

Milling Machine

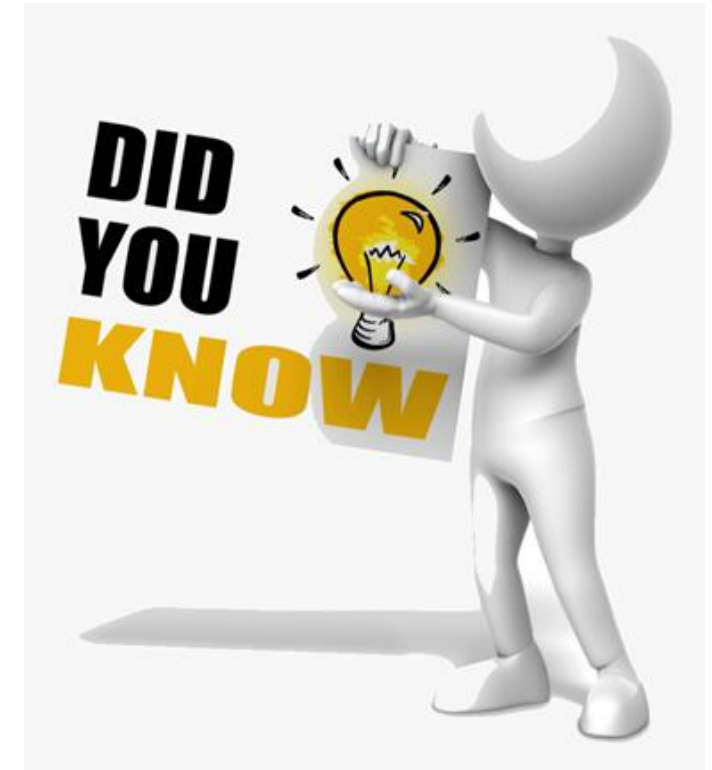
Definition and Applications of Milling Machine

Upon completion of the course the student shall be able to:

- Know the use of Milling Machine .
- Understand the applications of Milling machine.

Did you Know?

- A Milling machine uses a milling cutter to remove material from the surface of a work piece.
- This process is known as milling operation. Generally cutters have multi edges.



Introduction to Milling Machine

- **Definition** : Milling machine does the process of machining using rotary cutters to remove material by advancing the cutter into a workpiece.
- This may be done by varying direction on one or several axes, cutter head speed, and pressure.
- Milling covers a wide variety of different operations.
- It is used to machined the flat, rough and irregular surfaces and this is done by feeding the workpiece against a rotating milling cutter.



Parts of Milling Machine

1. Column & Base :

- Column including base is the main casting that supports all other parts of milling machine.

2. Knee :

- It is a casting that supports the saddle and table.
- All gearing mechanism is enclosed within the knee part. It is fastened to the column by dovetail guide ways.
- The knee is supported and adjusted by a vertical positioning screw known as elevating screw.



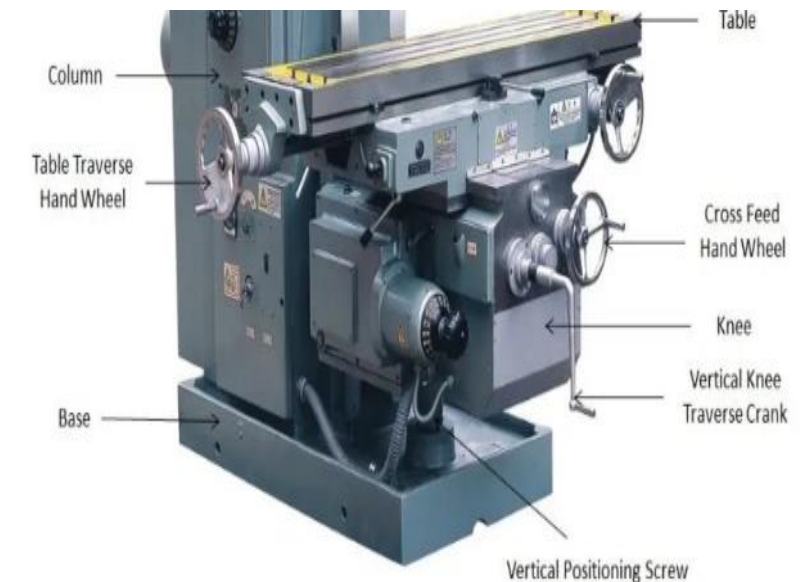
Parts of Milling Machine

3. Saddle and Swivel Table :

- The saddle is present on the knee and supports the table.
- It slides on a horizontal dovetail ways on the knee.

