Volume 2, Issue 02, February 2024 **ISSN (E):** 2938-379X

PROSPECTIVE SOLUTIONS FOR EXCAVATION OF LAYERED MINES WITHOUT LOSSES

Buriyev Sh. U.
NSMTU, Assistant of the Department "Excavation and Processing of Rare and Radioactive Metal Ores"

Avazov A. N.
NSMTU, Assistant of the Department "Excavation and Processing of Rare and Radioactive Metal Ores"

Umarov O. S.
NSMTU, 2nd Year Graduate Student of "Mining Department"

Abstract:

This article discusses the study of mining conditions, determining the efficiency of the excavation system, the correct and accurate application of columnar excavation methods, identifying the advantages and disadvantages of the excavation system, the application of the method.

Keywords: Minerals, excavation technology, excavation area, columnar excavation, horizontal width, loss, working face, column, gypsometry.

Introduction

Management of social relations in the field of use of minerals and protection of land is carried out by implementing various legal norms and regulations, which was first adopted by the Supreme Council of the Republic of Uzbekistan on September 23, 1994 and revised in 2002. It is expressed in the Law of the Republic "On Subsoil Resources"

In this document, the following requirements are noted in relation to the issue we are considering:

- Use of land for the specified purpose;
- The geological age of the earth should be fully studied, the mineral resources should be used rationally and comprehensively and protected;
- not allowing the selective use of mineral-rich sections of mines, excessive loss of minerals during the extraction and processing of mineral raw materials;
- taking into account the state of reserves and changes in them, the extinction and depletion of minerals, as well as timely recalculation, reconfirmation and deduction of reserves;
- storage and accounting of minerals added during mining, but temporarily unused;

- Maintenance of geological survey documents and other documents during the use of underground resources and their preservation;

At the present time, it is necessary to carry out mining works correctly and efficiently for rational and comprehensive use of mining resources. Accordingly, the most important issue is the correct and accurate development of excavation systems.

The location of the mines in different geological conditions and the variety of mining technologies used working face require different options for mining systems

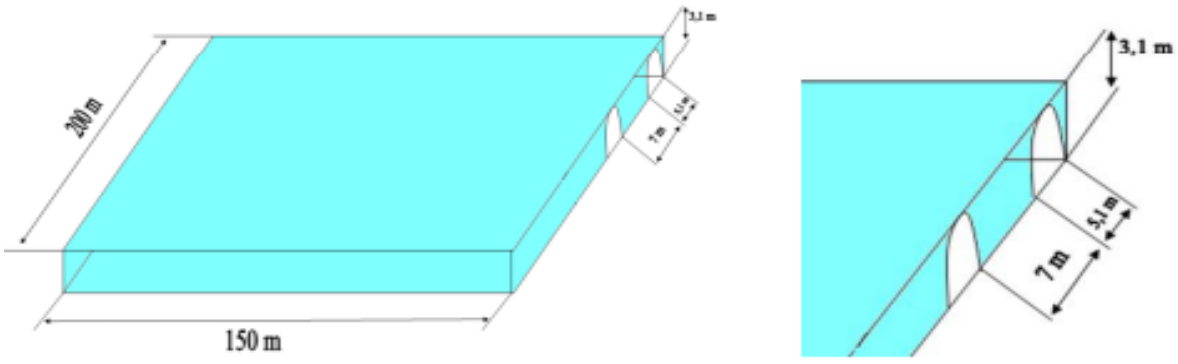
DISCUSSION AND RESULTS

In order to carry out mining operations in the Tepaqo'ton mine without damage, we are considering the use of a mining system with long pillars.

In the system of excavation with long shafts, mine preparation and excavation are carried out in an unconnected manner at the boundaries of the excavation area. The for excavation, that is, it can be used no matter how the mine site is prepared. In this case use of column excavation systems does not depend on the way the mine site is prepared, the working face can be pushed in different directions, longitudinally, downwardly, upwardly and diagonally. for digging with a column, we will consider the application method for the technical and horizontal creation of the panel.

