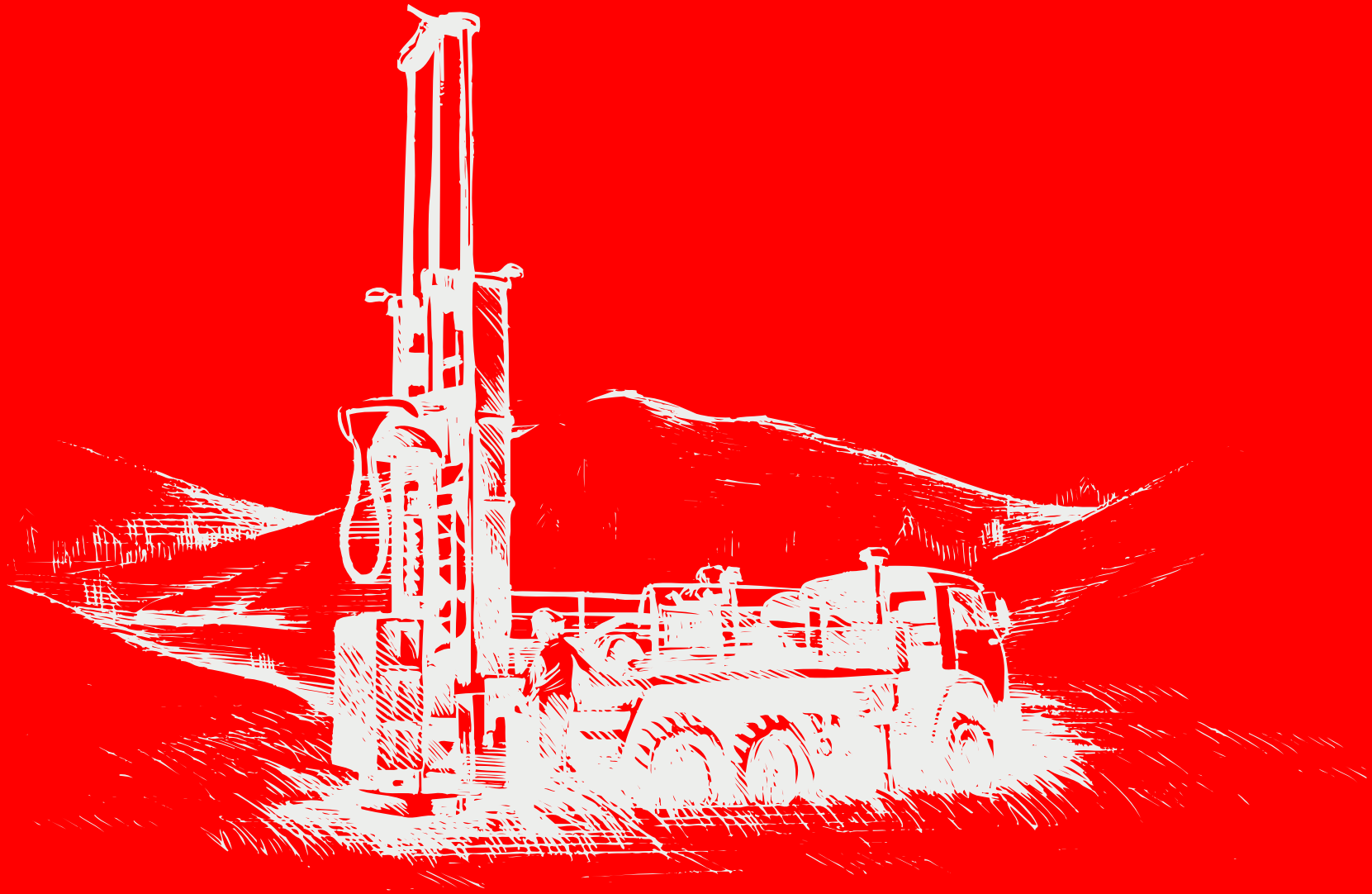




Drill rigs of the LBU family

Effective drilling solutions





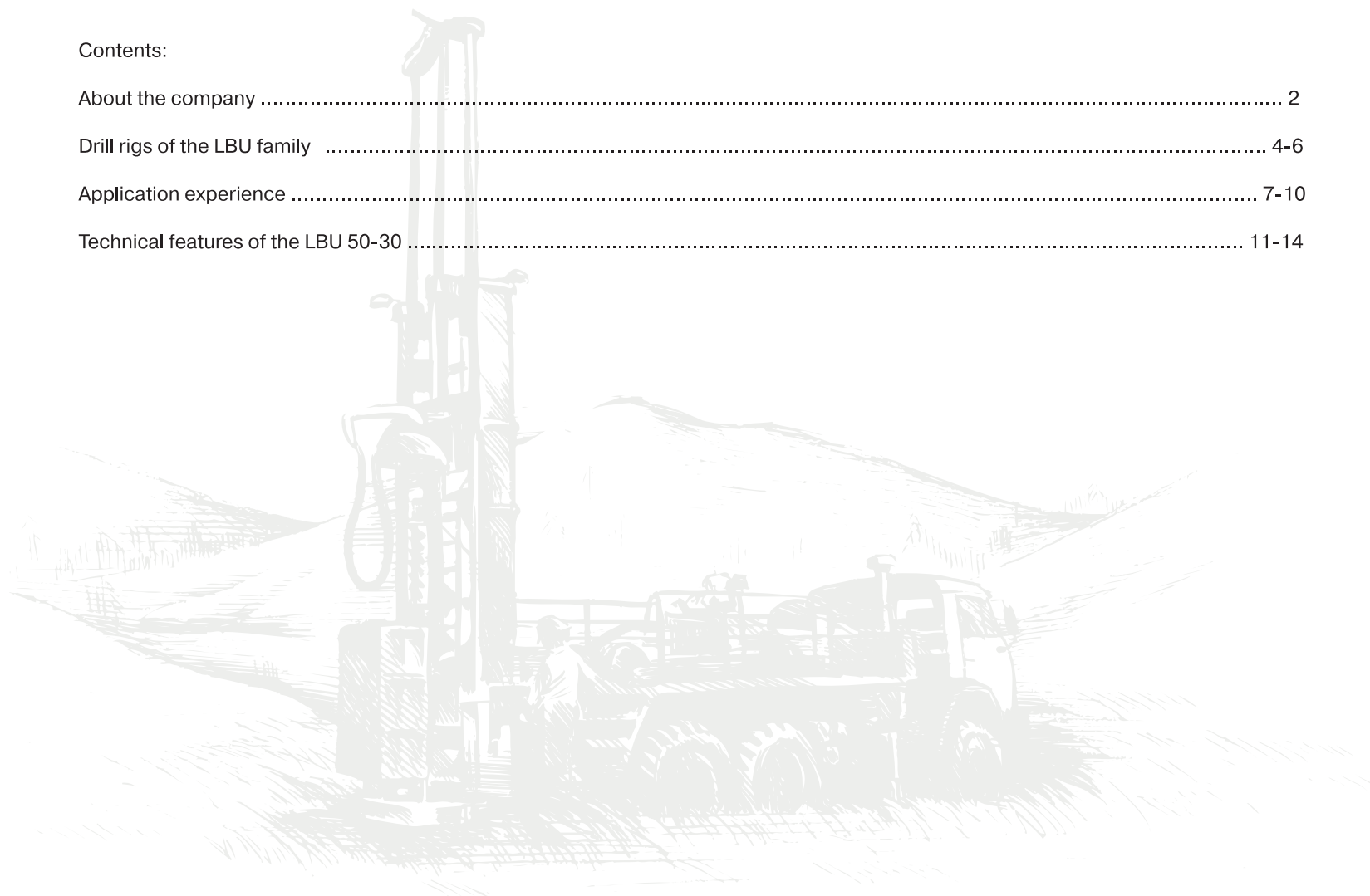
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LLC Geomash manufactures a wide number of universal drilling rigs for solution of tasks in the field of drilling of exploration wells, seismic exploration, engineering researches, drilling of wells of different function when performing construction works, and also hydrogeological wells.

For more than 130-year of the company history a lot of things changed, invariable was only one — our aspiration to create drilling equipment capable to provide effective drilling for our partners.

The "Geomash" quality management system conforms to the ISO 9001:2008 standard concerning design and production of mobile drilling rigs, spare parts and boring tools.

Detailed knowledge of technological drilling processes and problems which our buyers face in the course of drilling give the chance to create the drilling rigs which are most adapted for the geological conditions and tasks solved by our buyers.

Today the company has more than 1000 employees, production sites are located in the cities of Shchigra, Vladimir (Russia) and Nordkhouzen (Germany).

In 2011 "Lutz-Kurth" - the German producer specializing on production of small-sized boring equipment and boring carriages became a part of the Geomash company. "Lutz-Kurth" motto is to make machines small on dimensions and highly productive in work.

Companies of various activity profile successfully operate with "Geomash" products.

Largest geophysical organizations are constant partners of Geomash.

Among them are gas-and oil-extracting enterprises, such as JSC Gazprom, Lukoil, Transneft, Rosneft and others.

