ISMGEO

Geotechnics and modelling

Company profile

www.ismgeo.it

I PIÙ BENEDETTI DENARI CHE SI SPENDONO
A CHI VUOL FABBRICAR SONO I MODEGLI
(Dal Vasari) Michelangelo

Ismes

ISTITUTO SPERIMENTALE MODELLI E STRUTTURE

1 ORGANIZZAZIONE · IMPIANTI · ATTIVITÀ

BERGAMO - SETTEMBRE 1953

ISMGEO (Istituto Sperimentale Modelli Geotecnici) is an Italian company, leader in the geotechnical characterization of soils and rocks for civil engineering works and for experimental geomechanics.

ISMGEO is an independent research institute active in the fields of advanced geotechnical laboratory testing and physical modelling in geotechnics.

The in-house geotechnical soils testing laboratory can to carry out a wide range of tests: static, cyclic, dynamic, and advanced laboratory tests. Besides, in-situ tests on soils and rocks can be performed.

The company disposes of large laboratory equipments, unique in Italy, like the calibration chamber and the geotechnical centrifuge. These facilities are used to perform physical modelling activities, whose achievements have contributed, and still contribute, to increase the knowledge on the complex behaviour of soils.

MISSION:

Supporting the stakeholders working on design and construction of large civil engineering works and those working on the assessment and reduction of natural risks (landslides, floodings, earthquakes).

VISION:

Contribute to the development of knowledge in geotechnical engineering by providing careful testing activities and high quality data.

VALUES:

The passion for experimental geotchnics guide us, alongside the professionalism of the highly qualified technical staff and the willingness to establish strong links with industrials and academics.

OUR HISTORY:

ISMGEO is created in 2000, after the dissolution of ISMES (Istituto Sperimentale Modelli e Strutture), was one of the most important European resarch center on experimental engineering. Since the ‘50 ISMES represented the state-of-the-art in physical modelling for structural and geotechnical engineering. Physical models of dams, bridges, buildings, nuclear plants worldwide have been tested under static and seismic conditions.

ISMGEO took over the geotechnical laboratories, the physical modelling facilities, the technical and research staff. By this way the company has preserved the know-how and the high quality tipical of the ISMES tradition.

After about 20 years ISMGEO is now a benchmark in geotechnics and a soild partner for engineering and construction companies that work all over the world.


BOMBARDIERI S.r.l.

GEOTECHNICAL AND GEOMECHANICS LABORATORY

The Lab provides the complete physical and mechanical carachterization of soils and rocks by standard and advanced tests. Static and dynamic tests can be performed under perfectly controlled and repeatable conditions. ASTM (Volume 04.08 Soil and Rock), AGI (Associazione Geotecnica Italiana) ed UNI standatrds are applied in soil testing, ASTM and ISRM (Suggested Methods for Rock Characterization Testing and Monitoring) for rock testing.

