



GEOSERVICE

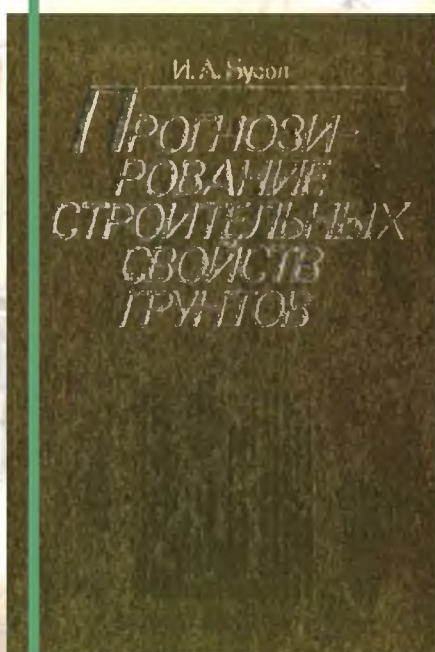


Minsk
Republic of Belarus

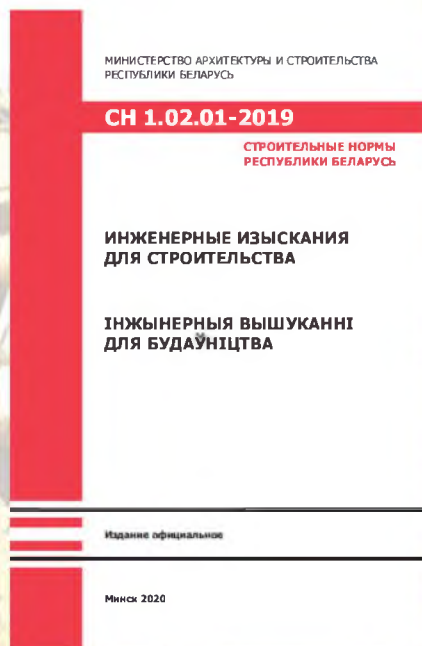
State Enterprise "GEOSERVICE", formerly the Belarusian State Institute of Engineering Surveys ("BelGIIZ") is the largest center of engineering geodesy, geology and ecology in Belarus.

The enterprise was founded in 1964. Its history is associated with of almost all the most significant projects of Belarusian industry, energy, infrastructure, as well as thousands of square kilometers of residential development.

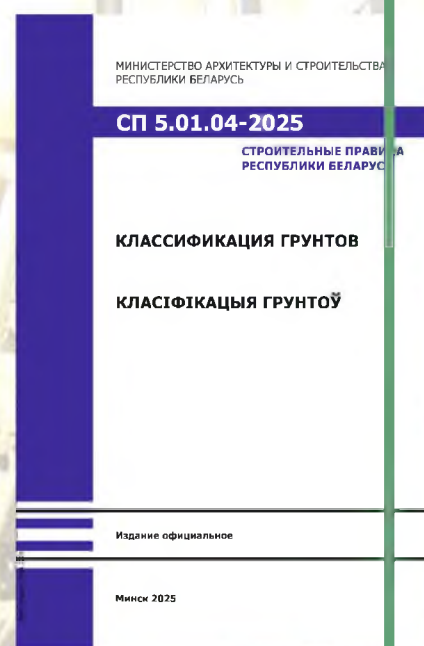
Today, "GEOSERVICE" is a leading organization in its field in Belarus, a developer of national codes for engineering surveys for construction, and the owner of a unique half-century engineering and geological archive throughout Belarus.



Monograph by Ivan A. Busel (1989) on engineering-geological properties of soils of Belarus, based of the practice of "BelGIIZ"



Belarusian Code for Engineering Survey for Construction (2019)



Belarusian Code for Soil Classification (2025)

We provide:

● **ENGINEERING GEODESY**

- establishment of reference geodetic networks;
- establishment of special-purpose networks;
- establishment of planimetric and vertical survey geodetic networks;
- topographic survey;
- compilation and updating of 2D and 3D topographic plans.

● **GEODESIC WORKS
IN THE PROCESS OF CONSTRUCTION**

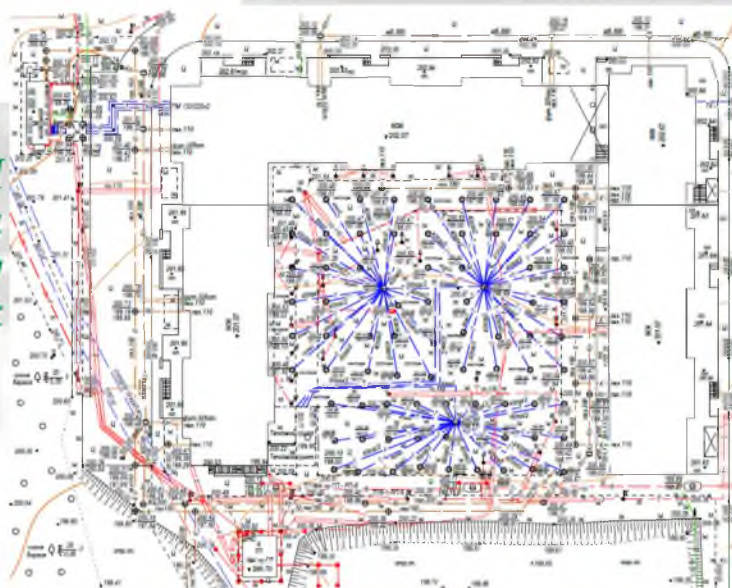


● DIGITAL TERRAIN MODELS (DTM)



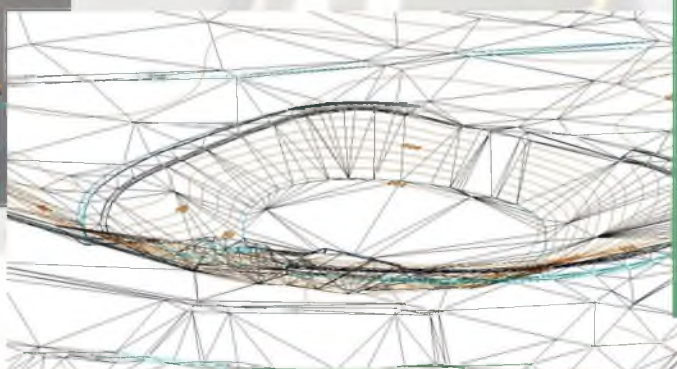
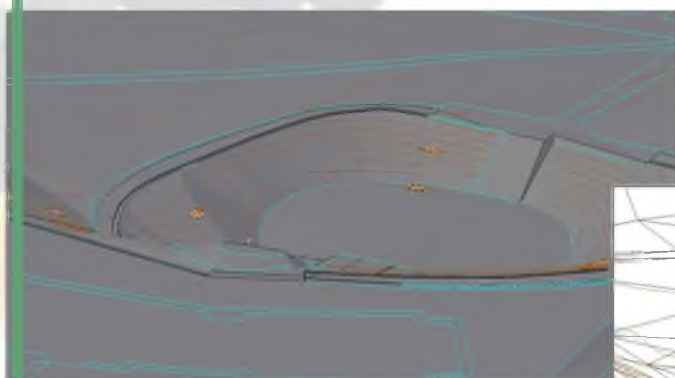
*DTM for reconstruction
of a complex of buildings
in Minsk*

*DTM
of a residential area
with geothermal energy
sources near Minsk*

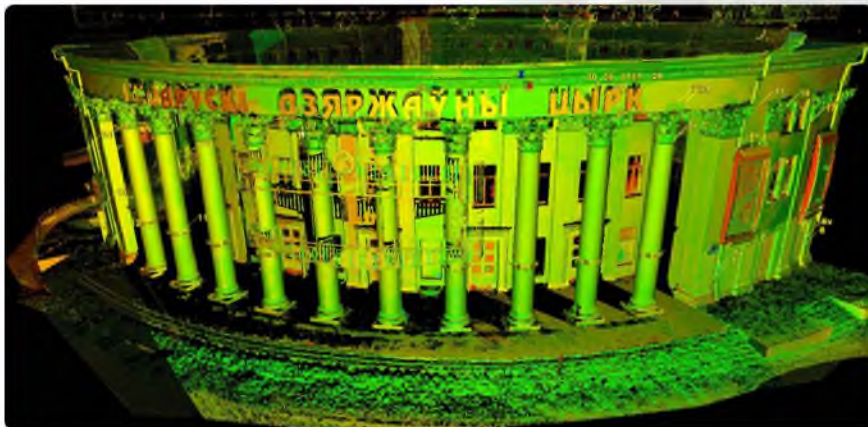


● BIM-MODELS

- Creation of 3D information models of buildings, structures and communications, linked to the database