Our delivery geography isn't limited to the territory of the Russian Federation and includes countries of the Near and Far-abroad countries.



We seek to turn our knowledge and experience in the area of development and production of drilling rigs into competitive advantages of our partners.



Multipurpose drilling rigs of the LBU-50 family are intended for drilling of wells of different function when performing construction, technical, hydrogeological works and water supply wells, at engineering researches and geological surveying. The LBU-50 drive is carried out from the transport base engine via the PTO. LBU-50 is mounted on the chassis of various trucks, including ZIL-131, URAL, KAMAZ.

Mobile rotator in combination with the powerful hydraulic feeder allows to create considerable axial load of the rock cutting tool from the first meters of drilling.

The LBU-50 rotator design provides possibility of its diversion from a well axis for performance of hoisting operations, installation of casing columns and realization of free-fall boring with use of the boring winch.

Drilling rigs of the LBU-50 family possess high rates of technical characteristics and modern constructive decisions:

- frequency rotation range of 14-220 rpm allows to use various boring tools, including hard-alloy crowns, bladed and core chisels
- carriage course of 3900 mm makes it possible to use elements of the bottom hole assembly and drill pipes with a standard length of 3200 mm - 3500 mm
- hydraulic mud pump or compressors allow to smoothly change their performance





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Multipurpose LBU 50-30 drilling rig with a hydraulic drive of a mobile rotator

Purpose:

- drilling of hydrogeological wells
- drilling of water supply wells
- drilling of wells of different function when performing construction works, engineering researches geological exploration

