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A STUDY OF FACTORS THAT NEGATIVELY AFFECT THE EFFECTIVENESS OF GRINDER DEVICES

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Abstract
The mountain crusher is the highest loaded and bulk of the drilling equipment. Much of the contribution of the operational efficiency of drilling equipment is due to the work of mountain precision flicker tools, and it has been found that many factors influence the work of a mountain flicker tool.

Keywords. Dolota, axial power, washing beloved, skvajina, Slam.

Introduction

In the process of drilling by cleaning them with compressed air, research into the temperature regimes of mountain rock flicker instruments is important. Increasing the volume of drilling work and increasing the capacity of the bottom of the technoligical well as a result of deepening it create the need to study the temperature of grinder devices and create effective ways to normalize them.

In the process of drilling Solid Rock rocks, a large amount of thermal separation is observed as a result of mountain rock decomposition, in which only 1% of the mechanical energy transmitted to the grinder is spent on the rock splitter, while the rest is scattered in the heat shrinkage, which in turn leads to an increase in the temperature of the mountain rock flicker [1].

When drilling a technological wells of high temperatures on the mountain rock flicker instrument is 10-12% [2].

The durability of grinider tools will directly depend on temperature at the bottom of the squash. The occurrence of high temperatures at the bottom of the squash leads to the formation of temperature deformations in the teeth of diamond-toothed mountain jeans flicker tools, in which cases of grinding, cracking and falling out of the matrix of the cutting edges of the teeth occur.

In the process of air-cleaning and drilling of machines, a study of the temperature of grinder instruments shows that grinding of teeth occurs when their temperature reaches up to 600℃, and cracking occurs when it reaches 800 ℃ and above. Fracture is observed on the upper surfaces of the connected part of the tooth mainly in bulky teeth, while grinding is observed on small bulky Diamond Teeth [3].

When drilling mountain rocks with firm and small abrasiveness, smooth surfaces are formed on the cutting edges of diamond teeth, in this case, the process of decomposition of mountain rocks becomes a tiring (rubbing absorption) state, and the mechanical speed of drilling is sharply reduced. Tooth grinding is evident in the process of drilling with compressed air, since the cooling of the tooth deteriorates due to the low heat capacity of the air compared to water. these situations can also be caused by mechanical tooth decay. Mechanical deformation of the tooth occurs as a result of increased axial pressure, i.e.[4]:

$$P_{\text{ўк}} > \psi \rho_N Z_{\text{Т}}, \qquad (2.1)$$

ψ - normal stable loading coefficient;
P_N-allowed normal load for one tooth, n / tooth;
Z_T is the number of teeth that simultaneously affect the bottom of the squash.
When drilling non-rigid, drilling category VII-VIII mountain wheels, mechanical deformation of the diamond teeth may not be formed, since under the influence of axial pressure, the diamond teeth completely sink into the mountain chain, in which the full load on the bottom of the squash is given through the body of the mountain chain splitter. In this case, however, a temperature deformation of the diamond teeth occurs as a result of a violation of the circulation of the washing fluid and slurring of the bottom of the squash.
The grinding teeth of the grinder instrument cause the load on the remaining teeth to increase and cause the teeth to undergo mechanical deformation prematurely, i.e. fracture and grinding. Mechanical abrasion of Diamond Teeth is often manifested in the process of drilling hard mountain rocks, which is caused by a fracture or crushing of the mountain ridge as a result of the high resistance of the tooth to subsidence. In this case, however, burnout of the teeth and deformation of the cutting edges are observed even when a non-high axial pressure is created at the bottom of the squash.
High temperature separation occurs during the process of drilling solid mountain wheels, in which the abrasiveness of the teeth of the mountain chain flicker instrument are reduced, as well as increased mechanical deformation. In the process of drilling solid rocks, temperature deformations of the grinder predominate, from which the need arises to normalize temperature factors, take into account their effect.
The issues of introducing advanced drilling technologies, that is, reducing the impact of temperature factors in the use of methods of drilling with high rev frequency and air purification, are of paramount importance.

Қаттиқ қотишма тишли ҳалқали бурғулаш коронетларининг ҳарорат режимларини ўрганиш

The increase in the temperature of the grinder instruments will depend on the power spent on the breakdown of the mountainjins and friction at the bottom of the squash, the thermophysical properties of the crumbling mountainjins, the material of the mountainjins flicker instrument, the type and consumption of the washing fluid.

