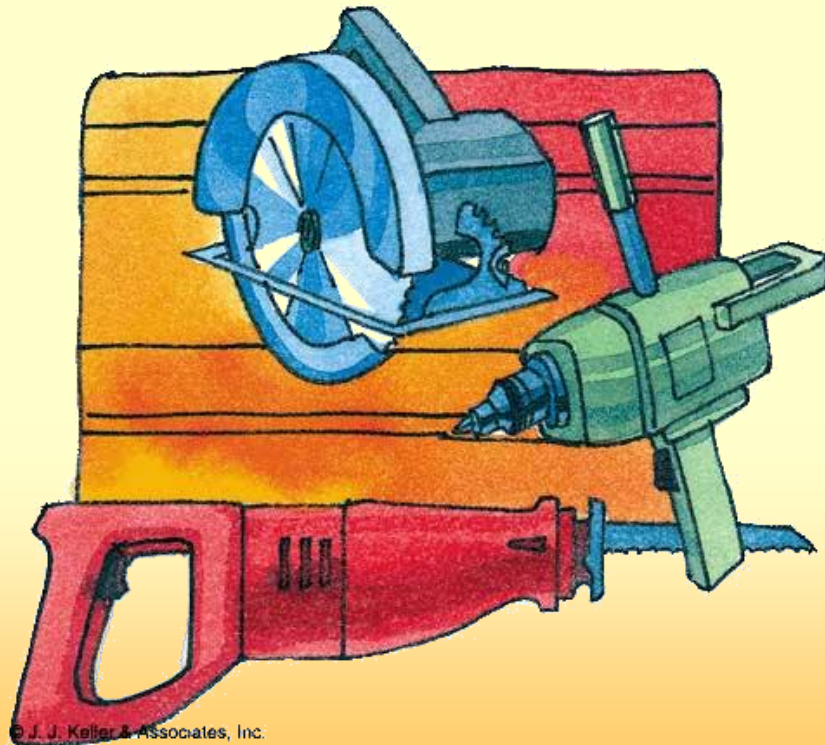
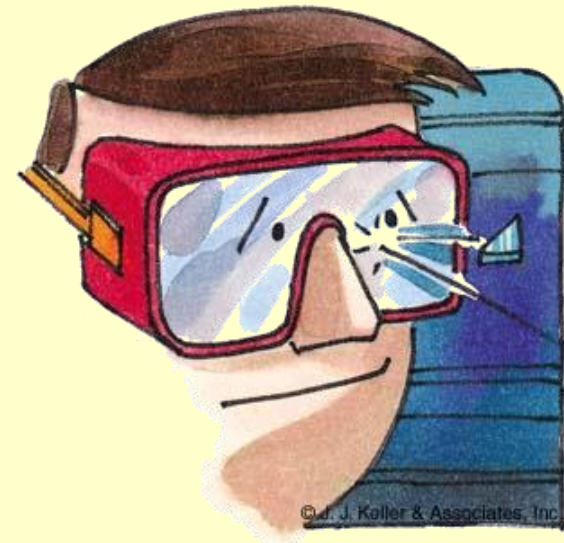


Hand & Portable Powered Tools



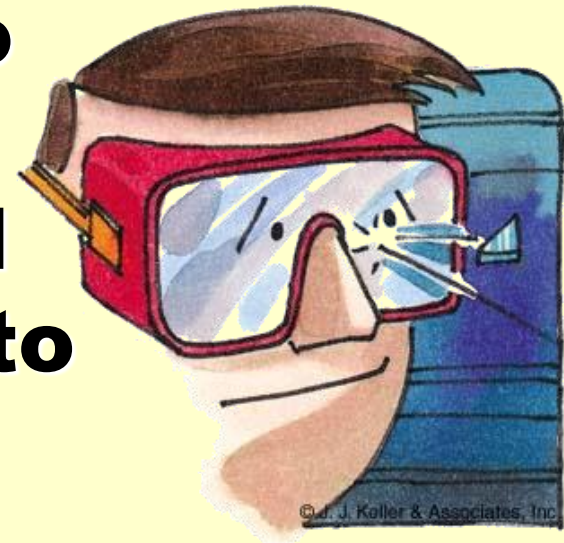
Injuries caused by hand & portable powered tools

