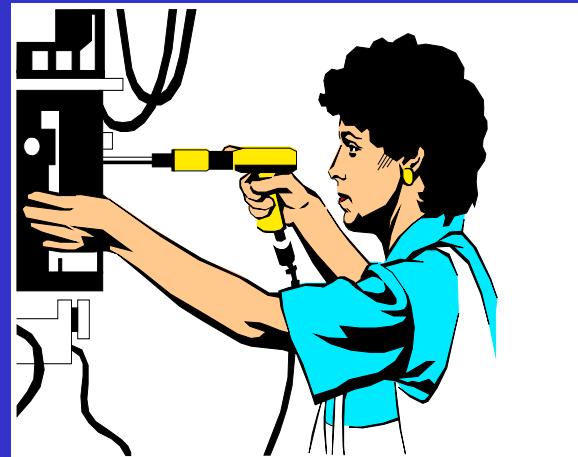


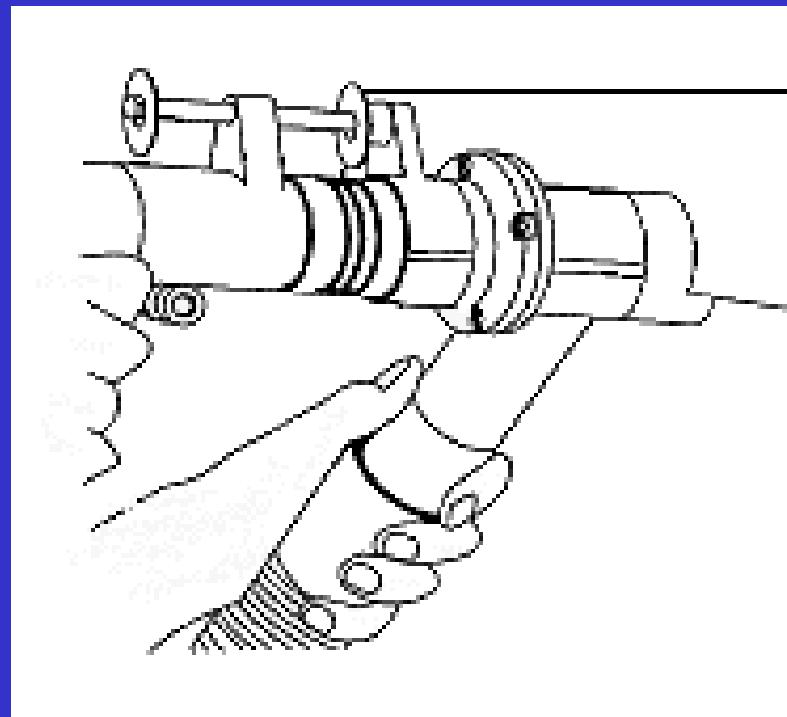
# Tools – Hand and Power



# Hazards

**Workers using hand and power tools may be exposed to these hazards:**

- objects that fall, fly, are abrasive, or splash
- harmful dusts, fumes, mists, vapors, and gases
- frayed or damaged electrical cords, hazardous connections and improper grounding



# Basic Tool Safety Rules

- Maintain regularly
- Use right tool for the job
- Inspect before use
- Operate according to manufacturers' instructions
- Use the right personal protective equipment (PPE)
- Use guards



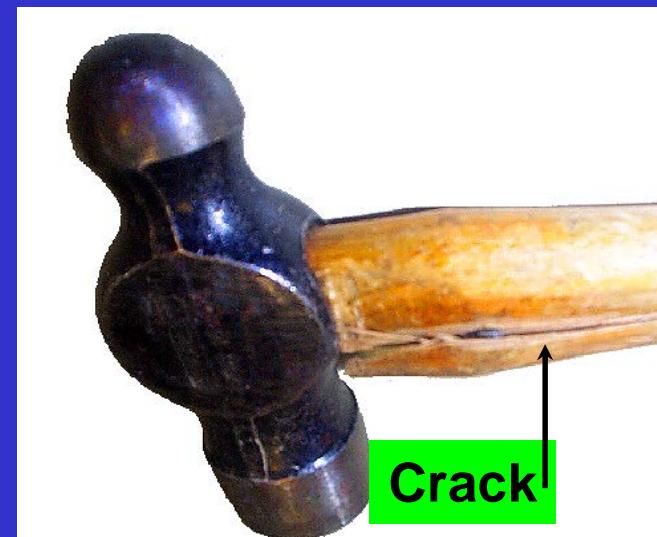


# Hand Tool Hazards

Hazards are usually caused by misuse and improper maintenance

## Do not use:

- wrenches when jaws are sprung
- impact tools (chisels and wedges) when heads have mushroomed
- tools with loose, cracked or splintered handles
- a screwdriver as a chisel
- tools with taped handles – they may be hiding cracks