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Determining the temperature of annular drilling coronks in the process of operation is considered complex, in which the average temperature of the coronka, which is formed by spreading the temperature fields in the groove formed by cutting the mountain ridge of solid alloy teeth, along the body of the coronka, is taken as its heating size. The temperature of a solid alloy threaded annular corona can be determined by the following expression:

$$t_T = \frac{2K_pN}{\pi\sqrt{\lambda_1(\alpha_1 D_1+\alpha_2 D_2)(D_2^2-D_1^2)}} + \frac{K_pN}{2Gc_p} + t_1\,, \quad ℃, \qquad (2.2)$$

here, λ_1 is the thermal conductivity coefficient of the corona material, Vt / ch (m·℃);
α_1 I α_2-thermal conductivity coefficients between the corona and Kern, between the corona and the squash, Vt/(m2·℃);
D_1 i D_2-inner and outer diameters of the corona ring, m;
t_1 - initial temperature of compressed air (over Corona), ℃;
N-power consumption of coronka at the bottom of the squash, Vt;
G-washing fluid consumption, kg / s;
cp-relative heat capacity of air, J / kg * °C;
Kp – dimensionless coefficient of heat flux propagation
:

$$К_p = \frac{1}{1+\lambda_2/\lambda_1\sqrt{a_1/a_2}}\,, \qquad (2.3)$$

here, a is the temperature permeability coefficient, m2 / s (indices 1 and 2 belong to the corona material and the mountain range).
The above expression (2.2) can be used to determine the mean of the temperature in the body of the equipment which is called coronka. This expression allows you to observe the effect on the temperature of the body of the Coronka on factors such as the capacity at the bottom of the squash, the temperature of the washing fluid, the constructive transverse dimensions of the coronka, the nature of the material and mountain range of the coronka, the temperature conductivity coefficients, the mode of action and consumption of the washing fluid. Analysis of expression 2.2 shows that there are ways to effectively cool diamond-toothed coronks when air-purged and drilling the machines. The hot temperature formed at the bottom of the squash is distributed between the body of the Corolla and the colon tube. The high thermal conductivity of the coronka material causes its temperature to be low, in addition to the High height of the coronka's ring section and the dense of the connecting resins with the colonial pipe, as well as high air consumption, and the low speed causes the coronka to cool well.
(2.2) the expression correctly reflects the Basic Laws of the temperature of the drilling Coronka. However, it is considered necessary to continue research on the normalization of temperature regimes of mountain precision instruments, the work proposed the following expression to determine the temperature of the incisors of the the teeth of equipment mentioned above which is called corona:

$$t_{тиш} = \frac{K_p N}{K_o} + t_1, \qquad ℃, \qquad (2.4)$$

It should not exceed 650℃, and 350-400 ℃ when it is a solid alloy, otherwise the hardness of the teeth will be reduced to temperature deformation.

From the expression analysis presented above (2.2), it can be concluded that when drilling technological wells with air cleaning, normalization of the temperature modes of the coronka, improvement of the koronka structure, rational selection of drilling modes and artificial cooling of the air temperature can be achieved.

Research of temperature drilling equipment with sharoshka

Today, in almost all mineral deposits of our country, compressed air is used as a washing liquid for drilling blower squats on the steps, in addition, 30-35% of the squats drilled by geology exploration parties are passed using compressed air. Drilling these technological well without Kern mainly uses tools that comprises of sharoshka.

The presence of such complex elements of sharoshkali mountain tools as teeth, ballpoint and roller supports, shell feather part in sharoshkali makes its analytical study of temperature difficult. In this case, the need arises to select a single section of the sharoshkali mountainjins flicker instrument that accurately describes the temperature regime during the study, the cross-section of the sharoshkali mountainjins flicker instrument tsapfa was selected as this part in the work:

$$t_ц = \left[\left(\frac{h}{\lambda_1 f_ц} + \frac{1}{\alpha f_л}\right)\frac{k_1 k_2}{m} + \frac{1}{2G_г c_p}\right] N - \frac{\Psi` \Delta W}{2c_p} + t_1, ℃, \qquad (2.5)$$

here, the H-tool paw is a rock-cut ball that splashes the gender of the mid-mid thickness, m;

f_{ts}, f_l is the cross-sectional surface surface surface of the base of the tsapfa and the outer cross-sectional surface of the paw, m2;

λ_1 is the thermal conductivity coefficient of the material of the mountain precision flicker instrument, Vt / ch (m·℃);

α - temperature conductivity coefficient, m2 / s;

sr-relative heat capacity of purifying air, Dj / kg·℃;

Gr-cleaning air consumption, kg / s;

N-zaboy power, Vt;

m-number of balls;

Ψ ' is the relative heat of par formation, Dj/kg;

ΔW-the proportion of moisture.