- ❖ **Serious eye injuries can result if materials shatter while using**
 - **hammers**
 - **mallets**
 - **powered impact tools**



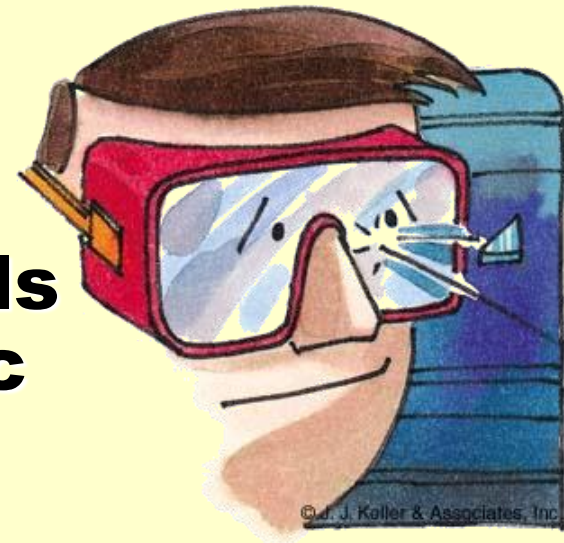
Injuries caused by hand & portable powered tools

- ❖ **Chiseling, filing, grinding, sawing generates chips that can get in your eyes**
- ❖ **If you're looking up to work overhead, any type of tool use could cause dust or debris to fall into your eyes**



Injuries caused by hand & portable powered tools

- ❖ **Other serious injuries can result if the wrong type of tool is used**
- ❖ **Tool use in areas where there may be a flammable atmosphere requires the use of**
 - **non-sparking hand tools**
 - **specially rated electric power tools**



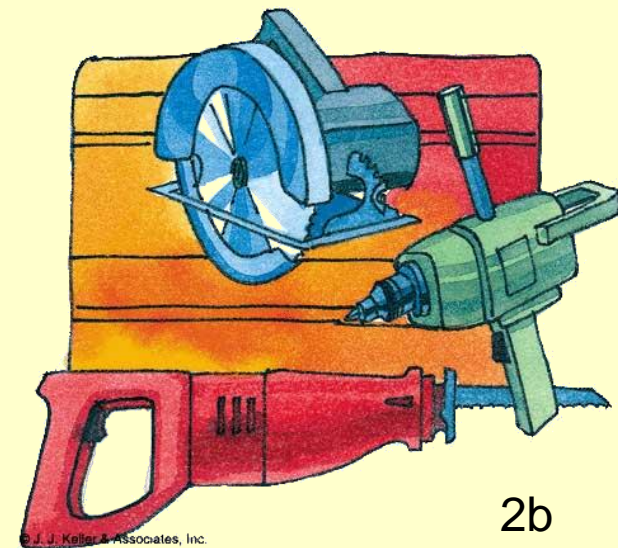


Tool quality and design

- ❖ **Tools made from good quality, durable materials will help avoid injuries caused by tools breaking or slipping**

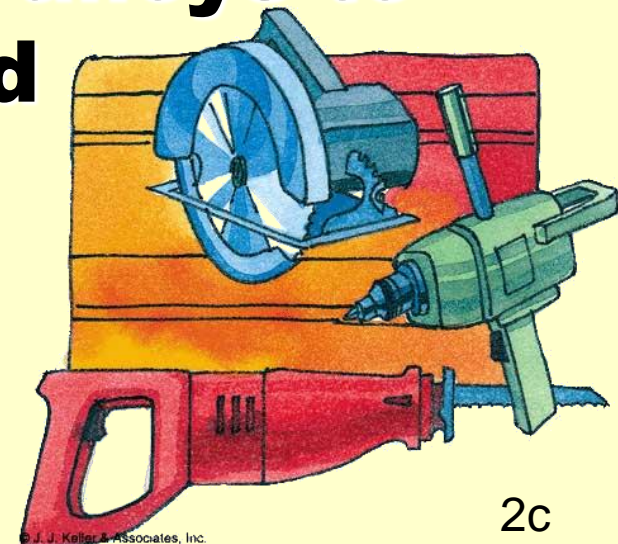
Tool quality and design

- ❖ **Metal tool parts should be strong enough to resist:**
 - **bending**
 - **cracking**
 - **chipping**
 - **excessive wear from normal use**



