



## DRILLING EQUIPMENT AND THEIR PARAMETERS IN THE PREPARATION OF ROCKS FOR THE TEBINBULOK MINE

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### ABSTRACT

*This article describes the advantages and main disadvantages of using modern, innovative types of drilling machines as a promising plan to further improve the drilling processes of the planned excavation works at the Tebinbulak mine. It provides more detailed information about alternative types of drilling machines that are economically and technologically feasible for the Tebinbulak mine, comparing the latest generations of drilling machines with a wide range of convenience and productivity.*

**Main part:** The Tebinbulak deposit is located in the Republic of Karakalpakstan, Uzbekistan, 8 km from the Karaozak station and approximately 16 km from the village of Qaratau, in the northwestern part of the Sultanuvais mountain range. Triangul Metals uses modern enrichment technologies that allow it to convert this ore into a concentrate with an average iron content of 67%, which ensures the economic viability and sustainability of the deposit. Currently, additional geological exploration is underway at the Tebinbulak deposit. Upon completion of the additional exploration program, reserves are expected to reach 500 million tons, and the total reserves of the deposit will reach 1.5 billion tons. [1].

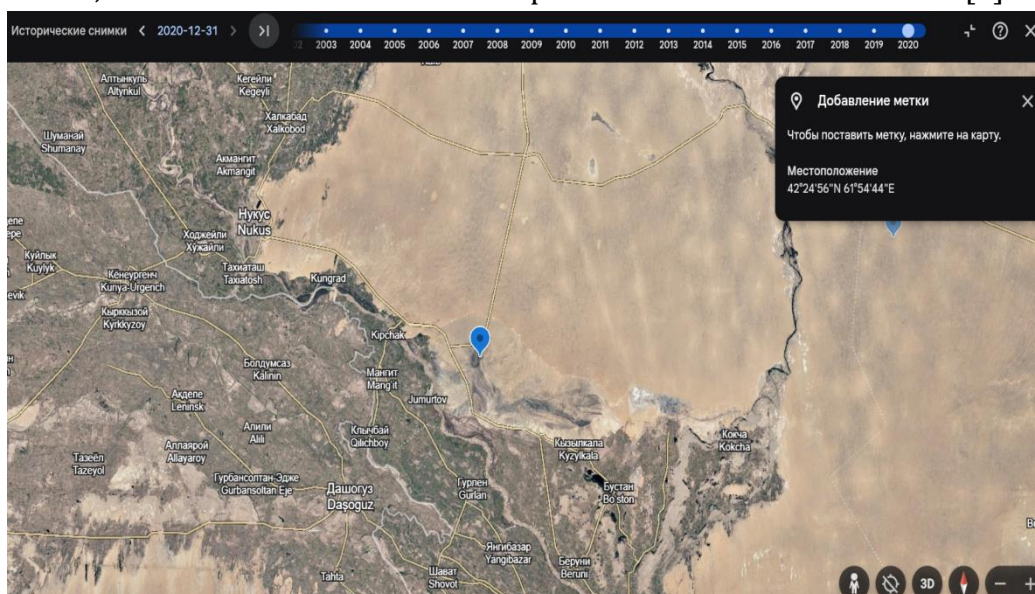


Figure 1: Location coordinates of the Tebinbulak mine. (Image taken using Google Earth)

The main ore-forming minerals in the deposit are titanomagnetite, ilmenite chalcopyrite, etc. [2]. The initial estimated reserves of the deposit are 452.3 million tons, and the chemical composition is mainly iron 15-16%, titanium 2-3%, and vanadium-0.15% [3]. The average hardness of the rock in the study area is  $f=9\div 13$  on the Protatyakonov scale.

At the same time, 13 “Sany SET150S” dump trucks with a lifting capacity of 150 tons were delivered to the Tebinbulok TKK (mining and mining complex).

The development of an ESK (experimental industrial quarry) is an important part of the process of developing a mineral deposit. The efficiency of quarry mining and the yield of minerals depend on the selection of quarry equipment and the quality of its operation.

Drilling rigs offered as an alternative to KAISHAN KT-9C:

- EPIROC- PowerROC D45
- EPIROC- FlexiRoc D50
- SANDVIK- Ranger DX800RT

The operating parameters of the drilling rigs, the names of the manufacturers and models of which are given above, i.e. drilling depth, diameter, and overall ratio, are selected to be almost the same size as the KAISHAN KT-9C drilling rig in the Tebinbulak mine. The table below provides more detailed information about the advantages and disadvantages of these drilling rigs compared to the current drilling rig.



