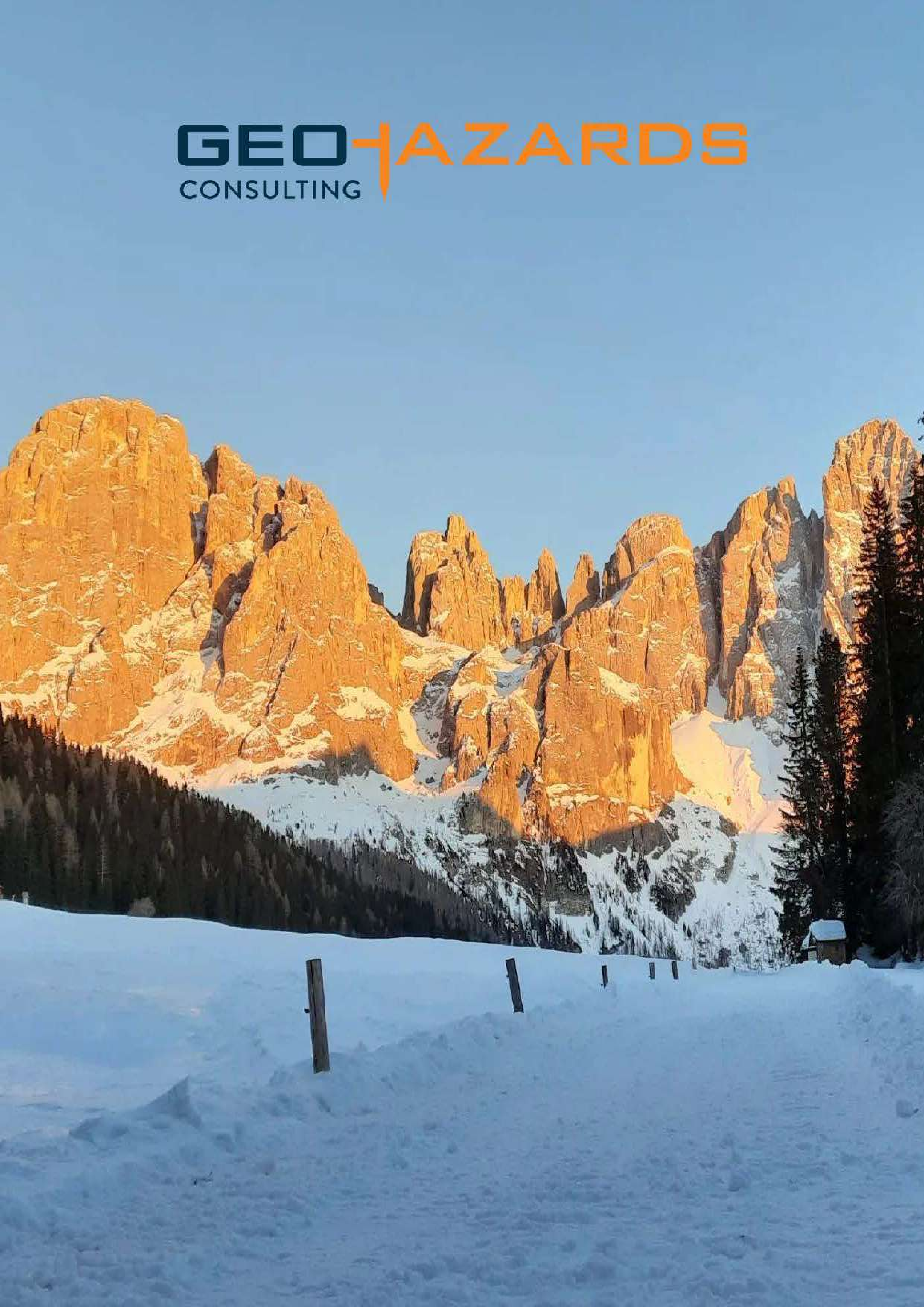
GEOHAZARDS
CONSULTING

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OUR MISSION 1

SOLID FOUNDATIONS TO PUT YOUR FEET ON!

Geological, Geophysical & Geohazards Consulting
since 2009

THE SOCIETY

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Since 2009, Geohazards Consulting has been a company that brings together professors, researchers and excellent professionals in the fields of earth sciences (geotechnics and geophysics) and engineering sciences. Their love for education and counseling naturally led to a company culture of personal service and thorough, thoughtful engineering and geology solutions. Geohazards Consulting presents itself as a service and consultancy structure in the field of problems related to the study of the territory, geology and the construction of civil engineering and environmental works. The organizational chart of the working group is made up of professors, researchers and professionals who stand out for their ability to plan and carry out scientific research and technological development activities in the field of geophysics, engineering geology and topography. A passion for research flows in the lifeblood of our work group. It is an instinctive and shared attitude that inspires us to keep our finger on the pulse of all the latest developments in technology and innovation, which in turn enables the transfer and translation process that makes application possible in various contexts we are called to work in.

Geohazards Consulting, unique in Albania for its innovation and service offering, boasts important national and international collaborations on important public and private projects.

A useful and sustainable approach to innovation, which arises when its application enables us to improve the present and plan for a more sustainable future.

GEOTECHNICS 3

Supporting Clients during Construction

Engineering Geologists provide the bridge between the built and natural environment and our diverse team of engineering geologists and geophysicist, allow us to take a holistic approach to design. Our engineers are constantly exploring innovative ways to optimize designs based on the conditions at the site, which means every design we provide is unique.

Subsurface soil conditions can be unique and require specific amendments or building design to ensure a solid foundation. If a problem exists in your current structure, it's important to find out what you're dealing with quickly, and then determine the best possible method to remediate. Our teams of engineers are deeply experienced with the subsoil conditions and can quickly ascertain a solid solution so you can resolve your project and move forward.

Geohazards Consulting engineers are experienced in assessing earthworks for signs of distress and designing remediation solutions to stabilize structures that could be at risk of failure from stresses such as climate change, subsidence, capacity limit and ageing or non-resilient materials. During site visits, we investigate infrastructural risks associated with earthworks and recommend short-term and long-term mitigation strategies. Our engineers undertake kinematic, limit equilibrium and finite element analyses to accurately model earthworks and deliver optimal design solutions. Our engineers work across various sectors, including private construction, infrastructure, highway, airports, ports and railways.

