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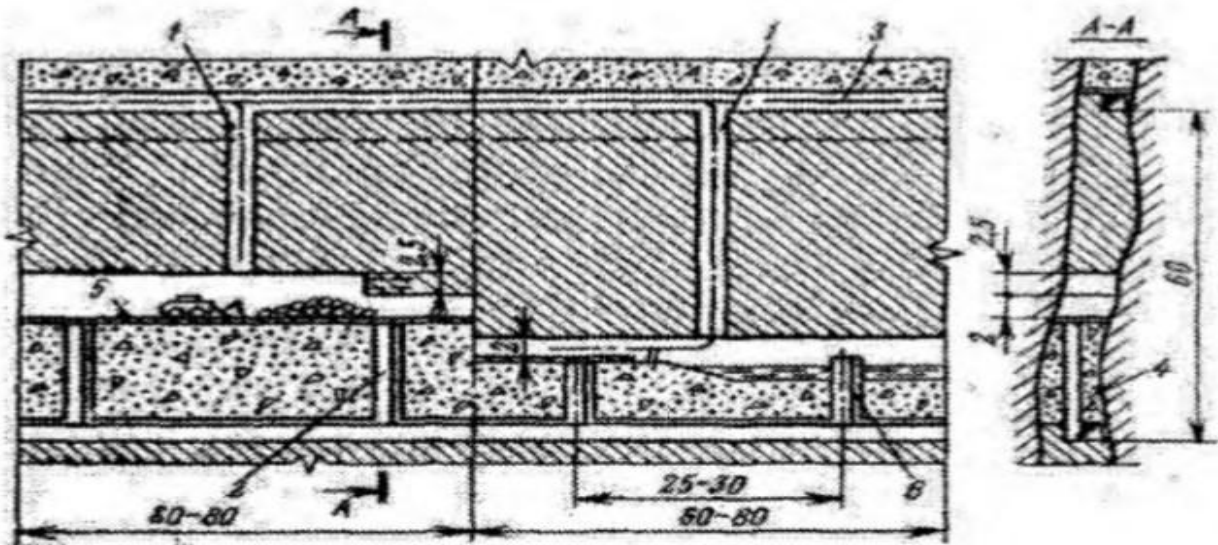
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## SYSTEM OF DIGGING BY FILLING THE EXCAVATION SPACE AND SEPARATING IT INTO HORIZONTAL LAYERS

**Annotation:** The article talks about the advantages and disadvantages of the mining system of filling the mined space and separating it into horizontal layers, which is part of the backfill mining class, the spurs that are passed when this system is used, the scraping technology, the method of delivering the ore extracted from the massif, the deterioration and losses during the mining period.

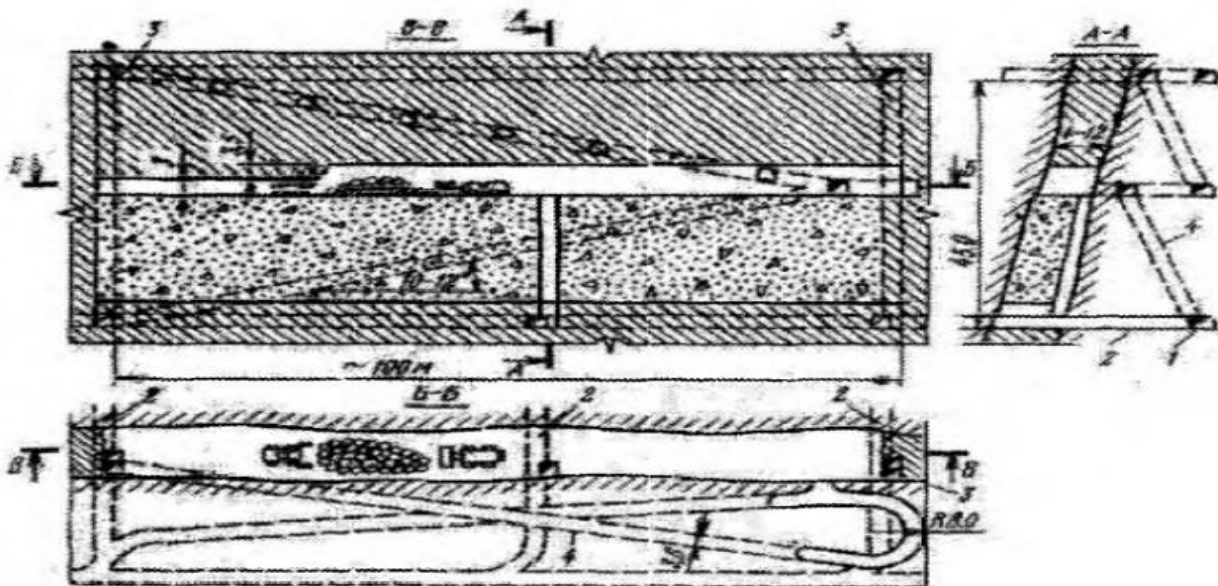
**Keywords:** consistency, ore, stagnation, slope, tectonic faults, streak, puch rocks, horizontal poets, inclined spurs, scraper, winch, loss, degradation.

