

Concept Paper on exploited area Ore Body S-150 of Horizon XI in "Trepça" Stanterg Mine

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Abstract: The orebodies of the mineral deposit Trepça in Stanterg are usually characterized with a dipping angle which is followed with a stable working medium. To ensure a safe production capacity must have enough "stopes" (working sites) which are mined in the mining horizons. The mining system of ore bodies is mainly done with the principle of "etages"(floors principle) from the bottom-up with a certain number of mining systems. In all cases, during the mining phase, when the ore bodies are in large size there are left safety pillars and safety plates. Even though in Trepça mine was not practiced the mining of safety plates still some of them have been mined out. Mining of the safety plates by planning the safety pillars inside the ore body is a method that has not been practiced yet in the Trepça Stanterg mine.

Keywords: *security crown, ore body, pillar, exploited*

Introduction

The Trepça mine in Stanterg has practiced few underground mining methods, which are:

- The backfilling method, with the exploitation system from down-up,
- Storing method,
- Combined methods, and not very often
- The frontal mining method.

Mining by utilizing the special mining system which involves the exploitation of one etage and leaving safety plates was not a practice until nowadays which was practiced in the Horizon XI of the mine. Leaving a certain number of safety plates resulted on loosing of ore, due to high content of minerals in being left. In the mining practice, the biggest loss of ore occurs when leaving safety pillars and plates. Mining of these safety pillars and plates is very complicated and requires a special approach on their exploitation. To mine out this remaining mineralization it is required to project a conceptual system of mining the safety plates.

Exploited methods with Crown Pillar

Many experts of the mining sector have done a lot on increasing the production capacities by analysing all effective mining methods. One of these methods have been used also on exploitation of the safety plates. Exploitation of the ore bodies by leaving the safety plates is always done by leaving a safety plate of a thickness from 5 m' whereas the mining surface to be done up to 5.5 m' Figure 1.

This mining system is practiced by creating also the safety pillars. First phase of exploitation is done by opening the spiral ramp which makes possible to utilize the productive heavy machinery which will be actively involved also on the exploitation phase, something that characterizes this method.

Mining system in stope S-150

Mining system of the stope S-150 with safety plates can be described as: Central ore bodies as well as most of the ore bodies are located in the contact between schists and limestones, where the limestones lay on the floor. Knowing the fact that the safety pillars are formed by securing a dimension of 10 m x 10 m then every 25 m distance must have one safety pillar in the form of chess squares with dimensions as mentioned above. As from the geological setting we can conclude that the safety pillars are consisted from the limestones on the lower part and ending with schists, what gives a very good stability to the safety pillars. Adjacent to these pillars will also be left the safety plates which are

consisted by the limestones connected to the safety pillar and ending with schists. In the Figure 2 we can conclude that the mining would be done in “etages” where each etage has the height from 5,5 m and forming safety pillars and plates. Stability of safety plates between the pillars is good, exceptionally care needs to be taken only in contact with schist, with which the conclusion of experts can also leave smaller safety pillars, which can be exploited again.

