SG GEOTECHNIKA

Company Profile
SG Geotechnika a.s.

Povrly – Děčín , Czech Republic
Rock Massif above Railway Track

SG Geotechnika contributed to this rock massifs stabilisation enhancement project by preparing of a 3D model of the rock massifs along rail transit corridor 090 between Ústí nad Labem and Děčín between chainages 528.350 and 529.950. The contour line plan and cross-sections were also created. A combination of two methods were chosen to achieve optimum results – 3D ground laser scanning and aerial digital photogrammetry using an unmanned aerial vehicle (UAV).

New Railway Connection, Vítkov Tunnels
Prague, Czech Republic

For the overall reconstruction and upgrade of the Prague railway node, SG Geotechnika 's involvement consisted primarily of the construction of the new Vítkov double-track tunnels with dariven section length of 2.4 km. It acted as the leader of the geotechnical monitoring consortium.

PRESENTING SG GEOTECHNIKA a.s.

Within its parent company, SG Geotechnika focuses on professional geotechnical and engineering-geological activities including monitoring of underground structures and geotechnical risks analysis. In September 2017, it became part of PURUM KRAFT a.s. – a Czech firm comprising a group of companies operating mainly in the environmental services sector. Synergy of individual companies guarantees integrity of the offered services in this area.

The uniqueness and strength of SG Geotechnika a.s. lies with the combination of knowledge and experience obtained from over 90 years on the Czech market and knowledge of modern European approaches to preparing and managing large engineering projects.

SG Geotechnika a.s. focuses on consulting, supervision, surveying and testing for engineering structures, particularly in geotechnical engineering, foundation engineering, underground structures and the environment. It also offers projects and project management, primarily for engineering and environmental constructions.

SG Geotechnika a.s. has complete internal resources for both laboratory and field geotechnical texting and for geotechnical monitoring of structures. Targeted investments into modern instrumentation and results of own technical development enable the company to solve technical problems and optimize design solutions in a complex way.

Collected knowledge and experience together with over ninety years of tradition obligate our company to maintain and further improve the state-of-the-art professional, complex, and high-quality services offered to our clients.

A TRADITIONAL COMPANY WITH A MODERN FACE

Extension of Metro Line V.A.

Prague, Czech Republic

Extension of the current Metro Line A to the west (Dejvická – Motol section) relieved the Dejvická station area from intercity bus traffic. The investor of this major project was the Prague Public Transit Company (Dopravní podnik hl.m. Prahy, a.s.). Part of the track tunnels (2 x 4.2 km) is were driven using TBM-EPBS full-face shields.

The TBM technology enabled routing of the tunnels under developed areas with nearly zero impact on surface subsidence. This technology was used in the Czech Republic for the first time. The 2.3 km section was driven using the NATM method. The new section comprises three stations driven with NATM (Bořislavka, Veleslavín, Petřiny) and one cut-and-cover station (Motol). The NATM driving works included excavation of a shallow ventilation tunnel situated below the underground water level. Moreover, there was a functional sewer tunnel just above the ventilation tunnel.

SG Geotechnika's personnel performed an engineering geological survey as well as complex geotechnical and hydrogeological monitoring for this project. Improvement of the transport service in this part of Prague together with a substantial reduction of surface public transport lowered the environmental burden and improved passenger comfort.

BASIC INFORMATION ABOUT THE COMPANY

Business Name:	SG Geotechnika a.s.
Information Number:	411 92 168
VAT Registration NUmber:	CZ 411 92 168
Company Seat:	Geologická 988/4 152 00 Prague 5, Czech Republic
Legal Form:	Share comporation
Incorporation Date:	October 24, 1991 The company was recorded in the Commercial Register administered by the , Municipal Court in Prague, under Section B, Entry 992
Bank Details:	Komerční banka a.s., Praha, Na Příkopě 33/969, Prague 1 Account Number: 7006931/0100

COMPANY STATUTORY BODIES

Company Board of Directors:	Daniel Kraft Chairman of the Board of Directors
	Mgr. Lucie Bohátková Member of the Board of Directors
	Ing. Petr Kučera Member of the Board of Directors

SG GEOTECHNIKA – ABOUT US

A major asset of SG Geotechnika as a universal consulting company is its independence, meaning that it is not linked through capital or otherwise to investors or large construction companies active in the construction or environmental sectors.

SG Geotechnika has an extensive local network at its disposal, which is in close contact with customers, and professional know-how linked to internationally acknowledged skills. The fact that our teams have various specializations while also acting as support allows us to enter any phase of the project. Our international reach also allows us to gain a head start on the technical and organizational sides. Direct contact with the client leads to correct understanding of the issue and requirements in a given locality. Our activities help us to create added value where, based on our creativity and responsibility, we try to offer the best solution, leading to successful projects.

We greatly appreciate the opportunities we have to work with major national investor organizations from the field of transport infrastructure as well as other leading investors from a range of large companies, banks, developers and other entities from both public and private sectors, and to assist them in achieving their goals.
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COMPANY ORGANIZATIONAL CHART SG GEOTECHNIKA a.s.

Czech Republic	Slovakia
SG Geotechnika a.s.	Geofos s.r.o.
SG – Geoinženýring s.r.o.	SG Geotechnika a.s., Organizational Unit, Slovakia

OUR CLIENTS' SUCCESS COMES FIRST

SAFE, QUALITY AND ENVIRONMENTALLY–FRIENDLY PROJECT MANAGEMENT

Safety

Care for the occupational health and safety (OHS) of SG Geotechnika a.s. staff and clients is considered to be an equal and integral part of all our business activities. Consistent management of safety risks, focus on prevention and protection against injuries, together with employee OHS training are standard at SG Geotechnika a.s. as well as in its subsidiaries. SG Geotechnika and GEOFOS, s.r.o. are certified to ČSN OHSAS 18001.

