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DEVELOPMENT OF AN ACCEPTABLE VARIANT OF THE FILL MATERILS BEING USED TO FILL THE GAP MINED AT THE KOVULDI GOLD MINE

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Annotation. In the article " Almaliq KMK" JSC Thermal Power Center (IEM) using the ash and non-combustible part of the coal used in heating steam boilers, the advantages and possibilities of filling the mined space and its technical implementation are calculated. The calculation and analysis of economic indicators shows the inconsistency of these modifications to the goal Under the conditions of the Kovuldi mine, the cost of the solidifying filler for 1m^3 was developed, and based on the developed mining plan, it was required that the share of additional crustaceans in this amount does not exceed 22%. Based on this condition, the economic calculation of the proposed option is determined.

Economic indicators satisfy the requirements of their share in the total cost amount. The specifications, on the other hand, do not meet the requirements of the 25,000 m^3 fillings envisaged in the mine works plan, which means that it is not possible to provide the amount of additional coagulation enhancers needed to complete the annual plan. The less the share of additional capacity-enhancing agents in the total cost amount, and the less the supply satisfies at least the annual need, this is considered to be of additional economic purpose.

Keywords: hardening filler, coal ash, red sand, fraction sizes, transportability (pre-chamber delivery), kemera, mining system, cement, marble sand.

Аннотация. В статье АО «Теплоэнергетический центр (ТЭЦ) «Олмалык ХМК» с использованием золы и негорючей части угля, используемого при отоплении паровых котлов, рассчитаны преимущества и возможности заполнения выработанного пространства и его техническая реализация. Расчет и анализ экономических показателей показывает несоответствие этих изменений цели. В условиях Ковульдинского рудника была разработана стоимость затвердевающего наполнителя на 1 м^3, и исходя из разработанного плана горных работ требовалось, чтобы доля прироста ракообразных в этом количестве не превышает 22%. Исходя из этого условия, определяется экономический расчет предлагаемого варианта.

Экономические показатели удовлетворяют требованиям по их доле в общей сумме затрат. С другой стороны, технические характеристики не соответствуют требованиям к засыпке объемом 25 000 м^3, предусмотренным планом горных работ, а это означает, что невозможно обеспечить количество дополнительных усилителей коагуляции, необходимое для выполнения годового плана. Чем меньше доля дополнительных средств, повышающих производительность, в общей сумме затрат и чем в меньшей степени предложение удовлетворяет, по крайней мере, годовую потребность, считается, что это имеет дополнительную экономическую цель.

Ключевые слова: твердеющий наполнитель, угольная зола, красный песок, размеры фракций, транспортабельность (форкамерная доставка), кемера, система добычи, цемент, мраморный песок.

Annotatsiya. Maqolada “Olmaliq KMK” AJ Issiqlik elektr markazi (IEM) bug‘ qozonlarini qizdirishda ishlatilgan ko‘mirning kuli va yonmagan qismidan foydalangan holda, qazib olingan bo‘shliqni to‘ldirish ishlari va texnik jihatdan tadbiq qilish afzalliklari va imkoniyatlari hisoblab chiqilgan. Iqtisodiy ko‘rsatgichlarini hisoblash va tahlil qilish bu o‘zgartirishlarning maqsadga nomuvofiqligini ko‘rsatib beradi. Kovuldi koni sharoitida qotuvchi to‘lg‘azmaning 1 m3 uchun sarflanadigan harajatlari ishlab chiqildi va ishlab chiqilgan kon ishlari rejasiga asosan qo‘shimcha qovushqoq vositalarining ushbu summadagi ulushi 22% dan oshib ketmasligi talab qilindi. Ushbu shartga asoslanib, taklif qilingan variantning iqtisodiy hisob-kitobi aniqlanadi.