Soil tests

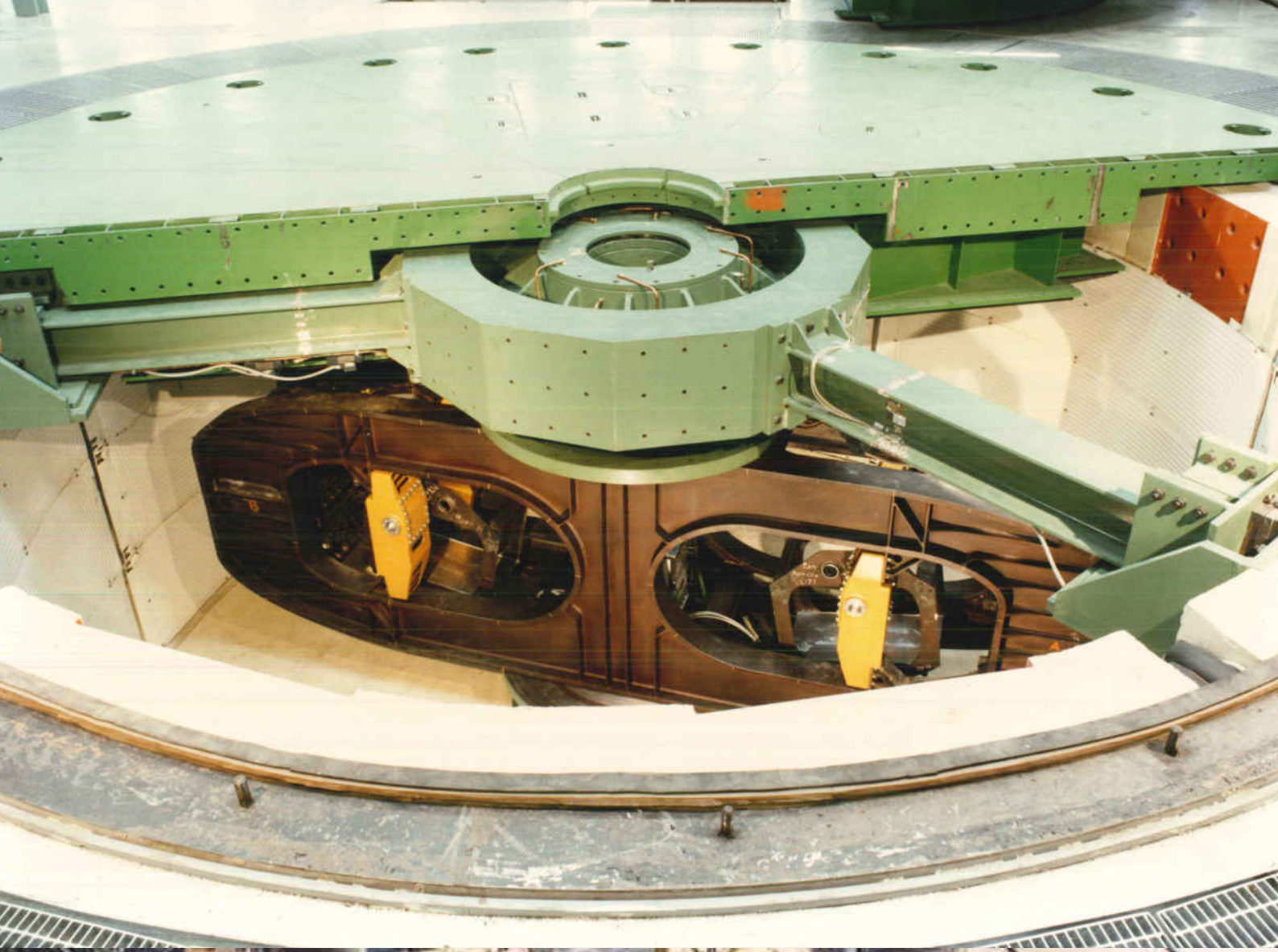
- Classification and Index test
- Load controlled oedometer test (Incremental Load IL and Controlled Rate of Strain CRS)
- Triaxial test with controlled strass path (TxCIU, TxCID, TxCAU, TxCAD, UU)
- Direct shear (DS)
- Ring shear (RS)
- Permeability measure (Constant head)
- Permeabiliy on specimen (flow pump)
- Proctor Test
- California Bearing Ratio (CBR)
- Cyclic triaxial (TXC)
- Cyclic torsional shear (CTS)
- P and S waves velocity by bender e compression elements (BE e CE)
- Resonant column (RC)

Rock tests

- Physical caracterization
- permeability
- Uniaxial Compressione
- Triaxial in Hoek cell
- Tensile failure (Brazilian test)
- Joint shear test

Advanced testing

- K_0 oedometer test (with horizontal stress measure)
- Triaxial test with Vp and Vs waves velocity, polarized on principal planes
- Triaxial test at High Pressure (< 20 MPa) and High Temperature (< 120 °C) by HITEP system
- Triaxial test with axial and radial local deformations
- Triaxial with extrusion pressure measure
- Direct shear with controlled normal stiffness (DS-CNS)
- Cyclic simple shear (CSS)
- Triaxial with large diameter (D=150 mm, 200 mm, 300 mm)



PHYSICAL MODELLING

The interaction between soil and structures is very complex and can be studied by physical modelling. There are several advantages in physical modelling. Real in-situ stress conditions can be reproduced on the models; soils and structures can be submitted to external stresses up to the global failure; it's a time and cost efficient solution in comparison with tests on real structures.

