

Drilling

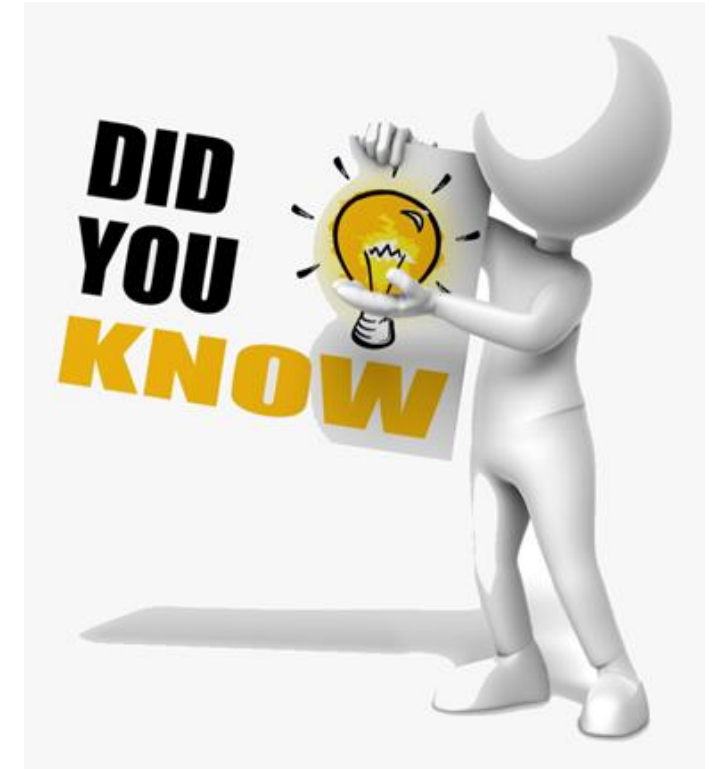
Definition of Drilling

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

- Understand the process of Drilling.
- Parts of Drilling machines.
- Application of Drilling.

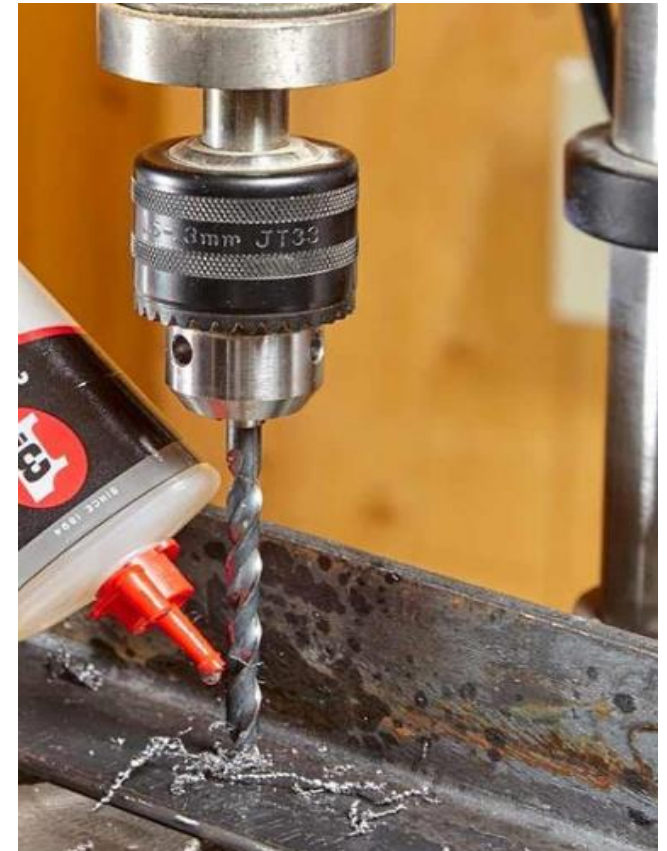
Did you Know?

- Drilling is a cutting process that uses a drill bit to cut a hole of circular cross-section in solid materials. The drill bit is usually a rotary cutting tool, often multi-point.



Introduction to Drilling

- The drill bit is usually a rotary and multipoint cutting tool made up of high speed steel.
- The bit is pressed against the work-piece and rotated at rates from hundreds to thousands of revolutions per minute.
- This forces the cutting edge against the work-piece, cutting off chips (swarf) from the hole as it is drilled.