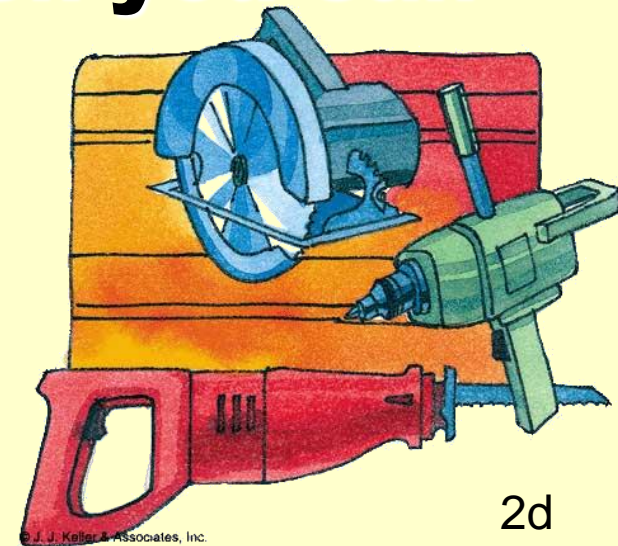
Tool quality and design

- ❖ **Handles should be shaped to comfortably fit the hand**
- ❖ **Non-sparking hand tools are made of non-ferrous alloys to reduce the likelihood that they will cause a spark**



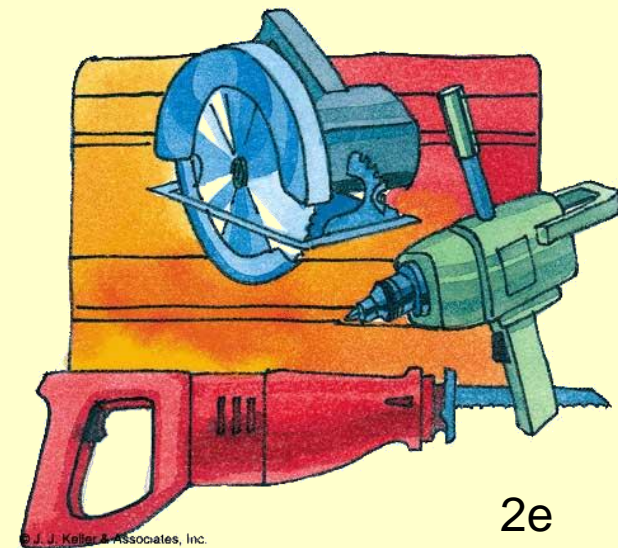
Tool quality and design

- ❖ **Always use the appropriate blades, bits, fasteners with powered tools**
- ❖ **Tools work best when you can easily hold, move, and use the tool**



Tool quality and design

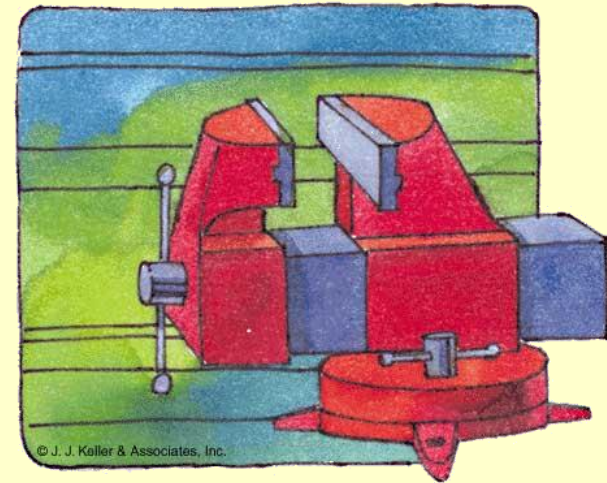
- ❖ **Avoid using tools that are too heavy or large for you to control**



