

3.2EQUIPMENT FOR DRILLING AND BLASTING

**3.2.1Percussion Drilling**

**Rotary drilling:** (a) Pressure drilling. (b) Abrasion drilling

- **Percussion drilling:** These can economically drill rocks of wide range of hardness. They employ a reciprocating air operated hammer which strikes rotating bit. An air or water system is used to remove stone cuttings from the drill hole. Jack hammers, drifters, feed leg drills are its examples.
- **Rotary drills:** In rotary drills the movement of the bit is due to the rotation of the drill bit.

(a) **Pressure drilling:** Drilling is provided by applying the down pressure on the bit. The pull-down pressure and the drill rotation is created by the hydraulic or electric variable speed motors. These drills are powered either by diesel engine or electric motor. The bit pressure and quantity of air are controlled as per requirement.

(b) **Abrasion drills:** Diamond core drills and shot core drills are common drills of this category. Diamond core drills are more common and popular amongst these two. Shot core drills are used for large dia drilling and are slow in drilling. They are suitable for dia upto 1.8 metres and depths upto 300 metres.

**Drilling Pattern:** Selection of drilling pattern varies with type and size of drill's used, depth of hole, kind of rock, quantity.

**Pneumatic drills:** Rock drills may be either percussion type or rotary types. The movement of the bit in percussion drill is mainly due to reciprocating action of a piston inside the cylinder. Percussion tools may be plugging drills, sinkers, drifters or wagon drills. These drills provide a hammering action together with rotational movement of the steel. The steel is tipped with chisel or cross bit to make holes in rock, concrete and other hard surfaces.

**1. Hydraulic drills:** Hydraulic drilling is becoming more popular than the pneumatic drilling. A hydraulic drifter is more efficient because of its higher operating pressure ranging between 100 to 250 bar and a 50 to 100% higher penetration rate than a pneumatic drifter. The use of hydraulics allows greater saving in energy costs. It consumes nearly one third of the energy consumed in pneumatic drilling.

**2. Diamond Drills:** These are used mainly for exploration work and in foundation treatment. These also play an important role in geological investigations, in mining surveys and in foundation design for bridges, dams, factories and tall buildings by enabling extraction of cores from the interior of the earth. These are used for very large depths upto 4000 metres, but restricts maximum diameter of the core upto about 15cm due to high cost of large dia bits.

#### **Blasting equipment's:**

**1. Dipper:** Used to drill hole to required depth.

**2. Jumper:** Used to make blast hole & more effective in boring a nearly vertical hole.

**3. Priming needle:** Used to maintain the hole while tamping is done & is in the form of a thin copper rod with a loop at one end.

**4. Scrapping spoon:** Used to remove dust of crushed stone from blast hole.

**5. Tamping bar:** Used to tamp the material while refilling a blast hole.

#### **Blasting Pattern:**

1. The blast holes are made and cleaned by using the tools.
2. The charge of explosive placed at the bottom.
3. Remaining portion is filled with clay and tamped.

4. Fuse is inserted, kept projecting 15-20 cm above the rock surface.
5. Thereafter free end of fuse is fired by the detonator.

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