IGS NEWS

A Bulletin of the Indian Geotechnical Society

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Contents

Message from President

Dear Distinguished Members,

IGS is celebrating 75th year of its formation and I would like to express my sincere thanks to one and all for your support and belief in me to serve as the President of the Indian Geotechnical Society during this historical milestone. I assure you all that, I will try my level best for the growth of IGS with the support of my fellow National Executive Committee members. I congratulate all the newly elected NEC members and Dr. A.P. Singh, who has agreed to serve the Society as Honorary Secretary for the Term 2023-2024.

I would like to acknowledge the immense contribution given by Immediate Past President, Prof. N.K Samadhiya, Past Hon. Secretary Prof. J.T Shahu and NEC members for the development of the Society during their tenure. Also I would like to place on record, my deep gratitude to all the past Presidents, Secretaries and other eminent leaders of Geotechnical fraternity who have worked hard to bring Indian Geotechnical Society to the current level. The vision of our new team for the growth of IGS during the tenure is finalised after multiple brain storming with National Executive committee members, office bearers of different local chapters and seniors in the fraternity and the following sub-committees (SCs) have been constituted to guide the IGS, for addressing various portfolios.

SC 1: IGS Website and Information, SC 2: Membership services, SC 3: Professional forum, SC 4: Finance, SC 5: International Cooperation (TC Activities), SC 6: International Cooperation (Networking), SC 7: Chapter Activities – Revamping, SC 8: Chapter Activities – New Chapter Formation, SC 9: Student Chapter Activities and Continuing Education, SC10: Young Geotechnical Engineers Forum, SC11: IGS Virtual University, SC12: Journal, SC13: Newsletter, SC14: Codes and Practice, SC15: Women Forum for IGS members, SC16: Infrastructure Development Committee, SC17: Formation of Indian Geotechnical Institute, SC18: Skill Development Forum, SC19: Laboratory Testing Forum, SC20: Social Media Development Forum, SC21: Data Bank for Soil Profile, SC22: Software Operations Committee, SC23: Diamond Jubilee Celebration Committee.

The SCs are expected to greatly assist IGS in going forward, in linking all members and providing professional services and I am thankful that all of the committees under the leadership of the respective conveners have started working for the vision set forth.Updates are regularly made to the IGS website, and the committee under the direction of Dr. Aarti Bhargava is functioning effectively and trying to bring the necessary changes needed. During the period of 1st January to 30th March 2023, 66 members have been added to the society. I congratulate Dr. S.K. Prasad, Convener of Membership Services for taking the lead in increasing the memberships. In the 234th National Executive Committee meeting held at Aurangabad, membership fees has been reduced by 25% effective from 1st April to 30th November 2023 to mark the 75th year celebrations of the society. We encourage you to promote this membership drive among your colleagues and members of the local chapters who are not yet taken the National membership. Various activities are planned by the Professional Forum headed by Dr. Jaykumar Shukla to have Academia-Consultancy-Industry-Bureaucracy interaction. Thanks to Er. Ravikiran Vaidya, Convener - Finance committee for taking lead in interacting with the Chartered Accountants and guiding in all the tax and financial budget planning of the Society.

Happy to inform that the representation of the IGS members in various TC Committees of International Society of Soil Mechanics and Geotechnical Engineering has been reconstituted and the list of nominated and corresponding members for each technical committee has been shared with the international society as well as the members. I request all assigned members to actively

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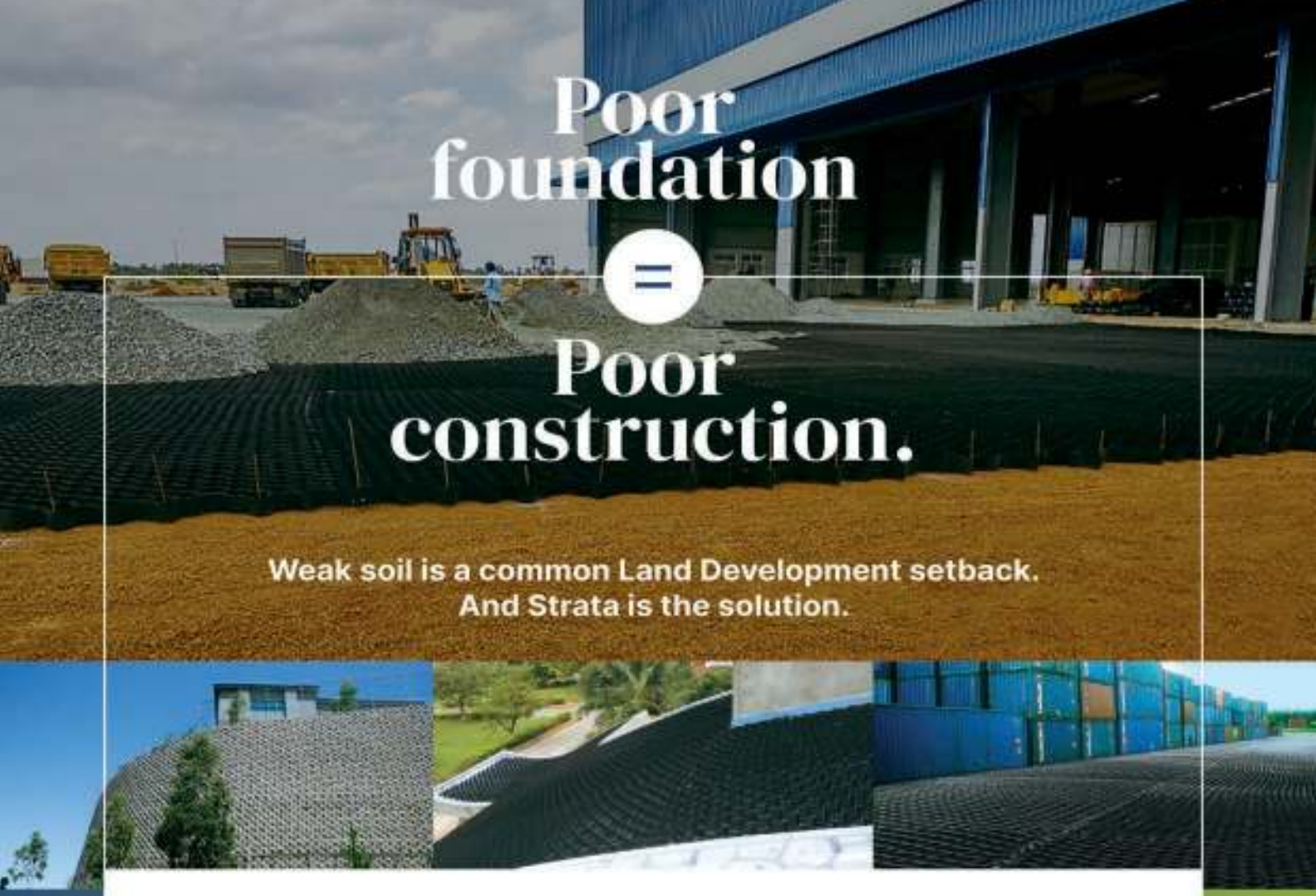

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take part in the respective TCs and update the activities of the committee to the convener. I would like to congratulate Dr. D. Neelima Satyam, Convener International Cooperation (TC Activities) for taking the efforts to revamp the TC Committee. On the International front, based on the invitation received from Nepal Geotechnical Society, a four-member team comprising of myself, Dr. A.P. Singh, Dr. A. Murali Krishna and Dr. Neelima Satyam attended GeoMandu 2023, an International conference on Geohazards and Geo-Infra Disasters held from 16th to 17th March 2023 at Kathmandu. A meeting among the representatives of the national member societies in South Asia was held on 16th March 2023 at Kathmandu to discuss the proposal on building a loose network of the South Asian national member societies of ISSMGE. The proposed countries comprise of Nepal, Pakistan, Sri Lanka, Bangladesh and India. Indian Geotechnical Society has submitted bid to host the 10th Asian Young Geotechnical Engineers Conference (10th AYGEC) to be held in 2024 and is planning to bid for hosting 18th ARC. I would like to congratulate Dr. Murali Krishna, Convener International Cooperation (Networking) for the dynamic activities.

