

# **Basic Hand Operations**

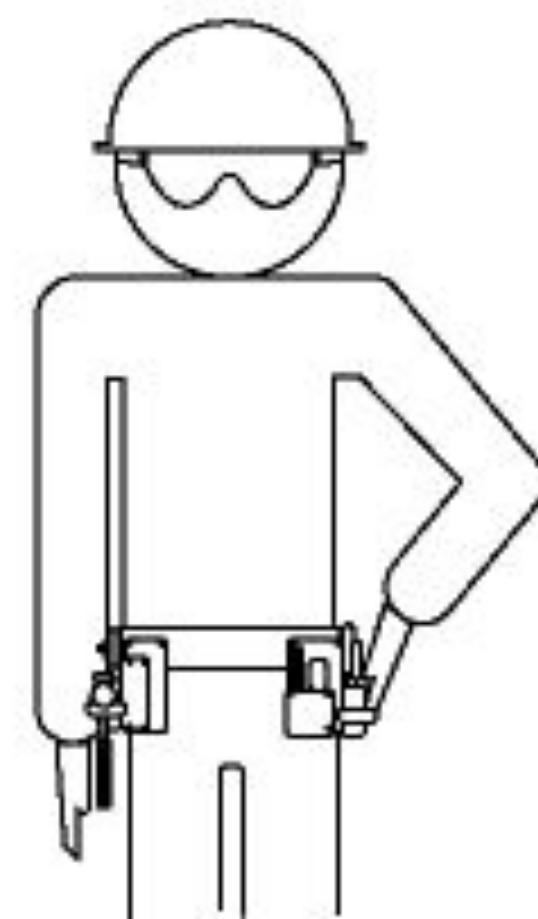
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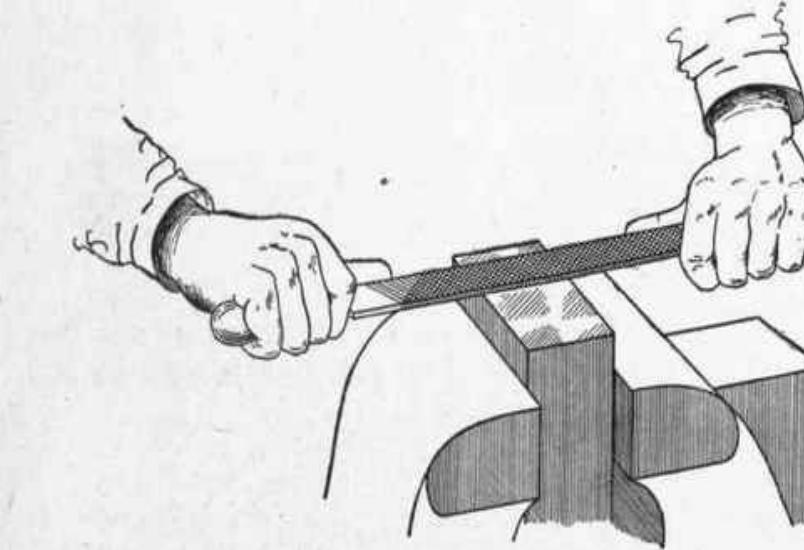
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- Basic hand operations are operations that a beginner should have basic knowledge about
- They are for working on the workpiece to get it to desired shape, size, form etc..
- The various operations performed are



