

Underground Mining of Metalliferous Deposits
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Lecture 13
Adit - II

EXCAVATION TECHNIQUES – HORIZONTAL OPENING

ADIT:

If we are considering the method of extraction of the adit, adit can be constructed either using a discrete method or a continuous excavation method or a semi-continuous excavation method.

Discrete method of excavations

- 1) Drilling
- 2) Blasting
- 3) Loading
- 4) Transportation

In the discrete method, we have to excavate in different unit operations. These operations are disjointed so that is why it is called discrete operation. One kind of this operations may be drilling, blasting or we can have cutting also, we can have large diameter drilling and the material can be taken out by mucking and then the material can be transferred.

These are the main excavation operations carried out and the auxiliary operations required in this excavation of the adit or we can go for roof scaling, so after blasting we have to scale the roof so that any loose material cannot drop on the head of the mining personnel. We have to provide the roof support, so that it will not collapse. We can extend the lighting fittings. ventilation ducts can be extended, which are providing the fresh air in the operating phase. We have to extend the other installations like electrical installations, air pipes extension of air pipes etc. and we have to extend the drainage facilities so that the water, percolated water coming out from the underground or any water is used for operation that can be drained out from the phase

Continuous method of excavations

- 1) Continuous mechanised excavation
- 2) Simultaneous Loading transportation

In continuous method of excavation, the continuous mechanized excavators are used which continuously takes out the material and simultaneously the excavated material is also transported using a continuous transporting system.

Semi-Continuous method of excavations

- 1) Continuous mechanised excavation + Loading + Transportation
- 2) Drilling + Blasting + sizing + continuous Loading transportation

Semi-continuous is the combination of discrete and continuous where either we are continuously excavating, but we are adopting the discrete loading and transportation system or we are using a discrete excavation system where we are continuously transporting the material with a continuous transporting system that is semi-continuous system, so basically, it is adopting the combination of the continuous and discontinuous method.

If you compare these two, continuous method of excavation the material is continuously excavated, so that is why the performance is very high and this is very cheap procedure also. But the problem is that the momentum, if we stop one operation, we have to stop the other one also.

Discrete method :

- Drilling Jumbo drill, handheld drill
- Blasting Wedge cut, burn cut
- Mucking LHD, SDL, Cavo loader
- Transportation Mine car, Haulage, Locomotive, Shuttle car, Low Profile Dump Truck

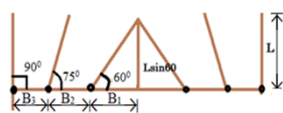
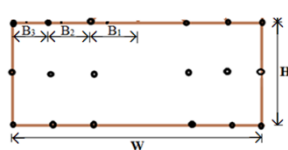


fig. plan view



Sectional view

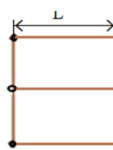


fig. side view

If we are considering the discrete method, we have to carry out drilling and the possible machineries are jumbo drill or handheld drill. Jumbo drill is the machine drill where we can use multiple jumbo boom. The current technology 8-boom jumbos are also available. There 8 holes can be drilled simultaneously. Blasting pattern adopted can be wedge cut or burn cut, mostly these two are the popular design of blasting.

The loading can be carried out either by LHD, load, haul, dump or a side discharge loader or a Cavo loader, this type of loaders can be used for taking the muck and transportation can be carried out either using a mine car or using the haulage system. We can use locomotive also. We can use shuttle cars also or we can use low profile dump trucks if it permits the dimension.

Continuous method

- Excavation Road header, TBM
- Transportation belt Conveyor, Chain Conveyor, slurry pipeline
- In general TBM is not preferred for a short length. TBM has long setting and dismantling time apart from the price and setting both are costly.