-conductive material

Never use a tool with a three-prong plug that has the ground prong removed,

Don't use a ground plug adapter.

Avoid wet conditions when using electric tools. If necessary, use a GFCI (ground fault circuit interrupter).

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).



Never use a tool that has a frayed or damaged cord or plug.

Energy Sources: Electrical Power

When using electric tools:

- ▶ Keep the cord clear of the tool's moving parts
- ▶ Keep your hands on the insulated parts of the tool
- ▶ Unplug a tool when not in use
- ▶ Keep the switch in the off position when the tool isn't in use, even when it's unplugged
- ▶ Don't unplug the tool by pulling on the cord
- ▶ Never carry the tool by its cord

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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-powered tools and battery chargers.

A battery-powered tool is connected to its power source, even when the switch is off.

Energy Sources: Battery Power

When using battery-powered tools:

- ▶ Remove the battery pack when the tool isn't in use or when changing or adjusting a bit or a blade
- ▶ Keep battery packs away from fire or heat
- ▶ Store battery packs away from metal objects (keys, coins, nails, screws, etc.)
- ▶ Check restrictions on shipping and disposing of battery packs

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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.

Energy Sources: Fuel Power

Tools powered by gasoline or other fuels can present risks from flammable fuel vapors and exhaust fumes. When using fuel-powered tools:

- ▶ Work in a well-ventilated area
- ▶ Allow the engine to cool before refueling
- ▶ Handle, transport, and store fuel properly
- ▶ Keep a Class B fire extinguisher available

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.



Air compressor and attachments.



Pneumatic chopper gun.

Energy Sources: Pneumatic Power

Powered by pressurized air driven through a hose by an air compressor.

- ▶ Check the tool attachment and the hose before powering on
- ▶ Use clips or retainers to prevent tool ejection
- ▶ Never point a stream of compressed air towards yourself or anyone else
- ▶ Set pressure for <30 psi for clearing dust and debris
- ▶ Don't carry tool by the hose

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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.



Spilled or leaking hydraulic fluid can create a slippery work surface.

Energy Sources: Hydraulic Power

Powered by pressurized hydraulic fluid driven through a hose by a pump.

- ▶ Hydraulic fluid can penetrate and burn skin
- ▶ Keep skin covered and wear proper PPE
- ▶ Spilled hydraulic fluid can cause slips and falls
- ▶ Depressurize lines before disconnecting them

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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.



Powder-actuated tool (PAT).

Use PPE for hearing and eye protection with these tools.

Energy Sources: Gas- and Powder-Actuated

Powered by compressed gas or gunpowder cartridges.

- ▶ May require special training and certification
- ▶ Not for flammable or explosive atmospheres

Handle gas-actuated tools and PATs with care:

- ▶ Never point the tool at anyone
- ▶ Stay off the trigger until ready to use tool
- ▶ Don't leave a loaded tool unattended
- ▶ Store unloaded tools and unused loads properly

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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.



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.

Energy Sources: Gas- and Powder-Actuated

- ▶ Be sure the fastening surface is hard enough
- ▶ Don't fasten into electrical wiring, water or gas pipes, or spalled areas
- ▶ Don't allow anyone to be behind a fastening surface

In the event of a PAT misfire:

1. Keep tool in the operating position for 30 seconds.
2. Fire again. If it doesn't fire, stay in operating position for 30 more seconds, then remove the load and take the tool out of service.

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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.

Tool and Machine Guarding

Point of Operation: The primary area of the machine where work material is cut, shaped, punched, bent, formed, or assembled.

Rotating Parts: Areas of a machine that turn (gears, shafts, pulleys, fans, etc.). The point at which a rotating part contacts work material or another machine part (such as a belt, chain, or another rotating part) is called an **in-running nip point**.

Pinch Points and Shear Points: Areas of a machine where non-rotating moving parts come together.

Flying Debris: Material and sparks that are produced during operation.

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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.



Band saw with guard.

Tool and Machine Guarding

A guard must:

- ▶ Prevent contact with moving parts
- ▶ Be secured to the machine and not easily removed
- ▶ Protect against items falling into the machine
- ▶ Create no new hazards
- ▶ Not interfere with the use of the machine
- ▶ Allow safe lubrication

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.



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.

Types of Guards

Fixed: A guard that is permanently attached to the tool or machine.

Interlocked: A guard that must be locked or in place for the tool to operate. If the guard is opened or removed, the power will shut off.

Adjustable: A guard that can be moved to accommodate the size of the work material.

Self-Adjusting: A guard that retracts or adjusts automatically while the tool is in use, then returns to its original position when the work is finished.

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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.



Scene 4 Power Tools

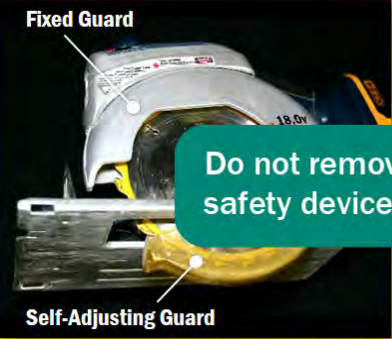
Types of Guards

Fixed: A guard that is permanently attached to the tool or machine.

Adjustable: A guard that can be moved to accommodate the size of the work material.

Self-Adjusting: A guard that retracts or adjusts automatically while the tool is in use, then returns to its original position when the work is finished.

Do not remove, disable, or bypass a guard or any other safety device on a tool or machine without permission. If the guard is locked or the guard is shut off.



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.

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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.

Switches and Controls



1 Constant-Pressure Switch



2 Lock-On Control Switch



3 On-Off Control Switch



4 Emergency Stop ("E-Stop")

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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.

