

PROSPECTING AND EXPLORATION APPROACH TO FIND OUT THE UNDERGROUND MINING EXTENSION

Prof.(Dr.) Arvind Dewangan, Professor & HoD- Civil Engineering Dept., Model Institute of Engineering & Technology, Jammu (J& K)

Study of Ingaldhal Copper Deposit shows the Dissemination and vienlet type of mine realization of hydrothermal origin found mainly in intrusive porphyries porphyry copper deposits. Precambrian greenstone schist belt express the stratigraphic guide in this Sulfur belt Copper is found to be enriched in Ingaldhal formation of Chitradurga group. Limonitic capping with traces of copper shows the Lithological guide. The main object of this work to find out in which direction, must extend to the exploration , using underground geological mapping, Sampling methods and estimation of Ore reserve. An area of former copper production where the presence of mineralization has already been established affords the best prospectus of finding additional reserves in either the lateral or the vertical extension of the known zones of mineralization. Therefore Sampling methods and Estimation of Ore reserve method and study of Lithological dip direction of strata are best approach to find out the suitable direction to extend the underground mining.

Keywords: 1. Ingaldhal Copper Deposit 2. Lithology 3.Mineralization 4. Copper

Sub Area 2 : Mining Geology

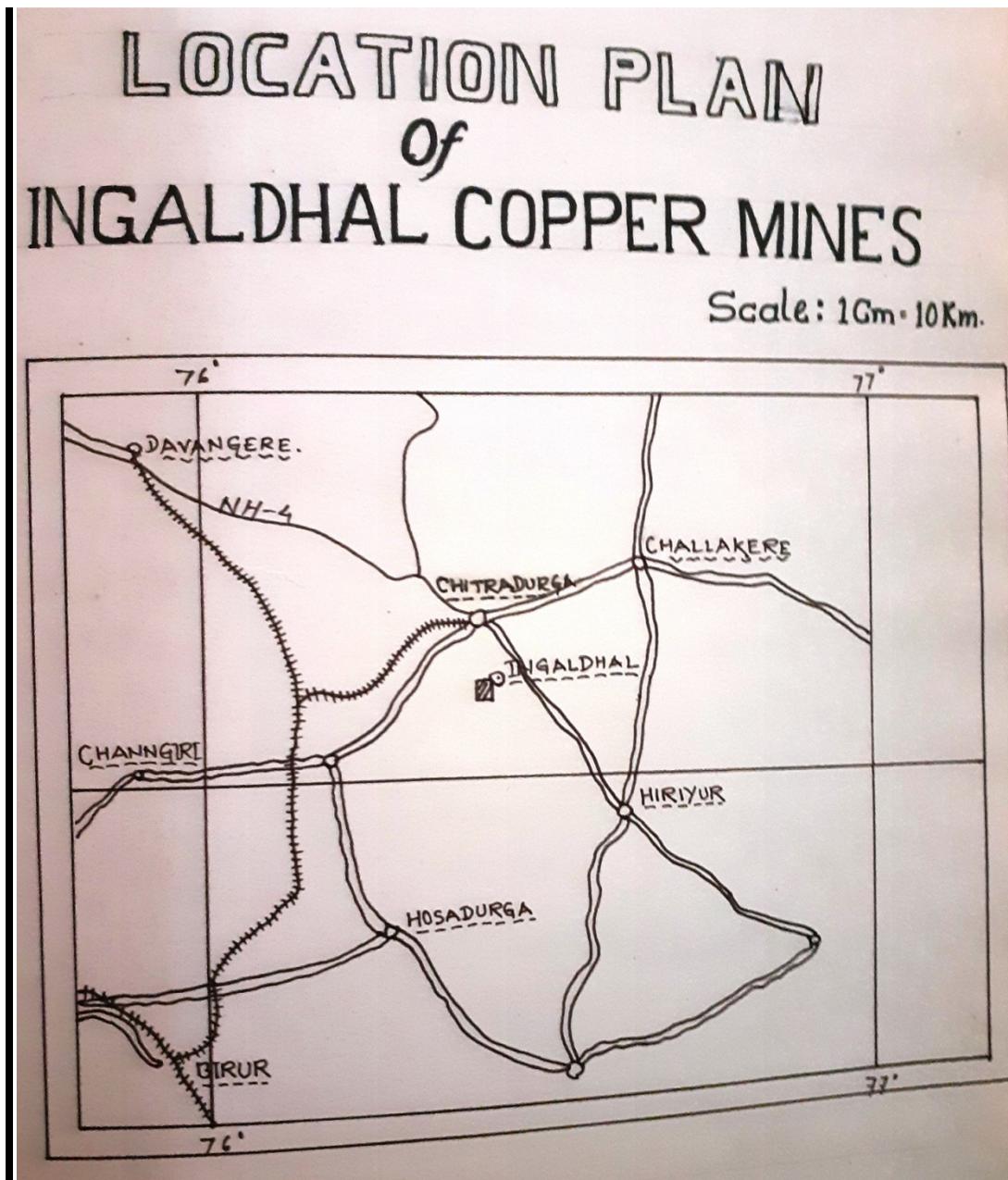
Broad Area : 3. Civil Engineering

INTRODUCTION

Numerous strategies are used within the search for a mineral deposit, an activity known as prospecting. once a discovery has been made, the property containing a deposit, known as the prospect, is explored to determine some of the extra vital characteristics of the deposit. among these are its size, shape, orientation in area, and location with recognize to the surface, in addition to the mineral great and pleasant distribution and the portions of those distinct traits.

In trying to find treasured minerals, the traditional prospector relied typically on the direct statement of mineralization in outcrops, sediments, and soil. although direct observation is still broadly practiced, the current prospector additionally employs a mixture of geologic, geophysical, and geochemical gear to offer indirect warning signs for reducing the search radius. The item of present day techniques is to find anomalies—i.e., differences among what's found at a selected location and what would typically be predicted. Aerial and satellite tv for pc imagery present one method of quick examining massive land areas and of identifying mineralization that may be indicated by using variations in geologic shape or in rock, soil, and vegetation kind. In geophysical prospecting