Underground Mining of Metalliferous Deposits

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Lecture 05

Terminology – 1

TERMINOLOGY

ROCK

A rock is any naturally occurring solid mass or aggregate of mineral matter. The rock is formed at once through different geological activities. Rocks are usually grouped into three main groups: igneous, metamorphic and sedimentary. The material which is forming the earth crust is called "Rockmass"/ "Rock mass".

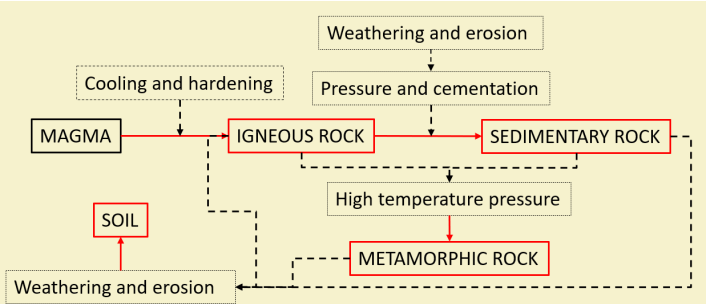


Figure1. General formation of rockmass

Minerals

Mineral is a solid chemical compound with a fairly well-defined chemical composition and a specific crystal structure, that occurs naturally in pure form.

Ore

Ore is natural rock that contains one or more valuable minerals, typically containing metals, or economic material that can be mined, treated and sold at a profit.

Mineral Resource

Mineral resources are the rockmass containing one or more minerals potentially valuable, and for which reasonable prospects exist for eventual economic extraction.

Mineral/Ore Reserve/Ore Deposit

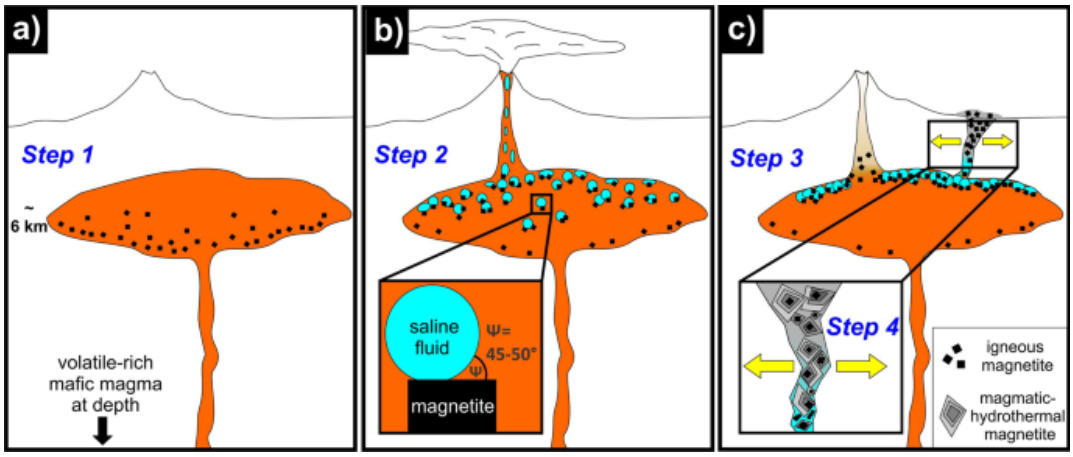
Mineral/Ore reserves are the mineral resource that are valuable and legally, economically, and technically feasible to extract.

Ore deposits is basically the way reserve is placed in the earth crust. Massive, vein, bedded, columnar, pipe etc are different available deposit types.

Massive Deposit

Magmatic segregation: high density material deposited or segregated at the bottom of the magma and developed to a massive deposit.

Massive sedimentation: Heavily deposited on sedimentation and covered under pressure. Later the other parts are leached out or eroded.

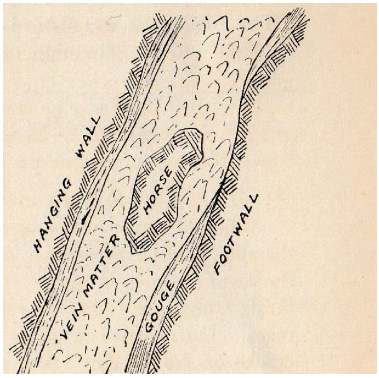


Vein Deposit

Hydrothermal deposition: are accumulations of valuable minerals which formed from hot waters circulating in Earth's crust through fractures. They eventually create rich – metallic fluids concentrated in a selected volume of rock, which gradually become supersaturated and then precipitated as ore minerals. Contact metasomatic deposit is formed by high-temperature magmatic emanations along an igneous contact.

Hanging wall and Footwall

The wall rock overlying a vein or bed of ore is called Hanging wall. The rock stratum underlying a vein or bed of ore is called **Footwall**. Or in other words, the vein/orebody is resting on Footwall and Hanging wall is resting on vein. This involves that the extraction of vein will lead the upper-wall hanging and has the risk to fall down.



ADIT

Adit is a horizontal or near horizontal access between surface to underground. Adit is similar to tunnel. It is applicable only if a hilly terrain exists which is amicable for approach from surface.

SHAFT

The opening created to access deposits for underground mining other than adit is called shaft. So shafts can be vertical or incline. Vertical shafts are truly vertical shafts so that the movement can be made through vertical winding system. Incline shafts are driven at an angle with the horizontal. The angle is maintained consistently so that the movement can be made through either as steps for men, or as Railway track for materials. The compartment run on the railway track is called either wagon/mine car or if it is a simple single box it is called skip. If it is wagon, it is called direct haulage. For very steep incline steps are not allowed in that case only skip is used. Inclination for laying the hauling track is very important. Often platforms are made, either wooden or concrete for the smooth hauling. For the deep incline, where the skips are used as man winding, utmost care should be taken.

Decline shafts are driven at an angle with the horizontal. This is a zig-zag path. The angle is maintained as the plyable angle and preferably 1 in 10. However, some cases it may increased to 1 in 7 also which are sustained by the special equipment. It is similar to the roads of hilly terrain, where pliable slope is maintained in a zigzag manner to allow the movement of the machines