

OBJECTIVE: INTRODUCTION TO WORKSHOP TOOLS

① Measuring tape

These're simple, widely used linearly measuring instruments available with different accuracy of graduations.

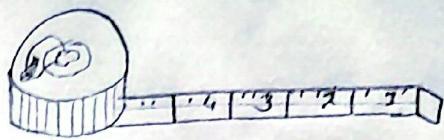


fig. Measuring Tape

② Scales:

Scales are one of the most simple and widely used linear measuring tools commonly used for works like laying out, checking stock sizes, setting dividers, etc.

Lines are called graduations are inscribed on the face of the scale to measure the distances.

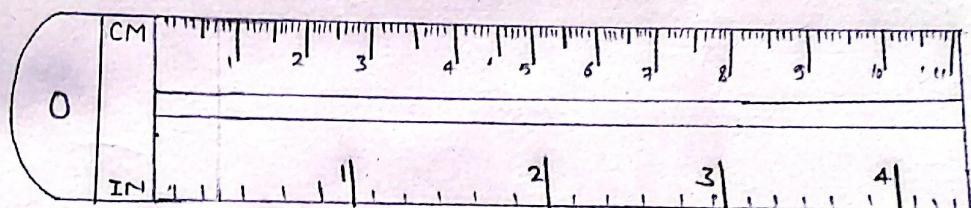


fig. Scale

3) Tri square

It consists of steel blades fixed at right angle at one end. It is used for checking the straightness of many types of small works.

It can also be used to mark the perpendicular lines on a work piece.

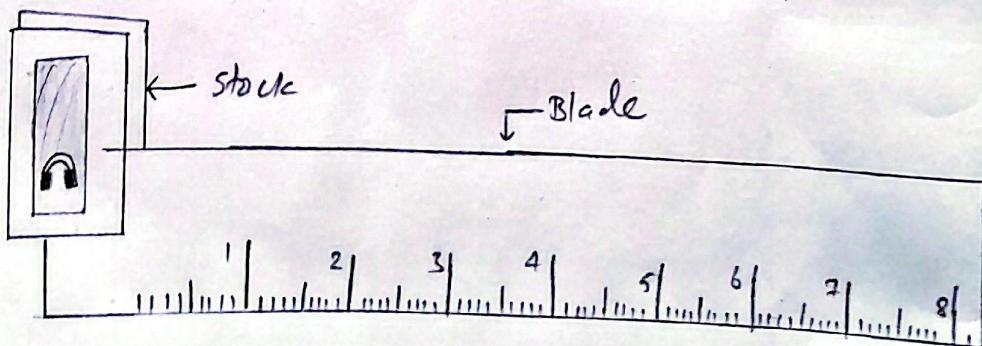


fig. Tri square

Marking tools

(1) Scriber:

A scriber is a sharp, pointed steel tool used to scribe lines on metal which is used to be laid out. It is made up of hardened steel.



Fig. Scriber

(2) Pencil

It is used to scribe lines on a work piece temporarily. Lines scribed by pencil can be erased.

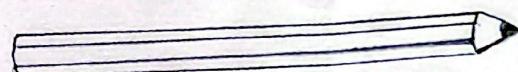


Fig. Pencil

(3) Marker

It is also used to scribe lines on a work piece when lines are to be made bold & dark.



Fig. Marker

(4) Centre punch

It is a short steel cylindrical bar with a conical point at one end & blunt & flat on the other end. It is used to mark the centre of hole to be drilled.

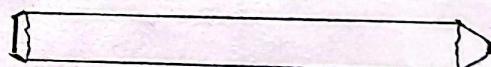


Fig. Centre punch

(5) Number Punch

These are used to mark numbers on the work-piece.

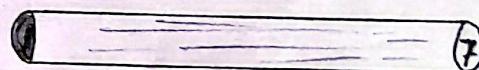


Fig. Number punch

Cutting tools

① Sniper

The snipers are the pair of scissors but considerably heavier. They're used to cut sheets of metals.

