

**Exp. No.**

**Aim:** Study of Lathe Machine Tool and Job Preparation on it.

**Lathe Machine Tool**

Lathe is known as the mother machine tool. It is one of the most widely used machine tool in all parts of the world. Operation like turning, facing, taper turning, drilling, reaming, boring, knurling, screw-thread cutting etc. can be performed.

**Working Principles:**

The lathe is a machine tool which holds the workpiece/job to be machined in between two rigid centers or in a chuck or face plate which revolves, the cutting tool is radially held and supported in a tool post which advanced radially into the workpiece with specified depth and moved longitudinally along the axis of the workpiece, removing metal in the form of chips

The different parts of lathe are

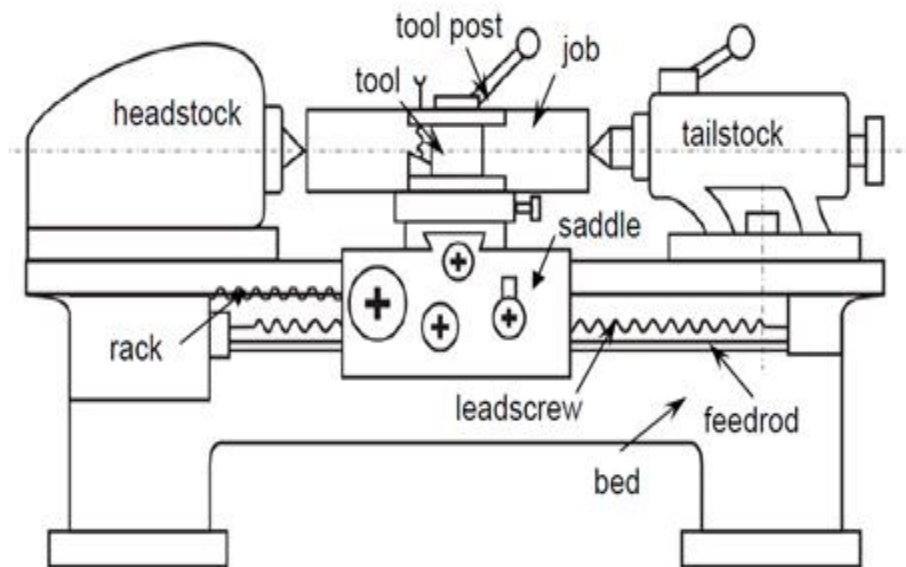
1. Feed Gear Box
2. Gear Guards
3. Reverse Lever
4. Back Gears(inside)
5. Face plate
6. Live centre
7. Tool post
8. Compound Rest
9. Carriage
10. Dead centre
11. Tailstock
12. Set over screws
13. Bed
14. Feed Rod
15. Lead screw
16. Thread Dial Indicator
17. Half nut lever
18. Apron
19. Cross feed handle
20. Hand wheel
21. Head stock
22. Spindle Sleeve

**Size of Lathe**

- The size of Lathe is specified by the maximum size of work that can be handled by the lathe. Size of work implies diameter and length of work.
- Length of work may be specified as the maximum distance between lathe centers
- The world swing is used to designate the size as the maximum diameter of the work that can be machined on the lathe.

- A 250x750 mm lathe: Lathe has a swing ( over the bed) of 250 mm and a distance between centers of 750 mm

## Layout of lathe m/c tool



### Types of Lathes

- Speed Lathe
- Bench Lathe
- Engine lathe
- Tool room lathe
- Special purpose lathe
- Turret lathe
- Automatic lathe
- 

### Speed Lathe:

Speed lathe is simplest of all types of lathe. Speed lathe find use as wood working lathes, metal spinning lathes and polishing lathes. It normally do not possess gear box, carriage and lead screw. In speed lathes, the tool rests on a support and is fed and operated/adjusted by hand only. It has a bed on which headstock and tailstock rest. Cone pulley arrangement in the headstock provides speed variation of the workpiece.

**Bench Lathe:** A bench lathe is a small engine lathe which can be mounted on a bench. It is used for doing small and light jobs which require precision work. It possesses almost all the parts of

an engine lathe and thus can do most of the operations which can be performed on an engine lathe.

