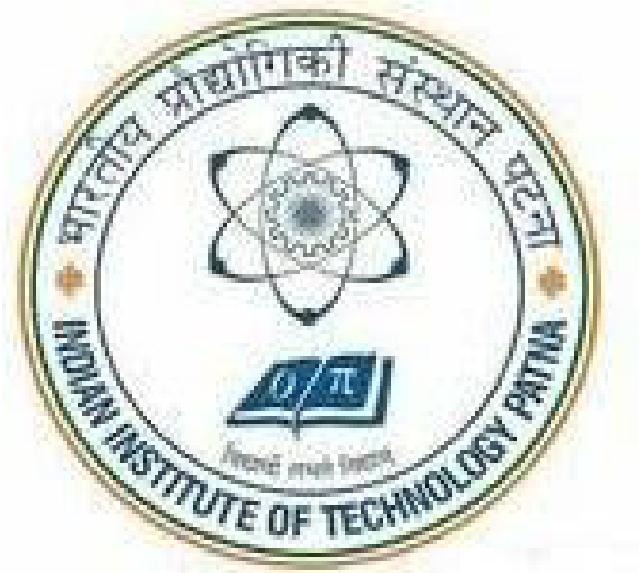
SHEET METAL WORKING



OBJECTIVES

- INTRODUCTION
- VARIOUS PROCESSES
- TOOLS USED
- APPLICATIONS
- MERITS & DEMERITS

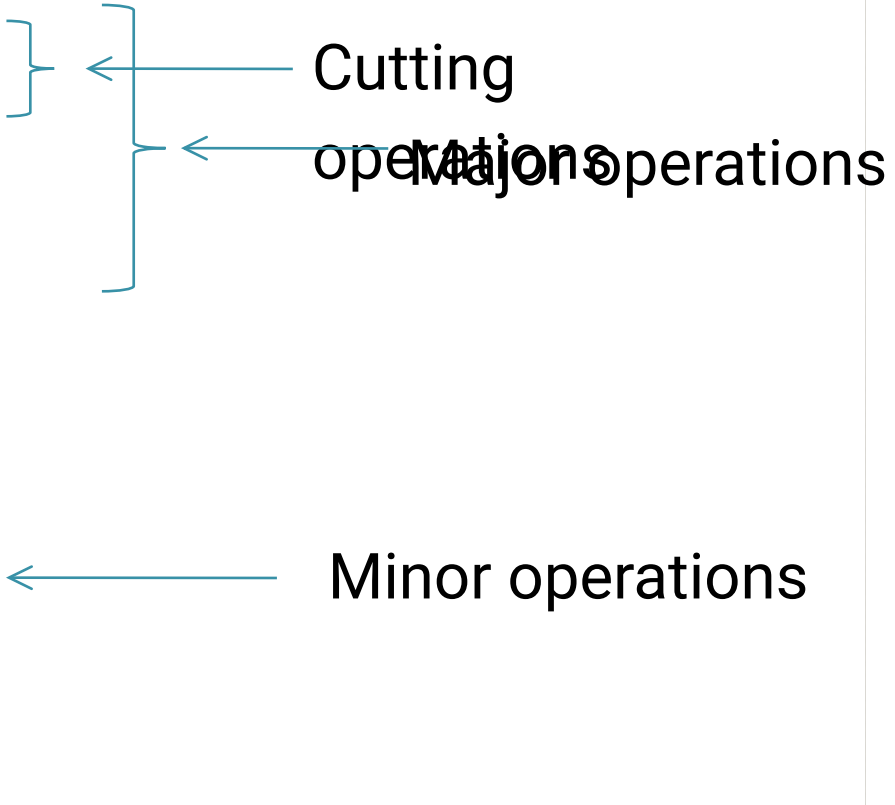
➢ INTRODUCTION

- The operations performed on the sheet to get the required shape are called as sheet metal operations

- The raw material for sheet metal manufacturing processes is the output of the rolling process. Typically, sheets of metal are sold as flat, rectangular sheets of standard size. If the sheets are thin and very long, they may be in the form of rolls. Therefore the first step in any sheet metal process is to cut the correct shape and sized ‘blank’ from larger sheet.