● TERRESTRIAL LASER SCANNING

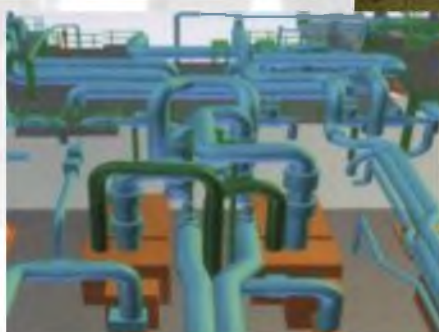


*3D image of the building
of the Belarusian State Circus*



*Leica
Scanstation2*

- Obtaining high-precision 3D models of industrial and civil objects, including buildings, bridges, equipment, tunnels, architectural monuments;
- determining the volume of reservoirs, rocks, quarries, pits etc.;
- surveying facades and interiors of buildings, obtaining their profiles and sections;
- monitoring the condition of objects, identifying deformations.



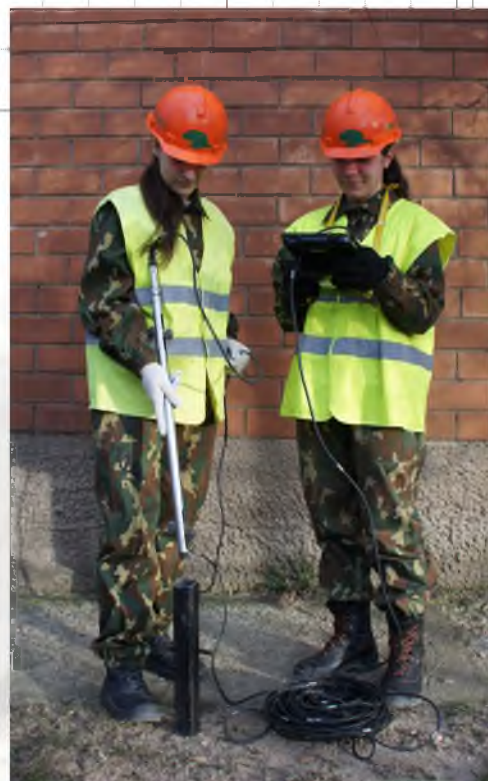
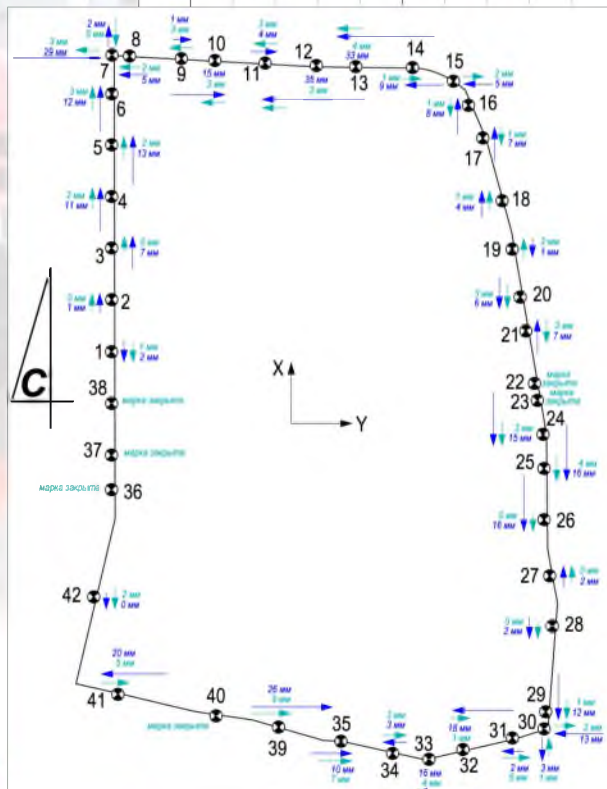
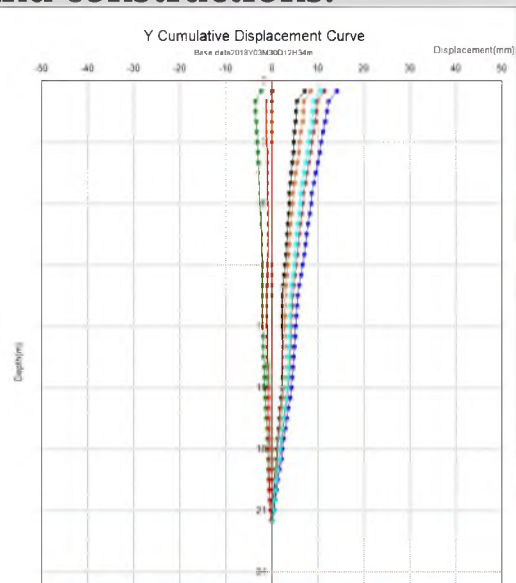
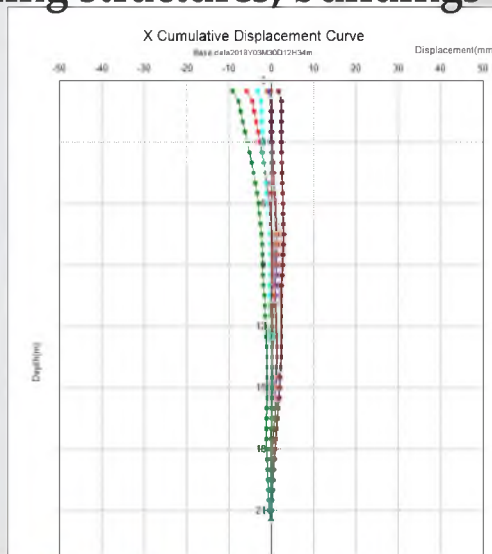
3D models of equipment



3D scanning of a gas filling station

● GEODESIC MONITORING

- observations of the settlement of buildings and structures under construction;
 - observations of the settlement and displacement of the earth's surface;
 - observations of modern movements of the earth's crust.
- ## ● MEASUREMENT OF DEFORMATIONS AND DISPLACEMENTS
- retaining walls, enclosing walls of excavations;
 - building structures, buildings and constructions.



● SPECIAL GEODESIC SURVEYS



*Working on a Belarusian
Power Plant site*



*Monitoring the settlement
of the National Library
of Belarus under construction*



*Observations at the monitoring
point of modern movements
of the earth's crust
in the area of the Belarusian
NPP site*