# Hand Tools - Protection

**Use PPE, such as safety goggles and gloves**

**Keep floor surface where working free from debris and tripping or slipping hazards**

**Keep cutting tools sharp**



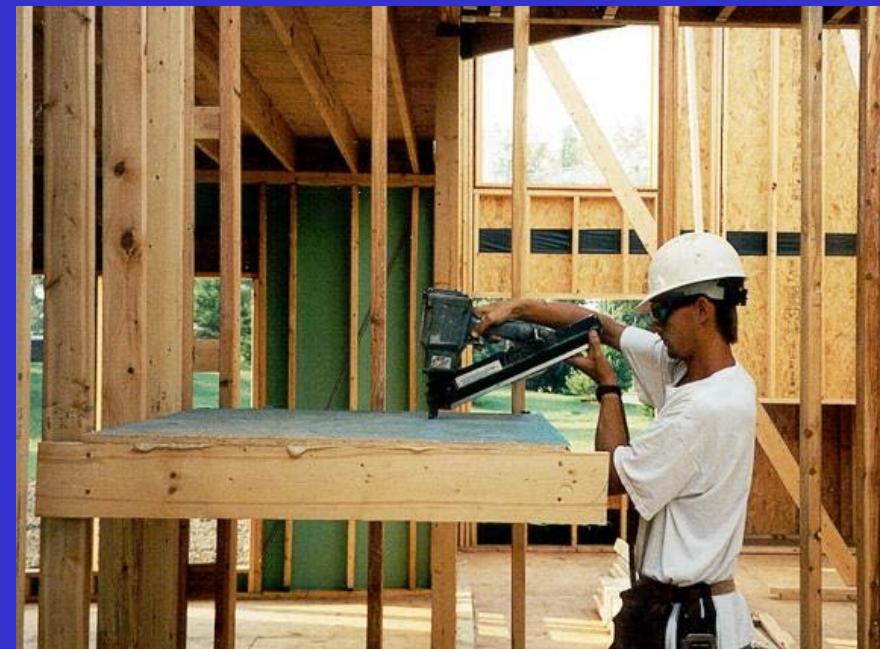
# Power Tools

**Must be fitted with guards  
and safety switches**

**Extremely hazardous  
when used improperly**

**Different types, determined  
by their power source:**

- Electric
- Pneumatic
- Liquid fuel
- Hydraulic
- Powder-actuated





# Switches

**Hand-held power tools must be equipped with one of the following:**

**Constant pressure switch**  
shuts off power upon release

**Examples: circular saw, chain saw, grinder, hand-held power drill**



**On-Off Switch**

**Examples: routers, planers, laminate trimmers, shears, jig saws, nibblers, scroll saws**



# Power Tools - Precautions

- **Disconnect tools when not in use, before servicing and cleaning, and when changing accessories**
- **Keep people not involved with the work away from the work**
- **Secure work with clamps or a vise, freeing both hands to operate the tool**
- **Don't hold the switch button while carrying a plugged-in tool**
- **Keep tools sharp and clean**
- **Consider what you wear – loose clothing and jewelry can get caught in moving parts**
- **Remove damaged electric tools & tag them: “Do Not Use”**

# Power Tools – Precautions

## Electric Cords



**Don't carry portable tools by the cord**

**Don't use electric cords to hoist or lower tools**

**Don't yank cord or hose to disconnect it**

**Keep cords and hoses away from heat, oil, and sharp edges**

# Electric Power Tools

To protect a worker from shock, these tools must:

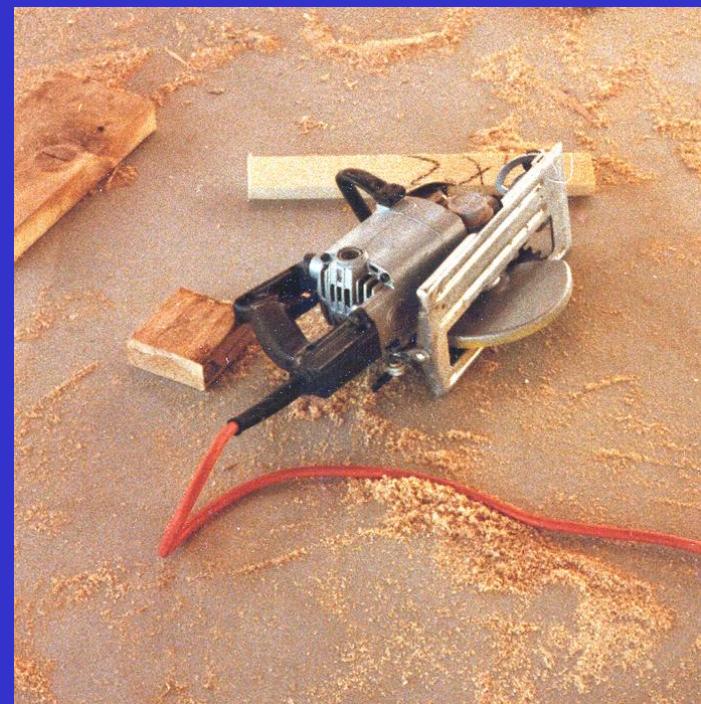
- have a 3-wire cord plugged into a grounded receptacle
- be double insulated, or
- be powered by a low-voltage isolation transformer





# Electric Tools – Good Practices

- Operate within design limits
- Use gloves and safety shoes
- Store in a dry place
- Don't use in wet locations unless approved for that
- Keep work areas well lit
- Ensure cords don't present a tripping hazard





# Abrasive Wheels and Tools

**May throw off flying fragments**

**Equip with guards that:**

- **Cover the spindle end, nut, & flange projections**
- **Maintain proper alignment with the wheel**
- **Don't exceed the strength of the fastenings**



**Guard so that a minimal amount of the wheel is exposed**

# Inspecting Abrasive Wheels

## Before mounting:

- inspect closely for damage
- perform sound- or ring-test to ensure free from cracks / defects

## To test:

- tap wheel gently with a light, non-metallic instrument
- if wheel sounds cracked or dead, do not use it because it could fly apart



# Abrasive Wheel Use

To prevent cracking:

- fit the wheel on the spindle freely
- tighten the spindle nut enough to hold the wheel in place without distorting the flange