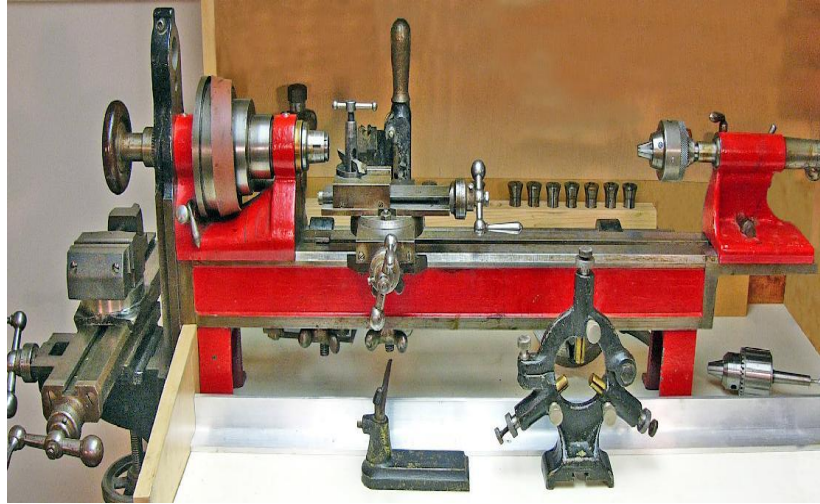


Fig. Bench Lathe

**Engine Lathe:** An engine lathe is a basic turning machine. Its main components are the bed, headstock, tailstock, carriage and quick change gear box. The headstock situated at one end of the lathe bed contains gears or pulleys to drive the workpiece at different speeds and is operated by an electric motor. The tailstock, mounted at the other end of the bed can be moved towards or away from the headstock to accommodate workpieces of different tools. The carriage situated between the headstock and tailstock carries the cutting tools. An engine lathe is one of the most widely used lathes.

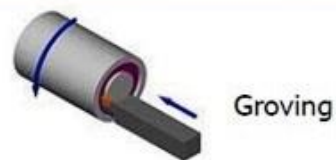
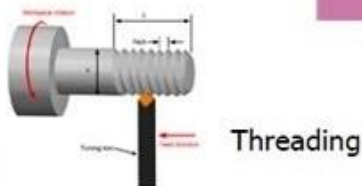
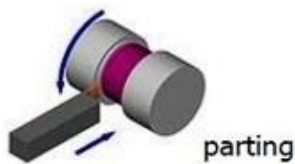
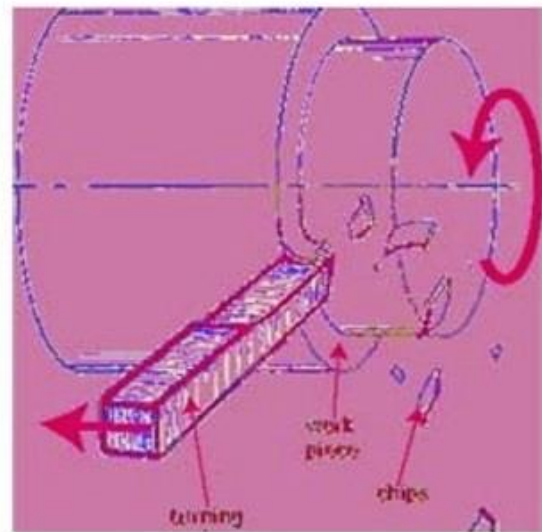
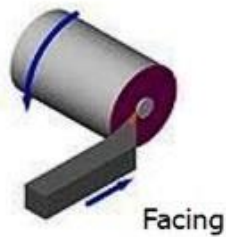
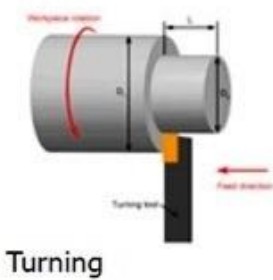
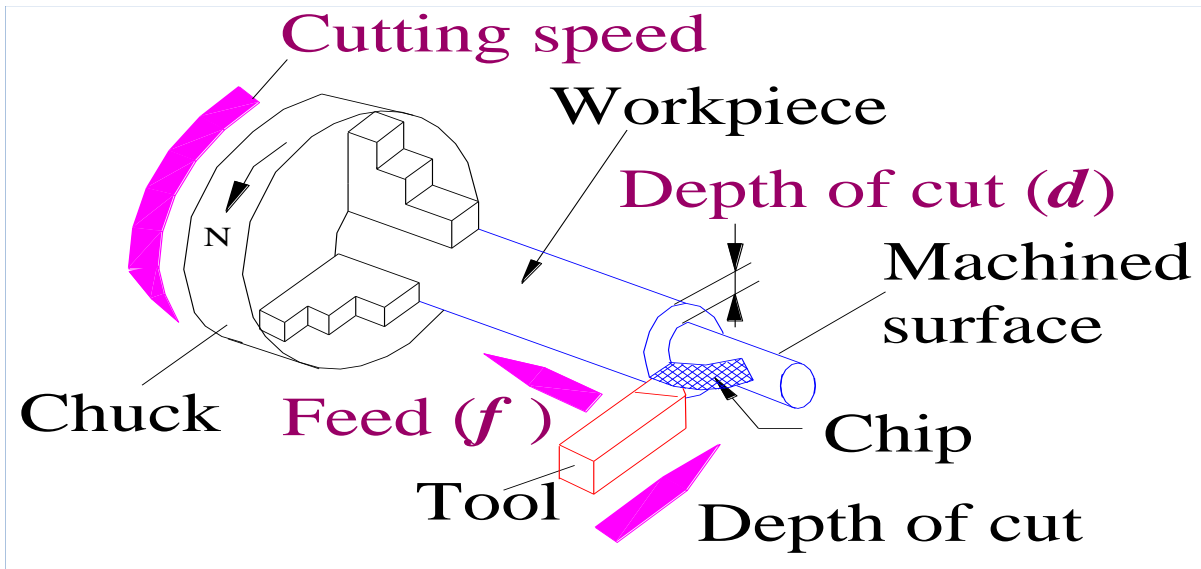
**Tool room Lathe:** A Tool room lathe is a precision engine lathe equipped with additional attachments needed for tool and die making operations. It has a geared headstock with a considerable range of spindle speed from very low to as high as 2500 rpm. It is equipped with steady rest, quick change gear, lead screw, feed rod, taper attachment, thread dial chuck, draw-in-collet attachment and a pump for a coolant. But it is more expensive than comparable sizes of engine lathes.

