IMPROVING DRILLING SPEED WHILE USING HIGH-EFFICIENCY DRILLING MACHINES IN QUARRY CONDITIONS.

Pardayev Akmal Bekmurodovich, pardayevakmal850@gmail.com

Faculty of Geology, Exploration and Mining Metallurgy, Tashkent State Technical University, Department of Mining Electromechanics, direction 5A312201-Mining machinery and equipment, master of group 13M-20.

Supervisor**: Rakhimov Anvarkhodja Akbarkhodjiyevich**, Doctor of Technical Sciences, Associate Professor.

Annotation. This research article is devoted to the discussion the effective methods and techniques of increasing the drilling speed of drilling machines in quarry conditions. An increase in the mechanical drilling speed - and torque indicates the transition of the rock-breaking tool into softer rocks. Under these geological and technical conditions, the axial load on the rock cutting tool should be reduced.

Key words: drilling machines, quarry machines, quarry conditions, mechanical drilling.

Introduction.

First of all, the drilling rig is the main machine for performing the drilling design. Performs ancillary work such as lifting drills and drilling tools and housings, removing cores, and removing drill bits into the drilling rig to drill drilling tools and bits deeper into the seam. The main function of the pump is to clean the bottom of the hole, cool the drill bit and deliver the washer to the hole to remove the drilling rig.

The value of mechanical speed for specific drilling conditions will be maximum only in the case of a certain combination of rotational speed, axial load and flow rate of the drilling fluid. The mechanical speed of drilling also depends on the hardness, elasticity, plasticity and other properties of rocks.

With surface destruction of rocks, an increase in the mechanical speed of drilling occurs in proportion to an increase in the frequency of rotation of the bit. The rotation frequency increases the efficiency of rock destruction, however, with its increase, the duration of contact of the bit teeth with the rock decreases. To prevent a possible decrease in the efficiency of rock destruction, with an increase in the rotational speed, it is necessary to increase the axial load.

Main body.

A positive effect on the process of destruction of the rock is exerted by the flow of drilling fluid coming out of the jet nozzles of the bit. In this case, the following conditions must be met:

— The fluid flow should exert pressure "P" on the bottom;

— The velocity of the jet relative to the bottomhole “V” must be less than the value depending on the fluid flow “P” and the strength of the rock “P”.

Relationship between fluid flow and rock strength at V = 0.5 m/s:

$P > K * P$;

K - Experimental coefficient \u003d 0.25 - 0.35.

In the case of the correct choice of drilling modes, volumetric destruction of the rock is ensured. However, due to various technical and technological difficulties, as well as due to ignorance of the abrasive, strength, plastic and elastic properties of rocks, the choice of optimal drilling modes is a very problematic task. One of the solutions to this problem is the use of generalized indicators that characterize the properties of rocks.

One of these indicators is drill ability. Drill ability is the mechanical rate of penetration, or deepening of a well in 1 hour. Drill ability tends to decrease exponentially over time due to the wear of the rock cutting tool.

Discussion and results.

An increase in the mechanical drilling speed by 20%, a 2–9 times increase in the depth per bit, and a 12% increase in core recovery is due to a decrease in tool vibration due to lubrication.

The increase in the mechanical drilling speed while maintaining the operating time of the bit is explained by loading the bit with an additional axial load due to the reduction of its dynamic component.

An increase in the mechanical drilling speed in the transition zones of the AHRP, due to a decrease or even a change in the sign of the differential pressure, leads to a noticeable increase in the content of cuttings carried by the flushing solution to the surface and separated from its flow on vibrating screens. With a decrease in the pressure drop at the bottom hole, as is known, the conditions for cleaning the bottom hole zone from cuttings particles are improved. This facilitates the separation of drilled particles from the rock mass and significantly reduces the possibility of their secondary grinding. As a result of the increase in the amount of cuttings on the vibrating screen, an increase in the size of drilled clay particles is observed.

An increase in the ROP may also be due to changes in the lithology of the rocks being penetrated. In cases where uncertainty arises, it is necessary to carefully analyze the situation with the involvement of other sources of information for control. In these cases, more reliable results are obtained by using methods for detecting pressure imbalance at the bottom of the well.

An increase in the mechanical drilling speed in the transition zones of the AHRP, due to a decrease or even a change in the sign of the differential pressure, naturally leads to a noticeable increase in the amount of cuttings carried by the flushing solution to the surface and separated from its flow on vibrating screens. As the value of the pressure drop at the bottom hole decreases, as is known, the conditions for cleaning the buttonhole zone from cuttings particles improve. This facilitates the separation of drilled particles from the rock mass, and the possibility of their secondary grinding is significantly reduced. Along with an increase in the amount of cuttings on the vibrating screen, an increase in the size of drilled clay particles is also observed.