Let the tool come up to speed prior to grinding or cutting

Don't stand in front of the wheel as it comes up to full speed

Use eye and/or face protection



Ensure the spindle speed doesn't exceed the maximum speed marked on the wheel

# Abrasive Wheel Work Rests

**Keep work rests not more than 1/8th inch from wheel surface**

**This prevents jamming the work between the wheel and the rest, which may cause the wheel to break**

**Don't adjust wheel while it's rotating**





# Guarding

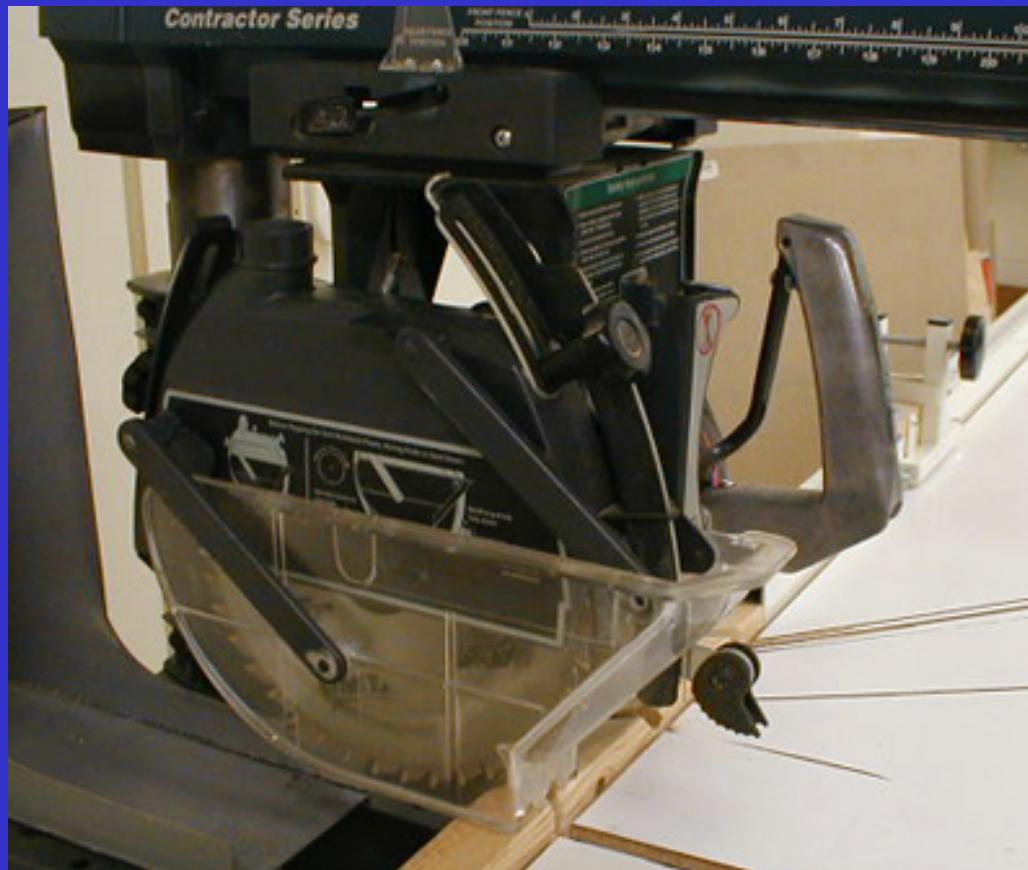
**Guard exposed moving parts of power tools**

**Guard belts, gears, shafts, pulleys, sprockets, spindles, flywheels, chains, or other moving parts**

**Never remove a guard when a tool is in use**



# Guarding - Point of Operation

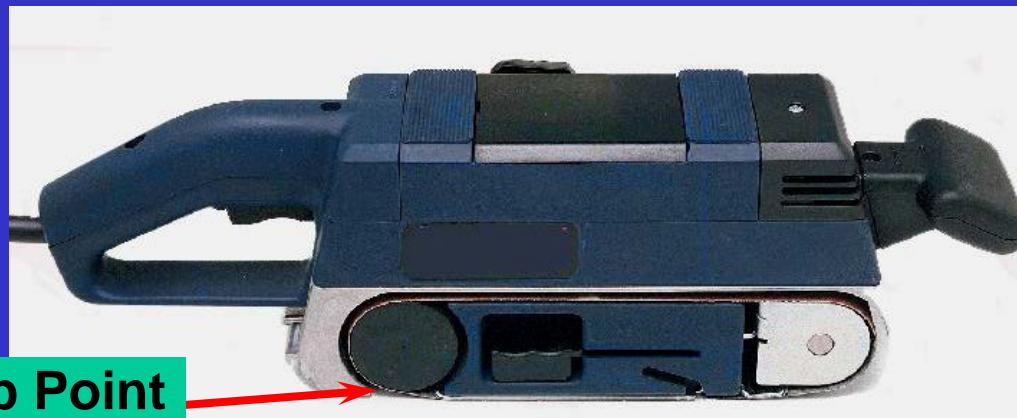


This shows a radial arm saw equipped with proper point of operation guards

The point of operation is where the work is actually performed on the materials – it must be guarded



