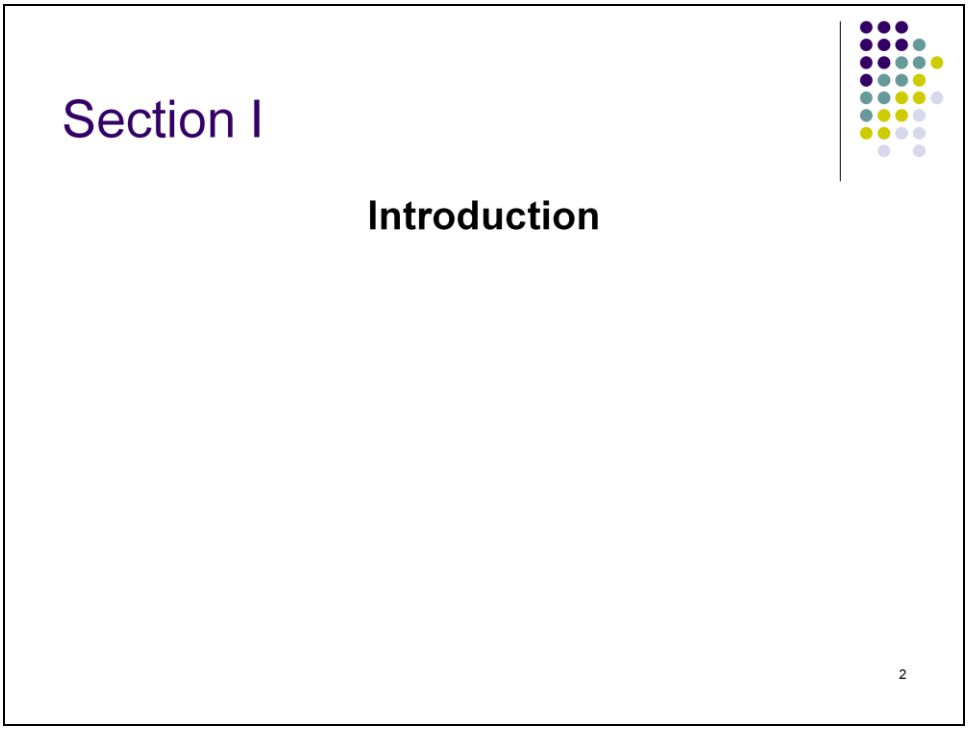
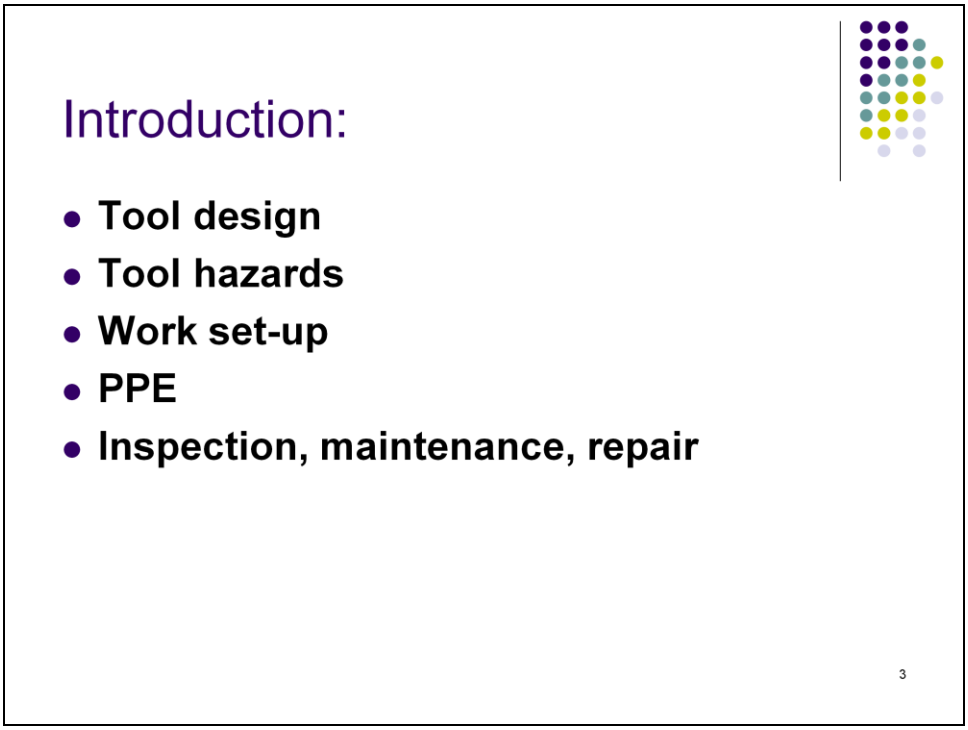
When you finish reviewing this article, be sure to take the Hand tool safety test for credit!

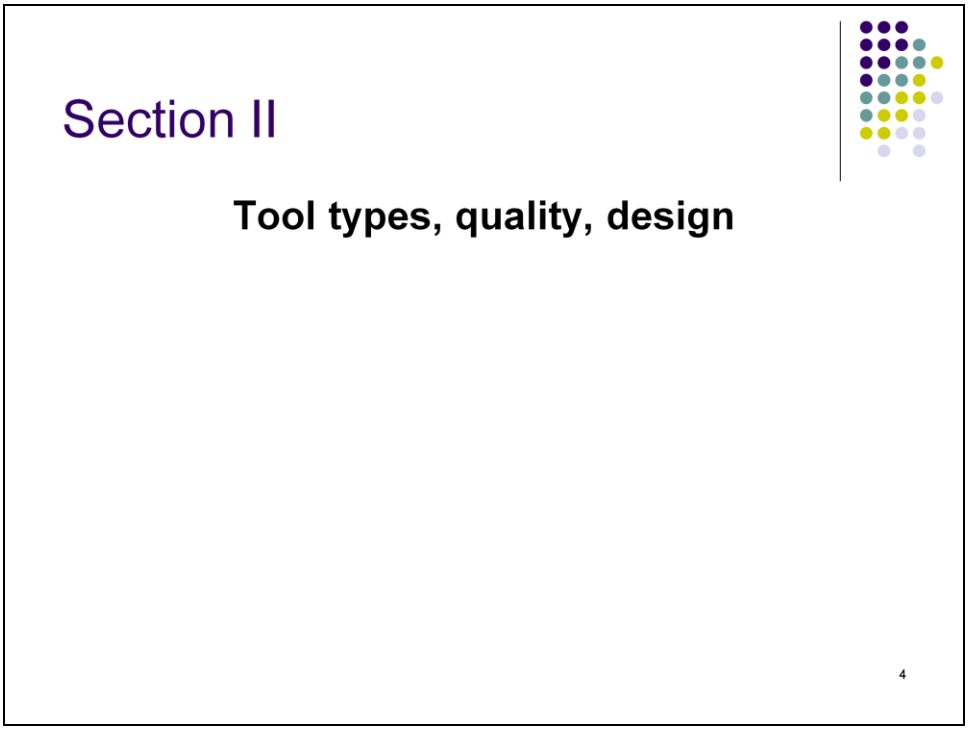
Continuing - What is proper hand tool safety?