Job set-up

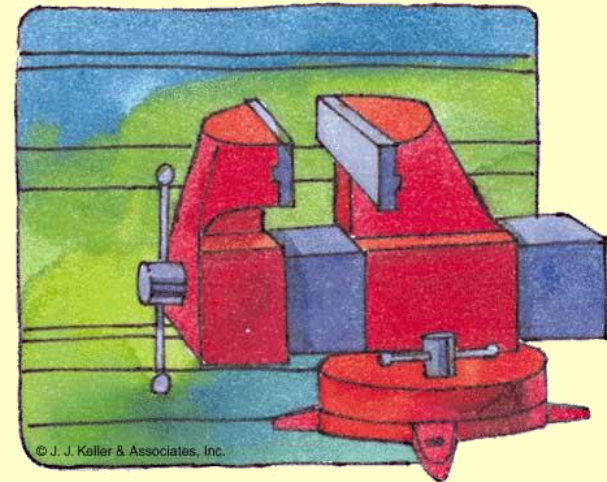
❖ **You want to easily reach your work without:**

- **straining muscles**
- **applying force in awkward positions**
- **bending, twisting**
- **overextending your reach**



Job set-up

- ❖ **Use a vise, clamps, or other means to secure the parts that you are working on**
- ❖ **While using the tool, take care that any chips or debris will be directed away from yourself and others**



Protective equipment

- ❖ **Using personal protective equipment (PPE) should become a habit**
- ❖ **Wear eye protection if there is a chance that chips, splashes, sparks, dust, or debris could get into your eyes**





Protective equipment

❖ **Some examples of jobs where eye protection should be worn include using:**

- **hammers**
- **mallets**
- **chisels**
- **punches**
- **bolt cutters**



Protective equipment

- ❖ **Some examples of jobs where eye protection should be worn include using:**
 - **staple guns**
 - **drills**
 - **abrasive wheels**
 - **saws**
 - **any other tool that could create chips, pieces, or splashes**



Protective equipment

- ❖ **Eye protection is required when using explosive actuated tools**
- ❖ **You can protect yourself from cuts while handling knives by wearing cut-resistant gloves**



Protective equipment

- ❖ **Another type of protective glove is made with a material that absorbs vibration and the shock of impacts**
- ❖ **Ear protection may be in order when using powered tools**

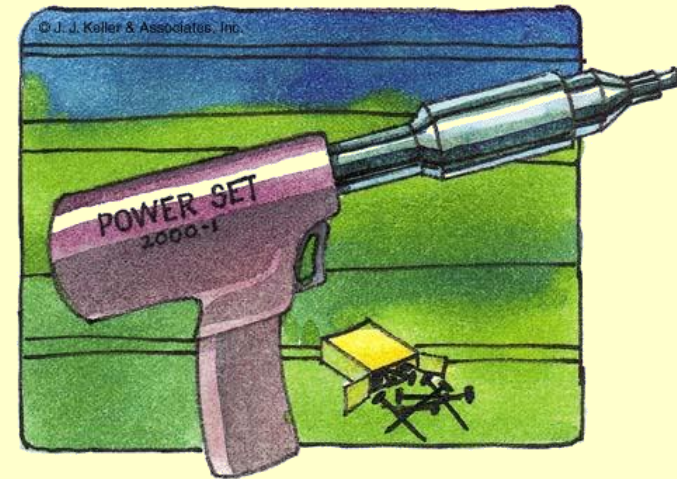


Protective equipment

- ❖ **Tool use may require the use of a respirator**

Tool inspection

- ❖ **Tools should be inspected before and after each use**





Tool inspection

Some signs of damage and wear to look for include:

- ❖ **Cracked or loose handles, casings, or guards**
- ❖ **Bent shafts or spindles**
- ❖ **Worn, cut, brittle, or frayed cords and hoses**



Tool inspection

- ❖ **Loose or leaking fittings**
- ❖ **Dull, rounded, or chipped cutting surfaces**



Tool inspection

- ❖ **Gouges or scrapes on gripping surfaces**
- ❖ **Mushroomed striking surfaces**