Our rope-access trained geologists can get up close to investigate tricky and remote areas that would otherwise be inaccessible. While there, they assess hazards, tactilely inspecting, taking structural rock measurements, and logging slopes to gain a complete understanding of risks presented by earthworks. Our studies and investigations can be conducted in numerous phases of public and private projects.

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We can provide comprehensive assessments, including geological hazard assessments, for geotechnical, material properties, stability of landslides and slopes, erosion, flooding, dewatering, and seismic investigations.

Give us a call and let's talk about your project!!!

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SERVICES

GEOTECHNICAL INVESTIGATION (SPECIFICATION, SUPERVISION, INTERPRETATION)

STRATIGRAPHIC BOREHOLES

Borehole logging. Used to make measurements inside boreholes (or drill holes).

Core drilling, destructive drilling (with parameter recording, in reverse circulation).

Before beginning construction on — or even purchasing — a plot of land, it's important to understand the makeup of the ground you intend to build on. What is the consistency of the soil? How much groundwater is there? Is the soil prone to liquefaction — when the ground takes on the properties of a liquid — in the event of an earthquake? It's important to know these characteristics so that your building is constructed on a sturdy enough surface.

This is where geotechnical surveying comes in. The process of a geotechnical survey involves testing the soil consistency and structure, groundwater level, and making recommendations for any technical project based on the results. Boreholes are drilled at the site and samples are taken from the ground and analyzed in a certified geotechnical laboratory. Based on the results of the survey, the 3D modeling of the subsoil is obtained. Refer to the 3D model, recommendations for the existing and the new civil construction are proposed.

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CPT STATIC TESTING (CONE PENETRATION TEST)

Penetrometric tests are carried out to obtain a continuous resistance profile of terrain and the consequent geotechnical characterization of various units identified.

With CPT static testing (Cone Penetration Test), a conical point with a 60° opening is advanced at a constant speed through the ground: the column of shafts that enables the tip to move forwards is protected by covering tubing with the same diameter as the tip. The tip, the pipe and both together are penetrated, respectively measuring tip resistance (Rp), lateral resistance (Rl) and total resistance (Rt). Said resistance values are correlated with the mechanical characteristics of penetrated ground.

Moreover, CPTU also enables the measurement of neutral pressures present in terrains under investigation, with the use of a special electric tip fitted with a type of sensor (Piezocone).

This investigation method is especially suitable for fine grain material (cohesive and fine sand).

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SCPT (STANDARD CONE PENETRATION TEST)

SCPT (Standard Cone Penetration Test) is used to measure a tip's resistance to penetration (with 60° or 90° opening) using a striker, to reconstruct a resistance profile expressed in the number of strikes per unit of advancement. Known correlations are used to establish a connection between the number of strikes and relative density (RD), and then to obtain other geotechnical parameters, the main one being the angle of friction. This type of testing is particularly suitable for incoherent terrains.

THE STANDARD PENETRATION TEST (SPT)

The Standard Penetration Test (SPT) is a common in situ dynamic testing method used to determine the geotechnical engineering properties of subsurface soils. It is a simple and inexpensive test to estimate the relative density of soils and approximate shear strength parameters

THE DRAWING OF UNDISTURBED SAMPLES (SHELBY SAMPLER)

The Shelby sampler consists of a galvanized steel core sampler; it is installed in and used to draw samples from undisturbed land. After drawing the sample at a desired depth, the core sample holder is sealed tightly.

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SOIL AND ROCK SLOPE STABILITY SURVEYS AND MODELLING

Soil slopes are typically composed of the superficial soils and deposits that exist stratigraphically above rockhead level (bedrock). These may in turn be subdivided into depositional soils – soils that have been emplaced by depositional processes such as fluvial or colluvial activity, and soils that are derived as a result of in-situ weathering of the underlying bedrock. These are soils in an engineering sense (as they are typically well less than 1 Mpa in compressive strength), but they may still retain the residual macro structural features (such as bedding structure) of the underlying bedrock, and are likely to increase in strength with depth as the weathering profile recedes back to unweathered bedrock. Soil slopes tend to be at a shallower gradient as these soils have achieved a sustainable angle of repose over time, the failure of these slopes then invariably occurs as a result of the disturbance of this soil profile, typically as a result of loading, excavation or saturation, so as to overcome the interparticle cohesion (shear strength) of the soil. The nature of the slope failure is likely to depend both on the depth to rockhead and the presence of groundwater, with rotational type failure more prevalent in deeper soils (depth to rockhead) and slumping or translational type failure more likely in shallower and water-saturated soils.