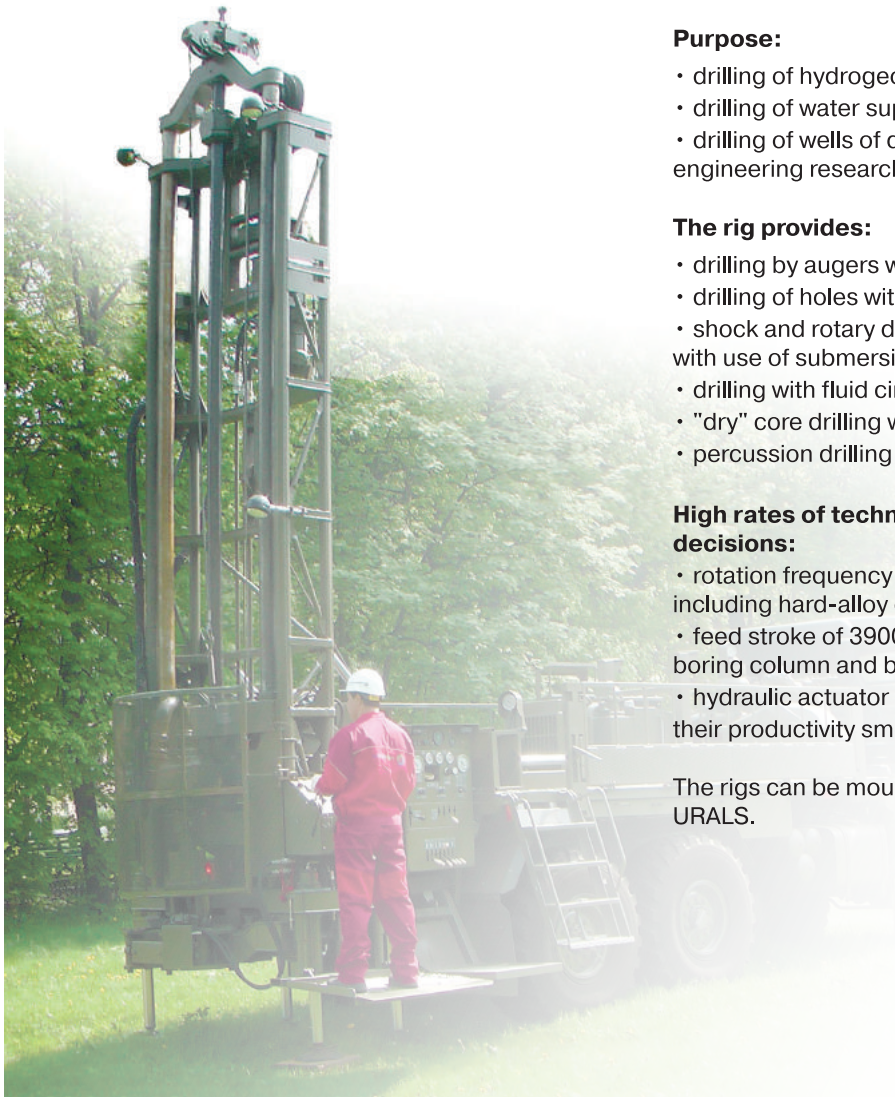
The rig provides:

- drilling by augers with a diameter up to 500 mm
- drilling of holes with a diameter of 1050 mm
- shock and rotary drilling with a diameter up to 550 mm with use of submersible pneumoshock cars
- drilling with fluid circulating/airflush with a diameter up to 490 mm
- "dry" core drilling with a diameter up to 172 mm
- percussion drilling with a diameter up to 168 mm

High rates of technical characteristics and modern constructive decisions:

- rotation frequency range of 0 - 200 rpm allows to use various boring tools, including hard-alloy crowns, bladed and auger chisels
- feed stroke of 3900 mm gives the chance to use bottom elements of the boring column and boring pipes of standard length of 3200 mm - 3500 mm
- hydraulic actuator of the boring pump or compressors allows to change their productivity smoothly

The rigs can be mounted on the chassis of various trucks, including KAMAZ, URALS.





Technical characteristics	
Hole depth, meters:	
Auger drilling	60
Auger bore drilling	25
Auger bore sliding along the rods	16
Mud Rotary drilling	200
Air Rotary drilling	100
DTH drilling	50
Hole diameter, mm:	
Auger drilling	500
Auger bore drilling	850
Mud Rotary drilling	190.5
Air Rotary drilling	190.5
DTH drilling	550
Rotary Torque, kgm	2000
Rotary speed, rpm	14-220
Feed stroke, mm	3900
Retract force, kgf	12000
Pushdown force, kgf	6200
Winch	
Type	Free fall
Load carrying capacity, kgf	3000

For alignment of rigs before operation hydraulic jacks are provided.

Equipment set (on demand):

- boring pump NB-80
- winch
- clamping hydraulic table for upsetting pipes
- work desk
- tool transportation trailer





The LBU-50 family application experience

The LBU 50-30 hydrodriving rig at construction of water wells as a part of the special complex

Construction of temporary wells with depths to 60m with use of special boring tools in the form of hollow auger colons which are meant not only for transportation of drilled solids, but at the same time carries out functions of a temporary upsetting colon. Hollow augers are equipped with a water intake, filter element, electric pump.

Upon completion of the well operation, the upsetting auger colon is extracted.

Productivity of the pump equipment for water rising on the wells surface - 6.5m³/hour.

Drilling is carried out in soft breeds of the IV category of drilling capacity with a drilling diameter of 250mm.

Approximate operation preparation time of the drilling rig is 15 min. Time of temporary wells production on a depth of 60 m makes 4-5 hours.

Drilling with a simultaneous upsetting by the shock and rotary drilling method with application of submersible pneumatic impact tools (DTH), with subsequent installation into a column of upsetting pipes of a filter and submersible electric pump.

The upsetting column is presented in two pipe sizes $d = 219\text{mm}$ and 146 mm .

Initial drilling diameter 250mm, final 160mm

Time for the of constant wells installation with a depth of 60m makes 6-7 hours, and 10-12 hours for 100 meters.

Recommended structure of the drilling rig:

Drilling rig on the chassis of the increased passability vehicle KAMAZ-43118.