Hand tool safety begins by understanding the tools, their hazards, and the need to take adequate precautions. You should know how to selection and use the right tool for the job, and you should wear appropriate personal protective equipment to protect against hand tool's hazards.



We will be looking at how tool design affects safety, the hazards of various hand tools, how proper work set-up can prevent tool accidents, the need for and use of appropriate personal protection equipment, and finally hand tool inspection, maintenance, and repair.



Hand tools are non-powered, and they include anything from axes to wrenches. Let's look at tool types, quality, and design.

Hammers, mallets:

- **Nail – nails**
- **Ball peen – chisels**
- **Mallets**
- **Sledgehammers**

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Hammers and Mallets:

Nail hammers are designed to drive nails. Ball peen hammers are for striking cold chisels and metal punches. Mallets have a striking head of plastic, rawhide, or wood and are designed for striking wood chisels, punches, wedges, or dies. Sledgehammers are for striking concrete or stone. You can damage a hammer by using it for the wrong purpose. You can damage other tools by trying to force them by hitting them with a hammer.

Pliers:

- **Grip material**

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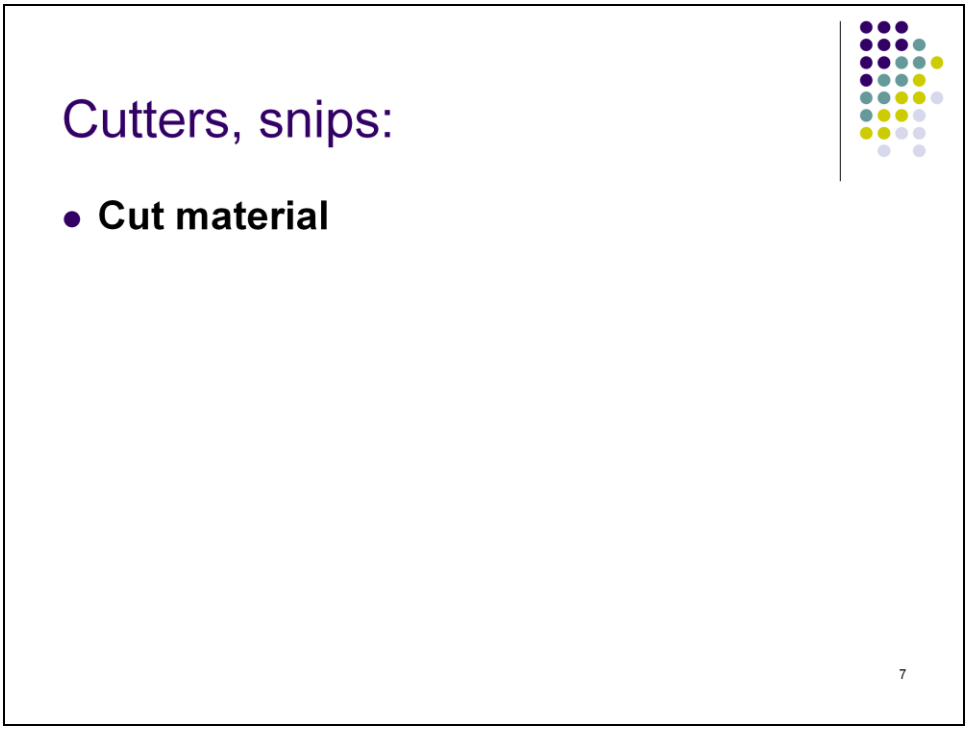
Pliers: Pliers are designed to grip material so you can bend or pull it. Don't substitute a pliers for a wrench – they can easily slip off of a fastener.



Cutters: Use cutters or snips to remove banding wire or strapping. Trying to use a pry bar to snap open banding can cause injuries.

Wrenches:

- **Open-end – light, medium duty**
- **Box – heavy duty**

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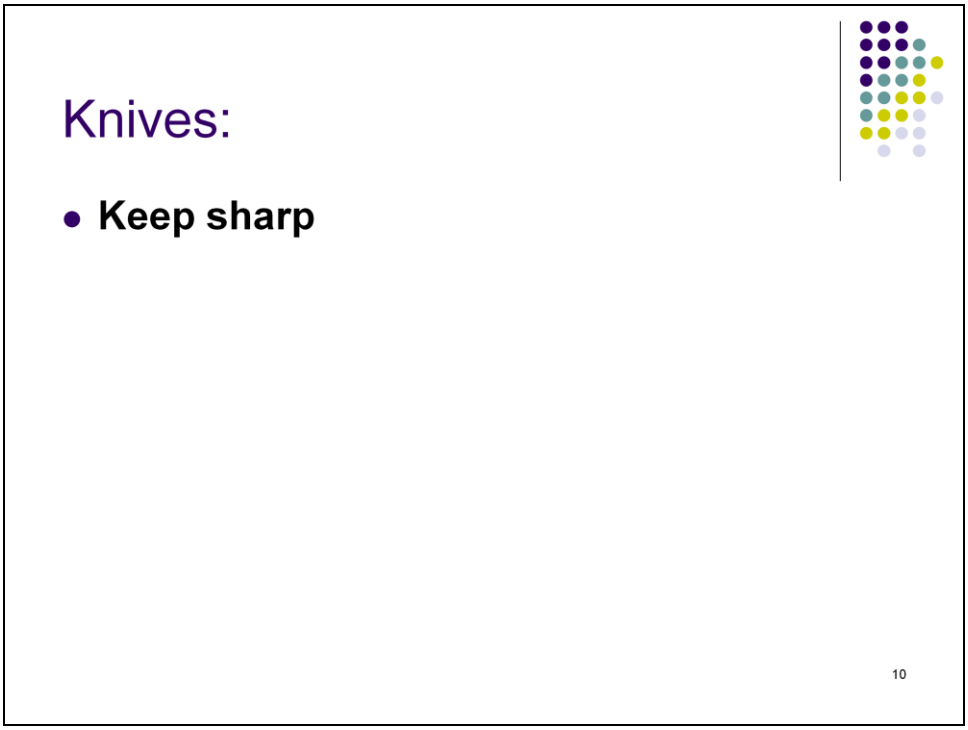
Wrenches: When using open-ended wrenches, position yourself so you will be pulling the wrench towards you, with the open end facing you – this lessens the chance of the wrench slipping off of the fastener when you apply force. Use open-ended wrenches for light-duty to medium-duty jobs.

Box and socket wrenches should be used when a heavy pull is needed. Because they completely encircle the fastener, they apply even pressure with a minimal chance of slipping. Some box wrenches are designed for heavy-duty use, and they do have a striking surface.

But, in general, don't try to increase the torque by hitting the wrench with a hammer or by adding a cheater bar to the wrench's handle – this can break or damage the wrench. If the fastener is too tight, use some penetrating oil to lubricate it.

