GEOTECHNICS AND FOUNDATION GROUND

Contact details

Name	**GEOTECHNICS AND FOUNDATION GROUND**
Acronym	**GFG**
Logo	-
Site	-
Address	25 C. Baritiu Str., 400020, Cluj-Napoca, Romania Laboratory „Geotechnics and foundation ground” http://constructii.utcluj.ro/cercetare_laboratoare.php
Faculty Department	Faculty of Civil Engineering Department of Structures
Telephone	0040744777009 / 02640401511
Fax	-
Director	Dr. Vasile Farcas, Asoc. Prof.
e-mail	vasile.farcas@dst.utcluj.ro

Areas of expertise

Geotechnical Engineering
- Finding the physical and mechanical ground characteristics (soil water content, plasticity index, compaction degree, friction angle, cohesion, Oedometric modulus etc.);
- Site measurements and analysis of soil lateral displacement (inclinometer measurements for slopes near roads, railways, bridges etc.)
- Site measurements of soil bearing capacity by means of soil plate test (determining the deformation modulus for roads foundation),
- Site and laboratory tests to verify any pavement and road base layers compaction,
- Slope stability analysis,
- Elaboration of the Geotechnical report (mandatory document for any construction),
- Elaboration of the Geotechnical expertise (mandatory document for any damaged roads and bridges foundation)
- Geotechnical structures design based on advanced soil mechanics

Team and key skills

Prof. Dr. Augustin Popa’s research activity focus on experimental analysis of physical and mechanical soil characteristics, soil dynamic properties, analysis of degradation of buildings foundations and consolidation solutions, slope stability analysis, retaining structures, deep structures soil - structure interaction

Asoc. Prof. Dr. Vasile Farcas’s research activity focus on experimental analysis of physical and mechanical soil characteristics, soil dynamic properties, study of foundation degradation,

Asoc. Prof. Dr. Nicoleta Ilies’s research activity focus on analysis of degradation of buildings foundations and consolidation solutions, slope stability analysis, retaining structures

Reader Dr. Dorin Moldovan’s research activity focus on designing with geosynthetics used for railways, trams, roads and pavements, designing slope stability using geosynthetics, bridge designing and traffic engineering.

Assist. Prof. Dr. Olimpiu Muresan’s research activity focus on experimental and computational analysis of slope stability problems, related to roads, pavements; experimental analysis of physical and mechanical soil characteristics; finite element analysis using software of soil structure interaction

Assist. Prof. Dr. Iulia Molnar’s research activity focus on experimental analysis on physical and mechanical soil properties, particular sands, computational models used for sands analysis

Assist. Prof. Dr. Calin Gherman’s research activity focus on experimental analysis of physical and mechanical soil characteristics; deep structures soil - structure interaction, effect of traffic vibrations on deep structures

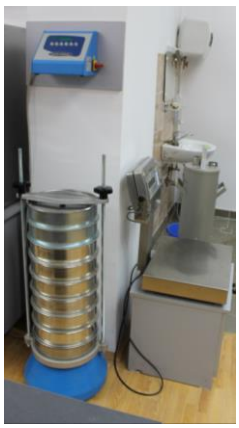
Infrastructure

Complete Triaxial System (Controls) – The most advanced technology for soil properties determinations such as: permeability, soil strength, consolidation. It provides software in order to analyze and determine soil parameters.

Five automatic shear testing machines (Controls), ideal for research purposes, in order to determine the soil mechanical parameters for consolidated, unconsolidated, drain and undrain conditions

Oedometers, front loading (Controls) - determines the rate and magnitude of consolidation of a soil specimen restrained laterally and subjected to a number of successive increments of vertical loads, provided with Data acquisition system (Controls) and software programs.

Small apparatus used to determine soil physical properties in order to classify soil types.

Proctor apparatus (Froewag) and sieve shakers (Matest S.p.A) in order to determine the degree of compaction and grain size distribution for transportation infrastructures.

Dynamic Probing Rig-DPSH (Geotool) for in-situ testing, in order to determine soil mechanical parameters at different depths.

