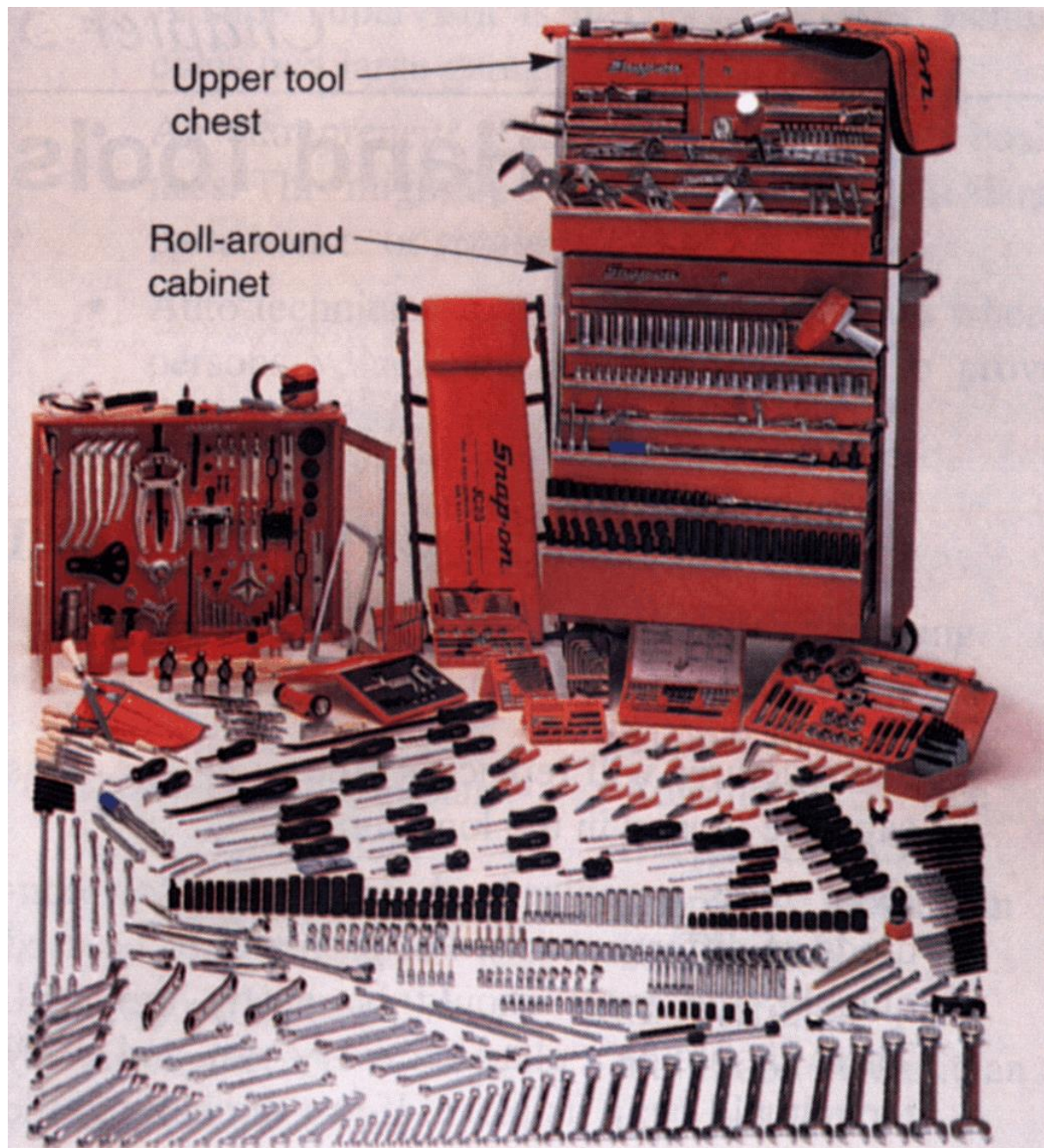


# HAND TOOLS



You do not need to take notes on this video

- <https://www.youtube.com/watch?v=v20X8BTEnYo>

# HAMMERS

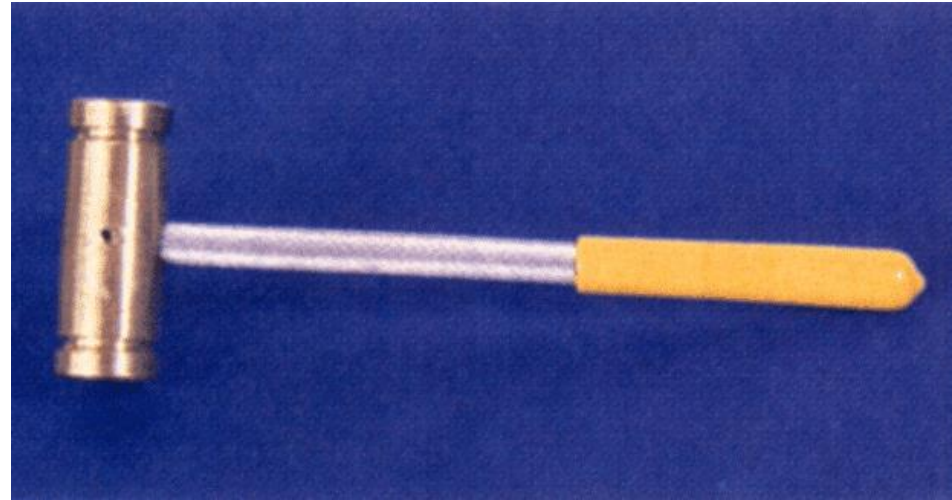
- Used for striking, riveting, and gasket cutting
- Wear eye protection





# HAMMERS

- Plastic, lead and rubber mallets are used to prevent damaging the surface



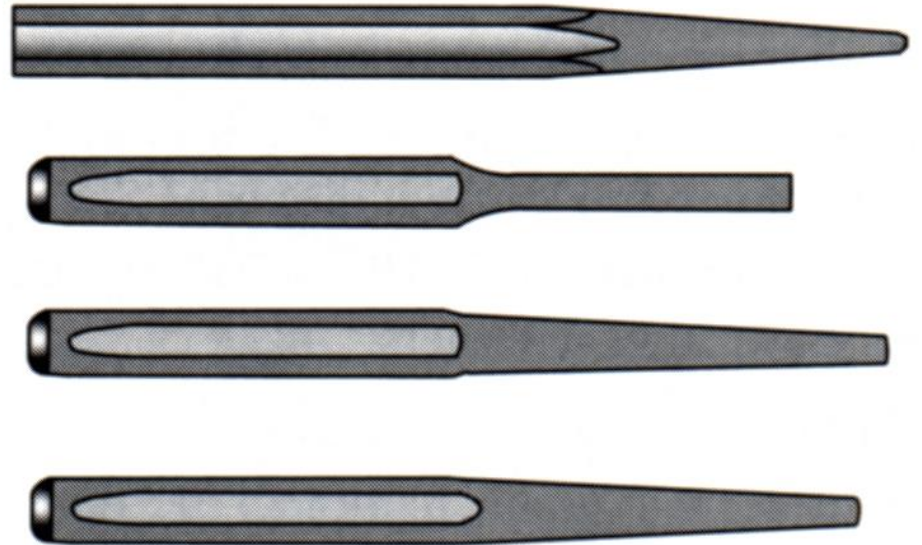
# CHISELS

- Used for cutting off rivet heads, bolts and rusted nuts



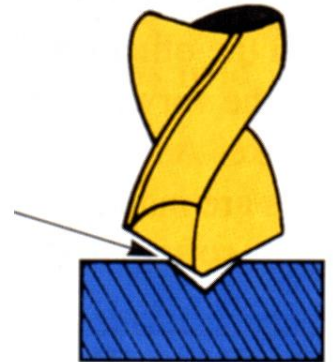
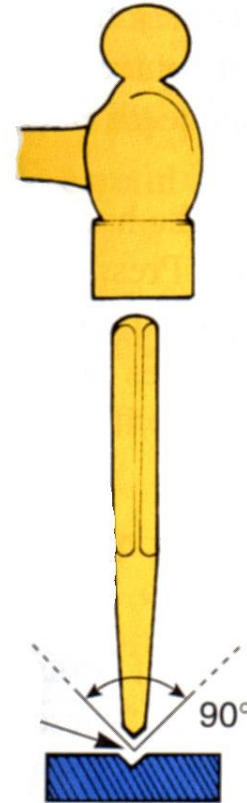
# PUNCHES