Wood Saws: Use a cross-cut saw to cut across the wood grain and a ripping saw to cut with the grain. Select a saw with coarse teeth for sawing green wood, thick lumber, or for making coarse cuts. Use fine-toothed saws for making fine cuts in dry wood.

Hack Saws: Install the blade with the teeth facing forward, and apply pressure on the forward stroke. Use a light pressure to avoid twisting and breaking the blade.



Knives: A sharp blade needs less pressure to cut and has less of a chance of getting hung up and slipping. Always move the blade away from yourself as you cut.

Screwdrivers:

- **Type**
- **Tip size**
- **Use as designed**

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Screwdrivers: Use the right type and size of tip. Using screwdrivers as pries, can openers, punches, chisels, wedges, etc. can damage them.

Special, non-sparking tools must be used in flammable atmospheres to prevent fires.

Tool quality:

- **Strong metal**

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Tools made from good quality, durable materials will help you avoid injuries caused by tools breaking or slipping on the job. Metal tool parts should be strong enough to resist bending, cracking, chipping, or excessive wear from normal use.

Tool design:

- **Handle design**
- **Proper tool use**

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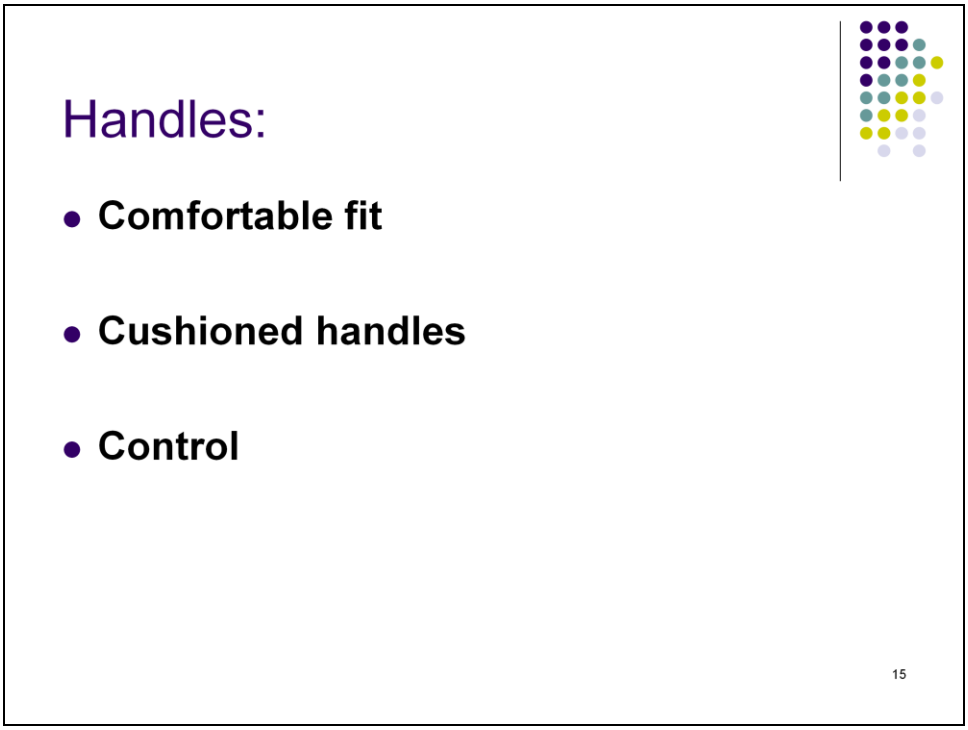
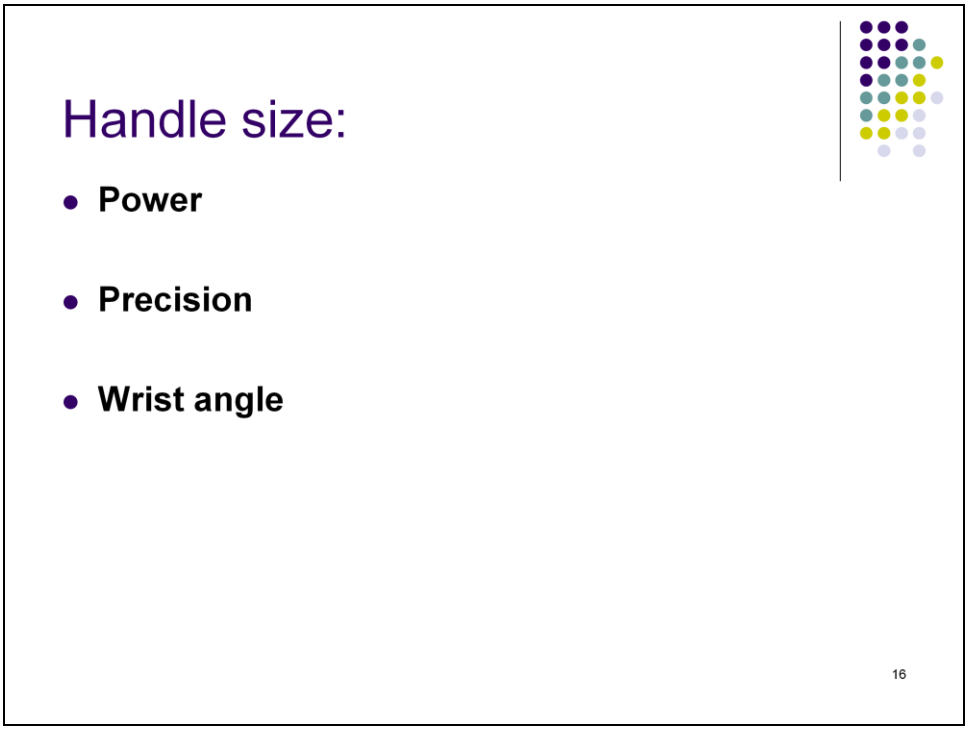
The proper tool should be used for the job. Select a tool that has a handle design that fits your hand, and use the tool the way it is supposed to be used. This will help prevent injuries.



Handles should be shaped to comfortably fit the hand. Avoid handles with sharp edges which can cut off circulation to your fingers during long periods of use. Tools with cushioned handles help absorb vibration, impacts, or squeezing pressure. Remember to use tools with electrically insulated handles for work on exposed energized parts. The tool should feel balanced and under control as you grip the handle.

Tools work best when you can easily hold, move, and control the tool. Avoid using tools that are too heavy or large for you to handle.