SHEET METAL PROCESSES

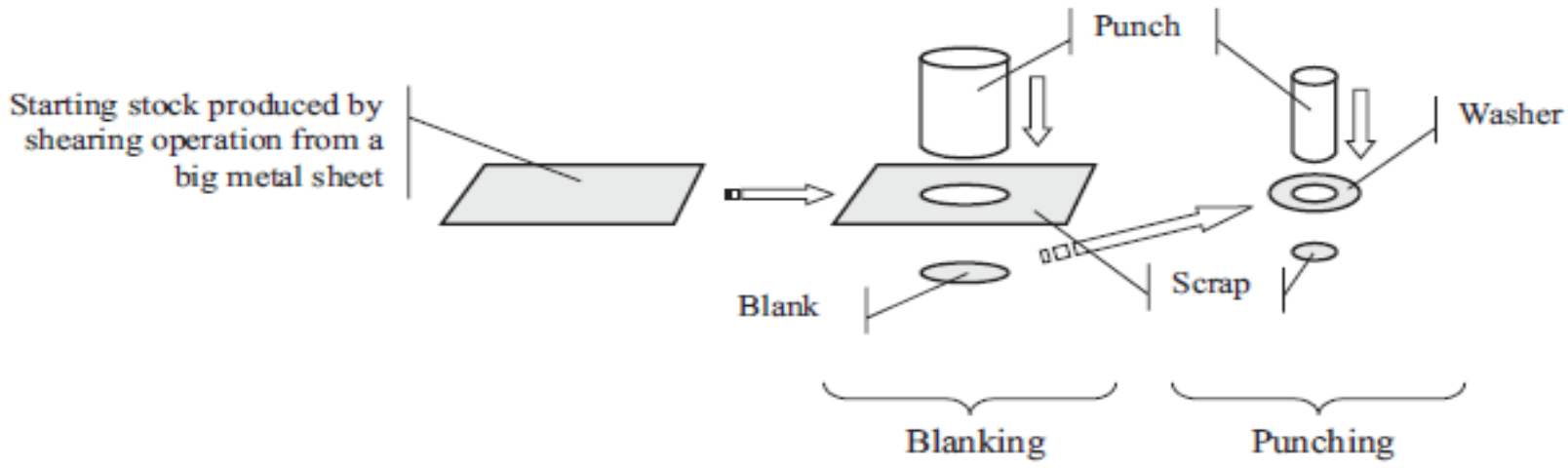
- Punching or Piercing
- Blanking
- Deep drawing
- Bending
- Perforating
- Notching
- Lancing
- Slitting
- Nibbling
- Trimming