Power Tool Safety: General



Use only manufacturer-approved bits, blades, or other tool accessories.

- ▷ Don't use a power tool when a hand tool would be more appropriate for the job.
- ▷ Before using an unfamiliar tool, review the owner's manual to learn the tool's operation and potential hazards. Keep the manual with the tool—if it is missing, locate it online and print out a copy.
- ▷ Use only the accessories recommended by the manufacturer.

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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.

Power Tool Safety: General



Keep both hands on a tool when appropriate.

- ▷ Carry a power tool with the trigger switch in the “off” position and your finger away from the switch.
- ▷ Keep your hands away from any hazardous area of the tool or machine.
- ▷ Keep both hands on a tool while you are working (if appropriate).

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).

Power Tool Safety: Preventing Kickback



Clamp down a workpiece to keep it (or the tool) from kicking back.

- ▷ Inspect wood for knots, defects, nails, warping, or dampness.
- ▷ Clamp down a workpiece to keep it under control.
- ▷ Use the correct blade or bit for the material in use, and make sure it's sharp.
- ▷ Allow a tool to come up to full speed before making contact with the workpiece.

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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.

Power Tool Safety: Preventing Kickback



- ▷ Change direction gradually when turning the tool or the work material.
- ▷ Don't "fight" a tool or a workpiece.
- ▷ Never attempt to remove work material when a blade or bit is in motion.

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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.

Power Tool Safety: Cleaning and Maintenance



- ▷ Keep motors and moving parts free from the accumulation of dust and debris.
- ▷ Clean, lubricate, and maintain tools according to manufacturer instructions.
- ▷ Keep tools in their original case or in a storage cabinet when not in use.

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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.

Power Tool Safety: Table Saws



- ▷ Don't remove guards or reach over or near a moving saw blade.
- ▷ Set the blade to a safe height for the work.
- ▷ Use a push stick or push block.
- ▷ Use clamps, fences, guides, featherboards, jigs, splitters, or other safety devices.
- ▷ Use proper PPE for eye protection.
- ▷ Stay focused and be alert to the possibility that the work material may kick back.

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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.

Power Tool Safety: Grinding Wheels



The space between the work rest and the grinding wheel must not be more than 1/8 of an inch.

- ▷ Grinding wheels can fly apart and cause injuries to the operator or bystanders.
- ▷ Check a wheel for damage visually and with a “ring test” before mounting it.
- ▷ The wheel must have a guard and a work rest.
- ▷ Use the correct wheel for the grinding task.
- ▷ Ease the workpiece against the wheel when you begin grinding.
- ▷ Always wear eye protection when grinding.

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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.

Power Tool Safety: Chain Saws



Operate a chain saw only if you have been trained to use it properly and are familiar with its controls.

- ▷ Refuel 10 feet away from ignition sources.
- ▷ Do not use a gas-powered chain saw indoors.
- ▷ Use proper PPE.
- ▷ Check your surroundings.
- ▷ Start the saw on a firm support surface.
- ▷ Keep both hands on the handles of the saw and keep a firm footing.
- ▷ Turn off the saw when a cut is completed.

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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.



A lock and a tag on an electrical panel.

Lockout, Tagout, and Blockout

Lockout/Tagout (LOTO) is a procedure that ensures that a machine that is being maintained or serviced is shut down and protected against accidental startup. This begins by cutting off the sources of energy that power the machine, such as:

- ▶ **Electrical Energy:** Includes battery power
- ▶ **Mechanical Energy:** Moving machine parts
- ▶ **Stored/Potential Energy:** Fluids and gases under pressure, suspended materials (gravity), springs (tension/compression)
- ▶ **Thermal Energy:** Steam, radiation, chemical reactions

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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.



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.



Lockout, Tagout, and Blockout

Tools and machines powered by a single cord or plug are generally exempted from OSHA lockout/tagout regulations. However, they can still be protected 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.

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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.

Other Tools: Jacks



- ▷ Check that the load is being lifted correctly and that it is stabilized until it is lowered again.
- ▷ 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.

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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.

Other Tools: Jacks



- ▷ 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.

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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.

Other Tools: Lawn Mowers



- ▷ 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.

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Other Tools: Lawn Mowers



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
- ▷ Pointing the discharge away from people, windows, and other glass (or fragile) structures

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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.

Other Tools: Landscaping Tools



- ▷ Keep cutting blades sharp
- ▷ Don't use tools with broken handles or missing parts
- ▷ Don't leave tools laying on the ground
- ▷ Pay attention to body signals when working in the heat (keep head and skin covered, drink water, take breaks)

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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.

Other Tools: Bungee Cord



- ▷ A bungee cord's rebound can reach up to 60 mph and cause eye damage, blunt-force injuries, and lacerations.
- ▷ Try to use ratchet straps instead of bungee cords whenever possible.
- ▷ Do not use bungee cords on a dynamic or top-heavy load.
- ▷ Do not use a bungee that appears frayed or worn or if the hook has been bent, gouged, or otherwise tampered with.

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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.

Other Tools: Bungee Cord



- ▷ Do not stretch a bungee more than 50% of its resting length—for example, a 24" cord should be stretched to no more than 36".
- ▷ Pull the cord to the side and keep your head and body out of the rebound path.
- ▷ Make sure the cord is attached to an anchor point at the center loop of the hook.
- ▷ Do not use a bungee around sharp or abrasive edges or corners.
- ▷ Store bungee cords in a clean, dry area.

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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.

Conclusion

- ▶ 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.
- ▶ Keep tools in good condition and remove defective tools from service.

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.

Remember...

Scan your work site

to identify and correct potential safety hazards

Assess tools and equipment

to make sure they work properly

Find out

about the job and location

Ensure you and others

are trained to do the task assigned

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.**