Quality

The business strategy of SG Geotechnika a.s. is based on the principle of providing the highest quality services to its clients. Quality is the priority in all processes. The quality management systems of SG Geotechnika and its subsidiary GEOFOS, s.r.o. are certified under the ČSN EN ISO 9001 standard. The quality management systems of SG Geotechnika and its subsidiary GEOFOS, s.r.o. are certified to the EN ISO 9001 standard, a testament to its long-term commitment to high-quality work.

Sustainability

SG Geotechnika a.s. is aware of its responsibility for the long-term sustainability of environmental quality and its protection. Therefore, the company's environmental policy and all its activities are aimed at having the least possible impact on the environment. The guarantee of this unequivocal focus is the environmental management system (EMS), implemented in SG Geotechnika and GEOFOS, s.r.o. certified according to ČSN EN ISO 14001.

Křižany – Remediation of a Major Landslide on Railway Track

Liberec – Česká Lípa, Czech Republic

A 20m high embankment on Liberec – Česká Lípa railway (near Křižany community) was damaged by a landslide due to excessive rainfall in June 2013. The main cause of the rotary-planar landslide, with an area of 60 x 40m and with the landslide scar height of up to 6m was the saturation of underlying formations pressurized underground water from the massif, interface of permeable sandstones and impermeable marlstones in the embankment bedrock, and partial loss of permeability of the drainage ribs constructed as a remediation measure in the 1920s.
The remediation design drawn-up immediately after the engineering-geological survey and results of numeric analyses the in construction of a geosynthetics reinforced earth formation provided with full-scale drainage. As a prerequisite for reliable remediation, it was necessary to remove the kneaded collapsed material (including the damaged embankment body) and incompetent underlying layers with the total volume of 22 thousand m3 of material. The extensive excavations exposed the geological structure of the site which fully confirmed the conclusions of the survey. The project could thus be implemented with minimum deviations from the original design and with high degree of precision continuously monitored by geotechnical supervision.

The implementation of both surveying and design works took place in close cooperation with the investor in all phases. The uniqueness of this project lies in speed of the geotechnical surveying and in the extent of earthworks in badly accessible terrain. The project of large landslide remediation near Křižany using the reinforced soil structure deservedly received the Czech Transport Structure Award for transport technology and major transport innovation in 2014. This award is the acknowledgement of flexible problem solving and high quality of work of our geotechnical experts and specialists.

4th Transit Railway Corridor

Votice – Benešov u Prahy, Czech Republic

The railway forming the 4th Railway Transit Corridor (Děčín, national border – Prague – Benešov u Prahy – Tábor – České Budějovice – Horní Dvořiště, national border) is one of the most important railway lines in the Czech Republic, connecting the capital of the country with the Tábor region and with South Bohemia. It also forms part of the significant trans-European TEN-T network on the Baltic Sea – Adriatic Sea north-south axis.

Construction between Votice and Benešov u Prahy (18.472 km) is exceptional due to the length of underground works – a total of 2,690 m of double-track tunnels. From south to north, these are: Votický tunnel (cut-and-cover tunnel with a total length of 590 m), Olbramovický tunnel (driven, total length of 480 m), Zahradnický tunnel (driven, total length of 1,044 m), Tomický I tunnel (driven, total length of 324 m) and Tomický II tunnel (driven, total length of 252 m). Relatively unfavorable engineering-geological conditions were encountered when driving the Olbramovický, Tomický I and Tomický II tunnels. On the contrary, high-quality granite was encountered while driving the Zahradnický tunnel. Granite was also encountered in the Votický tunnel, which was constructed in an open pit. However, this gravel was not of such high quality and the construction pit had to be carefully secured against falling rock blocks. Thanks primarily to the tunnels, it was possible to straighten the new route and considerably increase the speed parameters of the track (up to 160 km/hour).

SG Geotechnika a.s., has been a long-term geotechnical consultant to SŽDC, s.o. (Railway Infrastructure Administration, state enterprise) in the field of rail transit corridor upgrades. The company also held this important position during the upgrade of the 4th corridor between Votice and Benešov u Prahy. The Geotechnika division of ARCADIS CZ ensured complete geotechnical supervision and monitoring of the abovementioned tunnels.
These activities included the engineering-geological documentation, geodesic surveying both under-ground and on the surface, extensometric measurements, seismic monitoring, surveying of technical condition of nearby structures, scanning of both primary and secondary lining, and more.

In addition to the tunnels, other structures along the route were part of the scope of geotechnical and civil engineering supervision. This included supervision over track subgrade and track structure construction, a large number of both existing and new bridges, culverts, walls, platforms at stops and stations, elevated access paths, etc.
The upgrade of the 4th rail transit corridor between Votice and Benešov u Prahy resulted in straightening and double tracking of the old railway route, leading to an increase in train speed, capacity upgrade, and higher comfort for passengers. Railway transport thus becomes more competitive compared to car transport.

MANAGEMENT POLICY AND COMPANY STRATEGY

SG Geotechnika strives to achieve a leading position in three business lines - Infrastructure, Water, and Environment. „Leading position“ means more than just size; it also requires better growth and profitability, leadership in development as well as in the quality of services provided. In today's world, it is also important to become an employer for whom people will be glad to work, and to be a leader in sustainable development as well as the area of health and safety.
The SG Geotechnika’s management policy and strategy are based on the ARCADIS Group global strategy and support the long-term increase in performance, achievement of goals, strengthening market position, continual improvements in all aspects of its activities, and fulfillment of legal requirements. We provide our clients with high-quality of services corresponding to international standards and our employees draw on an extensive international database of knowledge and experience in their work, which has been built upon by the ARCADIS Group over the course of more than a century.