- Starting, Drift and Pin punches are used to drive out rivets, bolts and pins from a hole



# PUNCHES

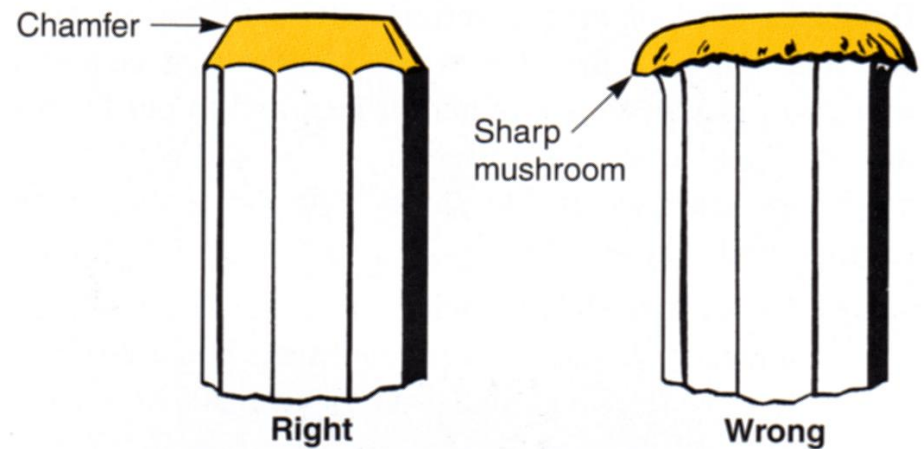
- A Center Punch is needed to mark material before drilling





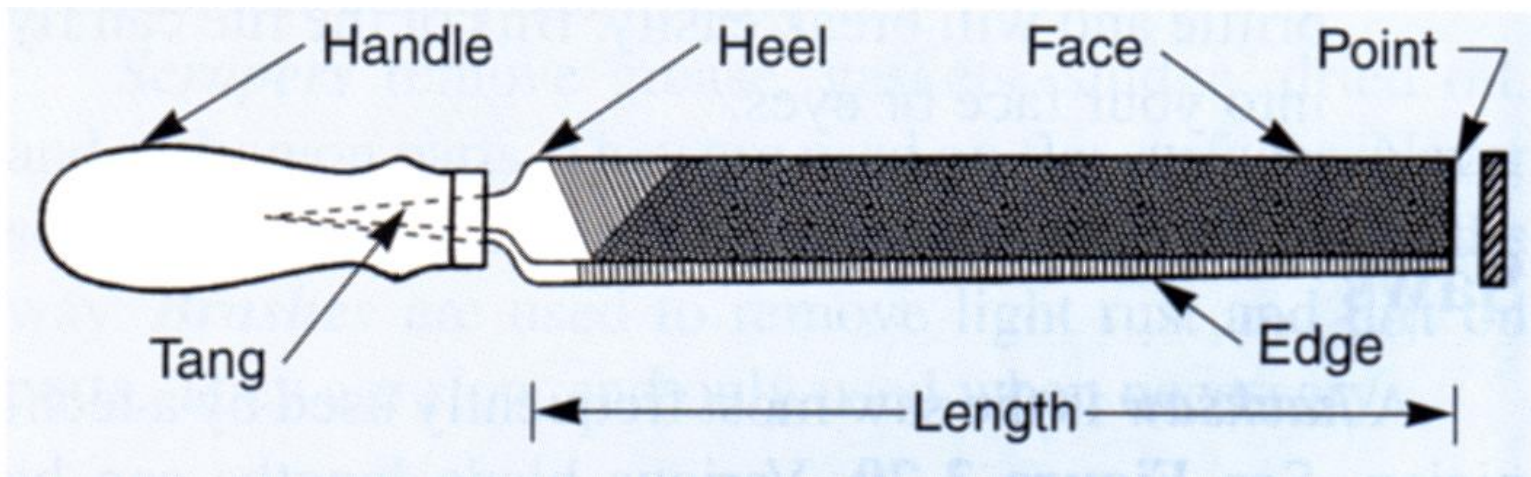
# PUNCHES

- Aside from sharpening, the ends need to be chamfered as they are used



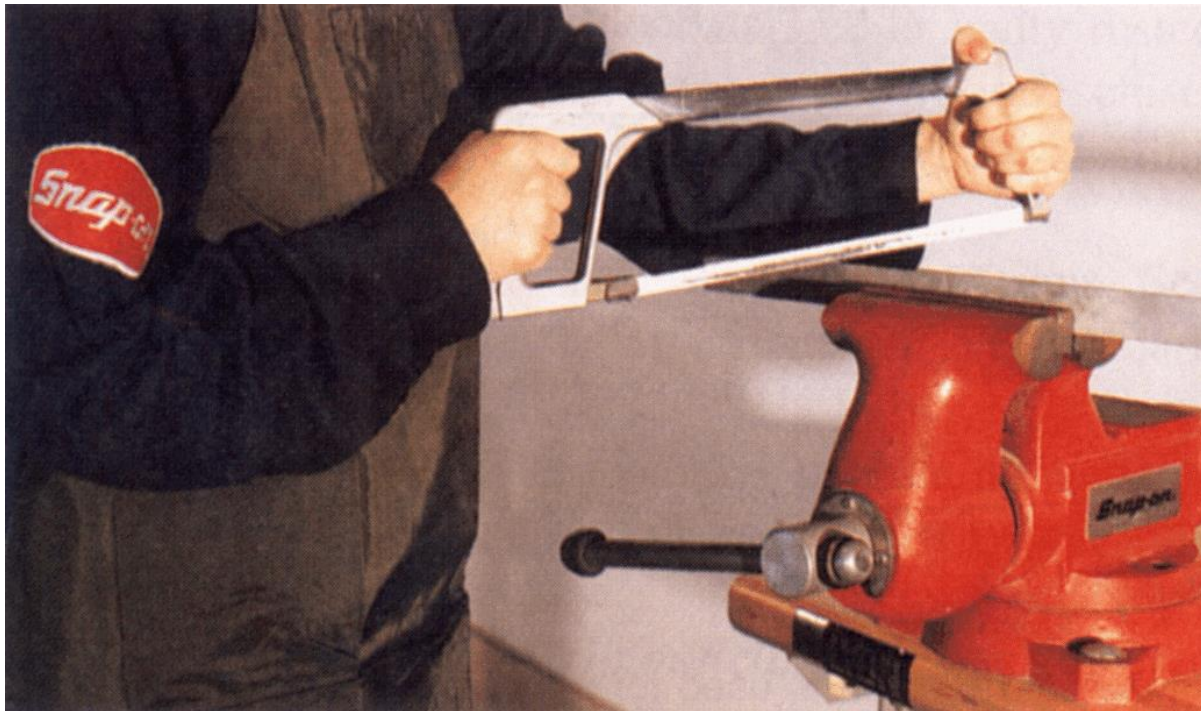
# FILES

- Used to shape and smooth material
- Single (smooth) or Double cut (rough)
- Always use a handle



