Underground Mining of Metalliferous Deposits
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Lecture 12
Access to Mineral Deposits Adit – I

ACCESS TO MINERAL DEPOSITS

ACCESS

Access to mineral deposit means the construction of entry to reach up to the point at which the ore body is situated.

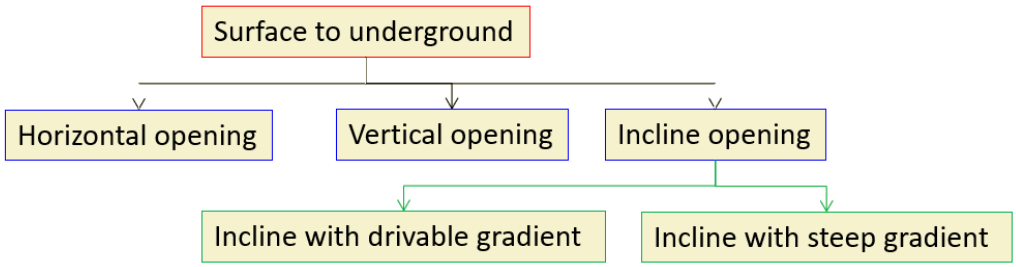
For an underground mining method, it is the connection openings from the surface to the underground point at which the mineral is situated. Thus access are made of different sizes, shapes, inclinations etc.

All the access are basically constructed for

- the ingress and egress of man and materials.
- Providing the fresh air for ventilation
- Allow the movement of the machines
- Accommodate the required fittings like air pipes, water pipes, electrical fittings etc

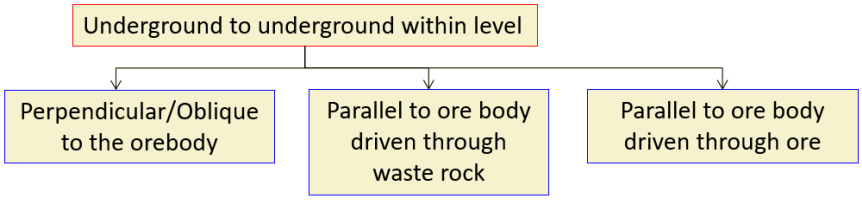
Access can be classified as –

- Access between surface to underground
- Access between underground to underground on a level
- Access between underground to underground between levels



These can also be classified as

1)



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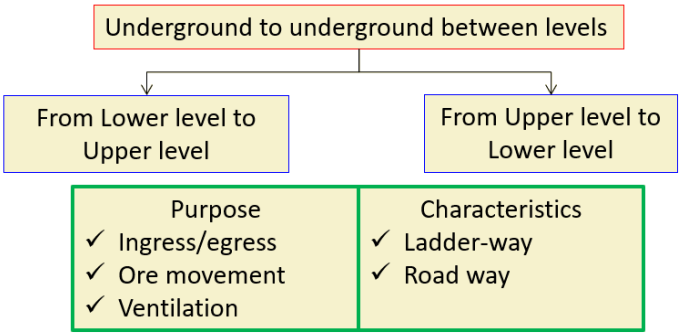
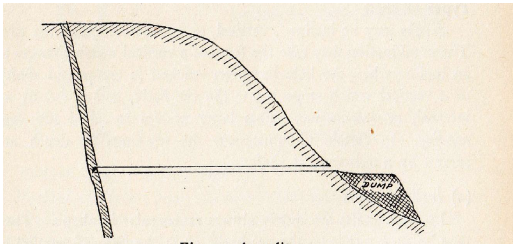


HORIZONTAL ACCESS TO THE DEPOSIT

ADIT – horizontal access

- Adit is a horizontal or near horizontal access between surface to underground.
- Adit is similar to tunnel.
- It is applicable only if there is a hilly terrain exists.



Size and shape

Size of an adit depends on the dimension of the largest equipment which is allowed to move. In general, it is preferred to keep a gentle inclination of the adit towards its mouth for facilitating the natural drainage of water, however it is not mandatory.

Shape of the adit can be anything – Rectangular, circular, 'D'-shape, horse-shoe shape etc. The choice of shape of the adit largely depends on –

- ✔ Insitu stress condition
- ✔ Stability of the opening
- ✔ Space utilization pattern etc.

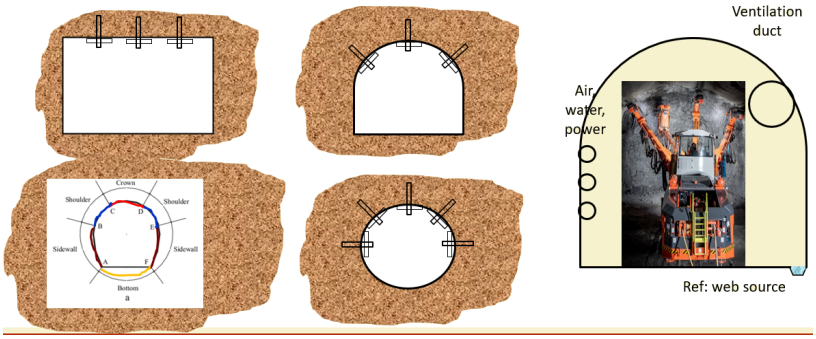
Figure: From left- "D", "Rectangular", "elliptical" shape of adit

EXCAVATION TECHNIQUES – HORIZONTAL OPENING

- **Size** As per the requirement, Highest size of plying machine, space requirements.
- **Shape** Rectangular, Circular, 'D' shape, Horse-shoe shape.

Influencing factors

1. Strength of rockmass: Weak rock Circular/'D'/Horse-shoe
2. Cost and method of excavation: Less cost in drilling Circular
3. Maintenance cost: Circular is more stable less maintenance cost
4. Ventilation requirement: Less resistance Circular
5. Capacity requirement: More capacity Rectangular
6. Depth of Opening: High in situ rock pressure (more stable) 'D' or Horse-shoe
7. Space requirement: Better Rectangular



Location

Adit is adopted as access –

- ✔ only when the terrain is hilly and posses an overlying ore body.
- ✔ Often, is kept in long term to act as the ventilation intake/return. If the location is considered for winning the ore material, minimum transportation distance point is considered. This minimum distance concept is hold true for both underground ore draw points as well as surface destination point.
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Method of Construction

Adit construction is basically horizontal rock excavation technique.
Horizontal excavation technique can be –
(i) Discrete excavation
(ii) Continuous excavation
(iii) Semi-continuous excavation

The main unit operations involves are –
Excavation operations

- ✔ Drilling, Blasting, Cutting, Large diameter drilling, Mucking, Transportation

Auxiliary operations

- ✔ Roof Scaling, Roof support, Extension of lightings, Extension of ducts, Extension of other installations, Extension of drainage