

Established in 1986

SLGS NEWSLETTER

SRI LANKAN GEOTECHNICAL SOCIETY

A Member Society of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE)

Message from the Editor

2023 March: No 25

Dear readers,

We are pleased to present the March 2023 newsletter which highlights two successful Geotechnical forums conducted in February and March through Zoom.

We are delighted to announce that the SLGS President, Eng. K.L.S. Sahabandu, was invited to deliver a guest lecture at the international conference "GeoMandu 2023" and was also part of a discussion on the formation of an "Association of Geotechnical Societies in South Asia".

The newsletter includes a Geotechnical Engineering case study titled "Applications of Nondestructive and Economical Investigations in Sri Lanka."

In addition, this issue invites the membership to contribute to the Time Capsule Project organized by ISSMGE. Also, for those who are interested in upcoming events, we have provided a summary of the ISSMGE Conferences scheduled for the year 2023.

Best regards, Dr. (Eng.) K. H. S. M. Sampath Editor, Newsletter

Contents

Message from the Editor	1
Virtual Geotechnical Forums	1
GeoMandu—2023: Geohazards a Geo-Infra Disasters	2
A case study titled "Applications of nondestructive and economical investigations in Sri Lanka"	3
ISSMGE Time Capsule Project	4
SLGS Project Day	4
Call for full-papers for SLGS Journal	4
Up coming ISSMGE Conferences	5

SLGS Virtual Geotechnical Forum 2023

SLGS Virtual Geotechnical Forum by Eng. Vasantha Wijeyakulasuriya — February

Some Challenges in New Highway Construction in Mountainous Terrain—A Case Study

Eng. Vasantha Wijeyakulasuriya graduated from the University of Ceylon, Peradeniya in 1975. He spent several years in the soil mechanics laboratory at the university working under late Prof. Thurairajah. He later proceeded to AIT where he obtained a Masters degree in Geotechnical Engineering working under Professor Balasubramanian. He has practiced geotechnical engineering in many of its sub-disciplines, but the major emphasis has been on transportation geomechanics. He was the Director (Geotechnical) at the Department of Main Roads in Queensland before he proceeded to Canada where he worked as a Senior Principal (Geotechnical) in a few consulting firms. He is now back in Australia and commenced his new position with Tonkin + Taylor Consulting Engineering, as a Senior Principal Geotechnical Engineer shortly. He was one of the lead investigators of the presented case study.

The case study presented in the SLGS Geotechnical Forum on 01st of February 2023 is based on a highway project undertaken in Queensland, Australia well over a decade ago. Deep hillside, benched road cuttings over 50 m high were involved. During the advanced stages of earthworks construction, progressively worsening earth movements occurred lifting the roadbed along two of the deep cuttings and the lower side slopes of road cuttings showed increasing instability, i.e., time-dependent movements. How the principles of soil mechanics of the shear behaviour of over-consolidated sediments have come into play was evident from this presentation which should also appeal to students of soil mechanics in Sri Lankan engineering academia.

SLGS Virtual Geotechnical Forums by Prof. Pinnaduwa H.S.W. Kulatilake — March



Representative Elementary Volume (REV) properties of a rock mass, and equivalent continuum/ discontinuum and fully discontinuum 3-D stability analyses of a tunnel in the same rock mass

Prof. Pinnaduwa H.S.W. Kulatilake is a Professor Emeritus at the University of Arizona, USA, and the President of the Sri Lankan Rock Mechanics and Engineering Society. Recently he served as a Distinguished Professor of Rock Mechanics and Rock Engineering for three years at a University in China under the Distinguished Foreign Expert 1000 Talent Program funding from both the Chinese Government and a Province in China. Prof. Kulatilake has 40 years of experience in rock mechanics & rock engineering and applications of probabilistic and numerical methods to mining and civil engineering.

Prof. Pinnaduwa H.S.W. Kulatilake
Professor Emeritus,
University of Arizona, USA

SLGS invited Prof. Pinnaduwa to make a presentation on the above topic on 22nd of March 2023. The presentation covered a study in which the fracture data available for a limestone rock mass were used to build and validate a stochastic 3-D fracture network model, and to perform REV properties and equivalent continuum study in 3-D. Several relations were discussed in the

presentation between the rock mass mechanical parameters and fracture tensor components in 3-D. An incrementally linear elastic, orthotropic constitutive model was suggested to represent the equivalent continuum pre-failure mechanical behaviour of the jointed rock mass by incorporating the effect of fracture geometry by the fracture tensor components. Deformation and stability around a tunnel in the limestone rock mass were investigated using both (a) an equivalent continuum/discontinuum model and (b) a fully discontinuum model through 3-D stress analyses. Using model (a), several factors that affect the geotechnical behaviour around the tunnel were studied in detail. A comparison was made between the stress analysis results obtained through the aforementioned two models.