Static plate bearing test equipment (Matest) used for the determination of the bearing capacity of a soil in-situ on road constructions, foundations, road subgrades, airport and highway pavements.

Portable horizontal and vertical inclinometers (Durham Geo-Enterprises) used to monitor subsurface movements and deformations.

Geotechnical software programs:

- Geostru Software: SPW, MDC, Slope, Loadcap, GFAS Static Probing , CVSoil, GHP Design 3D, Easy MASW, Easy HVSR, Easy Refract, RC-SEC-EN, GMS.
- Fine Software: Abutment, Beam, Cantilever Wall, Earth Pressures, FEM, FEM - Tunnel, FEM - Water Flow, Gabion, Gravity Wall, Ground Loss, Masonry Wall, Micropile, MSE Wall, Nailed Slopes, Pile CPT, Piles, Pile Group, Plate, Prefab Wall, Redi Rock Wall, Rock Stability, Settlement, Sheeting Check, Sheeting Design, Slope Stability, Spread Footing, Terrain
- Midas GTS
- ABAQUS v. 6.11
- Matlab ver. R2011b

Development strategy

The research and development activities of the research group are focused on experimental and computational analysis on physical and mechanical soil properties, site measurements and analysis of soil and structures in contact with soil, with emphasis on the following topics: analysis of slope stability problems, analysis and design of foundation structures, retaining structures, deep structures soil - structure interaction, geosynthetics used for railways, trams, roads and pavements, analyze and design of slope stability using geosynthetics, bridge and traffic engineering, soil and foundations degradation and consolidation solutions, soil improvement, embankments solutions, soil improvement, water management.

Representative projects

Project no.1. Massive landslide causes, analysis and technical solutions at Sibiu Airport Runway, project manager A. Popa (2012-2013)

Project no.2. Landslide causes, analysis and technical solutions for DN1N National Road, km5+500m ,

project manager A. Popa (2011)

Project no.3. Landslide monitoring along DN1 National Road Brasov-Sibiu, km204+500m, project manager O.C. Muresan, C.M. Gherman (2010-2012)

Project no.4 Diapfragm wall monitoring for a deep excavation near major comunications way, 21 December 1989 Boulevard, Cluj-Napoca, project manager V.S. Farcas (2013)

Reader Dr. Nicoleta Ilies was project manager of:

Grant CNCSIS PN II – Human Resurces, code TD 426 – Degradation causes on historical buildings and consolidation solutions, Oct. 2007 – Jan. 2009

In the **Laboratory „Geotechnics and foundation ground**" there were developed few other important projects, involving :

- Geotechnical report for the managing of the surface water and stability study for Piatra Albă- Noua Rosia Montana, Sept. 2009-mar. 2010, Beneficiary S.C. Rosia Montana Gold Corporation S.A., Contract value 10000Euro
- Laboratory tests on samples, Dec.2008 - Apr.2009, Beneficiary S.C. Proiect Bihor S.R.L., contract value 1800Euro
- Laboratory tests to establish physical and mechanical soil characteristic for Transilvania Motorway, Beneficiary Bechtel International Inc. S.R.L. Jun.2008 - Aug.2008, contract value 6645 Euro

Significant results

ISI Papers:

1. **Popa, A.; Farcas, V.; Ilies**, N. *Case study importance in geotechnical engineering - educational approach,* 1st International Conference on Education and Training in Geo-Engineering Science - Soil Mechanics, Geotechnical Engineering, Engineering Geology and Rock Mechanics Location: Constantza, ROMANIA Date: Jun 02-04, Pages: 397-404, 2008
2. **Ilies, N. M.; Popa, A.** *Geotechnical problems on historical buildings from Transylvania* , 2nd International Symposium on Geotechnical Engineering for the Preservation of Monuments and Historic Sites Location: Napoli, Italy Date: May 30-31, 2013 Geotechnical Engineering for the Preservation of Monuments and Historic Sites Pages: 431-436,2013
3. **Chira, Nicolae; Farcas, Vasile S.; Chorean, Cosmin G.,** *Using ecological solutions for slopes stability at Cojocna Salty,* Conference: 3rd International Conference on Environmental and Geological Science and Engineering (EG