Two two-axis trailers with a loading capacity not less than 4 tons with:

KV 20/25a compressor station

electrical unit with power not less than 8 kW

- set of drilling equipment for construction of temporary wells on a depth of 60 meters;
- set of drilling equipment for construction of constant wells on depth of 100 meters;
- set of drilling equipment for construction of constant wells on a depth of 100 meters;
- two sets of water lifting equipment with submersible borehole pumps with a productivity of 6,6 m³/h and thrust load of 110 m.
- ZIP set



LBU 50-04 and LBU 50-07 drilling of wells for electrochemical protection of the pipeline from corrosion and at installation of a sheet pile wall

During the shift LBU is capable to drill a well 60 m deep and immerse the tubing string with a diameter of 273 mm, and then into this column a core pipe with a diameter of 89 mm or a R-rail 24 of the same length - 60 m is lowered, connected by welding. For sheet pile walls drilling operations were performed for depths to 20 m by augers with a diameter 230 mm with lowering of the pipe with a diameter of 219 mm (on 20 m - to 12 per shift). By an auger with a diameter of 450 mm with the descent of the pipe 426 mm to a depth of 12.7 m per shift the rig performed to 12 wells.

The used boring tools, boring pipes with a diameter of 85 mm, augers with a diameter from 230-450 mm is made by LLC Geomash.

Complex of works on development of the fulfilled field of brown coals, engineering researches in construction, wells for control of level of ground waters.

LBU-50-07 is applied for carrying out of a complex of works on development of the fulfilled field of brown coals, and also for drilling of wells at engineering researches in construction and observation wells for control of ground waters level.

Drilling of wells at engineering researches in construction and observation wells for control of ground waters level is carried out with application of a column of hollow KSHR-250 augers with use of lowered on a rope removable punchdown sounding tube 1000 mm long of the German production with a diameter of 101 mm and a water sampler. Average depth of wells makes 40 meters.

When searching for dormant underground mine workings (shafts and drifts) in the mining lease to rotary drilling with water circulation to a depth of 60-80 meters is applied. Works are carried out for the purpose of prevention of failures formation. At detection of an excavation it is eliminated by filling with cement mortar pumped from the surface under pressure through steel columns with a diameter of 51 mm.

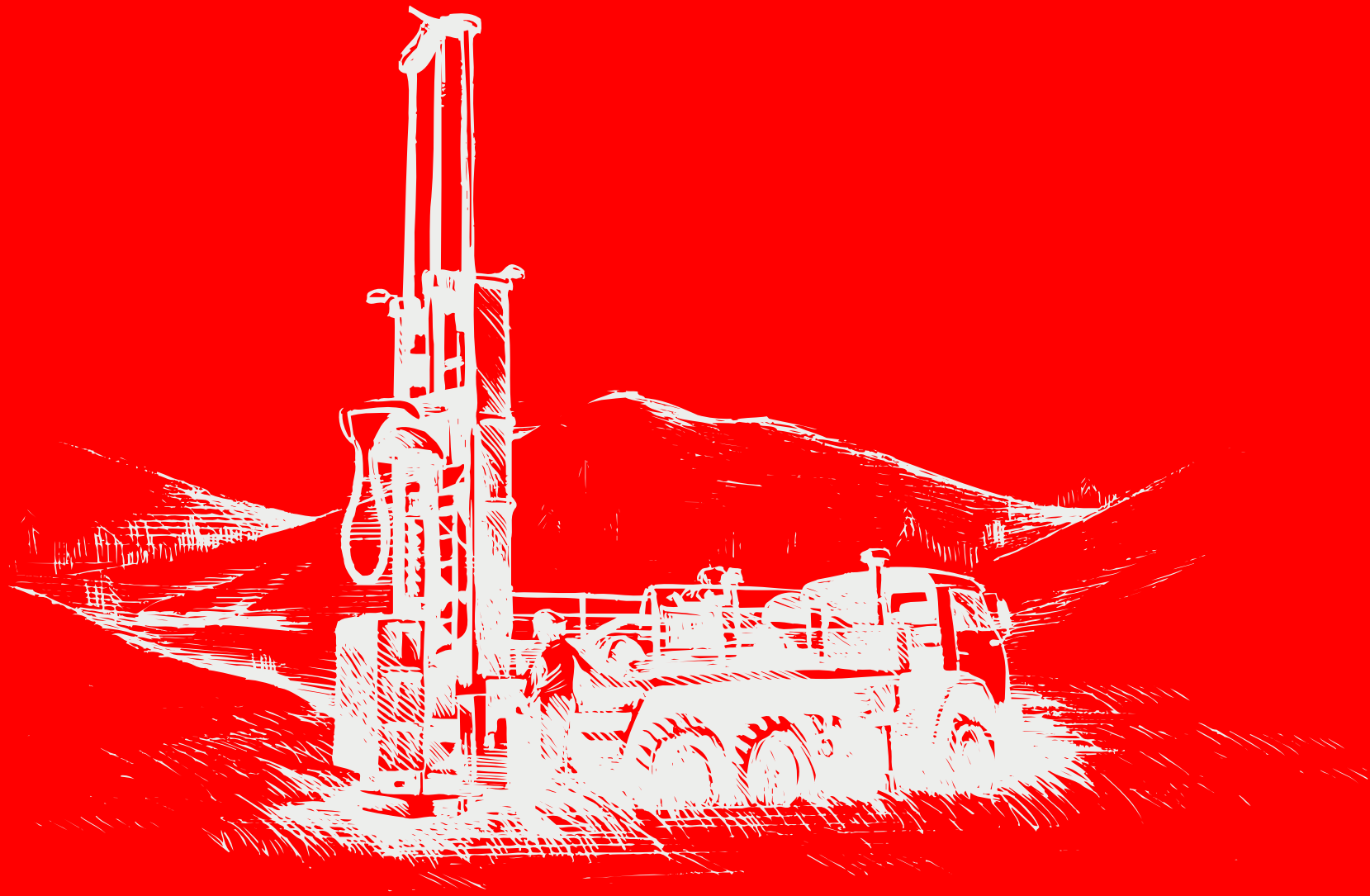
Selective approbation of the intervals adjacent to coal layer for the purpose of field delineation is performed. When carrying out these works the complex of hollow KSHR-250 augers with removable punchdown sounding tube is used.