GeoMandu: Geohazards a Geo-Infra Disasters

The Nepal Geotechnical Society (NGS) recently hosted a successful two-day international conference on 16th and 17th March 2023 at Hotel Radisson in Kathmandu, Nepal. This event, known as "GeoMandu", was the first of a series of NGS international conferences to be held every two years, with each conference featuring a different theme. The theme of this year's conference was "Geohazards and Geo-Infra Disasters."



Esteemed Geotechnical Engineers and Academics from around the world, representing various Geotechnical Engineering Societies, delivered keynote speeches and guest lectures. Among them was Eng. K.L.S. Sahabandu, President of the Sri Lankan Geotechnical Society (SLGS), who graced the occasion by physically participating in the event in Kathmandu and delivering a guest lecture on "Recent Development of Geotechnical Engineering in Sri Lanka."

In his lecture, Eng. Sahabandu highlighted the Geotechnical applications of several key infrastructure development projects in Sri Lanka, including the Southern Expressway, Construction of Eight Railway Bridges, Matara – Beliatta Rail Road, Metro Colombo Solid Waste Management Project, Kalu Ganga Development Project, Port-City Colombo Project, Shoring Systems for Deep Excavations and numerous landslide risk reduction and slope stabilization projects.

The extended abstract of the lecture can be found from [this link](#).

With the initiation of Prof. Netra P. Bhandary, The President of Nepal Geotechnical Society, a meeting was held to discuss the way forward of forming an 'Association of Geotechnical Societies in South Asia' (AGSSA) during the Conference. Presidents and representatives of the Geotechnical Societies of India, Nepal, Pakistan and Sri Lanka were participated in this meeting. In the meeting, it was agreed to have a regional corporation among the Geotechnical Societies in South Asia.

NGS's decision to hold the GeoMandu conference series regularly every two years is a testament to the organization's commitment to advancing the field of geotechnical engineering and fostering international collaboration among professionals in the field. This event has undoubtedly brought together experts from different corners of the world to share their knowledge and expertise, leading to a better understanding of the challenges and opportunities in geotechnical engineering.

Some Glimpses of the GeoMandu – 2023



Key Participants at GeoMandu with the Chief Guest, Dy. Prime Minister of Nepal



Presentation by Eng. K.L.S. Sahabandu



Participants to form Association of Geotechnical Societies in South Asia.



Receiving a Token of Appreciation by Eng. K.L.S. Sahabandu

For more information, visit <https://geomandu.ngcotechs.org/>

Applications of nondestructive and economical investigations in Sri Lanka

By: Eng.M.D.Janaka Priyantha Wickramasooriya (B.Sc.Eng, M.Sc.Eng, C.Eng, MIE(SL))
Irrigation Engineer - Irrigation Department

Electrical Resistivity Surveys (ERS) & Ground Penetration Radar (GPR) have been proven as reliable methods of indirect geological investigations during the investigations carried out in Sri Lanka. This article explains applications of ERS & GPR to investigate the anomalies in existing bunds in Sri Lanka before it has been treated with clay-cement grouting.

Excessive seepages were visible in Uyanwewa dam and through the sluice barrel in Kekiriobada dam both of which are located in Southern part of Sri Lanka and are investigated using geophysical methods. Both dams geologically belong to the Highland complex (Fig 01). The resistivity surveys and ground penetration radar were used to investigate the seepage locations using the anomalies in the earthen dam. The GPR survey in Kekiriobada was carried out by National Building Research Organization (NBRO) & ERS in Uyanwewa by Irrigation Department (ID). The recommendations were given by the Engineering Geology Division (EGD) of the ID and the grouting treatments were also carried out by EGD.

Wickramasooriya et.al (2018) used clay-cement grouting for densification of the soil around a sluice barrel in Kekiriobada reservoir in Sri Lanka & the treatments were successful. Further, the seepages through the joints could be controlled to the acceptable limits. In their research, bore hole data revealed core losses in some locations at different depths, Ground Penetration Radar (GPR) survey (Fig 02 & 04) confirmed the formation of cavities within the body of the earth embankment. Furthermore, the anomalies in the soil in the dam were clearly identified by the GPR survey.

For a quick and economical investigation, the electrical resistivity survey which is one of the methods used in geophysics was applied in Uyanwewa geotechnical investigations prior to the treatments.