DEFINITIONS

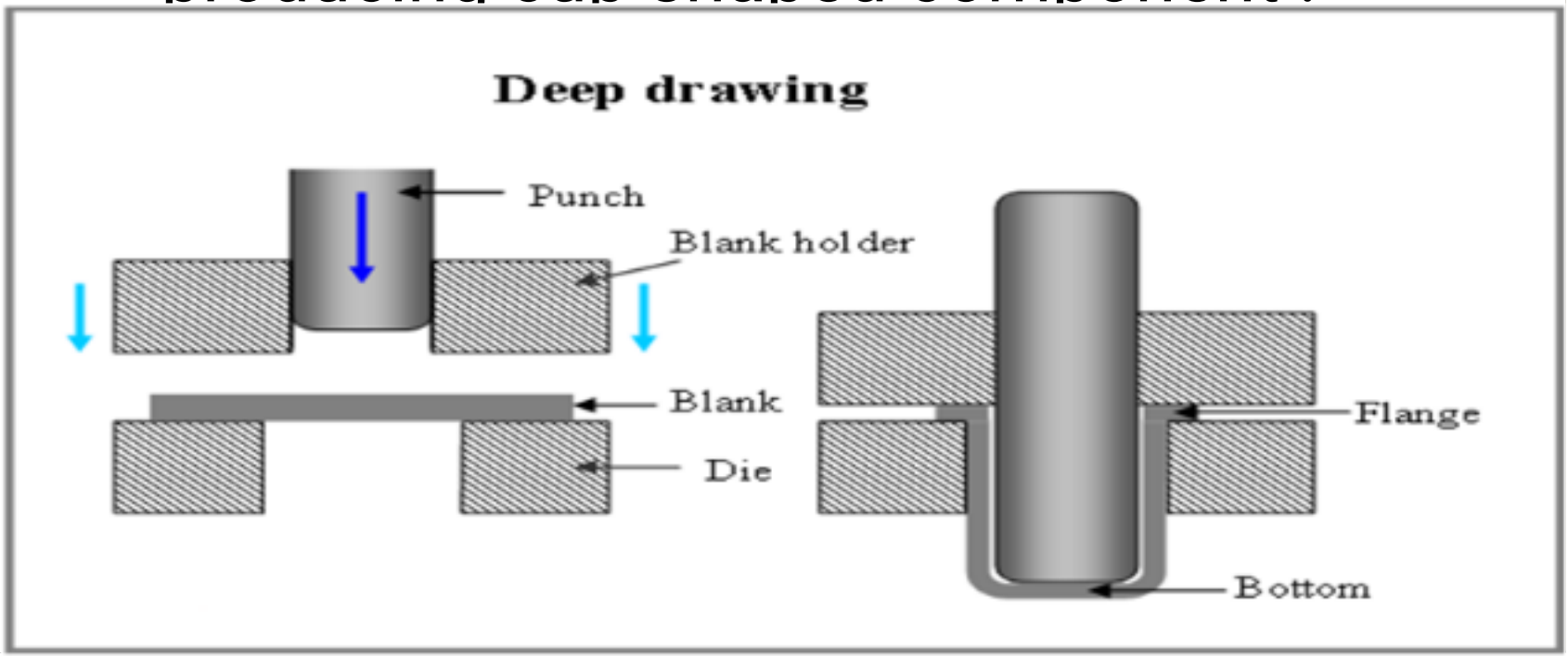
- Punching :- If the hole produced in the sheet is useful then the operation is called as punching operation.