Drilling of engineering-geological wells and construction of bored piles by the LBU 50-07

The drilling rig is used for boring of engineering-geological wells at construction of high-rise buildings (more than 30 floors), and also for construction of bored piles with a diameter of 250-650 mm. Depth of the constructed wells for engineering researches makes 80-100 meters, for construction of piles 15-20 meters

Drilling of engineering-geological wells is carried out by means of hard-alloy crowns with a diameter of 132, 112 mm, and sampling of undisturbed structure is made with the help of core pipes with a diameter of 127, 108 mm. Drilling of wells is conducted with fluid circulation, boring pipes with a diameter of 63,5 mm with welded locks are used as a shell.

Construction of bored piles is carried out by means of augers with a diameter of 230-500 mm, also for construction of piles with a diameter of 650 mm auger drills are used, as a column bars with a diameter of 63.5 mm are used.





Drilling of engineering-geological wells and construction of bored piles by the LBU 50-07

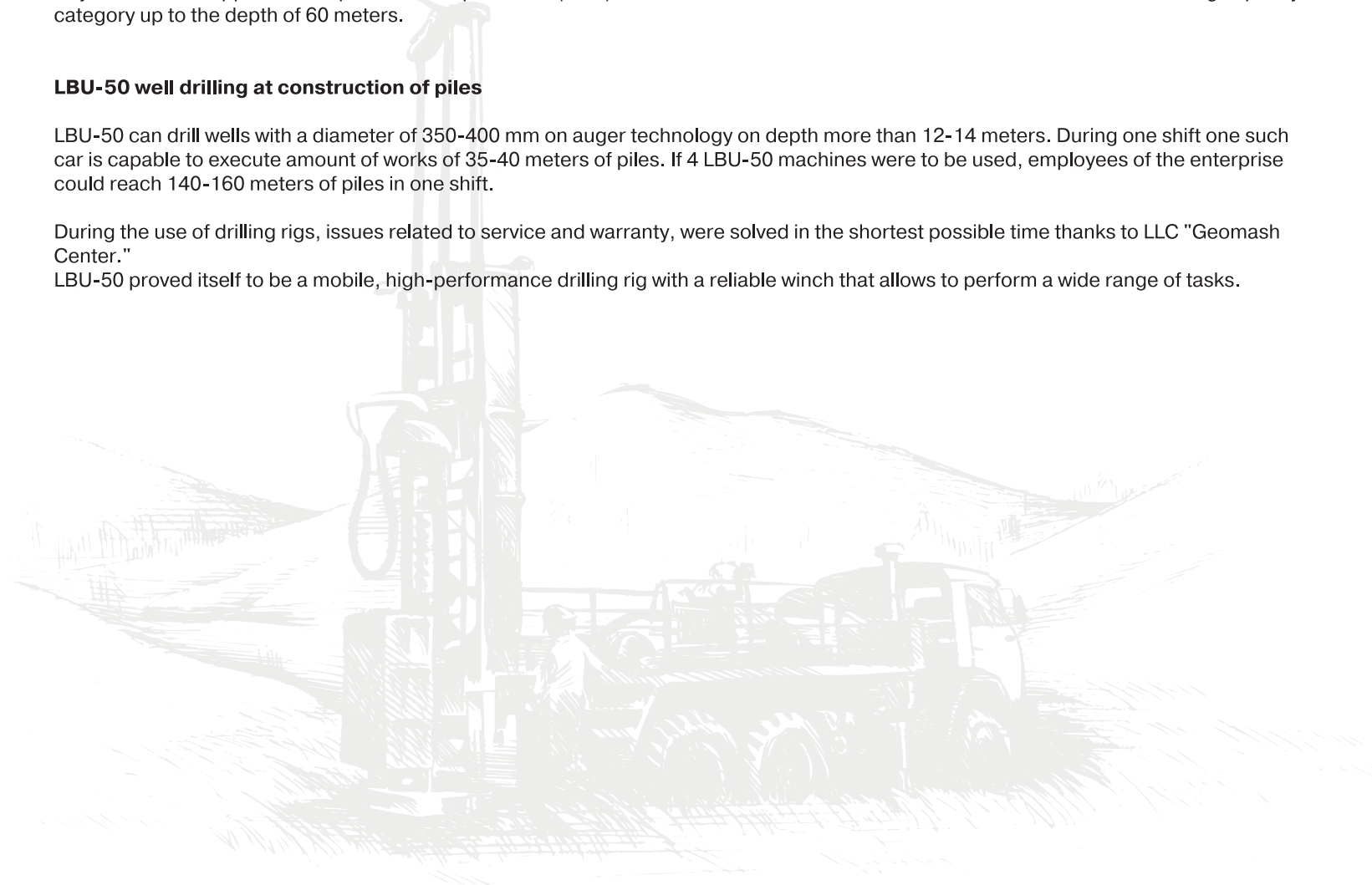
Drilling is carried out by augers with a diameter from 160 mm to 400 mm on breeds of the II, III drilling capacity categories and shock-rotary method with application of pneumatic impact tools (DTH) with a diameter of 110 mm and 125 mm on breeds of the IX drilling capacity category up to the depth of 60 meters.

LBU-50 well drilling at construction of piles

LBU-50 can drill wells with a diameter of 350-400 mm on auger technology on depth more than 12-14 meters. During one shift one such car is capable to execute amount of works of 35-40 meters of piles. If 4 LBU-50 machines were to be used, employees of the enterprise could reach 140-160 meters of piles in one shift.

During the use of drilling rigs, issues related to service and warranty, were solved in the shortest possible time thanks to LLC "Geomash Center."

LBU-50 proved itself to be a mobile, high-performance drilling rig with a reliable winch that allows to perform a wide range of tasks.