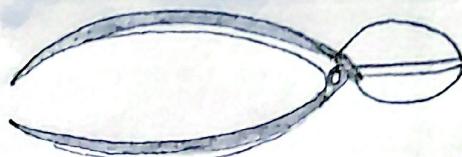


fig: Sniper

② Hacksaw

It is generally used for cutting a metal ~~part~~ into pieces. The cutting is done in forward stroke & the back stroke help to clean the path for forward path.

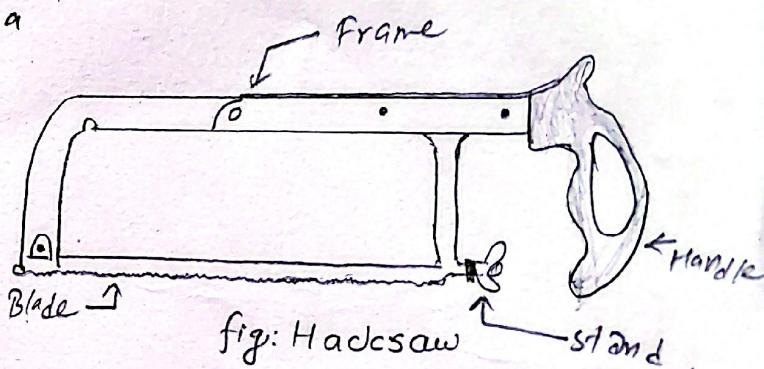


fig: Hacksaw

③ File :

files are the most important hand tools used for the removal of materials. They're made of hardened high carbon steel / with a soft tang to which a handle can be fixed.

They are classified as:

(i) Based on teeth :

- Single cut file
- Double ~~cut~~ file

(ii) Based on shape :

- Flat file
- round file
- triangular file .



fig: Double cut file

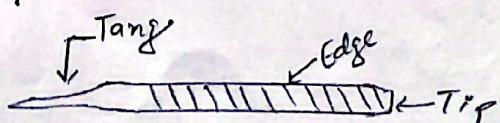
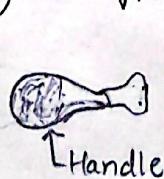


fig: Single cut file

1) Power saw:

It is similar to ordinary hacksaw, but it has motor driven attached to which moves the hacksaw blade to & from. It requires less time & accuracy.

Stripping tools

Dies

If is the tool for cutting external threads on bars or tubes is called a die.

It consists of nut having portions of its threads circumference cut away & shape to provide cutting edge to the remaining portion of thread.



fig. Die tool

Taps:

They're used for cutting internal threads into a hole.



Fig. Tap

Rivet gun

It is used to join permanently two pieces ~~of~~ sheet of metals with a rivet. Rivets are made up of soft iron & are usually coated with tin.

striking tools

- Ball peen hammer
- cross peen hammer
- claw hammer
- mallet hammer.