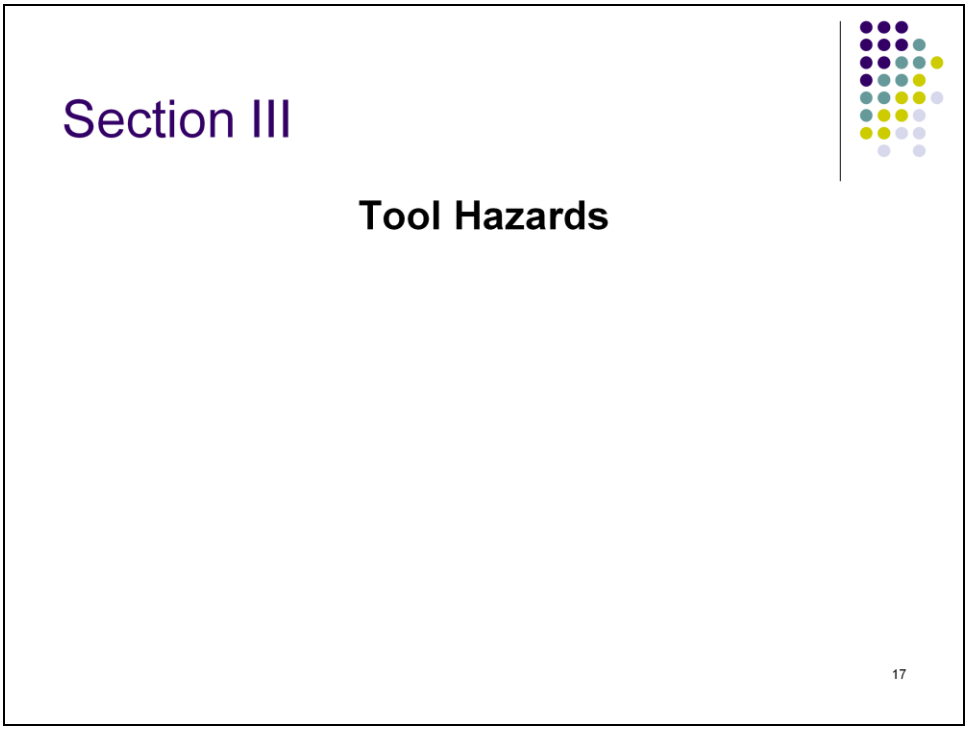


Hand tools used for power, such as hammers and mallets, require high force. For single-handle tools used for power tasks, select a tool with a handle diameter in the range of 1 ¼ inches to 2 inches. For double handle (pliers-like) tools used for power tasks, select a tool with a trip span that is at least 2 inches when fully closed and no more than 3 ½ inches when fully open. When continuous force is required, consider using a clamp or locking pliers. Select a tool with a handle length longer than the widest part of your hand – usually 4 inches to 6 inches. If the handle is too short, the end will press against the palm of your hand and may cause an injury.

Hand tools used for precision or accuracy require low force. For single-handle tools, select a tool with a handle diameter of ¼ inch to ½ inc. For double-handle (plier-like) tools, select a tool with a grip span that is not less than 1 inch when fully closed and no more than 3 inches when fully open.

For double-handled pinching, gripping, or cutting tools, select a tool with handles that are spring-loaded to return the handles to the open position.

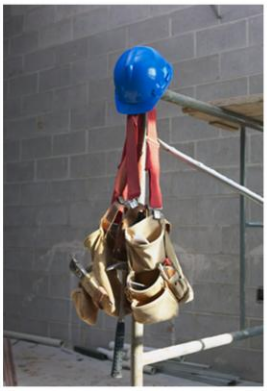
Select a tool with an angle that allows you to work with a straight wrist. Tools with bent handles are better than those with straight handles when the force is applied horizontally (in the same direction as your straight forearm and wrist). Tools with straight handles are better than those with bent handles when the force is applied vertically.



Let’s take a look at some of the hazards that can arise from tool use.

Hazards:

- **Misuse**
- **Improper maintenance**



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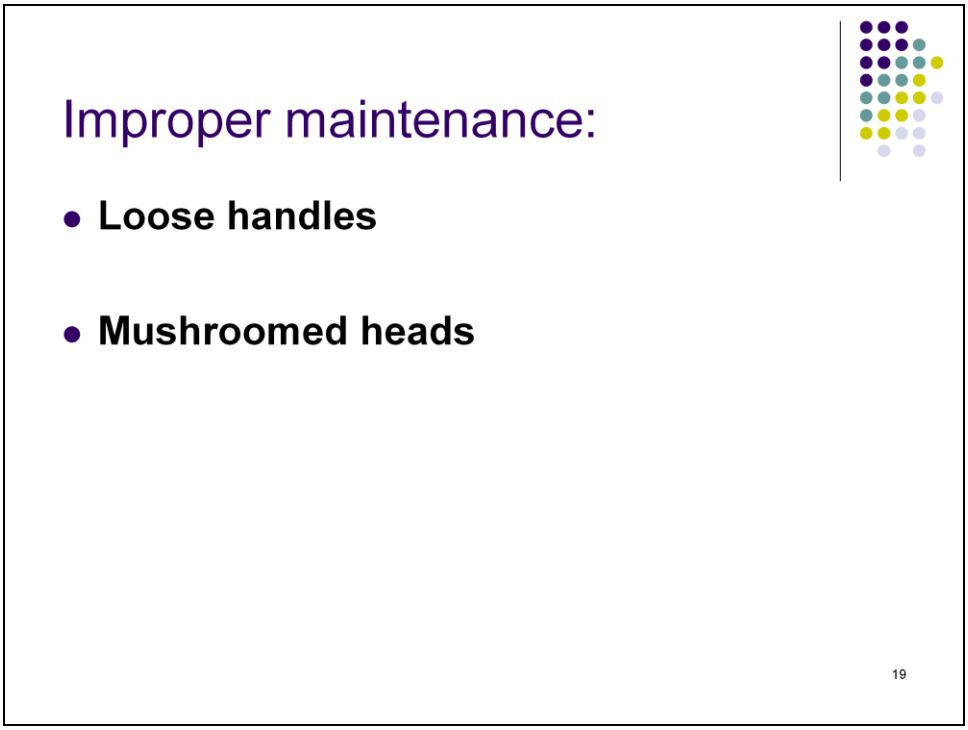
The greatest hazards posed by hand tools result from misuse and improper maintenance.



Some examples of hand tool hazards from improper maintenance include the following:

If a wooden handle on a tool such as a hammer or an axe is loose, splintered, or cracked, the head of the tool may fly off and strike the user or another worker.

Impact tools such as chisels, wedges, or drift pins are unsafe if they have mushroomed heads. The heads might shatter on impact, sending sharp fragments flying.