I would like to congratulate Dr. Ashish Juneja, Convener Chapter Activities for the efforts put forward to revampthe dormant chapters and for the meetings conducted by the Committee in this regard. I am delighted to inform you that 49th local chapter was inaugurated on 24th January 2023, in Dhanbad. I would like to congratulate Prof. Sarat Kumar Das for taking the lead in formation of the chapter. The 50th local chapter of IGS was inaugurated at Mysuru on 23rd February 2023 in the presence of Prof. G.L. Sivakumar Babu and Prof. H.N. Ramesh. The inauguration was followed by one-day National Workshop on "Forensic Geotechnical Engineering". Congratulations to Dr. S.K Prasad and Dr. Anand Hulagabali for taking the lead in formation of the chapter. The 51st chapter of IGS is scheduled to be inaugurated at Calicut and efforts are in progress for starting chapters at Madurai, Gorakhpur, Lucknow, Imphal, Palakkad and Pondicherry. I would like to appreciate the New Chapter Formation Convener, Dr. Dasaka Satyanaraya Murty and team in this regard. Many new student chapters were formed during this period. Special congratulations to Pune Chapter led by Chairman Er.Vikas Patil for leading from the front in opening student chapters and setting new benchmarks. Numerous student chapter activities were conducted during this period across the country and I congratulate the team led by Dr. G Sridevi, Convener Student Chapter Activities and Continuing Education for the efforts. As part of promoting young geotechnical engineers, it is planned to have a Young Member Group (YMG) in the National level to engage the next generation of geotechnical Engineers in IGS. The YMG will act as a nexus of this network by enabling the sharing of knowledge and ideas, connecting groups with each other and facilitating communication between younger members and IGS leadership. Also, in order to promote young members, as per the guidance of ISSMGE, the Bright Spark Lecture Award is planned, commencing from IGC 2023 at Roorkee. I would like to congratulate Dr. T. Thyagaraj and team for the efforts made in this regard. Under the leadership of Dr. B.K. Maheswari, Convener for the committee of IGS Virtual University, efforts are made to collect guidance documents, GIAN, VAJRA and similar course materials/ lectures, and other repositories of geotechnical knowledge and for periodic uploading of such documents on IGS Website.

Indian Geotechnical Society has entrusted Dr. Deepankar Choudhury with the duty of serving as new Editor in Chief for the Indian Geotechnical Journal. I wish all the very best for the new team. I would like to place on record our sincere thanks and appreciation to Dr. G. Madhavi Latha for her dedicated efforts in taking the Journal to new heights under her leadership in the last 6 years. A co-publishing agreement with Springer Nature Publications has been signed for the next eight years. IGS has been publishing Newsletters quarterly and are sending newsletter to all IGS members. I congratulate the team led by Dr. Ravi S. Jakka for the sincere efforts. In the Women forum of IGS members, special issue in IGJ on Women in Geotechnical Engineering is planned for 2024 and on the Occasion of 75th year celebration of IGS, it is planned to bring out a book on 75 Indian Women in Geotechnical Engineering. Congratulations to the Women Forum Convener, Dr. G. Madhavi Latha for the tremendous efforts.

As a long term planning for the development, the possibility of constructing IGS House in Delhi in the NCR region is worked out. The efforts for the same is being carried out under the leadership of Dr. A.P. Singh. There is also plan for formation of Indian Geotechnical Institute, similar to the Norwegian Geotechnical Institute. The planning is in progress under the leadership of Dr. R. Ayothiraman. As part of skill building exercise, IGS would like to conduct Skill development programs for laboratory personnel as well as field investigations with a standard syllabus applicable throughout India with specified costs by associating or interacting with Government agencies such as PWD, NHAI, IRC, etc. who can support in geotechnical challenges. The planning for the same is in progress under the leadership of Dr. K.Balan and possible tie up with Construction Industry Development Council is under discussion. It is planned to have interactive sessions with NABL to improve the quality of the testing in the lab and to have all basic tests facilities available in the laboratory for giving accreditation to the lab for geotechnical testing. I congratulate the team lead by K. Muthukumaran, Convener for the same.

The Society's YouTube and Facebook accounts are constantly updated with all the most recent events and programmes. Congratulations to the team led by Dr. Anitha G. Pillaiand the headquarters teamfor the efforts put forward for the same. WhatsApp groups were created as an attempt to bring all IGS life members together and to communicate the activity carrying out by the National Executive Committee for the development of IGS to the members and to get their feedback to know about how together we can make it more productive. I am happy to notice the active interaction of the members in the groups.Under the leadership of Dr. N. Unnikrishnan, the vision for creating data bank of soil profile all over the country is debated. In recent years, with pervasive developments in computer hardware and software, application of ML and AI in soil mechanics and geotechnical engineering have gained particular pace, and with growing interest in their application, new hopes and horizons have emerged. Under the convenorship of Dr. Ravi S. Jakka, Software operations committee is progressing.

As part of the 75th year celebrations of the Society, it is requested to all the chapters to conduct at least two special activitiesin this year. The local IGS chapters have been very active in this quarter, conducting a wide range of activities on a variety of subjects, such as laboratory investigations, field investigations for infrastructure projects, non-destructive testing, geotechnical earthquake engineering, ground improvement, rock engineering, towards better practices in geotechnical engineering, landslides, geo-environmental, geothermal piles, and site visits. Experts from other nations were also present on several of these programmes. These programmes addressed crucial geotechnical engineering topics for the benefit of experts, academics, and students, were of the highest calibre and relevance. All the events have been well organized and well attended. I wish to specially thank the local chapters at Aurangabad, Bengaluru, Dhanbad, Mumbai, Kochi, Guntur, Trichy, Vellore, Indore, Jodhpur, Pune, Surat, and Thiruvananthapuram. I do hope that dormant chapters will take a cue from these chapters and serve the geotechnical profession.

9th Indian Young Geotechnical Engineering Conference (IYGEC) was held on 21st to 22nd March 2023 was conducted at MIT, Aurangabad successfully. 70 papers were presented in the conference from 20 different states. Congratulations to the organizers from IGS Aurangabad Chapter and Marathwada Institute of Technology, Aurangabad for the successful conduct of the conference. The Special Executive Committee (EC) meeting of the Indian Geotechnical Society was held at Pune on 11th February 2023 after the connect and celebrate program organized by IGS Pune Chapter as part of 75th year celebration of IGS. During the special EC, Logo of 75th year celebration of IGS designed by student's chapter of IIT Indore was released. Special thanks to Pune chapter for organizing the events and students' chapter of IIT Indore for the logo. The 234th Executive Committee (EC) meeting of the Indian Geotechnical Society was held at Marathwada Institute of Technology, Aurangabad on 22nd March 2023.

Finally, a word on IGC-2022, which was held in Kochi from 15th to 17th of December 2022. As the organising secretary of IGC 2022, I express my sincere thanks for all the support given by IGS fraternity for the successful conduct of the conference. We had 794 delegates and totally more than 1000 participants for the conference and the feedback from the participants is that the conference has set new bench marks. I am grateful to my mentor and guru Dr. Babu T. Jose and our pillar of strength Er. M.D. Nair for all the guidance and support given in the activities of IGS and also in my career. We were able to honour many of the Indian GeolegendS during the IGC 2022 at Kochi and are in the process of honouring those who were not able to make it to IGC 2022 at their places of residence.

