

Workshop:-

Work Shop is combination of two words  
Work + Shop.

Work = physical or intellectual effort directed  
to some useful & meaningful activity.

Shop = place where this work is properly  
carried out.

OR

A workshop may be a room or building which  
provides both the area & tools that may be  
required for the manufacturing or repair of  
product.

OR

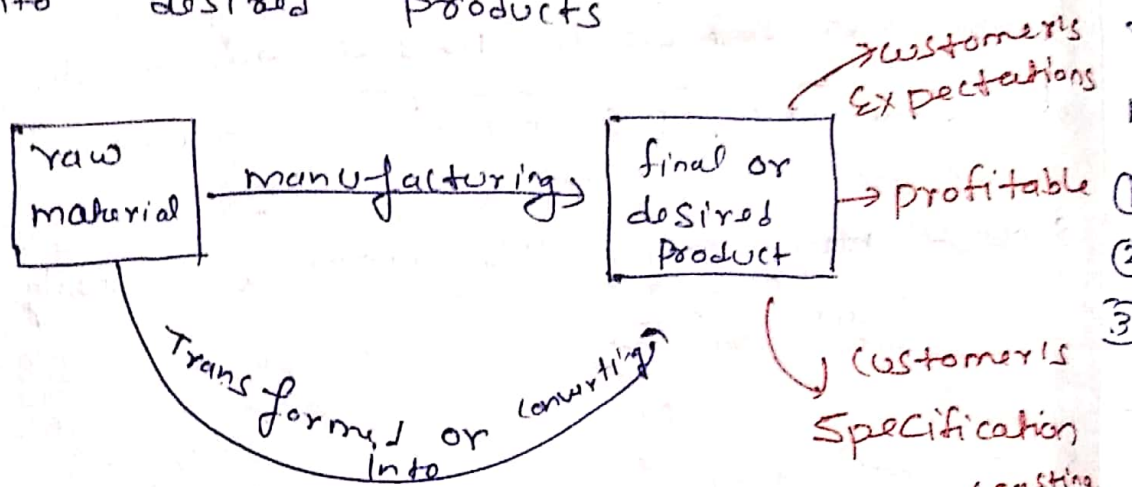
Workshop is a place where physical or  
intellectual effort gets properly utilized.

Types of Shops in Mechanical workshop:-

- (1) Machine Shop
- (2) Carpentry Shop
- (3) Smith Shop or forging shop
- (4) fitting shop
- (5) welding shop
- (6) foundry shop

## manufacturing process -

manufacturing may be defined as the process of transformation of raw material into desired products



process means the Engineering methods & techniques used for performing technology transformation.

Thus, when the raw material is technologically transformed into the desired shape, size & quality by using effective machine or equipments, tool & techniques or process, it's termed as manufacturing process.

**Safety** - the condition of being protected from or unlikely to cause danger, risk, or injury.  
 → lack of safety results into accidents

### ① Machine Shop

→ Machine Shop is used for Machining or cutting of material to get desired shape


→ machine shop contains different machine like lathe machine, Shaper machine, drilling machine, grinding machine, etc.



## Machining:-

(03)

It is a material removal process, in which a cutting tool removes unwanted or excess material from a workpiece to produce the desired shape.

Material remove in the form of chip. 

- ① Continuous chip
- ② Discontinuous chip
- ③ Continuous chip with BUE

Ductile material — Property of material by virtue of which it can be drawn into wires or elongated with the application of a tensile force, before fracture.  
Al, gold,

## Lathe Machine

The lathe is one of the most important machines in any workshop.

Its main objective is to remove material from ~~outside~~ workpiece by rotating the workpiece against a cutting tool. (Single point cutting tool & Multi point cutting tool)

The lathe using in our workshop is Engine lathe ~~or centre lathe~~; because in old days the lathe machine operated by <sup>Steam</sup> Engine, and work piece clamped by Centre so it is also called Centre lathe.