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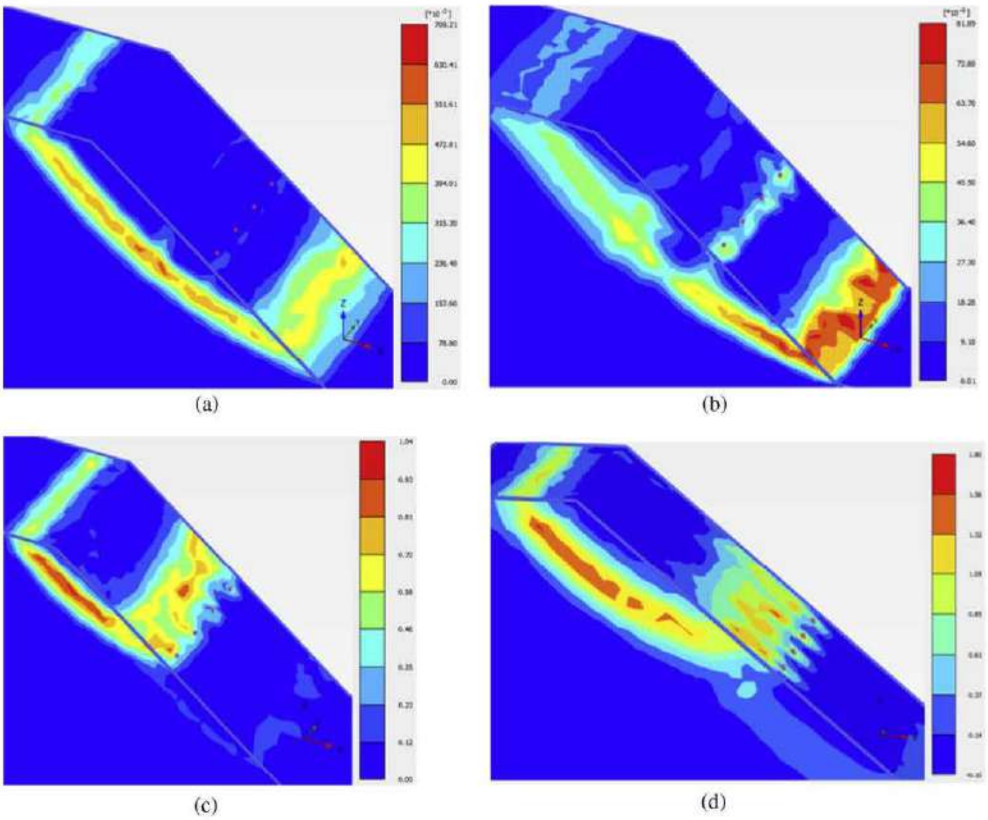
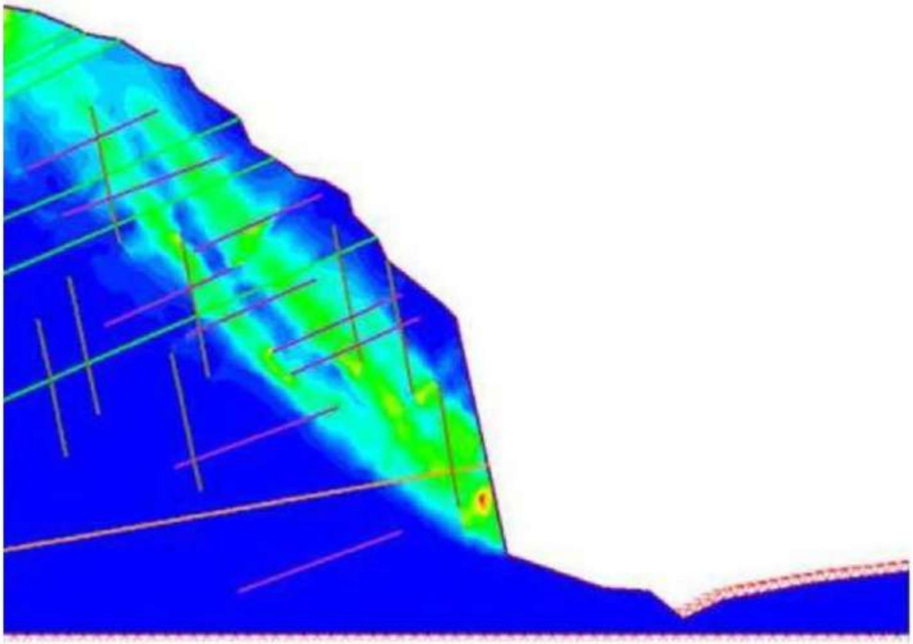
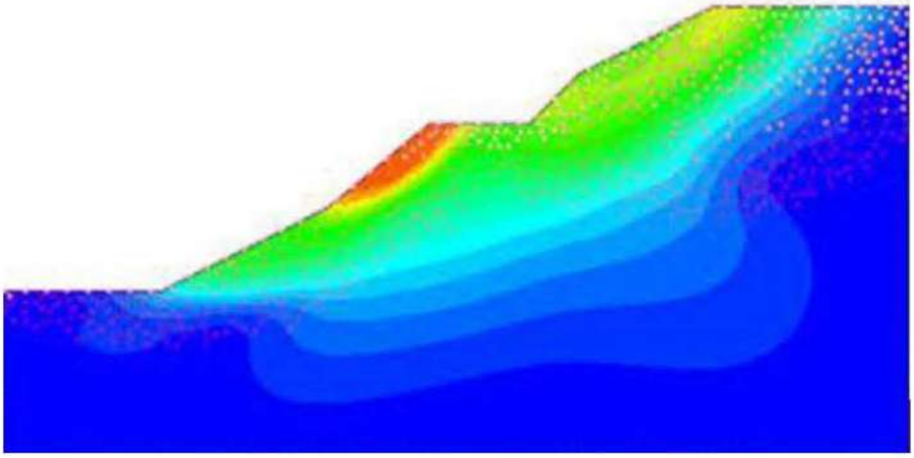


(a) (b) (c) (d)

Rock slopes by comparison are formed from exposed bedrock, either at natural outcrop or exposure, as would be the case in a coastal environment, or exposed through excavation, such as in a quarry setting. The rock slopes tend to be steeper, and may be vertical or sub vertical, with slope failure typically occurring as rockfall. The nature of the slope failure is defined by the quality (strength) of the rock mass and the way in which the discontinuities (joints and fractures) within the rock mass interact with each other and with the slope face. This gives rise to kinematic mechanisms of slope failure such as wedge, toppling or sliding-type failure





GEOPHYSICS

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Subsurface geophysical investigations

Geophysical surveying and mapping gives a clearer picture of subsurface conditions prior to site development or beginning construction, which helps you avoid costly mistakes and time delays. Geohazards Consulting deploys advanced, non-invasive surveying techniques using state-of-the art instrumentation and the last software's and our Professional Geologists and Geophysicists collaborate with your Geotechnical/Civil Engineers to provide you the best possible data. Our team also pinpoints possible hazards and the potential presence of the earthquake seismo-induced phenomena as: liquefaction, landslides, seismic amplification and sinkholes.

Not sure how we can help?

Call us and let's talk about your project!

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SERVICES

GEOPHYSICAL INVESTIGATION (SPECIFICATION, SUPERVISION, INTERPRETATION)

ACTIVE SEISMIC INVESTIGATIONS

MULTICHANNEL ANALYSIS OF SURFACE WAVES (MASW)

The M.A.S.W. method (Multichannel Analysis of Surface Waves) enables the reconstruction of a vertical velocity profile of sheer waves (Vs), through the acquisition of Rayleigh and Love surface waves, recorded by a series of geophones along a linear stringing and connected to a multichannel seismograph. Surface waves are easily generated by a seismic source, like a beating sledgehammer. Acquisition can occur with vertical energisation and the use of vertical geophones (ZVF), or with transverse energisation, using horizontal geophones (THF).

Fields of application:
Definition of Vs, eq
Definition of Soil Classification
Study of landslides
Elastic Spetrum of Resonance 1D/2D
Modeling and study of Local Seismic Response
Seismic Microzonation Study

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SEISMIC REFRACTION INVESTIGATION

Seismic refraction prospecting is a survey methodology for measuring how long elastic waves (P and S waves), generated at a source point, take to reach receivers (geophones), arranged along the surface of the land and aligned with energisation points. Distances between geophones and energisation points are established according to the thickness and types of material under investigation. In this way, the velocity of propagation of P and S waves and the thickness of layers crossed by them can be measured.