Physical modelling is suitable to analyze several situations: foundations, retaining walls, dams, levees and others. The effects of natural hazards can also be studied as sand liquefaction during earthquakes, sismic waves propagation, site effects, landslides and mass wasting processes.

ISMGEO special facilities for modelling in geotechnics:

- Seismic geotechnical centrifuge (only four in Europe)
- Calibration chamber
- Large direct shear apparatus
- Physical Modelling of real scale structures

The geotecnical centrifuge applies an increased gravity field (up to 300g) on a reduced scale model. The target is to reproduce the in situ original stress field. Once the model is in the correct state of stress, external loads (vertical and horizontal) can be applied on soil and structures up to the failure. By the earthquake simulator it is also possible to reproduce earthquakes in order to verify the seismic behaviour of the soil-structure system.

The calibration chamber reproduces a soil volume at 1:1 scale and applies real stress conditions on vertical and horizontal directions. This facility can be used to: calibrate conceptual and constitutive models, define correlations between tests results and geotechnical parameters, verify geotechnical instrumentation and develop new in situ instrumentation, testin piles, tie, rods, etc.

The large direct shear box (0.7 x 0.7 m) is useful for the mechanical characterization of soils with large size that cannot be treated with standard laboratory equipments. A vertical load can be applied to simulate a certain stress level. It can be used to characterize gravels, soil/wall interfaces, rigid inclusions and other.

ISMGEO also works on real scale models of structures such as walls, road pavements etc.

There are infinite possibilities of modelling soil and structures, the company is open to any new proposal from clients, adressing your needs and proposing solutions by putting our experience to your service.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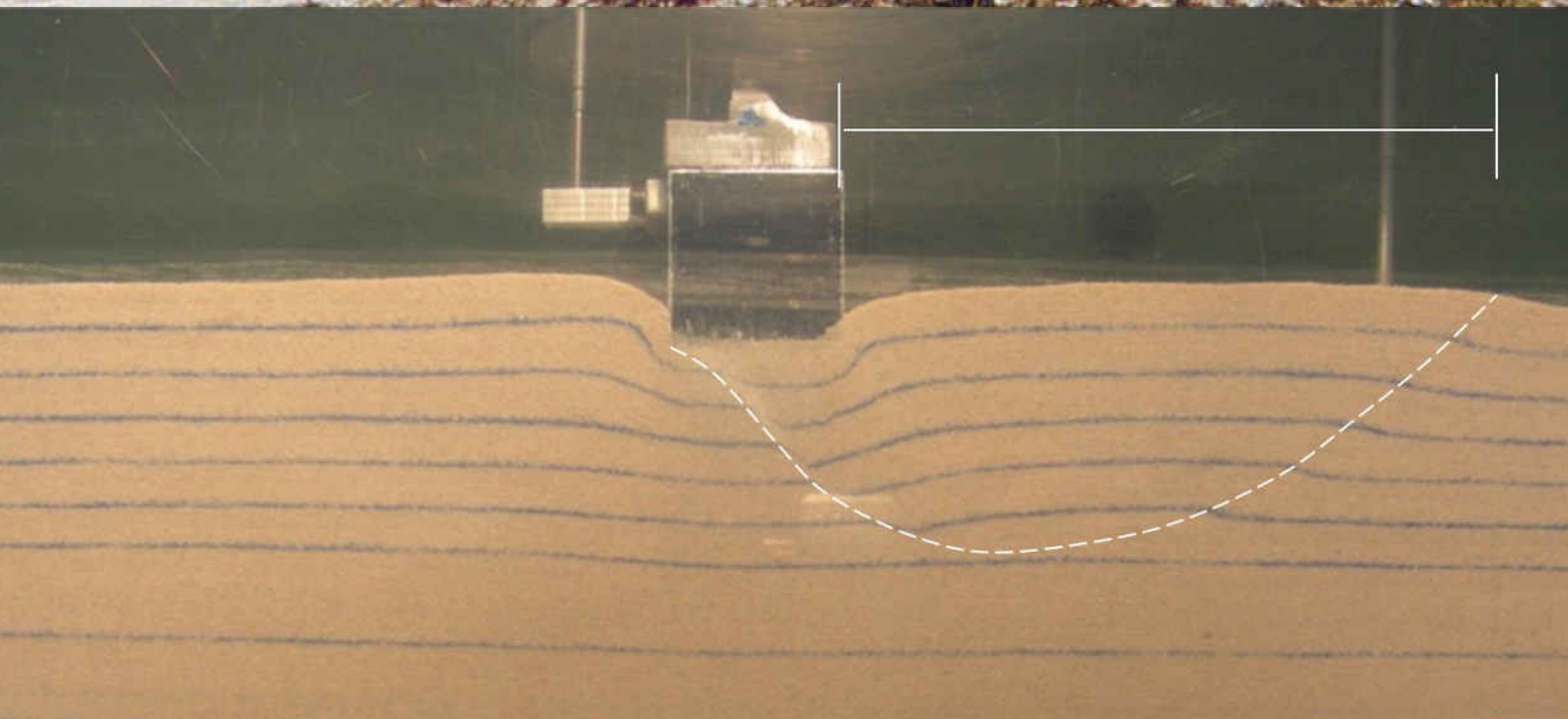