In dry mountain medicine, the expression simplifies when drilling the machines with air, as well as drilling using gas-liquid Δw=0 mix, so that the expression is obtained. K (1)= 0.1; k2 = 0.5.

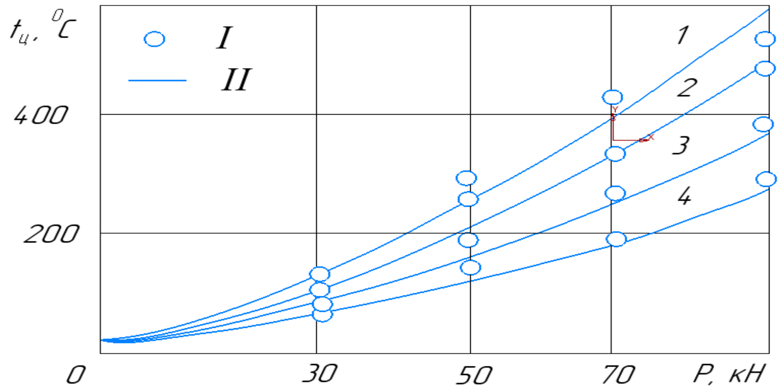
Accounting work on determining the temperature of a sharoshka of grinder using the above expression (2.5) was performed, adapted to the conditions of Experimental Research. In this case, drilling was carried out in dry granite, cleaned with compressed air, the air consumption was gr= 0.376 kg/s (QR= 17.5 m3/min), and the temperature was T1=20°C, the calculated and measured during experimental tests were given in Table 2.1.

2.1-жадвал

Number of rotations, (мин$^{-1}$)	Axial pressure, kN			
	30	50	70	90
	The temperature of tsapfa which is one part of drelling equipment			
68	68,8/60	125/150	193,8/190	273,4/300
131	87,7/80	165,7/190	261,4/270	371,9/400
242	112/110	218,1/270	348/350	498,2/500
350	130,7/120	258,2/300	414,4/450	595/550

Note: scorecards results / experimental test results.Figures 2.1 and 2.2

show a graph of the dependence of the temperature of the tsapfa, which a part of drelling equipment,of three-ball dolotes on the drilling modes at different number of revolutions and axial pressure magnitudes.

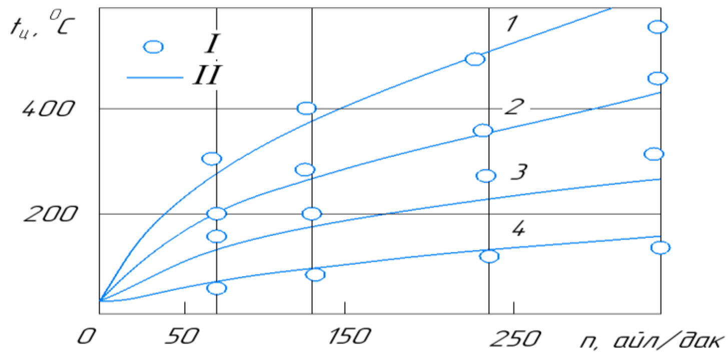


айланишлар сони:1 – 350; 2 – 242; 3 – 131; 4 – 68;

I – тажриба-синов нуқталари;

II – (2.5) ифода орқали ҳисоблар натижасидаги чизиқлар

2.1-расм. Турли айланишлар сонида уч шарошкали долоталарнинг цапфасининг ҳароратини ўқий босимга боғлиқлиги графиги



Axial pressure: 1 – 90; 2 – 70; 3 – 50; 4 – 30;

I – the results of first experiment;

II – (2.5) calculations and results

Figure 2.2 the temperature of three-ball dolotes at different axial pressures is a graph of rotation dependence

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From the graphs presented above in figures 2.1 and 2.2, it can be concluded that the results of accounting work and experiments on the executor correspond very closely to each other.

Conclusions

Analysis of the expression (2.5), which allows you to determine the temperature regime of the mountaineering grinder instrument, shows that the heat exchange surface of the sharoshkali dolota is large, the thermal conductivity of its material is high, and the high air consumption at a small speed reduces its temperature regime. Temperature regimes can also be lowered by lowering the initial air temperature.

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