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COMPLEX OF WORKS FOR DESIGN, CONSTRUCTION AND OPERATION OF OBJECTS OF INDUSTRIAL AND CIVIL PURPOSES

P r e s e n t a t i o n

Moscow, 2018r.



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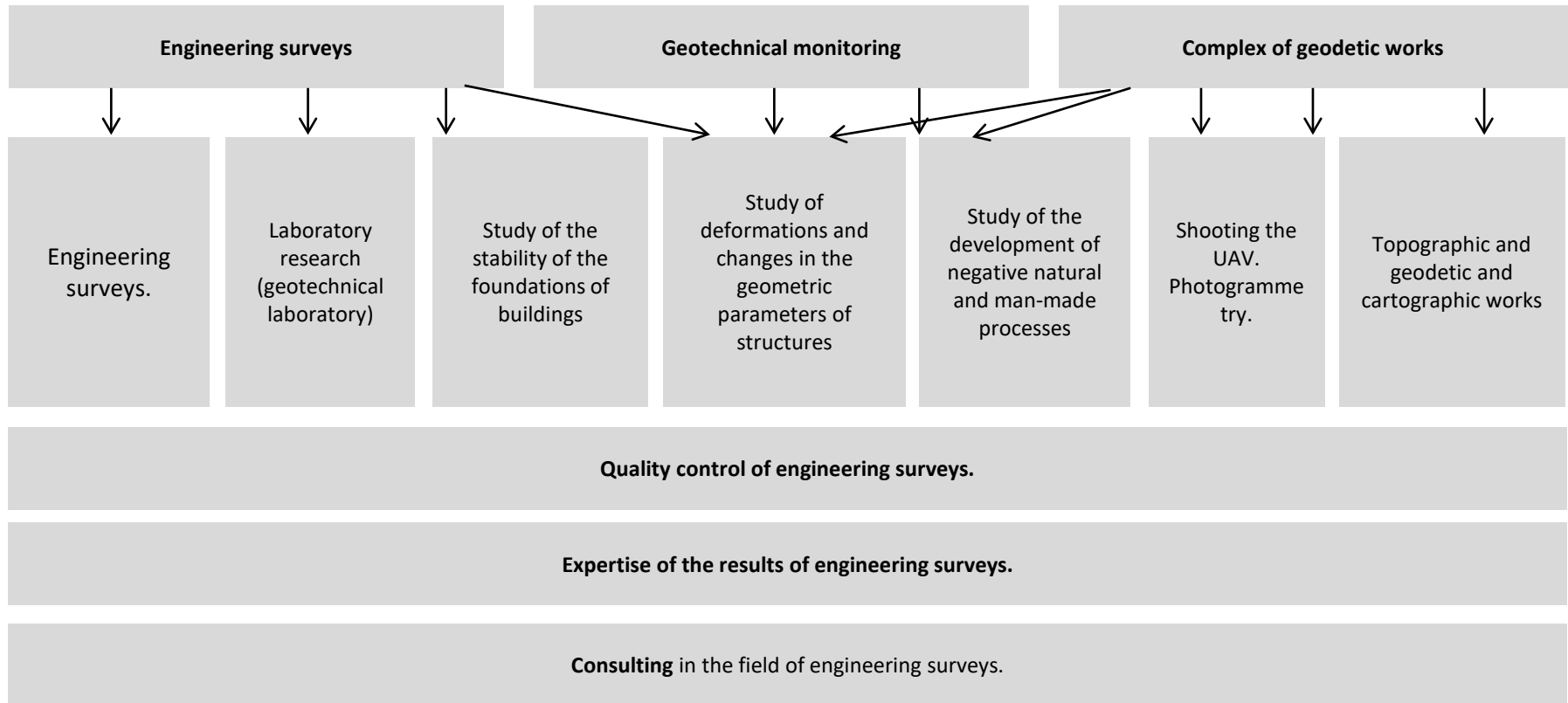
COMPLEX OF WORKS FOR DESIGN, CONSTRUCTION AND OPERATION **OF OBJECTS OF INDUSTRIAL AND CIVIL PURPOSES**





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TYPES OF WORK



RGI has the experience, specialized equipment to perform a **FULL COMPLEX of WORKS AND SERVICES** for implementation of the designed and using objects.