I am very much excited to lead the society in this historical period and dream for taking IGS to greater heights. It reminds me of the quote of Dr. APJ Abdul Kalam, "A Dream is not that which you see while sleeping, it is something that does not let you sleep". With the new team we will try to make the dream a reality and I believe that 'Together We Can and We Will'.

Dr. Anil Joseph

GeoSutra 3

Ground is neither Homogeneous nor Semi-infinite!

Madhira R. Madhav*
AICTE-INAE Fellow, Professor Emeritus, and Visiting Professor,
IIT Hyderabad and JNTUH, India

Introduction

Ground and soil are two distinctly different entities or aspects. One should distinguish between 'Ground' as not a material but an entity that can be visualized with great difficulty and 'Soil' as a material that can be handled and tested. There appears to be a tendency to mix up the two different identities. As a practitioner, one has to deal with the ground on or in which some engineering activity is envisaged or with its constituents for different earth structures, such as an embankment, dam, pavement, etc.

One needs vision or insight that can come only with practice to visualize the interior of the ground, just as in medical practice where in 3D CAT Scan or NMR (Nuclear Magnetic Resonance) are used to visualize the insides of the human body. Ideally, one needs three dimensional colored X-ray or some new technology to be developed to view the interior of the ground. As no such facility is available as of now in geotechnical practice, one has to devise alternative methods or measures to achieve the same.

With no offense meant, the geotechnical practice appears to be akin to an example of examining an object (in this case, an elephant (refer to **Figure 1**)) from different locations or perspectives but not integrating all of them. Even though one gets SPT (standard penetration test)-N value, natural moisture content, and laboratory test results, no attempt appears to be made to visualize or appreciate the possible in situ behavior of the ground. Sadly in spite of Terzaghi, the founder, emphasizing the importance of 'Engineering Geology,' very few practitioners consider the same and apply principles across marine, alluvial or residual soils as if all of them have identical or similar responses.

Fig. 1: Elephant and blind men

Geotechnical investigations are adopted to help visualize the insides of the ground in terms of engineering aspects such as strength, deformability, permeability, etc. Commonly boring with sampling and conducting SPT is practiced in our country. In spite of stratification observed most often, it appears many practitioners still consider the ground to be homogeneous and semi-infinite, especially for predicting ultimate and safe/ allowable bearing capacity and calculating stresses with depth in case settlement is to be estimated. **Figure 2** shows the ground profiles across the country, illustrating clearly the complex stratification and non-homogeneity and the need to consider the ground not necessarily as homogeneous or of finite thickness. In this case, a silty clay layer is sandwiched between boulder deposits.

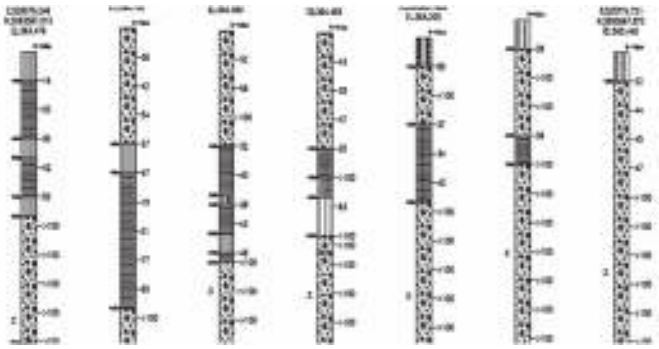

Fig. 2: The glacial deposit

Alluvial Ground

Note the material is homogeneous, but the strength and stiffness vary with depth. **Figure 3** shows the alluvial ground profile. In (a), stiff silty clay with an average SPT N of 35 underlies a medium stiff layer with N of 8, while in (b), the medium stiff silty layer with an average SPT N of 13 underlies a stiff desiccated layer with N of 32. These two profiles indicate a softer layer overlying a stiff layer and vice versa, i.e., a stiff layer overlying a softer layer.

Note the fine sand underlying silty sand in one location but not in the other. The soil is materially homogeneous with the same constituents but non-homogeneous with respect to strength and compressibility, as reflected in increasing SPT-N value, even though the water content is nearly the same over the whole depth. The stratum exhibits non-homogeneity because of increasing overburden stress.

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Email: madhavmr@gmail.com (Madhira R. Madhav).

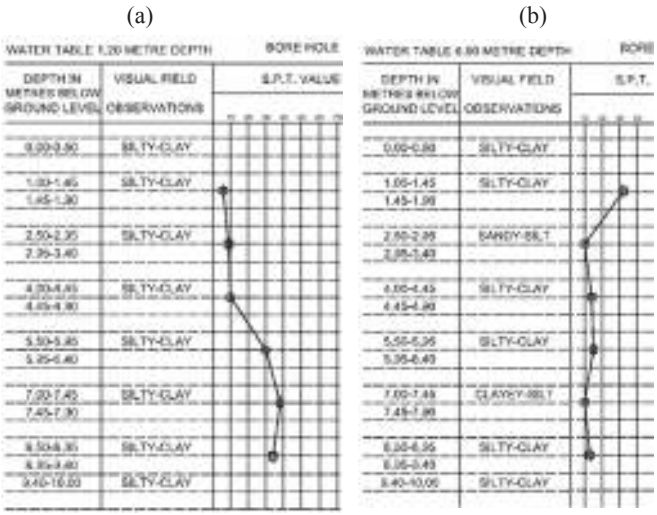

Fig. 3: Alluvial ground profile

Residual Soil

Figure 4 shows the typical residual soil profile. SPT N increases with depth, a form of non-homogeneity.

Typical residual soil clayey gravel with SPT-N value increasing almost linearly with depth (from about 15 at 1.5 m to refusal, i.e., more than 50 at 10.0 m), overlies laterite (rock). This profile is an example of a compressible layer of finite thickness.

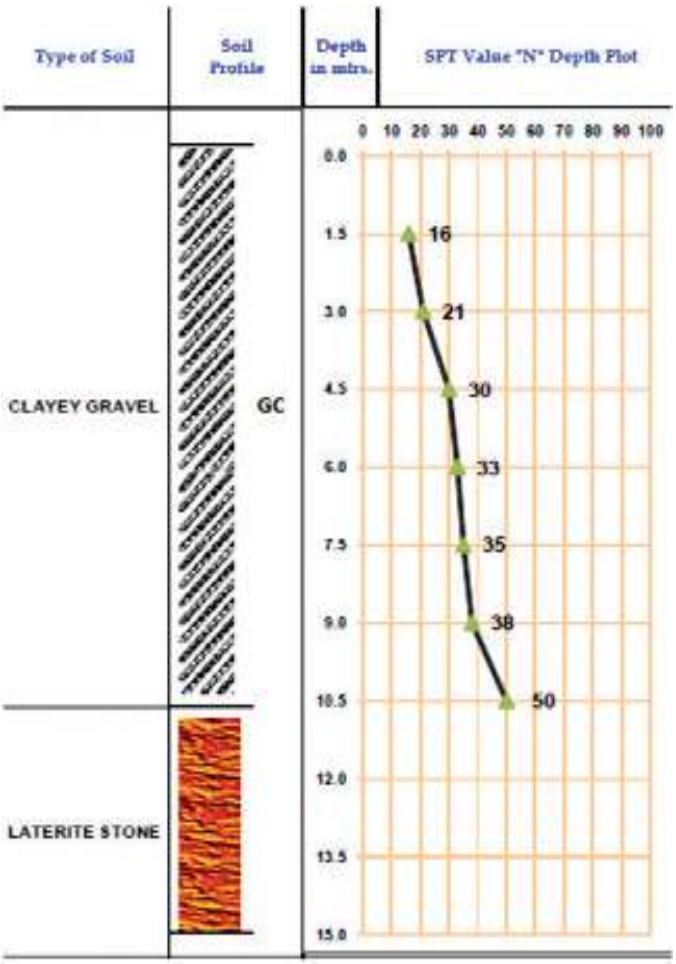

Fig. 4: Residual soil profile

Marine Soil

Figure 5 shows the marine soil profile. A desiccated layer or crust in the top 1.0 to 1.5 m overlies normally consolidated or lightly overconsolidated soil with undrained strength, c_u, increasing linearly with depth following Skempton's law, as

$$c_u/p' = 0.11 + 0.0037PI$$

where PI is the plasticity index of fine-grained soil and p' is the isotropic consolidation stress. This site has a hard or stiff stratum at a depth of about 11.0 m, whose presence would need to be considered in case of an embankment of large width.