Sawing



Filing



Scribing



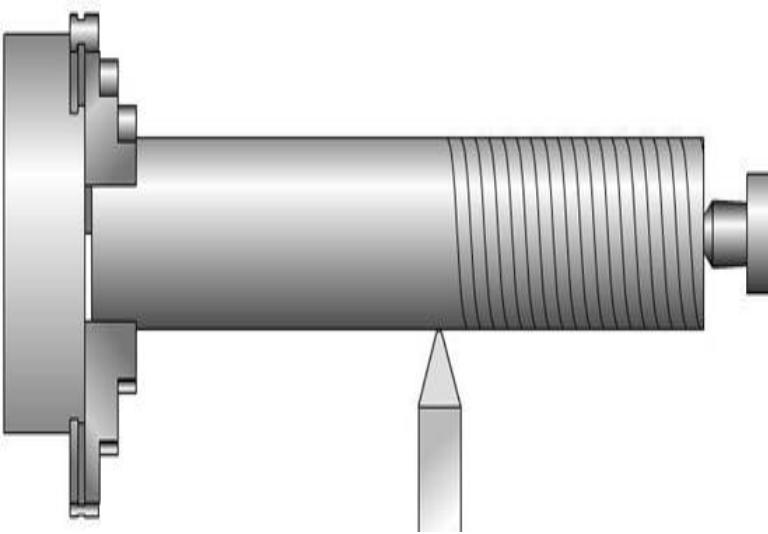
Shearing



Soldering



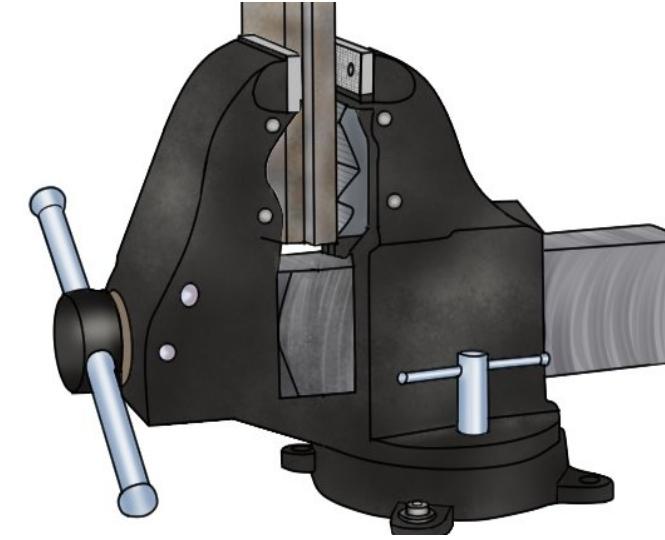
Riveting



Threading



Hammering



Clamping



Measuring

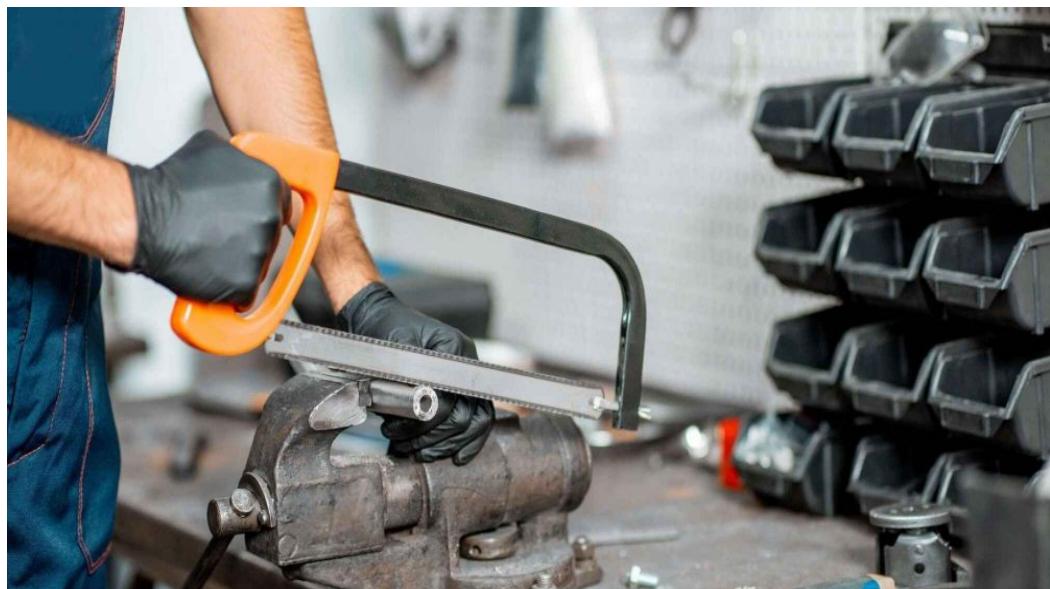
# Sawing

- Sawing is the process of cutting workpiece by using saw.
- Saw is a tool consisting of a narrowly spaced teeth called saw blade.
- Different types of saw is used for sawing different materials
- Cutting takes place in push(forward) stroke



# Sawing process

- Blade must always be mounted with teeth facing forward
- Workpiece must be held properly
- Saw should be held at a comfortable angle(preferably 30) with workpiece
- Pressure should be applied in push strokes