*Monitoring
of deformations
of the metro tunnel
in Minsk, Belarus*

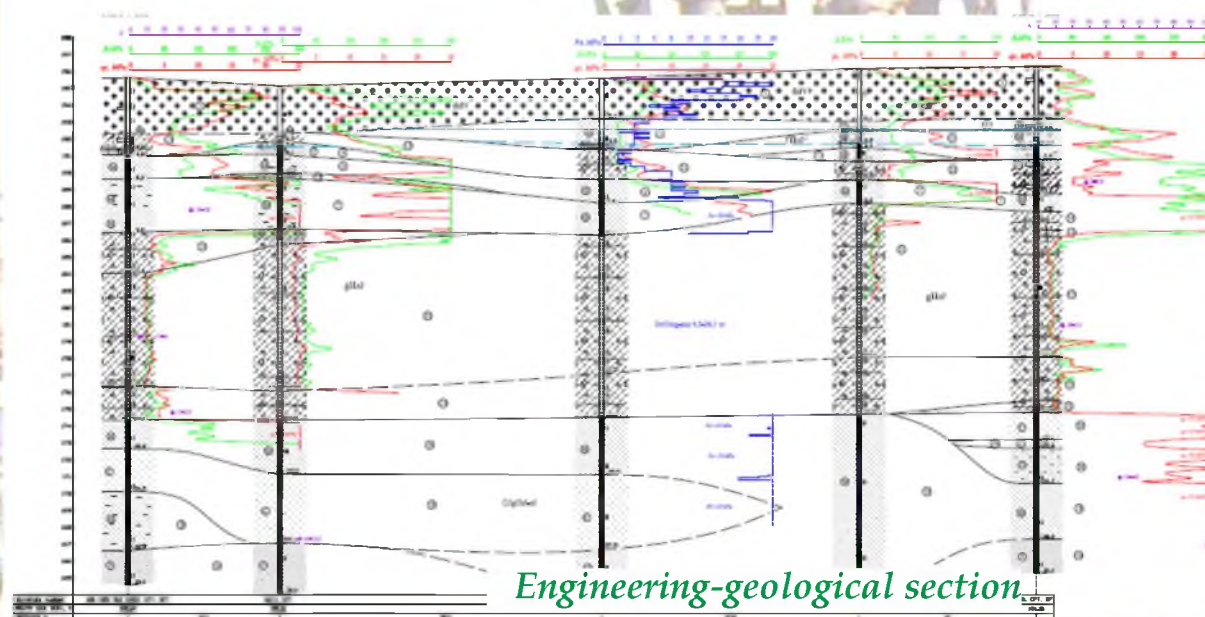


● ENGINEERING GEOLOGY

- *Drilling of boreholes using core, auger, and percussion-rope methods, with the undisturbed and disturbed sampling of soils, as well as water samples.*



Soil sampler

[illegible]

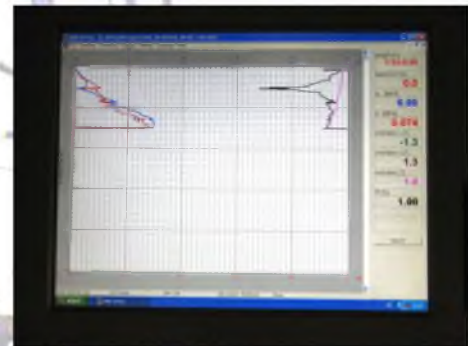
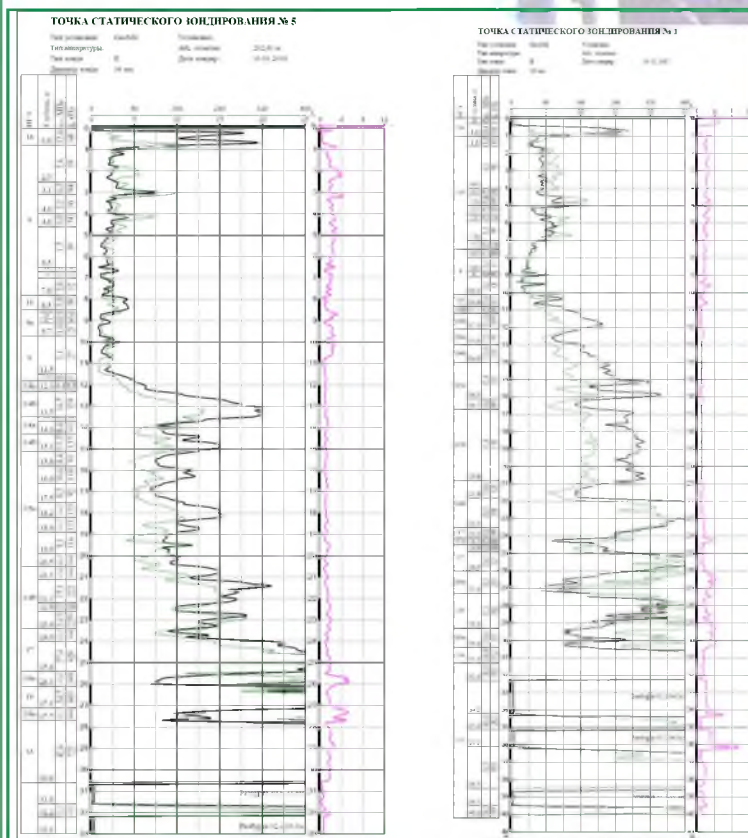
● CONE PENETRATION TESTING (CPT)



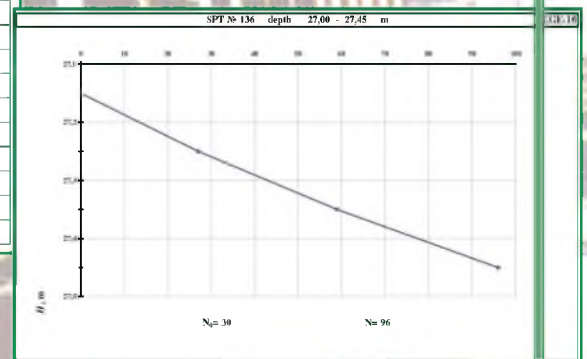
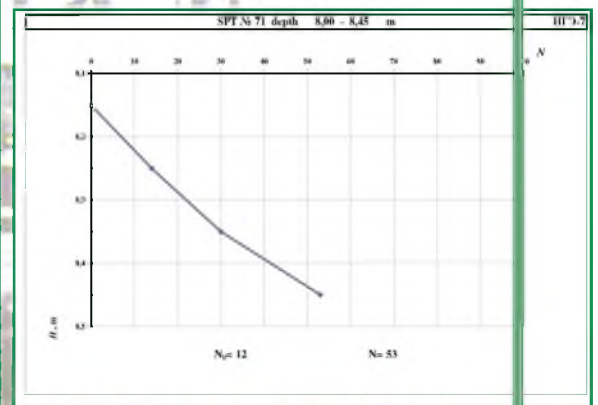
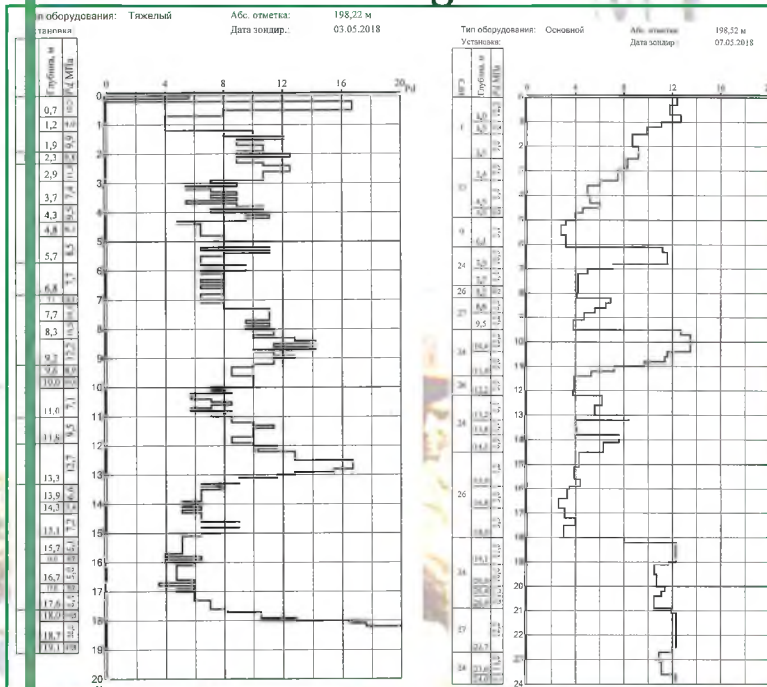
● DYNAMIC PENETRATION TESTING (DPT), SPT



● CPT log



● DPT and SPT logs



- **FIELD TESTING**

- *Plate loading testing using flat and screw-type plate
600, 2500 and 5000 cm²*



Deep plate loading test

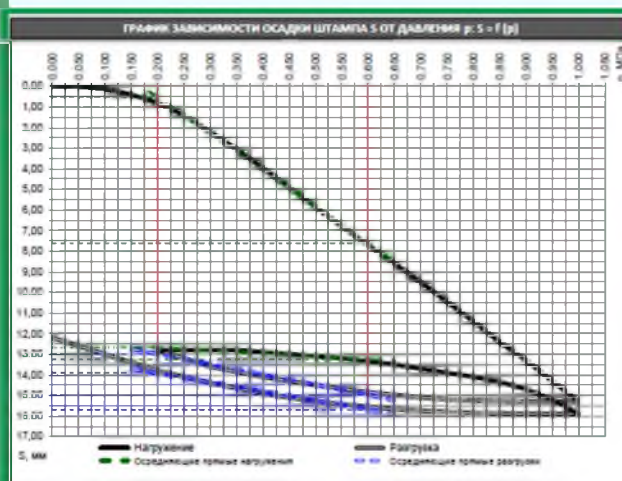
- *Rotational shear testing, shear testing of soil pillars*



