Subject

BASIC TECHOLOGY

Topic

METAL WORK HAND TOOLS

Class

J.S.S.1

LEARNING OBJECTIVES

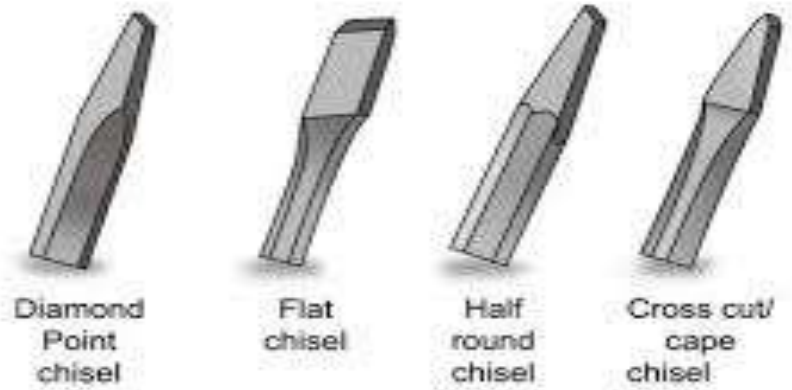
At the end of the class, student should be able to;

1. Metal work Cutting Tools
2. Metal work measuring and driving tools
3. Marking-out tools and setting-out tools
4. Metal work holding devices.

In metalwork, the tools used for cutting include chisels, files, scrapers and hacksaws.

1. CHISELS

chisels are made of high Carbon Steel. They are used for shaping metals where finishing can be carried out. The common ones are:



a. **Flat Chisel:** This is a general purpose chisel, used for leveling metal surfaces, removing rivet, screw and bolt heads, and rough-cutting sheet metal.

b. **Cross-cut chisel:** This chisel is used for cutting narrow grooves and key ways.

c. **Round nose chisel:** This is a chisel used for cutting straight, deep grooves and holes also called half round Chisel.

d. **Diamond point chisel:** This is a chisel used for cutting vee- grooves, as in bolts and nuts and for chiseling inner corners of metal work piece.

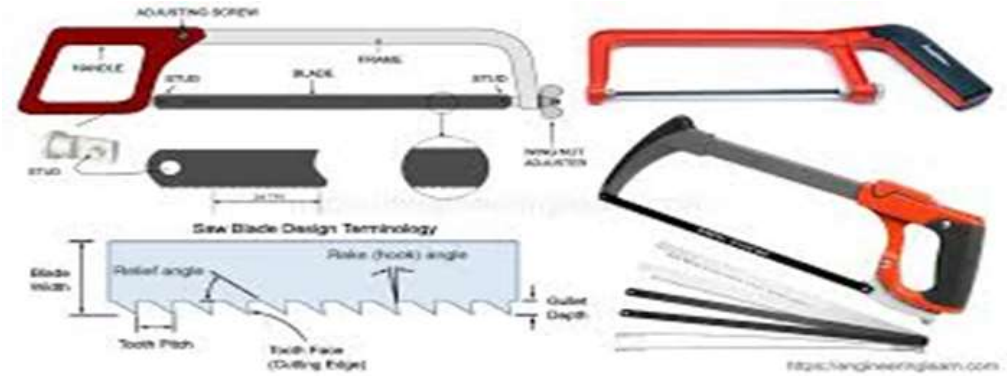
2. FILES

Files are used for finishing and smoothing metals to the required size and shape. The common ones are:

1. **Flat file:** This file is used to remove small roughness from flat surfaces, leaving it smooth. It contains a rectangular cross section.
2. **Square file:** This file is used for finishing square and rectangular holes.
3. **Round file:** It is a file used for finishing rounded edges or holes. It has a circular cross-section.
4. **Half-round file:** This file is used for filing curves of shapes to a specific radius.
5. **Triangular file:** it is the file used for filing awkward and sharp corners, especially faces less than 90 degrees.