BASIC COMPANY VALUES

- Creation of values and ongoing company development through continuous innovations in the field of methods, technology, management, and professional knowledge
- Responsibility and credibility with respect to our clients and company shareholders
- Customer service is the unwavering priority in all company operations
- Respect for the individuality of each company specialist as well as their ability to work in a team. A quality company is built through quality employees.
- Respect for the heritage and traditions of the Czech engineering geology school established by Quido Záruba by developing the interconnection between the technical and natural science approach to geotechnical engineering

WE WORK AS A TEAM FOR OUR CLIENTS’ BENEFIT

AREAS OF ACTIVITY OF SG GEOTECHNIKA

Spheres of Activity

Transport Structures
Subsurface and Underground Structures
Hydroengineering Structures
Civil and Industrial Structures
Industrial Parks and Logistics Facilities
Energy and Heating
Environment
Mining Industry, Mine Works
Utility Networks
Telecommunications
Waste Management

Specializations

Geotechnics
Engineering Geology
Hydrogeology
Soil and Rock Mechanics
Foundation Engineering
Engineering Seismology
Geophysics
Building Physics and Dynamics
Diagnostics of Building Structures
Construction-Technical Consulting
Technical Condition Surveying and Certification of Buildings
Engineering Geodesy
Mining Engineering
Urban and Regional Planning
Investor Activities
Ecology, Conservation and Landscaping

Extension of Metro Line V.A
Prague, Czech Republic

SG Geotechnika a.s., manages the on-site monitoring office, carries out geotechnical monitoring of driving works, and performs a wide range of measurements.

INFRASTRUCTURE

Life and work in a healthy environment, ease of mobility and communication, opportunity for change – for all these basic human needs, good infrastructure is a prerequisite, i.e. roads and motorways, railways, waterways, reliable sources of energy and water, and industrial development. SG Geotechnika a.s. operates primarily in the area of transport infrastructure, where it occupies a leading position in its field, but it is also active in the fields of engineering-technology construction, energy and mining, and processing of raw materials.

Doing business in the field of infrastructure requires detailed knowledge of local conditions and needs. Through its divisions and subsidiary companies, SG Geotechnika has built a strong position on local markets and provides a wide range of services related to infrastructure development. SG Geotechnika a.s. offers a comprehensive approach in the resolution of technical problems and optimization of planned projects to its clients in the field of transport infrastructure, who are both state investment organizations and major design and construction companies. SG Geotechnika helps its clients to find economical solutions and always offers an innovative approach, not only routine services.

The significance of the role the company plays in the field of transport infrastructure is visible in its regular annual participation in transport constructions that earn awards in Construction of the Year and the Czech Transport Structure of the Year competitions.

Spectrum of Services

Design work, engineering and construction management
Risk management, quantification and risk minimization
Slope stability, remediation of landslides and rock walls
Reinforced soil structures, retaining and supporting walls
Cable lines, oil pipelines, gas pipelines, water supply and sewerage systems
Urban solutions for industrial infrastructure
Long-term inspection monitoring
Project management of geotechnical structures
Supervision and professional construction supervision

CONNECTING PEOPLE AND PLACES IN SMARTER, MORE EFFICIENT WAYS

D3 Motorway

Tábor – Veselí nad Lužnicí, Czech Republic

Once completed, the D3 motorway will become part of additional network of European transport corridors (TINA), specifically the international road E55 linking Scandinavia to Greece via Germany, the Czech Republic, Austria, and Italy. The motorway will significantly relieve the existing overloaded road I/3 and part of the D1 motorway. It will also function as a high-capacity link between Prague and South Bohemia and connect the Tábor and České Budějovice regions to the national motorway and expressway network, plus provide a southern connection to the Austrian motorway network.

The D3 motorway section between Tábor and Veselí nad Lužnicí, in which SG Geotechnika a.s. participated, measures 25 km in length. It comprises an extensive group of structures: 48 bridges, 5 flyover junctions, and related excavation works and embankments. Construction works were preceded by a detailed geotechnical survey, archeological prospecting, and protective biological research. ARCADIS CZ, Geotechnika Division, provided complete geotechnical service for individual building contractors working on this motorway section, comprising geotechnical monitoring, measurement of settlement and pore pressures, pile integrity measurement, stability and deformation calculations including design of slopes and compaction tests.

Navigation Locks Brandýs nad Labem and Velký Osek

Elbe Waterway, Czech Republic

The Elbe Waterway is part of the 4th trans-European multimodal transport corridor and it is the only waterway in the Czech Republic that is also used for international shipping. For the planned increase in the percentage of ecological and cheap water transport, it was necessary to permanently improve the navigational conditions of the Elbe River. SG Geotechnika a.s. has long been working on projects related to the construction, reconstruction and modernization of the Elbe Waterway. Among the important contracts undertaken for our major client, the Directorate of Waterways, is work on the Brandýs nad Labem and Velký Osek locks.

Due to the technical state of the Brandýs nad Labem lock (finished in 1936), which is unsuitable in the long term, options are being considered for the construction of a new lock in the close vicinity, as well as reconstruction of the existing lock to secure the Elbe Waterway.

SG Geotechnika s.s. carried out ongoing engineering-geological surveying works here between 2007 and 2013. An engineering-geological and construction-technical survey of the existing lock has been prepared to assist with strategic decisions regarding the future operation of the Brandýs nad Labem lock. This survey was also used as the groundwork for the lock reconstruction design. Another engineering-geological survey for the second lock was prepared to assess an alternative variant of the project. As a part of the project preparation, the company also provided comprehensive monitoring of underground water level and quality in the vicinity of the lock.

At the Velký Osek lock, SG Geotechnika performed an extensive construction-technical survey. The surveys comprised detailed geo-physical measurements including georadar surveying of the bottom and walls of the navigation locks. The purpose of the surveying work was to document the state of the locks statically and technically, and provide documentation for the client for proposed technical solutions to modernize both locks and for drawing up project documentation.

WATER

Hydroengineering Structures

Hydro engineering structures and services related to the field of hydro engineering have over 60 years of history at SG Geotechnika. Our professional staff can now draw on the extensive experience gained from large hydroengineering structures built in the past in Bohemia and Moravia, From the dams of the Vltava cascade and rock-fill dams to sludge beds of most thermal power plants, the Želivka feeder gallery and other underground galleries and sewage collectors, to flood barriers, the Děčín weir, or the rehabilitation of Jordán Lake, currently underway.