The principle is based on the hypothesis that the subsoil consists of a limited number of flat/parallel surfaces, each characterized by a constant seismic velocity, both vertically and laterally, and that velocity increased with depth.

Fields of application:
Study of subsoil stiffness through the measurement of the velocity of P and S waves
Analysis of the anelastic attenuation of material under investigation
Determination of the Q quality factor and relative geophysical/geomechanical characterizations
Determination of dynamic modules of terrains
Lithostratigraphic research
Tectonic/ structural research
Hydrological research
Study of landslide movements
Geological cartography
Geological modeling

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SEISMIC REFLECTION INVESTIGATION

Seismic reflection prospecting is more complex than refraction seismic surveying, in terms of execution, data analysis and interpretation. It is a sophisticated surveying methodology used for reconstruction, as it provides higher resolution and greater depths of the stratigraphic structure of the area under investigation, for the detection of lateral lithological variations and study of geological structures like folds, faults, oil traps and profound instabilities. It is the most widely used geophysical prospecting method by the oil and geothermal industries, for exploring the subsoil.

The use of this geophysical surveying technique, for the purpose of defining acquisition parameters, like the length of recording, sampling intervals, the distance between geophones, the type of stringing, far-offset or near-offset (to name but a few), shows just how crucial it is for us to be aware of "what we want to do", which leads to "what we need to see it" and in turn "how can we obtain what we need to see it". While a preliminary assessment of site characteristics and research objectives provides fundamental information on method applicability, nothing can replace the meticulous and expert analysis of field walkaway testing, which provides precious data.

Seismograms acquired on the field are processed with the use of specialized and high performance software, to obtain the final stack section. The use of ultra-surface reflection techniques involves the identification and definition of the stratigraphic structure of geological bodies (stratification, depositional geometries, discordances, overthrusts, faults, cavities, etc.), of shallow to medium depth (from a few metres to 500 metres deep), and is one of the most effective surveying methods for the reconstruction of morphologies buried under the Earth's surface.

Fields of application:
Tectonic investigations
Structural investigations
Lithostratigraphic investigations and reconstructions
Hydrogeology
Analysis of karst phenomenologist
The identification of cavities
Geological modeling
Hydrogeology

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Study of landslide phenomena

BOREHOLE SEISMIC INVESTIGATION:

Down-Hole and Cross-Hole Borehole seismic surveying is useful for obtaining a detailed seismic stratigraphy of the subsoil and is effective in defining complex stratigraphies in the best possible way.

The purpose of such testing is to determine the propagation velocity of compressional (P) waves and shear (S) waves, within the lithotype under investigation.

Fields of application:

Determination of the direct velocity of compressional (P) waves and shear (S) waves

Definition of Soil Classification

Study of landslides

Elastic Spetrum of Resonance 1D/2D

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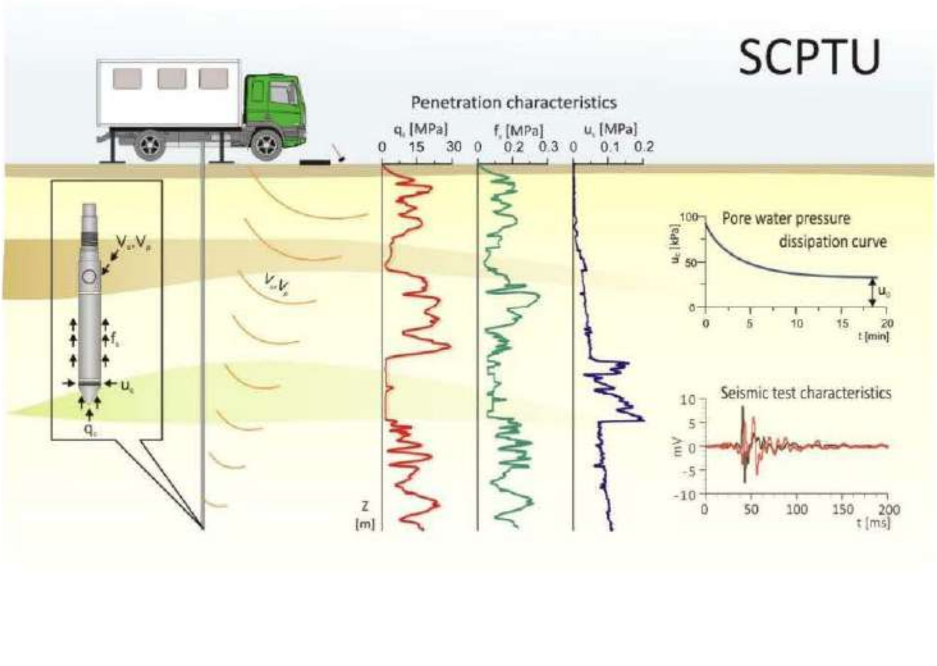
Modeling and study of Local Seismic Response
Seismic Microzonation Study
Definition of dynamic elastic modules of materials



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PASSIVE SEISMIC INVESTIGATIONS

HVSR (HORIZONTAL TO VERTICAL SPECTRAL RATIO)

Microtremor analysis technique (also known as Nakamura technique) aimed at determining the natural frequency of vibration of the ground in a certain site and based on the Fourier analysis of the microtremor components measured on the plane horizontal and in the vertical direction. HVRS passive seismic investigations enable the identification of the natural frequencies of resonance of lands. It is used above all in Seismic Zoning studies and for designing anti-seismic buildings. The versatility of this surveying method is also exploited to obtain the resonance frequencies of a building, which is then compared to that of the land. The technique involves obtaining recordings of environmental noise using a digital tromometer, connected to a seismograph.

Fields of application:
The fundamental resonance frequency (fR) of the subsoil.
Definition of Vs
Definition of Soil Classification
Study of landslides
Seismic Microzonation Study

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Re.Mi. SEISMIC INVESTIGATIONS

This method, whose name stands for Refraction Microtremor, uses the same array as M.A.S.W., or seismic refraction, namely low frequency geophones, but instead of recording the seismic perturbation induced by energisation, it records micotremors over a time periods ranging from 20 to 30 seconds.

Fields of application:
Definition of Vs, eq
Definition of Soil Classification
Study of landslides
Modeling and study of Local Seismic Response
Seismic Microzoning

ESAC SEISMIC INVESTIGATIONS

This method records micotremors with geophones positioned in any 2D arrangement.