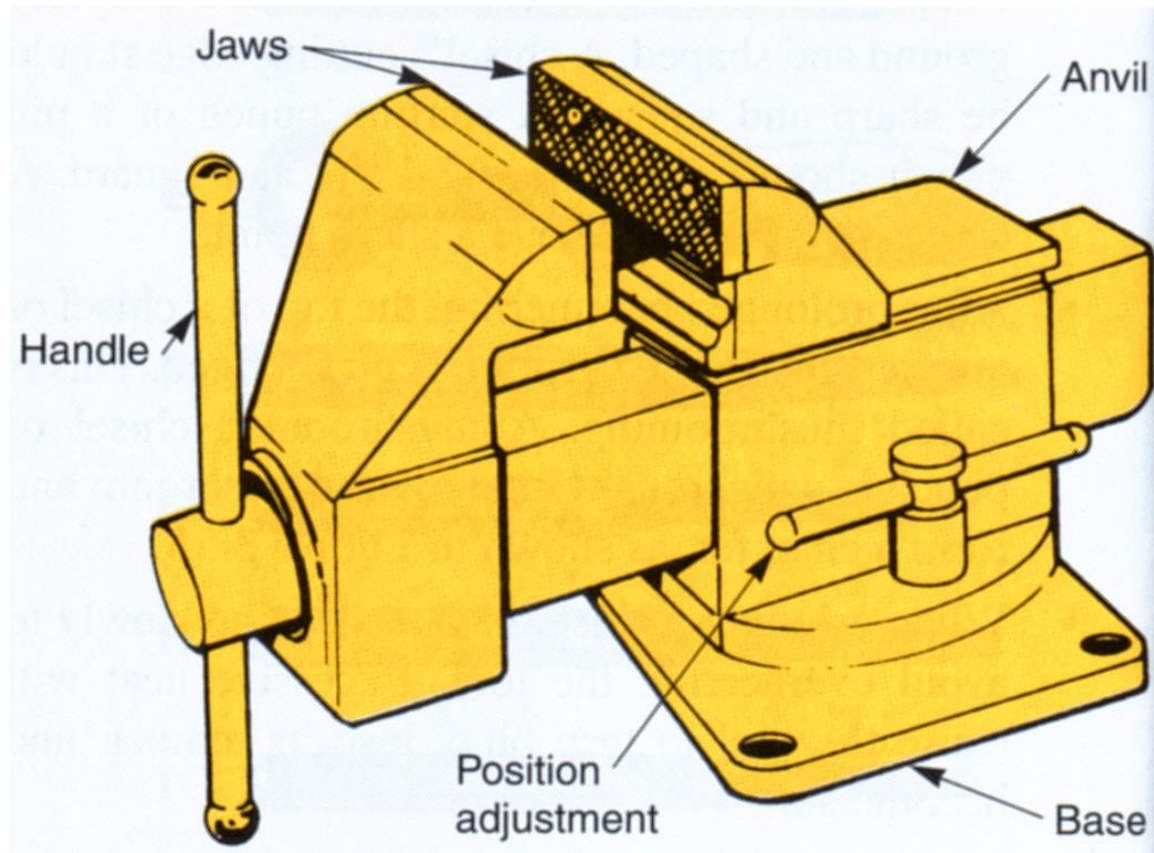
# HACKSAWS

- Used to cut tubing, bolts, other materials
- Let the saw do the work



# WISE

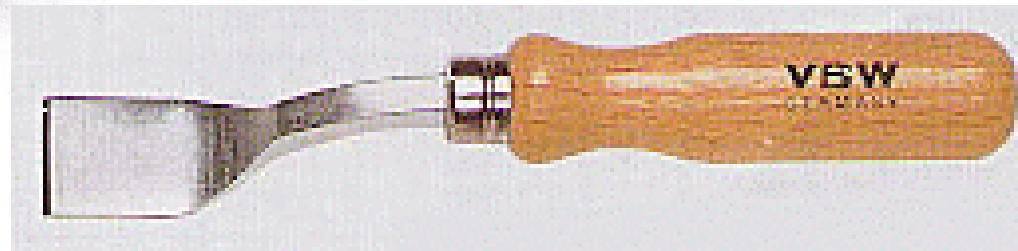
- A bench mounted clamp





# CLEANING TOOLS

- Wire Brushes and Gasket Scrapers
- Wear eye protection!
- Keep scrapers *sharp!*





# CLEANING TOOLS

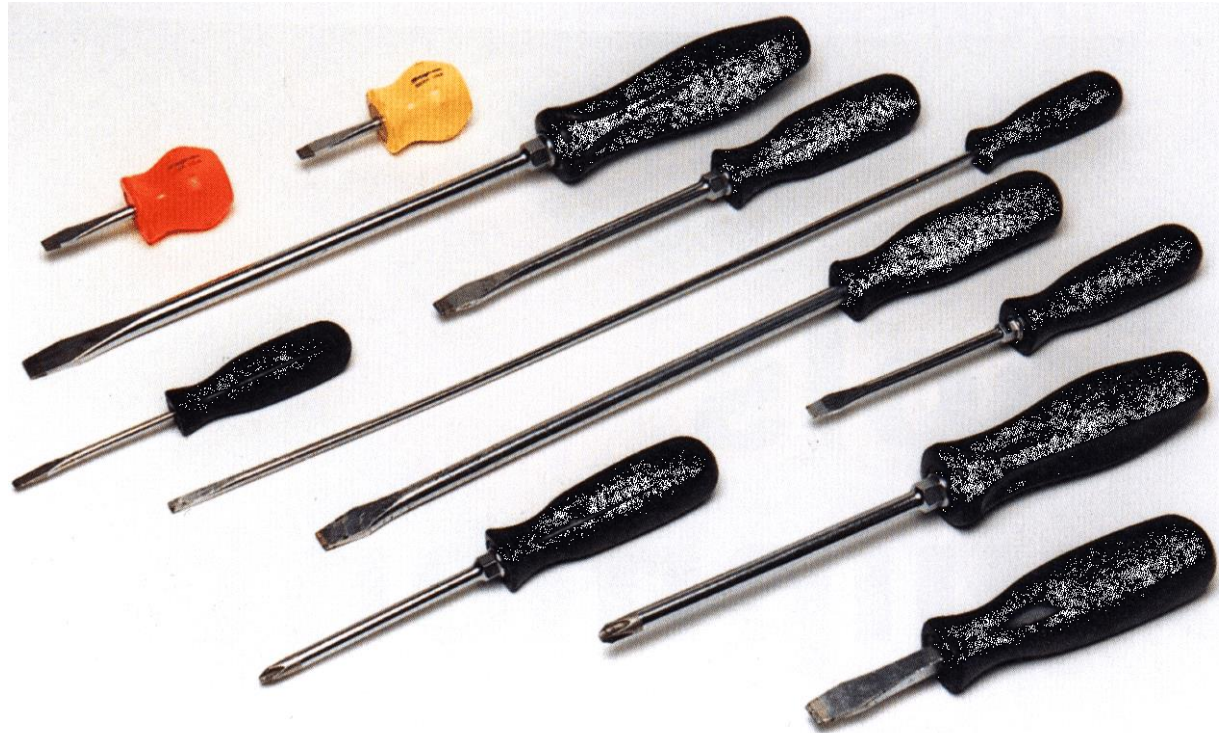
- Solvent Tank
- Wear eye protection!
- Wear rubber gloves!