Technical features

The rig is equipped with a hydrodriving rotator that at preservation of all LBU-50 benefits, provides a number of advantages in comparison with other modifications:

- reduced mass of a hinge plate and more favorable weight distribution on axes of the transport base allowing to organize cargo platforms for convenient transportation of the boring tools.
- smooth spindle rotation frequency adjustment of two high-speed rotators provides a torque in the range from 3500 to 20000 Nm.
- greater flexibility and universal control of the feeder with an opportunity of accelerated (to 5 times) movements of the rotator.
- winch with a loading capacity of 3000 kgf with a free dumping function, allows to effectively realize percussion drilling, and also a well casing.
- complete set with a powerful pump or compressor block in combination with high torque value provides high rates of drilling operations at construction of wells of different function.
- hydraulic actuator of the boring pump or compressor allows to change their productivity smoothly
- high reliability due to the lack of the difficult mechanical drive.
- simplicity in service and increased maintainability.

Basic set

- Winch
- Boring pump NB-50 *
- Front* / back leveling jack
- GSV-500 welding generator
- Platform
- Hydrojacks (additional)
- Desktop
- Clamping table (hydraulic)



Boring pump

Pump parameters	NB-50	NB-80
Feeding, l/min	39.6	50.4
Pressure max, MPa	6.3	10.0
Type	piston	piston
Power, kW	50	80
Drive	hydraulic	hydraulic
Weight, kg	1100	1300

Clamping table

Designed to hold the upsetting pipes when expanded, typical size - 159-426 mm.

Parameters

Largest passage diameter on a table at removed cams	500
The greatest weight of the withheld freight on the table	12

Welding generator GSV-500

Parameters

Conventional welding current, A	500
Nominal voltage, V	40
Welding current range, A	60-500
Nominal cycle welding rate, min	10

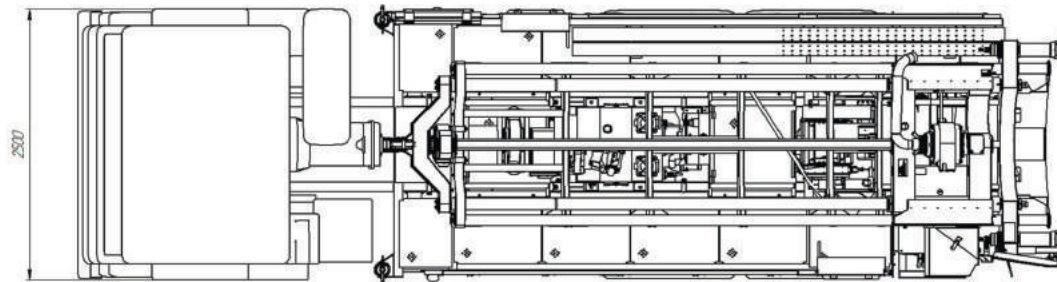
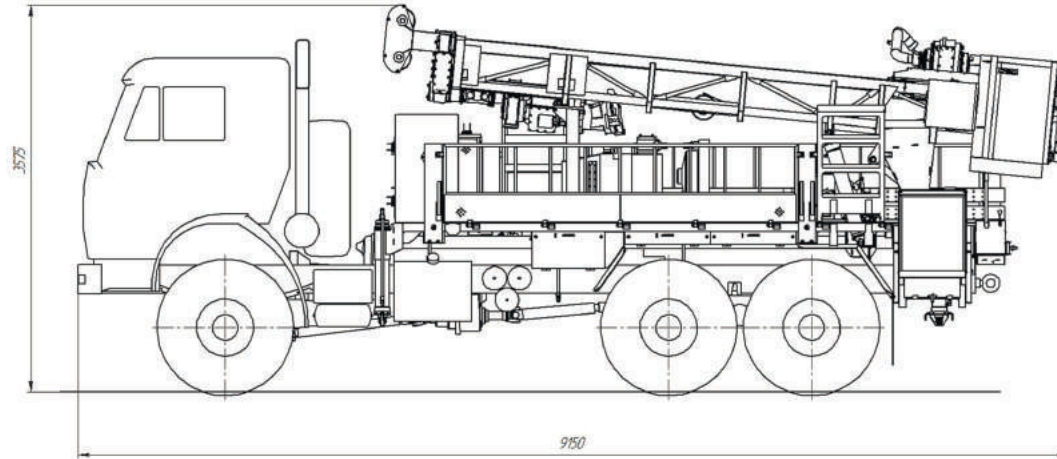
Additional equipment

- Boring pump NB-80
- Welding generator GSV-500
- Hydrojacks (additional)
- Work desk
- Clamping table (hydraulic)