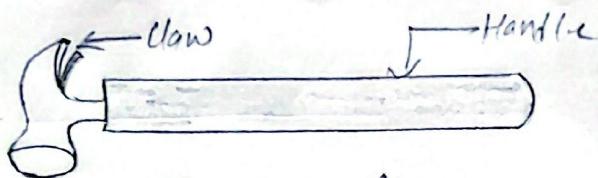


Fig. claw hammer

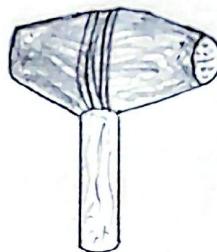


Fig. Mallet hammer

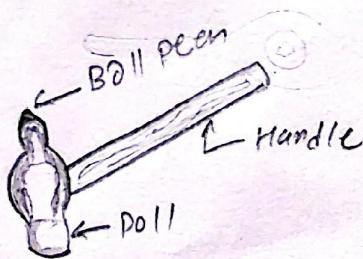


Fig. Ball peen hammer

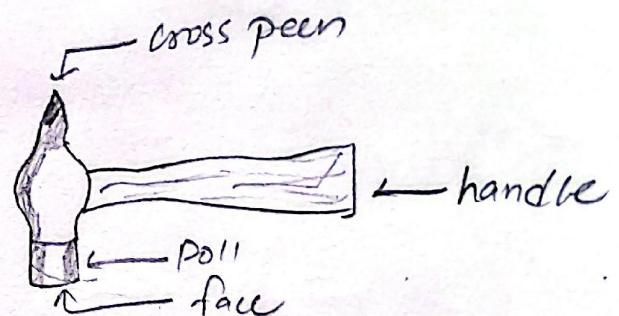
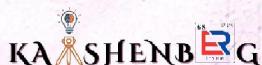


Fig. Cross peen hammer



Holding tool (Bench vice)

It is used for holding the workpiece & is firmly fixed to the bench with the bolts & nuts. It consists of an iron or steel cast body, square threaded screw, nut, handle, two jaws, & jaw plate.

Grinding Machine

It is used to grind the work pieces. It is a type of machine using an abrasive wheel as cutting tool.

OBJECTIVE: TO MAKE A RECTANGULAR TRAY OF SIZE 150 mm

X 300 mm

MATERIALS REQUIRED:

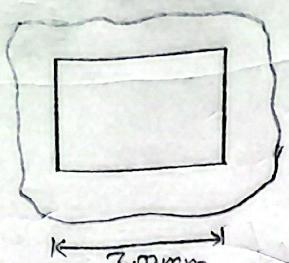
Bench vice, metal sheet, centre punch, soft hammer, scriber

PROCEDURE :

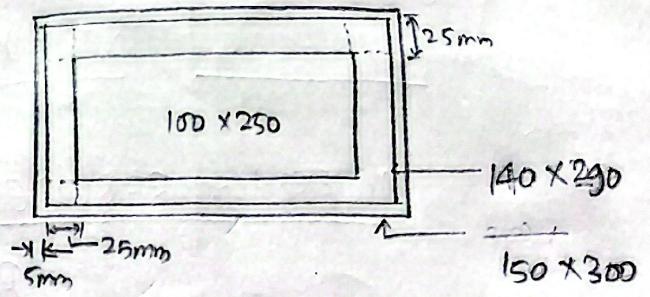
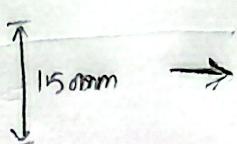
- (i) First of all the metal sheet is taken and a rectangle of size $150\text{ mm} \times 300\text{ mm}$ is marked on it.
- (ii) Then it is cut out so that the metal sheet has the required size of the rectangle as in Fig (i).
- (iii) Then in thin rectangular sheet, two rectangles of sizes $140\text{ mm} \times 290\text{ mm}$ and $100\text{ mm} \times 280\text{ mm}$ are inscribed with the help of scriber or marker such that the former & latter rectangles are at distance of 5mm & 25mm from each edge of the metal sheet as shown in fig (ii).
- (iv) The part sheet at each corners is a square of 25mm by 25mm which is cut out as we obtain metal sheet as in Fig (iii).
- (v) The part outside $140\text{ mm} \times 290\text{ mm}$ rectangle is bent and flattened. Then the part outside the $100\text{ mm} \times 280\text{ mm}$ is bent so that it is perpendicular to metal sheet. Thus, we obtain a rectangular tray as in fig (iv).

Conclusion:

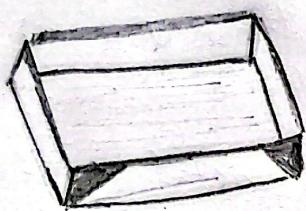
The two rectangular sheets were prepared and the basic knowledge of sheet metal work was obtained.