Potential injuries:

- **Eye injuries**
- **Cuts**
- **Fractures**

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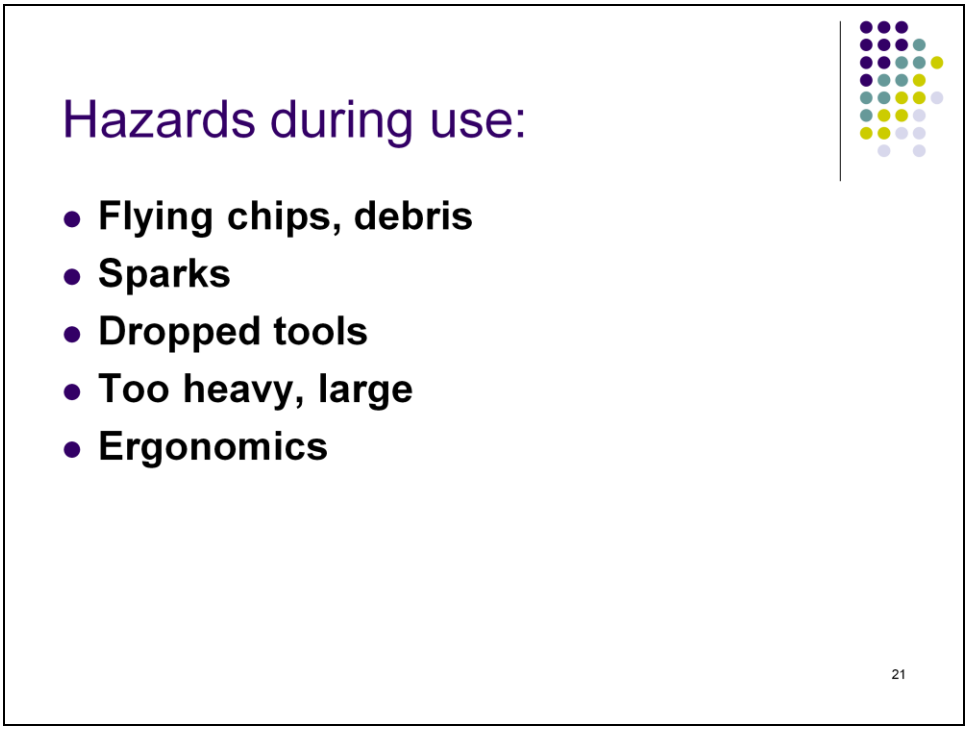
Using hand tools creates hazards, even when the tools are used properly.

Serious eye injuries can result if materials shatter while using hammers, mallets, or powered impact tools. Chiseling, filing, or sawing generates chips that can get into your eyes. If you are looking up to work overhead, any type of tool use could cause dust or debris to fall into your eyes. Even using a brush can spatter paint, stain, thinner, or other chemicals into your eyes and face.

Hand tools cause other injuries, too. A knife that slips can cause a serious laceration. A saw can sever a nerve, tendon, or blood vessel. A misplaced hammer blow can break a bone in your hand or wrist. A dropped pipe wrench can break a toe. Tool use presents plenty of other opportunities for minor scrapes, cuts or bruises. Other serious injuries can result if tools are misused or if the wrong type of tool is used.



Hand tools can present a variety of hazards to the user and those nearby. Those hazards can include injury from:

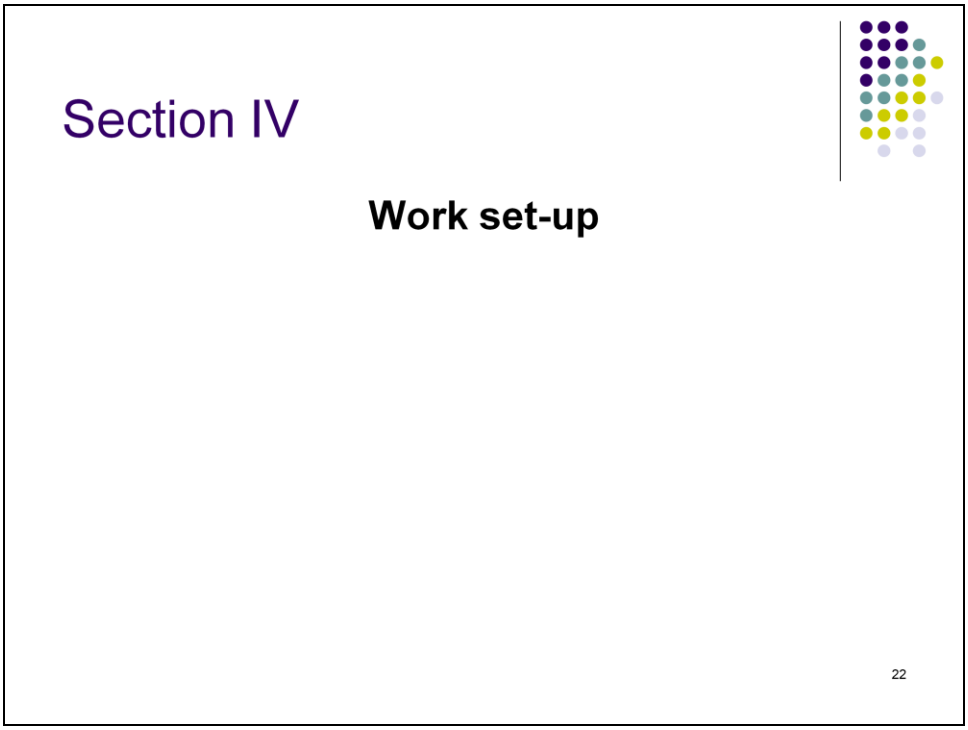
•Flying chips and debris caused by cutting;

•Sparks in potentially explosive atmospheres;

•Dropped tools that injure feet, hands, or co-workers;

•Using tools that are too heavy, too large, or just generally awkward; and

•Ergonomic concerns.



Also of concern is how the work is set-up. Work set-up itself can present a hazard when using tools.

Work set-up:

- **Easy to reach**
- **Right height**

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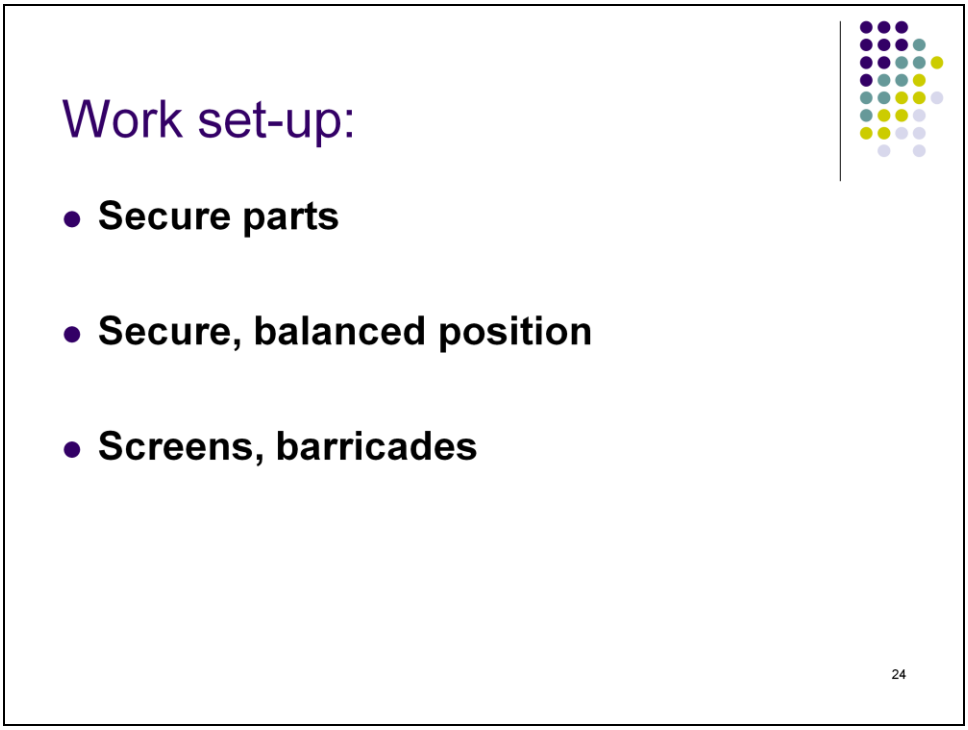
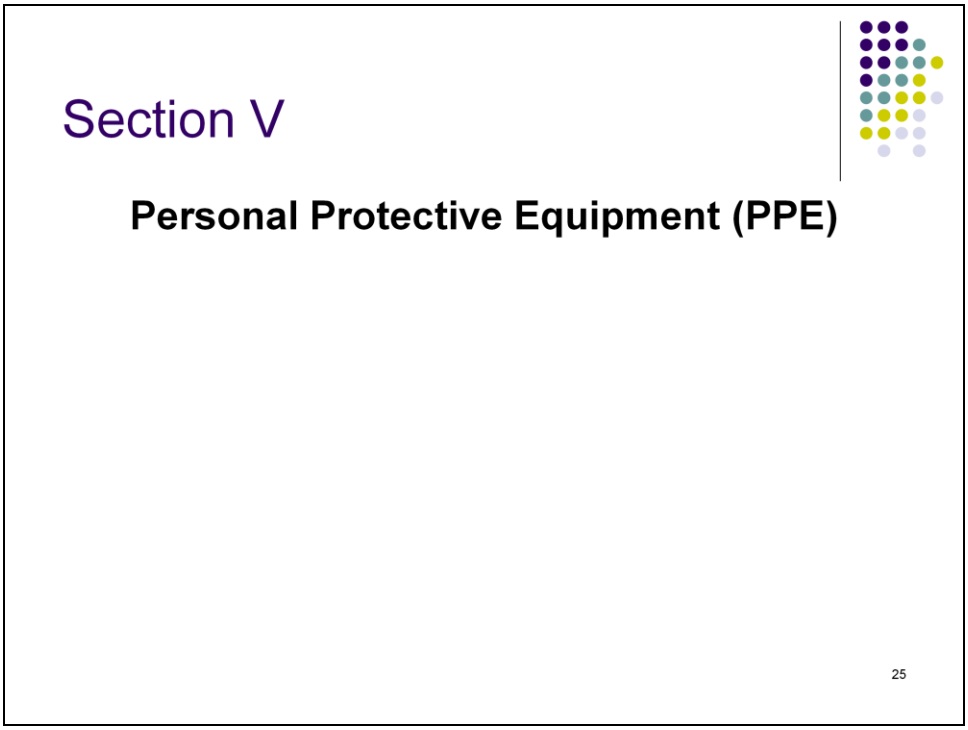
Proper job set-up can improve tool use. You want to easily reach your work without straining muscles, applying force in awkward positions, bending, twisting, or overextending your reach. You are the first person to notice that you are uncomfortable, so make suggestions on how to improve the set-up.

Heavy, forceful tool use is easier to perform when the job is set up slightly lower than waist level. Intricate, lightweight tool use is more comfortable when the job is at or above your waist. If you have to kneel to do the job, wearing kneepads will make the work more tolerable.



Use a vise, clamps, or other means to secure the parts that you are working on. Make sure that you have secure footing and good balance as you use the tool. Injuries can happen if parts or tools slip-causing you to lose your balance and slip. Floors should be kept clean and dry to prevent accidental slips with or around dangerous tools.

While using the tool, take care that any chips or debris will be directed away from yourself and any other people in the area. Setting up protective screens or barricades may be in order for some jobs. Remember that saw blades, knives, or other tools should be directed away from aisle areas and other employees working in close proximity.



When using hand tools, don't forget about the role that personal protective equipment can play in keeping you safe. Using personal protective equipment (PPE) should become a habit when doing certain jobs.

Eye protection:

- **Chips**
- **Splashes**
- **Sparks**
- **Dust**
- **Debris**
- **Face shield**

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Wear eye protection if there is a chance that chips, splashes, sparks dust, or debris, could get into your eyes.

Some examples of jobs where eye protection should be worn include using hammers, mallets, chisels, punches, bolt cutters, saws, or any other tool that could create chips or pieces. For some jobs, face protection may be needed in addition to safety glasses or goggles.

Hand protection:

- **Cuts**
- **Vibration**
- **Impact**

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You can protect yourself from cuts while handling knives by wearing cut-resistant gloves. Recent glove designs have fine metal mesh woven in with cut-resistant fibers – they are more flexible and comfortable than metal mesh alone. They can also protect you from getting cut while working on materials with sharp edges (sheet metal or glass).

Another type of protective glove is made with a material that absorbs vibration and the chock of impacts. Wear them for sanding, repeated hammering, etc.

Other PPE:

- **Hearing protection**
- **Respirators**
- **Steel-toed footwear**
- **Head protection**

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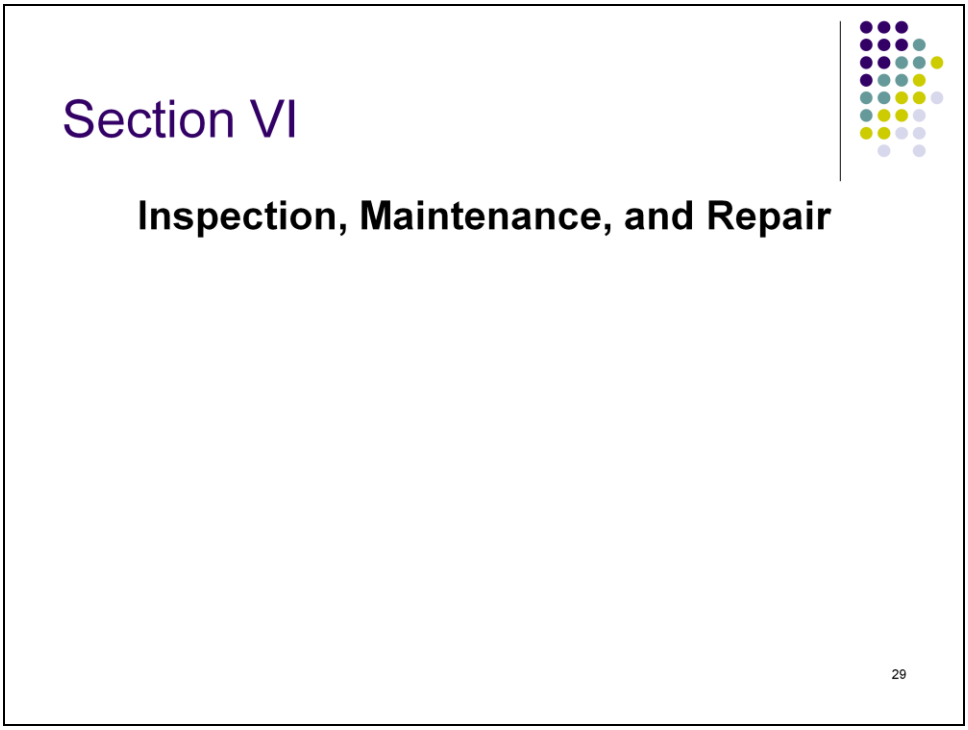
Hearing protection may be in order when using certain striking tools. Even short-term overexposure to excessive noise can be damaging. Tool use might also contribute to your need to wear a respirator. Follow your employer's Respiratory Protection Program, and use your respirator correctly. Steel-toe safety boots are needed where employees handle tools or materials that could fall or roll onto the feet.