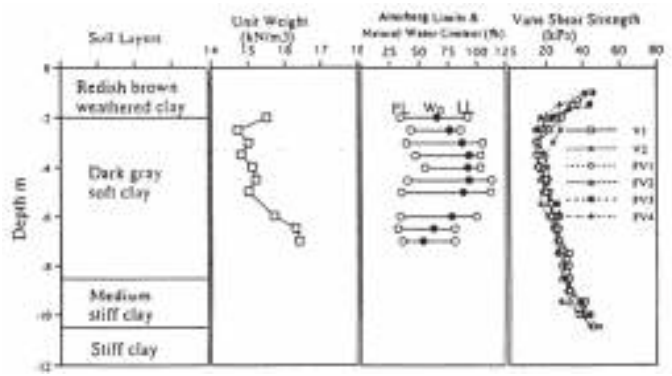

Fig. 5: Marine soil profile

The profile of marine clay indicates a desiccated layer (weathered crust) over materially homogeneous but non-homogeneous with respect to void ratio, strength, compressibility, permeability, OCR, etc.

Another marine clay with CPT results, as shown in **Figure 6**, indicates a desiccated layer of thickness of about 1.0 m over materially homogeneous clay with tip resistance, q_c, increasing from 0.1 MPa to 0.5 MPa over a depth of 10.0 m.

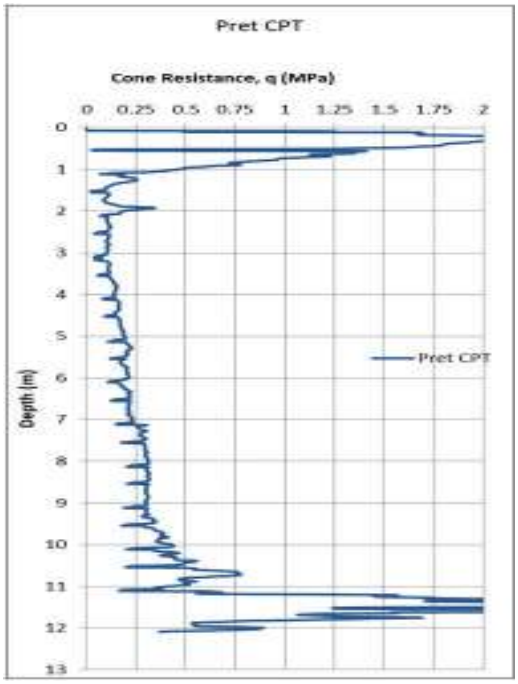

Fig. 6: Marine clay profile showing depth versus CPT

Complex Profiles

Figure 7 shows the soil profile with the typical complexity of the ground condition obtained from a West coast. **Figure 8** shows the geotechnical profile obtained from an East coast site. **Figure 9** shows the variation of SPT-N value with respect to depth and soil type. Very soft to soft, fine-grained soils are met with depth and are bounded by very stiff to strong layers of lateritic and cemented clay stone. The stiff and strong layer above the soft soil should be considered in design as it helps in redistributing the foundation stresses to relatively smaller values and facilitate designing shallow foundations.