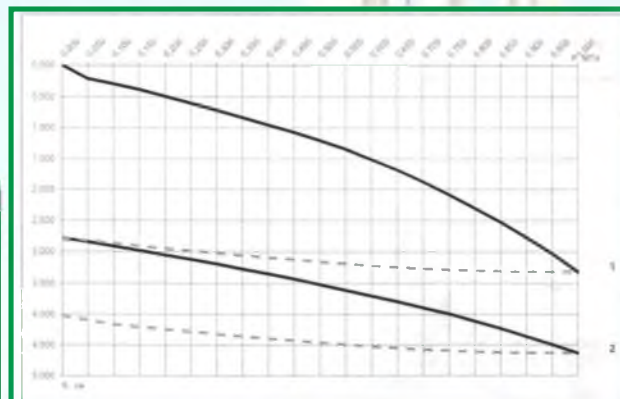
- *Radial pressuremeter testing*



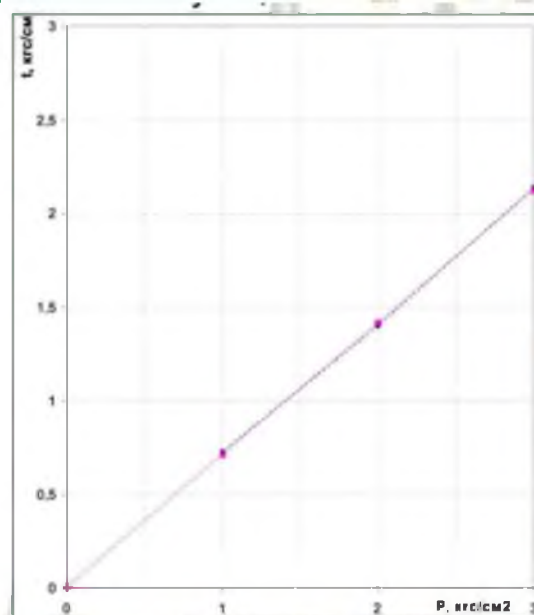
● PLT logs



600 cm² plate testing log
with unloading and reloading

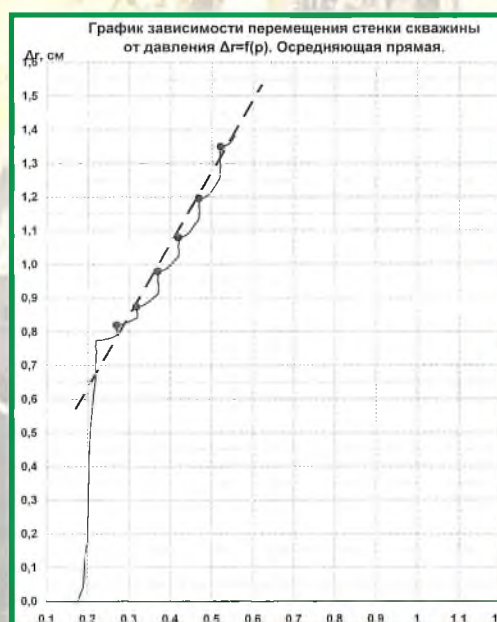
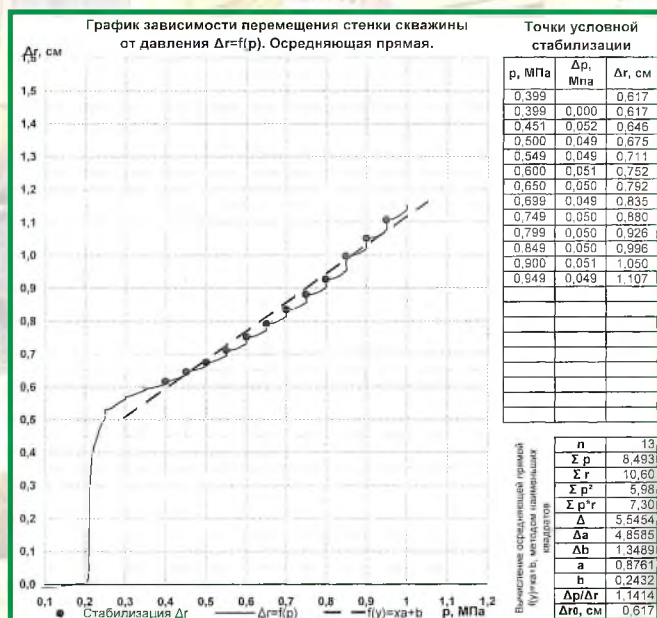


5000 cm² plate testing log



● Field shear test results

● Pressuremeter test logs



● PILE LOADING TESTING



300 t load test



250 t load test



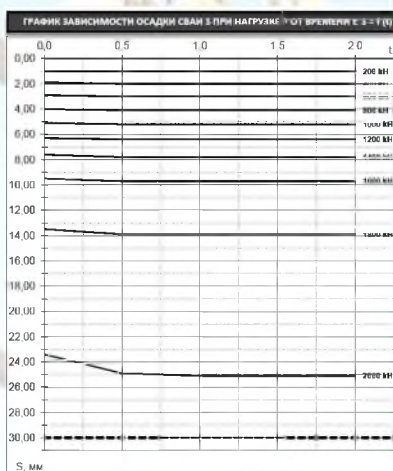
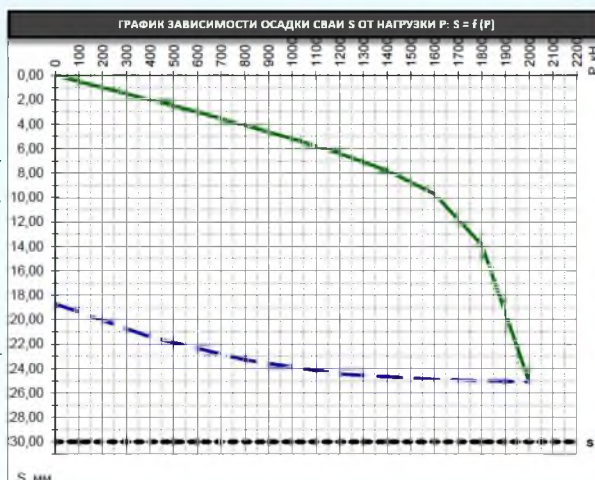
Soil testing
with
bored piles



● Field quality control of soil compaction

● Pile loading test logs

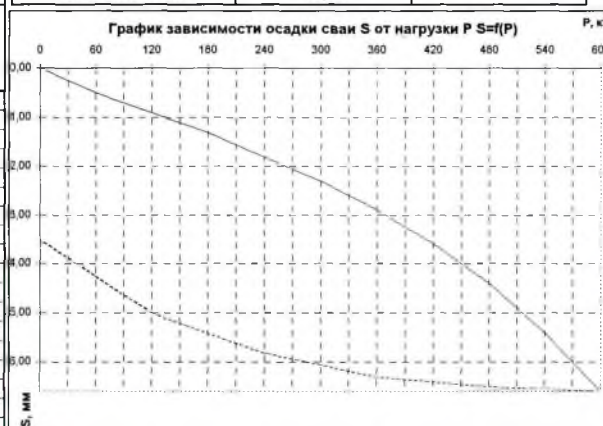
Log
of soil testing
with bored
piles
by static load
up to 2000 kN



Результаты испытаний статической нагрузкой					
№ Ступени	Показание манометра, атм	Величина ступени нагрузки P, кН	Общая нагрузка P, кН	Осадка сваи S, мм	Разгрузка сваи, мм
0	0	0	0	0,00	3,50
1	6	60	60	0,50	
2	12	60	120	0,90	5,00
3	18	60	180	1,30	
4	24	60	240	1,80	5,80
5	30	60	300	2,30	
6	36	60	360	2,90	6,30
7	42	60	420	3,60	
8	48	60	480	4,40	6,50
9	54	60	540	5,40	