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LIST OF OBJECTS



AMONG THE PROJECTS:

- **Objects of civil purpose:**

Consulting

"Zenit-Arena" Stadium.

Geotechnical monitoring:

the "Gornaya Carousel" complex, ski jumping complex K-125, K-95 (Sochi, Olympic objects)

- **Railway infrastructure facilities:**

Consulting

Railway line bypassing Ukraine;

- **Oil and gas objects:**

Quality control of engineering surveys/Expertise/Geotechnical monitoring

Main gas pipeline "Power of Siberia", pipeline system "South-Eastern Siberia – Pacific ocean", "South European gas pipeline", gas Pipeline "Nord stream", projects "Sakhalin 1,2,3", Arrangement of chayandinsky and Urengoy NGKM, Main gas pipelines "Ukhta-Torzhok", MG "Gryazovets-Vyborg»;

- **Extraction of minerals:**

Geophysical surveys

Deposits of chromite in the Chelyabinsk region, etc.

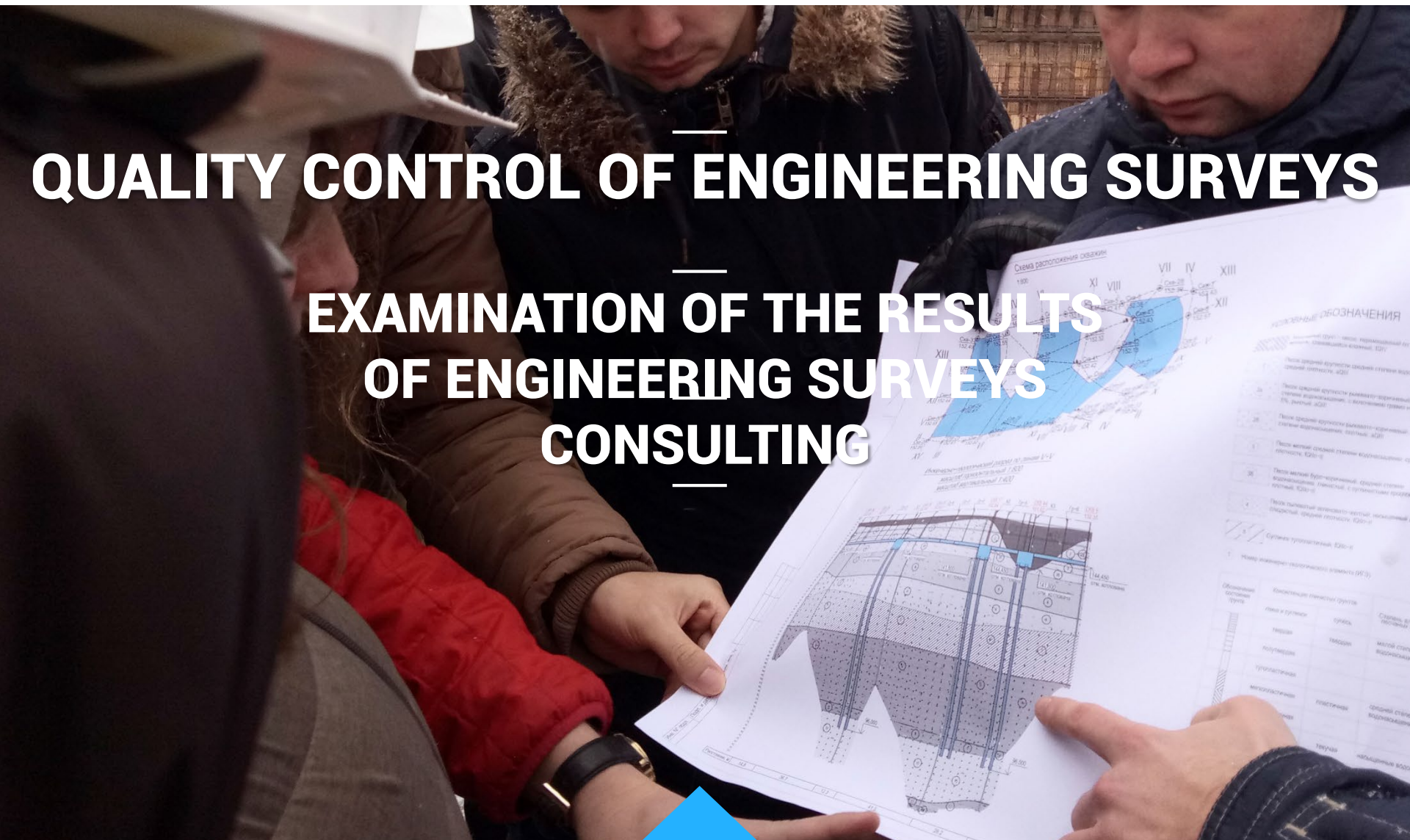


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QUALITY CONTROL OF ENGINEERING SURVEYS

EXAMINATION OF THE RESULTS OF ENGINEERING SURVEYS CONSULTING





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QUALITY CONTROL OF ENGINEERING SURVEYS

The main task of external quality control of engineering surveys is to ensure compliance of the work performed or performed by the contractor and their results with the requirements of the task, program, regulatory documentation.