- Blanking :- If the blank produced in the sheet is useful then the operation is



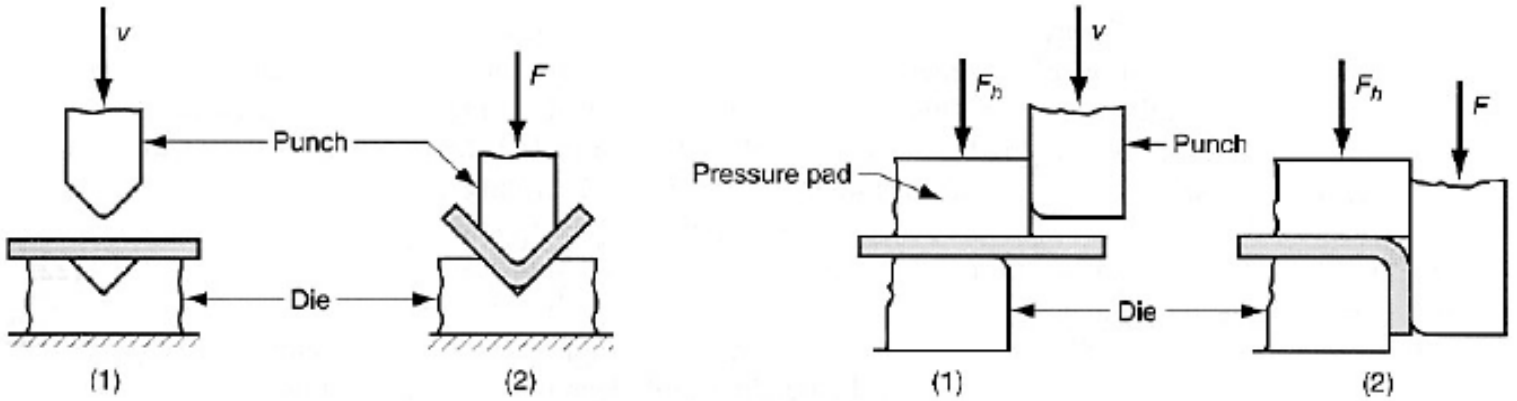
Steps in production of washer

- Deep drawing:- In deep drawing process the forces are applied on the sheet such that the stress induced in the material is greater than the yield and less than the ultimate so that the material is deforming plastically to get the required shape . In general it is used for producing cup shaped component .



- **Bending:-** It is also a forming operation where the forces are applied such that the stresses induced is greater than yield and less than ultimate. Usually bending are of three types u, v and

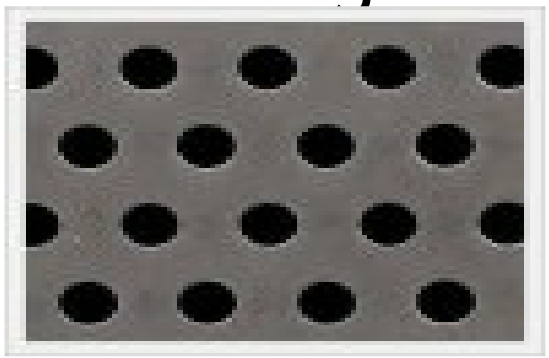
Bending operations involve the processes of *V-bending* and *edge bending*:



(*Left*) V-bending, and (*Right*) edge bending; (1) before and (2) after bending

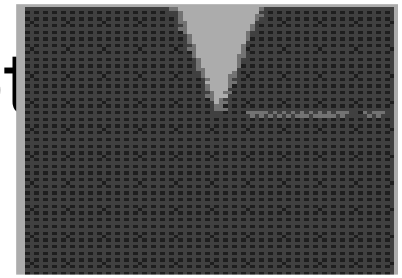
- *V-bending*—sheet metal is bent along a straight line between a V-shape punch and die.
- *Edge bending*—bending of the cantilever part of the sheet around the die edge.

- Perforating :-Producing many number of small size hole on the sheet is called perforating.

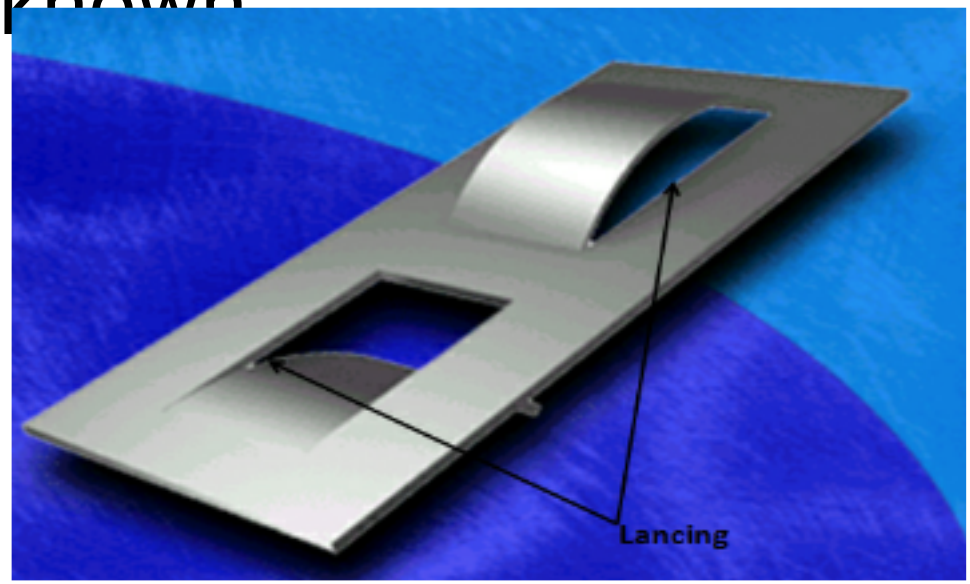


Perforated Sheet

- Notching:- Removing a piece of material from the edge of the sheet is called not



- **Lancing:-** Producing an incomplete hole or blank at the centre of the sheet is known



- **Slitting:-** Producing an incomplete hole or blank at the edges of the sheet is called as slitting.