Fields of application:
Definition of Vs, eq
Definition of Soil Classification

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Modeling and study of Local Seismic Response
Seismic Microzoning

SPAC SEISMIC INVESTIGATIONS

This method requires acquisitions obtained from circular arrays and is rarely used as it requires large spaces (the diameter of a circular array cannot be less than 50m).

Fields of application:
Definition of Vs, eq
Definition of Soil Classification
Modeling and study of Local Seismic Response
Seismic Microzoning

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GEOELECTRIC INVESTIGATIONS

VERTICAL ELECTRICAL SOUNDING (VES)

The vertical electrical sounding (or VES) method is used to investigate how resistivity varies with depth. This technique involves taking a series of resistivity measurements at progressively longer distances between current electrodes (A-B) and potential electrodes (M-N), within various types of quadripolar arrangements. A mathematical model is then used to obtain true resistivity value and the actual thickness of layers of different resistivity.

Fields of application:
Geological modeling
Verification of presence or search for groundwater

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Searching for water
Searching for hidden or buried cavities
Stratigraphic research

2D - 3D ELECTRICAL RESISTIVITY TOMOGRAPHY

Multielectrode prospecting involves taking a number of apparent resistivity readings using quadripoles arranges along profiles, fitted with a certain number of electrodes (in general at least 48), usually equidistant along the investigation line, which can be controlled from a programmable georesistivity meter, so that operation can either take place when current is emitted (A, B) or when measuring potential (M, N).
Acquired data are processed using mathematical algorithms, to define two-dimensional electroresistive sections, in which resistivity variations can be highlighted, both vertically (as in VES) or along the investigation profile.
The use of special and complex electrode configurations installed in areas and powerful software, means that 3D resistivity models of the subsoil can be obtained.

Fields of application:
Study of landslides
Geological modeling
Verification of the presence of structural discontinuities (faults, sliding surfaces, etc.)
Verification of presence or search for groundwater
Study of pollution phenomena in the ground or beds
Searching for water
Definition of contaminated volumes
Searching for hidden or buried cavities
Stratigraphic research
Identification of underground utility leaks

2D - 3D INDUCED POLARISATION MEASUREMENTS

Induced polarization is a type of multielectrode prospecting that is often associated with ERT investigations, as it enables the measurement of the

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capacitative component of terrain (known as Induced Polarisation), following the emission of electric current into it. The physical parameter measured in the time domain is represented by apparent loadability, namely power loss along a discharge transient.

Fields of application:
Geological modeling
Study of landslides
Verification of presence or search for groundwater
Study of pollution phenomena in the ground or beds
Searching for water
Definition of contaminated volumes
Stratigraphic research

SELF-POTENTIAL MEASUREMENTS

The Self-Potential method is a passive geoelectric type of investigation which involves the measurement of electric power variations in the subsoil, caused by an electrical field generated by natural sources (hydraulic, thermal and chemical), using a couple of non-polarizable electrodes. Spontaneous Potential components are mostly Electrokinetic Potential, generated by the flow of the aquifer, and Electrochemical Potential, generated by the difference of solute concentrates following redox reaction between water and rocks it comes into contact with.

GEORADAR SURVEY

Georadar, or GPR (Ground Penetrating Radar) is a non-invasive system for surveying the subsoil, suitable for modest depths and based on the reflection of electromagnetic waves. This technique is mostly used in underground utility investigations, including manholes and pipes, for the identification and mapping of existing installations, the identification of the geometric structure of foundations, in archaeological research and the identification of masonry structures and cavities. Maximum depth and the consequent degree of obtainable detail vary according to the frequency used. A low frequency enables information to be collected at

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grater depths, whereas high frequencies are desirable when aiming for better resolution for surface targets.

TDEM AND FDEM ELECTROMAGNETIC INVESTIGATIONS

Electromagnetic investigations, both in the time domain (TDEM) and in the frequency domain (FDEM), involve the generation of an artificial magnetic impulse (the primary field), which induces a secondary field within the land. Electromagnetic investigations in the time domain (TDEM) involve reconstructing true resistivity distribution in the subsoil. The FDEM investigation method (in the frequency dominion) enables the mapping of phase variation and secondary electromagnetic field amplitude values with respect to the induced primary field. This type of investigation is carried out above all to identify buried metal objects, in archaeological research, investigations in waste disposal plants, the identification of cavities and buried debris, environmental investigations and the identification of underground ducts in non-urbanised areas.

GRAVIMETRIC AND MICROGRAVIMETRIC INVESTIGATIONS

The gravimetric method consists of the detailed analysis of deformations of the land's gravitational field, caused by anomalies and heterogeneities present in the subsoil. Gravimetry (and microgravimetry in particular) is a geophysical method used to map rock density and to search for natural and artificial cavities in the subsoil.

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MONITORING

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We recognize, observe and foresee problems by analyzing the land deep-down, including physical perturbations, monitoring and observing values and indicators that can help prevent them.

In order to do so we have converged different fields of competence, from geology to engineering, geophysics and geotechnics, integrating an approach that respects nature, ecosystems and infrastructures, thanks to non-invasive technologies. This has culminated in profound knowledge, combined with the ability to anticipate and monitor criticalities of sites, areas and human works.

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GEOTECHNICAL INSTRUMENTATION

STATIC LOAD TESTS

The purpose of load testing is to verify the stability and resistance of the structure under investigation. Specifically, tests subject the structure to maximum tolerable static stress, at least as declared in the project, once more within the scope of service actions. Such testing can be carried out with a concentrated load (pull or push), or with a load distributed over works requiring reconstruction or rebuilding from scratch.

PULL-OUT TEST

Pull-Out testing is a non-destructive method for evaluating the mechanical qualities of reinforced concrete. He force required to extract a plug is measured, which may already have been incorporated within the concrete cast, or fitted once the concrete was already hardened. In this way information is obtained on the cortical layer of the structural element under investigation. Reference standard: UNI EN 12504-3.

PULL-OFF TEST

The purpose of the Pull-off test is to verify that adhesion has occurred between the support and outer layers of concrete coating, like malts, plasters, waterproofing material, etc. The method involves the application of an increasingly heavy load onto the surface under investigation, until the element detaches or breaks. Resistance to traction and tearing of the masonry or cement conglomerate wall coverings is measured in this way. Reference standard: UNI EN 1015-12/2002, ASTM – C1538/04, UNI EN 1542/2000, UNI 12636/2001. Reference recommendations for applications with composite materials: CNR-DT 200 R1/2013, C.S.LL.PP. 24th July 2009.