A mining system in the condition of the Tepaqo'ton.

Currently, the mining system in the conditions of the Tepaqo'ton salt mine is mined using the panel method, leaving column.The digging system has the following appearance.



Picture-1

The scheme of the length and horizontal width of the panel **the scheme of width and height of mining workings**

As can be seen from this drawing, the width of the mining workings is a=5.1 m, and its height is h=3.1 m. In the case of the width of the pillar b=7 m. The horizontal length of the panel is L=200 m. The horizontal width of the panel B=150 m. The height of the mineral layer is h=3.1 m. The lying angle of the mineral is b=10˚

Here, the size of the block is found by the following formula

$V_b = L \cdot B \cdot h \cdot g = 200 \cdot 150 \cdot 3.1 \cdot 2.05 = 190650$ T

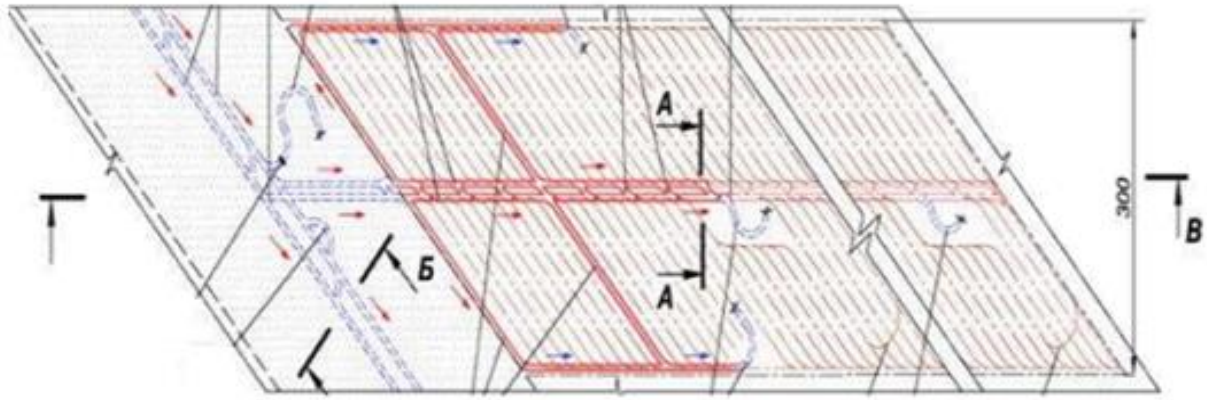
We know that the loss coefficient is Kn=0.56%. The amount of loss in the panel is determined using the following formula:

$V_n = V_b \cdot K_n = 190650 \cdot 0.56 = 106764$ T

The amount of extracted ore is determined as follows**:**

$V = V_b \cdot K_{qo} = 190650 \cdot 0.44 = 83886$ T

$V_{um} = L*h*B = 200*3.1*150 = 93000$ m ^{3}



Picture-2

Schematic view of mining extraction

In the current situation, if the width of the mining workings is a=5.1m, b=7m, the number of mining workings is approximately 16 in every 200 m length.

So, the amount of ore mined for one mining workings;

Vbl =a*h*b=5.1*3.1*200=3162 m ^{3}

This is the amount of ore that can be mined for one panel

$$V_{bp} = N^* V_{bl} = 16*3162 = 50592 \text{ m}^3$$

$$X = (V_{bp} / V_{um}) 100\ \% = (50592/93000)\ 100\% = 54.4\%$$

Amount of ore left for one panel

$$V_{bpq} = V_{um} - V_{bp} = 93000 - 50592 = 42408 \text{ m}^3$$

X= (V_{bpq} / V_{um})100 %=(42408/93000) 100%=45.6%

If we pay attention to the results, we can see that the amount of losses is very high. Based on this, we will consider the use of an additional excavation method, a bench excavation method, in order to reduce the damage.

In order to increase the efficiency of mining in the Tepakoton salt mine, we will see the method of using the column mining system for horizontal mining.

If the mining workings width is a=5.1m, the width of the slab is b=10m, the number of mining workings in the L=150 m long panel is approximately 10.