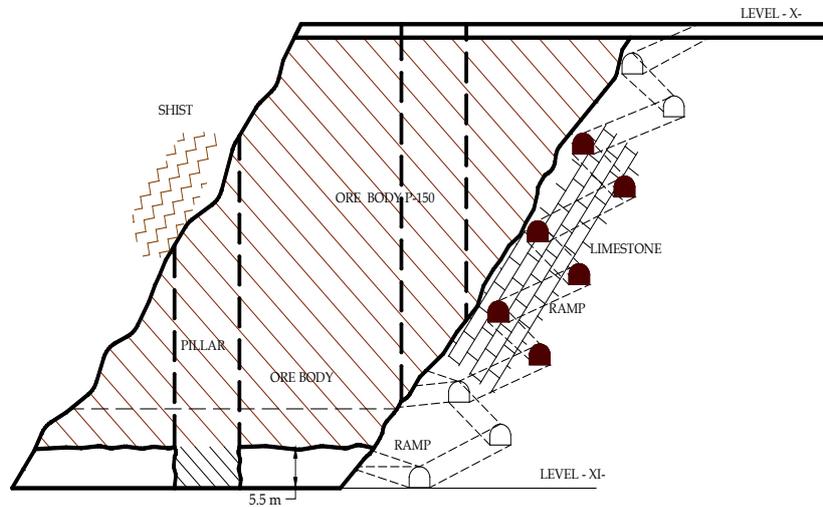


Figure1. Scheme of first phase of the exploitation of stope S-150

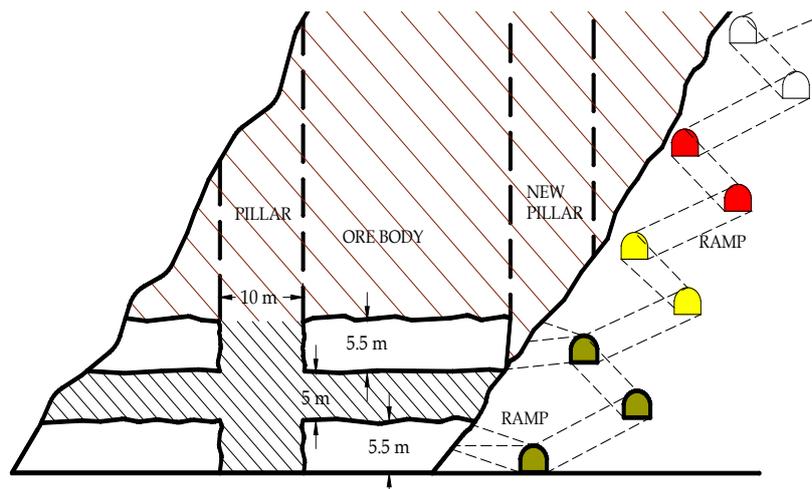


Figure2. System construction of safety pillars and crown during the exploitation phase

Continuation of exploitation in ore body S-150

The mining system will continue same:

The exploitation of the ore body continues same as in the figure 2 but always priory with the preparation phase of spiral ramp construction. The spiral ramp must be raised up to the level of 10.5 meters from the floor level of the mined ore body. The spiral ramp is constructed with a purpose of exploitation by etages and creation of another safety plate. This is best shown in the figure 3, continuing the same up to the final operation of the stope and complete exploitation of the ore body. The process presented is not the complete one because in principle is the same method which is also explained in the Figure 3.

This process we have separated in two phases for easy understanding of the mining system. The two phases (1 and 2) have been presented as separated because the second phase is presented as same with the first phase and which must end as entire up to the Horizon X.

System exploitation security crown and Principe work in filling

The mining system of the safety pillar will be done after the all etages has been exploited from the Horizon XI up to Horizon X. Since the stope P-150 is in the same condition this is the case to best

explain the idea of ore body exploitation because the ore body is 50% mined out. The mining system is as in the following:

- Construction of the spiral ramp for the upper etages,
- The mining system of the etages leaving the safety plates in the floor side,
- Planning and mounting of the pipes for the backfilling system through the ventilation shaft,
- Securing the stope with concrete barricades on the galleries which were used for exploitation from the spiral ramp,

The system of safety plates with shaft and spiral ramp is presented in the Figure 4 showing the same situation in the entire stope until the termination, but we are showing only one detail as in the figure 4.

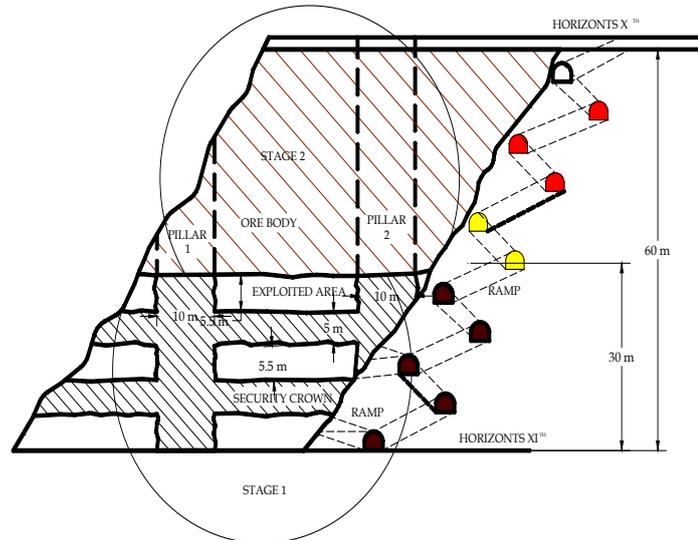


Figure3. Presentation for two stage exploitation of ore body and forming security crown