gravity, magnetic, electric, seismic, and radiometric methods are used to differentiate such rock houses as density, magnetic susceptibility, herbal remnant magnetization, electrical conductivity, dielectric permittivity, magnetic permeability, seismic wave speed, and radioactive decay. In geochemical prospecting the search for anomalies is primarily based at the systematic measurement of hint elements or chemically inspired houses. Samples of soils, lake sediments and water, glacial deposits, rocks, plants and humus, animal tissues, microorganisms, gases and air, and particulates are gathered and tested so that unusual concentrations may be diagnosed.

On the basis of such research, some of potentialities are identified. The most promising of those becomes the focal point of a field exploration program. several exploration strategies are used, relying on the sort of deposit and its proximity to the floor. while the pinnacle of a deposit intersects the floor, or outcrops, shallow trenches may be excavated with a bulldozer or backhoe. Trenching affords accurate near-surface statistics and the possibility of collecting samples of big quantity for checking out. The technique is obviously confined to the slicing depth of the device concerned. every now and then special drifts are driven which will explore a deposit, however this is a very costly and time-eating exercise. In preferred, the cause of driving such drifts is to offer drilling web sites from which a massive extent can be explored and a three-dimensional model of the capacity ore frame evolved. old shafts and drifts regularly offer a treasured and handy way of sampling existing reserves and exploring extensions. Ingaldal copper mine is situated near Bangalore-Bombay National Highway at about 6 Kms from Chitradurga town (Karnataka State). The proposal is . The latitude and longitude of the site are as follows



Typically, core holes are drilled in a extra or less ordinary sample, and the places of the holes are plotted on plan maps. so one can visualize how the deposit appears at intensity, holes are also plotted alongside a series of vertical planes called sections. The geologist then examines every phase and, on the basis of data gathered from the maps and center logs in addition to his knowledge of the structures gift, fills inside the areas mendacity between holes and among planes. This approach of constructing an ore frame is widely used in which the boundaries between ore and waste are sharp and where medium to small deposits are mined via underground techniques, however, within the case of huge deposits mined through open-pit strategies, it has largely been replaced by using the use of block models.

