**Underground Mining of Metalliferous Deposits**

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**Lecture No. 22**
**Raising and Winzing - 1**

## TERMINOLOGY

**Raise** and **Winze**:

Raise is a vertical or near vertical opening driven from the lower level to upper level mostly through the orebody.

Winze is a vertical or near vertical opening driven from the upper level to lower level mostly through the orebody.

## RAISING METHOD IN METAL MINES

Raising is a regular operation in the development of metalliferous mines.

The methods practised for raising are –

1) Open raising by drilling, blasting, mucking.
2) Two or three compartment raising.
3) Raising with Jora raise lift.
4) Raising by long hole drilling.
5) Raising with Alimak Raise Climber.
6) Raise borers - latest achievement.
7) Drop raising method.

## OPEN RAISING

This is a simple and most common method adopted in majority of the metal mines.

This is one of the manual raising method.

The unit operations followed in the construction of a manual raise are:

drilling and blasting

mucking and transportation

erection / construction of a manual platform or also known as scaffold

The workers stand on a platform or scaffold made of timber planks supported in stulls or iron bars fitted into the footwall. The clamps used for supporting the platform are made in standard lengths out of old rails.

**Drilling & Blasting:**

Jackhammers / stoppers are used for drilling either wedge pattern or burn cut pattern holes of 32 mm diameter and 1.5m deep. Before each round is blasted the platform is dismantled. Immediately after blasting, compressed air is forced to the working faces to remove the fumes of blasting. In longer raises sometimes a blower with a flexible air duct is installed. Access to the faces is by a ladder way.

**Mucking & Transportation:**

The muck (ore if the raise in driven within the orebody, or a waste rock if the raise is placed in foot-wall rock) based of ore or waste rock are trammed by a mine car to the nearest grizzly.

**Construction of a scaffold:**

The stoppers can reach a height of 2m and it facilitates the construction of scaffold after every two rounds of drilling and blasting. The scaffold is advanced regularly so as to maintain necessary head room at the face. The broken rock rolls down by gravity. The scaffold is constructed by fixing steel bars into the holes drilled in the side walls.

**OPEN RAISING | Limitations**

A simple but a very tedious method and has a limitation of comfortable raising operations upto 15m. Careful checking and dressing down of the loose rock by skilled workers before allowing workers to go up is essential.

**Disadvantages**

Lack of ventilation.

Damage to pipes and ladders etc. from the blasting.

Loss of efficiency when the raises go higher as the workers have to frequently go up and down the ladders.

Platform holes require careful alignment.

## TWO OR THREE COMPARTMENT RAISING

This is also one of the manual raising method.

This method of raising is adopted for vertical or very steep raises only.

After initial excavation from the lower: level in the direction of the raise for 2 m the raise is divided into 2 or 3 compartments and the method of further raising is similar to conventional driving method.

This method of raising consumes a large quantity of timber and has the disadvantage of sluggish ventilation.

**Raising with 2-compartment method**

Raising with shallow holes is started by cutting out a recess at the bottom level, from which subsequent operations are performed. Work is done from stage 1 sited 1.8 - 2.0 m from the face.

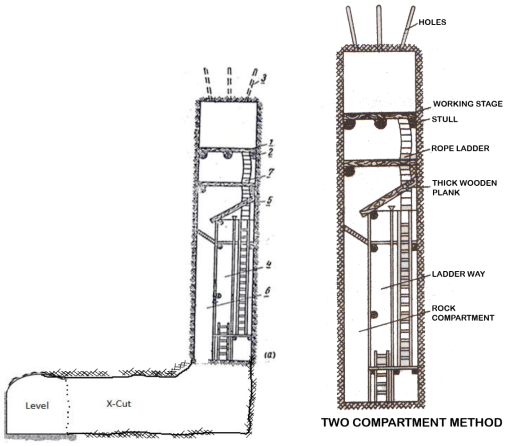


Figure 1. Two compartment method

After firing a round of holes the stage is advanced towards the face.

The working stage rests on two or three stulls (2) temporarily set into holes made in the walls of the raise.

It consists of wooden planks laid over the stulls.

Holes (3) are drilled from the stage by means of stopers.

After the drilling is completed the drilling equipment and the tools are removed from the face and the holes are charged with explosives.

Before firing, the ladder way (4) of the raise is covered by inclined ·thick wooden planks (5) which guide the broken rock away into rock compartment (6).

After blasting, the face is cleared of smoke and the miners inspect it and dress down loose pieces of rock, while standing under protection of the stage.

Then the timber sets are erected and the working stage is transferred closer to the face.

As the face advances, the ladder compartment is extended and equipped with ladders.

Rope ladder (7) connects the upper segment with the working stage.

The raising cycle comprises the following operations:

inspection and dressing down of loose rocks,

timbering extending the ladder way,

construction of the working stage and drilling,

removing the working stage,

charging and firing of the blast holes, and

clearing the smoke.

One of the drawbacks of the method of raising by firing shallow holes is the need for performing a number of subsidiary tasks (like building the stages and ladder ways, their extension, and repairs, etc.).