Different types of Drilling

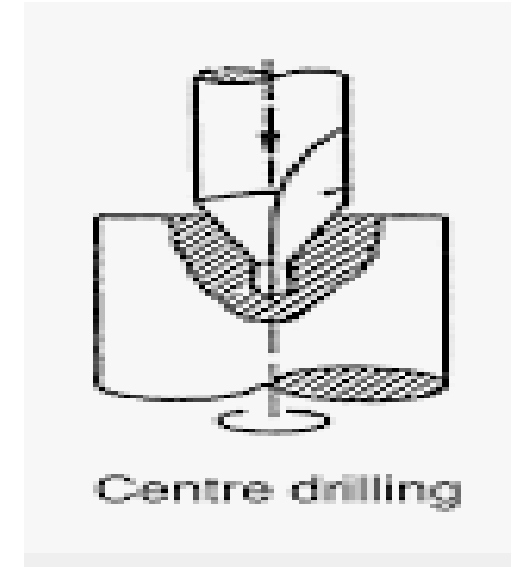
1. Spot drilling :

- The purpose of spot drilling is to drill a hole that will act as a guide for drilling the final hole.
- The hole is only drilled part way into the workpiece because it is only used to guide the beginning of the next drilling process.



2. Centre drilling :

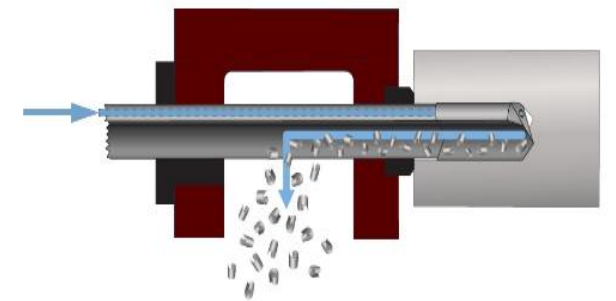
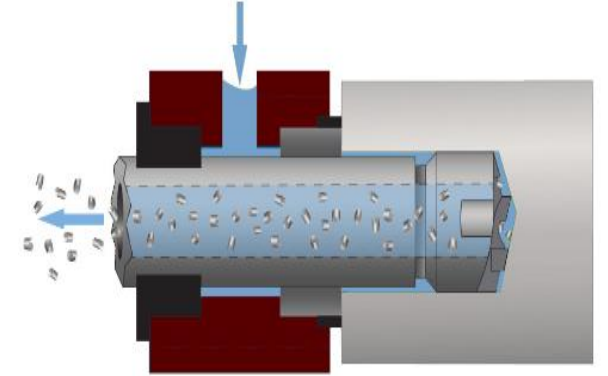
- Centre drill is a two-fluted tool consisting of a twist drill with a 60° countersink; used to drill countersink center holes in a workpiece.



Different types of Drilling

3. Deep hole drilling :

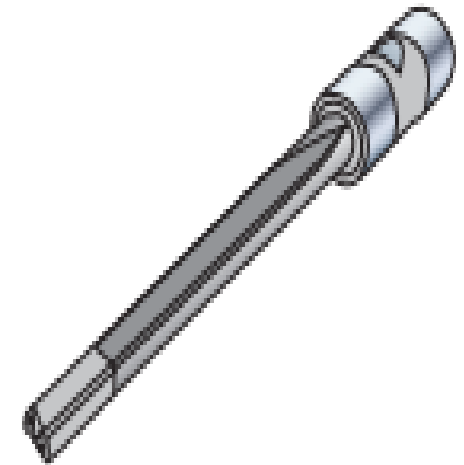
- Deep hole drilling is defined as drilling a hole of depth greater than ten times the diameter of the hole.
- These types of holes require special equipment to maintain the straightness and tolerances.
- Other considerations are roundness and surface finish.
- Deep hole drilling is generally achievable with a few tooling methods, usually gun drilling or BTA drilling.



Different types of Drilling

4. Gun drilling :

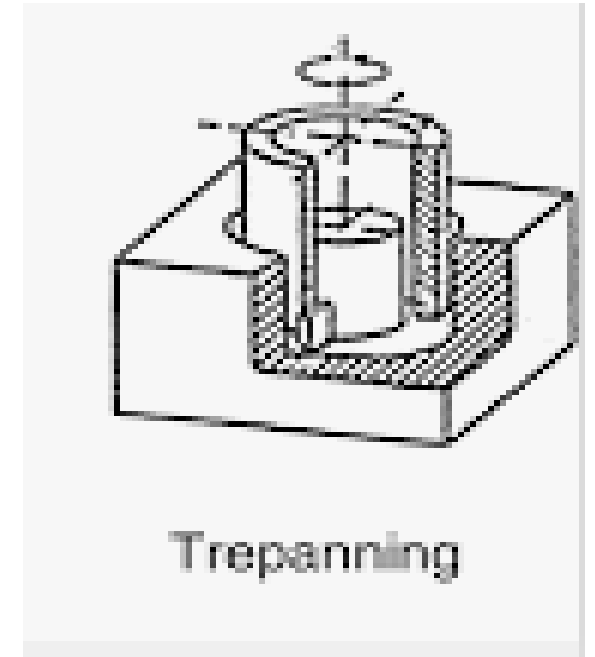
- Gun drilling was originally developed to drill out gun barrels and is used commonly for drilling smaller diameter deep holes.
- The depth-to-diameter ratio can be even greater than 300:1. The key feature of gun drilling is that the bits are self-centering; this is what allows for such deep accurate holes.
- Gun drilling is usually done at high speeds and low feed rates.