Spectrum of Services

Consulting, design and engineering services
Management of surface and waste water
Provision and protection of water sources
Hydro-geological surveying and monitoring
Drainage of ground, slopes and construction pits
Collaboration on programs for building and improving the quality of flood prevention measures
Remediation and reconstruction of earth-filled dams
Technical safety supervision at construction sites
Revitalization and modification of water courses
Supervising activities, technical supervision and monitoring
Erosion control of watercourse and reservoir banks

FOR LONG-TERM SUSTAINABILITY AND RENEWAL OF WATER SOURCES

Jordán Lake Rehabilitation

Tábor, Czech Republic

Jordán Lake is a water reservoir in the city of Tábor with an area exceeding 51 hectares. It was built in 1492 and thus is the oldest dam in Central Europe. Its earth embankment is 20 meters high and 284 meters long, retaining approximately 3 million m^3 of water.

Tábor was struck by floods in August 2002 and was listed among the structurally affected regions. A decision regarding the overall renovation of the Jordán storage reservoir was thus made. The construction project comprises establishment of a bottom water outlet, which forms an important operating element of the dam structure, and which increases its safety, particularly during floods and other extraordinary events.

The bottom water outlet is designed as a linear underground construction enabling drainage of the reservoir from its deepest point and - for the first time ever - will ensure smooth control of the water level in the reservoir. The outlet consists of a gallery with a length of 208.2 meters with a vertical shaft excavated from the surface. The driven gallery of the outlet has cross sections measuring 2.6 x 2.7 m and 2.4 x 2.5 m.

The task of SG Geotechnika a.s. as the geotechnical consultant was to provide continuous information about the bedrock quality through geological and geotechnical documentation of the excavation and face. This information served as the groundwork for specifying the type of reinforcement, driving technology, attack length, and for deciding whether or not any of the alert states was reached. Geological documentation of both excavated and driven parts of the outlet enabled the contractor to respond flexibly to the current rock environment and to make the driving more effective.

Another activity consisted of cooperation with the designer in the field of additional forefield survey design with core boreholes into the face and consulting regarding securing the forefield while passing under an open tectonic fault zone.

Družba Mine
Sokolov Region, Czech Republic

The large-scale lignite mine Družba in the Sokolov coal basin, the adjacent mine Jiří and surrounding spoil dumps were an important area for ARCADIS CZ, Geotechnika Division's operations for many years. The company performed extensive geotechnical monitoring here and executed a number of stability calculations.

ENVIRONMENT

All urban, transport and industrial projects must take into account the environment while respecting the principles of sustainable development. SG Geotechnika offers an extensive range of services necessary to achieve this objective. Among its services are consultancy and environmental management, environmental audits, assessing the impact of construction and activities on the environment, resolving old environmental issues, and technology for storage and processing of waste. We also carry out surveys of geological environment pollution and associated remediation projects.

In collaboration with of SG Geotechnika specialists, we are prepared to create proposals for modern, highly effective and economical remediation methods to our clients. A specific advantage of SG Geotechnika over its competitors is its capability for an engineering approach and integrating construction fields, primarily geotechnics, into projects as well as supervision of remediation work.

Spectrum of Services

Surveys and remediation of landfills and sludge beds
Waste management Audits and consulting
Risk analysis, studies and expertise
Recycling of demolition waste and building materials
Revitalization, rehabilitation of land
The Use of secondary materials
Acoustic studies, noise pollution measurement, noise abatement measures
Daylight studies
Indoor climate and air quality
Measurement of radon, radiation protection
Comprehensive solutions in the field of energy by-products
Certification of products of anthropogenic activities
Resolving soil contamination, groundwater and surface water
Soil and water analysis
Renewable resources, wind and solar power plants
Environmental protection in industrial production

PARTNERING WITH NATURE CREATES A BETTER FUTURE

Remediation of a Hazardous Waste Landfill

Chabařovice, Czech Republic

The chemical waste landfill near Chabařovice is one of the most hazardous toxic and industrial waste disposal sites in the Czech Republic. Among other things, about 40,000 barrels of hexachlorobenzene are stored here. The landfill was opened in 1908 and was used until 1993, when its area reached 41 ha. In the poorly secured body of the landfill, chemical reactions occurred and contaminated water leaked into the drainage basin of the Bílina River, reaching as far as the Elbe. It was therefore decided that a complete, technically very demanding and costly decontamination of the landfill should be carried out.

SG Geotechnika a.s. specialists participated in the remediation work back in 2002, when there was an extensive landslide on the northern slopes of the landfill. The company installed a monitoring system there. In the next stage, additional engineering geological surveying was performed and the cause of the landslide identified. This information, as well as the (design, supervision and evaluation of the major attempt, repeated monitoring of the front and part of the surface of the landfill using laser scanning, surveying for the cut-off wall), was the basis for the design and stability assessment of the landslide remediation solution.

After analyzing the geotechnical risks for different versions of completing the remediation, the optimum version was selected based on SG Geotechnika's recommendations and implemented under their professional supervision. There was a major decrease in the landslide speed and it is expected that the landslide will be stabilized in several years. Currently, the remediation is complete, the surface reclaimed and the landfill is completely safe.

Pravčická Brána – Photogrammetric and Thermovision Imaging

Hřensko, Děčín District, Czech Republic

SG Geotechnika has cooperated with the Bohemian Switzerland National Park since its establishment in 2000. This cooperation has included a number of activities from rocks remediation to design works, and 3D laser scanning to aerial thermal imaging.

SG Geotechnika a.s. holds permits for works execution by means of unmanned aerial vehicles issued by the Civil Aviation Authority. The company currently operates 2 unmanned aerial systems (UAS) with cameras covering three spectral bands. This equipment enables SG Geotechnika a.s. to perform all photogrammetric and thermal imaging works in various industrial sectors.

The aim of the contract was to create a 3D model of the Pravčická Brána monument, to quantify the areas with matured sandstone crust peeling, and applying a texture obtained in thermal imaging to the 3D model. A series of flights were performed under demanding climatic conditions while observing all legal and safety procedures. The data was obtained using aerial digital photogrammetry and an unmanned aerial vehicle (UAV). Subsequent calculations and modeling took place in the photogrammetric software.

