4

Boring Machine

Contents

4.1 Introduction,purpose and field application of Boring machine

- Boring is the process of using a single point tool to enlarge and locate a previously made Drills tend to wander or drift, thus, where greater accuracy is required, drilling is followed ! boring and reaming.
- Besides enlarging previously made holes, a boring machine can be used for drilling, facing, milling etc.
- Boring machines are one of the largest of the machine tools and are able to machine workpieces weighing upto 180 kN.
- The boring tool for a boring machine is usually a single point cutting tool made of HSS or carbide and is mounted on the tool head.

4.2 Comparison between boring and reaming

- Boring can correct hole location , size, or alignment and can produce a good finish if a fine feed and a correct tool are used.
- The reamer follows the hole already in the workpiece and so cannot correct location.
- Reaming involves the use of a tool of fixed size, which is different for each size of hole and a large hole would require an expensive reamer, while a boring tool can make a hole of any size.
- Reaming is faster than boring but boring operation is often preferred because of location correction advantage.

4.3 Various Types of Boring Machine

1. Horizontal boring machines (HBM)
(i) Table type HBM
(ii) Planer type HBM
(iii) Floor type HBM
(iv) Multiple spindle HBM.
2.Vertical boring machines.
3. Jig boring machines.

4.3.1 Horizontal Boring Machines (HBM)

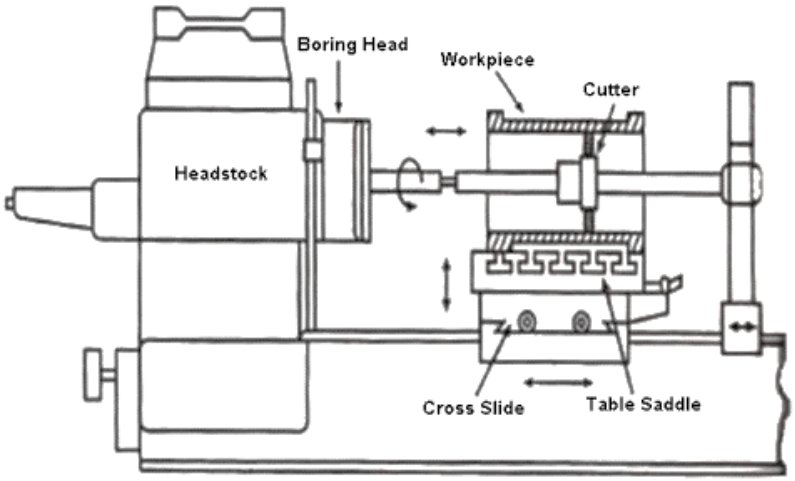

Table Type Horizontal Boring Machine

Fig.4.1 Horizontal Boring Machine

- **Bed :**A heavy and strong bed carries the entire load of different parts, workpiece ; tooling over it.
- **Columns :** Two vertical columns, one on each end of the table.
- **Head stock :** The head stock can be moved vertically along the main column.
- **Horizontal spindle :** It is suitably housed in the headstock, and can be rotated and fa forward and backward according to requirement.
- **Load bearing end support :** It supports the end of a long boring bar and can 1 adjusted vertically along the end support column.
- **Horizontal table :** It is mounted on a saddle and can be moved horizontally forwa and backward and sideways by moving the saddle.

4.3.2 Vertical Boring Machine

- The parts whose length or height is less than diameter are machined, for convenience, on vertical boring machines.
- On a VBM, the work is fastened on a horizontal revolving table, and the cutting tool or tools, which are stationary, advance vertically into it as the table revolves.