Figure 2: Kaishan KT-9C

Table 1:

Technical specifications of Kaishan KT-9C drilling machine [4].

KAISHAN KT-9C		
Push/pull forces	32	kN
Rotating torque force	2800	Nm
Speed / frequency of rotation of the dolota	120	R/min
Total power consumption of the machine	205	kW
Speed of movement	2,5/4	Km/h
Drilling (squash) diameter	100-125	mm
Drilling depth	21	m



Figure 3: PowerROC D45

Table 2:

PowerROC D45 drilling machine specifications [5].

PowerROC D45		
Push/pull forces	25-30	kN
Rotating torque force	1600-2500	Nm
Speed / frequency of rotation of the dolota	90-100	Ay/min
Total power consumption of the machine	205	kW
Speed of movement	3,16	Km/h
Drilling (squash) diameter	90-130	mm
Drilling depth	29	m



Figure 4: FlexiROC D50

Table 3:

FlexiRoc D50 drilling machine specifications [6].

FlexiROC D50		
Push/pull forces	25-35	kN
Rotating torque force	1839-2350	Nm
Speed / frequency of rotation of the dolota	107-137	Ay/min
Total power consumption of the machine	287	kW
Speed of movement	3,24	Km/h
Drilling (squash) diameter	90-130	mm
Drilling depth	45	m

One of the main advantages of the above-brought FlexiROC as well as PowerROC drilling machines to other types is the presence of a remote control panel provided by the Epiroc company, the employee can control drilling machines of several drilling Epiroc models at the same time [7].



Figure 5: Ranger DX800RT

Table 4:

Ranger DX800RT drilling machine specifications [7].

We make a single priority graph for the proposal and all applicable drilling machines,

Ranger DX800RT		
Push/pull forces	20-30	kN
Rotating torque force	1355	Nm
Speed / frequency of rotation of the dolota	58	Hz
Total power consumption of the machine	168	kW
Speed of movement	3,5	Km/h
Drilling (squash) diameter	76-127	mm
Drilling depth	29	m

making the above tables general:

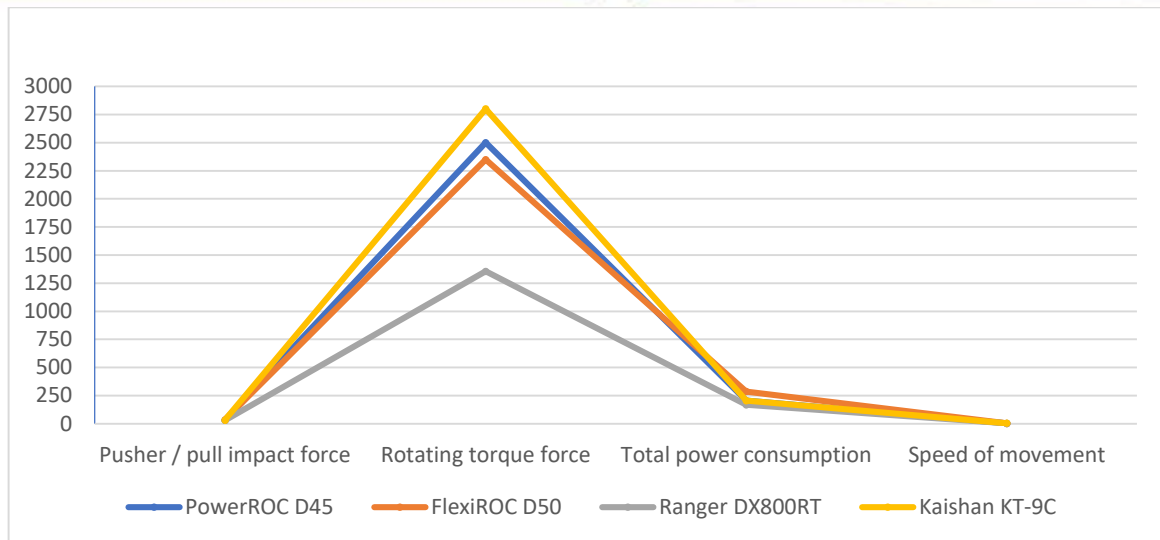


Figure 6: Graph depicting the proportionality and disparity of drilling machines.

Through this diagram we can see how suitable and main priority and disadvantages of other types of drilling machines that we have proposed as an alternative alternative for the current Kaishan KT-9C drilling machine, as can be seen from the parable graph Ranger DX800RT drilling machine some of the pointers cannot be a worthy option but some of the remaining.

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