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TESTS WITH FLAT SINGLE JACKS

The purpose of such testing is to estimate the compressive stress state on a portion of masonry, during testing. This method of investigation involves making a flat cut, normally in the main direction of tensional stress in masonry, into which a flat jack is inserted, before being connected to the circuit of a hydraulic pump. The internal surfaces of the cut are stressed with a known pressure that is gradually increased, enabling a return to the initial condition, namely the annulment of deformation measured after the cut was made. This is measured using relative distance measurements between couples of analogous points arranged symmetrically to the cut. Reference standard: ASTM C 1196 – 09 and ASTM C 1197 – 04.

TESTS WITH FLAT DOUBLE JACKS

The purpose of testing is to estimate the deformability (and/or breaking) value of a portion of masonry between two flat jacks. The test consists of making two flat and parallel cuts at a known distance, into which two flat jacks, connected to the circuit of a hydraulic pump, are inserted. The portion of masonry under investigation is stressed with loading and unloading cycles and deformation is measured using at least three displacement transducers in a vertical and symmetrical position, mid-way between both jacks. In this way, the elastic module, the load/deformation curve and the tensile strength of the structure subjected to investigation, are all obtained. Reference standard: ASTM C 1196 – 09 and ASTM C 1197 – 04.

DIRECT CUT SHOVE TEST

The direct cut test is used to estimate the average shear strength of brick structures. The test involves the lateral (horizontal) sliding of a portion of masonry (generally brick), suitably and laterally isolated from the rest of the structure, using the thrust generated by a hydraulic jack. Reference standard: RILEM MS-D.6; ASTM C1531 – 16.

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MASONRY BORING

Continuous core boring is a type of mechanical investigation involving the drawing of material from the structural element under investigation. This type of investigation enables direct sample observation, so that the stratigraphy of masonry can be obtained, along with the identification of any anomalies and discontinuities within it. Coring can be carried out with the purpose of analyzing internal masonry composition and to evaluate the depth of the foundation laying surface of the structure under investigation. Reference standard: UNI EN 12504-1.
SCLEROMETRIC TEST

Sclerometric testing is a non-destructive surveying method used to obtain information on the quality and homogeneity of concrete, by measuring the surface hardness of the material. The test involves measuring the rebound height of a conventional mass launched with a constant kinetic energy, against the surface of the structural concrete element under investigation, using a spring of known stiffness. The rebound index is proportional to the surface hardness of concrete. Reference standard: UNI EN 12504-2/2012.

STRUCTURAL DIAGNOSTIC

PILE INTEGRITY

Pile integrity testing is carried out using the Pile Integrity Tester (PIT). This kind of testing is used to verify the presence of significant defects inside foundations, including breakages, significant size variations and cavities, before proceeding with construction above. It can also be used to test piles already integrated within the structure, like support foundations on bridges or towers, and to evaluate their length.

ULTRASOUND TOMOGRAPHY

Ultrasound tomography is a non-invasive technique for the investigation of high-thickness concrete elements, like tunnel cladding and post-compression sheaths, as well as the condition of reinforcement and

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stone structures. Tomography involves the reflection of short elastic impulses of waves (P or S), off cracks, cavities, reinforcements and other discontinuities and anomalies present in material. The advantage of this type of equipment is that 2D tomographies can be obtained along an orthogonal section of the surface of the product, even with structures accessible from one side only. By repeating the evaluation on a regular grill of points, a 3D model of the internal structure of the product under investigation can be obtained

GEORADAR SURVEY

Georadar, or GPR (Ground Penetrating Radar) is a non-invasive system for surveying the subsoil, suitable for modest depths and based on the reflection of electromagnetic waves. This technique is mostly used in underground utility investigations, including manholes and pipes, for the identification and mapping of existing installations, the identification of the geometric structure of foundations, and the identification of masonry structures and cavities. Short electromagnetic impulses of varying frequencies are emitted, which upon meeting surfaces with different physical characteristics (different dielectric constant or electrical conductivity), are partly reflected (so they return to the receiving antenna) and partly transmitted in the subsoil. Maximum depth and the consequent degree of obtainable detail vary according to the frequency used. A low frequency enables information to be collected at grater depths, whereas high frequencies are desirable when aiming for better resolution for surface targets. The antenna is made to slide along a previously defined straight line (usually a rectangular grill is created), to obtain a real-time radargram in digital format on a PC monitor, which is successively elaborated and interpreted using specific software.

ULTRASOUND TEST

The purpose of ultrasound testing is to determine the velocity of propagation of ultrasound through concrete, which is directly correlated with its resistance to compression. In ultrasound testing, the propagation time of elastic longitudinal waves between one or more couples of sampling points is measured to obtain information on the homogeneity

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of concrete. Equipment includes a generator/receiver of electric impulses, a transducer and a calibration bar with a known propagation time. Impulse speed can be measured directly (by positioning the transducer and receiver on opposite façades), semi-directly (positioning the transducer on a surface and the receiver on an adjacent side), or indirectly (positioning the transducer and receiver on the same surface). Reference standard: UNI EN 583-1/2004, UNI EN 12504-4/2005.

WATER TESTING - LUGEON LEFRANC

Lugeon & Lefranc permeability tests

PIEZOMETRIC, HYDROGEOLOGICAL AND WEATHER MONITORING

Installation of a fully digital monitoring of the groundwater with the visualization of the measurements in real time on a web platform. This will facilitate your work and you could be able to monitor and analyses the data from remote and in real time.

Designing and installing the Weather monitoring station for the study areas. The Weather monitoring station is composed of 3 monitoring systems: a) Precipitation monitoring system, b) Wind speed and wind direction monitoring and c) Temperature, Relative humidity and Dew point / frost point monitoring system. The entire system will be connected with a web platform and the data could be downloaded and analyzed in real time. If needed, a surveillance and security camera could be installed next to the station. The video will be uploaded online in real-time. We firmly believe that the Weather monitoring station could be helpful in the design process of all the new structures of your project.

Installation of different types of piezometers, open pipe, Casagrande, vibrating wire.