Subsurface profile was developed based on the resistivity values of bund which is about 200 m long as shown in the figure 3. One bore hole investigation was carried out at the location where maximum seepage occurred, to verify the resistivity survey results and for data interpretation purpose.

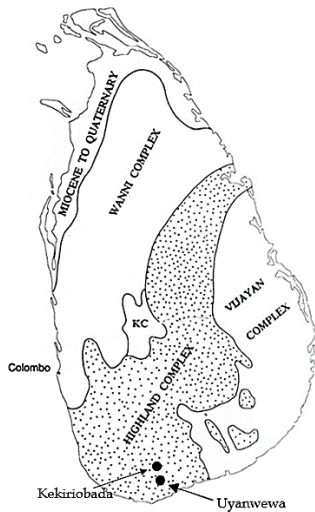


Figure 1 : Locations of dams



Figure 2 : GPR survey – Kekiriobada dam

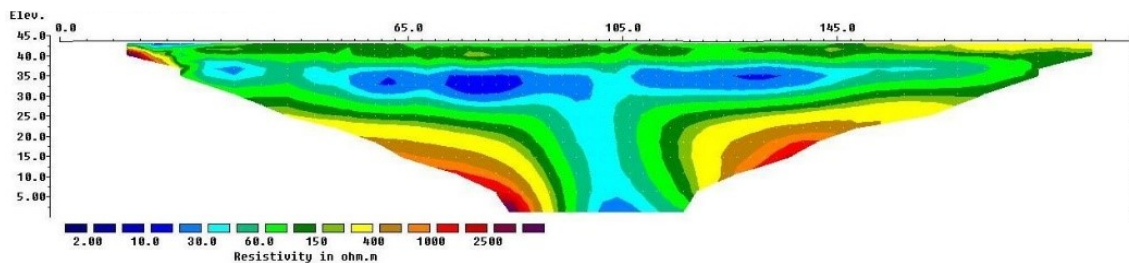


Figure 3 : ERT profile - Uyanwewa dam

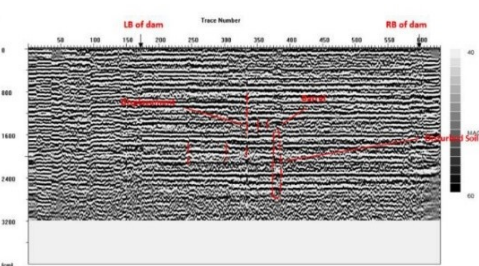


Figure 4 : GPR profile – Kekiriobada dam

In general, It can be concluded that the GPR & ERS can reliably be applied as a nondestructive & economical method of indirect geotechnical investigations. However, a bore hole is mandatory to interpret the indirect investigation results.

Further Read:

M.D.J.P.Wickramasooriya, L.L.Silva , K.H.N.S.Kumara, Pathmakumara Jayasinghe, M.M.C.U.B.Moremada, "Geological Investigations & Foundation Treatments at Kekiriobada Reservoir," in SLNCOLD Bulletin, Colombo, 2018.

ISSMGE Time Capsule Project

Invitation for members to make contributions for the "Time Capsule Project".

ISSMGE has initiated a project inviting member societies to publish special achievements in the advancement of theory and application of geotechnical engineering in their countries.

Sri Lankan Geotechnical Society has initially uploaded a series of presentations and publications in the reduction of risks of landslides in the country.

This has been uploaded to the SLGS website.

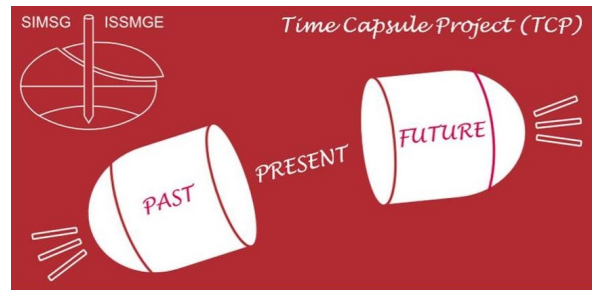
Visit <https://slgs.lk/overview/issmge-time-capsule/>

You may visit the Time capsule contributions made by different national societies through ISSMGE website.

Visit <https://www.issmge.org/the-society/time-capsule>

Executive committee of SLGS invites membership to send special achievements made by their establishments in an appropriate form to be uploaded to the website after necessary editing.

You may send your achievements through email to Dr. Sampath Hewage, editor-newsletter (khsmsampath@gmail.com)



SLGS Geotechnical Engineering Project Day

Sri Lankan Geotechnical Society (SLGS) conducts the **Geotechnical Engineering Project Day** with the objective of promoting research and improving the presentation skills of Civil Engineering students in Sri Lankan Universities.