- Too much pressure on workpiece should be avoided
- Always check the saw blades before use
- Suitable tension should be applied on blade

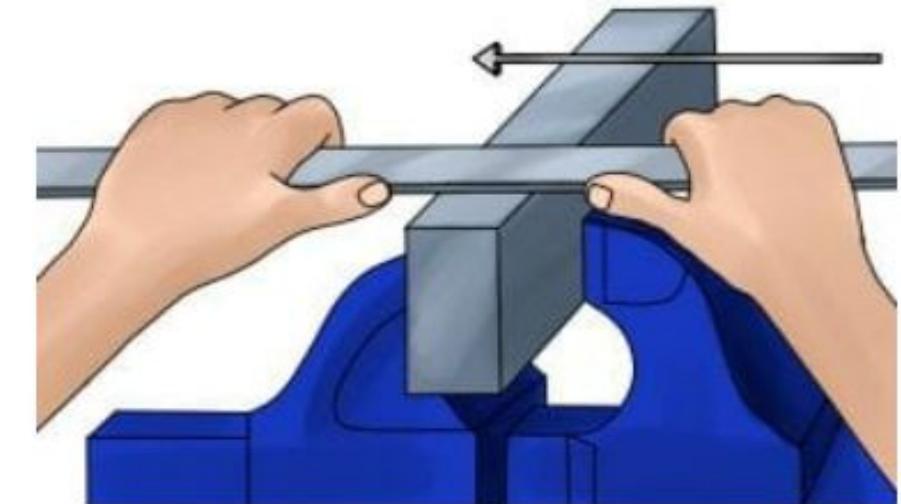
# Filing

- Filing is the process of removing materials from workpiece
- It is done by using files
- Files are of different types according to length, shape, pitch and type of cuts/patterns of cutting edge



# Filing techniques

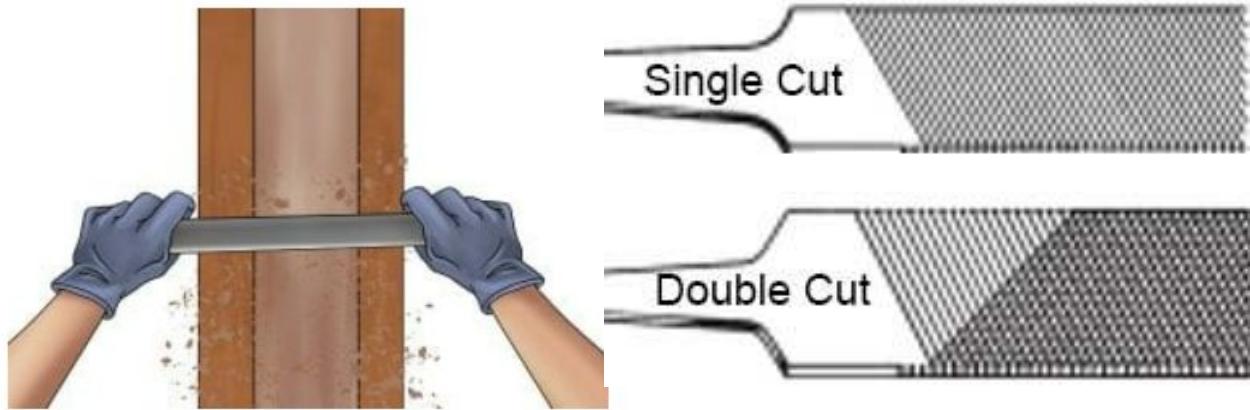
- Filing can be done in 3 major ways:
- Cross filing, Draw filing and lathe filing.



1. Cross filing: is a straightforward filing
  - Involves pushing the file across the edge of material.
  - Can be used for finishing, sharpening and shaping
  - Most commonly used method

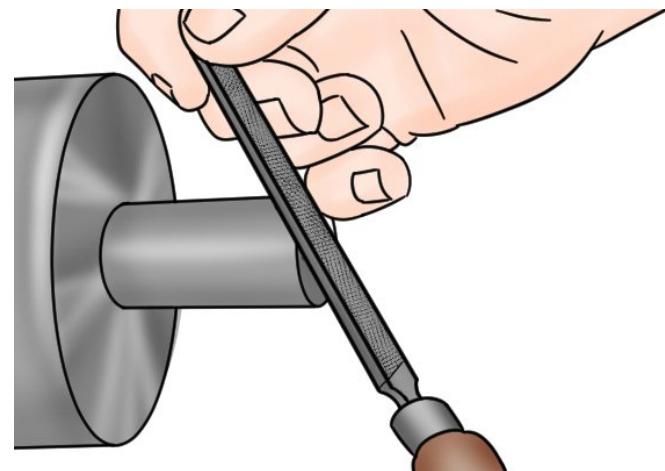
## 2. Draw filing: involves holding file in each end and filing

