

Job Report

Mining Excavator

R 9150

The Liebherr R 9150 Mining Excavator
at Udachny kimberlite (diamond) mine, Russia
Operated by ALROSA



LIEBHERR



Key Facts

- ALROSA, the world's leading diamond miner
- Extreme mining conditions: vary from -55°C to $+40^{\circ}\text{C}$
- Kimberlite, a very hard and abrasive rock
- 136 t mining truck loaded in seven passes
- Liebherr developed a specific climate solution, called Arctic Package
- Liebherr service specialists provide 24/7 support on site

Situation

ALROSA, the world's leading diamond miner, is operating the "Udachnaya" kimberlite pipe which is the largest, both by scale and reserves, diamond mine in Western Yakutia, Russia. The working conditions and the climate at this site are extremely harsh as mining is being done in permafrost ground where temperatures vary from -55°C to $+40^{\circ}\text{C}$ (-67°F to $+104^{\circ}\text{F}$). When thermometer marks -78°C (-108°F), working in these environments affects all types of mining equipment extensively: standard fabricated rubber products soon get brittle while working fluids thicken and steel reaches its strength limit at -50°C (-58°F).

Located far away from cities and basic infrastructure facilities, the Udachinsky mine can only be reached via air or temporary winter roads that are carved from snow and ice. As there is no fast way of getting to the mine, the delivery of equipment, spare parts and maintenance materials can be complicated.

The transportation chain at the Mining Processing Plant Udachinsky GOK is based on mining trucks with a capacity varying from 40 to 136 metric tons (44 to 149 short tons). Predominantly these trucks are used for the removal of overburden and the transportation of kimberlite. To ensure the mine's continuous production, mining equipment are working on a 24/7 basis. This requires very efficient loading tools that are capable of handling no less than 20,000 tons of material per day. Extremely reliable and highly efficient excavators means that the company imposes very strict specifications for each new piece of equipment. Therefore, in order to meet ALROSA's requirements, a Liebherr R 9150 mining excavator has been chosen to fulfil this challenge.

High monthly production for the R 9150

Once the Liebherr R 9150 mining excavator was delivered to the ALROSA mining site in 2014, the machine was commissioned and successfully passed tests in these severe conditions.

As well as the freezing climate, the mined material is an additional challenge for the equipment, as kimberlite is one of the hardest and most abrasive types of rock in the world. This leads to intensive wear on the excavator parts such as sticks, booms, buckets and tracks. This R 9150 is equipped with an 8.3 m³ (10.9 yd³) heavy-duty backhoe bucket specially designed for handling hard, abrasive and frozen rock. This bucket is exceptionally durable and resistant to wear: it penetrates the material with ease and is characterised by a very high fill factor. In addition, larger track pads have been mounted on the undercarriage of this R 9150 to reduce the

applied ground pressure and also provide better machine stability during operation. To minimize downtime and damage, the machine is also equipped with a piston rod guard for the bucket cylinder. This robust steel cover protects the cylinder from being damaged by falling rocks.

Throughout operation, the R 9150 proved to be a highly reliable and productive machine capable of withstanding extreme environmental conditions and continuously working on a 24/7 basis. Although this R 9150 mining excavator is digging hard material, it loads a 136 t dump truck within just seven passes, while the average duration of one cycle time is 24 sec, resulting in a very high monthly production of 250,000 m³ (327,000 yd³), which represents over 90 % of machine availability.

Liebherr Arctic Package secures R 9150 high performances

For Russian operators it is crucial to be able to start engine at temperatures as low as -50°C (-58°F), sometimes even lower. To meet the customer's requirements, Liebherr provides specific climate solutions for its equipment, called Arctic Package. This kit comprises a broad array of devices that ensure easy start up and consistent and uninterrupted work at extremely low temperatures.

The operator comfort is optimized thanks to the various additional options installed inside the cabin. To maintain warm air, the driver has access to additional heating, better cab insulation, double glazing and front and side window defrosting.

To avoid the cooling of the engine compartment during machine downtime, a special connection with a duct below the engine and the splitter box allows warm air to be brought from an external heater. The Liebherr Arctic Package also offers a pre-heating system for hydraulic oil, fuel and engine coolants, specific cold temperature fluids and includes also insulation of heating hoses in order to reduce the dissipation of heat. The pre-heating of the machine is possible thanks to the use of a genset disposed on the ground. This avoids the genset not to be subject to machine vibrations and also allows the customer to use it easily elsewhere in the mine site.

Dedicated Liebherr customer service on site

Continuous operation of the machine and extreme working conditions require constant on-site presence of service specialists. In view of this, Liebherr set up a service support point on the premises of the Mining Processing Plant Udachinsky GOK. Here, two Liebherr service engineers are always present, providing 24/7 support and ensuring the machine's uninterrupted operation. Additionally an on-site stock of spare parts was implemented, guaranteeing top-quality maintenance and timely repairs.





Technical Data

Operating weight	128 tonnes/141 tons
Engine model	Liebherr D9512, 12 cylinders
Engine output	565 kW/757 HP at 1,800 rpm
Fuel tank	1,984 l/524 gal

Backhoe Attachment

Bucket capacity @ 1.8 t/m ³ (3,035 lb/yd ³)	8.3 m ³ /10.9 yd ³
Max. digging force (SAE)	530 kN/119,149 lbf
Max breakout force (SAE)	620 kN/139,381 lbf