Different types of Drilling

5. Trepanning :

- Trepanning is commonly used for creating larger diameter holes (up to 915 mm (36.0 in)) where a standard drill bit is not feasible or economical.
- Trepanning removes the desired diameter by cutting out a solid disk similar to the workings of a drafting compass.
- Trepanning can also be useful to make grooves for inserting seals, such as O-rings.



Different types of Drilling

6. Microdrilling :

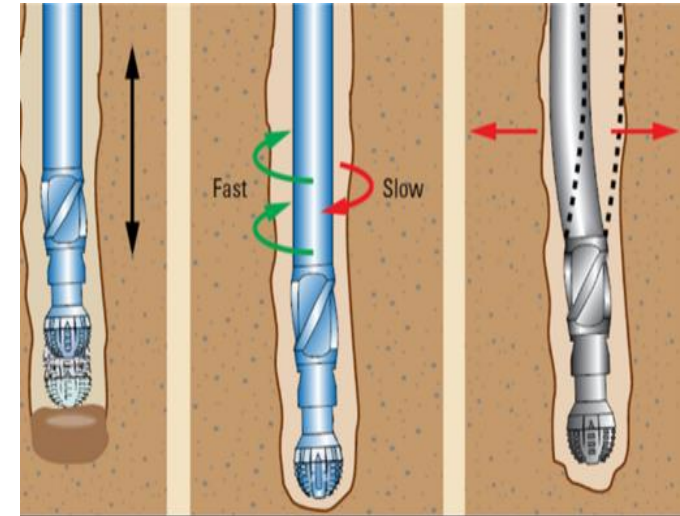
- Microdrilling refers to the drilling of holes less than 0.5 mm (0.020 in). Drilling of holes at this small diameter presents greater problems since coolant fed drills cannot be used and high spindle speeds are required.
- High spindle speeds that exceed 10,000 RPM also require the use of balanced tool holders.



Different types of Drilling

7. Vibration drilling :

- The main principle consists in generating axial vibrations or oscillations in addition to the feed movement of the drill so that the chips break up and are then easily removed from the cutting zone.
- There are two main technologies of vibration drilling: self-maintained vibration systems and forced vibration systems.



Different types of Drilling

8. Circle interpolating :

- Orbital drilling is based on rotating a cutting tool around its own axis and simultaneously about a centre axis which is off-set from the axis of the cutting tool.
- The cutting tool can then be moved simultaneously in an axial direction to drill or machine a hole – and/or combined with an arbitrary sideward motion to machine an opening or cavity.



Application of Drilling

- Drilling is used in metal as well as wood workshop.
- For domestic use also we use drilling like making hole in concrete to fix any object.

From the above Topic we learnt about :

- The types of Drilling
- Uses of drilling

Check Your Understanding

1. What is the name of the cutting tool used for drilling ?
 - A. Drill Chuck
 - B. Drill bit
 - C. Spindle
 - D. Table
2. The space provided to eliminate undesirable contact between the drill and the workpiece ?
 - A. Clearance
 - B. Clearance diameter
 - C. Cutter sweep
 - D. None of the above

Check Your Understanding

3. Gun drilling was originally developed to drill out gun barrels.

- A. True
- B. False

4. There are two main technologies of vibration drilling: self-maintained vibration systems and forced vibration systems.

- A. False
- B. True

Check Your Understanding

5. Drill bit is made up of ?

- A. Mild steel
- B. High speed steel
- C. Carbon steel
- D. None

6. The purpose of spot drilling is to drill a hole that will act as a for drilling the final hole?

- A. Startor
- B. Drive
- C. Guide
- D. Depth of cut

Check Your Understanding

7. Which of the following is a type of drilling?

- A. Centre drilling
- B. Spot drilling
- C. stamping
- D. Both B and A

8. Drilling can be performed on which of the following object ?

- A. Concrete
- B. All of the given options
- C. Wood
- D. Metal

Answer Key

1. B. Drill bit
2. A. Clearance
3. A. True
4. B. True
5. B. High speed steel
6. C. Guide
7. D. Both B and A
8. B. All of the given options