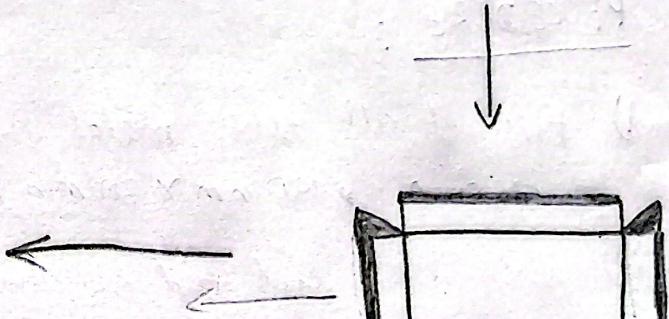
Fig(1)



Fig(2)



Fig(1)



Fig(3)

OBJECTIVE : TO PREPARE A DUSTPAN FROM GIVEN SHAFT OF METAL

MATERIALS REQ:

Metal sheet	Drilling machine
Soft hammer	centre punch
Bench vice	Tisquare
Scissors	Scriber

PROCEDURE :

- (1) The given metal sheet was cut into size of 200 mm to 250 mm.
- (2) At any two adjacent corners, an isosceles triangle having 2 sides 22 mm are made. Then this triangle made on sheet is cut out of the sheet with the help of sniper.
- (3) At the distance of 35 mm. from remaining two corners, a right angled triangle of perpendicular 5mm & 40mm are cut out from sheet.
- (4) The sheet is folded around the dotted lines as shown in figure.
- (5) For the handle, a metal sheet is taken & a rectangle of 45 mm x 250 mm is cut out at either ends with base & perpendicular 40mm & 30mm are cut out of sheet.
- (6) With the centre punch, a hole is marked in both handle and dustpan. Then hole is drilled and nails are hammered on it.