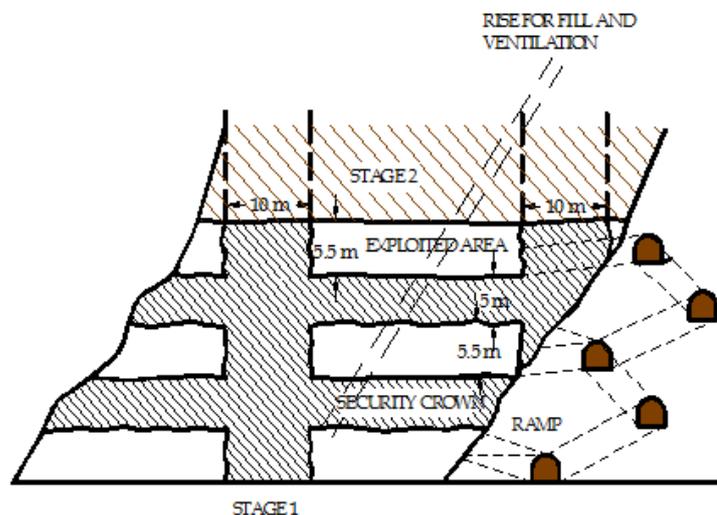


Figure4. Forming security crown and projecting to starting exploration.

After the all the areas has been mined out and all the safety pillars and plates has been formed, starts the process of backfilling through the ventilation shaft. Prior to backfilling the exploited etage, we must build the concrete barricade of the gallery from the spiral ramp used for exploitation as shown in the figure 5. The backfilling of the empty space is preferred to be done utilizing the Fly-ash as a hydro-backfilling material because such a method ensures stability due to the high hardness after solidification of the material. The empty space must be filled up to the safety plate but leaving an empty space on a distance from 0.5 to 0.8 m. The reason for this empty space is that any blasting effect to be on the floor side and occurrence of any cracking to be manifested as monitoring mean during the continuing of the mining system. The preparation of the stope for backfilling is presented in the Figure 5.

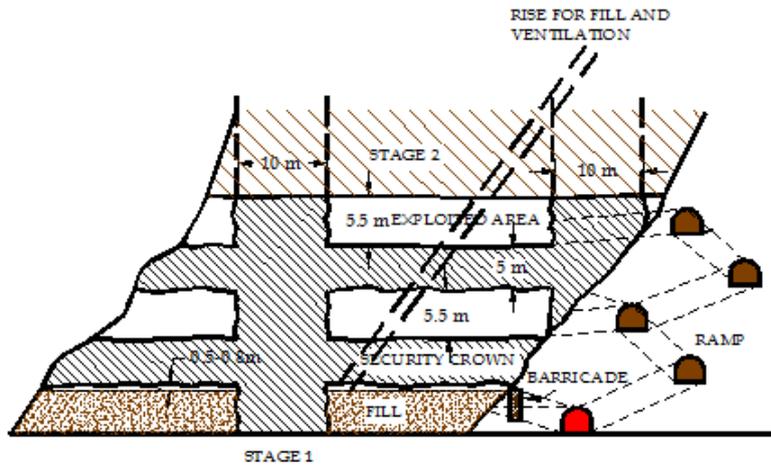


Figure5. Preparing exploiting security crown and fill to exploited area

After the empty space of the stope has been backfilled, than we start with the preparations for exploitation of the safety plate from the entrance of the gallery. As preparation work is also considered the opening of the gallery from the spiral ramp to the level of the safety plate.