- It is only done with single cut files
- It is used to remove file marks and finishing



## 3. Lathe filing: involves smoothing out cylindrical shaped work pieces

- Involves fixing work piece in lathe machine and filing while it is rotating.
- High speed lathe ensures maximum filing consistency



# Scribing

- Scribing is the process of marking in a workpiece
- It can be done to mark lines, arcs points before cutting, filing etc.



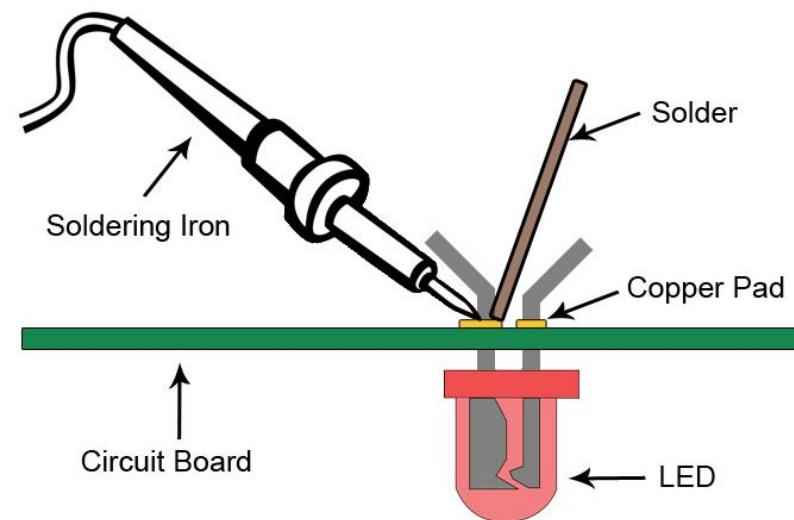
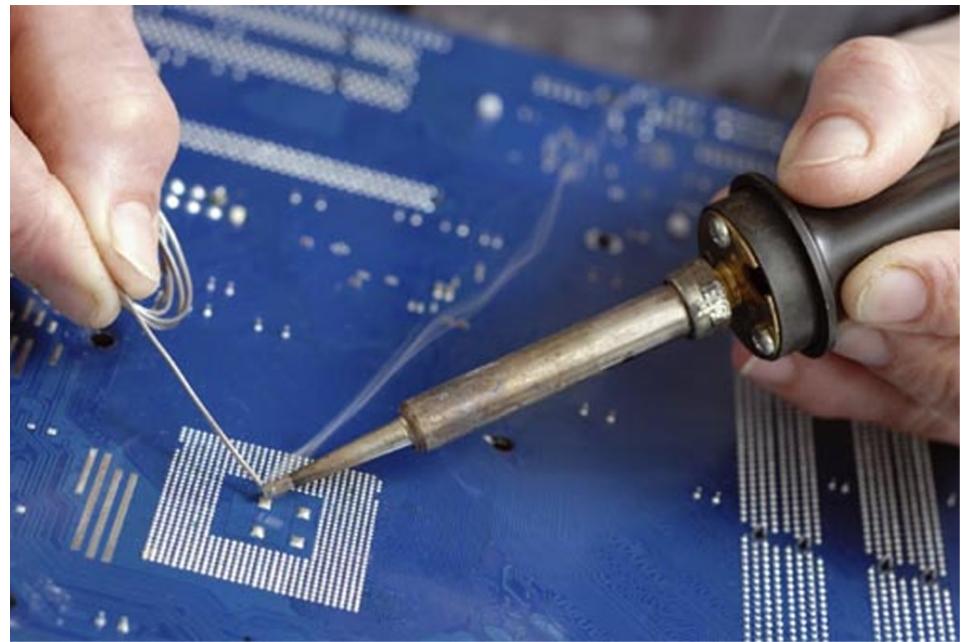
# Shearing