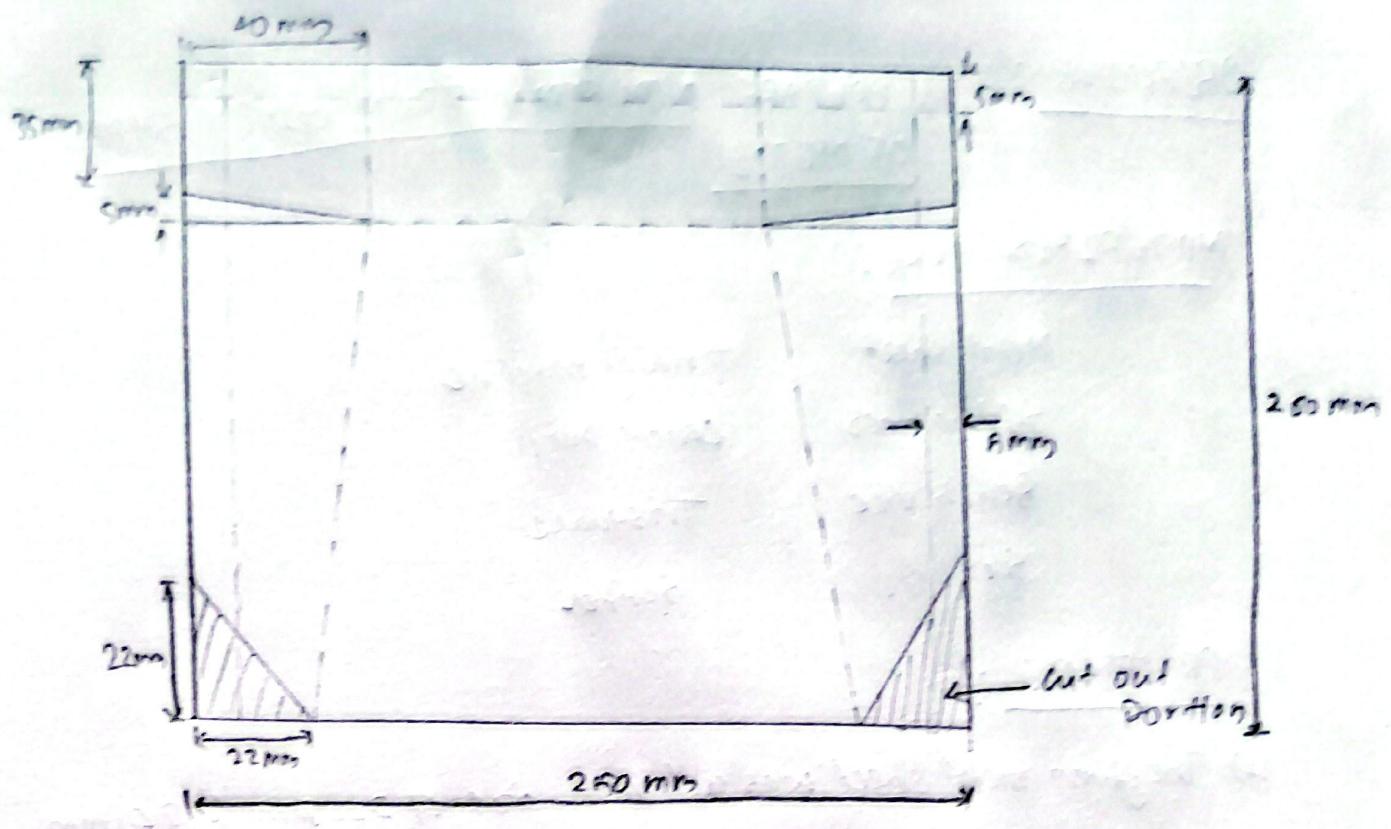


Fig. Dust Pan body

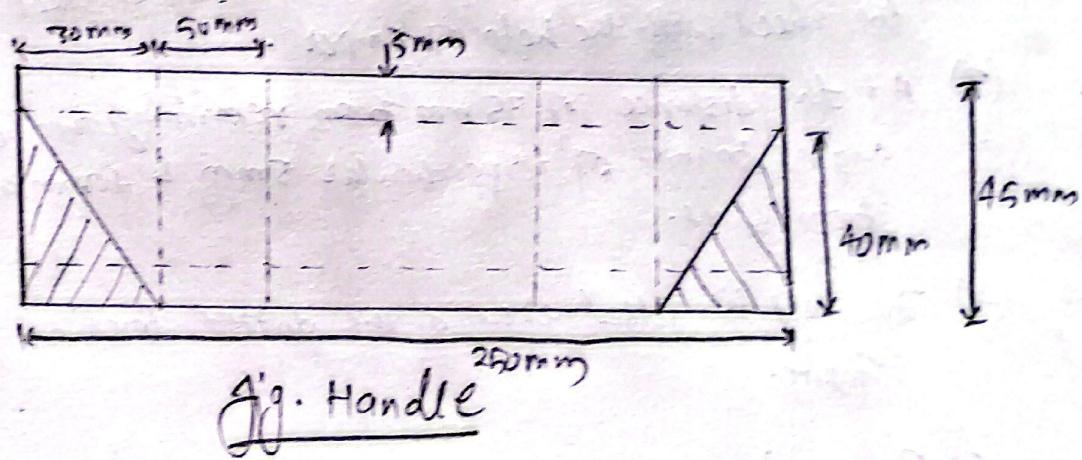


Fig. Handle

OBJECT: STUDY AND DEMONSTRATION OF BASIC WELDING TECHNIQUES

TOOLS USED:

- Welding machine
- Electrode holder
- Welding electrodes
- Work bench
- Safety equipments.

THEORY:

Welding is a fabrication process that joins materials usually metals by using high heat to melt the parts together, followed by cooling that causes fusion.

It is the most essential operations in manufacturing, automotive, construction, etc.

The various types of welding processes are:

- Arc welding
- Gas welding
- Spot welding
- TIG welding
- MIG welding
- Cored arc welding

Arc welding: In arc welding, an electric arc is generated between an electrode & base metal. The intense heat from arc melts base metal & the electrode & during cooling, forms a strong joint.
Key components:
- electrode - power source - ground clamp

The basic weld joint types commonly done using arc welding are:

- Butt joint : Two plates are placed edge to edge
- Lap joint : One plate overlaps another.
- T-joint : one plate is placed perpendicular to other.