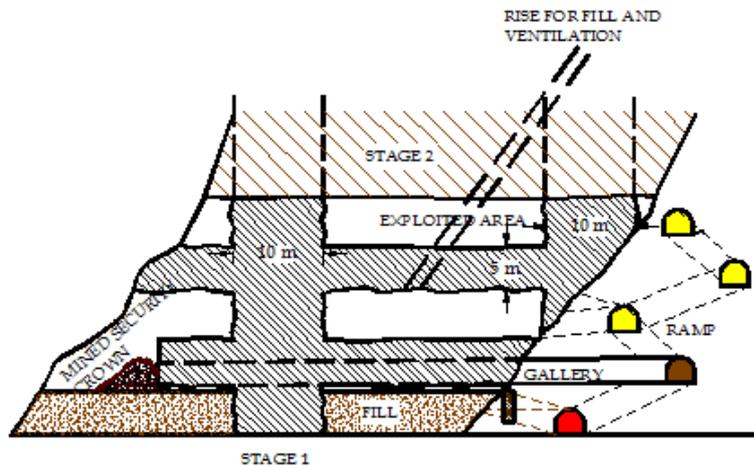


Figure6. Starting exploiting phase security crown

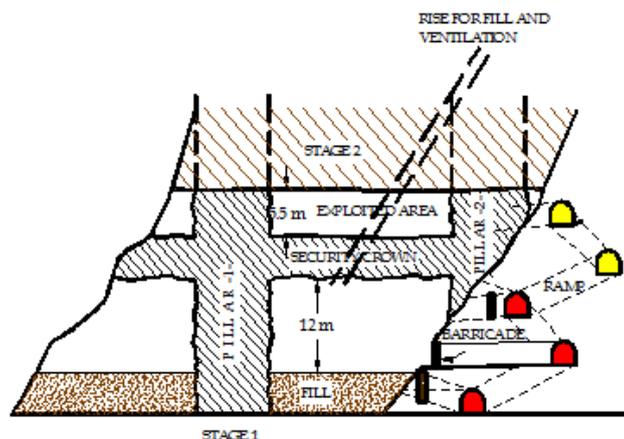


Figure7. First exploiting security crown and preparing for filling to phase two

After the entire system of drilling-blasting-loading and transportation of the ore has been finished we will have the space available for starting with the preparation works. The space created is big, therefore the entire stope must be secured and the workers involved must have high professional preparation and the quantity of the explosives must be conditioned in the way to not generate blasting

waves which can damage the safety plate. Monitoring the detonation waves in the upper safety plate must be done with specialized measurements and must precisely determine the quantity of the explosives. The creation of the space, sizes and preparation works will be presented in the Figure 7.

When the all preparation works are done by building up the concrete barricade in the stope and loading all the quantity of the ore, a space from 12 meters high will be created which is endangered and on the fastest possible way must start with the backfilling process as shown in the Figure 5. The backfilling process and preparation for the start of exploitation of the safety plate will be presented in the Figure 8. In the Figure 8 we can see the scheme of filling of the second etage of the safety plate and preparations exploitation of the second safety plate. This process will continue up to the ending of the etage and the stope to the Horizon X.

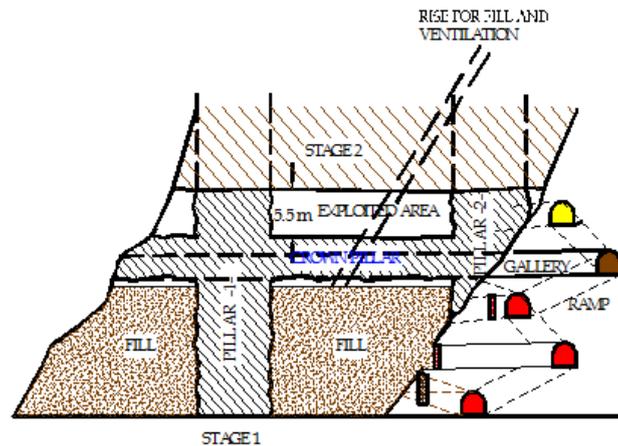


Figure8. Preparing exploiting secondary security crown and fill to exploited area

Conclusions

The mining process with safety plates and safety pillars is a method that can be practiced and creates possibilities for safe and suitable conditions also for exploitation of the safety pillars. The safety pillars are estimated as ore reserves which are left but their exploitation must be planned. The method with safety plates is not considered as a good mining method knowing that 50% of the ore body will be left unexploited, but when using this studied method, the losses could be reduced to 100% and to remain only those reserves of ore body which are practiced also in the other mining methods as down-up with backfilling. The Trepça Mine has good knowledge on mining of the safety plates but the method of mining differs from this because each exploitation of the safety plate is considered as a plate with a load of backfilling material, whereas in our case it only represents the weight of its material and the risk is always presented in the empty space left between the safety plate and the backfilling material. The backfilling of the space up to the ceiling of the safety plate is presented as stabile and filling of the spaces is quite stable and has a stability of the surrounding walls of the stope.

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