HACK SAW

Hacksaw is equipment for cutting hard substance mostly metals. A hacksaw can also be used for cutting materials like wood. It is a fine-toothed saw having a thin, wide and straight blade under tension in a C or also can say U shaped metal bow frame, which is adjustable for tightening to cut according to the need of operation and to accommodate blades of different sizes.



According to the cut needed blade can have different teeth set like 14, 18, 24, 32 teeth per inch. Some hacksaw can also have a frame which is adjustable according to the need for blades. A hacksaw usually has one handle but some hacksaws are exceptional, they have two handles for holding the hacksaws comfortably while working.

The junior hack saw is used to cut soft metals

While the senior hacksaw is used for harder metals

USES OF HACK SAW

1. It is mainly used to cut steel and other metals such as bars or pipes or rods into the desired length.
2. It also can be used to cut plastics.
3. It can also cut wood, but it is not normally used to cut woods.

4. It is generally used for cutting and sawing, it is mainly suitable for cutting hard materials like stainless steel and alloy

5. A hacksaw is better for cutting thinner materials. Cutting thick materials may become difficult and may damage or break the blade of the saw.

METAL WORK MEASURING TOOLS

Accurate measurement in metal work practice is very important. However, knowledge of how to make good use of measuring tools and gauges is imperative. The measuring tools and gauges include steel rule, engineer's protractor, caliper, vernier caliper, micrometer etc.

There are many factors to consider when gathering measuring tools in order to layout work accurately.

1. The first factor is to choose the correct measuring tool for the job.
2. The second factor is to use the measuring tool correctly.
3. It is also important to know how to read the graduations on different measuring tools.

METRIC RULE/MEASURING TAPE

These tools are used for taking straight lines measurements. It is made of steel; the engineer's measuring tape can also be used for this purpose.

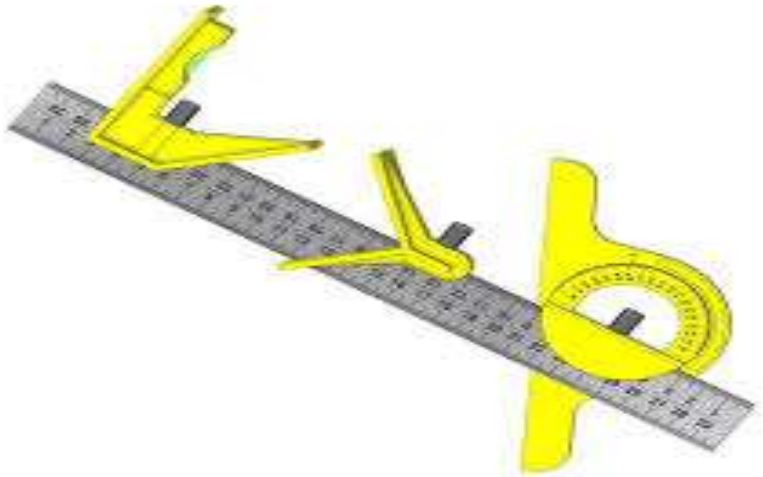
CALIPERS

The Calipers are used for measuring diameters. The inside caliper for measuring the inside diameter of holes and the outside caliper for measuring the outside diameter of holes

COMBINATION SET

This is a set that consists of a center square, a square head, a protractor and a graduated steel rule called the blade.

This set can be used as a try-square, protractor, center GAUGES and a depth gauge.