- Shearing is the process of cutting sheet metals to required size.
- It is done with the help of hand shears



# Soldering

- Soldering is a process of joining two or more metals by melting filter metal.
- It involves heating surfaces to be joined, the melting filter metal between the surface joints and letting it cool and solidify
- Usually done for electrical components



# Riveting

- Riveting is the process of permanently fastening materials together
- It is done by a fastener called rivet
- Riveting is done by ball peen hammer , rivet gun or hydraulic riveting methods

Hydraulic riveting

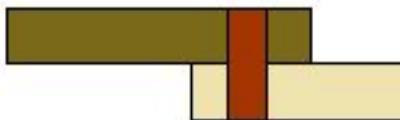
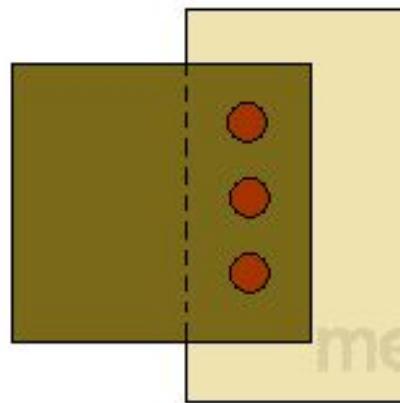


Ball peen hammer

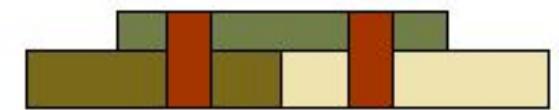
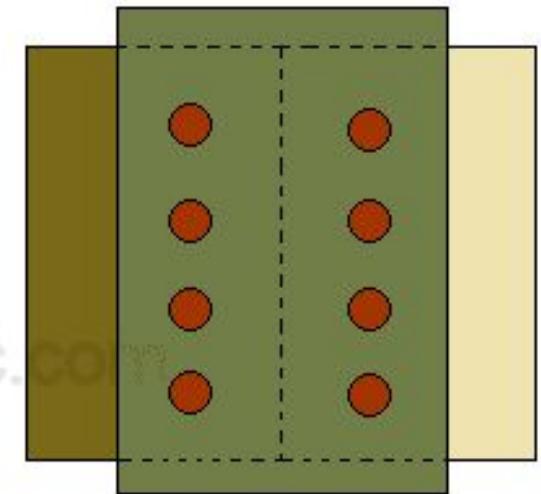


Rivet gun

- Riveting can be done for two types of joints:
  1. Lap joint: joint where one plate overlaps other and riveting is done
  2. Butt joint: joint where main plates are kept in alignment and a cover plate is placed on one or both side of main plates