№ сваи	Глубина, м	Частное значение предельного сопротивления сваи F_{sw} , кН	Осадка сваи s, мм при F_{sw} , кН	Нагрузка допустимая на сваю по прочности грунта F , кН	Осадка сваи s, мм при F , кН
4	10,00	600	6,60	500	4,85
34	10,00	600	15,30	500	10,8
101	10,00	600	5,30	500	2,9

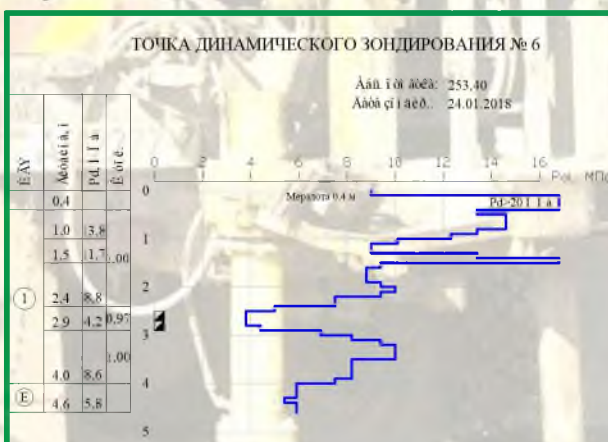
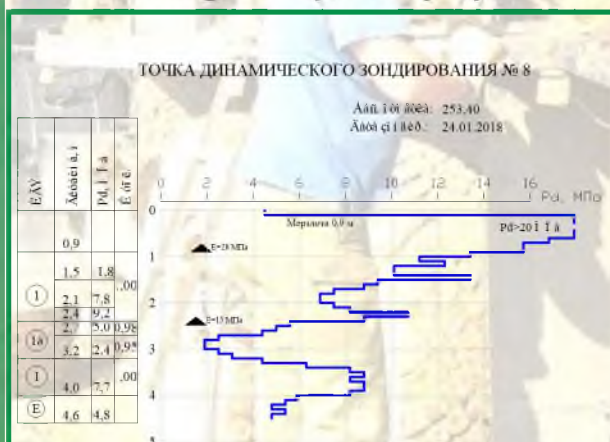
Свая №4	Глубина, м	Дата
Сечение 300 мм	10,00	



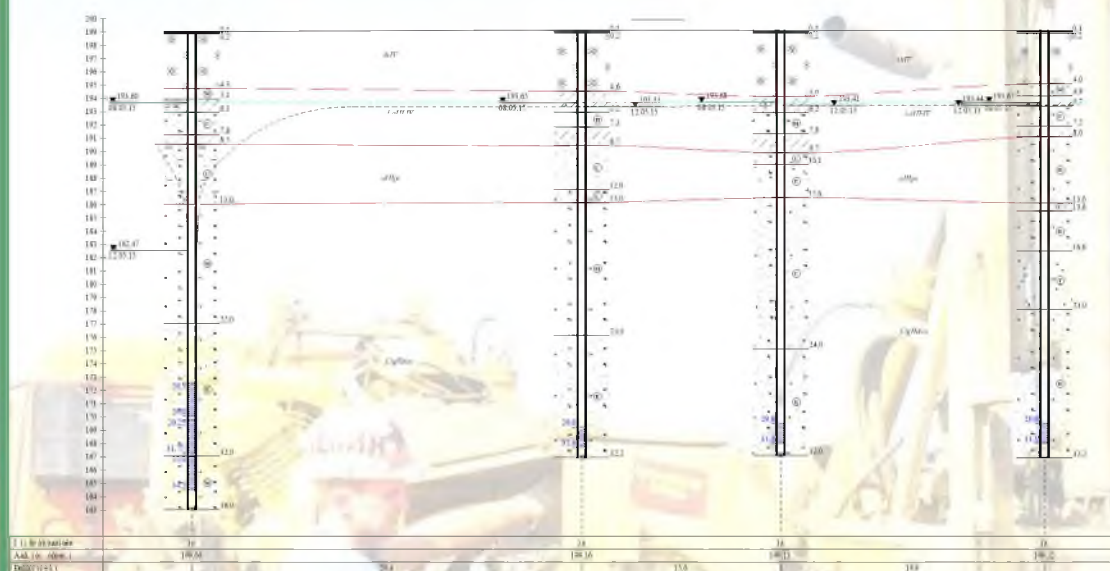
$F_u =$	600 кН	$F =$	500 кН
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Natural pile static testing log

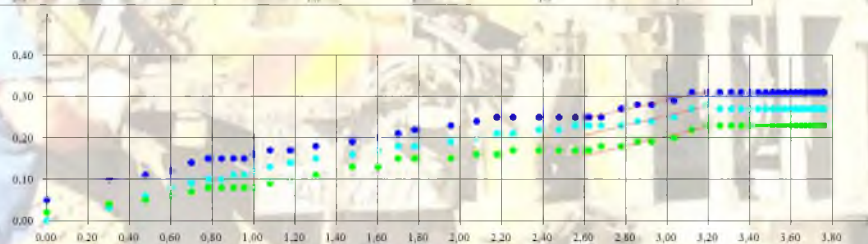
● Checking the quality of soil compaction



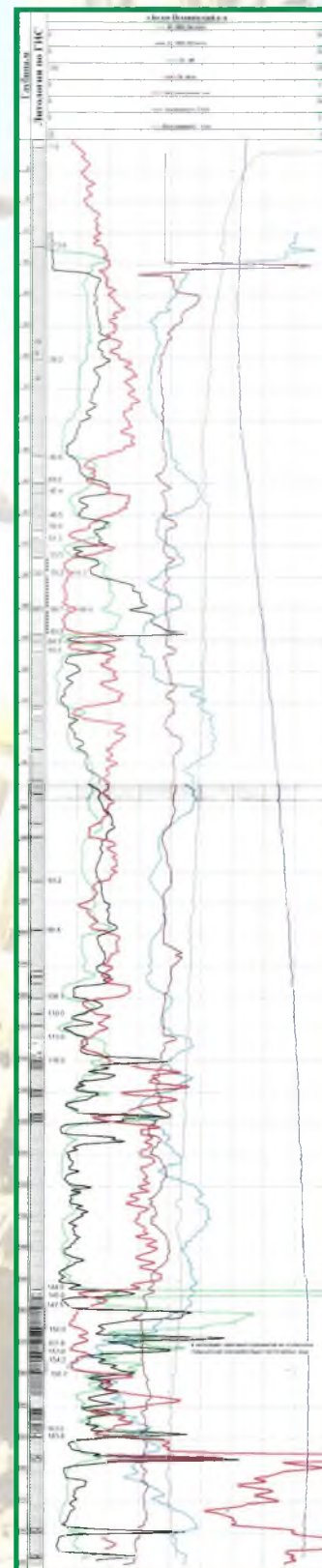
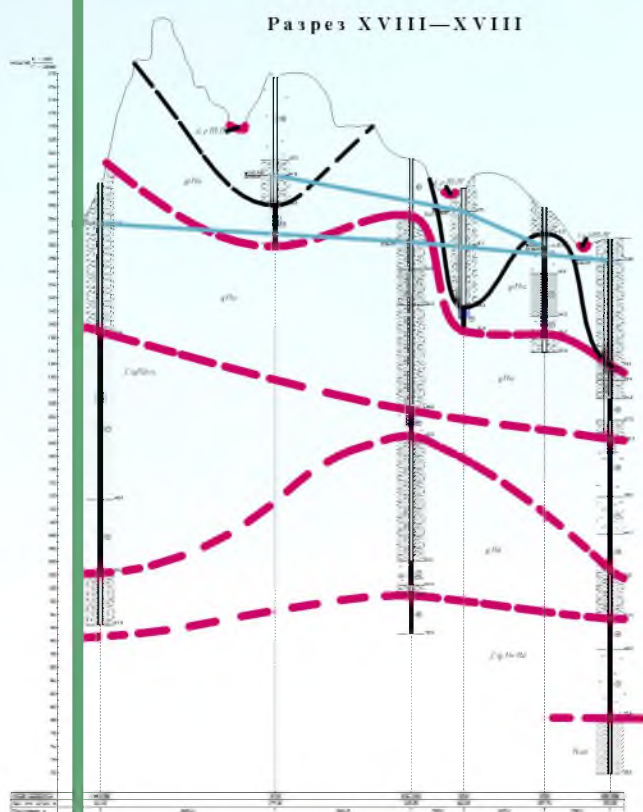
● Engineering hydrogeology