Tool maintenance and repair

- ❖ **Portable tools should be kept clean**
- ❖ **Maintain and repair tools before it's too late**
- ❖ **Sharpen cutting edges regularly**



Tool maintenance and repair

- ❖ **Follow a schedule to make sure tools get lubricated**
- ❖ **To prevent rust, lightly oil tools before putting them away**
- ❖ **Take damaged tools out of service immediately**



Tool maintenance and repair

- ❖ **Only authorized employees should be allowed to repair tools**
- ❖ **Some types of tools must meet the manufacturer's specifications after they've been repaired**

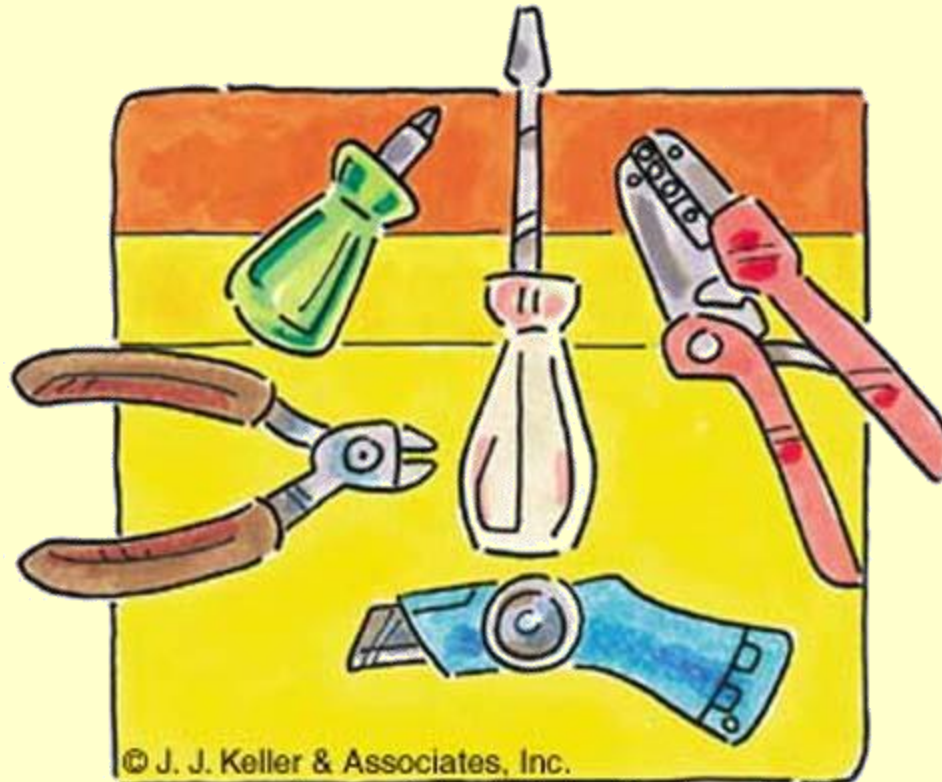


Tool maintenance and repair

- ❖ **All repaired tools should be thoroughly inspected before they are put back into use**
- ❖ **Discard damaged tools that cannot be repaired**
- ❖ **Use tool boxes or tool chests to keep tools organized**

Using different types of hand tools

- ❖ **Hand tools are non-powered**



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Using different types of hand tools

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

- ❖ **Using a screwdriver as a chisel may cause the tip of the screwdriver to break and fly, hitting the user or other employees**



Using different types of hand tools

- ❖ **If a wooden handle on a tool is loose, splintered, or cracked, the head of the tool may fly off and strike the user or another worker**
- ❖ **A wrench might slip if its jaws are sprung**



Using different types of hand tools

- ❖ **Impact tools such as chisels, wedges, or drift pins are unsafe if they have mushroomed heads**

Using different types of hand tools

❖ Types of hand tools include the following:

- **Hammers and Mallets**
- **Pliers**
- **Cutters**
- **Wrenches**
- **Wood saws**
- **Hack saws**
- **Knives**
- **Screwdrivers**



Precautions for power tool use

- ❖ **Power tools can be hazardous when improperly used**

Precautions for power tool use

- ❖ **There are several types of power tools, based on the power source they use:**
 - **electric**
 - **pneumatic**
 - **liquid fuel**
 - **hydraulic**
 - **explosive-actuated**