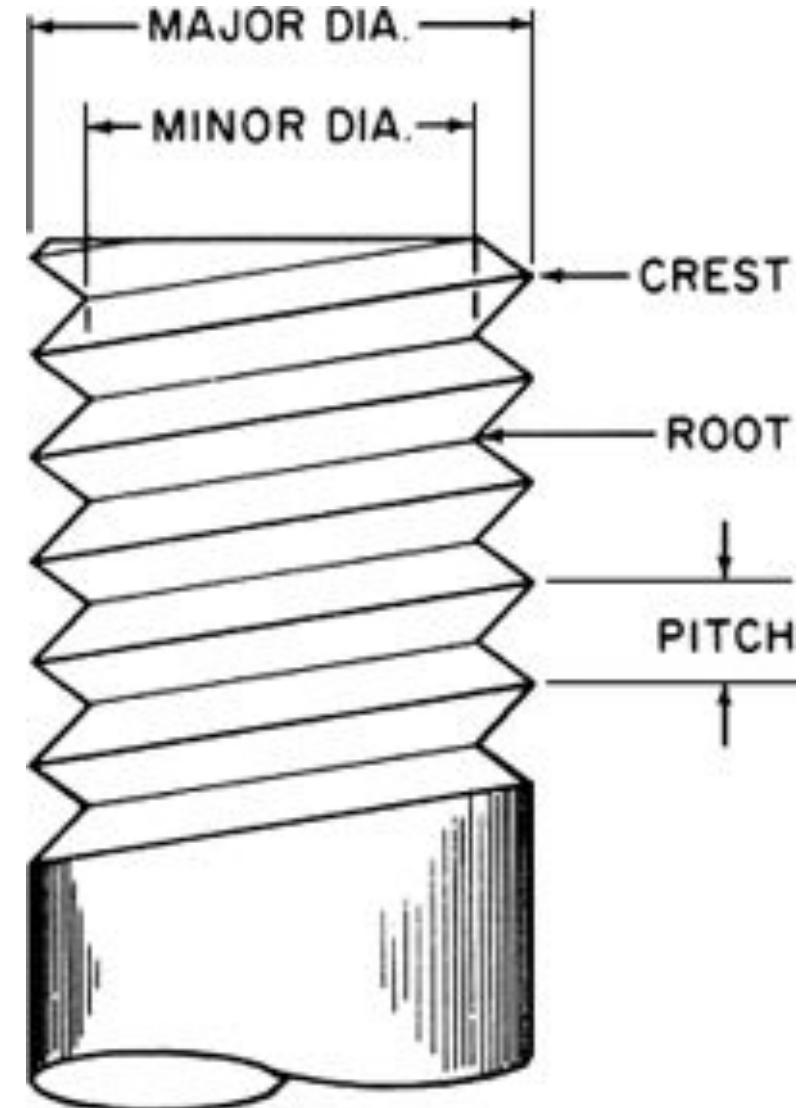
Lap joint



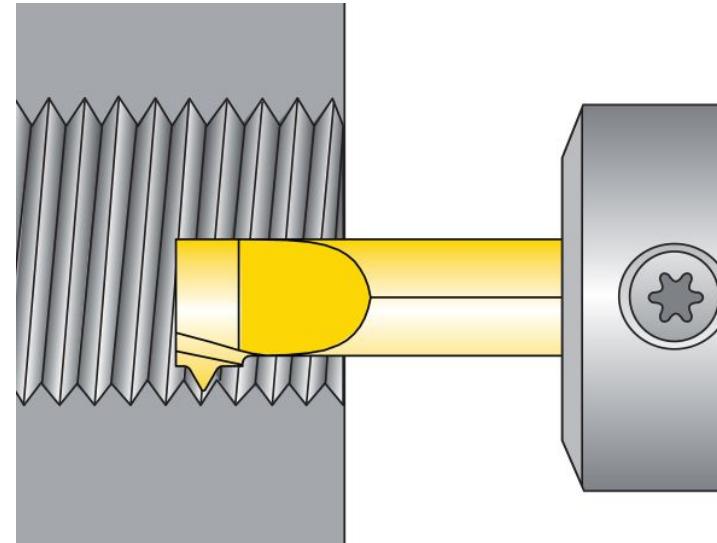
Butt joint

# Threading

- Threading is a process of creating helical patterns on a cylindrical or conical objects
- It can be done internally or externally
- It is used to join materials with similar threads



- Internal threading is done inside of a material.
  - It is done using taps
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- External threading is done outside of a material
  - It is done using die



Internal

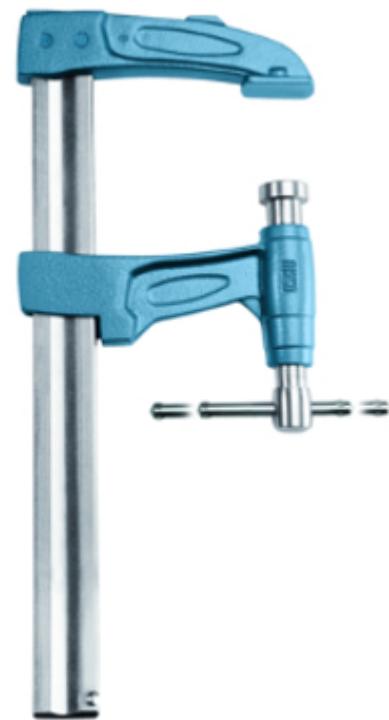


External



# Clamping

- Clamping means fastening or fixing something in place
- It is done by using vices and clamps
- Some clamping tools are fixed in workbenches while some are not



# Hammering

- Hammering is the action of hitting a surface repeatedly using hammers
- Hammering has different purposes according to the hammer used



- Hammering can be done for fitting nails, rivets
- They can also be used to break materials and even get some to flatten or get desired shape



# Measuring

- Measuring is the process of determining quantity, amount, size, etc. of a material
- It can be done by scales, vernier calipers, measuring tapes, etc.





- **Bibliography**

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