When employees work below elevated employees, hard hats are needed to protect workers from falling tools or other materials.



Tool inspection, maintenance and repair play key roles in safety.

Inspection:

- **Before & after each use**

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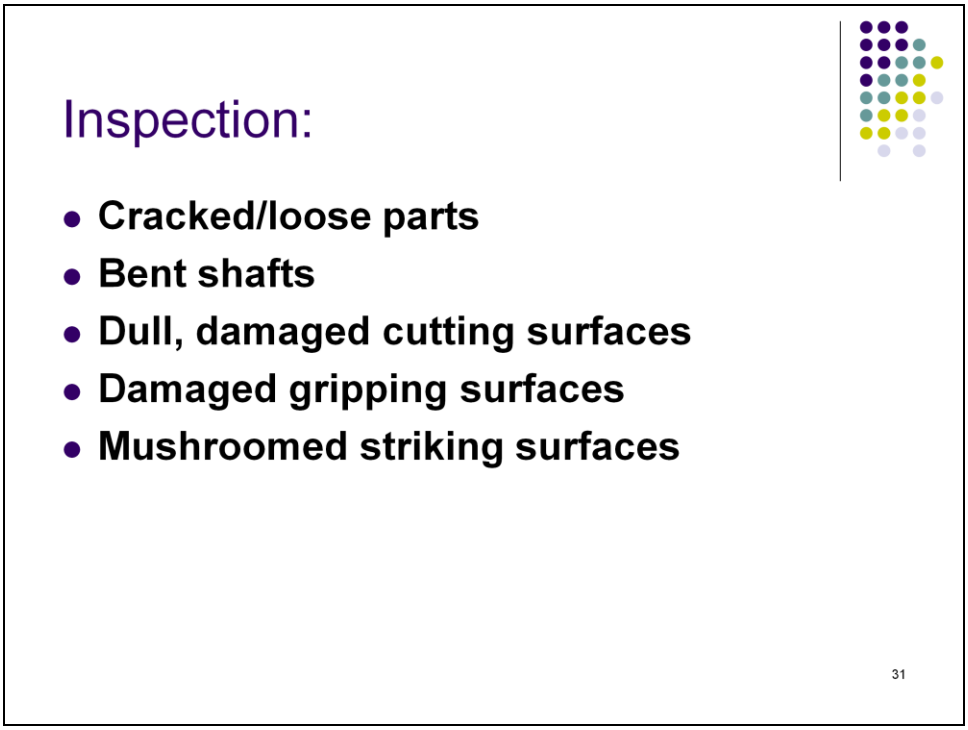
Tools should be inspected before and after each use.



Some signs of damage and war to look for include cracked or loose handles, dull, rounded, or chipped cutting surfaces; gouges or scrapes on gripping surfaces; mushroomed striking surfaces, etc.

Maintenance:

- **Keep tools clean**
- **Sharpen cutting edges**
- **Oil, lubrication**
- **Proper storage**

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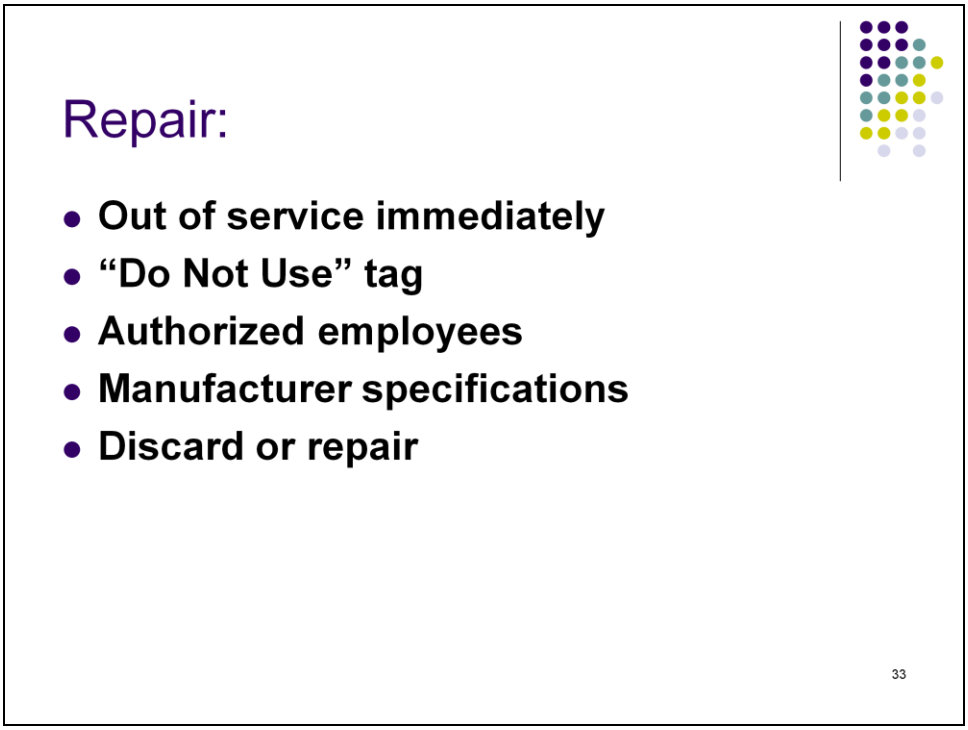
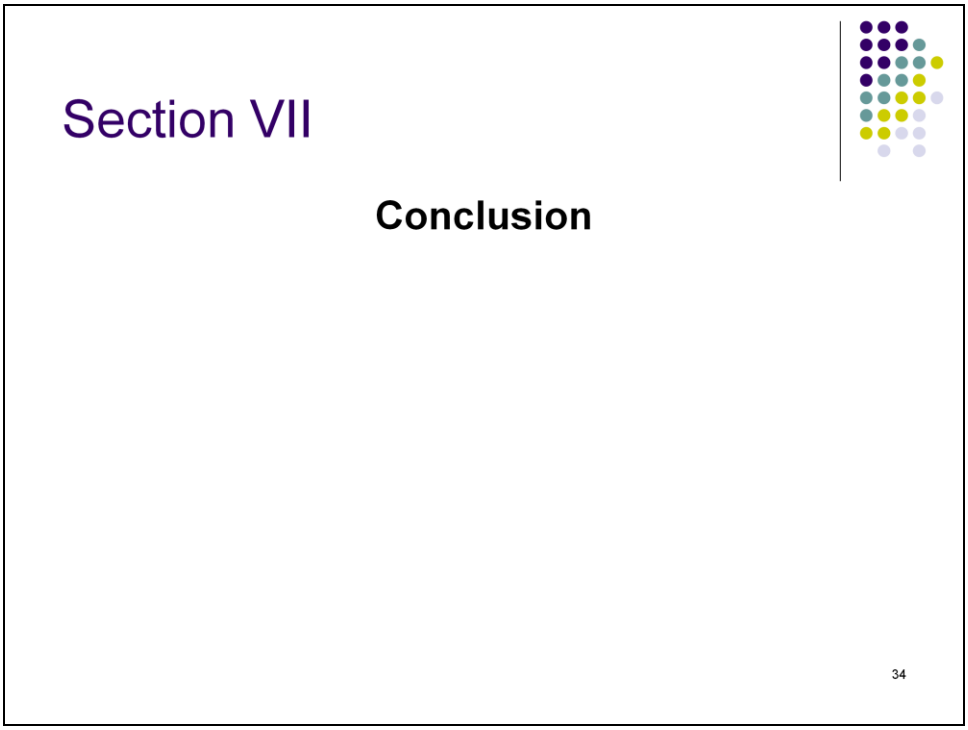
Hand tools should be kept clean. Dirt and grease can hide damage.

