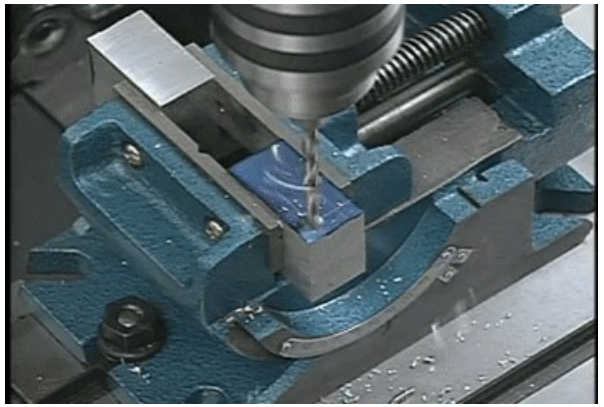
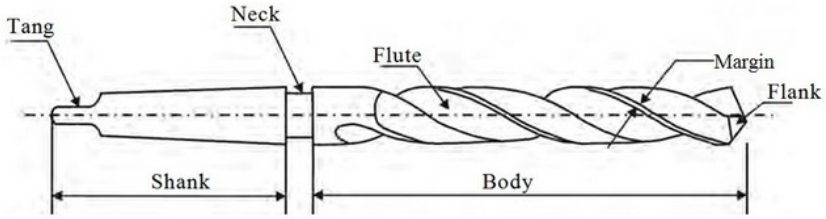
DRILLING



- Drilling is the operation of making primarily a hole in a workpiece using a drill bit.
- The stationary work is held in a fixture and rotating tool is fed vertically to make a circular hole.
- The cutting tool used for making holes in solid material is called the **twist drill**.



- It basically consists of two parts; the body consisting of the cutting edges and the shank which is used for holding purpose. This has two cutting edges and two opposite spiral **flutes** cut into its surface.

- These flutes serve to provide clearance to the chips produced at the cutting edges. They also allow the cutting fluid to reach the cutting edges.

DRILLING MACHINES

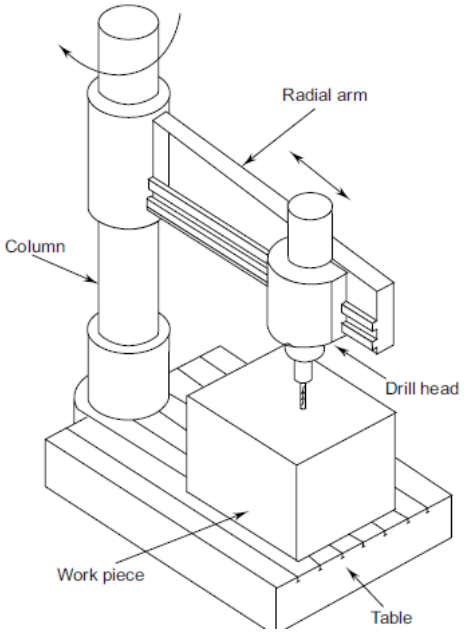
RADIAL DRILLING MACHINE

GANG DRILLING MACHINE

Radial Drilling Machine

- The drill head can move along the radial arm to any position while the radial arm itself can rotate on the column, thus reaching any position in the radial range of the machine.

- They are more convenient to be used for large work pieces, which cannot be moved easily because of their weight, such that the drill head itself will be moved to the actual location on the work piece, before carrying the drilling operation.



Gang Drilling Machine

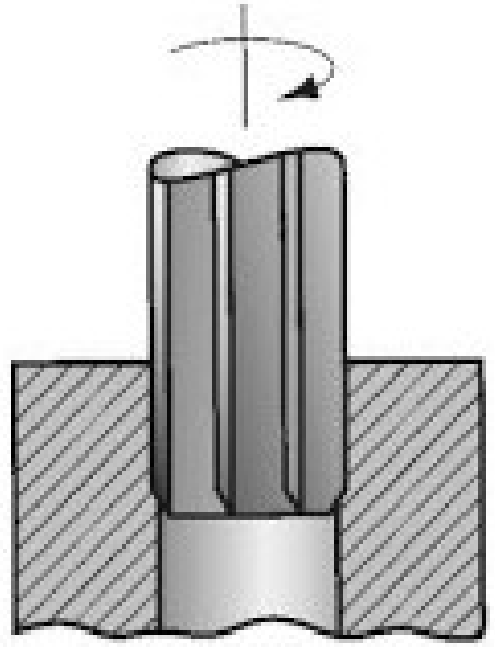
- Gang drilling machines have a number of spindles (often equal to four) laid out in parallel. Each of the spindles can have different drills or other hole making operation tools fixed in sequence.

- These are used for volume production with the work pieces located in a jig.