The increase in the mechanical speed of drilling wells also depends on the quality of the drilling fluid used. Here are some results of the study of the effect of oil additives to slurry on the ROP of wells.

Increasing the mechanical drilling speed of a machine tool by a factor of two increases labor productivity by only 1 2 - 1 3 , and mechanization of auxiliary operations, allowing the maintenance of at least two machines (two spindles), will lead to an increase in labor productivity by about two times.

The introduction of a percussion-rotary method of drilling wells with hydraulic hammers and pneumatic hammers and the introduction of optimal modes contributes to an increase in the mechanical speed of drilling. Unfortunately, the speed of auxiliary operations, and first of all tripping, increases much more slowly. And this leads to the fact that with an increase in mechanical speed, the percentage of pure drilling time decreases. There are prerequisites that in the near future the mechanical speed will reach 6 m / h, which will lead to an even greater reduction in clean drilling time. The increase in the depth of exploration wells contributes to a decrease in the time of pure drilling. It is known that the time spent on tripping operations increases exponentially with increasing depth. With an increase in the mechanical speed of drilling, the difference in performance when using candles 6 and 18 m increases.

The latter is achieved by increasing the mechanical drilling speed by 10 - 12 times; increasing bit life (increasing penetration per trip and reducing bit consumption by 10 times or more); no costs associated with the preparation and delivery of flushing fluid, etc.

An increase in thrust leads to an increase in ROP in almost direct proportion. As it was found, the value of the axial force is determined mainly by the temporary resistance of the rock to crushing.

In the area of insufficient bottom hole cleaning, the rate of increase in the mechanical speed of drilling also decreases in proportion to the specific load - the curves BC, BC form an obtuse angle with the abscissa axis. The same is observed in the area of maximum deepening and in the area of unsatisfactory buttonhole cleaning.

Conclusion.

In mining and exploration workings of a limited cross-sectional area, it is advisable to perform the main production processes of the tunneling cycle sequentially. Under these conditions, it is difficult to achieve a reduction in the bottomhole area per one drilling machine to 1 m2, since this is associated with an increase in the number of drifters in the bottomhole, which is not always profitable and expedient. That is why it is believed that when mining exploration workings of small sections, the face area per one drilling machine should be 1.8–2.8 m2.

The main reserves for increasing the productivity of drilling holes are the following areas:

- use of advanced drilling equipment and tools;
- reduction in diameter and increase in the depth of holes;
- ensuring optimal pressure of compressed air;
- proper organization of the process of marking and drilling holes, the use of automated control systems for marking and drilling holes;
- rational organization of the process of manufacturing and sharpening of drilling tools.

REFERENCES:

1. **Системы мониторинга и управления для мехфонда**
   Опыт и оценка эффективности внедрения систем погружной телеметрии Анализ результатов ОПИ интеллектуальных станций управления Опыт внедрения систем мониторинга и управления для механизированного фонда скважин в ТНК-ВР, «Сургутнефтегазе», «РН-Юганскнефтегазе», «ЛУКОЙЛ-Западной Сибири», НГК «Славнефть», «Газпромнефть-Хантосе», «РН-Пурнефтегазе», «РН-Ставропольнефтегазе», «Томскнефть ВНК», «ЛУКОЙЛ-ПЕРМИ»
2.

3. O‘zbekiston Respublikasi sanoatda, konchilikda va kommunal-maishiy sektorda ishlarning bexatar olib borilishini nazorat qilish davlat “Sanoatkontexnazorat” inspeksiyasi boshlig‘ining buyrug‘i. https://lex.uz/docs/-1872747
4. https://vseoburenii.com/vliyanie-parametrov-rezhima-bureniya-na-mehanicheskuyu-skorost/
5. https://studref.com/364078/geografiya/osnovnye_napravleniya_povysheniya_effektivnosti_burovzryvnyh_rabot
6. https://www.ngpedia.ru/id531102p1.html
7. https://www.ngpedia.ru/index.html
8. Kizi S. G. G. Formation Of Independent Reading Skills in Primary School Students //Texas Journal of Multidisciplinary Studies. – 2021. – T. 2. – C. 222-224.
9. Qizi S. G. G., Teshaboyevna D. D. Methods Of Formation Of Independent Reading Skills In Primary School Pupils //JournalNX. – C. 21-24.
10. Habibiloyevna M. D. The Semantic Analysis of Slang in The Movie “School” //Journal of Pedagogical Inventions and Practices. – 2021. – T. 3. – C. 83-85.
11. Madazizova D. X. SOME LINGUISTIC PECULARITIES OF SLANG //Scientific progress. – 2021. – T. 2. – №. 7. – C. 1277-1278.