- <https://www.youtube.com/watch?v=-ZU6d6FciZ4>

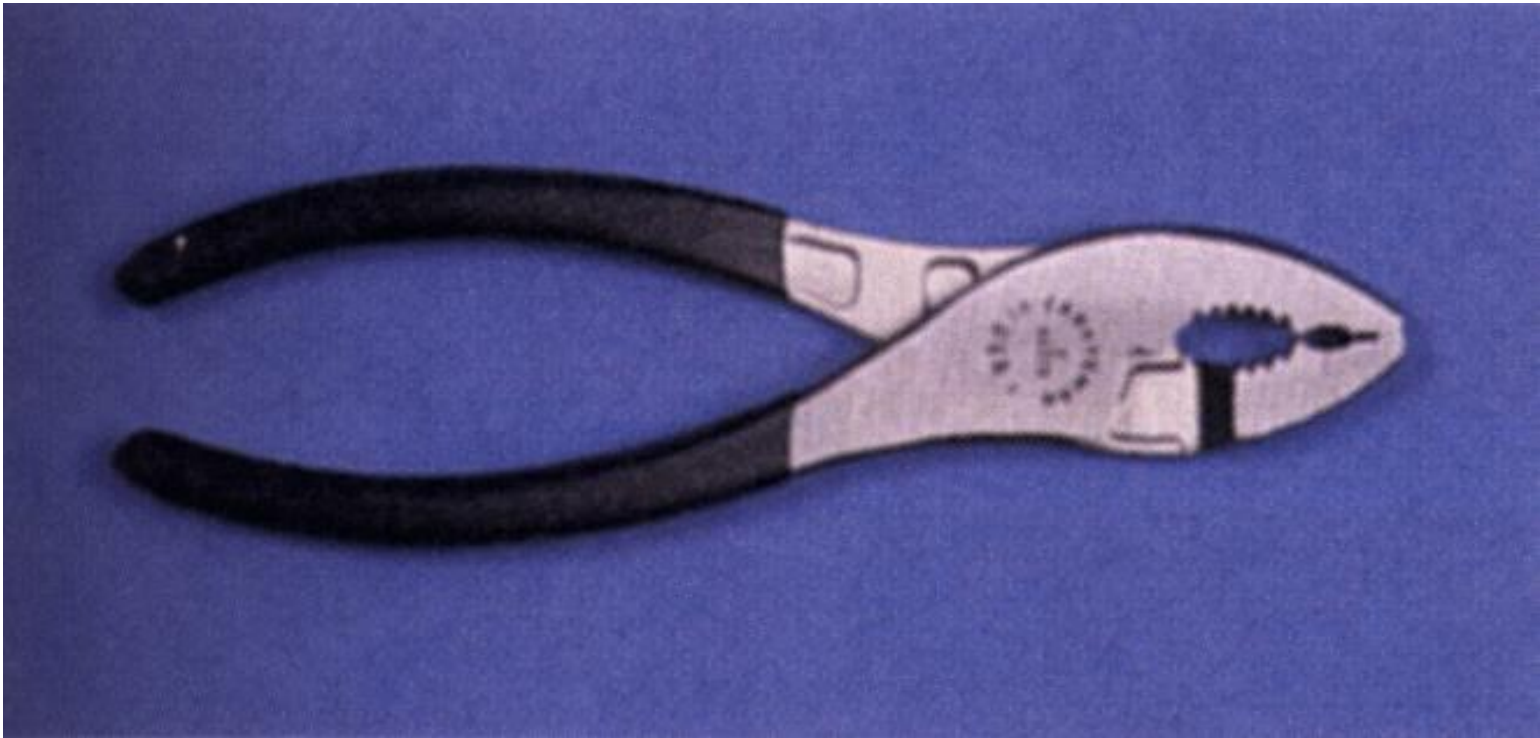
# SCREWDRIVERS

- Flat blade
  - Philips
  - Robertson
  - Torx
  - Clutch
- 
- Do not use as a pry bar
    - Instead, use a pry bar



# SLIP JOINT PLIERS

- Two sizes of adjustability



# WATER PUMP PLIERS

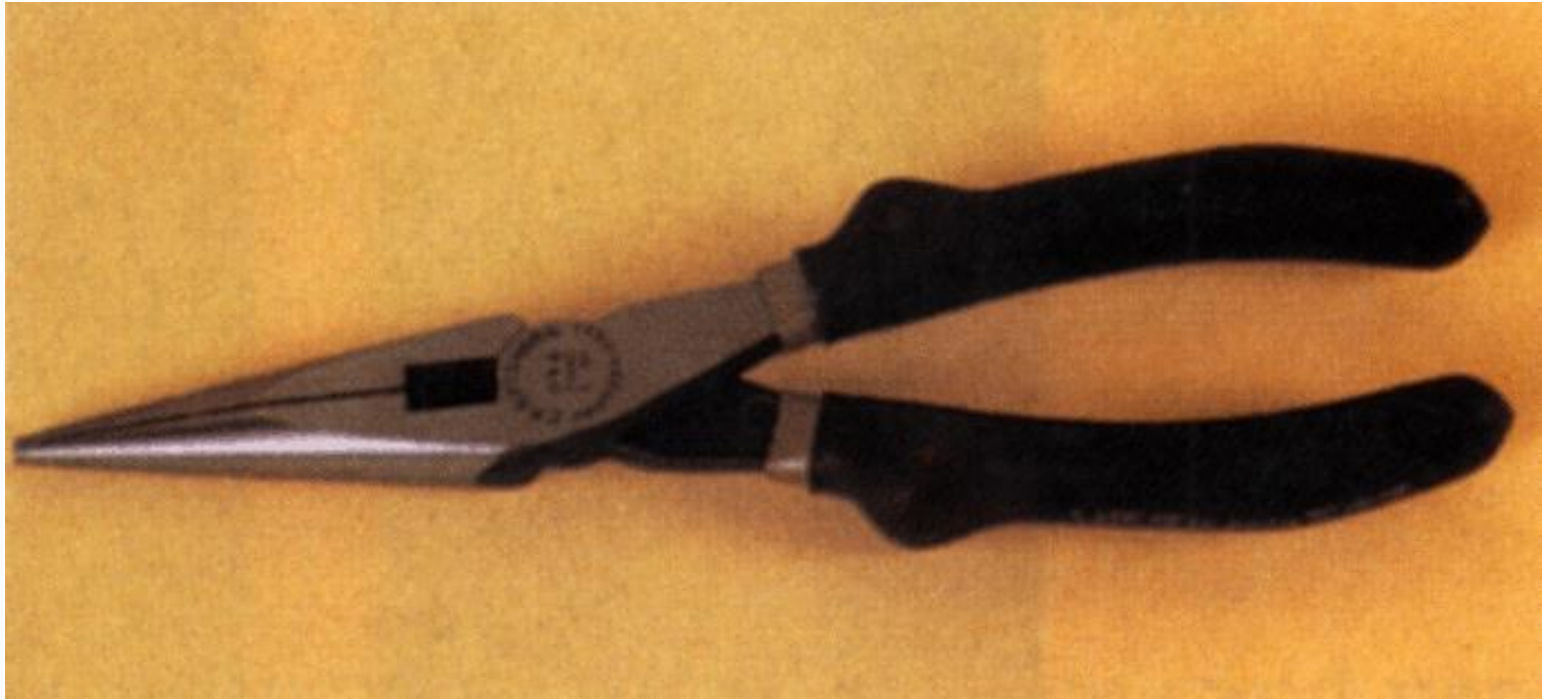
- Five or so sizes of adjustability
- “Channel-Lock” is a brand name





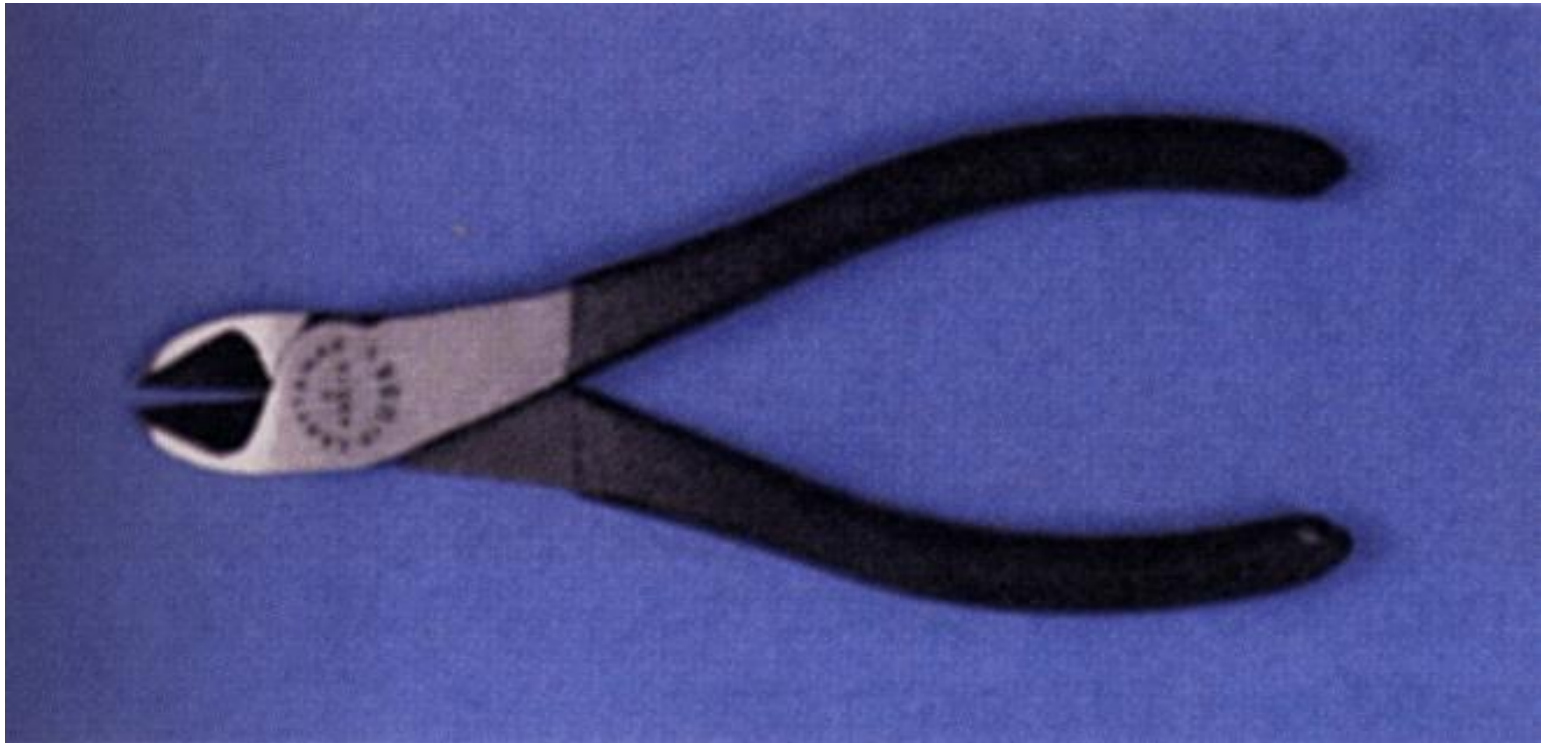
# NEEDLE NOSE PLIERS

- Great for grabbing or holding small clips or pins
- Also has a small wire cutter