Iqtisodiy ko’rsatkichlar umumiy xarajatlar miqdorida ularning ulushi talablariga javob beradi. Boshqa tomondan, texnik xususiyatlar kon rejasida ko‘zda tutilgan 25,000 m3 to‘ldirish talablariga javob bermaydi, ya’ni yillik rejani bajarish uchun zarur bo‘lgan qo‘shimcha koagulyatsion kuchaytirgichlar sonini ta’minlash mumkin emas. Hosildorlikni oshiruvchi qo‘shimcha mablag‘larning umumiy xarajatlardagi ulushi qanchalik kam bo‘lsa va taklif kamida yillik ehtiyojni qanchalik kam qondirsa, bu qo‘shimcha iqtisodiy maqsadga ega deb hisoblanadi.

Kalit so’zlar: qotuvchi to‘lg‘azma, ko‘mir kuli, qizil qum, fraksiya o‘lchamlari, transportabellik (kameragacha yetkazib kelish), kemera, qazib olish tizimi, sement, marmar qumi.

Introduction.

As a result of the rapid deepening of mining operations and muracabization of mining – geological conditions, mining is widely used, filling the space excavated at the latest with solidifying fill.

The correct choice of the composition of the solid filling ensures the formation of a solid (monolithic) massif in the mine. The choice of a filling with an acceptable composition assumes an emphasis on technological and economic factors.

The selection of the composition of the solid filling should be carried out taking into account the suitability of local materials near the mine, determining their reserves, depending on the amount suitable for use, taking into account the possible methods of their subsequent supply or extraction, delivery to the site of mining and laying (filling) work. In the second stage, it will be necessary to study the physical and mechanical properties of fillers, the activity of fasteners. The rational composition of the solidifying filling is determined experimentally, by developing solidifying filling naamunas of various

compositions and testing the ability to transportability (pre-chamber delivery) [1,2].

The composition of the solidifying filling should be selected depending on the desired rigidity and strength of the formed Artificial array, the accepted method of supplying the mixture, the technology of building the laying array, the intensity of attachment and impregnation, and the economic indicators of laying work.

Advantages of the mining system by filling with solidifying fillings:

flexibility that allows the extraction of complex ore bodies with minimal losses;

reduce loss and loss of quality by 3 – 4%;

the creation of safe working conditions in the process of mastering unstable and unstable ores;

it is possible to fully absorb the ore body, reducing loss and poor quality (usually 3-4 times).

In the Kovuldi gold mine there are a number of disadvantages of using the mining system by filling it with a solidifying filling: outdated equipment in the complex (complex) of solidifying fillings;

a large amount of cement consumption per hour;

the shortage of ash in the dry coal industry, which increases the viscosity of mercury;

freezing of the solidifying filling mixture during the winter season and the occurrence of propane in the part of the filling line located on the surface of the earth;

natural stratification according to the need for stratification, or fraction, of the concrete mixture during the transportation of mercury through the long-distance laying pipeline;

limited capacity to fill the full ceiling of the mining elaboration.

All these disadvantages lead to an increase in the cost of ore mining.

In the process of developing the Kovuldi gold mine, the following main problems arise:

*The strength of the sealant filler is low, the reason is the high sand fraction and density,

resulting in the washing of cement from the prepared concrete mixture;

*Due to the large size of the barrier distance in the filling cleaning chambers, it is observed that the filling does not fill in the bottom of the chamber where the filling is laid and around the barrier until the filling ceiling, resulting in a gap between the filling and the ceiling;

Cases of clogging in the pipes of the pipe of the pipe are often occurring, after a solidifying filling of the size of a shift is laid in the chamber, the water itself is run through the pipe to remove the remaining mixture inside the pipe, as a result, the cement in the chamber is washed away, or, if done outside the barrier, there is a 20 – 30 cm surface waterlogging on the horizon.

To make a hardening filler for the Kovuldi gold mine, cement of the M-400 and M-500 marks, sand formed from grinding loose rocks, and ash formed from coal burning are used [3,4].