IN-SITU GEOTECHNICAL TESTS

Site investigation are complementary to laboratory tests. They are fundamental for a proper definition of the subsurface geotechnical model. ISMGEO proposes, directly or by solid partners, geotechnical investigations and in-situ tests for mechanical and environmental characterization of soils:

- Drilllings
- Cone Penetration Tests with electric cone and with piezocone (CPT, CPTU)
- Standard penetration tests (SPT, SPTL)
- Plate Load Test (PLT)
- Field Vane Test (FVT)
- Permeability measures (K)
- down - hole with seismic cone (SCPTU)
- Envirocone
- Spectral Analysis of Surface Waves (SASW)
- Pressuremeters (self boring - SBPM, Camkometer)
- Self boring permeameter

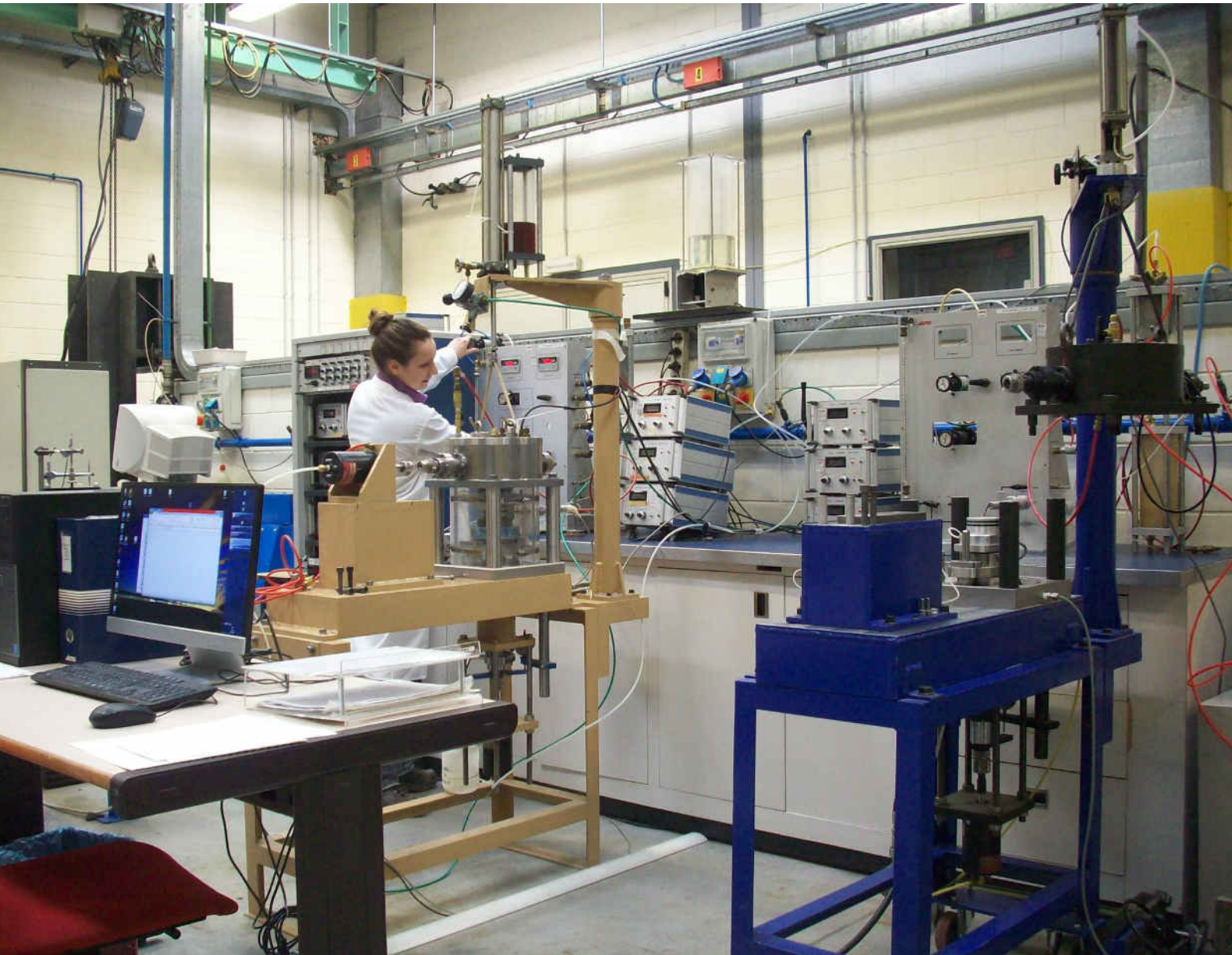
EXPERIMENTAL RESEARCH

Considering our past and the attitude that since the beginning has lead this company, the experimental resarch is a fundamental target for us.

We maintain strong collaborations with companies interested in innovative solutions and techniques, we collaborate with universities and research centers all over the world; our staff is composed by a high percentage of PhDs; the company is directly involved in European (Horizon-2020) and international research projects.

We are always fascinated by scientific research, fundamental and applied, and our aim is to be more and more involved in order to offer experimental support to universities, institutions and companies.