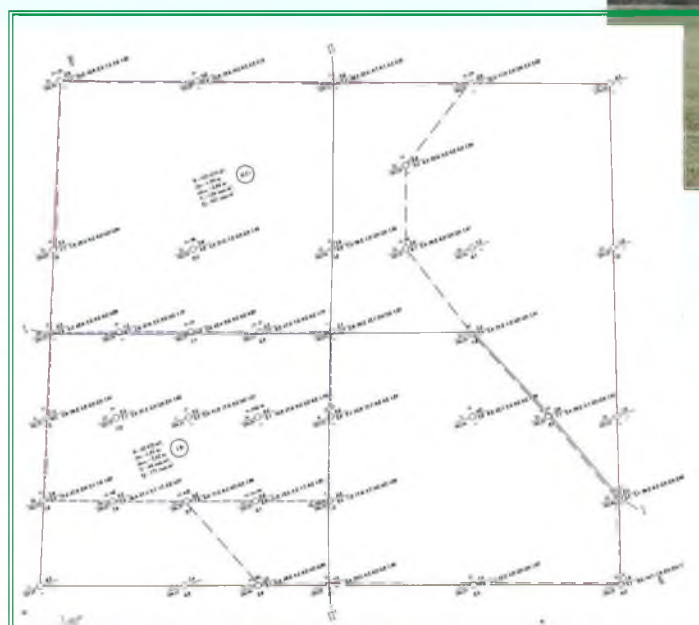
Pumping testing



● Groundwater exploration , drilling of water wells

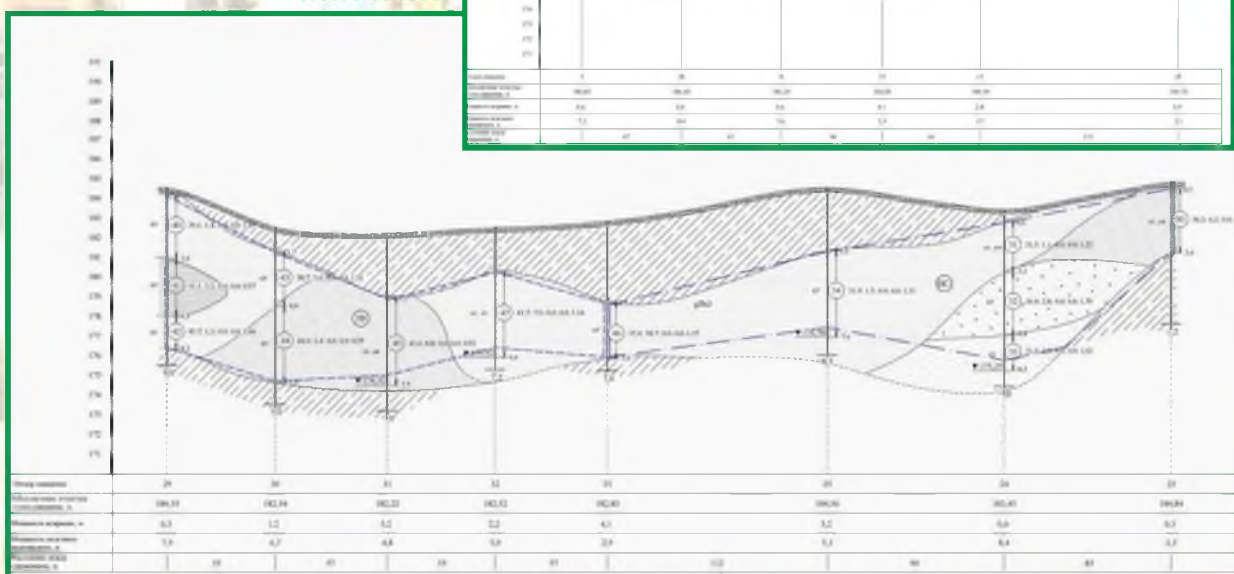
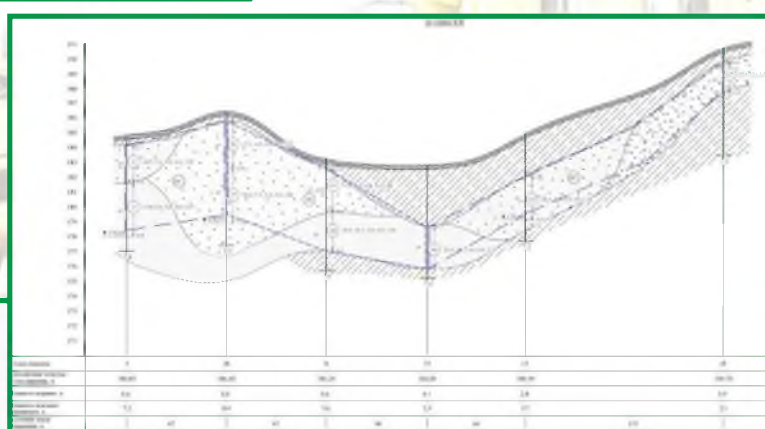


- Exploration of deposits of building materials (chalk, marl, clay, sand, sand-gravel mixture)



Scheme for calculating reserves of a sand-gravel-boulder material deposit

Geological and lithological sections of a deposit of sand, gravel and boulder material



● LABORATORY TESTING OF SOIL AND GROUNDWATER

● *Our laboratory carries out a wide range of tests to determine the mechanical, strength and deformation properties of soils, performs chemical analysis of water extracts from soil and of groundwater, determines their aggressiveness to concrete, cable sheathing, reinforcement and metal structures.*



Triaxial testing

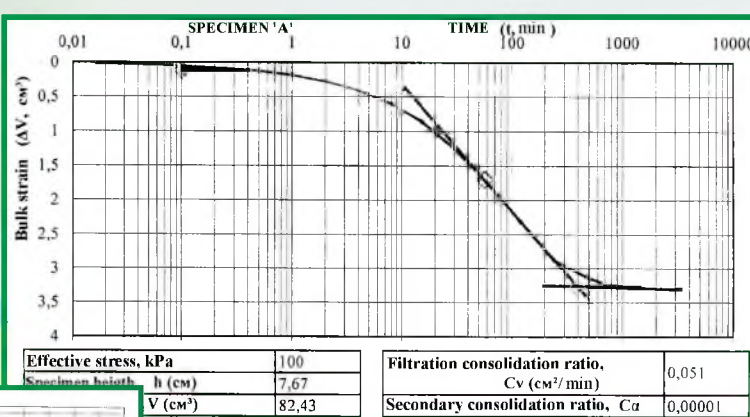
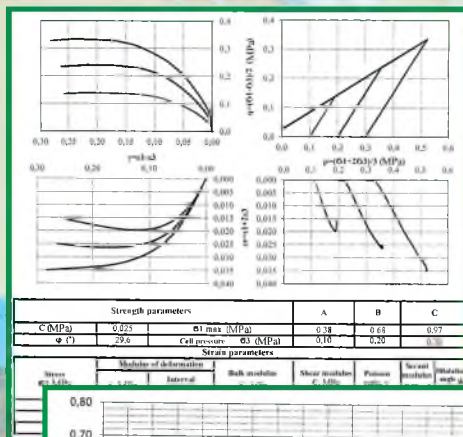