The task of external quality control of engineering surveys is assigned to the Customer.

LLC "RGI" has the most significant Russian experience on ensuring quality of engineering studies. Of the 350 specialists of the Institute, 150-170 people are constantly on expeditions, controlling the quality of engineering surveys on the largest and most important projects in the field.

Scope of work:

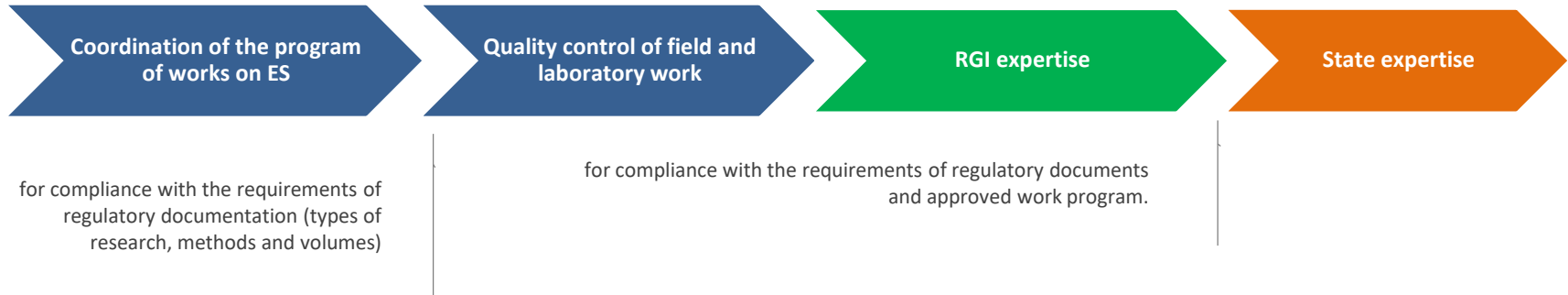
- Examination of tasks and programs;
- Quality control of field work; Welding work;
- Quality control of laboratory tests; Examination of technical reports.

LLC "RGI" carries out quality control of engineering surveys on **objects**: the pipeline system "South-Eastern Siberia-Pacific ocean", gas pipelines "Turkish stream", "Power of Siberia", "Nord stream", etc.



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EXPERTISE OF ENGINEERING SURVEY RESULTS



Examination of the results of engineering surveys can be considered as the next stage after the quality control of engineering surveys. **In this case, a positive conclusion of the expertise Institute (RGI) guarantees the Customer the quality of technical reports prepared by research organizations.**

CONSULTING IN THE FIELD OF ENGINEERING SURVEY



In the state of RGI more than 20 candidates of science in engineering, geophysics, geodesy, ecology and hydrometeorology.