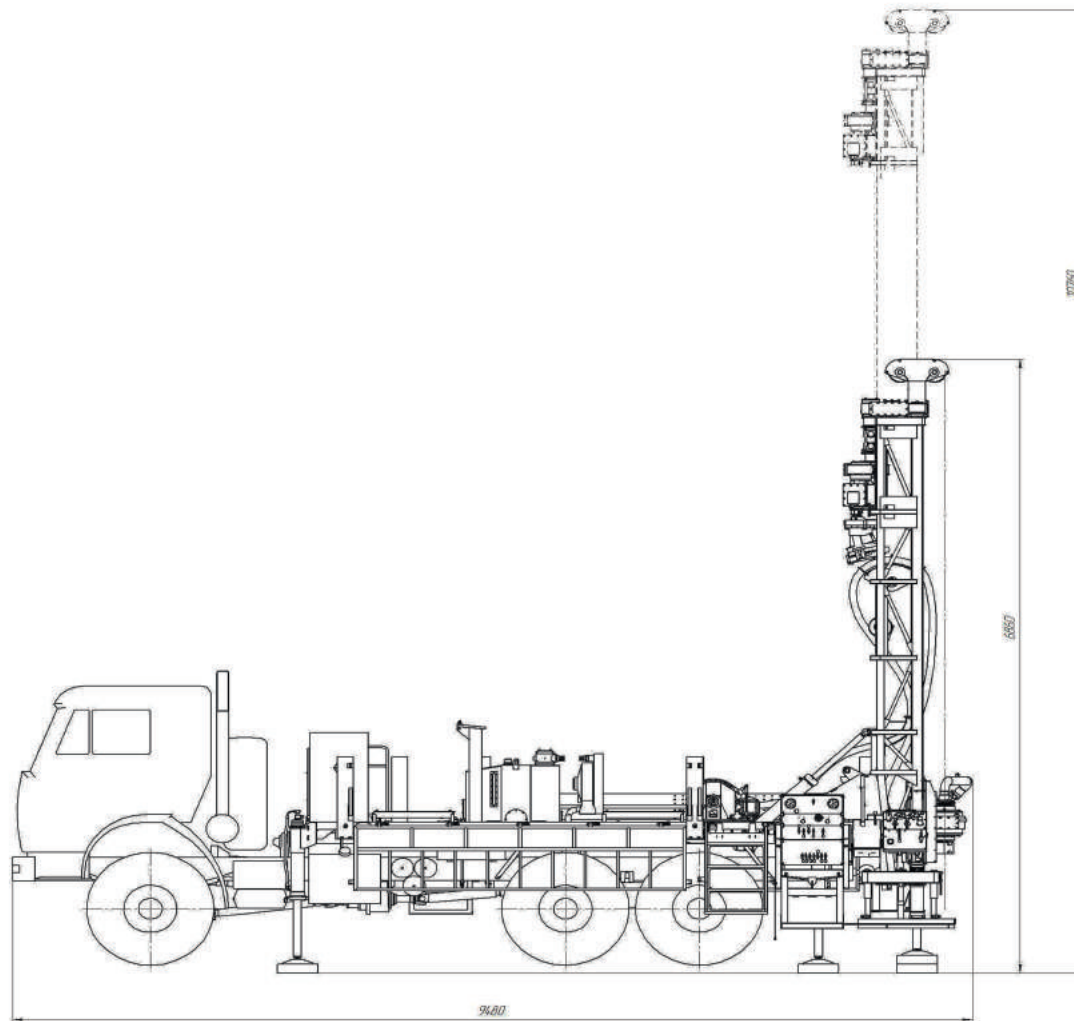
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Overall dimensions