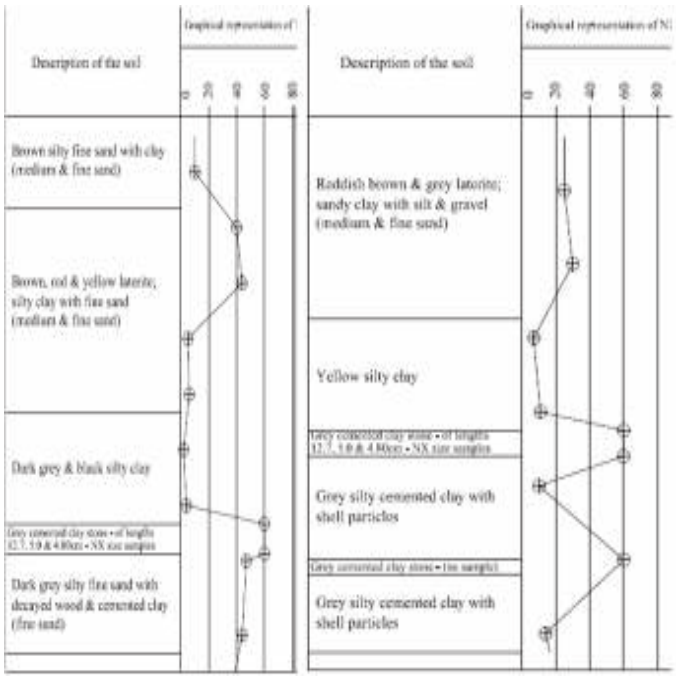

Fig. 7: Complex soil profile from the West Coast site

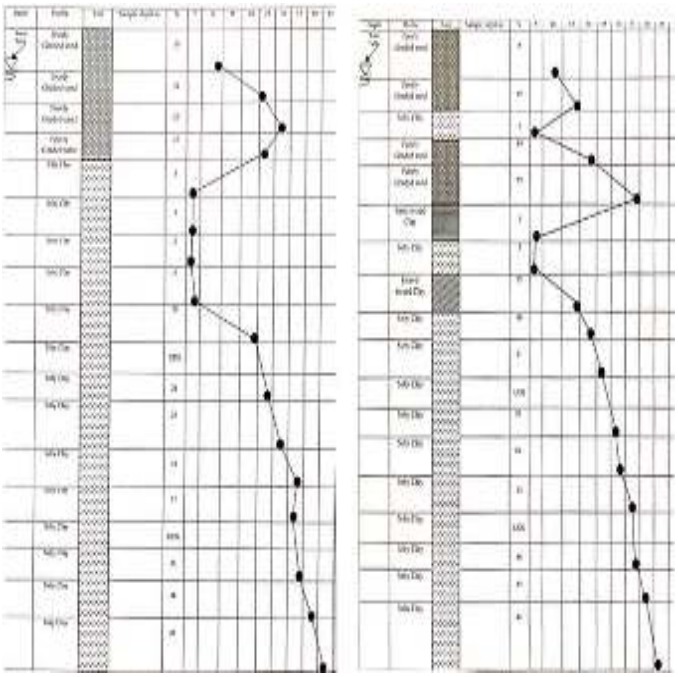

Fig. 8: Geotehnical Profiles from a site on the East Coast

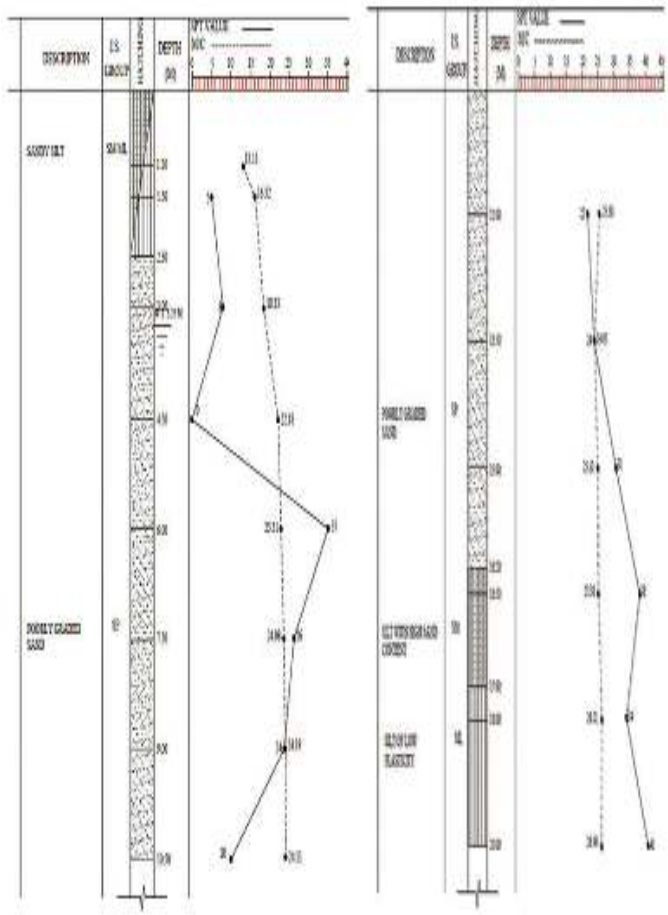

Fig. 9: The variation of SPT-N value with respect to depth and soil type

Non-homogeneity can be of two kinds, viz.,

1. *Material non-homogeneity* in which case two different materials/soils such as silty clay and dense sand, silty sand and soft clay, etc. and
2. *Stress-induced non-homogeneity* in which case the material is the same, e.g., soft soil or sand with nearly the same constituents and physical properties such as grain size and/or consistency limits, etc., at all depths but the engineering properties such as strength, deformability, permeability, etc. vary with depth.

Figure 10 schematic shows the possible broad classification of homogeneous (HM) and non-homogenous (NH) ground conditions:

1. Homogeneous (HM) and semi-infinite (Fig. 10a)– very rare except if the footing sizes are relatively small. IS Code considers the same most often.
2. Homogenous and of finite thickness (Fig. 10b);
3. Non-homogeneous (NH) and of finite thickness (Fig. 10c);
4. Layered and homogeneous: (i) Two (Fig. 10d), (ii) Three (Fig. 10e), or (iii) Multi-layered
5. Layered and non-homogeneous: (i) Two (Fig. 10f), (ii) Three (Fig. 10g), or (iii) Multi-layered

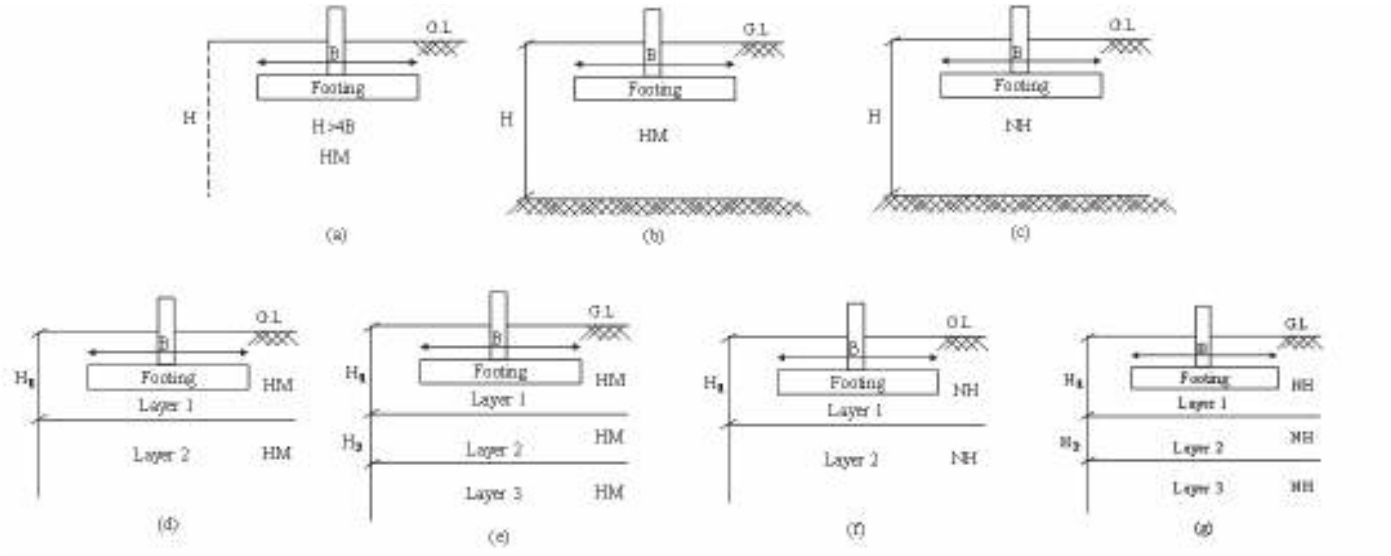

Fig. 10: Different ground condition scenarios

The Moral

Ground should be modelled and analyzed as one of the above alternatives and the solutions available applied rather than following a simplistic, trivial, and very conservative (often) as in Case 1.

Acknowledgement

The help of Dr. Baadiga Ramu of IIT, Patna, in formatting this note is gratefully acknowledged.

MEMBERS' NEWS

Sarathy Geotech and Engineering Services (AM-0039) were the winners of SME Empowering India 2023 - Jury award in the category 'Engineering, Procurement, Construction' felicitated by Shri. Bhanu Pratap Singh Verma, Hon'ble Minister of State, Ministry of Small and Medium Enterprises, Govt. of India at New Delhi. The award was received by Dr. C R Parthasarathy, Dr. Malavika Varma and Ashitha C.

Mr. Nandhagopal A.R. (LM-5230), Sarathy Geotech and Engineering Services Pvt. Ltd, Certified as "Advanced" in the recent Dynamic Measurement and Analysis Proficiency Test by PDA and PDCA.

ISSMGE BULLETIN

Vol 17, Issue 1, February 2023

Table of Contents

SUMMARY OF Ph.D THESES

Title of Thesis:

Name of the Student: Dr. Shivanshi

Supervisor: Dr. Md. Parwez Akhtar and Dr. Arvind Kumar Jha

Department & Institute: Department of Civil Engineering, School of Civil and Chemical Engineering, Manipal University Jaipur, Jaipur, Rajasthan

SUMMARY: Lime treatment of expansive clayey soil subjected to sulphate attack has been ambiguously announced to cause heaves or swell. Sulphate contamination can occur through in-situ existence of sulphate or through industrial refuse, soil pollution, groundwater contamination, accidental chemical spillage, acid mine drainage etc. The presence of high sulphatic concentration in black cotton expansive soils upon lime treatment may have alarming factors for the construction practices. Present research investigated the engineering behaviour of untreated and lime treated soil in presence of sulphate contamination by different sulphatic compounds. Additionally, field conditions have also been studied experimentally to comprehend the influence of sulphates.

Title of Thesis: **Geotechnical Characterization of Soils blended with Fly Ash**

Name of the Student: Dr. Sagar Dattatray Turkane

Supervisor: Dr. Sandeep Kumar Chouksey

Department & Institute: Department of Civil Engineering, NIT Raipur, Chhattisgarh

SUMMARY: The fly ash an industrial by-product is utilized in geotechnical construction work as road and embankment material. The geotechnical characterizations of moorum mixed with fly ash were utilized to optimize the fly ash content needed for partial replacement, and practical application has been demonstrated in terms of numerical modeling to determine the stability of the slope of the moorum-fly ash embankment. A multilinear regression equation was developed for prediction of the factor of safety. Further, a road subbase and subgrade material were investigated by locally available soil and fly ash-based geopolymer and their optimization was determined to achieve the maximum strength performance. Based on the findings of the study, the application of stabilized expansive soil in comparison with conventional materials, the flexible pavement design gives a significant reduction in pavement thickness and overall cost of pavement construction.

Title of Thesis: **Lunar In-Situ Resource Utilization for Evaluating Design Criteria of Lunar Structures Including Moonquake Effect**

Name of Student: Dr. Prabu T.