- Nibbling:- Producing a large size hole using small size punch in many repetitive stroke of the punch is called ni

- Trimming :- Removing a piece of material from complete circumference of the component is called as trimming.

TOOLS USED

Marking and measuring tools

Steel Rule : It is used to set out dimensions.

Try Square: Try square is used for making and testing angles of 90degree

Scriber: It used to scribe or mark lines on metal work pieces.

Divider: This is used for marking circles, arcs, laying out perpendicular lines, bisecting lines, etc

Hacksaw

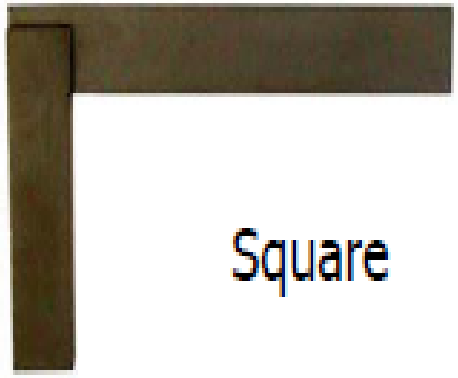
Files

Scriber

Hammer

Spring Dividers

Bench Vise

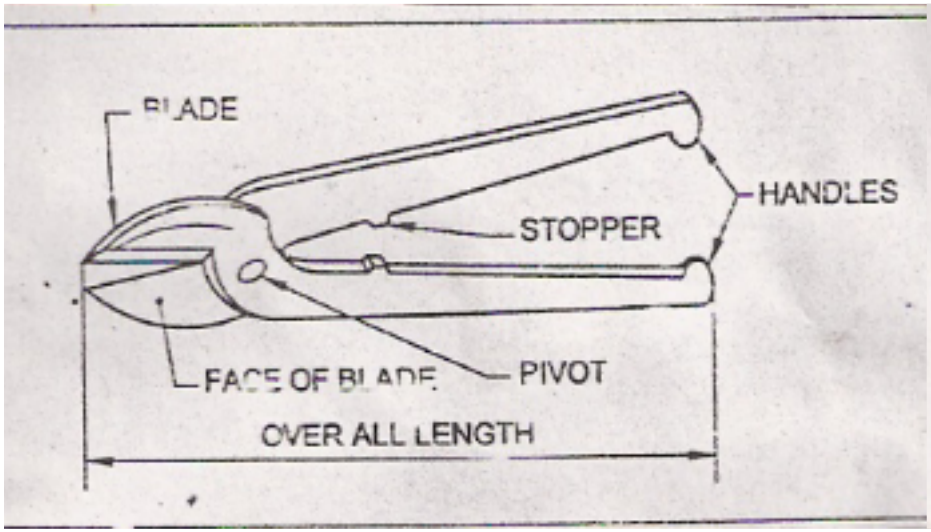


Square

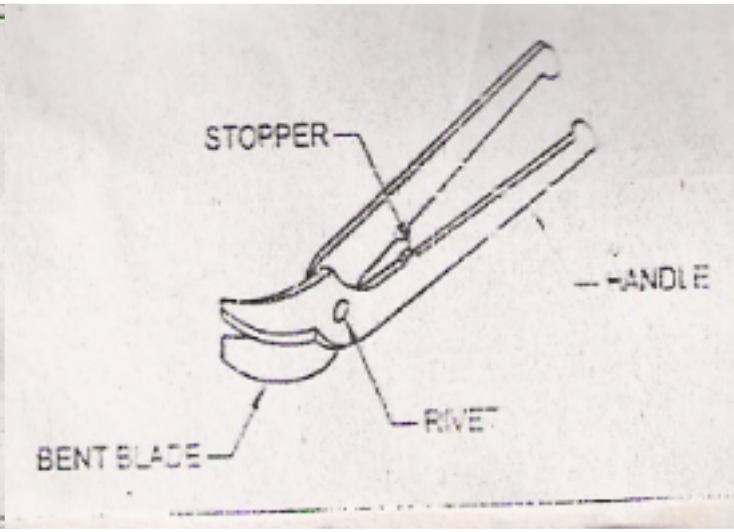
Cutting Tools

Straight snip - They have straight jaws and used for straight line cutting.

Curved snip - They have curved blades for making circular cuts.