Among the developments of the Institute – a unique station elektrotermicheskogo monitoring, received the status of "SKOLKOVO".

Experience of specialists" in the industry " more than 25 years.

Our employees are graduates of the leading Universities of the country. The Institute maintains close contacts with the expert community - the leading related specialized research institutes: SIC "Construction", Geological and Geographical faculties of Moscow state University.

We provide consulting assistance in complex issues related to the field of engineering surveys (stability of foundations of buildings, the development of negative natural and man-made processes, monitoring of the state of the soil.



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The background is a close-up photograph of several cylindrical soil samples. The central sample is a reddish-brown color and appears to be covered in a fine layer of white powder or frost. To its left is a lighter, tan-colored sample. In the background to the right, a dark-colored hammer is visible. The samples are resting on a white surface, possibly a table or a piece of paper, which has some soil debris scattered on it.

ENGINEERING SURVEYS



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ENGINEERING SURVEYS

Engineering and land surveys



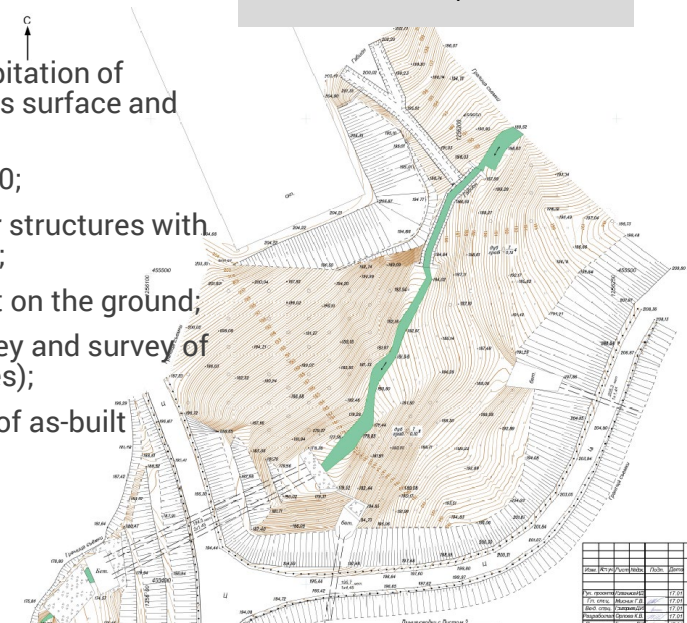
Cartographic and geodetic
support of construction.

The task of engineering and geodetic surveys is to obtain topographic and geodetic materials and data on the situation and terrain, existing buildings and structures, and others necessary for a comprehensive assessment of the natural and man-made conditions of the territory and the justification for the design, construction and operation of facilities.

Types of work:

- Creation of geodetic reference networks;
- Geodetic observations of deformations and precipitation of buildings and structures, movements of the earth's surface and dangerous natural processes;
- Shooting and updating plans in m 1:200 - 1: 10 000;
- Tracing of linear objects including survey of linear structures with drawing up of longitudinal and transverse profiles;
- Determination of the project position of the object on the ground;
- The creation of the survey geodesic network survey and survey of underground and above-ground structures (utilities);
- Engineering and hydrographic works; Preparation of as-built geodetic documentation.

Topographic plan of the site
works. CS "Kazachya"





ENGINEERING SURVEYS

Engineering-geological surveys



- Field and office engineering-geological works:
- Drilling of geological wells with core selection;
- Drilling of hydrogeological observation wells, observation of groundwater level.
- Large-scale General and specialized engineering-geological survey;
- Field studies of soil properties (dynamic testing of soils, passionatecutie testing, inclinometry and thermometry of wells);
- Laboratory determination of physical and mechanical properties of soils;
- Representation of geological structure of survey sites for area structures in the form of 3D-model;
- Study and modeling of negative natural and man-made processes (karst, suffusion, landslides, subsidence);