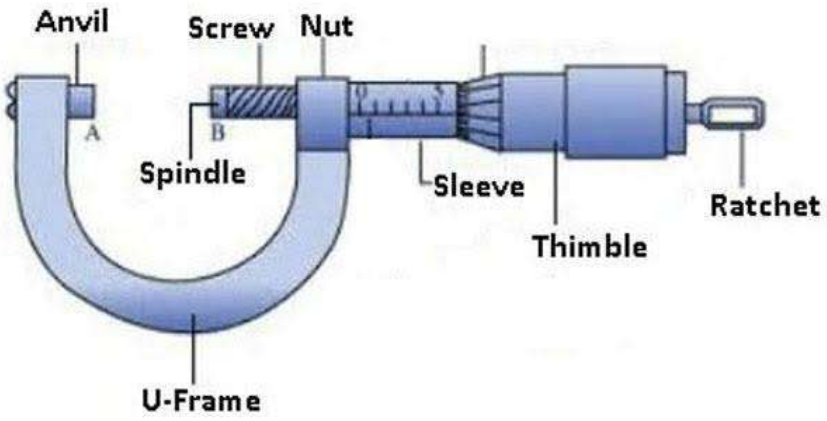


VERNIER CALIPER

The vernier caliper can do the jobs of the inside and the outside calipers to a very accurate measurement.

MICROMETER SCREW GUAGE

It is used for taking accurate measurement of relatively small thickness. It has a spindle and a thimble.



SURFACE TABLE AND SURFACE PLATE

They are both made of cast iron. Surface plates provide a flat plane used as a horizontal reference point for your dimensional measurements.

METAL WORK DRIVING TOOLS

Driving Tools is another useful tool in metal work. They are so called because they are used to move fasteners such as nails, screws, bolts and nuts and pins from one state to another. Examples include: hammer, screwdriver, punch and spanners.

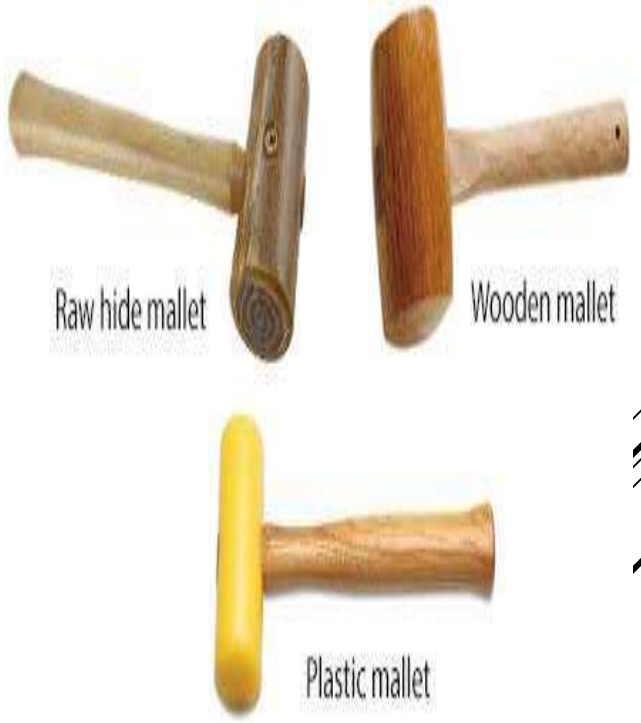
HAMMER

In metal work hammers are used for bending, riveting, and shaping.

1. Ball-pein hammer: This is a general purpose hammer used for riveting i.e. forming a cup like shape from a metal sheet.
2. Cross-pein hammer: This hammer is used for striking at the horizontal corners of metals. For example, it is used during panel beating operations.

- Blocking or head sledge hammer: Used for the heavier jobs, such as driving in stakes or to break up concrete, stone or masonry. For lighter jobs just the weight of the head may be used for blow's, but for heavier work, the hammer is swung like an axe.

- Mallet Hammer: A mallet is a block on a handle, which is usually used for driving chisels. The head on a rubber mallet is made of rubber. These types of hammers deliver softer impact than hammers with metal heads. They are essential if your work needs to be free of impact marks.



EVALUATION

1. Name 3 of the metal work hand tools
2. Describe the function of the hand tools
3. Sketch out the hand tools.

Thank You

For Watching!!!