**Special Purpose lathes:** Special purpose lathes are all adaptations of the engine lathe. It is used to manufacture those jobs which cannot be conveniently produced on normally available lathes.

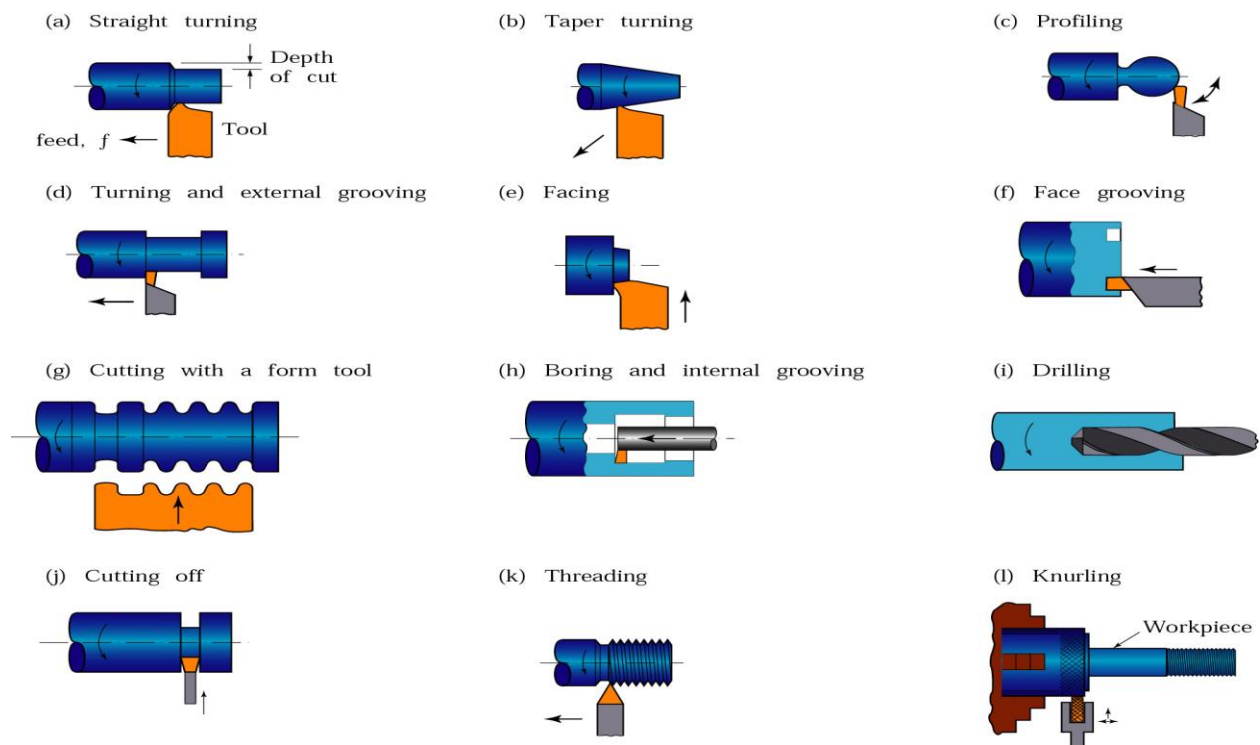
#### **Lathe Operations:**

- Plain Turning
- Step turning
- Taper Turning & its steps
- Centering
- Facing
- Drilling

- Reaming
- Boring
- Grooving
- Threading
- Knurling



- Turning: Excess Material is removed to reduce Diameter
- Facing: machine end of job to produce flat surface or to Reduce Length of Job
- Grooving: Produces a Groove on workpiece. Shape of tool is same as shape of groove. It is carried out using Grooving Tool.
- Parting: Cutting workpiece into Two piece
- Chamfering: Beveling sharp machined edges
- Knurling: This is not a machining operation at all, because it does not involve material removal. Instead, it is a metal forming operation used to produce a regular crosshatched pattern in the work surface.
- Threading: Threads are cut using lathes by advancing the cutting tool at a feed exactly equal to the thread pitch. The single-point cutting tool cuts in a helical band, which is actually a thread.



#### References:

- **Workshop Technology by Hazara Prasad & BS Raghuvasi**
- **'Manufacturing Technology by P.N. Rao, Tata McGraw Hill, New Delhi**
- **'Production Technology' by R K Jain, Laxmi Publisher**
- **Ghosh A. and Mallik A. K., Manufacturing Science, EWP Pvt. Ltd**