Supervisor: Prof. K. Muthukkumaran

Department& Institute: Department of Civil Engineering, National Institute of Technology, Tiruchirappalli

SUMMARY: The present study explains the possible use of lunar in-situ resources for evaluating the design criteria of lunar structures for futuristic lunar habitation on the lunar surface. A newly developed lunar highland soil simulant (LSS-ISAC-1) was used for this study. The geotechnical and geomechanical properties of the LSS-ISAC-1 were determined and compared with the existing lunar highland soil simulants and the actual lunar soil to examine the fidelity of the LSS-ISAC-1. The dynamic properties and the bearing capacity of the LSS-ISAC-1 were also assessed to give input for the design of lunar foundation systems for the lunar structures. The influence of lunar gravity on the bearing capacity and slope stability of the LSS-ISAC-1 was also assessed and compared with past studies. Sulphur was used as a binder with LSS-ISAC-1 to develop a lunar sulphur mortar and blocks which were developed and tested to evaluate the strength properties. A model lunar pile was made using the sulphur mortar and tested against the uplift force and suggested that the lunar pile foundation could be a suitable foundation system for the proposed lunar structures.

Title of Thesis: **Landslide Microzonation in Himalayan Region Using Geospatial Tools**

Name of Student: Dr. Sandeep Panchal

Supervisor: Prof (Dr) Amit Kr Srivastava

Department & Institute: Department of Civil Engineering, Delhi Technological University, Delhi

SUMMARY: Landslide microzonation maps and susceptibility maps play an important role in planning and managing landslide hazards. A comparative study of qualitative, semi-qualitative, and quantitative techniques is performed for analyzing the most suitable technique for the

microzonation of landslide susceptibility in Shimla district, Himachal Pradesh (H.P.). The expert-based technique is improved and a new hybrid technique named Shannon's Entropy-AHP method is proposed. The hybrid technique is compared with the frequency ratio (FR), Shannon's Entropy (SE), and Analytic Hierarchy Process (AHP), and the accuracy of the expert-based technique is improved significantly. The results of the study can be used by the construction planners and risk managers.

Title of Thesis: **Behaviour of Loosely Skirted Shallow Foundation resting on Reinforced Sand**

Name of Student: Dr. B.Kirtimayee

Supervisor: Prof. Narendra Kumar Samadhiya

Department& Institute: Department of Civil Engineering, IIT Roorkee, Roorkee

SUMMARY: The primary aim of the present study was to investigate the influence of a series of variable parameters on the performance of skirted foundation. Biaxial geogrid with high strength, stiffness and rigidity has been tried as skirt and horizontal reinforcement. The effect of various parameters such as depth and top surface dimension of skirts, spacing, length and number of horizontal reinforcements on the bearing capacity and settlement of skirted foundation have been thoroughly analyzed under vertical, inclined and eccentric loading. The laboratory model tests have been conducted on surface footing, footing with skirt, footing with reinforcements, footing with skirt and reinforcements configuration. The results have been compared with numerical analyses results carried out using finite element software Plaxis 3D.

Title of Thesis: **Model Deep Soil Mixing Studies on Expansive soil and Loose sand using Fly ash Geopolymer Binder**

Name of Student: Dr. Mypati Vamsi Navya Krishna

Supervisor: Prof. Sireesh Saride

Department & Institute: Department of Civil Engineering, Indian Institute of Technology Hyderabad

SUMMARY: This study investigates the feasibility of using fly ash geopolymer as a binder for deep soil mixing (DSM) method. The research includes bench-scale, model-scale, and large-scale experiments to determine the optimal binder proportion for expansive soil and loose sand. A DSM rig was designed and used to install scaled columns, and their behavior was studied in terms of swelling, shrinkage, strength, and durability. Three different geometric patterns were tested using two approaches, and large-scale model studies provided insights on bearing pressure-settlement profiles. The study developed a DSM design protocol for fly ash geopolymer in expansive soil and loose sand.

Title of Thesis: **Modeling of Tunnel Behavior under Static Load**

Name of Student: Dr. Parvesh Kumar

Supervisor: Prof. (Dr.) Amit Kumar Srivastava

Department& Institute: Department of Civil Engineering, Delhi Technological University, Delhi, India

SUMMARY: The constant growth of cities has led to a shortage of land in metro areas and as a result - numerous transportation issues must be addressed. This research aims to determine the deformation behaviour of single and twin tunnels under static loading conditions. The present study is divided into two parts. Firstly, laboratory experiments are carried out on small-scale physical simulated tunnels models. Secondly, numerical simulation of physical simulated tunnel models were carried out to determine the deformation that occurs at various points in the tunnel model. The results obtained from the experimental and numerical study are compared and validated. It can be concluded that the testing methodology which is proposed in this study can be used for the safe and economical design of both single and twin tunnels subjected to static loading conditions.

Title of Thesis: **Behavioural Studies on Cohesive Soil Amended with Granite Sand and Calcium Lignosulphonate**

Name of Student: Dr. Gudla Amulya

Supervisor: Dr. Arif Ali Baig Moghal

Department& Institute: Department of Civil Engineering, National Institute of Technology Warangal (NITW), Waranga, Telangana.

SUMMARY: This work concentrated on the sustainable blending of Granite Sand (GS) along with Calcium Lignosulphonate (CLS) at varying dosages in enhancing the geotechnical properties of an intermediate compressible clay. The performance indicators chosen were unconfined compressive strength, hydraulic conductivity, and California bearing ratio behaviour. The interaction mechanism between soil and GS blended with CLS was established by relying on micro-level studies. The carbon footprint analysis carried out for a 3.75m wide and 2 km long stretch low-volume road with 30% GS and 0.5% CLS addition to clay as a subgrade layer, revealed that there are significant savings in terms of carbon emission factors when the subgrade layer is prepared using lime (6%) and cement (4%) at their respective optimum dosages.

IGS Dhanbad Chapter

On January 24, 2023, IIT(ISM) hosted the official opening of the Dhanbad chapter of the Indian Geotechnical Society. The IGS Dhanbad Chapter's office bearers are as follows: Prof. S. K. Das is the Chairman; Prof. A.K. Choudhary serves as Vice Chairman; Dr. Sowmiya Chawla serves as Secretary and Dr. V.N. Khatri is the Treasurer.

Dhanbad Chapter was incorporated to Indian Geotechnical Society as its 49th local chapter by Prof. Rajiv Shekhar, Director, IIT(ISM). The ceremony was attended by Prof. Sarat Kumar Das, HOD, Civil engineering Dept, IIT(ISM); Dr. Anil Joseph, President, IGS; Dr. A.P. Singh, Secretary, IGS; Prof. Subhamoy Bhattacharya, University of Surrey and Prof. Claudio Cameselle, University of Vigo, Spain. Dr. Anil Joseph presented the certificate of inauguration of the IGS Dhanbad chapter to Prof. Sarat Kumar Das.

The inaugural ceremony was followed by technical lectures from academic and industry experts. Prof. Subhamoy Bhattacharya delivered the lecture on 'Geotechnics for development of sustainable energy: Opportunities and Challenges', where he discussed in detail the challenges and immense prospects of offshore wind farms and how they can effectively cater to the demanding energy sector.

The second lecture was by Dr. Anil Joseph on the 'Engineering challenges behind the demolition of the Supertech Twin Towers at Noida, Delhi'. Being a leading expert in demolition engineering, Dr. Joseph delivered an interesting and informative lecture emphasizing the need for precision in the planning and execution of controlled implosion, such as the one nation witnessed at Noida. An insight into the practical challenges of demolition engineering was much appreciated by the audience since it is an emerging area of specialization in Civil engineering.