# Guarding Protection



**Machine guards must protect the operator and others from:**

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

# Radial Saw Guarding

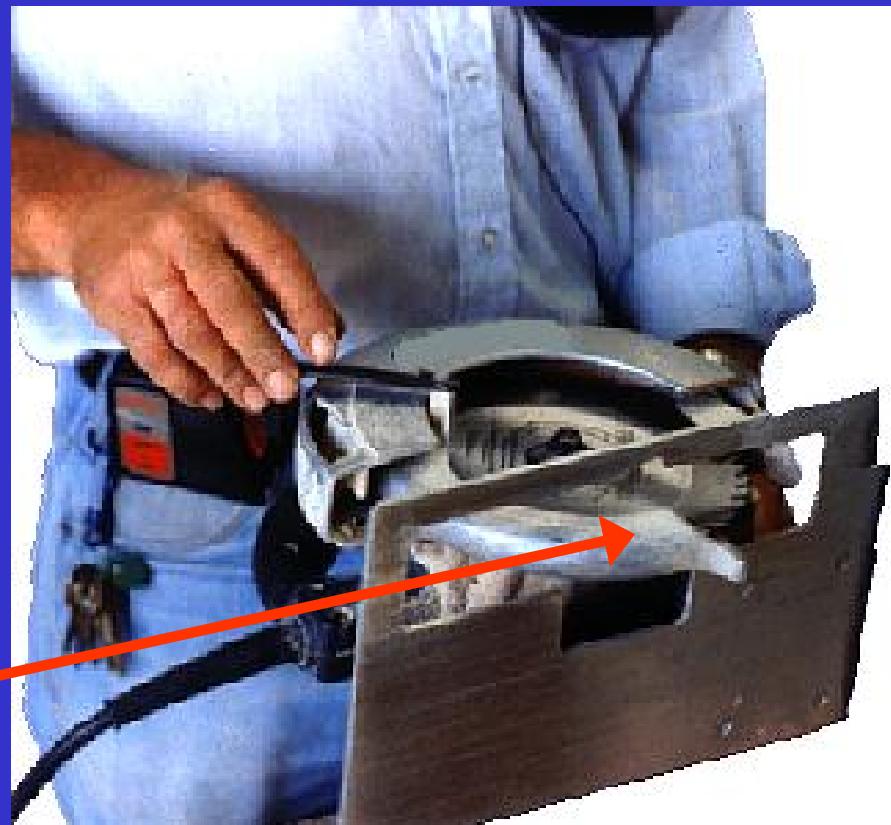


Radial arm saw  
equipped with an  
upper and lower  
blade guard

Guard to prevent the operator from coming  
in contact with the rotating blade



# Guarding Portable Circular Saws

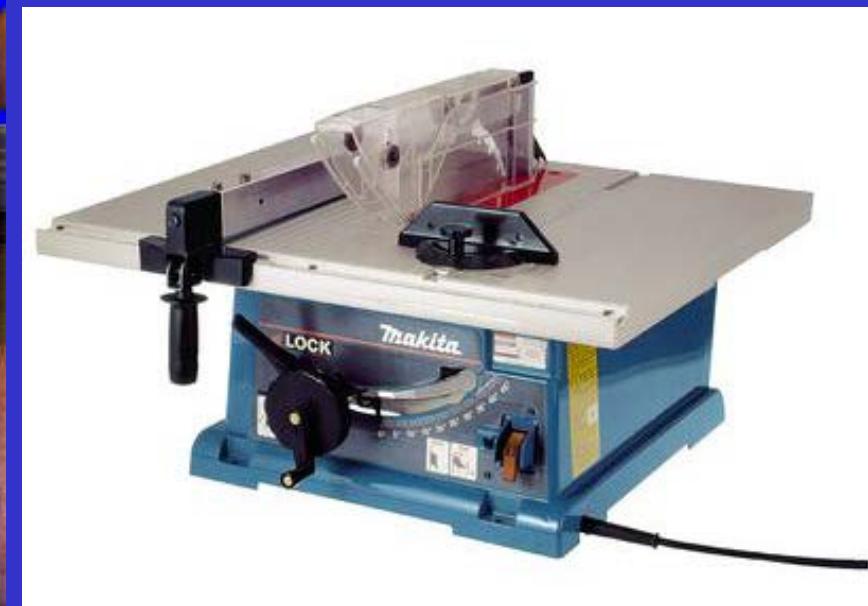


**Guard these saws above and below the base plate or shoe. The lower guard must cover the saw to the depth of the teeth.**