4. Power Feed Mechanism :

- The knee which contains the power feed mechanism. It is used to control the longitudinal (left and right), transverse (in and out) and vertical (up and down) feeds.



Parts of Milling Machine

5. Table

- It is a rectangular casting which is present on the top of saddle.
- It is used to hold the work or work holding devices.



6. Spindle

- It is the shaft that is used to hold and drives the cutting tools of the milling machine.
- The spindle is mounted on the bearings and supported by the column.
- Spindle is driven by the electric motor through gear trains.



Parts of Milling Machine

7. Over Arm / Overhanging Arm :

- It is a horizontal beam present at the top of the column.
- It may be a single casting which slides on the dovetail ways present on the top face of the column. The overhanging arm in the vertical machine is called ram.

8. Arbor Support :

- It is a casting with bearing that supports the outer end of the arbor.
- It also helps in aligning the outer end of the arbor with the spindle.



Types of Milling Machine

1. Horizontal Milling Machine

In horizontal milling machine the axis of rotation of the spindle is horizontal to the table. And due the axis of spindle horizontal, it is called as horizontal milling machine.



2. Vertical Milling Machine

The milling machine in which the spindle axis is perpendicular to the table is called vertical milling machine.



Types of Milling Machine

3. Knee-Type Milling Machine

The milling machine which has a knee like projection at the middle is called knee-type milling machine. It is characterized by a vertical adjustable work table resting on a saddle supported by a knee.



4. Ram-Type Milling Machine

A milling machine which has a ram on the top of the column is called ram type milling machine. Generally ram is used in vertical milling machine. It can be moved on the column in transverse direction.



Types of Milling Machine

5. Universal Milling Machine

- The universal milling machine is suitable for milling planes, bevels, grooves, etc. using a variety of bar milling cutters, circular milling cutters, and angle milling cutters.
- If you use the universal milling head, round table, indexing head and other milling machine accessories, you can expand the processing range of the machine.
- The machine has sufficient rigidity and power, and has powerful machining capabilities for high-speed and heavy-duty cutting operations and gear machining.



Specifications of Milling Machine

A Milling machine can be specified as per:

- Working Surface
- Number of T-slots
- width of T-slots
- Pitch of T-slots
- Maximum distance from spindle centre to underside of over support



Applications of Milling machine

- Milling machines are usually used to machine flat surfaces, but can also produce irregular surfaces.
- They can also be used to drill, bore, cut gears, and produce slots.

From the above Topic we learnt about :

- The uses of Milling machine
- Applications of Milling machine
- The specification of Milling machine

Check Your Understanding

1. Up milling is also called as ?

- A. End Milling
- B. Face milling
- C. Climb milling
- D. Conventional milling

2. The cutting tool in a milling machine is mounted on ?

- A. Spindle
- B. Arbor
- C. Column
- D. Knee

Check Your Understanding

3. The universal milling machine is suitable for milling planes, bevels, grooves, etc.

- A. True
- B. False

4. The milling machine which has a knee like projection at the middle is called knee-type milling machine.

- A. True
- B. False

Check Your Understanding

5. Generally ram is used intype milling machine ?

- A. Vertical
- B. Horizontal
- C. Flexible
- D. None of these

6. In horizontal milling machine the axis of rotation of the spindle is to the table. ?

- A. Vertical
- B. Horizontal
- C. Angular
- D. None

Check Your Understanding

7. Which of the following is a type of milling machine ?

- A. Knee-type
- B. Ram-type
- C. Both A and B
- D. None of them

8. Which of the following work can be done in milling?

- A. Flat surface machining
- B. T-slut making
- C. Groove cutting
- D. All of These

Answer Key

1. D. Conventional milling
2. B. Arbor
3. A. True
4. A. True
5. A. Vertical
6. B. Horizontal
7. C. Both A and B
8. D. All of These