Shear testing

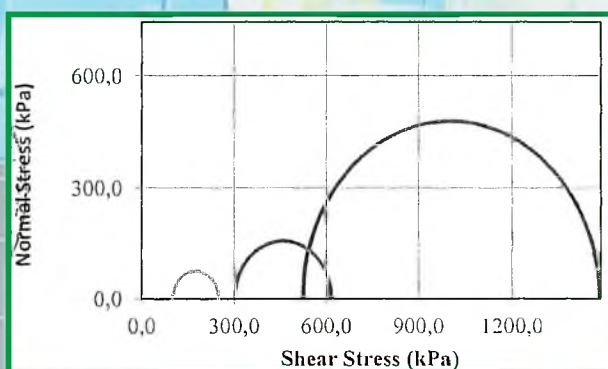
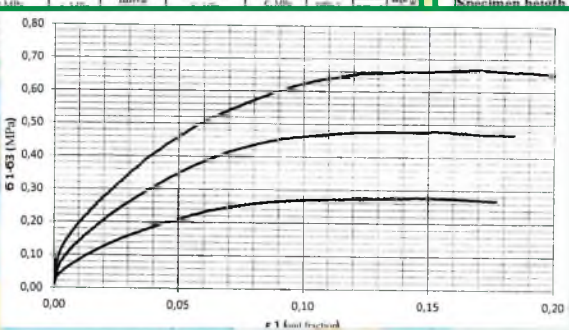


Compression testing

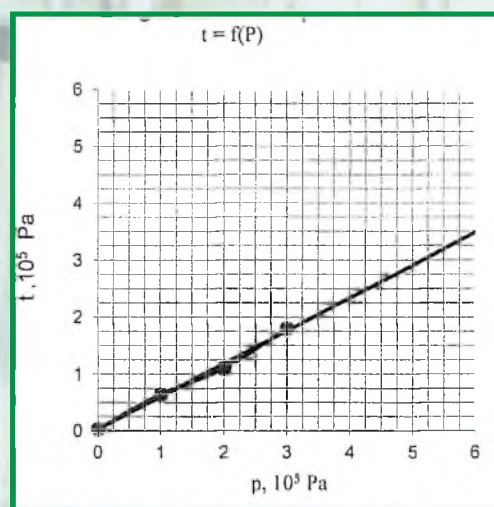
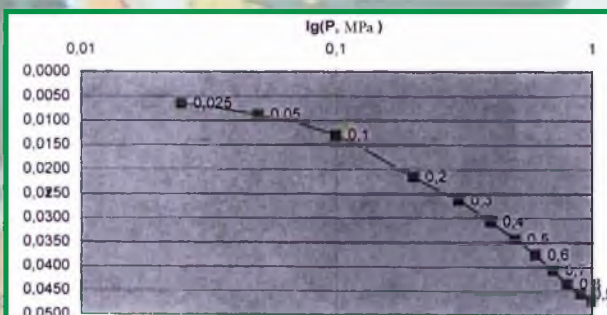
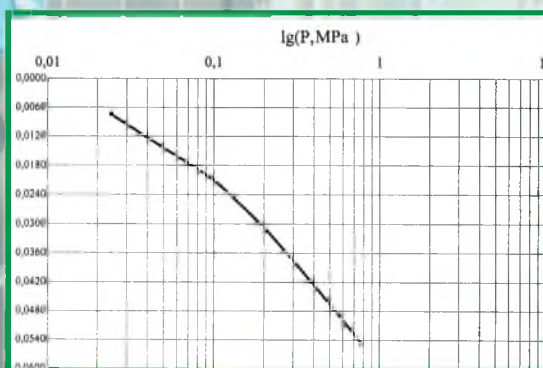
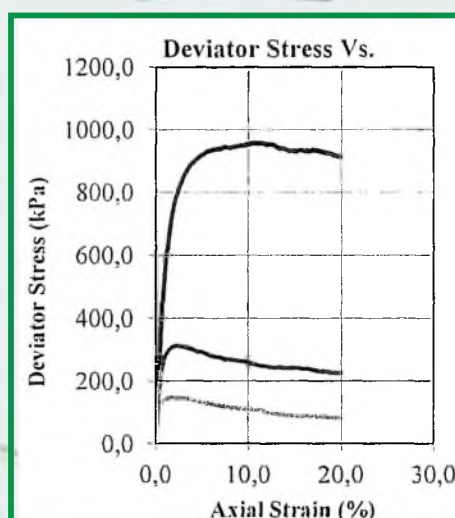




CD triaxial test results



CU triaxial test results

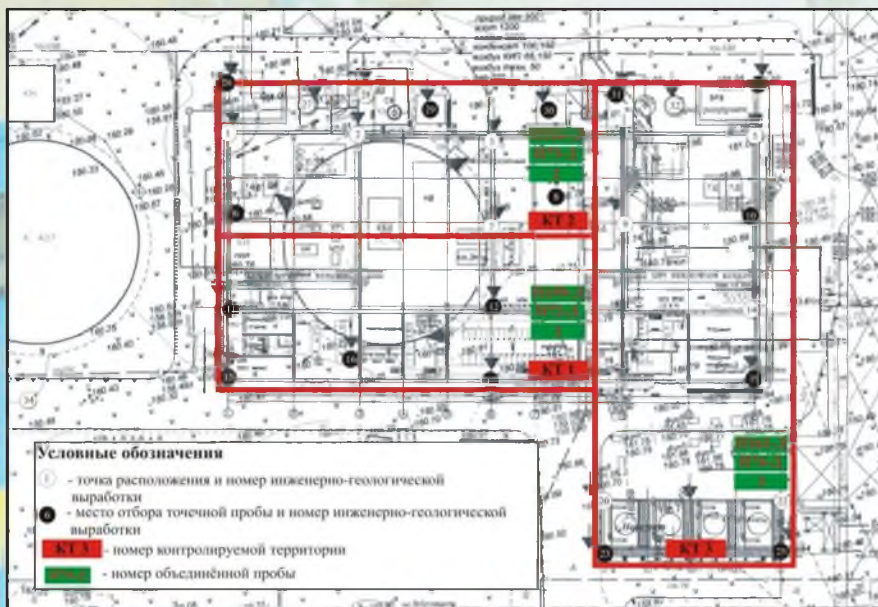


Shear test graph

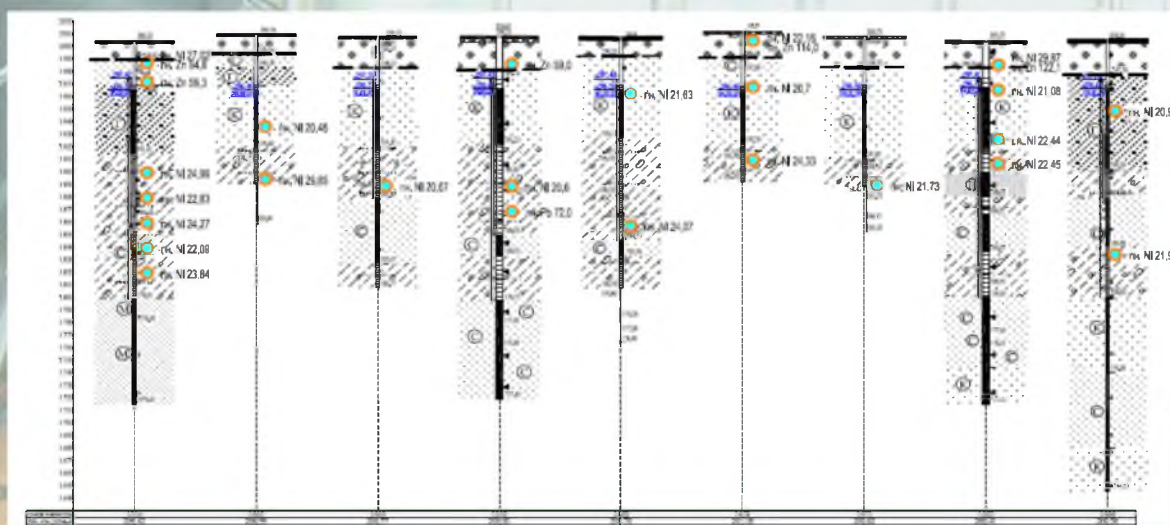
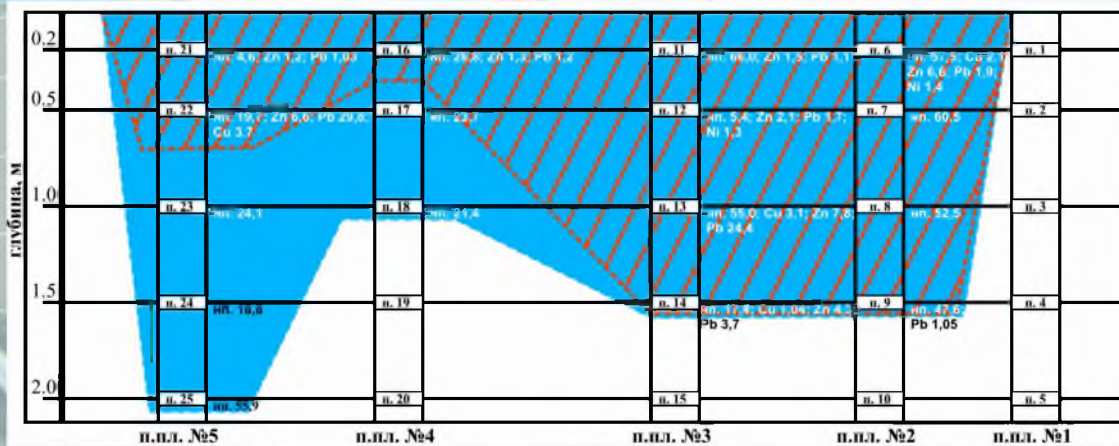
Compression test graphs