10), Constantza, Romania Date: SEP 03-05, 2010 International Conference on Environmental and Geological Science and Engineering-Proceedings Pages: 39-44 ,2010

4. **Molnar Iulia C.**, *Geotechnical Parameters Obtained With Nonlinear Computational Models Based On Triaxial Laboratory,* 1st International Conference on Quality and Innovation in Engineering and Management (QIEM) Cluj Napoca, ROMANIA , MAR 17-19, 2011 Quality and Innovation in Engineering and Management Pages: 457-460 ,2011
5. **Muresan Olimpiu-Cristian** , *Possible Overwiev Of Landslide Risk Assessment, Mitigation And Management*, 1st International Conference on Quality and Innovation in Engineering and Management (QIEM) Cluj Napoca, ROMANIA , MAR 17-19, 2011 Quality and Innovation In Engineering and Management Pages: 143-146, 2011
6. **Pintea, Andrea; Popa, Augustin**, *Geotechnical Investigations For The Consolidations Of Earthworks And Stabilization Of Slopes At Transilvania Motorway,* 1st International Conference on Quality and Innovation in Engineering and Management (QIEM) Location: Cluj Napoca, ROMANIA Date: MAR 17-19, 2011, Quality and Innovation in Engineering and Management Pages: 471-476, 2011

International Database Indexed Papers:

1. **Molnar Iulia,** "Correlations between geotechnical parameters of transilvanian cohesionless soils based on triaxial laboratory tests results"- JAES Journal of Applied Engineering Sciences Volume 2 (15), Issue 1/2012, pg.65-70, ISSN/ISSN-L 2247-3769/e-ISSN2248-7197, 2012
2. **Molnar Iulia, Popa A.,** *"Geotechnical parameters obtained with nonlinear computational models used in geotechnical engineering problems"*, Proceedings of the International Scientific Conference CIBv2010, Universitatea Transilvania, vol. 2, pg 323-331, ISSN 1843-6617, Braşov, Romania, 12-13 noiembrie, 2010
3. **Muresan O., Molnar I., Popa A.,** *"Designing retaining walls using Eurocode 7"*, Proceedings of the international scientific conference CIBv2010, Universitatea Transilvania, vol. 2, pg 331 -339, ISSN 1843-6617, Braşov, Romania, 12-13 noiembrie, 2010
4. **Farcas, V.S., Popa, A., Ilies, N.M.,** *Variation of the parameters of injection for the ground in different regimes*, Proceedings of the 17th International Conference on Soil Mechanics and Geotechnical Engineering: The Academia and Practice of Geotechnical Engineering3 , pp. 2431-2434, 2009

The offer addressed to the economic environment

Research & development in core areas	- Development of monitoring solutions for infrastructures, - Development of software based on kinematical elements for slope stability analysis - Development of an original procedure for testing sands using triaxial apparatus - Development of databases of solutions for soil and foundation degradations and consolidation solutions - Development of soil improvement solutions and software for infrastructures
Research & development in applied fields	Transport infrastructure - bridges, railways and civil engineering buildings: - soil mechanical and physical properties determination - correlation of FE models with the real soil behavior and classical models - site measurements and analysis of soil deformation characteristics - site measurements and analysis of soil displacements - damages detection and consolidation solutions - long term infrastructure and geotechnical structures monitoring
Consulting	Consulting, design, research for companies in civil engineering field: - experimental support for soil physical and mechanical characteristic determination, - experimental support for roads, pavements, railways and bridges structural consolidation projects - long term monitoring of slopes toward roads, pavements, railways and bridges structural consolidation projects - optimal technical and economical solutions based on site conditions
Applied engineering services	Advanced soil properties determinations. Advanced analysis of foundation soil for roads, pavements, railways , bridges and design of Geotechnical Structures
Training	Advanced software applications such as: Geostru, Geo Fine, Midas GTS, Abaqus. Advanced laboratory tests. Advanced geotechnical design.