SG Geotechnika first carried out accurate geodesic points surveying at the site which was followed by collection of aerial images in form of point clouds. These points were then transformed into S-JTSK coordinates to produce a 3D model based on which the peeling areas were identified. Thermal imaging was also performed. The resulting 3D model provides detailed overview of the temperature distribution and resulting percentage of peeling sandstone crust

Services Provided

Consultation and advisory services in geotechnics, underground structures, foundation engineering and the environment

Structural-geological survey work

Numerical modeling of geotechnical problems, analysis of geotechnical structures

Structural-geotechnical and environmental-geotechnical projects

Organization, management and implementation of geotechnical structures

Supervision and construction supervision

Laboratory tests in an accredited geomechanical laboratory

Field testing and monitoring - geotechnical, civil, and in mines

Verification tests during construction works

Assessment of the impact of construction or technology on the environment

Supervision of contaminated environment remediation

Liquidation and remediation of surface and underground mine works

Engineering seismology

Assessment of the impact of underground activities on ground and building stability

Quantification and management of geotechnical risks

Surveying of technical condition of roads and structures

Geological surveys of deposits, deposits appraisal

Consulting and advisory activities in the field of waste handling

Engineering geodesy, including 3D laser scanning and modeling

Geophysical surveying, including georadar, radon surveying

Standardization and regulatory activities

Applied research in the field of geotechnics and ecology

Education and training activities

SG Geotechnika - Major References

Czech Republic

- D8 Motorway – Panenská, Libouchec, Prackovice, and Radejčín tunnels – comprehensive geo-monitoring; Lovosice – Řehlovice section – inspection and consulting activities
- Prague – metro IV.C1, IV.C2, V.A – survey and comprehensive geo-monitoring
- Modernization of railway transit corridors (I–IV)
- Želivka – drinking water feeder gallery – monitoring
- Prague – Nové spojení – geotechnical monitoring of tunnels
- Prague – Charles Bridge – geophysical surveying and monitoring, surveying for stone quarrying
- D3 motorway – Tábor – Veselí nad Lužnicí – geotechnical works
- Prague – Blanka tunnels – surveying and monitoring
- Elbe water works – Děčín weir
- Brno – VMO Dobrovského B – monitoring
- Loukov – construction of storage capacities
- R35 expressway – Hradec Králové (Sedlice) – Opatovice
- Prague – utility conduits in Vodičkova Street, Wenceslas Square
- Tábor – Jordán Lake renovation
- Lužická – Nisa River flood barrier
- Historical mine Jeroným – repair of damage caused by tin ore mining
- Underground water balance – large-scale geophysical measurements in selected hydrogeological areas at Moravia
- Josef underground research center – grouting, drilling, and excavation of rock for a pressure plug experiment (DOP AS project)
- Prague Bubeneč – Holešovice track optimization, geotechnical supervision
- Pilsen Node, 1st construction, Prague gridiron reconstruction, geotechnical supervision
- Liberec – Tanvald track reconstruction, geotechnical supervision
- Cheb – German border track optimization, 1st construction, Phase I – geotechnical supervision

Europe

- Iceland – supervision of Olafsjurdur and Siglufjurdur road tunnel construction
- Poland – A1 motorway, Laliky tunnels – geotechnical surveys and monitoring
- Romania – Bucharest – Brašov motorway – engineering-geological survey
- Slovakia – Strečno, Vrtižer – rock wall remediation

Worldwide

- Yemen – Fartak tunnels – geotechnical supervisionn
- Russian Federation – Sakhalin – construction of oil and gas pipeline – geological and geotechnical supervision
- Uganda – supervision of geological surveying and water pressure tests for a dam
- Qatar – pile loading tests
- China – high-speed railway – expertise and supervisory activities

Blanka Tunnels

Prague, Czech Republic

The Blanka tunnel complex forms part of the Prague city inner ring road. It consists of the Královská obora and Brusnice driven tunnels and the Dejvice cut-and-cover tunnel. The tunnels pass under the Vltava River, under the Královská obora natural park, and under densely built-up parts of the city to the borders of the historic city center. They are the longest city tunnels in Europe passing through an urban environment.

The tunnels have been designed as two parallel one-way two-lane (excavation cross-section 124 m2) and threelane (excavation cross-section 173 m2) tunnel tubes. The driven tunnels are 5,540 meters long; the cut-and-cover tunnels are 6,600 meters long. The total length of the tunnels is 12,140 m. The tunnels were driven using the NATM method. The underground constructions comprise several technological centers with a ventilation machine room, with an excavation cross-section of almost 300 m2 and length of 125 m. In addition to the tunnels, the project also comprises four flyover junctions, a new bridge over the Vltava River, and flood prevention measures in Troja.

An exploratory gallery with a length of 1,949 m was excavated along the future route of the Blanka tunnels prior to commencing with their construction; SG Geotechnika a.s. provided geotechnical monitoring of this exploratory gallery and assisted with detailed geotechnical surveying.

During the construction of the tunnels, SG Geotechnika performed geological documentation of the tunnel driving and excavation of the construction pits, complete geotechnical surveying in tunnels, construction pits, and on surface structures, as well as additional geotechnical surveying. Comprehensive geotechnical monitoring with immediate evaluation and subsequent presentation of measured data in the BARAB® system ensured safety of construction works, driving optimization, and risk management during the construction.

D1 Motorway

Slovaia

Expansion of the motorway network is an integral part of developing new trade and investment activities inthe country. The D1 motorway is the main and also the longest Slovak motorway, which, upon completion, will measure 517 km in the section Bratislava – Košice – Slovakia/Ukraine border.

