



Engineering-geological assessment of soils by field and laboratory tests including geophysical investigations

5th National Symposium on “Recent problems of engineering geology in Poland”

September 15–17, 2014, Lublin, Poland

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PREFACE

The symposium, organized by the Polish Geological Institute – National Research Institute, is the only conference in Poland that is fully dedicated to the issues related to engineering geology and the assessment of physical and mechanical soil properties. The symposium allowed exchanging experiences collected during the engineering-geological recognition of the subsoil under various types of construction, especially with regard to modern investigation techniques.

The symposium was held on September 15–17, 2014, and was attended by 153 delegates. Among all submitted papers, 10 papers are included in this Special Issue of Geological Quarterly, and another 29 articles have been published in *Przegląd Geologiczny* (vol. 62, No 10/2, 2014).

The Authors presented the results of their studies in four thematic sessions:

- Engineering geology in the construction process,
- Geohazards,
- Geophysical investigations in the construction process,
- Assessment of geological conditions.

All papers of the session “Engineering geology in the construction process” have been published in *Przegląd Geologiczny*.

The papers assembled in the session “Geohazards” focused mainly on the results of studies of soils that are prone to rapid settlement (collapse) or landslides. The possibility of using remote sensing methods and radar interferometry for landslide mapping was also discussed. Szajna and Gontaszewska analysed the usability of static and dynamic penetrometers to detect and characterise post-mining excavations in the area of former lignite mining. The Authors obtained precise characteristics of physical parameters of soils filling the excavation by means of CPTU, DPL and SDMT penetrometers.

The session “Geophysical investigations in the construction process” contained several papers on various geophysical methods, such as Electrical Resistivity Tomography (ERT) and Seismic Refraction Survey (SRS) for precise recognition of flood embankments, and Ground Penetrating Radar (GPR) for technical assessment of the construction walls.

Godlewski and Szczepański described the necessity of G_0 modulus determination in the assessment of soil stiffness. Various methods of field and laboratory tests were evaluated including SDMT, CSWS/SASW and BET, which show that the choice of investigation method(s) is a crucial factor for the interpretation of the results. Each method has different test conditions and the knowledge of its limitations is an important factor. Kowalczyk et al. presented an example of identification of a peat layer within sandy deposits by means of ERT method, and described a model of soil resistivity by comparing the results with RCPT penetrometer test.

In the session “Assessment of geological conditions”, numerous examples of the newest measurement techniques were presented, including field and laboratory tests. Dobak and Gaszyński proposed a new method of consolidation coefficient and permeability index determination. Due to the implementation of several additional parameters, the Authors were able to follow the course of filtration and soil creeping processes. As a result, the consolidation coefficient values became much more reliable than those obtained by classical methods. Dobak et al. obtained more precise results in CL (Continuous Loading) than in IL (Incremental Loading) methods.

Interesting data on collapsing properties of sandy clays and clays were presented by Woźniak. The Author described the factors driving the rapid settlement process in oedometer tests and indicated the differences between natural and dump soils behaviour during the tests.

Sulewska and Zabielska-Adamska presented the best empirical relations between the density parameters of loose soils and the particle size distribution obtained by various methods: regression model, neural networks (ANN) and principal component analysis (PCA).

Pinińska et al. described the results of engineering-geological assessment of the area for a future Geopark. The following factors were taken into consideration: soil properties, slope inclination, locality towards the river, and potential geohazard.

Tschuschke et al. presented the SCPTU results with regard to large and small strains. Evaluation of the usability of this young investigation method (seismic CPTU) was also presented in the paper.



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Rydelek et al. presented the assessment of the variability in permeability parameters of peats with regard to their usability as natural geological barriers. The investigations included modern methods of permeability investigations such as BAT penetrometer and Rowe-Barden chamber.

The range of topics of the papers included in this issue of *Geological Quarterly* indicates that the methodology for soil properties characteristics is continuously developing. This is mainly due to the necessity of taking into consideration the number of factors that have an influence on the obtained results. The modern methods of investigation (in both field and laboratory) are commonly used in practice, this is why they need to be validated and calibrated with regard to national conditions and particular types of soil. Such validation will allow obtaining the full characteristics of the subsoil, as well as making the geological risk assessment in the construction process.

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