Precautions for power tool use

- ❖ **Never carry a tool by the cord or hose**
- ❖ **Never yank the cord or the hose to disconnect it from the receptacle**
- ❖ **Keep cords and hoses away from heat, oil, and sharp edges**



Precautions for power tool use

- ❖ **Disconnect tools when not in use, before servicing, and when changing accessories**
- ❖ **Keep observers a safe distance away from the work area**
- ❖ **Avoid accidental starting**



Precautions for power tool use

- ❖ **Tools should be maintained with care**
- ❖ **Be sure to keep good footing and maintain good balance**

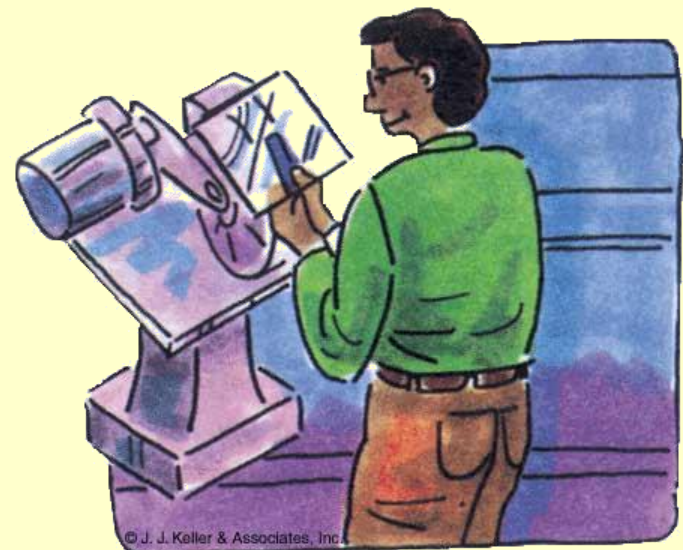


Precautions for power tool use

- ❖ **Wear proper apparel - loose clothing or jewelry can get caught in moving parts**
- ❖ **All portable electric tools that are damaged are to be removed from use and tagged “Do Not Use.”**