OUR PROJECTS...



MAIN PROJECTS

Our support in experimental and applied geotechnics brought us to work in projects all over the world. Some of our main projects:

Infrastructures and earthworks

- Strait of Messina Bridge project
- Metro lines (Rome, Tessaloniki, Varsavia, Riyad)
- High-speed rail (Italy, Algeria)
- Ports (Taranto (Ita), Vado Ligure (Ita), Valencia (Esp), Al Faw (Iraq), Rio (Brazil)
- Milan Linate Airport pavement
- Tunnel (A14 Highway, Monte Mario (Rome), …)
- Stabilisation of landslides by shafts (Italy)
- Seismic behaviour of Po levees (Italy)

Energy

- Wind farms for Enel Green Power (Italy)
- Power plants (Italy, Honduras)
- Embankment dams (Algeria, Poland, Georgia, Tajikistan, Italy)
- Gas pipelines (Kazakhstan)
- Regasification plants (Italy)

Offshore

- Oil and Gas fields (North see, Mozambique, Myanmar, Egypt)
- Seismic stability of offshore slopes (Latin America)
- Artificial islands for oil and gas exploration (Abu Dhabi, Persian Gulf)

Cultural Heritage, Disaster risk reduction and management

- Leaning Tower of Pisa straightening and restoration (physical modelling)
- MOSE project in Venice: protect the city from floodings (physical modelling)
- Murazzi in Venice : protect from erosion
- Seismic Microzonation of Tuscany and L'Aquila
- Wreck removal of Costa Concordia on Giglio Island

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