● GEOECOLOGICAL SURVEYS

Assessment of contamination of soil and groundwater at the construction site



Geoecological sections showing the depth and degree of chemical contamination of soil



● Radiation-ecological surveys

- determination of gamma radiation dose rate;
- gamma-radiation survey of the construction site;
- determination of the specific activity of natural radionuclides;
- assessment of other radiation characteristics of soils;
- assessment of radon hazard of the territory.



Номер контрольной точки	Средняя МЭД в i-той точке, мкЗв/ч	Номер контрольной точки	Средняя МЭД в i-той точке, мкЗв/ч	Нормируемое значение МЭД, мкЗв/ч
1	0.06	34	0.056	0.3
2	0.057	35	0.056	
3	0.057	36	0.056	
4	0.057	37	0.057	
5	0.054	38	0.058	
6	0.057	39	0.058	
7	0.058	40	0.057	
8	0.057	41	0.058	
9	0.059	42	0.057	
10	0.058	43	0.056	
11	0.06	44	0.056	
12	0.062	45	0.056	
13	0.063	46	0.056	
14	0.064	47	0.057	
15	0.062	48	0.055	
16	0.063	49	0.055	
17	0.067	50	0.054	
18	0.068	51	0.055	
19	0.068	52	0.056	
20	0.069	53	0.057	
21	0.058	54	0.058	
22	0.057	55	0.059	
23	0.056	56	0.06	
24	0.061	57	0.059	
25	0.057	58	0.059	
26	0.058	59	0.058	
27	0.061	60	0.058	
28	0.057	61	0.071	
29	0.056	62	0.068	
30	0.056	63	0.068	
31	0.056	64	0.067	
32	0.056	65	0.067	
33	0.061			

Оцененная МЭД по всем точкам 0,059±0,012 мкЗв/ч

Номер контрольной точки (рег. номер пробы (образца))	Оцененная удельная эффективная активность ЕРН в грунтах в i-той точке, Бк/кг (k=2, P=95%)	Номер контрольной точки (рег. номер пробы (образца))	Оцененная удельная эффективная активность ЕРН в грунтах в i-той точке, Бк/кг (k=2, P=95%)
1 (3829)	62,85 ± 12,83	38 (3835)	63,58 ± 13,08
5 (3830)	61,48 ± 12,60	43 (3836)	62,60 ± 12,24
8 (3831)	46,11 ± 9,82	47 (3837)	65,58 ± 13,90
14 (3832)	51,61 ± 10,54	52 (3838)	64,54 ± 13,57
28 (3833)	57,52 ± 12,22	57 (3839)	64,58 ± 13,72
35 (3834)	55,35 ± 11,96	61 (3840)	66,64 ± 14,12

Номер контрольной точки (рег. номер пробы (образца))	Оцененная объемная активность радона в почвенном воздухе в i-той точке, кБк/м³ (k=2, P=95%)	Номер контрольной точки (рег. номер пробы (образца))	Оцененная объемная активность радона в почвенном воздухе в i-той точке, кБк/м³ (k=2, P=95%)	Нормируемое значение объемной активности радона в почвенном воздухе, кБк/м³
1 (3817)	2,70 ± 0,64	38 (3823)	3,55 ± 0,78	40
5 (3818)	2,82 ± 0,60	43 (3824)	3,56 ± 0,74	
8 (3819)	3,16 ± 0,65	47 (3825)	3,66 ± 0,77	
14 (3820)	3,47 ± 0,74	52 (3826)	3,76 ± 0,79	
28 (3821)	3,88 ± 0,80	57 (3827)	3,30 ± 0,75	
35 (3822)	3,61 ± 0,75	61 (3828)	3,40 ± 0,73	
Оцененная объемная активность радона в почвенном воздухе по всем точкам, 3,40 ± 0,73 кБк/м³				

- *Radial pressuremeter “RP-1”
(manufactured by “GEOSERVICE” for sale)*

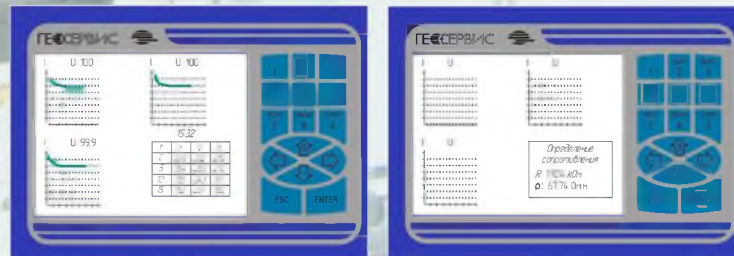


*Designed for soil testing in boreholes to determine the deformation modulus (E) of sands, clayey and organic soils.
The testing process is fully automated.*

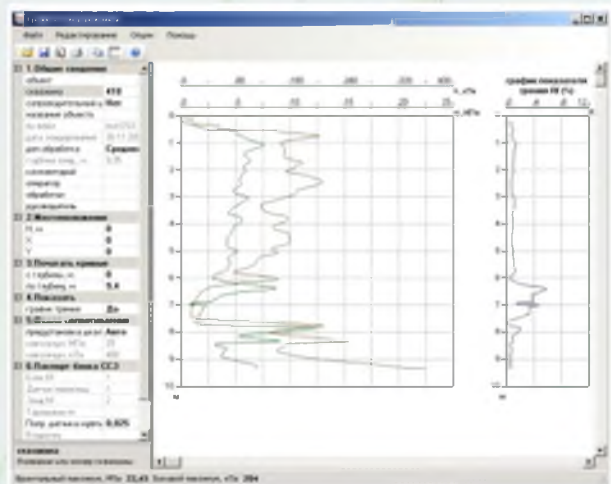
- *Equipment for determining the corrosive aggressiveness of soil
(manufactured by “GEOSERVICE” for sale)*



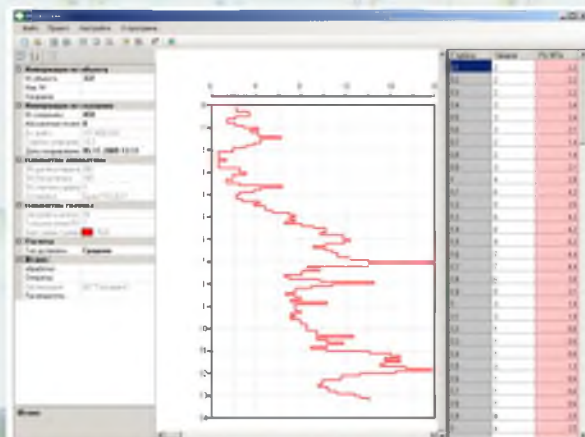
- *automatic analysis of soil corrosion aggressiveness to steel*
- *plotting cathode current stabilization graphs*
- *determining cathode current density simultaneously for three cells*



- CPT equipment
(manufactured by "GEOSERVICE" for sale)



- DPT + SPT equipment
(manufactured by "GEOSERVICE" for sale)



The background of the slide is a photograph of a yellow drilling rig. A worker in a blue shirt and khaki pants is standing next to the rig, which is mounted on a truck. The rig is a large, vertical machine with various pipes and components. The scene is outdoors on a dirt surface under a clear sky.

**Republic of Belarus
Ministry of Architecture
and Construction**

State Enterprise “GEOSERVICE”

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www.geoservice.by