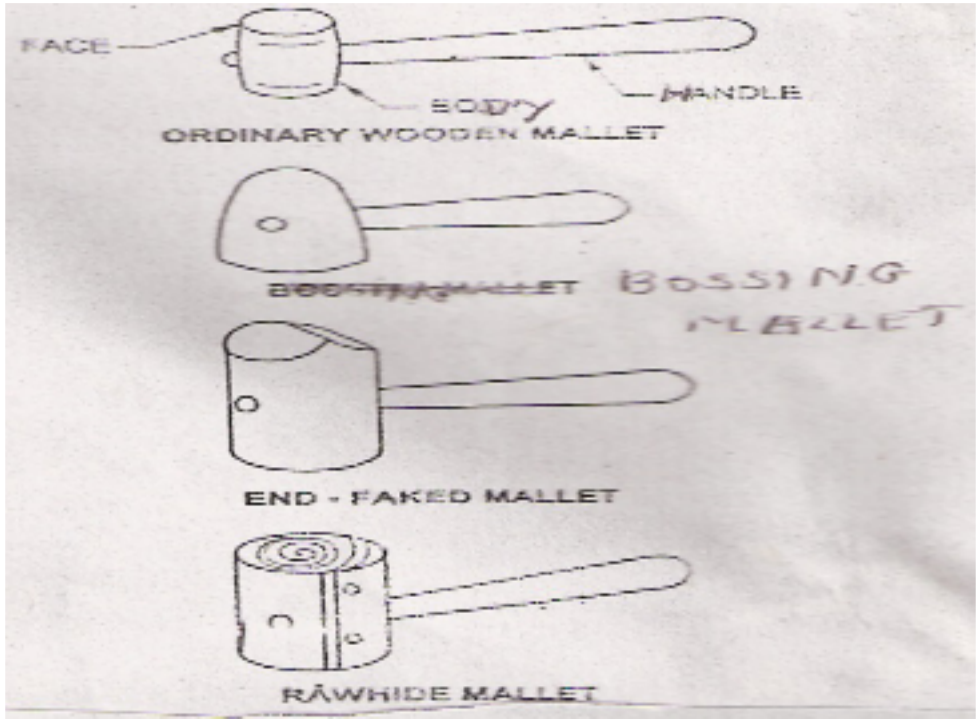
Straight snip



Curved snip

Striking Tools

Mallet - It is wooden-headed hammer of round or rectangular cross section. The striking face is made flat to the work. A mallet is used to give light blows to the Sheet metal in bending and finishing.



Types of Mallets

Applications

- Countless everyday objects are constructed such as
  tables ,chairs ,boxes etc
- Widely used in automobile industry.
- Used in the manufacturing of outer envelopes for the electronic components.
- Widely Used in shipping industry.
- Used for the temporary roofing of houses and for the manufacturing of the decorative structures.

Merits & Demerits

Merits

- ✓ High strength
- ✓ Good dimensional accuracy and surface finish
- ✓ Relatively low cost

Demerits

- ✓ Wrinkling and Tearing are typical limits to drawing operation.
- ✓ Earring defect
- ✓ Determination of amount of spring back .

Thank you……..