LITERATURE REVIEW :

Arvind Dewangan, Dr. P.K. Rhode and Dr. P.K. Shrivastava, Crimson- mattress deposits purple-bed deposits are named, glaringly so, due to their purple coloration, which is the result of oxidation of the rocks after publicity to the surroundings. There are wonderful kinds of purple-mattress deposits, volcanic and sedimentary. The volcanic range is of greater monetary significance than the sedimentary; however, in this article we will keep our recognition on the sedimentary range. Sedimentary red-mattress deposits are incredibly small, and as a end result are hardly ever mined.

FORMATION & OCCURANCE

Minerals form in all geologic environments and as a result underneath a extensive range of chemical and bodily conditions, including varying temperature and stress. The 4 most important categories of mineral formation are: (1) igneous, or magmatic, in which minerals crystallize from a melt, (2) sedimentary, in which minerals are the end result of sedimentation, a manner whose uncooked materials are debris from other rocks which have undergone weathering or erosion, (three) metamorphic, wherein new minerals shape at the price of in advance ones as a result of the outcomes of changing—normally growing—temperature or strain or each on some present rock type, and (four) hydrothermal, wherein minerals are chemically induced from hot solutions inside Earth. the primary three strategies typically cause kinds of rocks in which exclusive mineral grains are carefully intergrown in an interlocking cloth. Hydrothermal solutions, and even solutions at very low temperatures (e.g., groundwater), tend to comply with fracture zones in rocks that could provide open areas for the chemical precipitation of minerals from solution. it is from such open areas, partially stuffed by minerals deposited from solutions, that most of the astounding mineral specimens had been accrued.

DEVELOPMENT OF COPPER ZONE



BELLIGUDA HILL-INGALDHAL –CHITRADURGA(Karnataka)

Copper bearing sandstones and shales Copper may be deposited in sandstones and shales from the precipitation of metals from fluids circulating inside the host rock. Geologists' have differing evaluations as to whether this usually happens on the time the host rocks had been deposited or later on, however each colleges of concept agree that the minerals have been deposited when the fluids reached a “chemical entice”, an area wherein the chemistry of the rock modified in a way that made it impossible for the metals to remain in solution.

METHODOLOGY

Mineral deposits have special shapes, relying on how they had been deposited.

The maximum common form is tabular, with the mineral deposit lying as a filling between more or much less parallel layers of rock. The orientation of such an ore frame can be described by using its dip (the angle that it makes with the horizontal) and its strike (the location it takes with admire to the 4 factors of the compass). Rock lying above the ore body is referred to as the putting wall, and rock placed below the ore body is referred to as the footwall.

The most broadly used exploration approach is the drilling of probe holes. in this exercise a drill with a diamond-tipped bit cuts a slender kerf of rock, extracting intact a cylindrical center of rock in the centre (see center sampling). these center holes may be loads or even thousands of metres in length; the most not unusual diameter is ready 50 mm (2 inches). The cores are positioned in unique center containers inside the order wherein they have been removed from the hole. Geologists then carefully describe, or log, the core so that it will determine the place and forms of rock and mineral gift; the exceptional structural functions consisting of joints, faults, and bedding planes; and the power of the rock fabric. Cores are frequently break up lengthwise, with one half being despatched to a laboratory in order that the grade, or content, of mineralization may be determined.

DELINEATION

Usually, core holes are drilled in a greater or much less everyday pattern, and the locations of the holes are plotted on plan maps. to be able to visualize how the deposit seems at intensity, holes also are plotted along a series of vertical planes known as sections. The geologist then examines every section and, on the premise of statistics gathered from the maps and middle logs in addition to his information of the systems present, fills in the regions lying between holes and among planes. This approach of building an ore body is widely used in which the limits among ore and waste are sharp and wherein medium to small deposits are mined by way of underground strategies, but, inside the case of huge deposits mined by means of open-pit methods, it has largely been replaced by means of using block fashions.