GEOFOS has been involved in the preparation and construction of this motorway from the planning phase, including EIA studies, engineering-geological and hydrogeological surveys through the geotechnical monitoring and geological/geotechnical supervision for its most significant client – National Motorway Company Bratislava. From 2005–2006, GEOFOS experts carried out a complex engineering-geological and hydrogeological survey for the D1 motorway section between Hubová – Ivachnová. This section is situated in a difficult mountain landscape and measures 15.250 km in length. Its design comprises 22 bridges with a total length of 4.951 km and the Čebrať tunnel with a length of 1.965 km.

The comprehensive engineering geology and geotechnical surveying aimed to clarify the characteristics of the engineering geology conditions in the sections with extensive slope deformation, add geotechnical parameters and properties of the rock massif for construction of foundations for structures on the proposed motorway route, and verify the hydrogeological conditions and the groundwater regime.

In the next phase of surveying (2006 – 2007), work to change the location of the western portal of the Čebrať tunnel to more favorable geotechnical conditions was designed and implemented. During the preparátory work for the PPP projects (2009 – 2010), additional engineering geology and geotechnical surveys were carried out by installing monitoring networks in the area of landslides and Čebrať tunnel portals.

GEOFOS s.r.o.

GEOFOS s.r.o. is the leading Slovak geology and geotechnics company with years of history and professional experience in engineering geology, geotechnics, field measurements, ecology and geodesy. It provides comprehensive services to its clients in the fields of surveying, monitoring, supervision and consultancy at various stages of planning and construction of roads and motorways, hydro engineering structures, tunnels and bridges, railways and the environment. The company was established in 1996.

It actively collaborates with the Slovak Technical University, Comenius University in Bratislava and the University of Žilina. It is a member of the Slovak Tunneling Association, the Slovak Association of Engineering Geologists and many other professional organizations. The company has implemented an integrated management system that merges the system of safety management and of occupational health and safety protection system with an environmental management system and a quality management system. The systems are recertified regularly..

GEOFOS – Major References

Slovakia

- D1 motorway – Hričovské Podhradie – Lietavská Lúčka – Dubna Skala section – Žilina access road, including surveys for tunnels Ovčiarsko, Žilina, Višňové, Budimír – Bidovce – border of SK/Ukraine, Bratislava – Trnava section
- D3 motorway – sections Hričovské Podhradie – Klatovy with Brodno tunnel, Kysucké Nové Mesto – Čadca – Svrčinovec and Skalité – border of SK/PL
- R1 expressway with sections Nitra – Selenec – Tekovské Nemce, northern by-pass of Banská Bystrica, Slovenská Lupča – Korytnica with Diel and Rázsošná tunnels
- R2 expressway – sections Trenčianske Mitice – Ruskovce– Pravotice, Dolní Vestenice – Nováky, Zvolen – Pstruša – Kriváň – Bátka – Figa
- R3 expressway – sections Trstená bypass, Tvrdošín – Nižná nad Oravou – Kriváň – Selská Dubová
- R4 expressway – Prešov, northern by-pass
- Modernization of railways to 160 km/hour capacity – sections Nové Mesto nad Váhom – Zlatovce – Trenčianská Teplá, Beluša – Púchov – Považská Bystrica with Diel and Milochov tunnels
- Hydroengineering structures – small hydroelectric stations Žiar nad Hronom, Kralovany, Stankovany, Švošov, Ružomberok; Žilina waterworks; pumped-storage hydroelectric power plant Ipeľ
- Tunnels: Turecký Vrch, Bratislava – Sitina, Bórik, Dubná Skala, Rojkov, Havran, Šibenik, Dargov, Biele Skaly, Bigoš, Okruhliak, Horelica, Svrčinovec, Polana

Europe

- Iceland – Siglufjurdur and Oshlíó tunnels
- Poland – Laliky tunnel

SG GEOTECHNIKA a.s., ORGANIZATIONAL UNIT SLOVAKIA

SG Geotechnika a.s. has been active on the Slovak market since 2004, when Stavební geologie – Geotechnika, a.s. founded an independent organizational unit.

SG Geotechnika a.s., Organizational Unit Slovakia, as well as the parent company, focuses on consulting, supervision, surveying and testing in the field of engineering structures, particularly in geotechnical engineering, foundation engineering, underground structures as well as the environment.

It benefits from the knowledge and experience gained during almost 90 years of operation of the SG Geotechnika (and its predecessors), currently the largest and oldest geotechnical consulting company in the Czech and Slovakia.

Slovakia Branch – Major References

- R1 expressway Nitra – Tekovské Nemce and the northern by-pass of Banská Bystrica – Independent Engineer for PPP project
- Upgrade of Trnava – Nové Město nad Váhom railway between stationing 47.550 and 100.500, phase II – construction supervision
- D3 motorway, Svrčinovec – Skalité, phase 0 – exploratory gallery Poľana – geotechnical monitoring
- Construction of R2 expressway Figa – bypass – construction supervision
- Building complex - Apponyi Palace and Old Town Hall in Bratislava – special surveying works – 3D scanning
- D1 motorway Sverepec – Vrtižer, km 0.000 – 9.595 – construction supervision
- OPTIMA shopping centre, Košice – comprehensive geotechnical survey
- D1 motorway Hubová – Ivachnová – detailed engineering-geological survey
- Upgrade of Žilina – Krásno nad Kysucou railway – construction supervision
- D1 motorway Jánovce – Jablonov – phase I – detailed and additional engineering-geological survey; phase II – geotechnical monitoring
- Technical-quality conditions (TQC part 28) – geotechnical monitoring for tunnels and exploratory galleries
- Technical-quality conditions (TQC part 35) – geotechnical monitoring for line sections of roads and railwaysí
- R2 Motorway Ruskovce - Pravotice – construction supervision
- Strečno rock face remediation

Tunnels on D1 and D3 Motorways

Žilina District, Slovakia

GEOFOS and SG Geotechnika provided comprehensive geotechnical monitoring during the process of driving the Ovčiarsko and Žilina tunnels on the D1 motorway section Hričovské Podhradie – Lietavská Lúčka and the Považský Chlmec tunnel on the D3 motorway section Žilina, Strážov – Žilina, Brodno. Ovčiarsko tunnel is 2367m long, Žilina tunnel is 687m long, and Považský Chlmec tunnel is 2120m long.