Types of Drilling Machines

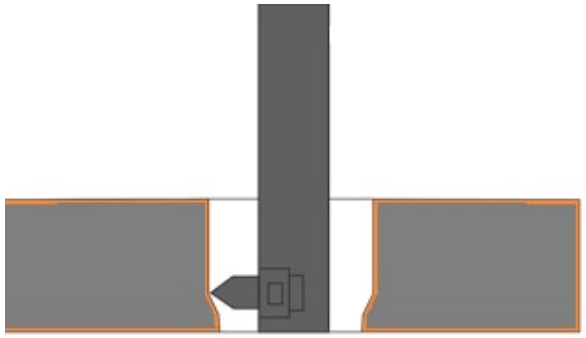
Reaming

- Reaming is the operation of finishing a previously drilled hole to bring it to a more exact size and to improve the surface finish of the hole.
- The operation is carried out using a multi tooth revolving tool called reamer which consists of a set of parallel straight or helical cutting edges along the length of the cylindrical body.
- While reaming, the speed of the spindle is reduced to nearly half of that of drilling.



Types of Drilling Machines

Boring

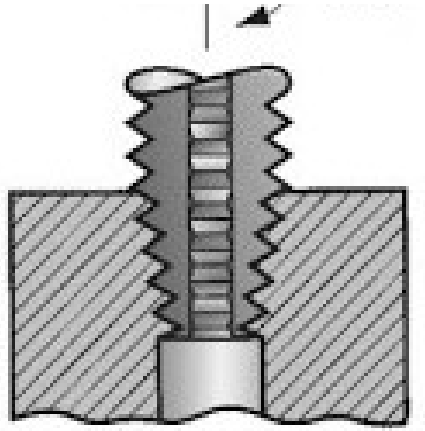


- Boring is an operation of enlarging a hole.
- The single point cutting tool used for boring operations is mounted in the boring bar of suitable diameter commensurate with the diameter to be bored.

- **Sizing**: Boring brings the hole to the proper size and finish. A drill or reamer can only be used if the desired size is **"standard"**. The boring tool can work to any diameter and it will give the required finish by adjusting speed and feed.
- In addition to enlargement, boring operation corrects the hole loctation and out of roundness, if any, as the tool can be adjusted to remove more metal from one side of the hole than the other.

Types of Drilling Machines

Tapping

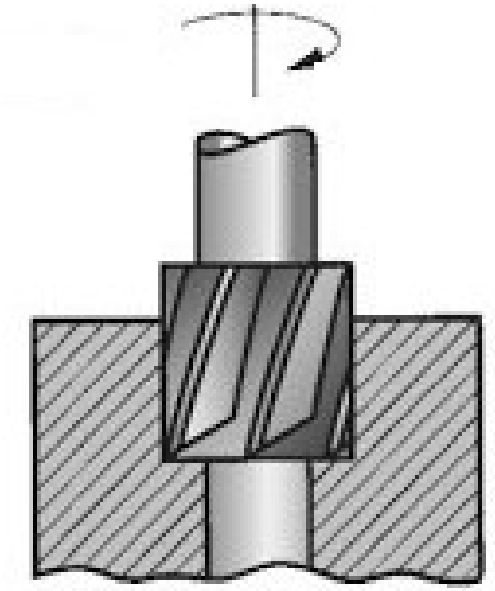


- A faster way of producing internal threads in a previously drilled hole is by the use of tapping operation.
- A tap is a multi fluted cutting tool with cutting edges on each blade resembling the shape of threads to be cut. A tap of the required size is to be used after carrying out the pre-drilling operations. The tapping drill sizes for ISO metric threads are usually available in standard tables.

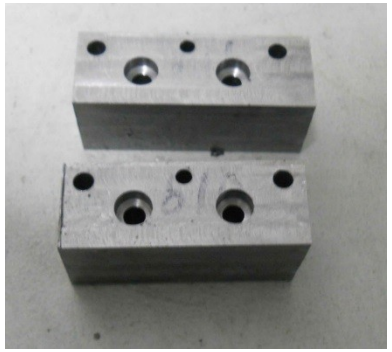
- While tapping, care has to be taken to see that the tap is started in proper alignment with the hole.
- Sometimes it may become necessary to reverse the tap slightly to break the chips and clear the chip space and then continue in the normal way.

Types of Drilling Machines

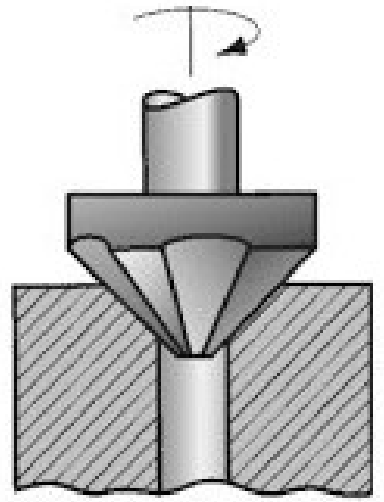
Counter boring



- In the counter boring operation, the hole is enlarged with a flat bottom to provide proper seating for the bolt head or a nut, which will be flush from the outer surface.
- The counter boring can be done by a tool with the cutting edges present along the side as well as the end, while a pilot portion is present for the tool to enter the already machined hole to provide the concentricity with the hole.
- The pilot should fit snugly in the hole and should have sufficient clearance facilitating the free movement of the tool.
- Generally the speeds and feeds used for counter boring are slightly smaller than those used for the corresponding drilling operation.



Types of Drilling Machines



Counter sinking

- Counter sinking is also similar to counter boring; except that the additional machining done on a hole is conical to accommodate the counter sunk machine screw head.

- Again the depth of counter sinking should be large enough to accommodate the screw head fully flush with the surface.