Hence, the amount of ore mined for one mining workings

V_{bp} =a*h*L=5.1*3.1*200=2371.5 m^3

Amount of ore mined per panel.

$$V_{bp} = NV_{bl} = 10*2371.5 = 23715\ m^3$$

$$X = (V_{bp} / V_{um})100\% = (23715/93000)*100 = 25.5\%$$

Amount of ore left for one panel

$$V_{bpq} = V_{um} - V_p = 93000 - 23715 = 69285$$

$$X = \frac{69285\ T}{93000\ T} \cdot 100\% = 74.5\%$$

The results of the last accounting book show that if the current mining system is used, the amount of ore mined in the direction of the panel lay was 54.4%, and if the column mining method was used horizontally, the amount of mined ore is 25.5%. So, we can see that the total amount of mined ore has increased by 79.9%

The use of this method corresponds to the mining geological and mining technical conditions of the Tepaqo'ton mine. The thickness of the salt layers in the Tepaqo'ton mine, the strength of the working face, angel of repose and the moderate hardness of the ore, the long pillar indicates that the excavation system can be used..

There are several tools of long-column mining systems, which are used to dig layered deposits located in various mine-geological conditions.

The system of digging horizontal layers with long column in the Tepakoton potash mine differs from other methods by the specific order of pillar preparation and mining. In the Tepaqoton mine, the pillar prepared using this method are dug one by one, in a checkerboard pattern, and as a result, there is always one unexcavated pillar, that is, pillar, in the excavated space.

Preparation for the excavation of this column: after the collapse of the roof rocks of the excavated columns is over, after a certain period of time has passed (at least 6 months, at most 1.5-2 years), working faces are placed between the rocks that have fallen into the excavated space is carried out by transferring.

In some cases (when the water level of the surrounding rocks is high), the working face is placed on the side of the excavated cavity or a narrow column (1-3 m instead of the usual 8-10 m) is left. As a result, the amount of selvinite lost in the columns is significantly reduced and

favorable conditions are created for mining the prepared reserve. When this mining system is used, there is a high possibility of concentration of mining operations.

This excavation system is mainly used for excavation of 1.4-3 m thick horizontal sylvinite layers with complex hypsometry. In addition, the application of this method is suitable for the Tepaqo'ton mine. It shows that the use of these methods has several advantages in the mining process and that it is possible to achieve a reduction in waste. Currently, the annual production capacity of the Tepaqo'ton mine is equal to 700,000 tons, and it is planned to serve for 100-120 years.

CONCLUSION

The use of the above methods allows to increase the annual production capacity by 100,000 tons, increase the service life to 150 years, and reduce the loss of minerals by 25-30% compared to the project.

The slope height of the horizon is large, the length of lava does not change regardless of the complexity of the layer hypsometry, the dimensions of the excavation columns are large, they are suitable for any open mine, the slope of the layer is 10°, it is recommended to carry out excavation work without using reinforcing structures will be done.

REFERENCES:

1. Geomechanics work dannie dlya proektirovaniya otrabotki Kubikatanskogo mestorojdeniya kaliynix soley. JSC Galurgia . Perm , 2008
2. Changes and additions to the Law of the Republic of Uzbekistan "O nedrax" dated December 13 , 2002.
3.texnicheskoe zakluchenie ob injenerno-geologicheskix usloviyax po obyektu:'' Dobivayushiy complex i vostochranilshse zavod po pererabotke kaliynix soley Kubikatanskogo mestrorojdeniya v Kashkadarinskoy oblast Republic of Uzbekistan". Republic of Uzbekistan. Gosudarstvenniy komitet po architekture i stroitelstvu . GAK " UZKIMESANOAT" .g . Tashkent - 2008
4. Study guide for underground mining of layered deposits: N.Kh. Sagatov; Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan: Tashkent: "Philosophers" Publishing House, 2013..

Internet sites

5. www.google.ru
6. www.region.resurs
7. http://mggu.ru - Moscow state mining institute
8. http://www.dissercat.ru