Driving in soils was carried out using NATM technology with side wall drifts, driving in rocks was performed with horizontal division. GEOFOS in cooperation with employees of SG Geotechnika performed comprehensive geotechnical monitoring for the building contractor. The goal of the monitoring was to produce continuous geological documentation of the tunnel tube and portal sections of the tunnel and to monitor the geotechnical parameters of the massif during the construction period in line with the approved geotechnical monitoring design.

The works comprised convergence, inclinometric, and extensometric measurements, laboratory and field tests, stress measurement in the tunnel lining and in anchors near the portal, surface leveling and measurement of portal deformations, seismic monitoring, georadar and corrosion measurements. As chief geologist and geotechnical engineer of the project, the company managed the monitoring office including data sharing through the BARAB® on-line database.

Pumped-Storage Hydro Power Station Dlouhé Stráně, Czech Republic

The Dlouhé Stráně Hydroelectric Power Station is an important workplace for SG - Geoinženýring; Experts from SG – Geoinženýring have been performing remediation and grouting works here for an extended period.

SG – GEOINŽENÝRING s.r.o.

SG – Geoinženýring s.r.o. is a specialized geotechnical firm seated in Moravská Ostrava, that deals with design, engineering, and project management of mainly engineering, underground, and environmental projects. It also performs geotechnical and environmental surveys, as well as independent execution of the above-mentioned structures. SG – Geoinženýring is an independent legal entity that offers its services mainly in the Moravian-Silesian Region.

SG – Geoinženýring collaborates as much as possible with reputable design, construction, and mining companies, as well as with VŠB – Technical University of Ostrava. In cooperation with local specialists, the company can guarantee state-ofthe-art solutions to the most current issues in given regions, for example, consequences of undermining for surface development, methane outbursts, subterranean occupational safety, etc. An important part of the cooperation is the technical development of given field; in particular in the area of development and practical implementation of numerous specialized (mainly metering) devices. Success in the field of development is proven by a number of utility design registrations that the experts from SG – Geoinženýring have submitted to the Industrial Property Office in recent years.

SG – Geoinženýring – Major References

Czech Republic

- Monitoring and evaluation of thermal activity of old spoil dumps (Ema, Hedvika, Heřmanice, Hrušov – Vrbice)
- Pumped-storage hydroelectric power plant Dlouhé Stráně – grouting in feed conduits and discharge tunnels, sealing of locks facility, landslide stabilization, securing loose rock blocks
- Stabilization of Petříkov – Tarabar landslide
- Mšeno dam – sealing of water leakage into the gallery
- Vratislavice grain silo – Sealing grouting
- Štěchovice dam – Linear sealing grouting
- Sluncová – Stabilizing and sealing grouting in forefield
- Remediation of mine spoils below foundations of building structures –Hedvika storage hall, Ostrava- Petřvald

Geotechnical Securing of a Rock Formation

Dlouhé Stráně, Šumperk District, Czech Republic

Plchova soutěska is situated at the access road to the Dlouhé Stráně pumped-storage hydro power station. It is a 100-meter-long section where the Divoká Desná river valley narrows and its slopes have an inclination of 70 to 80 degrees. The road is owned by ČEZ, a.s. and it serves as the primary service road for the pumped-storage hydro power station. Maintaining its functionality is crucial for the power station's operations.

Re-profiling of the heavily damaged rock formation took place without use of explosives by gradual scaling of damaged rock blocks using steel wedges installed in strategically placed boreholes. Darda hydraulic rock splitters were used together with a pick hammer. Block "K" was secured with steel ropes before commencing with the operation. Approximately 20 cubic meters of rock were scaled in total. Of this amount, 17 cubic meters were removed using hydraulic wedges and 3 cubic meters were removed with pick hammers. After re-profiling the protruding rock formation at critical point "K", the resulting surface, including the immediate surroundings, was secured with Galmac safety nets. The total area of the secured slope was 90 square meters.

The remaining part of the rock formation and the adjacent slope were secured with permanent safety nets to ensure that no loose pieces of rock can fall out and slide in the future. The nets were anchored with a system of anchors – both self-drilling R32 anchors and rebar anchors with diameters of 22 and 25 mm. Securing was performed using a perimeter steel cable with a diameter of 12/14 mm.

A protective intercept was constructed at the road as an additional safety measure. Its purpose is to capture small rain-washed rock fractions to ensure they do not reach the road surface.

SG GEOTECHNIKA – CONTINUITY SINCE 1926

SG Geotechnika a.s. continuously reflects the tradition of the first geological engineering workplace in the Czech Republic, established in 1926 by Professor Quido Záruba. Professor Alois Myslivec, another significant Czech geotechnical engineer, established the first Czechoslovak soil mechanics laboratory in Prague in 1929.

The Ústav stavební geologie (Engineering Geology Institute) was created from these workplaces in 1954. This institute concentrated all specialists crucial for the resolution of geotechnical problems of engineering structures of all kinds. A specialized surveying company, Stavební geologie Praha, n.p. (Engineering Geology Prague, state enterprise), was established in 1968. In addition to professional and design workplaces, this company also comprised technical and building works departments.

Stavební geologie Praha, n.p. guaranteed comprehensive development of all professional geotechnical disciplines, performed applied research, and played a decisive role in geotechnical and geological data provision for all major construction projects in the Czechoslovak Republic as well as abroad.

Stavební geologie – Geotechnika joint-stock company was established during the privatization in 1991. It included all professional geotechnical workplaces of the original Stavební geologie Praha. The company jettisoned its drilling and building operations and evolved into a modern independent consulting and engineering company.