Maintain and repair tools before it is too late. Many tools use metal parts that must be changed, sharpened, or oiled. These include tools that cut metal or wood, any tool with a cutting surface, and those used to place or drive fasteners, such as screws. Sharpen cutting edges regularly. To prevent rust, lightly oil tools before putting them away. Follow a schedule to make sure tools are lubricated.

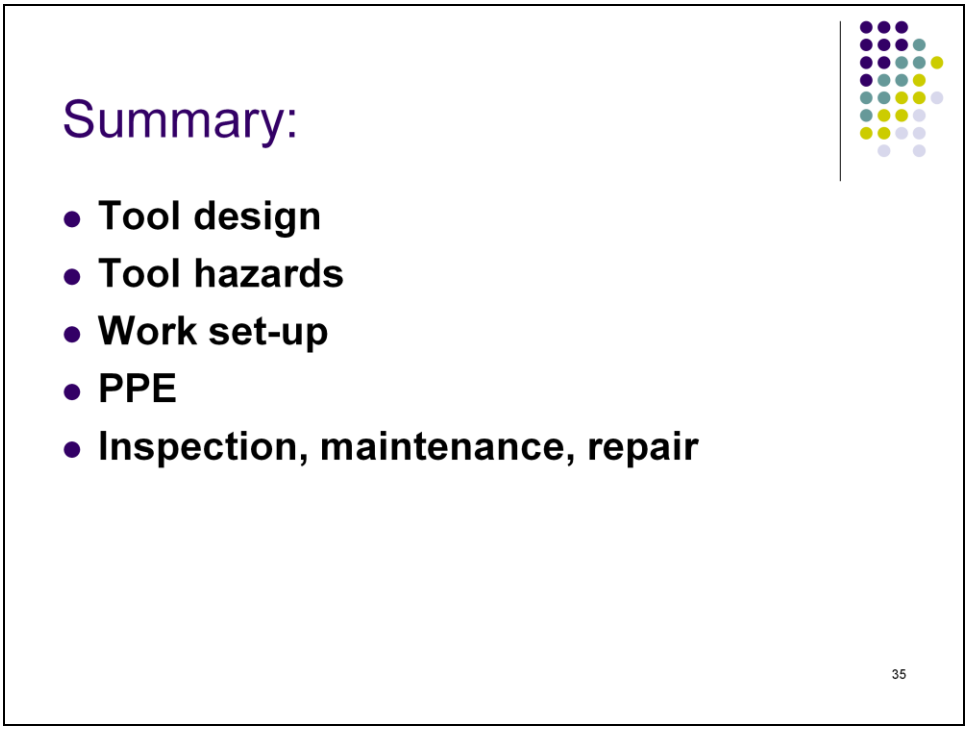
Use tool boxes or tool chests to keep tools organized. Hang larger tools on pegboards. It is easier to keep track of portable tools when they are put back where they belong after a job.



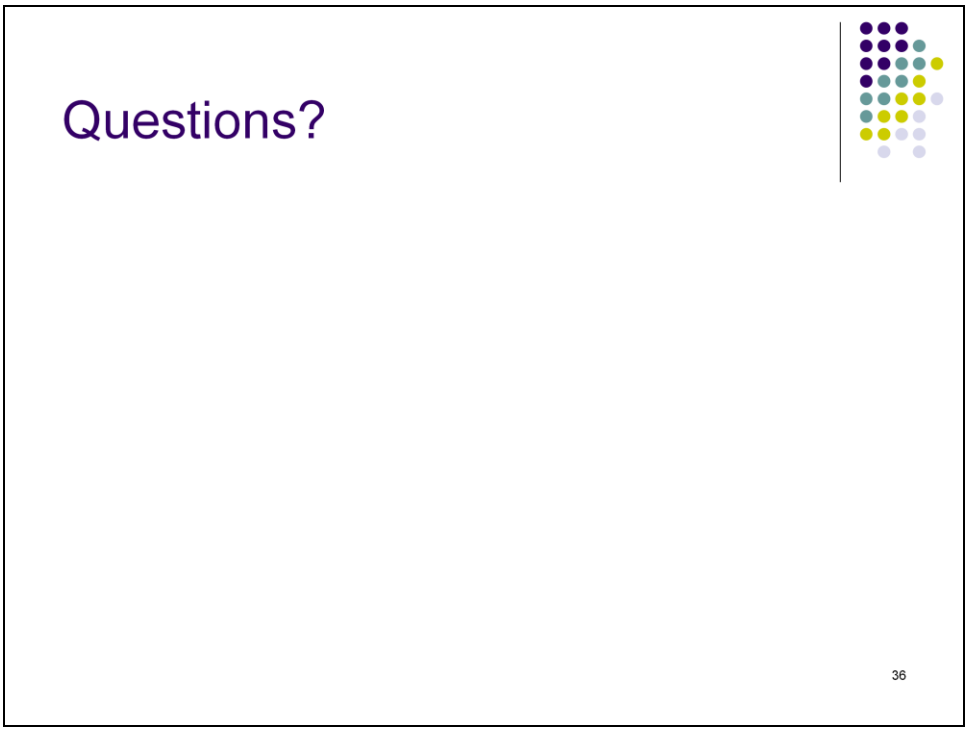
Take damaged tools out of service immediately. Apply a "Do Not Use" warning tag so everyone knows not to use the tool. Only authorized employees should be allowed to repair tools. Some types of tools must meet the manufacturer's specifications after they have been repaired. All repaired tools should be thoroughly inspected before they are put back into use. Discard damaged tools that cannot be repaired.



In conclusion, remember that hand tools are great time savers, but they need to be used and maintained properly to prevent injuries.



We have discussed how tool design determines proper tool selection and use; the hazards involved; how proper work set-up can prevent tool-related injuries; the need for and use of appropriate personal protection equipment; an d the importance of hand tool inspection, maintenance, and repair.



Are there any questions?