The following indicators are more characteristic of the use of digging systems by this group. The ore body is thin to medium thick; the ore body is located close to vertical, medium strength, and solid, but the mixed rocks are not stable, the bed elements are variable, and there are tectonic faults separating the precious ore body mixed with loose rocks into the ore body. The system of excavation is used, leaving loose rocks in the excavated space. For example, the mixed rocks may be strong and stable, the deposit elements may not change, and the ore may not be mixed with friable rocks. In such a case, keeping the surface of the earth from deformation and shifting and reducing the level of mineral loss determines the scope of application of this system. Depending on the direction of excavation, the system of filling the cavity by dividing it into a horizontal layer can be divided into two options: along the length of the ore body and in the direction transverse to the length. Excavation starts from the height of the ceiling of the cargo line, or a 3–4-meter-thick protective layer is left in its part. ore is broken up into blocks, and the retaining integrity is broken up into layers 3–4 m thick in the upper part. Increasing the thickness of the layer increases the labor productivity of the workers engaged in excavation, but the level of safety decreases. Ore is crushed by small spurs placed horizontally or vertically. Crushed ore is transported to the ore loading pit in a mechanized way with a scraper winch or loader-transporter. After digging the first layer, a solid bed is installed on the stringer or retaining unit, a large slot is made in the place intended for ore unloading, and after digging the second layer, the first layer is filled with backfill materials. On the large slot, the ore is first unloaded, and its surroundings are reinforced with wood, concrete, or a large-diameter metal pipe or ring-shaped reinforced concrete pipe. The mined block is separated by a board along its entire height and thickness, reducing the level of ore degradation. A solid wooden or thick metal plate is laid over the surface of the filled materials to prevent the loss of small pieces of ore. In the mining of important precious ore, an old conveyor belt is used as a bed, and sometimes tarpaulin is covered over the bed. The most effective way to fight against its loss and deterioration in the system of dividing the ore into horizontal layers and filling the space is to compact the filled massif or cover its surface layer with a concrete slab 15-20 cm thick. The use of such a bed protects small particles of ore from getting stuck between the filling materials and getting lost, improves the ventilation of the block, ensures the stability of the filling array, and facilitates drilling and ore delivery with self-propelled equipment. For this, the surface of the filler materials is leveled and concreted with a quick-hardening liquid concrete solution; that is, concrete is sprayed.



Excavation system using horizontal layers of hydrofilling materials and covering the surface with concrete: 1st unit block, 2-two-sectioned ore unloading and human movement, 3-pipe for supplying liquid filling materials, 4-hydraulic pump, 5-concrete bed, 6-drainage pipe.

Horizontal layering and filling the space with solidifying material is used in mining expensive deposits with high stability; the ore layer is thick, the slope is close to the vertical, and the horizontal layer is laid. Self-propelled equipment is widely used both in preparing the block for work and in the excavation process. Preparation works are carried out from the side of the ore bed at an angle of 10–12° to the block diagonal from the side of the ore bed. The use of an inclined welding machine allows mechanization of all main auxiliary work in the block and the maintenance and repair of self-propelled machines. Excavation works are carried out in horizontal layers with a height of 3.5–4.5 m. In order to move the block from the center to its flange, the layer is connected with an inclined solder. When ore is mined with spurs drilled in ascending order, the height of the pit reaches 3 m; when mined with horizontally placed spurs, this size can be smaller.



A system of mining by filling the ore body with solidifying materials layered in a linear direction. In the system of filling the cavity created by the horizontal layering of ore, the placement of the camera transversely to the length of the ore body is rarely used in practice.

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