Guards

- ❖ **Hazardous moving parts of a power tool need to be safeguarded**

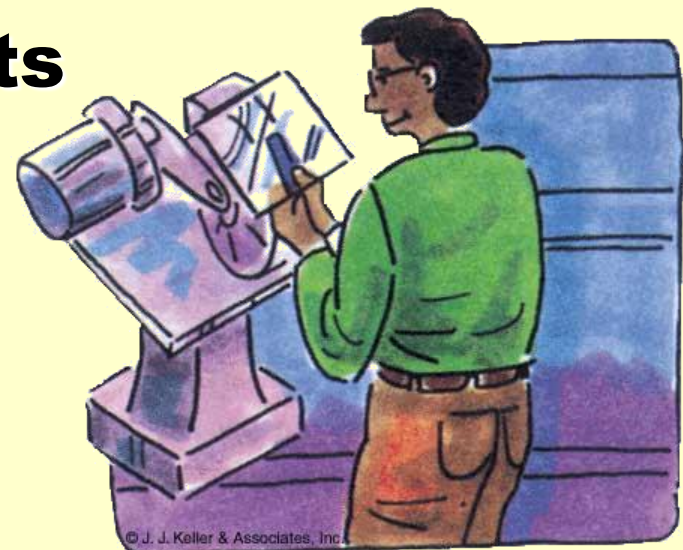


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Guards

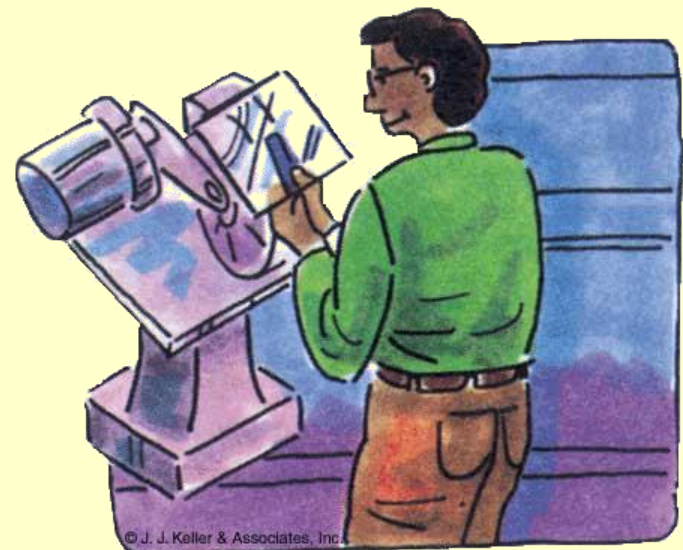
❖ **Guards protect the operator and others from the following:**

- **Point of operation**
- **In-running nip points**
- **Rotating parts**
- **Flying chips and sparks**



Guards

- ❖ **Safety guards must never be removed when a tool is being used**





Safety switches

- ❖ **The following hand-held powered tools must be equipped with a constant-pressure switch or control. They may also be equipped with a “lock-on” control:**



Safety switches

- ❖ **drillstappers**
- ❖ **fastener drivers**
- ❖ **horizontal, vertical and angle grinders with wheels larger than 2 inches in diameter**
- ❖ **disc sanders with discs larger than 2 inches**



Safety switches

- ❖ **belt sanders**
- ❖ **reciprocating saws**
- ❖ **saber saws**
- ❖ **scroll saws**
- ❖ **jigsaws with blade shanks greater than 1/4 inch wide**



General precautions for electric power tools

- ❖ **Operate electric tools within their design limitations**
- ❖ **Use gloves and appropriate safety footwear when using electric tools**
- ❖ **Store electric tools in a dry place when not in use**



General precautions for electric power tools

- ❖ **Do not use electric tools in damp or wet locations unless they are approved for that purpose**
- ❖ **Keep work areas well-lit when operating electric tools**

General precautions for electric power tools

- ❖ **Ensure that power cords do not present a tripping hazard**





Electrocution and shock

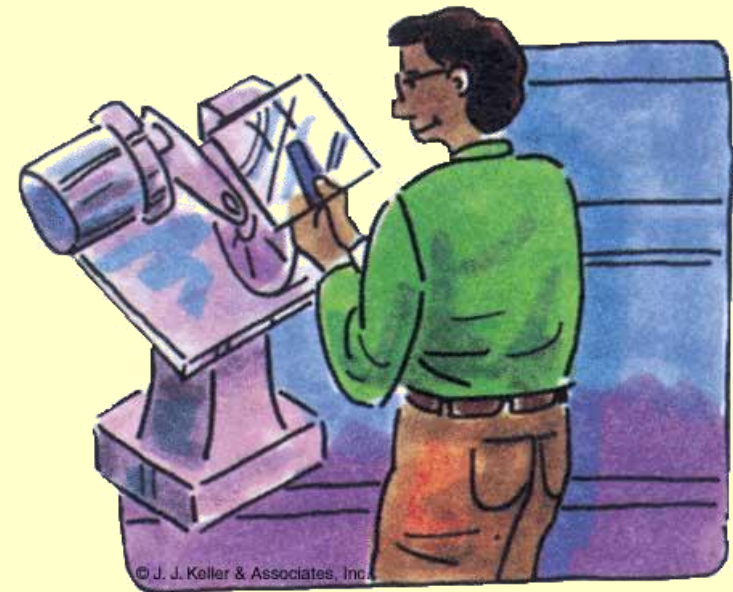
- ❖ **Electric-powered tools can cause burns and slight shocks which can lead to injuries or even heart failure**
- ❖ **Even a small amount of current can result in fibrillation of the heart and death**

Electrocution and shock

- ❖ **To protect the user from shock, tools must either:**
 - **have a three-wire cord with ground and be plugged into a grounded receptacle**
 - **be double insulated**
 - **be powered by a low-voltage isolation transformer**