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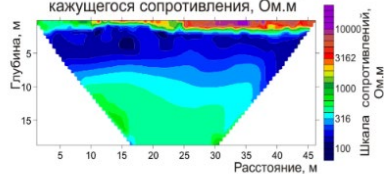


EMS 1917

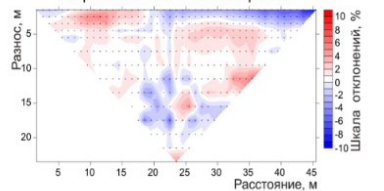


Electromyographic monitoring station
EMS 1917

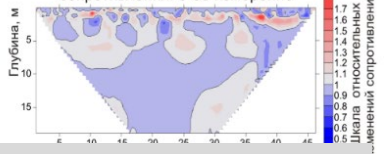
Геоэлектрический разрез от 5-ого псевдо-разреза Г
кажущегося сопротивления, Ом.м



Псевдоразрез остаточных кажущихся
сопротивлений. 5-ое измерение



Разрез остаточных аномалий
сопротивления. 5-ое измерение



Series of geoelectric sections

ENGINEERING SURVEYS

Geophysical studies of the structure of the soil

Geophysical surveys are conducted for:

- Study of changes in the state and properties of soils, level, temperature and hydrochemical regime of groundwater, seasonal freezing and thawing depths of soils;
- Study of changes of state of soil Foundation of buildings and constructions, including constructions of engineering protection;
- Study of environmental changes;
- Study of the dynamics of development of dangerous geological and engineering-geological processes;

1. Electrical resistivity tomography of a soil massif.

Station elektrotermicheskogo monitoring EMS 1917 has improved measurement accuracy, which allows you to get 4D results on changes in the structure and properties of the soil to a depth of 25 m.

2. Classical geophysical methods for engineering Geology: electrical prospecting, seismic prospecting



ENGINEERING SURVEYS

Engineering and environmental surveys

Types of work:

- Laboratory studies: chemical-analytical, determination of radiation contamination;
- Studies of gas-geochemical effects; Studies of physical effects (noise, vibration, electromagnetic field);
- Biological research-study of species composition of flora and fauna and their technogenic damage in the area of object design;
- Socio-economic, sanitary-epidemiological, medical-biological.
- Etc.

Engineering-hydrometeorological surveys

Types of work:

- Observation of the hydrological regime characteristics of water bodies and meteorological elements;
- Study of hazardous hydrometeorological processes and phenomena;
- Study of soil freezing regime and snow cover characteristics (for land);
- Desk processing of materials with the definition of the calculated hydrological and (or) meteorological characteristics.



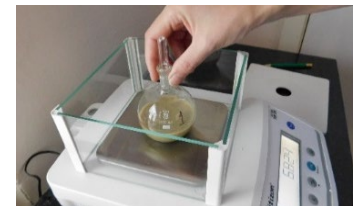
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LABORATORY RESEARCH

Ground and permafrost RGI laboratory

Determination of physical and mechanical properties of soils:

Soil laboratory of RGI conducts a full range of laboratory definitions of physical and mechanical properties of soils in accordance with the current regulatory documentation.



Geotechnical laboratory of RGI company is equipped with a complex of test equipment and freezers for complex tests of thawed and frozen soils and groundwater.



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The background image shows a large-scale construction or mining operation. A deep, narrow trench has been excavated into the ground, revealing a mix of soil and rocks. In the upper left, a yellow dump truck and a yellow excavator are visible on a dirt road. The ground is uneven and covered with loose soil and stones. The overall scene is one of active earthmoving and infrastructure development.

GEOTECHNICAL MONITORING

GEOTECHNICAL MONITORING THE STUDY OF THE STABILITY OF FOUNDATIONS

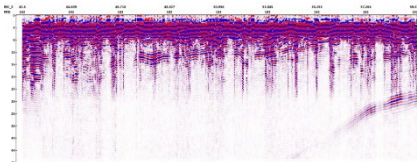
Geophysical methods (GPR)

Georadar studies are in demand at all stages of the life cycle of capital construction projects: in the performance of design and survey works, construction, operation of facilities.