The company teamed – up with a strategic foreign partner - the French company Simecsol – in 1993, which enabled its rapid consolidation. Since its establishment, Stavební geologie - Geotechnika, a.s. has been developing in both externally and internally. The company continued to extend the portfolio of its services, established regional offices in Brno and Ostrava, proceeded with its research activities, and invested heavily into instrumentation

In 2002, Stavební geologie – Geotechnika, a.s. and its foreign partner became part of ARCADIS - a multinational group of engineering and consulting companies seated in Netherlands. In 2005, the company established an organizational unit in Bratislava, Slovakia, and acquired a share of GEOFOS (Žilina, Slovakia), the leading engineering-geological company in the Slovakia.

From 2007, Stavební geologie – Geotechnika, a.s. together with ARCADIS Project Management s.r.o. were part of ARCADIS CZ a.s., a holding company whose majority shareholder was the ARCADIS multinational group. In 2014, the company took on the Group's name and subsequently conducted business as ARCADIS CZ a.s.

In 2016, the company returned to the short version of its original name - SG Geotechnika, in honor of its over ninety years of tradition on the Czech market..

Road 1/35 – Landslide Remediation at Hřebeč Tunnel

Svitavy District, Czech Republic

From late March to early April 2006, an extensive landslide of slope sediments buried the eastern portal of the Hřebeč tunnel and part of the surrounding three-lane 1/35 road, an important link for the Pardubice and Olomouc regions. The landslide length in the horizontal projection was 52 m, its width was 45 m, and the volume of collapsed material was 13,000 m^3. The landslide was accompanied by a rock fall; the separation was up to 15 meters high. In terms of the volume of shifted earth and collapsed rock blocks, it was the biggest landslide in road construction in the Czech Republic.

Immediately following the landslide, SG Geotechnika staff began building a geodetic monitoring system, compiled a project for preliminary measures and the entire landslide material was measured using a Leica HDS 3000 laser scanner to create a precise 3D model. This was followed by geological mapping, geotechnical surveying, field and laboratory tests, and an assessment of various remediation alternatives.

The landslide remediation was implemented using a combination of drainage ribs, reinforced soil loading bench, light ceramic gravel backfill, installation of nets, and anchoring of the rock outcrop. Remediation is technically demanding, in which largely unique modern technologies were used and which was performed in difficult geological and structural conditions. Some remediation procedures were implemented for the first time ever in the Czech Republic.

During the remediation, SG Geotechnika provided professional supervision over the contractor SKANSKA DS and gradually implemented a comprehensive monitoring system. With this, the long-term functionality and permanent safety of the structure in a problematic location is currently monitored. The Hřebeč Tunnel landslide remediation received an honorable mention in the 4th Annual Transport Structure of the Year competition in 2006.

COOPERATION OF SG GEOTECHNIKA ON AWARD-WINNING STRUCTURES

Specialists and staff at SG Geotechnika in the Czech Republic and Slovakia often participate in construction projects which then receive awards in national "Construction of the Year" and "Czech Transport Structure of the Year" and other competitions. Some structures have also been very successful internationally. In recent years, SG Geotechnika has collaborated on dozens of award-winning structures:

D3 Motorway Žilina (Strážov) – Žilina (Brodno)

- The main prize in the Construction of the Slovak Republic of the Year 2017
- Ministry of Transport and Construction of the Slovak Republic Award in the Slovak Transport
- Structure of the Year 2017

D3 Motorway Svrčinovec – Skalité

- Slovak Chamber of Civil Engineers Award for the best design solution in the Construction of the Slovak Republic of the Year 2017

Modernization of the Tábor– Sudoměřice railway line

- Title of Construction of the Year 2016

Construction project I/27 Velemyšleves – bypass and bridge over Chomutovka river

- Road and Motorway Directorate Award in the Czech Transport Structure of the Year 2016

City Ring Road of Prague Blanka tunnel complex

- Title of Structure of the Year 2016
- Title of Czech Transport Structure of the Year 2015

Modernization of Brandýs nad Labem locks

- Waterways Directorate of the Czech Republic Award in Czech Transport Structure of the Year 2015

Metro Line V.A Extension Dejvická-Motol, Prague

- Title of Czech Transport Structure of the Year 2015

Road I/11 Mokré Lazce

- Title of Czech Transport Structure of the Year 2015

Large landslide remediation on Liberec – Česká Lípa railway with a reinforced soil structure

- Czech Transport Structure Award, transport technology and significant innovation in transport, 2014

Modernization of the 4th Railway Transit Corridor, Votice-Benešov

- Title of Czech Transport Structure of the Year 2014
- Ministry of Transport Award in the Czech Transport Structure of the Year 2013

R1 Expressway, Pribina, Slovakia

- Award in the Top 40 PPPs in Emerging Markets international competition – 4th best PPP project in EMEA region for 2013

Road I/42 Brno, VMO Dobrovského B)

- Construction of the Year 2013 title
- ČKAIT Award in Construction of the Year 2013 competition
- Czech Transport Structure of 2012 title

Beroun – Zbiroh Railway Optimization

- Title of Construction of the Year 2013
- SŽDC award in Construction of the Year 2013 competition

Road I/38 Kolin – By-pass

- Minister of Transport Award in Construction of the Year 2013 Competition Structure of the Year 2013

Road I/11 Mokré Lazce

- Title of Czech Transport Structure of the Year 2015

Completion of Vltava Waterway Between Hluboka nad Vltavou – Hněvkovice Dam and – Hluboka nad Vltavou Lock

- Construction of the Year 2013 award

Road R6 Nove Sedlo – Sokolov

- Construction of the Year 2013
- Chairman of the Road Society Award in the Construction of the Year 2013 competition

High-Capacity Fuel Storage Tanks – Loukov

- Construction of the Year 2012 title

D1 Motorway, Section 0135 Kroměříž West – Říkovice

- Title of Czech Transport Structure of the Year 2011

Hédinsfjardargöng Road Tunnels – Iceland

- Award of Foundation for Development of Architecture and Civil Engineering in Construction of the Year 2011 competition

WE CONTRIBUTE TO OUR CLIENTS' SUCCESS

Förbifart Stockholm – Project FSE209
Sweden

Surveying for drill and blast tunneling method..

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