

Modern Drilling Machines and Their Parameters

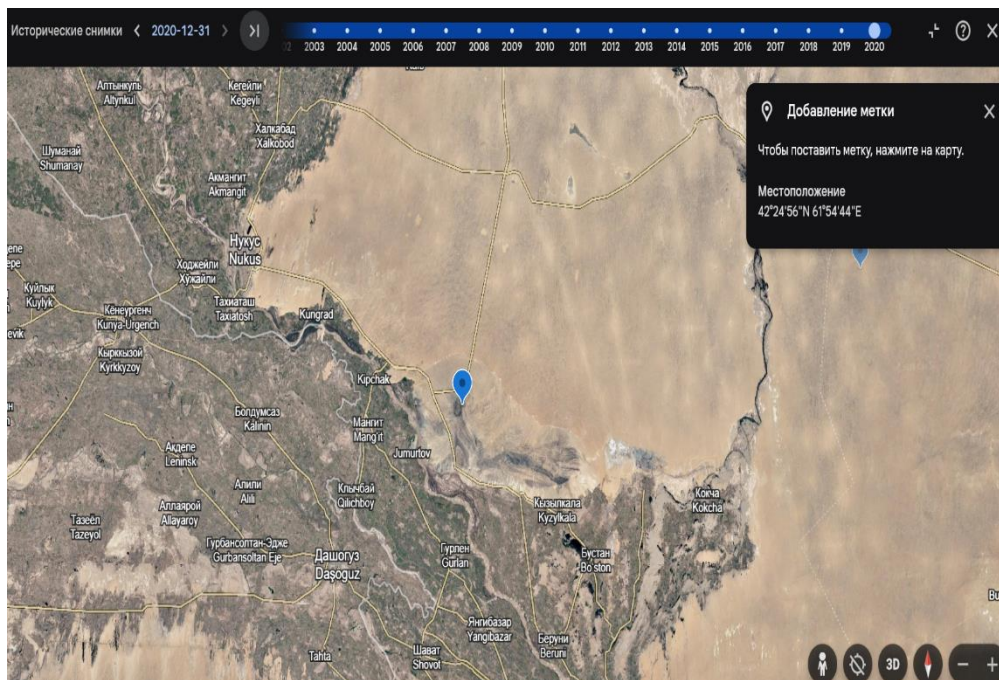
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Abstract: This article discusses the advantages of using modern, innovative types of drilling machines as a promising plan to improve the drilling processes of planned excavation works at the “Tebinbuloq” deposit. It outlines the benefits and main challenges of using these advanced drilling machines, comparing the latest generations of drilling machines that offer broad convenience and productivity. The article provides a detailed comparison of alternative types of drilling machines that are economically and technologically suitable for the “Tebinbuloq” deposit.

Keywords: Kaishan, Epiroc, Sandvik, drilling machines, rock hardness, remote control panel, Tebinbuloq deposit.

The Tebinbuloq deposit is located in the Republic of Karakalpakstan, Uzbekistan, approximately 8 km from the Qora o'zak station and about 16 km from the Qoratau village, in the north-western part of the Sultonuvays mountain range.



Picture- 1:

Location coordinates of the Tebinbuloq deposit. (Image obtained using the “Google Earth” program).

The main ore-forming minerals in the deposit are titanomagnetite, ilmenite, chalcopyrite, and others. The initial estimated reserves of the deposit amount to 452.3 million tons, with a chemical composition primarily consisting of iron (15-16%), titanium (2-3%), and vanadium (0.15%). The average hardness of the rock in the explored area ranges from $f=9$ to 13 on the Protodyakonov scale. Currently, KAISHAN KT-9C diesel-powered drilling machines are actively operating at the

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deposit. Based on this, we will list the new alternative types of drilling machines in accordance with their parameters, such as drilling depth, diameter, energy consumption, and others.

Drilling machines proposed as alternatives to the KAISHAN KT-9C:

- EPIROC - PowerROC D45 model
- EPIROC - FlexiROC D50 model
- SANDVIK - Ranger DX800RT model

The manufacturers and models of the drilling machines listed above have similar operational parameters, such as drilling depth and diameter, which are almost the same as those of the KAISHAN KT-9C model used at the Tebinbuluq deposit. The following table provides more detailed information on the advantages and disadvantages of these drilling machines compared to the existing KAISHAN KT-9C model.

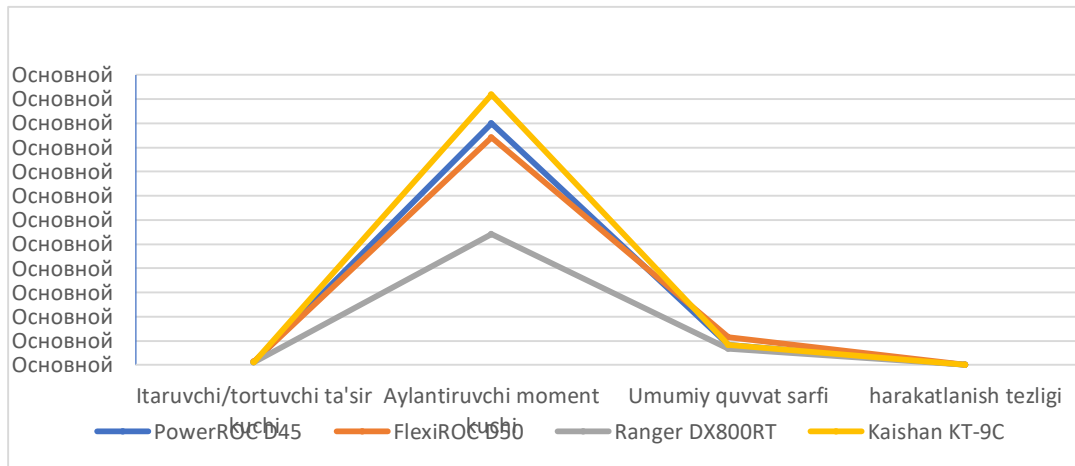


Picture-2.

Kaishan KT-9C Technical specifications of the Kaishan KT-9C drilling □

Rotary/traction force: 32 kN;
Rotational moment: 2800 Nm;
Drill rod rotational speed/frequency: 120 rpm
Total power consumption: 205 kW;
Movement speed: 2.5/4 km/h;
Drilling (borehole) diameter: 100-125 mm; Drilling depth: 21 m.

Based on the above-mentioned tables, we will create a single priority chart for all proposed and existing drilling machines:



Picture-3: Graph depicting the proportionality and disproportion of the drilling machines.

Through this diagram, we can observe how suitable the alternative drilling machines, proposed as replacements for the existing Kaishan KT-9C model, are, as well as their main advantages and disadvantages. For example, the graph shows that the Ranger DX800RT model may not be a suitable option in terms of some parameters, but other parameters are quite similar to each other.

CONCLUSION

Drilling machines are one of the important pieces of equipment in industry, widely used in metallurgy, machinery manufacturing, and other sectors. Modern drilling machines have high precision, strong work efficiency, and energy-saving features. The main parameters of these machines, such as drilling speed, torque, friction coefficient, material and geometry of the tools, and the shape and material of the parts being produced, are adjusted depending on the requirements. Modern drilling machines are mainly based on CNC (Computer Numerical Control) technology, which ensures a high level of automation. With the help of these technologies, drilling processes are precisely and efficiently controlled. Furthermore, new materials and technologies are being applied in these machines to save energy and improve product quality.

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