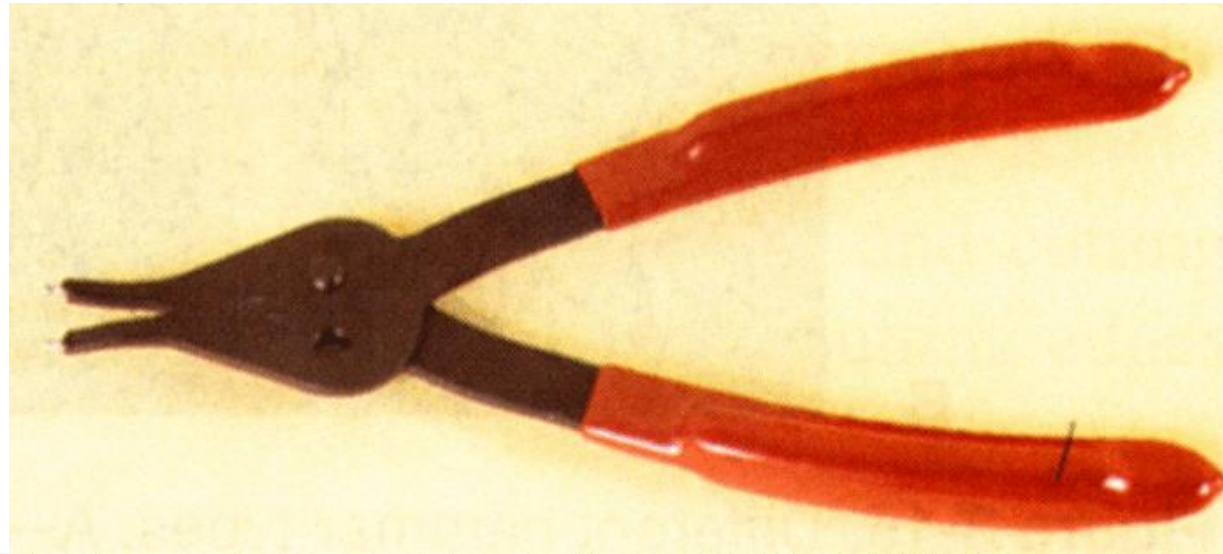
# SIDE CUTTERS

- Also called Diagonal Pliers
- For cutting ROUND



# SNAP RING PLIERS

- *Internal or External*



# LOCKING PLIERS

- “Vice Grip” is a brand name





# WRENCHES

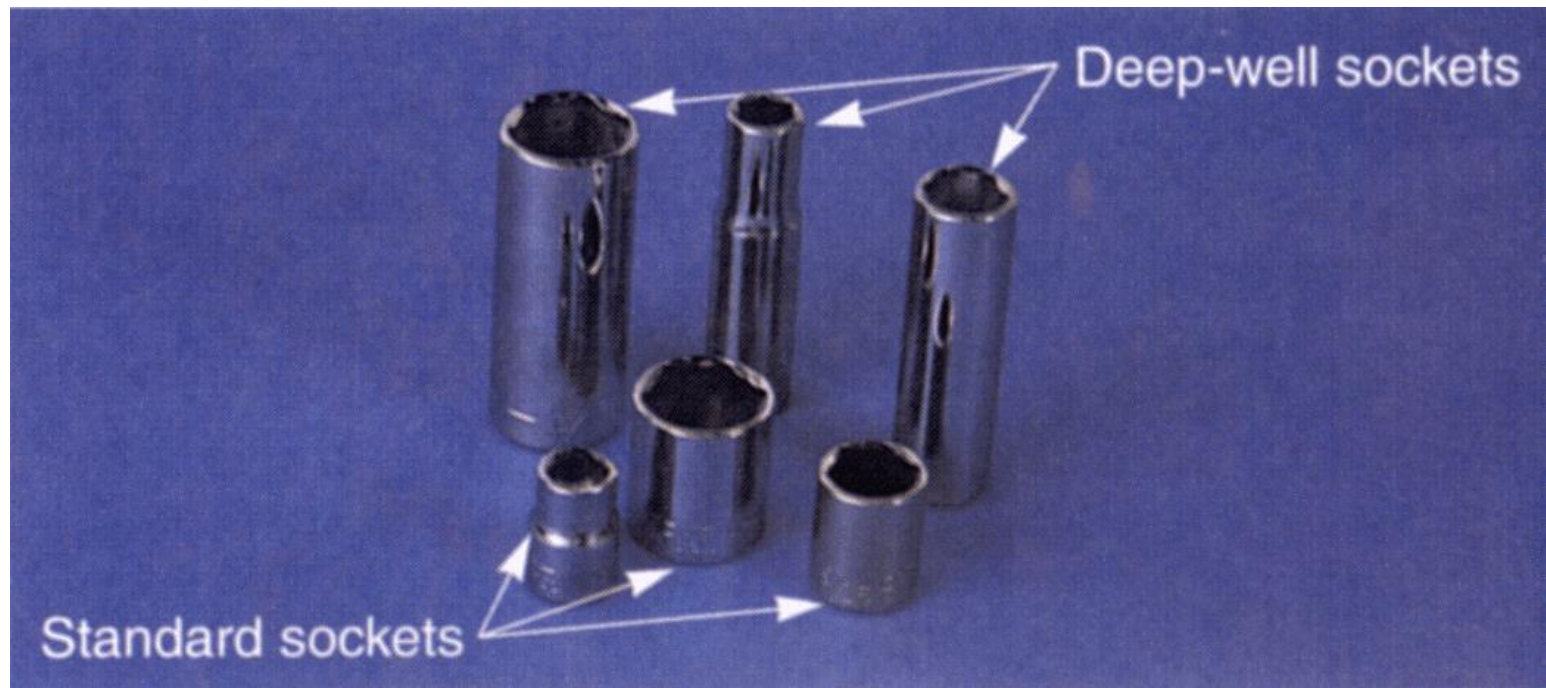
- A. Open End
- B. Box End
- C. Combination End
- D. Flare Nut Wrench





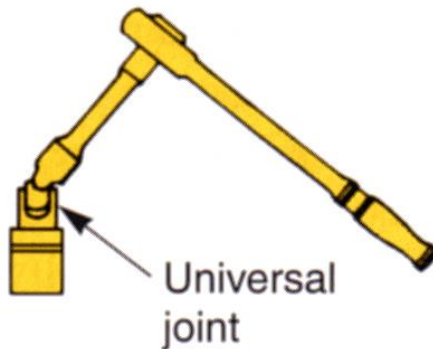
# SOCKETS

- Fastest and most convenient
- 6-point and 12-point
- Deep-well and standard (shallow) depth



# SWIVEL SOCKETS

- Allows the user to turn fastener at an angle
- Universal Joint has no socket



# SPEED HANDLE

- Allows faster removal/installation



# BREAKER BAR

- THIS IS THE TOOL YOU WANT
- Also called a Flex-Bar
- Allows considerable leverage