IGS Guntur Chapter

The IGS Guntur Chapter conducted a Webinar under the IGS Student Chapter of Chalapathi Institute of Technology, Guntur, A.P. on 25.02.2023. Ms. Ema M.R. Founder & Principal Trainer, Ema's BIM_Academy, Chennai, Trainer for Corporates, Faculty and Students of Architecture, Civil, Mechanical & Construction on BIM (Building Information Modeling) & AECO Industry software, delivered a webinar on 'Building information Modeling & Scope in construction industry'. She also enlightened the participants regarding opportunities for civil engineers, if they are familiar with BIM. Dr. Anil Joseph, President IGS also enlightened about BIM for civil engineers during the inaugural address. Dr. K. Naga Sreenivasa Rao & Prof. Sanjay Verma, NEC Members also participated in the webinar.

The Student Chapter, Indian Geotechnical Society Guntur Chapter in association with student chapter, Dept. of Civil Engineering, Velagapudi Rama Krishna Siddhartha Engineering college, Vijayawada, Andhra Pradesh in association with ISET (Indian Society for Earthquake Technology) Guntur chapter organized Two-Day on-line workshop on "Sustainable construction for Disaster Mitigation" on 23rd and 24th March, 2023 in virtual mode. The technical session was hosted by Dr V V N Prabhakara Rao, Professor, Department of Civil Engineering, VRSEC - Coordinator of the workshop along with Dr. B. Kesava Rao, Assistant Professor, Department of Civil Engineering, Secretary, ISET Guntur Chapter, and the Co-Coordinator of the

Seminar Dr. Chava Srinivas, Professor and HOD-Civil Engineering, VRSE. During the inauguration, Mr. Swapnil Dinakar Pundkar, IAS, Commissioner, Vijayawada Municipal Corporation (VMC) explained the necessity of Disaster oriented up by curriculum, motivate students on society-related careers and strategies to achieve the same including tips for interview.

1st day, Dr. Sreevalsa Kolathayar, Assistant Professor, National Institute of Technology Karnataka delivered a lecture on 'Tips for Earthquake Susceptible Construction'. He explained the significant role of 17 Sustainability goals especially Goals 6, 9, 13, 17 as well as their relevance to Civil Infrastructure in general and reiterated how they are essential for geotechnical engineers in particular. He further explained how earthquakes result in disasters and approaches to evolve construction techniques to sustain the vulnerabilities arising out of such events.

2nd day, Dr. G. L. Sivakumar Babu Professor, Department of Civil Engineering, Indian Institute of Science Bangalore started the second session with the importance of sustainability goals and solid waste practices in India, kinds of hidden disasters, efficient methods of Solid waste disposal, merits of using abandoned quarry cites as sites for landfills, efficacy of bioreactor landfill as a sustainable option, life cycle assessment and methodological structure applied to Sustainability analysis. He discussed "Do's and Don'ts" for budding engineers.

IGS Indore Chapter

Expert Lecture was delivered by Dr. Ashish Verma, Professor, Transportation System Engineering, Convener, IISc Sustainable Transportation Lab, Department of Civil Engineering, IISc Bangalore on "Understanding Linkages between Sustainable Transport and Quality of life" for Physical, Mental, Social, Economical well being on 24 Feb 2023.

An expert lecture was delivered by Er. Shrinivas Kutumbale, Chairman and Managing Director Kutumbale Consultants and Engineers Pvt. Ltd. (KCEPL), on "Healthy Concrete" on 2 March, 2023.

An expert lecture was delivered by Shri Govind Parchani, Outstanding Scientist and Head C&SD and Chief Engineer, RRCAT, on "Seismic Design of RCC Building - Basic Principles and Codal Provision" on 20 March 2023.

An expert lecture was delivered by Col (Retd.) Sudhir Tamany, on "Role and Responsibilities of Engineers in Indian Armed Forces" on 31 March, 2023. This lecture includes the true stories of contribution and great courage of Indian Engineer Sappers during India-Pakistan war of 1971.

Site/Field Visit was organized on 25 February, 2023 for UG and PG students. The Project was Design and Construction of flyover including allied works at Khajrana square along Ring Road Indore M.P. A plate load test was carried out for determining bearing capacity of soil and settlement of soil under a given condition of loading for the open footing of flyover.

Under the aegis of the IGS PIEMR student chapter Indore, an expert lecture was organized by Dr. Krishna R. Reddy, University Scholar, Distinguished Researcher & Professor of Civil & Environmental Engineering, University of Illinois at Chicago USA on 29 March 2023. The topic was titled "Sustainable and Resilient Civil Infrastructure".

It was great knowing the nuances of Sustainability and Resiliency from Dr. Krishna R Reddy, who highlighted the idea that SDGs should be considered for constructing a structure and briefed us about 64 sustainability and resilience indicators. In addition to this, he also made us aware of the resiliency analysis and design. The session was highly interactive and received an overwhelming response from the students. Organizers thanked Prof. Neelima Satyam from IIT Indore.

IGS Jabalpur Chapter

In this first quarter of the year, the 2023 Jabalpur chapter conducted field-oriented activities for the student's chapter. The IGS TIET student's chapter conducted three site visits in the months of January, February, and March 2023 for the students. In January the students visited the construction site of a pylon near Madan Mahal Railway station in Jabalpur where construction work of the cable stayed bridge is in progress for the longest elevated corridor in the state Madhya Pradesh. The second visit was conducted near Bhedaghat at the construction site of submersible level bridges across the Narmada River on Bhedaghat - Gwari Road at Saraswatighat. The students learned the construction of Pile, Pile Cap, Pier Shaft, Pier Cap, Holding Bracket and Abutment, etc. The students saw the use of heavy machinery in construction work. Students also visited the site laboratory and performed tests of soil and concrete. On another visit chapter's students visited the existing bridge at Tilwara Ghat over the river Narmada and a unique aqueduct under the bridge. Dr. Sanjay Verma and college professors coordinated these visits.

Students Visit at under construction Saraswati Ghat Bridge

Dr. Dasaka S. Murthy, Professor IIT Mumbai and IGS National Executive Committee member visited Takshshila Institute of Engineering and Technology Jabalpur on 6th February 2023 and interacted with the students of TIET student's chapter and guided them for internship and advanced study. Dr. Murthy also visited Engg. Geology and Geotechnical Engineering Lab of the Civil Engineering department and saw the innovative works done by the students and appreciated them. Under one more activity Er. Sanjiv Verma, Chairman of IGS Jabalpur Chapter delivered a lecture to the students of GGITS Jabalpur Student's Chapters on 'Challenges in Construction Industry and Disaster Management'. About 40 students attended the lecture, and participation certificates were given to the participants.

IGS Kochi Chapter

IGS Kochi Chapter associated with The Civil Engineering Department of Albertian Institute of Science and Technology (AISAT) Kochi along with GRACE Kochi and BIMLABS Kochi in conducting a 5 day Faculty Development Program on "Building Information Modelling Tools For Digital Transformation In Construction" from 6th – 10th March 2023 at AISAT,

Inaugural Function

Kochi. The program was inaugurated by Shri Loknath Behera IPS, Retd. DGP of Kerala and Mg. Director of Kochi Metro Rail Limited and Dr. Anil Joseph, President of Indian Geotechnical Society was the Guest of Honour. Rev. Fr. Antony Vacko Arackal, Manager AISAT has given the presidential address. Dr. Benny Mathews Abraham,

Chairman IGS Kochi Chapter, Er. A V S Chakravarti, Hon. Secretary and Er. Abhilash Joy, Exe. Committee member of IGS Kochi Chapter and President of Grace has attended the inaugural function in addition to other dignitaries. Dr. Veena V, Exe. Committee Member of IGS Kochi Chapter & Faculty of AISAT was the program coordinator.