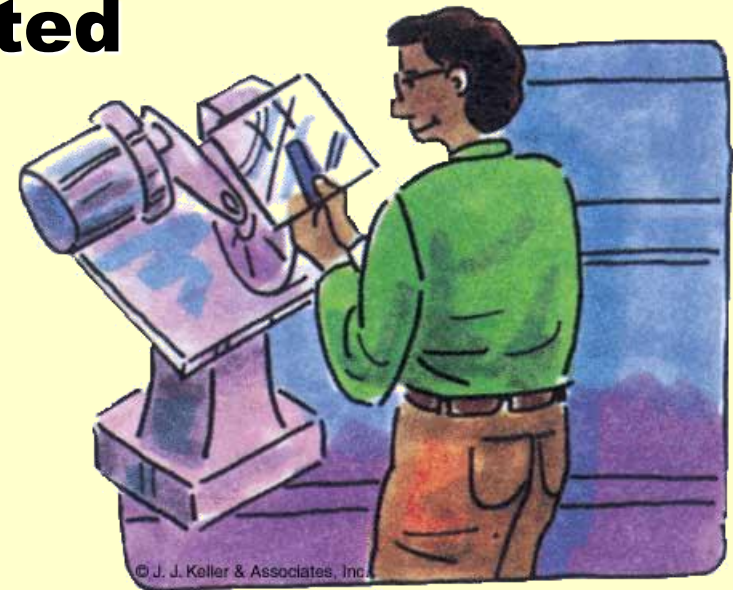
Powered abrasive wheel tools

- ❖ **Powered abrasive wheels create special safety problems because they may throw off flying fragments**



Powered abrasive wheel tools

- ❖ **Before an abrasive wheel is mounted, it should be:**
 - **inspected closely**
 - **sound- or ring-tested**





Powered abrasive wheel tools

- ❖ **To test, wheels should be tapped gently with a light non-metallic instrument**
- ❖ **If they sound cracked or dead, they could fly apart in operation**



Powered abrasive wheel tools

- ❖ **A sound and undamaged wheel will give a clear metallic tone or “ring”**



Powered abrasive wheel tools

- ❖ **Portable grinding tools need to be equipped with safety guards to protect workers from:**
 - **the moving wheel surface**
 - **flying fragments in case of breakage**



Powered abrasive wheel tools

- ❖ **When using a powered grinder:**
 - **always use eye protection**
 - **turn off the power when not in use**
 - **never clamp a hand-held grinder in a vise**

Pneumatic tools

❖ **Pneumatic tools are powered by compressed air and include:**

- **chippers**
- **drills**
- **hammers**
- **sanders**



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Pneumatic tools

- ❖ **The main danger in using pneumatic tools is the hazard of getting hit by:**
 - **one of the tool's attachments; or**
 - **a fastener being used with the tool**



Pneumatic tools

- ❖ **Eye protection is required and face protection is recommended**
- ❖ **Check to see that the tool is fastened securely to the hose – use a locking device**



Pneumatic tools

- ❖ **Set up screens to protect nearby workers from being struck by flying fragments around:**
 - **chippers**
 - **riveting guns**
 - **staplers**
 - **air drills**



Pneumatic tools

- ❖ **Use hearing protection when working with noisy tools such as jackhammers**



Compressed air

- ❖ **Compressed air cannot be used for cleaning purposes unless:**
 - **the pressure is reduced to less than 30 p.s.i.**
 - **effective chip guarding is used**
 - **personal protective equipment is used**

Compressed air

- ❖ **Methods for pressure reduction include:**
 - **Reducing the air compressor pressure level**
 - **Fitting the air source with a relief device to release the air when the nozzle is dead-ended**



Compressed air

- ❖ **Methods for pressure reduction include:**
 - **Installing an air nozzle with holes that will reduce the air pressure to less than 30 p.s.i. when the nozzle is dead-ended**



Compressed air

- ❖ **Never point compressed air guns toward anyone**
- ❖ **Never “dead-end” an air gun against yourself**



Compressed air

- ❖ **Compressed air typically contains chips, oil particles, and other debris that can cause serious injuries to eyes, ears, and even intact skin**
- ❖ **Use a brush to remove dust and debris from clothing**



Compressed air

- ❖ **Wearing disposable coveralls will also help keep employees' clothing clean during dusty jobs**