# Table Saw Guarding



Hood guard



Use a hood for guarding

# Pneumatic Tools

**Powered by compressed air**

**Includes nailers, staplers, chippers, drills & sanders**

**Main hazard - getting hit by a tool attachment or by a fastener the worker is using with the tool**



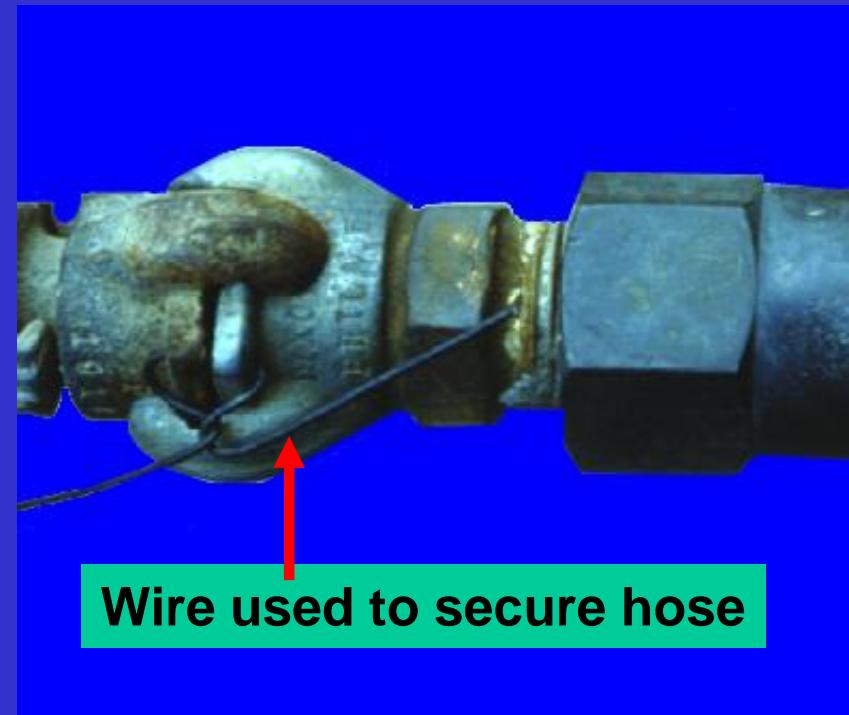
**Nail Gun - Cut-Away View**

**Take the same precautions with an air hose that you take with electric cords**

# Pneumatic Tools - Fastening

Ensure tool is fastened securely to the air hose to prevent a disconnection

Use a short wire or positive locking device attaching the air hose to the tool



# Pneumatic Tool Connections



← **Unacceptable**



← **Acceptable**



# Pneumatic Tool Safety

**Place a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with work surface**

**Install a safety clip or retainer to prevent attachments, such as chisels on a chipping hammer, from being ejected**

**Wear eye protection. Wear hearing protection with jackhammers.**



**Muzzle in contact with work surface**

# Compressed Air Cleaning



**Don't use compressed air for cleaning**

**Exception - where reduced to less than 30 p.s.i. with effective chip guarding and PPE**



# Liquid Fuel Tools

**Usually gas powered**

**Main hazard – fuel vapors**

**Use only approved  
flammable liquid containers**

**Before refilling a fuel-  
powered tool tank, shut  
down the engine and allow it  
to cool**



# Powder-Actuated Tools

User must be trained and licensed to operate

Test tool each day before loading to ensure the safety devices are working properly

Wear suitable ear, eye, and face protection

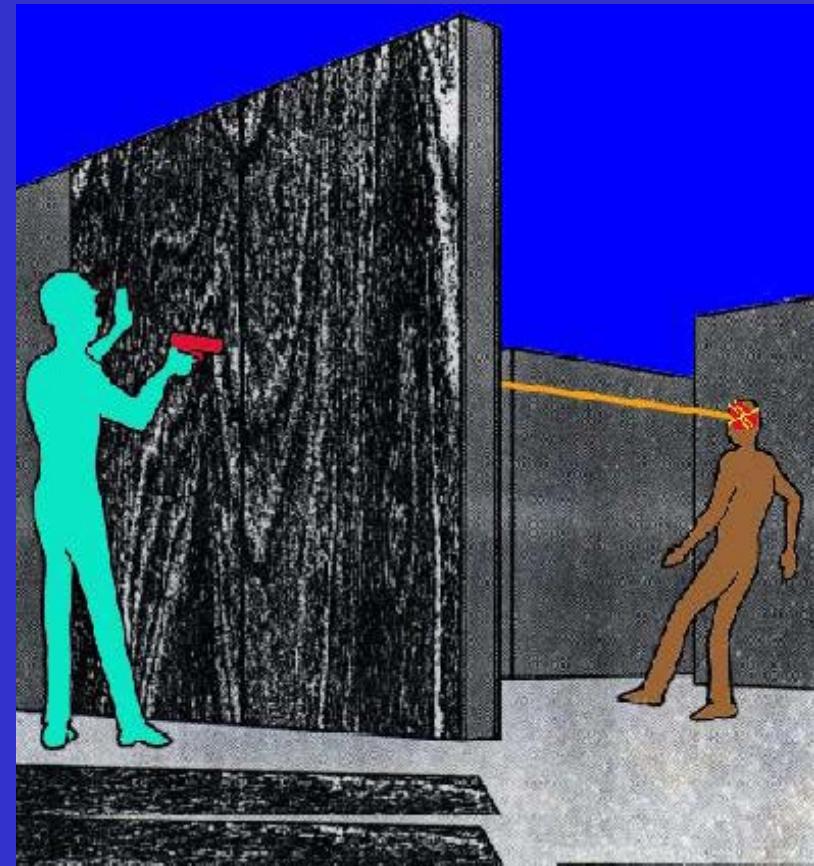
Select a powder level that will do the work without excessive force