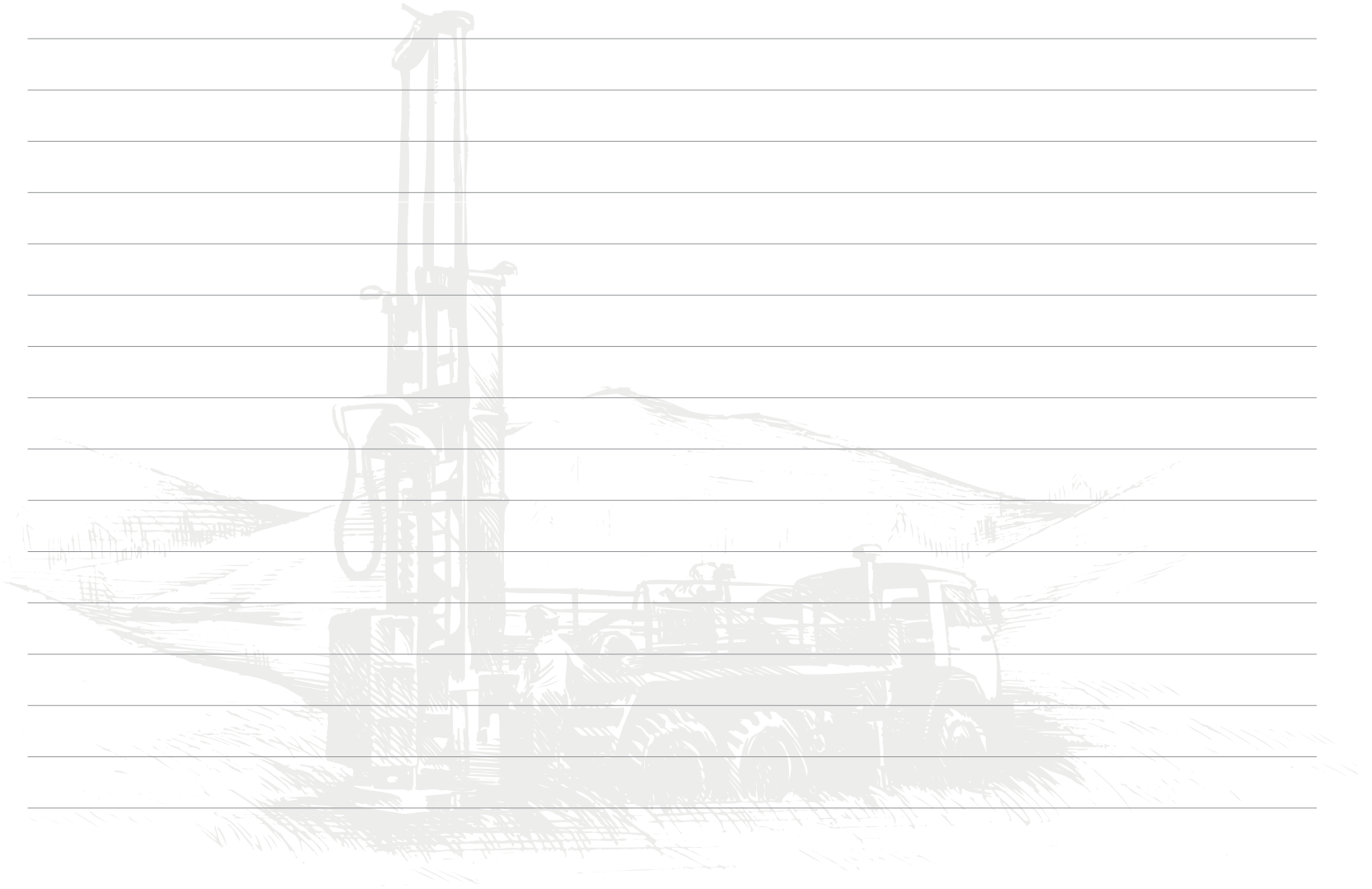
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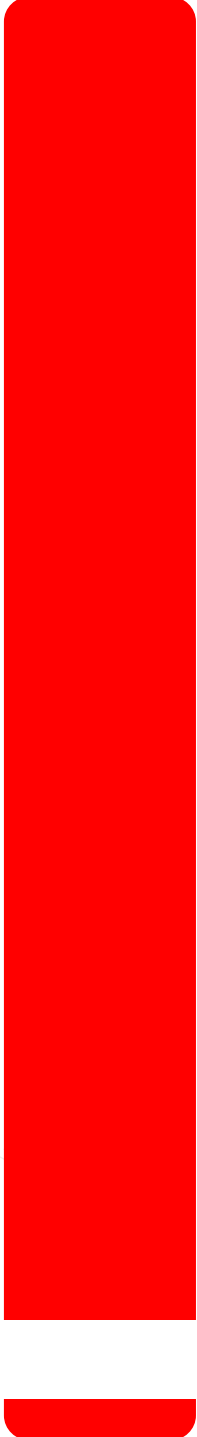
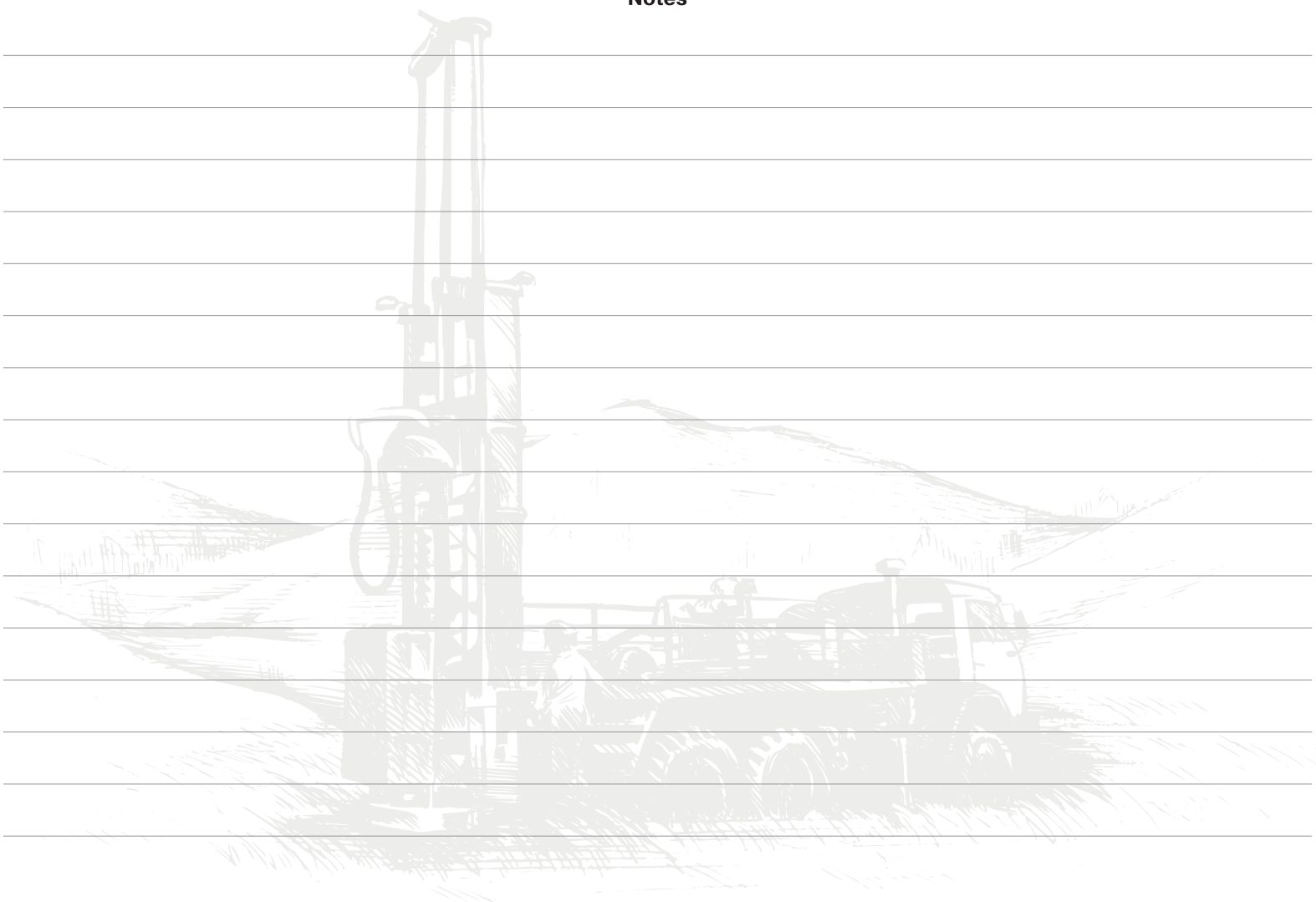
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Notes





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For equipment purchase
and additional information:
LLC "Geomash-Center"
9, build.2, Kuntsevskaya str, Moscow,
121351, Russia.
tel/fax: +7 (495) 902-55-20
www.geomash.ru
