

Summary of ISC6 Workshop

Special soils – MSW

– Professor László Rétháti memory workshop –

Summary of ISC6 Workshop	1
Special soils – MSW	1
Organizer: ISSMGE HNC.....	1
TOPIC	1
SUMMARY	2
PROGRAM:	2
Opening on behalf of the Hungarian Academy of Sciences:Prof. János Józsa	2
Jean-Sébastien L'Heureux - NGI : Sensitive/quick clay in Norway.....	2
Szilvia Simon: Surface salinization from deep source	2
Zsombor Illés : Dispersive soils from geophysics viewpoint.....	2
János Lógó: Topology optimization as tool for the analysis of flow problems.....	2
Kornél Kovács: A stimulating bacterium in the methane development, H ₂ production.....	2
Arif Mohammad : Decomposition Characteristics of Municipal Solid Waste in a Bioreactor	2
Emoke Imre et al: Dike piping	3
Viktória Parrag, Kornél Szalay : Potential applications of hyperspectral imaging with a particular focus on the agriculture and food industry	3
Ágnes Bálint: Heavy metal pollution in soils along the Sajó, Hernád and Tisza rivers.....	3
Emőke Imre, G. Varga, T. Firgi, J. Ósz, , László Tóth, et al : Wind energy plant on the top of a landfill hill	4
CV-s	4

Organizer: ISSMGE HNC

Date: 14h to 17h September 30th 2021

Location: Hungarian Academy of Sciences

Prof. Devendra Narain Singh (DNS) chair

Prof. Kornél Kovács co-chair

Secretaries: Quỳnh Hương Đặng, Nadaprapha Binsaaeteh, dr. Eموke Imre

TOPIC

The workshop aims to promote dissemination of earlier and current research related to special (saline, quick, peat, special mineral and volcanic etc.) soils or special soil properties.

SUMMARY

“The workshop allowed the participants an impressive insight into the opportunities of environmental engineering in different fields. Current research findings in soil pollution, landfill energy and effects of agricultural activities have been presented by experts. The atmosphere of the workshop enabled inspiring discussions following the presentations.”

PROGRAM:

**Opening on behalf of the Hungarian Academy of Sciences: Prof. János Józsa
(a few words on Professor Rétháti)**

Jean-Sébastien L'Heureux - NGI : Sensitive/quick clay in Norway

Abstract: The concept of quick clay is explained. The main in situ and laboratory testing tools are analysed and some slope stability issues are treated.

Szilvia Simon: Surface salinization from deep source

Abstract: The presentation introduces an example from Hungary where surface and shallow groundwater salinization is influenced by deep saline groundwater upwelling. It highlights that groundwater is a geological agent, contributing to several surface phenomena, such as extended soil and shallow groundwater salinization. The study reveals that in some cases hydrogeological characterization can be necessary to understand surface saline features.

Zsombor Illés : Dispersive soils from geophysics viewpoint

Abstract: Investigation of a subject usually means that the tools of some field of study are used in order to obtain information. When similar disciplines, such as geotechnics and soil sciences are evaluating the same object, the diverse ways of collecting information leads to different conclusions. However, they study the same subject, only from distinct points of view. In the case of lake Szappanos, the properties of the subsoil were measured by the equipment of soil sciences and geotechnical engineering, and the results and correlations of the different parameters are collected and evaluated in this paper.

János Lógó: Topology optimization as tool for the analysis of flow problems

Summary

Optimization methods are presented and their use in fluid theory are included. Likely some fluid optimum modelling may explain the fast piping, which may include dynamic effects of the ground, the dyke and the effect of a vortex reaching the river bed.

Kornél Kovács: A stimulating bacterium in the methane development, H₂ production

Abstract: The Hungarian Biotechnological Research in related to Renewable Energy is considered. The role of Hydrogen in biogas production is depicted.

Arif Mohammad : Decomposition Characteristics of Municipal Solid Waste in a Bioreactor

Abstract: Bioreactor landfill , wherein leachate recirculation is practised, has emerged as a panacea that facilitates the rapid decomposition of municipal solid waste. This is achieved by controlling the prevailing conditions (viz., pH, moisture content, temperature, and nutrient requirement of microorganisms) properly to regulate the microbial metabolism. This technology is also instrumental to tackle the issues related to the scarcity of the land required to create or expand the new landfill by resorting to landfill mining. However, it should be realized that efficient monitoring of a fully functional bioreactor landfill is not so easy due to several operational constraints and environmental issues. Keeping this in view, several strategies, including destructive (sampling from landfill and followed by laboratory testing) and non-destructive (in situ) tests (cone penetration tests, multichannel analysis of surface waves) have been adopted to establish the rate of decomposition of municipal solid waste in a bioreactor landfill , located in Mumbai, India. Based on these results, a numerical model also has been developed by incorporating coupled thermo-hydro-bio-chemico-geomechanical phenomena to simulate the decomposition of municipal solid waste in landfill .

Emoke Imre et al: Dike piping

Abstract: Some cases of backward erosion/liquefaction piping are described. These distinguish between usual sand boils and the 'fast' piping, the - possibly dynamic liquefaction induced - breach. The latter happens in a matter of minutes, whereas in the former emergency response measures can be effective. According to the presented case studies, the 'fast' piping failure has a typical pattern. This pattern can be explained by optimisation theory in fluid flow since the liquefied soil layer behaves as a fluid.