# RATCHET HANDLE

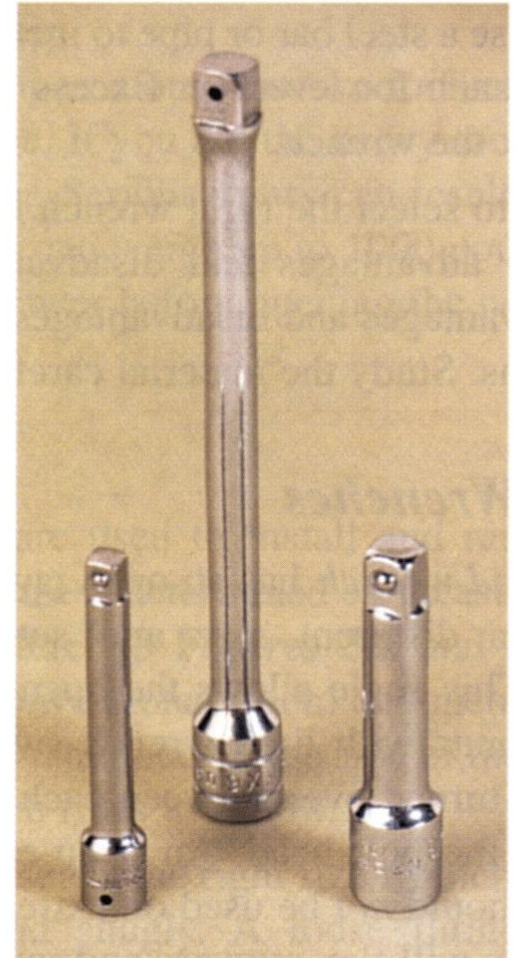
- Ratcheting mechanism inside allows rapid use in a confined space





# EXTENSIONS

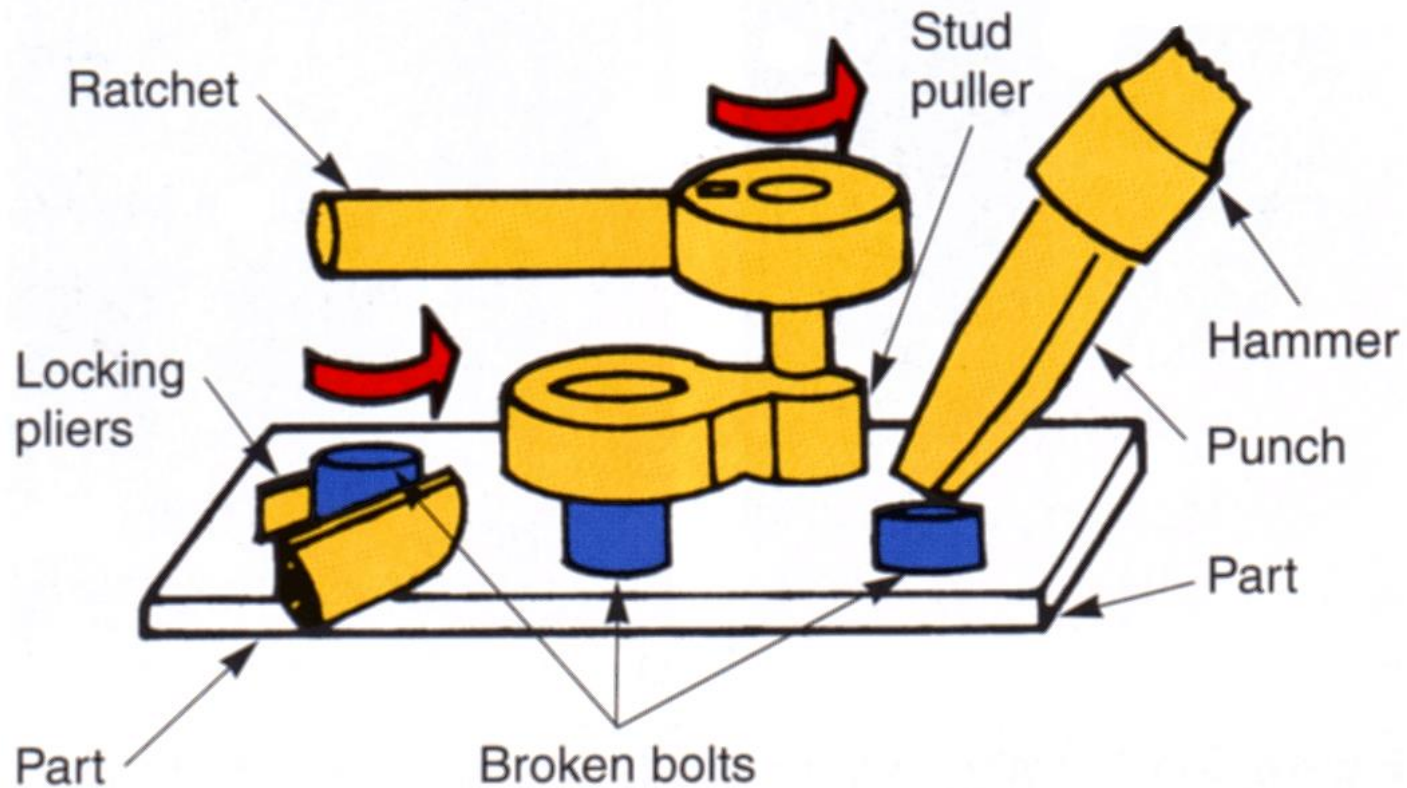
- Allows a longer reach
- CAUTION: extensions “flex”, reducing force



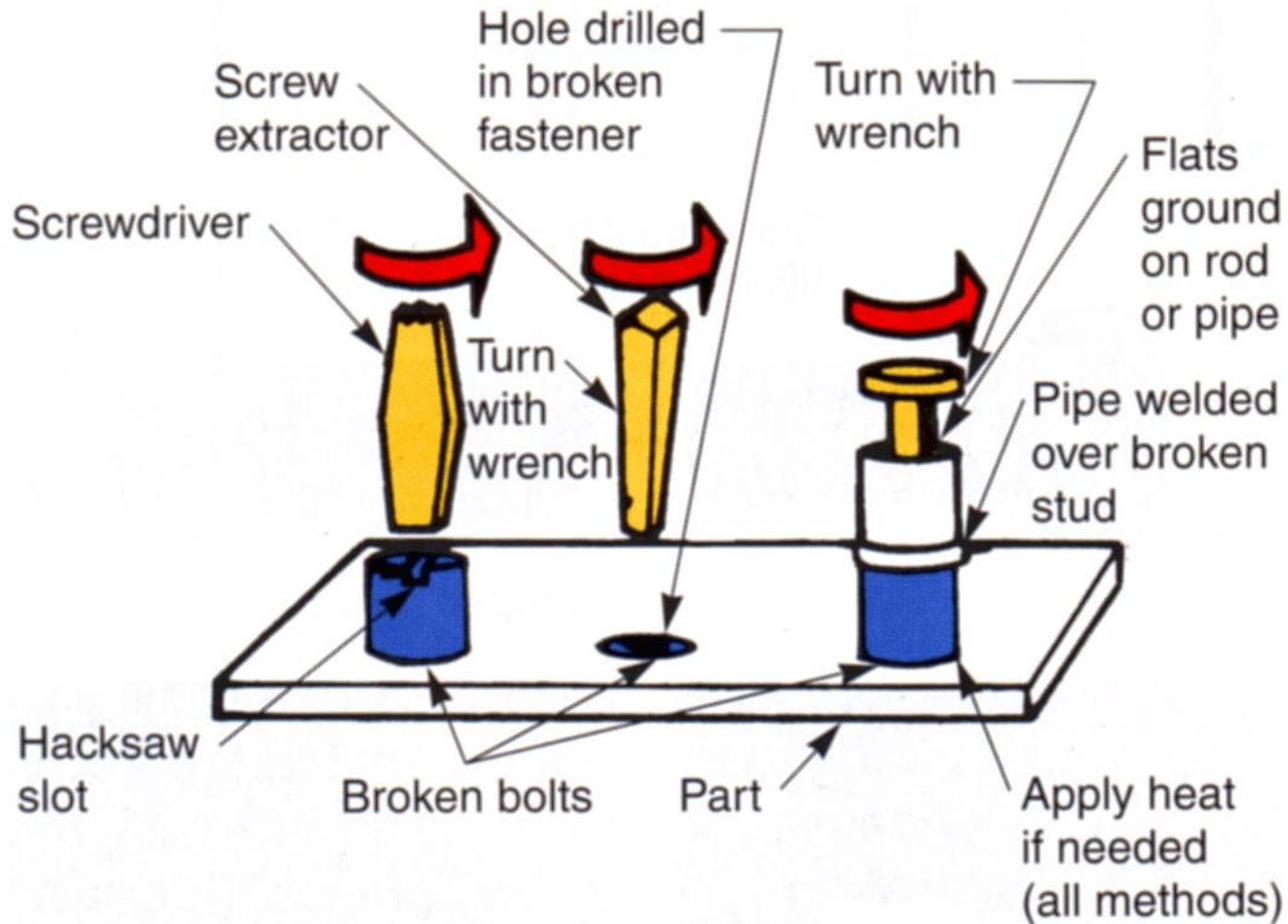
# REMOVING BROKEN BOLTS

- Broken fasteners is a FACT OF LIFE
- Try to avoid breaking the fastener in the first place:
  - Turn the correct direction
  - Penetrating oil
  - Heat
  - Tapping with hammer
- When a fastener breaks, there are ways of dealing with it. Try the easiest fixes first....