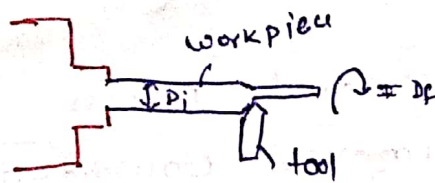
~~Lathe machine different operations can be operate~~

Various types of operation performed in lathe machine.

- |               |                    |                   |
|---------------|--------------------|-------------------|
| (i) Turning   | (iii) Step turning | (v) Taper turning |
| (ii) Facing   | (iv) Knurling      | (vi) Cutting      |
| (vii) Parting | (viii) Threading   |                   |



turning:-

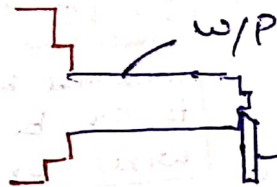


$$D_i > D_f$$

tool will be  $\perp$  to w/p

Turning is an operation of reducing the workpiece diameter to a specific dimension, as the carriage moves the tool along the workpiece.

Facing:-



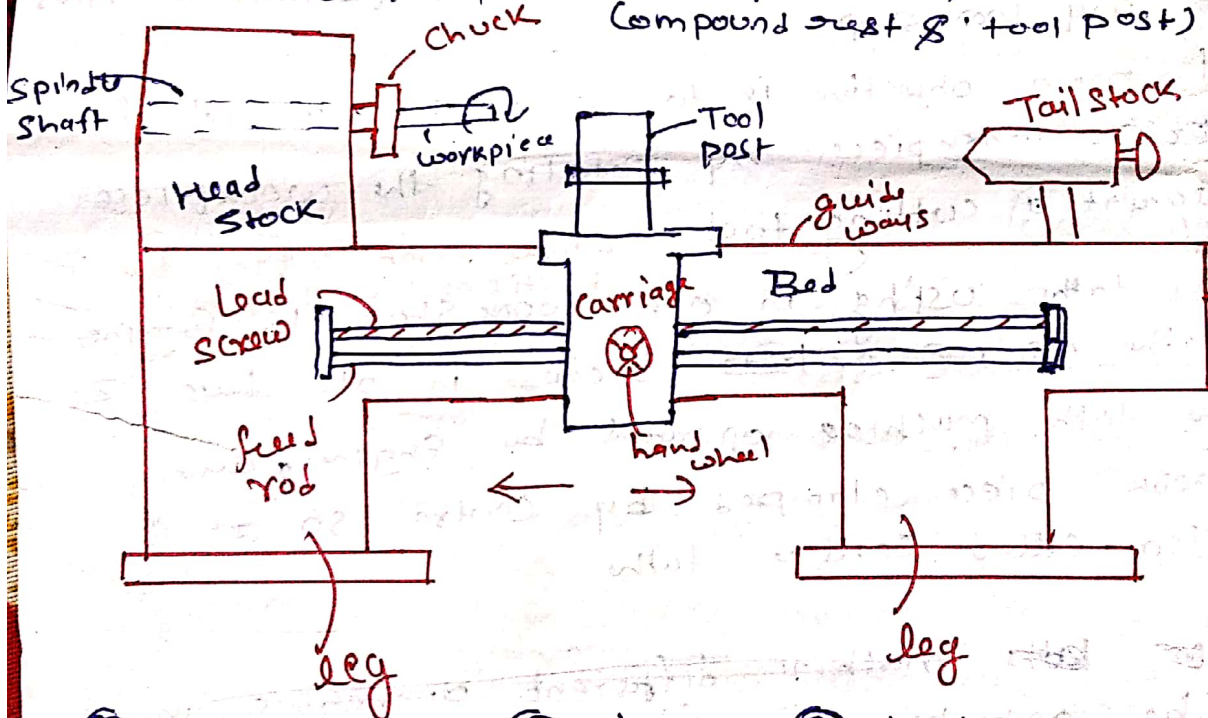
→ Facing is an operation of reducing the w/p length.

and make flat

→ In this cutting tool removes metal from the end of the w/p & makes it flat.