Viktória Parrag, Kornél Szalay : Potential applications of hyperspectral imaging with a particular focus on the agriculture and food industry

Abstract: The presentation gave a general introduction of hyperspectral imaging, its basic principle and a short overview of the application fields of the technology. In the second part current agri-food application projects has been presented including the detection of ragweed, dust sensing and visualisation in agriculture via video spectroscopy and the study of the spectral response of raspberry plants to different light conditions. Food safety and quality aspects have been discussed related to applications of hyperspectral imaging for the study of toxigenic Fusarium infection on cornmeal and the detection of cobweb disease infection on white button caps.

Ágnes Bálint: Heavy metal pollution in soils along the Sajó, Hernád and Tisza rivers

Abstract: The Sajó valley was a thriving industrial area 20-25 years ago, but in the early 1990s most of the factories closed down, but relatively little attention was paid to the pollution left behind. The Green Action Association carried out a comprehensive monitoring of the Sajó Valley in the early 1990s. This gave us the idea to carry out our work, as significant heavy metal pollution was found in the areas surveyed. It is very likely that this was mainly caused by heavy industry from the 19th century until the 1980s. Our aim was to investigate what heavy metal contamination might be found in some of the areas studied by the association 20 years later.

Six areas were selected as study sites for the soil samples, between Onód and Muhi (3 areas) and near Tizzaszederkény and Tiszagyulaháza (3 additional areas). Our soil samples were collected in November 2009 from the floodplains of the Sajó, Hernád and Tisza rivers at a depth of 0-40 cm.

Emőke Imre, G. Varga, T. Firgi, J. Ósz, , László Tóth, et al : Wind energy plant on the top of a landfill hill

Abstract:

The design of a wind turbine founded at the top of the Pusztazámor MSW (municipal solid waste) landfill hill, is based on the results of some large-scale compression tests and on some in-situ seismic, density and light falling weight deflectometer tests. In addition, some wind velocity measurements were made, to plan the number and size of the wind turbines. The compression curves of three waste samples showed stiffening with increasing depth and increasing degradation. The immediate settlement, the primary consolidation settlement and the creep settlement were separated. The settlement of the wind turbine under static load was determined with the Axis software in the function of the sub-grade modulus, the true value was inferred from the seismic test. The settlement was in the order of magnitude measured earlier in Karlsruhe for a somewhat smaller load.

CV-s

Dr. Jean-Sebastien L'Heureux

Dr. Jean-Sebastien L'Heureux is a senior scientist and head of a section at the NGI office in Trondheim. He has over 15 years of experience in geotechnical engineering practice, characterization of sensitive clays, hazard and risk mapping, and design of landslide mitigation measures.

Szilvia Szkolnikovics-Simon

Szilvia Szkolnikovics-Simon is an assistant professor at ELTE, Eötvös Loránd University, Institute of Geography and Earth Sciences, Department of Geology, József and Erzsébet Tóth Endowed Hydrogeology Chair. She is also a hydrogeologist, who is interested in surface and subsurface manifestation of groundwater flow.

Dr. Kornél L. Kovács

Professor Kornél L. Kovács graduated from the Faculty of Natural Sciences, the University of Szeged in 1971. His main affiliation was at the Biological Research Center of the Hungarian Academy of Sciences between 1971 and 1996. He became a full professor at the Department of Biotechnology, the University of Szeged in 1996. Between 1996 and 2012 he served as department chair. He was also the Dean of Biosciences at this University for 12 years, currently Professor Emeritus. Altogether he spent 4.5 years as visiting scientist in the USA (University of California at Berkeley and the University of Georgia) and 1.5 years in France (CEA-CENG Grenoble). He participated in several EU FP5-FP7 and H2020 projects in the field of biogas biotechnology. His main scientific interest is to understand the complex biological activity of anaerobic microbial communities via metagenomics and metatranscriptomics, to engineer the community for more efficient P-2-G and for utilization of unconventional substrates. In 2004 he was elected as President of the Hungarian Biogas Association, reelected in 2008 and 2012. He has published more than 300 publications in various scientific journals and is a co-author of 8 patents.

Dr. Arif Mohammad

Dr. Arif Mohammad is working as an Institute Postdoctoral Fellow in the field of Environmental Geotechnics at Environmental Geotechnology Laboratory, Department of Civil Engineering, Indian Institute of Technology Bombay, India. He has completed his Ph.D. from Indian Institute of Technology Bombay on “Decomposition Characteristics of Municipal Solid Waste in a Bioreactor Landfill”. His research interests are primarily focused on numerical and experimental studies on temporal and spatial variation of thermo-hydro-bio-chemico-geomechanical properties of geomaterials (i.e., soils, solid wastes, sludges, sediments, etc.) due to various environmental stresses, including chemical, thermal and biological. He has been working in the area of management of municipal solid waste for more than six years, directly with several landfill operators and agencies in India.

In addition, he is currently serving as a reviewer of international peer-reviewed journals, such as Environmental Geotechnics, ICE, Journal of Cleaner Production, Elsevier. He was a recipient of the European Commission Scholarship via the Marie Curie IRSES project GREAT to work as a Visiting Research Scholar at the University of Strathclyde, Scotland. Also, Dr. Arif was selected for Tata Centre for Technology and Design Fellowship (Fellow of TCTD) at the Indian Institute of Technology Bombay for pursuing his postgraduate studies.