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TOPOGRAPHY

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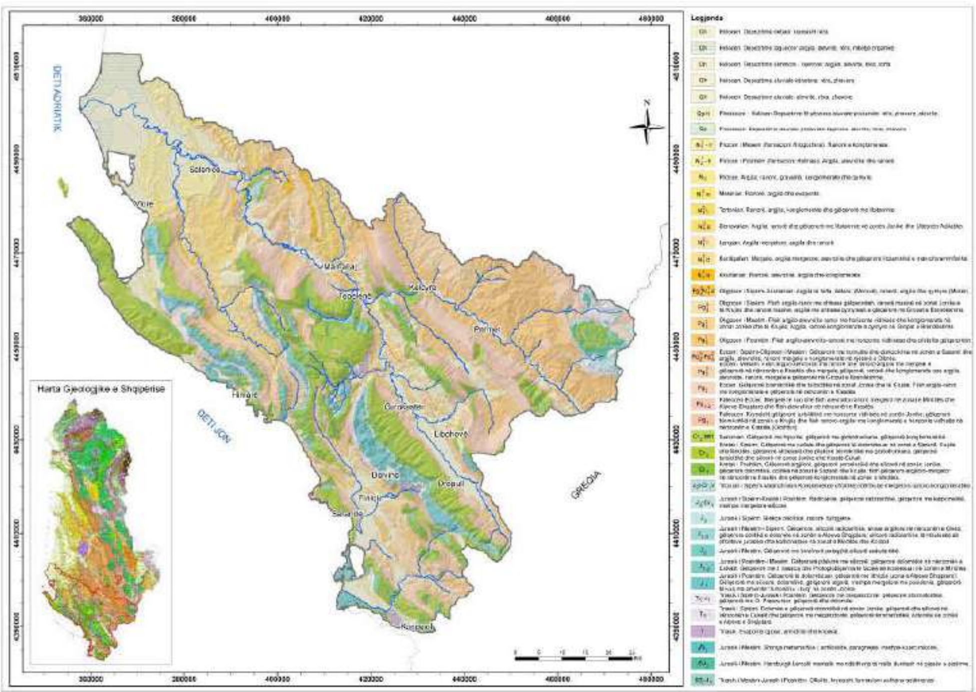
A topographic survey gathers data about the natural and man-made features of the land, as well as its terrain. Permanent features such as buildings, fences, trees and streams accurately define the ground and its boundaries. Land contours and spot levels show the elevation of the terrain. Topographic maps are used by architects, engineers, building contractors and others to accurately visualize their sites and help bring forward development. Depending on the purpose of the survey and the desired output, there are a few types of topographical surveys to choose from, including a general land survey, boundary survey, and survey for construction projects. Also, depending on the scale of the map that is required and location of the site, for instance whether it's an urban or rural area, a survey can be classified by accuracy level. In Geohazards Consulting we perform topographical survey with an accuracy of 1-2 cm.

Fields of application:
Study of landslides
Study of engineering structures and infrastructures (buldings, dams, highways, bridges etc.)
River modeling
Flooding
Seismic Microzonation Study

MAPPING, DATABASES AND MODELLING

GEOLOGICAL MODELLING

Geologic mapping is a highly interpretive, scientific process that can produce a range of map products for many different uses, including assessing ground-water quality and contamination risks; predicting earthquake, volcano, and landslide hazards; characterizing energy and mineral resources and their extraction costs; waste repository siting; land management and land-use planning; and general education. The value of geologic map information in public and private decision-making (such as for the siting of landfills and highways) has repeatedly demonstrated to be crucial in benefit-cost analyses to reduce uncertainty and, by extension, potential costs.



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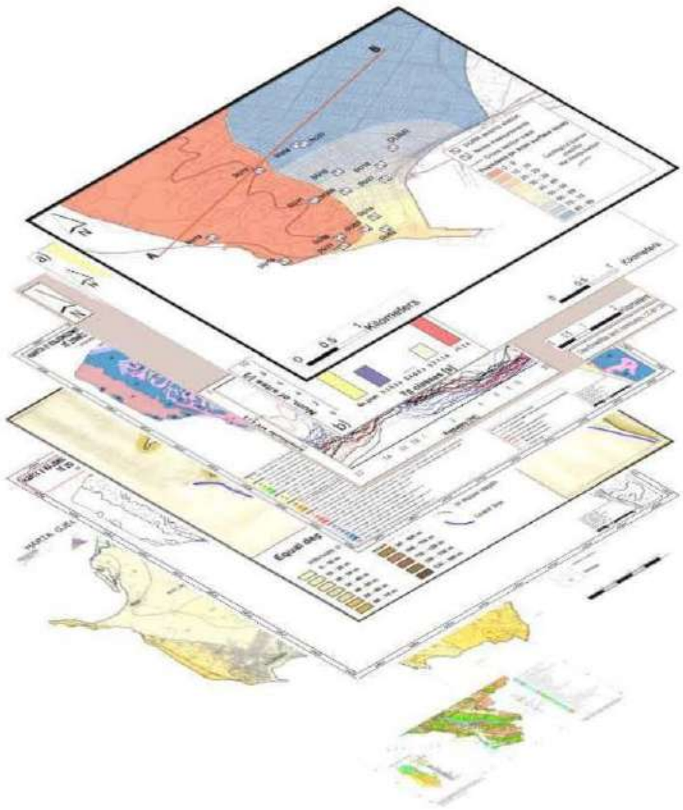
GIS GEO-DATABASES & WEBGIS

The main goal in many geological, geophysical, hydrogeological, geomorphological geo-mechanical surveys no longer is to create a single geologic map but to create a database from which many types of geologic and engineering geology maps can be derived. This requires a database design or "data model" that is sufficiently robust to manage complex geologic concepts such as three dimensional (spatial) and temporal relations among map units, faults, and other features.