This is an annual event where final year undergraduates who have done projects in Geotechnical Engineering are invited to compete for an award.

They are required to write a 4-6-page research paper and make a 5-minute presentation.

The best projects for the year will be selected by a committee of eminent professionals appointed by the SLGS, based on the written paper and the presentation.

The first, second and third place projects will receive certificates and cash awards and all the other participants will receive a participation certificate.

SLGS has received 18 submissions this year and they have been sent to 6 evaluators for the evaluation process.

The Project Day is tentatively planned for the **April 2023**.



Call for full-papers for SLGS Journal

SLGS wishes to call for full papers for its Annual Journal. Number of pages per paper is limited to 12.

All the papers will be subjected to double blind review by two referees.

Selected papers will be published in the SLGS Journal and will be made available online through the SLGS website.

Please send your papers to the following email address.

Editor Journal: nadeejpriyankara@yahoo.com

The previous journal publications can be found in SLGS website.

Please visit <https://slgs.lk/journals/>



Up coming ISSMGE Conferences

8th INTERNATIONAL CONFERENCE ON UNSATURATED SOILS

The Hellenic Society for Soil Mechanics and Geotechnical Engineering (HSSMGE) invites you to participate in the 8th International Conference on Unsaturated Soils that will be held on **Milos island, Greece between the 2nd and 5th of May 2023**.



For more details, visit <https://www.unsat2023.org/>

Organizer: Hellenic Society for Soil Mechanics and Geotechnical Engineering (HSSMGE)

Contact Information : Dr Michael Bardanis (mbardanis@edafos.gr)

15th INTERNATIONAL CONFERENCE: "UNDER-GROUND CONSTRUCTION PRAGUE 2023"

The Czech Tunnelling Association ITA-AITES cordially invites you to 15th International Conference entitled "Under-ground Construction Prague 2023", which will be held in **Prague, the capital of the Czech Republic, 29-31 May 2023**.

This international conference is one of the series of conferences "Underground Construction Prague", which are held regularly every three years. The conferences have been attended by distinguished international experts in the field and we look forward to prominent guests also in 2023. For these reasons, "Underground Construction Prague" can be considered as one of the key events of 2023 in the discipline of underground construction.

The joint conference will be held at the **Clarion Congress Hotel Prague** and will include a technical exhibition and a post-er session.

For more details, visit <https://www.ucprague.com/>

Organizer: The Czech Tunnelling Association ITA-AITES

Contact Information: Czech Tunnelling Association ITA-AITES (pruskova@ita-aites.cz)



17th DANUBE - EUROPEAN CONFERENCE ON GEOTECHNICAL ENGINEERING

Romanian Society for Geotechnical and Foundation Engineering invites you to the 17th Danube - European Conference on Geotechnical Engineering, which will be held in **Bucharest, Romania from 7-9 June 2023**.

For more details, visit <http://www.17decge.ro>

Organizer: Romanian Society for Geotechnical and Foundation Engineering

Contact Information: Alexandra Ene (srgf@utcb.ro)



9th INTERNATIONAL CONGRESS ON ENVIRONMENTAL GEOTECHNICS

The 9th International Congress on Environmental Geotechnics is part of the well established series of ICEG. This conference will be held on an outstanding resort in the town of **Chania of the island of Crete in Greece from 25-28 June 2023**. The theme of the conference is "Highlighting the role of Environmental Geotechnics in Addressing Global Grand Challenges" and will highlight the leadership role of Geo-environmental Engineers play on tackling our society's grand challenges.

For more details, visit <https://iceg2023.org>

Organizer: Dimitrios Zekkos, University of California at Berkeley

Contact Information: Contact person: Dr. Rallis Kourkoulis (rallisko@grid-engineers.com)



NUMERICAL METHODS IN GEOTECHNICAL ENGINEERING 2023

The European Regional Technical Committee ERTC7 is pleased to invite you to attend the 10th European Conference on Numerical Methods in Geotechnical Engineering in **London, United Kingdom, 26-28 June 2023**. The NUMGE 2023 is organized by the ERTC7 under the umbrella of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE).



The objective of the conference is to provide a forum for exchange of ideas and discussions on topics related to different forms of numerical modelling in geotechnical engineering. Both senior and young researchers, scientists and practitioners from Europe and overseas are warmly invited to attend this conference to share and exchange their knowledge.

For more details, visit <https://www.imperial.ac.uk/numerical-methods-in-geotechnical-engineering/>

Organizer: Imperial College London

Contact Information: numge2023@imperial.ac.uk