Principle parts of lathe:-

- (1) guide ways
- (2) Bed (chip tray)
- (3) legs
- (4) Carriage (saddle, cross-slide, compound rest & tool post)
- (5) tail stock.



- (6) Head stock
- (7) chuck
- (8) Lead screw & feed rod
- (9) Spindle

Working principle:-

The working principle of a lathe is shown in Fig A. In a lathe, the workpiece is held in a chuck or between centres and rotated about its axis at a uniform speed. The cutting tool held in the tool post is fed into the workpiece for a desired depth & in desired direction.

Since there exists a relative motion b/w the w/p & the cutting tool, therefore the material is removed in the form of

chips and the desired shape is (05) obtained.

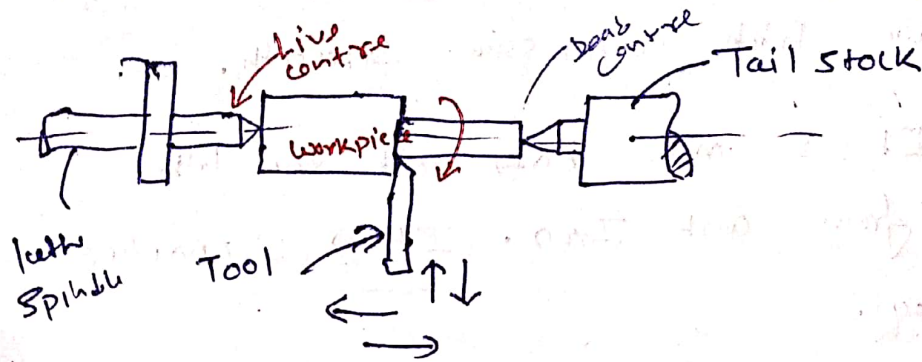
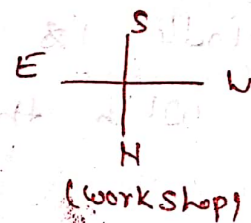
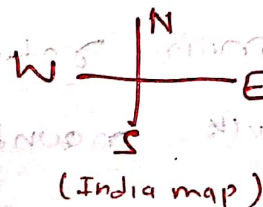


fig (A) Working principle of a lathe

Plant layout:- It is the most effective physical arrangement either existing or in plans of industrial facilities.

i.e. arrangement of machines, processing equipment & service departments to achieve greatest co-ordination & efficiency of 4 M's (Men, Materials, Machines & Methods) in a plant.



brittle material:-

It is defined as the property of a material by virtue of which it will fracture or break without any appreciable deformation.

This property is opposite to ductility

Iron & some glass product, concrete,

Centering- the action or process of placing something in the middle of something else.



(06)

Legs - made of cast Iron, because Cast Iron have high compressive strength.

Bed - It is main body of the lathe made from cast Iron. It is supported on legs.

Guide ways :- The guide ways are the ground surface on the top side of the bed on which the carriage & tail stock ride.

Head Stock :-

- It place on left end of the lathe
- It contains Spindle Shaft, gearing arrangement.
- Spindle is the main rotating shaft on which the chuck mounted.

Tail Stock :-

It is located opposite to head stock on the guide ways. It has two purposes

- (i) To support free end of the job during machining.
- (ii) To hold the tool for carrying out certain operation like drilling, boring, reaming etc.

## Carriage

(07)

(i) Saddle - move right to left & left to right by operating hand wheel.

(ii) Cross slide - It move crossly to the guide ways or table, It gave crossly movement. It is assembled on the top of the saddle.

(iii) Compound rest - rotate at any angle, but it can also move backwards & forward, with the help of hand wheel. It provide supports to the tool post.

(iv) Apron - It has gearing arrangement.

(v) Apron wheel - move full apron forward & backward.

(vi) Half nut - It engage automatically, ~~on carriage~~ to lead screw.

Carriage start move automatically