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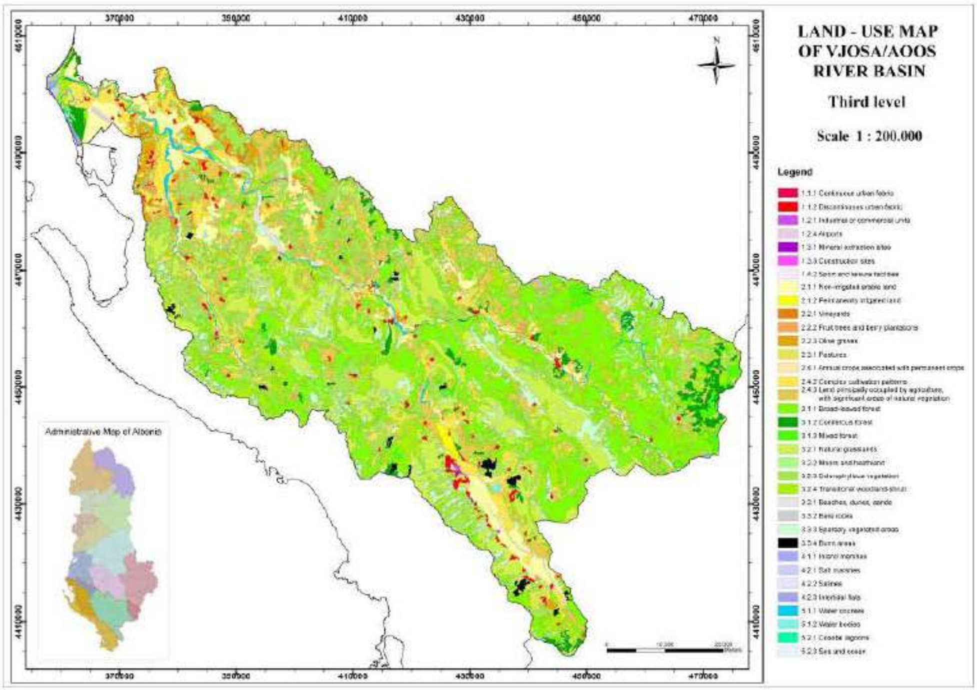
DELIVERY OF MAPS & CARTOGRAPHY

GIS and graphic design software have radically changed the techniques by which map information is published. Digital cartographic techniques are evolving and becoming capable of producing sophisticated map layouts and products. It is anticipated that digital cartographers will be continually challenged to develop new techniques as software evolves and as geologists and users demand more complex and informative products.



EQUIPMENTS

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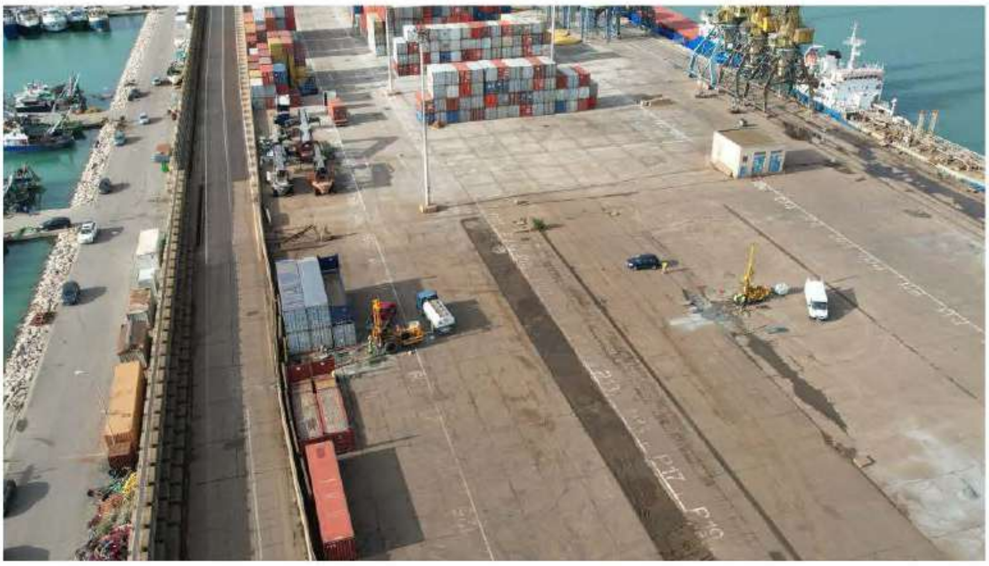
GEOTECHNICS

GEOTECHNICAL & ENVIRONMENTAL DRILL RIGS (3 TYPES)



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PAGANI PENETROMETER TG 63-200 FOR STATIC AND DYNAMIC PENETROMETRIC TESTS

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GEOPHYSICS

MULTICHANNEL SEISMOGRAPH DOREMI 24CH - 16Bit SARA ELECTRONIC INSTRUMENTS

3 CHANNELS DIGITIZER SR04 GEOBOX

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DownHole Probe (5 channel modular sensor)

PASI RM1 EARTH RESISTIVITY METER

Earth Resistivity Meter: RM1

GEOPHYSICS

RM1 is a compact versatile earth resistivity meter with 24 bit data acquisition. All parameters in "stand alone" mode can easily be set using the console keyboard, even in harsh environmental conditions; connect the RM1 to your laptop via the dedicated acquisition software, and use the taylor-made measuring session (VES/ERT) to organize your in-field sessions quickly and efficiently.

Applications

- water surveys of the subsoil to shallow, medium and great depths
- geological stratigraphy, landslide studies, etc.
- groundwater contamination by salt water and / or pollutants
- subsoil cavities detection
- mining (sulphides, etc.)
- archaeology

Methodology

- Vertical Electrical Soundings (VES)
- Electrical Profiling (EP)
- Self Potential (SP)
- Induce Polarization (IP)
- Electrical Resistivity Tomography (ERT, Electrical Imaging)

Main features

- 24-bit Sigma-Delta ADC + oversampling for noise reduction
- High resolution: 2nV - 1nA
- A.I. (Artificial Intelligence) function with automatic setting of all acquisition parameters (V, I, Te, T0, Ti, etc.)
- **Standard deviation setting (σ) to optimize measurement accuracy and acquisition times**
- Internal > 5000 measurements (standard version)
- **Electrical Resistivity Tomography function (ERT)** - 32 el. (optional)
- USB data transfer
- Internal battery autonomy: > 1300 continuous measurements (electrical tomography); more than 40h works in SEV mode
- Power supply from external power bank (optional) or PC (via USB)
- Automatic Filtering – oversampling – 50/60 Hz noise removal
- Noise reduction with stacking and average of the acquired values
- Autocalibration at start-up
- **Connects to any external energy source - max.1000V-1A (5A opt.)**
- Light compact PELI IP 67 case - 270x246x123mm - 2.9kg

PASI

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TOPOGRAPHY

GNSS Trimble R8s

Total Station Leica Tsr403

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Drone DJI Matric 300 RTK

Drone DJI Mavic Air 2s

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Drone DJI Mavic 2 Pro

MONITORING

Piezometric, Hydrogeological and Weather monitoring

Inclinometer
Tiltmeter