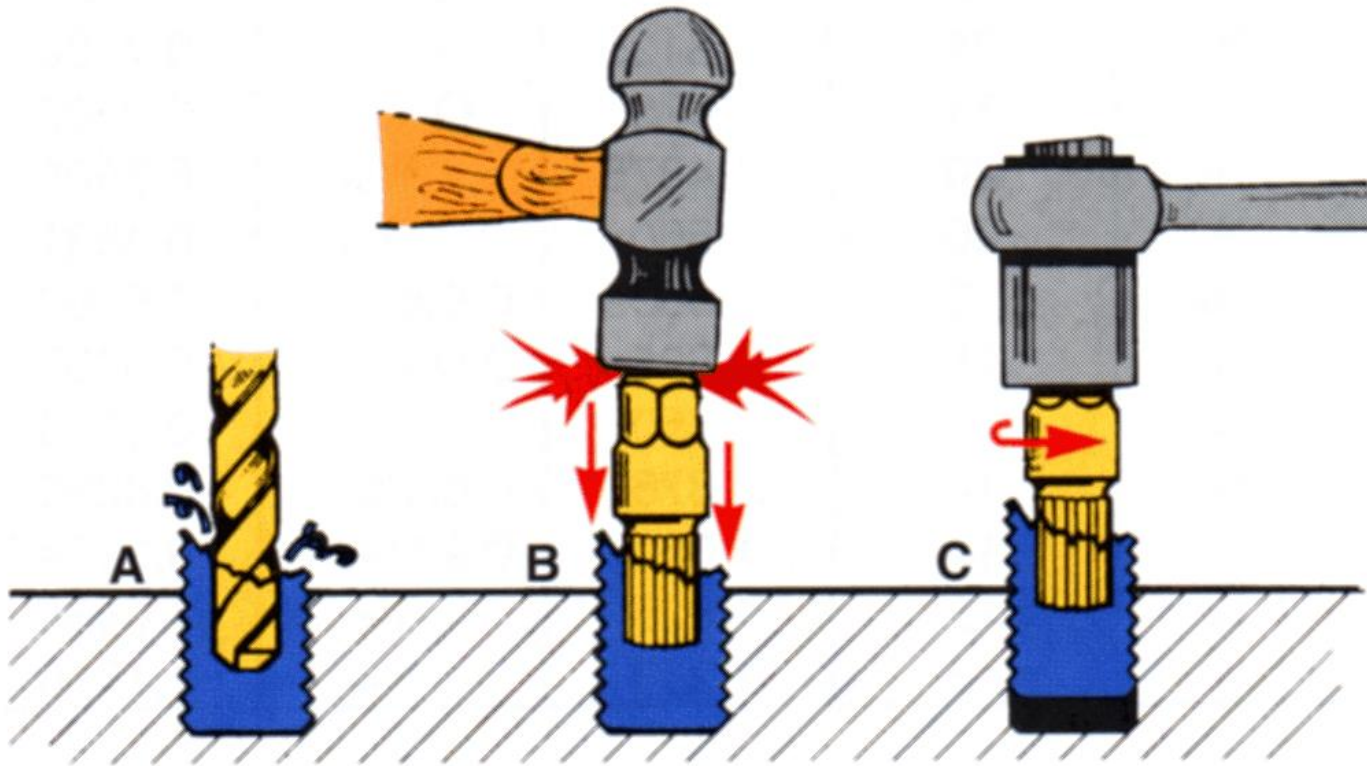
# REMOVING BROKEN BOLTS



# REMOVING BROKEN BOLTS



# REMOVING BROKEN BOLTS



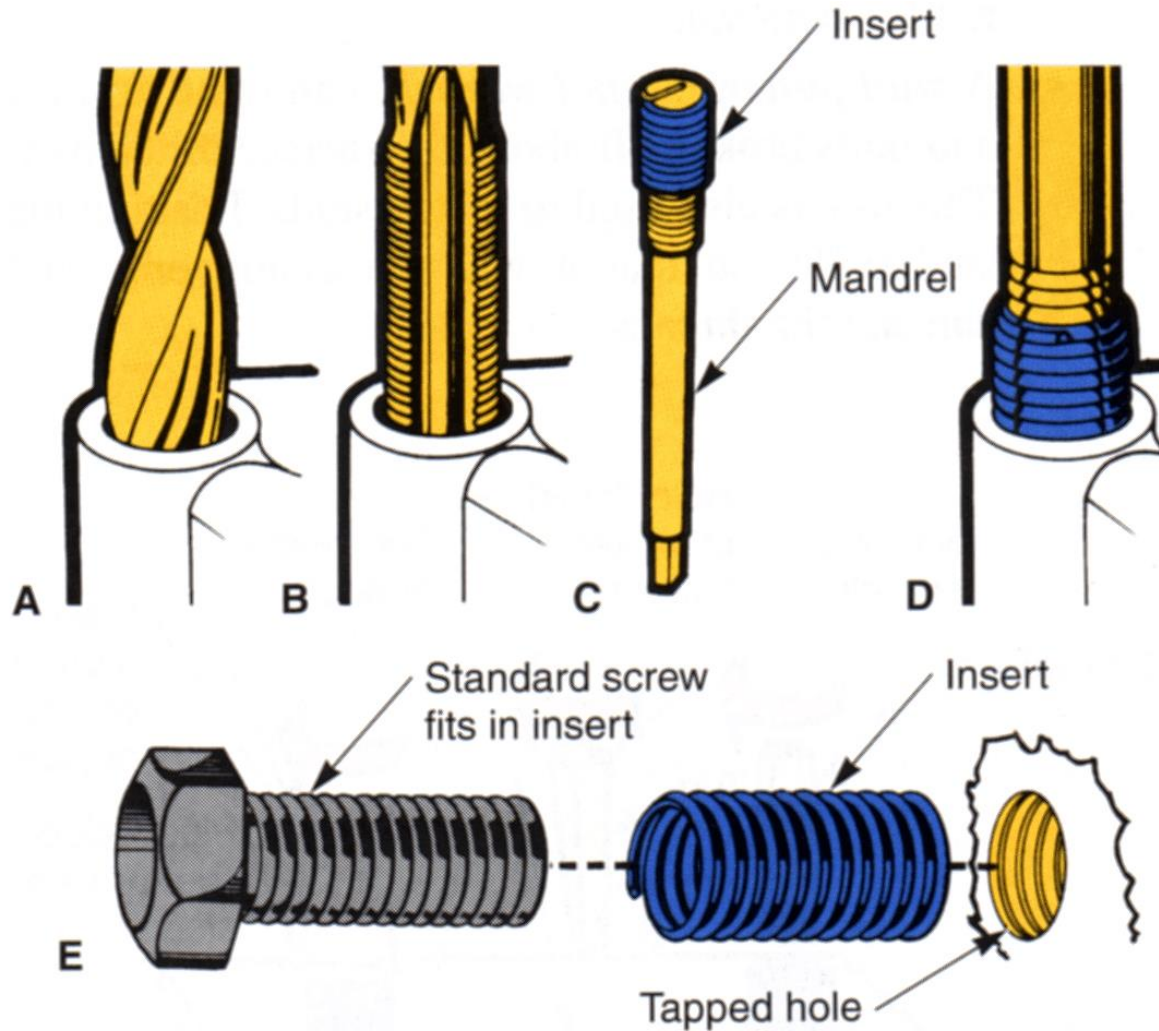


- [https://www.youtube.com/watch?v=N\\_hLV\\_Dm\\_61A](https://www.youtube.com/watch?v=N_hLV_Dm_61A)