The primary methods used to extract minerals from the ground are:

- Surface (open pit) mining.
- Placer mining
- Underground mining.

It has been envisioned that greater than two-thirds of the arena's every year mineral production is extracted through floor mining. There are numerous forms of floor mining, however the 3 maximum common are open-pit mining, strip mining, and quarrying. these differ from each other within the mine geometries created, the techniques used, and the minerals produced.

Open-pit mining often (but not constantly) results in a massive hollow, or pit, being fashioned inside the system of extracting a mineral. it could additionally result in a part of a hilltop being removed. In strip mining an extended, slender strip of mineral is uncovered with the aid of a dragline, big shovel, or comparable type of excavator. After the mineral has been removed, an adjacent strip is exposed and its overlying waste fabric deposited within the excavation of the first strip.

There are types of quarrying. there's the extraction of decorative stone blocks of specific shade and pleasant—an operation requiring special and luxurious production methods. similarly, the time period quarrying has been applied to the healing of sand, gravel, and overwhelmed stone for the production of street base, cement, concrete, and macadam. but, for the reason that practices accompanied in those operations are much like the ones of open-pit mines, the dialogue of quarrying here is limited to the excavation of ornamental stone.

conditions important for the formation of hydrothermal mineral deposits include (1) presence of hot water to dissolve and shipping minerals, (2) presence of interconnected openings in the rock to allow the solutions to move, (3) availability of websites for the deposits, and (four) chemical response.

The Ingaldal Mine is an underground mine so that it will be worked the use of the present antique openings. The method of mining could be –shrinkage Stopping and overhand stopping by means of reduce and fill technique when you consider that back filling of the stopes will be constantly achieved, the vicinity of the beneficiation plant is at crucial Block.

The copper bearing ore will b treated in beneficiation plant with gravity separation, floatation, and improving copper. The beneficiation plant is positioned inside the (relevant Block) the company and is an intergral part of the mines. The life of the mine with proposed manufacturing can be four years. but, after the proposed exploration, the reserves function might be reviewed and consequently the lifestyles of the mine may be recalculated.

Information of waste generated and it's control/backfilling if any.

Waste rock generated at some point of mine development can be used for stope filling.

details of water requirement and it's approval from Water Authority, if any.

the whole fresh water requirement for the undertaking is envisioned as 50 KLD.

info of floor water intersection and hydrogeological examine, if any.

It was said by the PP that the mining sports will intersect ground water desk.

CONCLUSION

Sedimentary deposits are generally stratiform- which means their morphology is managed by means of stratigraphy of their host rocks. Sedimentary deposits are generally tabular, sheet-like or flat lenticular form. they're horizontal if no longer disturbed, however are regularly folded and faulted. Beds containing steel ore are usually much less than 20 toes.

thick. beyond copper, commonplace metals found in sedimentary deposits are lead, zinc, cobalt and silver. Sedimentary copper can be deposited via extraordinary procedures. This paper well-known shows that this formation is the result of the motion of a copper-bearing fluid via strata, that for one motive or another precipitates. This studies provides the structurally managed mineralized vein quartz owing arsenopyrite , galena and chalcopyrite has been located for the primary time within the region Precipitation is commonly because of a of chemical change, both via the contact of certain host rocks, or as inside the case with sedimentary exhalative deposit via touch with water.

REFERENCES

1. Mineral Economics By Verma [1990]
2. Arvind Dewangan and Rajesh Chandra Dissertation work (M.Tech.) on Ingaldhal Copper & Gold Hutti Mines Chitradurga - Karnataka[1993]
3. <https://www.britannica.com/technology/mining/Prospecting-and-exploration> .

BIOGRAPHY



Corresponding Author –Prof.(Dr.)Arvind Dewangan: At present is working as a Professor & HOD in the Department of Civil Engineering, **Model Institute of Engineering & Technology, Kot-Bhalwal road Jammu.** His highest academic qualification is Ph.D. in Mining & Geological Engineering. He has 20 years of experience in teaching and research. He has published about 146 research papers in International and National journals and won more than **45 times National Level Essay Competition.**