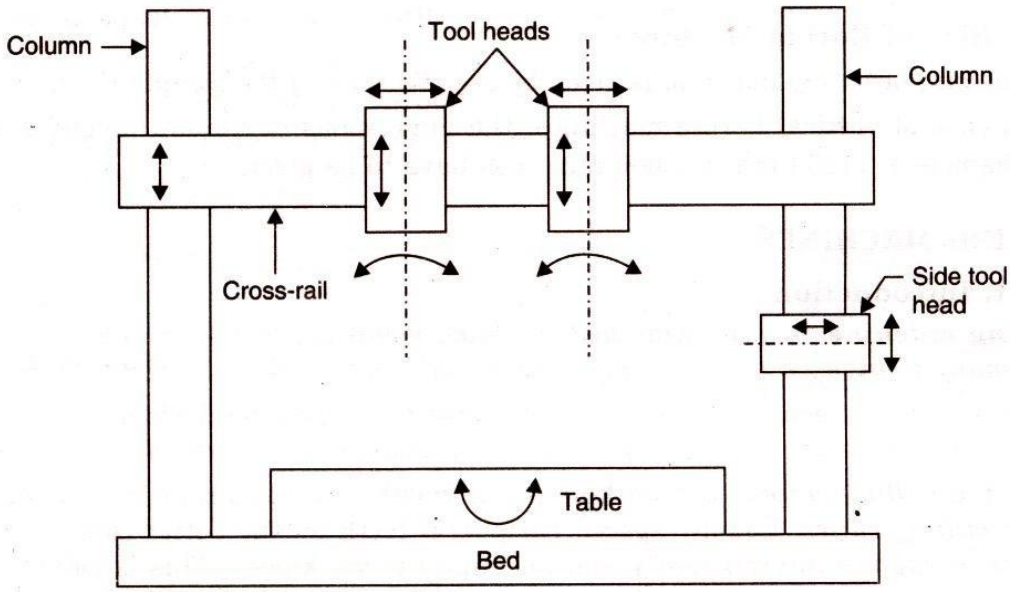

Fig.4.2 Vertical Boring Machine

- There are two designs of a VBM
  (i) Single column VBM, and
  (ii) Double column VBM.
- The work is accommodated on the horizontal revolving table at the front of the ma-chine. The circular work can be clamped on to the table with the help of jaw chucks whereas the T- slots can be used with bolts and clamps for setting up and holding irregular work.
- A horizontal cross-rail is carried on vertical slide ways and carries the tool holder slide or slides.
- On machines designed for working on large batches of similar articles, a single slide with may be employed.
- Most machines also have a slide tool head.
- A vertical boring machine is sometimes called a rotary *planer* and its cutting action on flat discs is identical with a planer. These machines, rated according to their table diameter, vary in size from 0.9 to 12 m.

4.3.3 Jig Boring or Precesion Boring Machine.

- A jig boring machine is a very precise vertical type machine.
- Jig boring machines are constructed with greater precision and are equipped with accurate measu-ring devices for controlling table movements. On typical machines positioning to ± 0.003 mm can be dialled directly from a drawing.

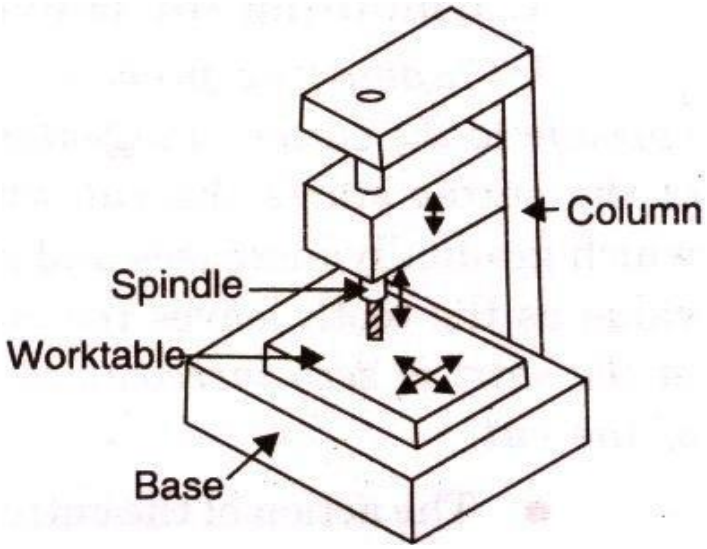

Fig.4.3 Jig Boring or precesion boring machine

- These machines are also operated by numerical control. By putting part design on tape, accurate repetition is ensured, jigs and fixtures are eliminated, and precision boring becomes practical for small-lot manufacturing.
- To prevent the influence of ambient temperature changes on machining, jig boring machines should be installed in special environmental enclosures with temperature maintained at a level of 20°C.
- Jig-borers are used as coordinate measuring machines for inspection and precision layout operations.

4.4 Size or Specification of Boring Machine

- The size of boring machine is given by the diameter of the spindle (75 mm to 350 mm).
- In case of vertical boring machines, the dimensions of column height and table size (diameter), 11200 mm to 3600 mm, also have to be given.

4.5 Reference

1) R.K.Rajput,"Manufacturing Technology",Lakshmi publication (P) Ltd.
2) B.S.Raghuvanshi, "Workshop Technology (Vol.II)",Dhanpat Rai & Co.