DRIVES : SHAFTS, ADITS (Tunnels)

Mine drivage and tunneling operations are the toughest task as they have to encounter new sets of conditions concerning ground, water and gases every moment

These are obviously start with openings (excavations).

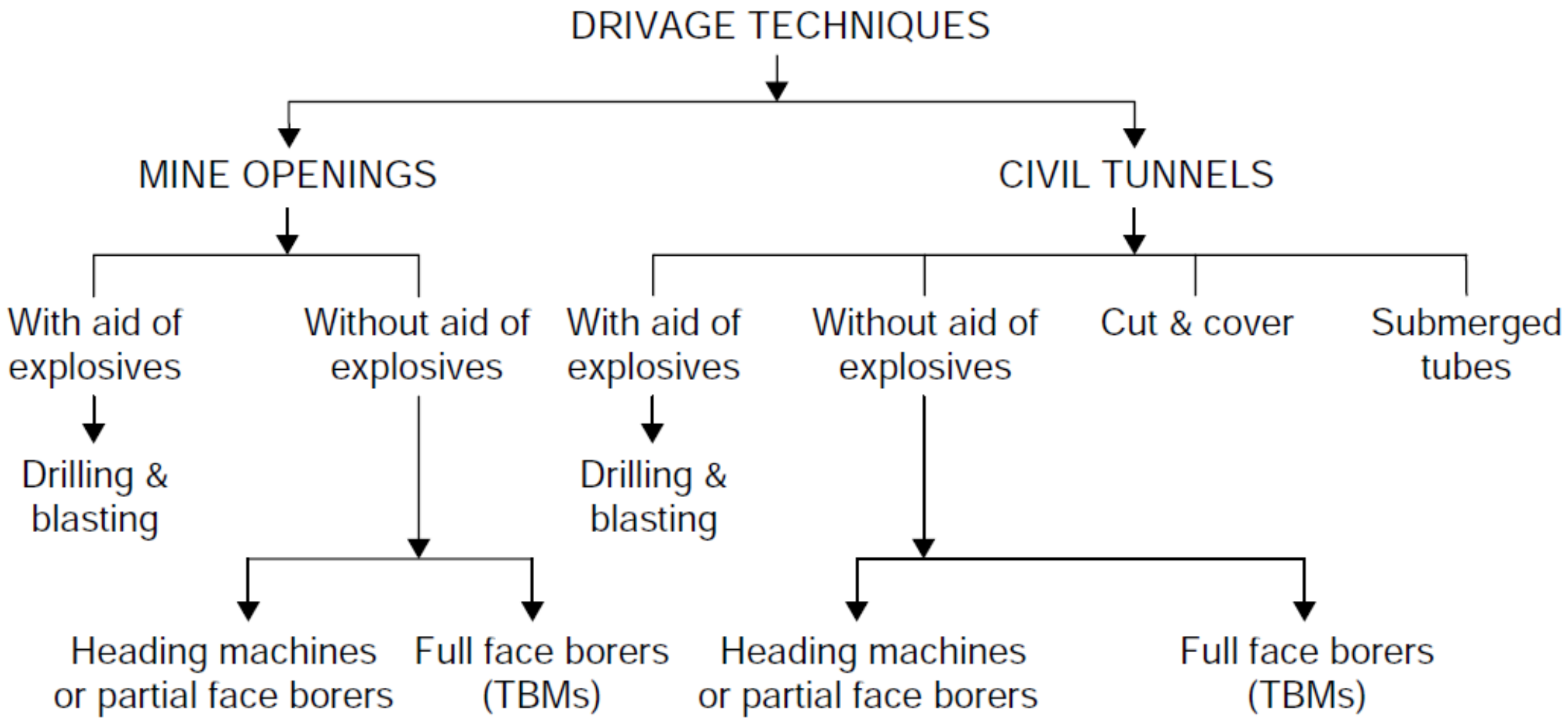
Such openings are of different shapes and sizes with their inclination either almost horizontal or inclined.

In mining these openings are blind ended and have been designated by different names based on their purpose, utility or orientation with respect to a deposit for whose exploitation purpose they are driven or constructed.

Adits, inclines, declines/ramps/slopes, crosscuts, levels, sub-levels etc. come under this category.

But the openings of the similar configuration having both the ends exposed to atmosphere are known as tunnels. Tunnels are driven to provide passage to rails, roads, navigation, pedestrian etc. and also for conveyance of water and serve as sewerage.

An account of available techniques to drive openings for mining and civil engineering works.



Some of the processes for tunneling (adit) /shaft construction:

- Probe drilling (when needed)
- Grouting (when needed)
- Excavation (or blasting)
- Supporting
- Transportation of muck
- Lining or coating/sealing
- Draining
- Ventilation

Main opening(workings)

The main shaft, internal shafts, inclined shaft, slope shaft, adits, crosscut always belong to the main opening.

All the working driven horizontally underground includes: Adits, crosscuts, drifts and cross entries

All horizontal workings should have a little gradient, 4-8 degrees in the moving direction of haulage ores for proper water flowing and convenient carriage.

Adit: An adit is one whose collar is on the ground surface and driven horizontally to open up orebody. Adit is used for miners passage, load haulage, drainage and ventilation and hence it's life must be long.

Crosscut: it is the horizontal opening driven at the right angle or any slope direction across the strike of orebody to reach the orebody from shaft or slope shaft.

Drift: it is horizontal opening driven along the strike of orebody. This can be a haulage opening to develop a stope.

- Cross-entry: horizontal opening driven across the hanging wall and bottom of the orebody. This is used for geological exploration, drainage, ventilation and haulage.

- Shaft: vertically driven passage for opening up.

  Main shaft is used for hauling of ore materials and

  Auxiliary shaft is used for barren and materials, ventilation and miners' passage.

Winze: A short shaft with its' collar is on ground and is sink to reach the orebody to explore.

Raise: A inclined shaft with its' collar is in underground and is driven upward. Also driven for ventilation and miners' passage.

Slope shaft: Inclined shaft driven downward mainly to hoist loads

Underground rooms: Underground openings driven for installation of machines, storage of accessories and equipments etc. Also used for waiting purposes, first-aid purposes etc.

Shafts are required for the following purposes:

- Mining the mineral deposits
- Temporary storage and treatment of sewage
- Bridge and other deep foundations
- Hydraulic lift pits
- Wells

In conjunction with tunneling system or network for the purpose of lifts, escalators, stair and ladder-ways, ventilation, conveyance of liquid, carrying pipes and cable in river crossings, drainage and pumping particularly from sub-aqueous tunnels.

Decision with regard to size, shape and its positioning are taken based on the purpose a shaft intends to serve.

Circular shafts are preferred in almost all situations due to their stability characteristics.

When strata are competent one, such as that in most of the metal mines, rectangular or elliptical shafts give the advantage of proper use of their cross sectional areas.

Location of shaft to sink:
Several points to be considered, they are:

1. *Positioning w.r.t. to deposit's geometry*
2. *Positioning w.r.t. to surface topography*
3. *Positioning w.r.t. to geological disturbances, water table and ground conditions*