# Fatal Fact

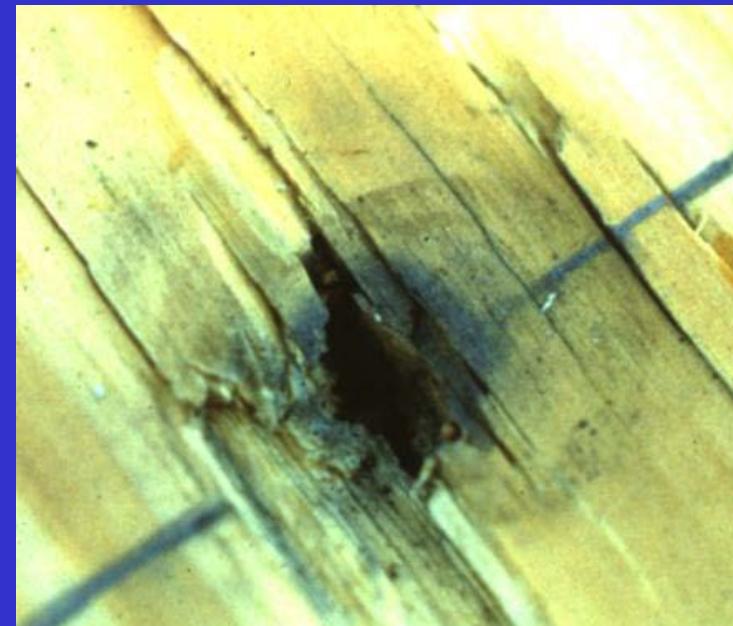
**Employee killed when struck in head by a nail fired from a powder actuated tool.**

**Tool operator was attempting to anchor a plywood form in preparation for pouring a concrete wall**



# Easily Penetrated Material

**Avoid driving into materials easily penetrated unless materials are backed by a substance that will prevent the pin or fastener from passing through**



**Also, don't drive fasteners into very hard or brittle material that might chip or splatter, or make the fasteners ricochet**

# Powder-Actuated Tool Safety Tips

- Don't use in explosive or flammable atmosphere
- Inspect tool before use to ensure:
  - it is clean,
  - that moving parts operate freely
  - the barrel is free from obstructions and has the proper shield, guard, and attachments
- Don't load the tool unless using immediately
- Don't leave a loaded tool unattended
- Keep hands clear of the barrel end
- Never point the tool at anyone
- Store unloaded in a locked box



# Jacks

To set up a jack, ensure:

- The base is on a firm, level surface
- It's centered
- The jack head is placed against a level surface
- You apply the lift force evenly

Lubricate and inspect jacks regularly



# Jacks - Capacity



**The manufacturer's rated capacity must be marked on all jacks and must not be exceeded**

**All jacks must have a stop indicator that is not exceeded**

# Jacks - Blocking

**Immediately block the load after it is lifted. 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.**

**Photo - handyman jack is provided a firm base by using the railroad tie. The load is cribbed to prevent it from falling.**



# Summary

**Hazards are usually the result of improper tool use or not following one or more of these protection techniques:**

- **Inspecting the tool before use**
- **Using PPE (Personal Protective Equipment)**
- **Using guards**
- **Properly storing the tool**
- **Using safe handling techniques**

# Need more information?

**Shop Supervisor  
Facilities Safety Office 2-1141  
UGA Environmental Safety Division  
Equipment Manufacturer**



**UNIVERSITY OF  
GEORGIA**  
Facilities Management Division