

## IMPROVING THE PRODUCTIVITY OF WELL DRILLING MACHINES.

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**Annotation.** The main purpose of this work is to study the methodology for calculating the regime parameters of mine drilling rigs, the mechanical speed of drilling, productivity, the number of drilling rigs to ensure the specified amount of work. In the process of development of various deposits and exploration of rocks, the correct selection of the type of blasting well drilling is one of the important factors that ensure the efficiency of mining operations.

**Key words:** Drilling, well, column, auger, rotor, rock.

The main advantages of rotary percussion drilling machines are the conservation of impact energy on the drill bit of a down-the-hole pneumatic hammer, regardless of the depth of the well, and the possibility of applying a large torque to the drilling tool.

An essential tool for improving the productivity of drilling with pneumatic hammers is the use of thrust regulators. They allow you to increase the ROP by 15-20% and at the same time reduce bit consumption.

To increase the efficiency of rotary percussion drilling machines, an increase in the impact energy by 2-3 times is required, i.e. increasing the supply pressure of compressed air. Also, drilling efficiency can be increased by increasing the speed of rotation of the drill bit, changing the angle of rotation of the working tool for 1 hit. The performance and durability of machine tools can also ensure the normal condition of their work and compliance with the rules of operation.

Since rotary drilling is the main method of drilling wells, it should be considered in more detail. The rotary drilling method is divided into three types:

- Columnar.
- Auger.
- Rotor.

The rotary drilling method can be used to drill rocks of different strengths, therefore, rotary drilling is divided into three subtypes, each of which has its own purpose and characteristics. The general process of rotary well drilling is not much different, but each method is acceptable only if certain criteria are met.

You may need a drilling rig for various purposes, for example, to drill a well to access natural resources (water, oil, geothermal energy, etc.), to lay foundations, to open blastholes in mines, collect samples for work and in other cases. It is important to determine how the drilling rig will be used, that is, in which jobs it will be used. Depending on the job, there are different models of drilling rigs. To make the right choice, it is important to determine whether the drilling rig will be used for your main work or for one-time operations, whether you want to invest in the latest innovations or a machine that has proven itself for several decades. Security, reliability and ease of use are also important elements to consider and are directly related to each other.

The shift productivity of drilling rigs is calculated as follows.

$$P_{sm} = \frac{T_{sm}}{T_o + T_v} * Ku.m. = \frac{12}{0.1 + 0.083} * 0.875 = 57 \text{ m/time}$$

$T_{sm}$  = - shift duration,  $T_{sm} = 12$  hours;

$T_v$  - the duration of auxiliary works performed for drilling a well,  $T_v = 2 - 5 \text{ min} = 0.083$  hours;

$T_o$  - the duration of the main works to drill a well,  $T_o = 1/V_b = 1/10 = 0.1$  m/hour

$V_b$  is the technical speed of the drilling machine,  $V_b = 8-10$  m/h

$K_{u,m}$  - coefficient of utilization of working time in one shift.

To increase the productivity of drilling rigs, it is necessary to reduce the volume of tripping operations when drilling wells and reduce their duration. Increasing the productivity of a drilling rig under the condition of its normal operation, which is characterized, first of all, by reliability and durability. Failures of electrical equipment (or associated mechanical equipment) in the conditions of production and exploration wells, at a significant distance from the repair bases, can lead to losses that significantly exceed the level of savings.

The introduction of this organizational form ensures: the continuity of the well construction process and their planned commissioning; production of the most complex section of installation and dismantling works - removal, transportation and installation of the rig unit by specialized rigging teams, whose members are financially interested in improving the final results of the work of drilling teams; the release of drilling foremen from work on the construction of drilling rigs, which allows them to focus all their attention on technological issues; increasing the responsibility and interest of members of drilling and rigging crews in the preservation and careful use of materials, tools and equipment; increasing the productivity of drilling rigs on the farm; reduction in the share of depreciation charges in the cost of drilling operations due to a reduction in the fleet of drilling rigs; more rational use of the calendar time of drilling crews in the performance of all work; simplification of accounting for the results of the work of rigging and drilling crews.

The main competitive advantage of dump trucks compared to other types of trucks is the ability to quickly unload. However, loading the machine takes a relatively long

time, especially if performed manually. As a result, this approach significantly reduces the efficiency of dump trucks.

A well-organized loading mechanism (for example, using a manipulator or excavator to continuously load successive machines) speeds up this process, allowing you to reduce the time it takes to complete one trip.

Significantly speed up the process of loading dump trucks equipped with a crane, grab or bucket. Although they have a slightly reduced carrying capacity, they allow you to save on attracting additional equipment and personnel. Due to this, the average downtime of machines is reduced and the speed of flights is increased.

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