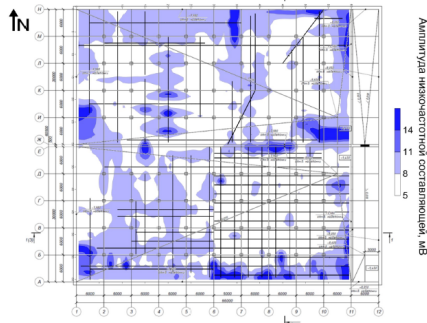
Solving the problems:

- Study of the structure of the soil mass for the optimal choice of the location of the structure;
- Quality control of works on baraccuda piles, jet grouting technology, quay walls and rosemantic piles, Foundation slabs, etc.
- The study of underground space during casting of the Foundation slab or the use of a previously constructed slab foundation.
- Monitoring of changes in hydrogeological conditions and the nature of suffosion processes near the pits and excavation sites;
- Study sections for trenchless laying of communications.
- Monitoring of the foundations of structures falling into the zone of influence of new construction.
- Assessment of the current state of structures.

The use of remote geophysical methods, the method of inter-well scanning for the construction of 3D-sections of the array has no alternative for solving the problems of quality control of the work performed to strengthen the foundations of buildings.



Карта участков повышенного относительного увлажнения, определенного по амплитудам низкочастотной составляющей (см. стр. 10)





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GEOTECHNICAL MONITORING

**STUDY OF THE DEVELOPMENT OF NEGATIVE NATURAL AND ANTHROPOGENIC PROCESSES.
STUDY OF THE DEFORMATIONS AND CHANGES OF GEOMETRIC PARAMETERS OF STRUCTURES.**

PHASES OF WORK:

Phase 1. Shooting with quadrocopter.

The purpose of the work: reconnaissance, selection of potentially dangerous areas of development of negative natural processes; field reconnaissance observations;

Phase 2. The development of the programm of work on geotechnical monitoring;

Phase 3. Execution of work;

Phase 4. Forecast of further development using methods of mathematical modeling.

The RGI is equipped with the necessary equipment, software has experience for complex geotechnical monitoring.



GEOTECHNICAL MONITORING

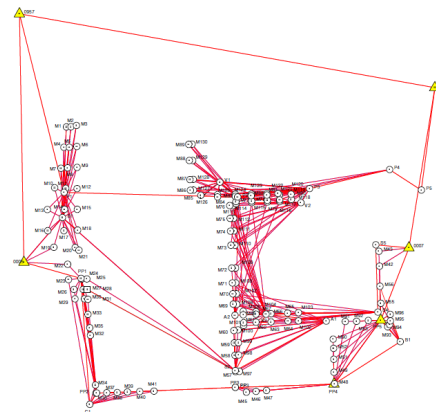
STUDY OF THE DEVELOPMENT OF NEGATIVE NATURAL AND ANTHROPOGENIC PROCESSES. STUDY OF THE DEFORMATIONS AND CHANGES OF GEOMETRIC PARAMETERS OF STRUCTURES.

The development of the programme of work on geotechnical monitoring;

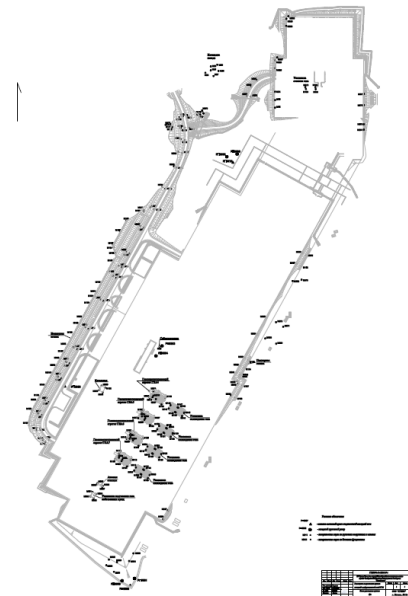
The work program includes the composition, volume, frequency and methods of work, taking into account engineering surveys on the construction site, design solutions of the designed or reconstructed structures and buildings of the surrounding buildings, the sequence of construction works.