The Kovuldi mine has been using marble sand which forms in a marble mine 2 km north west instead of ash since 2003 after leaving the 2002 Uzalmazzolota state-owned enterprise and joining the “Almalyk Mining And Metallurgical Complex” JSC. In 2018 and 2019, red sand mined from the Sharhiya quarry under JSC “Almalyk Mining And Metallurgical Complex” was used, with red sand mined from the Sharhiya quarry being abandoned due to the inability to provide stable supplies. Since the 4th quarter of 2019 to this day, marble cone sand has been used.

According to the approved mining plan for 2022, the annual mining productivity of the mine is 100 thousand tons, and the annual volume of filling works is 25 thousand m^3 [5,6]

Material and methods.

Coal is widely used in ring farming, and the use of coal ash in farming and industrial production is widely established. The composition and quality of coal ash varies. Activated charcoal contains nutrients, which are in a form that is rare for plants. In addition, coal ash can contain heavy metals and other harmful substances. Therefore, coal ash is not considered the best fertilizer and is rarely used in agriculture.

Composition of coal ash:

Silicon oxide (SiO_2) - 45-60%

Aluminum oxide (Al_2O_3) - 20-30%

Iron oxide (Fe_2O_3) - 5-20%

Magnesium oxide (MgO)-0.5-3%

Calcium oxide (SaO) – 1-15%.

Figure 1. M-400 and M-500 brand cement

Figure 2. Sand formed from grinding loose rocks

Figure 3. The Hall formed by coal burning

The Kovuldi gold mine is envisaged to make a solidifying filling mixture in the following variants:

1. C+ O+S +W;
2. C+ O+W;
3. C+ S+W;
4. (C* +CS) + O+ S+W;
5. (C* +CS) + O+W;
6. (C* +CS) + S+W;
7. CS+ O+ S+W;
8. CS+ O+W;
9. CS+ S+W;

in this,C– cement, O– oversized sand,S– sand, C* – additive that increases cement fluffiness, CS-cementless squat, W– water [7,8]. Using the ash and non-combustible part of the coal used in the heating of steam boilers “Almalyk Mining And Metallurgical Complex” JSC. Thermal Power Center (IEM), a complex composition mixture option is considered:

$$(C^* + CS) + O + S + W$$

Activity R_C = 40 MPa is M400 branded cement;
Activity R_{CS} = 5 Mpa is dross; oversized sand – fraction up to 20 mm, fine-sized sand-sand.

Additional consumption of complex composition, which increases cement viscosity, is defined as follows (Table 1):

$$C^* = 600\left[\frac{\sigma_{sj} - c(600)^d\sigma_{cs}}{a(600)^b\sigma_c - c(600)^d\sigma_{cs}}\right]^{\frac{1}{b}}$$

1- Table

The calculated parameters of the slug warbler are given in the table below:

Slag activity,	Etalon stuffing mustachkamlik limit	Empirical coefficient	
		S	***D***
3,8	1,5	1	0,38
5	2	0,059	0,48
6,2	2,5	0,018	0,67
7,5	3	0,01	0,78

$$C^* = 600\left[\frac{5,3 - 0,059(600^{0,48}\cdot 2)}{0,0046(600)^{0,9}9,7 - 0,059(600)^{0,48}\cdot 2}\right]^{\frac{1}{0,9}}$$

According to the technological instruction, water consumption in the Kovuldi mine V is carried out in the following form:

W = 360 ÷ 450 l/m^3 – in an oversized sandblast;

W= 400 ÷ 500 l/m^3 – in a mixture of large and fine-sized sand;

W = 450 ÷ 550 l/m^3 – in a fine-grained sandblast;

"Almalyk Mining And Metallurgical Complex" JSC Thermal Power Center (IEM) using the ash and non-combustible part of the coal used in heating steam boilers, taking into account the filling, the water consumption is assumed to be V 450 l/m^3;

The consumption of large and small-sized sandblasts is determined by the following formula:
To ensure this productivity, the pipe diameter must be at least as follows:

$$d = 35\sqrt{\frac{10,5}{0.6}} = 146,3\ mm$$

A pipe with a diameter of D = 159 mm is selected in the standard view.

Results.