# FIXING DAMAGED THREADS

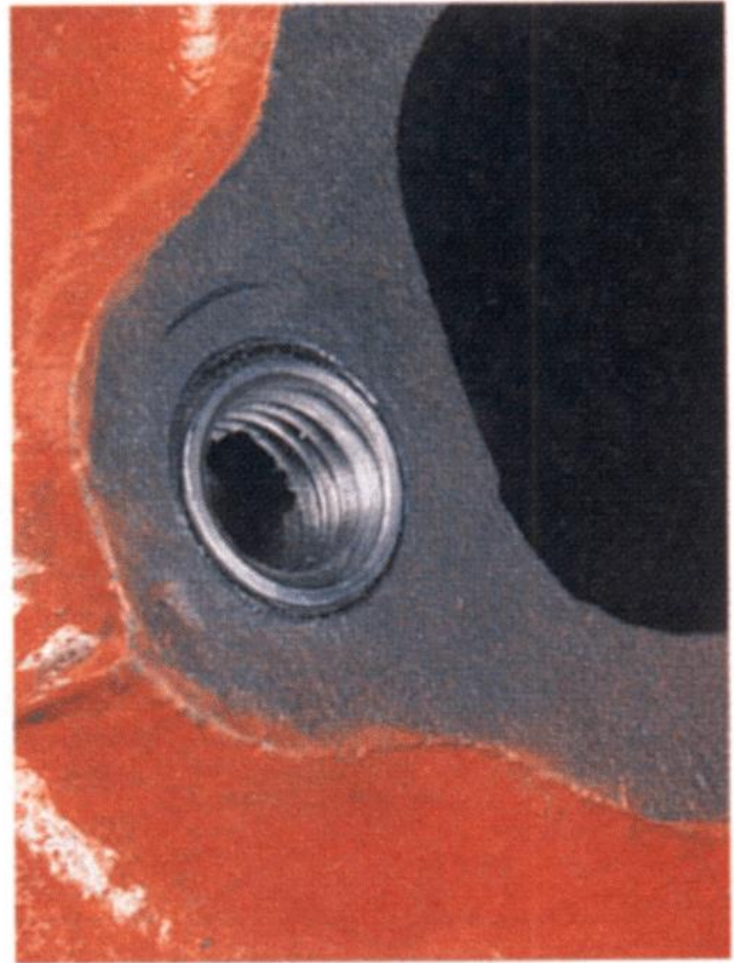
- Reality 1: When a threaded hole becomes stripped or damaged (usually aluminum threads)
- Reality 2: When removing or drilling out a broken fastener goes horribly wrong
- “Heli-Coil” to the rescue
  - *(but they’re not cheap)*

# FIXING DAMAGED THREADS



- <https://www.youtube.com/watch?v=9rtiFBC0wms>

# FIXING DAMAGED THREADS





# ADJUSTABLE WRENCHES

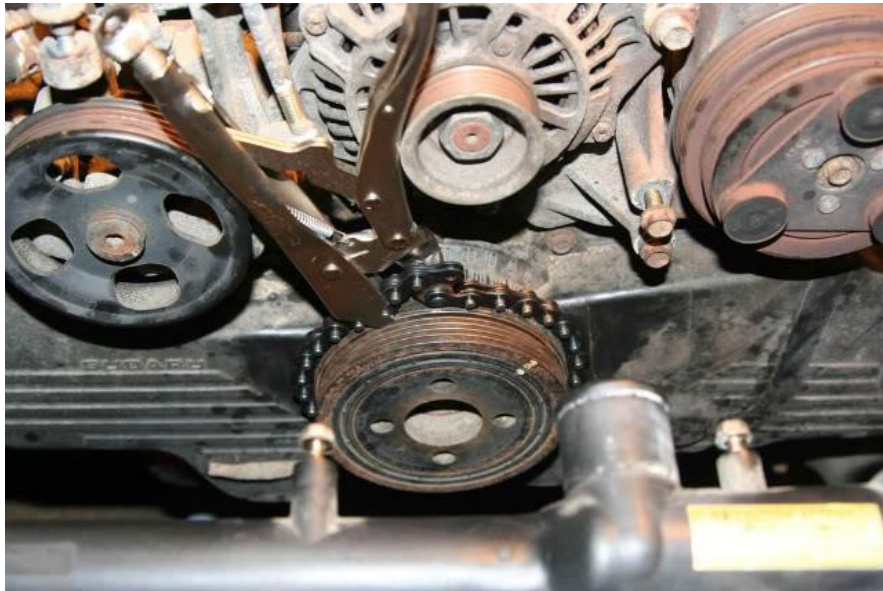
- DO NOT use these.



- DO NOT use these.

# CHAIN WRENCH

- Greatest tool ever made



# ALLEN WRENCHES

- Used for set screws and cap screws



# IMPACT DRIVER

- Greatest tool ever made
- Loosens the impossible (with a hammer)
- Wear eye protection



# FLOOR JACK AND STANDS

- SPECIFIC “jacking points”
- ALWAYS use jack stands
- ALWAYS raise jack handle





# ENGINE CRANE

- AKA “Cherry Picker”
- Lifts engines out of vehicles
- Chain must be WELL secured
- NEVER go under an engine supported only by a chain



# OIL DRAIN

- Stores drained engine or transmission oil
- Must be emptied frequently



# GREASE GUN

- Used to lubricate steering and suspension components through grease fittings





# GEAR PULLER

- Used to remove gears and pulleys
- NOT for harmonic balancers



# HARMONIC BALANCER PULLER





- <https://www.youtube.com/watch?v=3JEWACpOzLA>

# PISTON RING PLIERS

- Used to remove/install piston rings from pistons without breaking them
- <https://www.youtube.com/watch?v=y9Dh2K7kAHs>



# CYLINDER HONE

- Used to remove glazing from cylinders in preparation for new rings
- Used with a hand drill and honing oil
- Flex Hone (top)
- Ball Hone (bottom)
- [https://www.youtube.com/edit?o=U&video\\_id=Kn6JdlfkckM](https://www.youtube.com/edit?o=U&video_id=Kn6JdlfkckM)



# PISTON RING COMPRESSOR

- Compressing piston rings into the ring grooves to fit pistons into the cylinders
- Sharp edges may cut hands
- <https://www.youtube.com/watch?v=Q0N-f7J36HE>



# TIRE INFLATOR

- Used to inflate tires
- Has a built-in pressure gauge





# SPARK PLUG BOOT PLIERS

- Removes stubborn and hard to reach spark plug boots



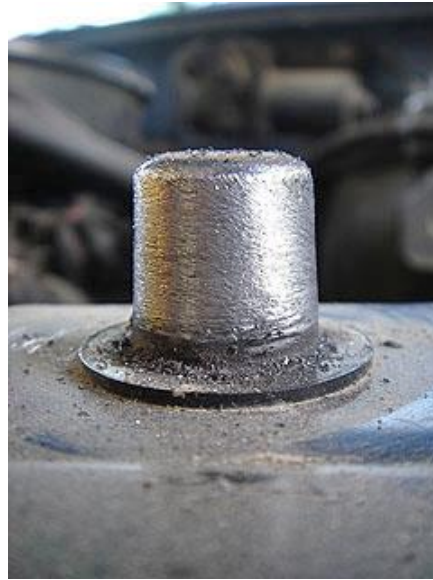
# BATTERY CLAMP PULLER

- Removes battery cable clamps without damage



# BATTERY POST CLEANER

- Two wire brushes help to clean both battery posts and battery clamps



# TORQUE WRENCH

- A tool that allows a MEASURED amount of TIGHTNESS
- NOT A BREAKER BAR!
- NOT FOR “REMOVING” FASTENERS
  - This ruins the calibration



# BEAM TORQUE WRENCH

- Has a handle (that flexes) and a needle (that points to numbers)





# MICROMETER TORQUE WRENCH

- Dial up desired torque by turning the handle
- Lock it
- Hear/feel “click”



- <https://www.youtube.com/watch?v=AgAY0wIBgjQ>

# TEST LIGHT

- “Idiot Light”
- Tests electrical circuits
- Handle lights up when voltage is present
- DO NOT use with computer-controlled components



- <https://www.youtube.com/watch?v=kPSBaYw2uEo>

# VALVE SPRING COMPRESSOR

- Used for disassembling Cylinder Heads
- This type requires cylinder head removal





- <https://www.youtube.com/watch?v=kRCxGABJfhk>

- Screw head shapes?
- Push or pull the wrench?