CS "Kazachya". Part of the geotechnical monitoring program.



Scheme of observations of Linear-angular network of CS "Kazachya".



The scheme of placement of geodetic points of the initial and deformation networks of GTM.



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GEOTECHNICAL MONITORING

Geodetic methods of research

Vertical, horizontal movements.

Methods:

Installation of geodetic reference signs of high-rise and planned basis.
Tab of observation network, Levelling



Borehole inclinometer monitoring

Determination of the lateral displacement along a linear profile.

Methods:

Well inclinometry (stationary and mobile inclinometers)



Hydrogeological observations

The level, pressure and temperature of groundwater monitoring .

Methods:

Laying the system of observation wells;
Conducting observations.



Geophysical monitoring

Determination of changes in the stress-strain state of soil bases, changing their occurrence in the array.

Methods:

The EP and VEZ, Electromyography. Seismic exploration.



EMS 1917

Electromyographic monitoring station



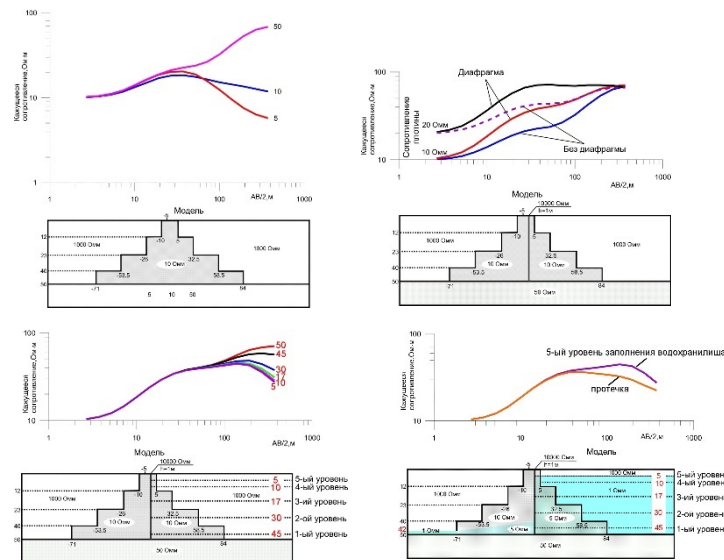
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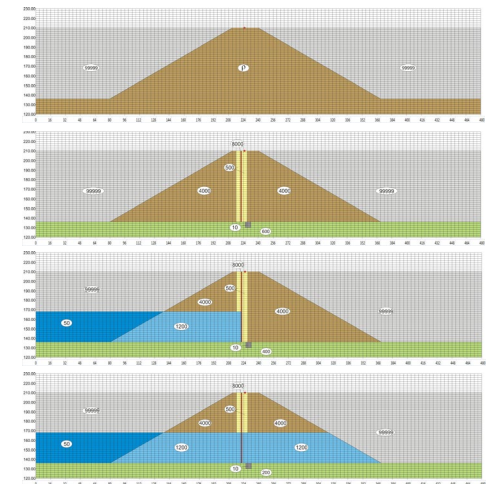
Forecast of further development of dangerous man-made and natural processes.

Development of measures to prevent them.

Methods of mathematical modeling.



Mat. simulation of calculation of the curves of VEZ for different modes of operation of hydraulic structures:



RGI uses such software products in its work as:
Plaxis 3D; Geo-Slope GeoStudio Professional; Processing Modflow 8;



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DRONES SHOOTING

Shooting with quadrocopter (UAV)



Usage:

Reconnaissance observations. Allocation of potential areas of development of hazardous natural and man-made processes.

Creation of orthophotos of the area;

Photogrammetry: construction of digital 3d-models of terrain, engineering structures;

Monitoring of the spread of surface waterpollution;

Monitoring of the timing of construction and installation works.

Advantages:

High speed of work, low cost.



THANK YOU FOR YOUR ATTENTION!

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