In conclusion, we can say that The Hollow, which has been mined in the Kovuldi gold mine since 1977, is being filled with solidifying fill. Over the past 45 years, various options have been considered and tried to improve this mining system. Each of the proposed options has its own advantages and disadvantages, these conclusions have found their own proof in production practice, it is at the expense of its technical and economic indicators that options are analyzed and optimal options are selected.

The "Almalyk Mining And Metallurgical Complex" JSC Thermal Power Center (IEM) using the ash and non-combustible part of the coal used in heating steam boilers, the filling was calculated.

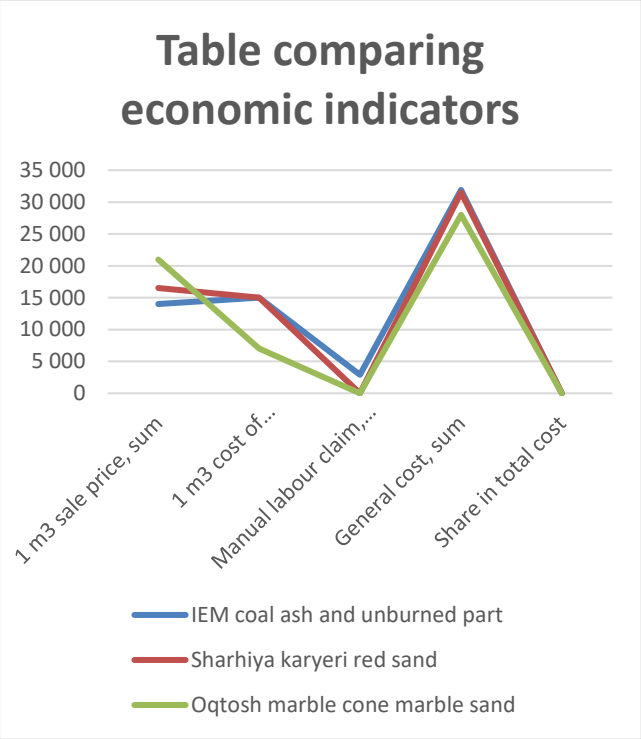
Technically, the advantages and possibilities of implementation were calculated and the corresponding hulosas were issued. The calculation and analysis of economic indicators shows the feasibility or inconsistency of these modifications. Prices (in rubles) differ from the actual state of production, the change was required by the administration of the Kovuldi mine [9].

The cost per 1 m^3 of the solidifying filling in the conditions of the Kovuldi mine is 145,000 soums. According to the developed mining plan, the share of additional melons in this amount should not exceed 22%. Based on this condition, we will economically compare the option that has been applied and proposed in recent history (Table 2):

2-Table

Table comparing economic indicators

Display name	IEM coal ash and unburned part	Review career red sand	White stone marble cone marble sand
1 m³ sale price, sum	14 000	16 500	21 000
1 m³ cost of transportation, sum	15 000	15 000	7 000
Manual labour claim, som	2 900	0	0
General cost, sum	31 900	31 500	28 000
Share in total cost	0.22	0.21	0.19



Conclusion.

Economic indicators satisfy the requirements of their share in the total cost amount. The specifications, on the other hand, do not meet the requirements of the 25,000 m³ fillings envisaged in the mine works plan, which means that it is not possible to provide the amount of additional coagulation enhancers needed to complete the annual plan.

The less the share of additional capacity-enhancing agents in the total cost amount, and the less the supply satisfies at least the annual need, this is considered to be of additional economic purpose.

The share of additional viscosity-enhancing agents in the total cost amount in limestone marble cone marble sand is at a minimum of 19% indicator, but does not satisfy the annual need.

Sharhia quarry red sand the proportion of additional roughness-enhancing agents in the total cost sum is on average 21% indicator, but due to the abrasiveness of red sand, pipe decay is 25 times greater.

IEM coal ash and non-combustible part share in the total cost sum of additional viscosity enhancers in the marginal 19% indicator, the supply satisfies the annual Need requirements, the physical and mechanical properties of the product are within the framework of technolic solutions.

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