During the 5 day program, expert talks were delivered by Dr. Jeevan, Retd. Professor of MA College of Engg., Kothamangalam on "An Overview on BIM and Concepts of BIM", Dr. Amarnath CB, President India BIM Association on "Need for digitalisation in construction". Eminent speakers Dr. V. Senthil Kumar, Er. Shiju Sasidharan and Er. S Suresh lectured on "Adoption of BIM" and some case studies, "Employability in Digital Construction" and "The Art of Debugging" respectively. Hands-on Training was given to the participants on the Architectural Modelling using Revit Architecture on the 4th day. Also, Er. Rezi Zachariah, Treasurer IGS Kochi Chapter has explained the aspects of Integrated Project Delivery in Construction to the participants. On the 5th day, hands-on training to the participants was given on Project Management using Primavera and Simulations using Navisworks. The program came to a close with a valedictory program in the 2nd half of the fifth day.

Exchange of signed MOU between IGS Kochi Chapter and AISAT

A Memorandum of Understanding is signed on the 6th day of March 2023 between Kochi Chapter of Indian Geotechnical Society represented by Hon. Secretary of the Chapter Er. A. V. S. Chakravarti and on the other side Albertian Institute of Science and Technology, an Engineering College under the Patronage of Archbishop of Verapoly (AISAT) represented by Rev. Fr. Antony Vacko Arackal, Manager AISAT, as partners for promoting the professional/academic excellence and fulfill the social commitment of Albertian Institute of Science and Technology. Both the partners of the MOU decided to work towards the upliftment of education in civil engineering through seminars, workshops and technical conferences in the state of Kerala in general and central Kerala in particular.

IGS Mumbai Chapter

IGS Mumbai Chapter inaugurated its first students' chapter at Shree L.R. Tiwari College of Engineering, Mumbai on March 10, 2023. Dr. Deven Shah, Principal and Dr. Ajit Patil, Head of Civil Engineering department welcomed the IGS delegates and briefed about the college, its infrastructure and facilities. Over 120 students and faculty of the department attended the half day event. Prof. Dasaka Murty and Prof. Ashish Juneja delivered interesting and motivative speeches. The audience were made aware of the benefits of having and maintaining the students' chapter. This chapter would help develop leadership and public relationship skills, create internship and job opportunities and improve chances of admission to masters' program. Mr Gaurav Parab interacted with the students and faculty. And Mr. Sridhar Valluri of Keller Ground Engineering, delivered an educative seminar on Geotechnical Engineers' and Civil Engineers' contribution to the society.

A seminar on Geotechnical Challenges on the Margins of Land and Sea was held at Civil Engineering Department, IIT Bombay on March 18, 2023. The presentation was delivered by Mr. Sajith Sreedharan of Eka Infra Consultants Pvt Ltd. He shared his experience on Major Ports of many important developers and the geotechnical challenge including dredging, breakwaters, berth/storage yard and climate adaptation at each site. His talk focused on the quality of data and its impact on cost and timeline of projects.

IGS Mumbai Chapter conducted elections and formed a new executive committee on March 18, 2023. This was done by an Election Officer, who had rigorously followed the election procedure for over a month. The members thanked the outgoing EC members and welcomed the new EC members. The Chairman of the new committee is Prof. Dasaka S Murty and Hon' Secretary is Mr. Sandip Deshpande.

IGS Pune Chapter

Indian Geotechnical Society, Pune Chapter was given the honour and responsibility of hosting a special National Executive Committee (NEC) meeting by the newly elected NEC under the leadership of ever-encouraging IGS President Dr Anil Joseph. Pune chapter graciously accepted this and organised a half-day event at COEP Technological University, Pune on 11th February 2023. Dr. Mukul Sutaone, Vice Chancellor COEP was the Chief Guest and Dr. Hemant Dhumal, Chief Engineer WRD, Maharashtra was the Guest of Honour. The event saw participation of more than 250 students from various engineering colleges in Pune. Two lectures were delivered, first session was delivered by Dr Anil Joseph on 'Challenges behind demolition of high-rise structures' followed by a session delivered by Er. Naval Kishor Ray from Garware Technical Fibres Ltd on the topic 'Aquarock Bag for Scour Protection and erosion control'. The morning event was followed by a sumptuous lunch post which the special National Executive Committee was held. It was a memorable event for Pune Chapter that provided a wonderful opportunity to 'Connect and Celebrate' the commencement of 75 Years Celebration of IGS.

An opening ceremony of 21st IGS student chapter was held on 15th February 2023 in seminar hall of Vishwakarma Institute of Information Technology, Pune. This step towards IGS student chapter was encouraged and supported by Director, Dr V S Deshpande, VIIT, Pune. The Chief Guest for the function was Er. Vikas Thakar, Director- Pavetech Consultants and Expert speaker Dr. Sariput M Navghare, Treasurer, shared the dais along with Director, Dr V S Deshpande, VIIT Pune, Er Vikas Patil, Chairman, Prof Suman Jain, Hon. Secretary, Dr Shrikant Shinde, HOD Civil VIIT Pune, Prof R S Apte, faculty coordinator VIIT Pune.

Inauguration of 22nd Chapter at PCCOE&R

On February 17, 2023, the Civil Department of PCCOE&R hosted the Inauguration Ceremony of the 22nd IGS Student Chapter. Chief guest Mr. Anil Dhobale, Session expert Dr. M. S. Hanumanthappa, Er. Vikas Patil, Er. Ramesh Kulkarni, Dr. Krishnaiah, Mrs. Suman Jain, Mrs. Annapoorni Iyer, Dr. Sariput M Navghare, Prof. Banne from IGS PC attended the ceremony. Mr. Rahul Patil, Coordinator of the IGS Student Chapter at PCCOE&R, gave a brief overview of IGS and its goals. Er. Vikas Patil, Chairman IGS PC, provided an update on the various activities organised by the IGS Pune Chapter. The ceremony was attended by 115 students. Dr. M.S. Hanumanthappa gave a knowledgeable talk to the faculty members and students.

IGS Pune Chapter in association with JSPM's RSCOE, Pune organised their signature event GEOFEST 2023 on 22nd and 23rd Feb 2023. This was a national event and it saw more than 250 numbers of participants from colleges in and around Pune and NIT Trichy. The event was inaugurated on 22nd Feb by Chief Guest Dr. Vinay Chavan and Guest of honour Dr. Jundhare in the presence of IGS Pune Chapter Executive Committee members. The event concluded on 23rd February with a very exciting session by Dr. Manoj Verman who enthralled the audience and students with his excellent oratory skills and experience sharing. This was followed by the valedictory function.

Department of Civil Engineering, AISSMS COE Pune, IGS Pune Chapter, IEI and IWA Student Chapter organized National Level Workshop, "Implementation of National Educational Policy 2020: Alumni Connect" from 23rd - 24th Feb. 2023. This program was sponsored by Savitribai Phule Pune University (SPPU) under QIP Scheme. `

Er. Vikas Patil, Chairman, IGS Pune Chapter started with history of Indian Geotechnical Society in India during the inauguration of IGS student Chapter at APCOER. He also emphasized on the future opportunities for students in the field of Geotechnical Engineering. Dr. Sunil Thakare, Principal and HOD Dr. Abhay Shelar welcomed all dignitaries. Er. Omkar Shendure started his session with MPSC career guidance and opportunities in various government departments.

Department of Civil Engineering of TSSM's Bhivarabai Sawant College of Engineering & Research, Narhe, Pune, in association with Indian Geotechnical Society, Pune chapter conducted webinar on "Emerging trends, Opportunities & Challenges: Metro System" on 24th March 2023. Resource

Inauguration event of GEOFEST on 22 Feb 2023

person was Er. Shailesh Tiwari, Senior Section Engineer, Maha Mumbai Metro Operation Corporation Limited.

Webinar on Applications of GIS and Remote Sensing was held on 25th March at APCOER. Er. Vikas Patil welcomed Dr. Dhawale and shared his views on this occasion. Expert lecture started with the brief introduction of Expert Dr. Arun W. Dhawale given by Prof. N. S. Deshmukh. Dr. Dhawale started his session by emphasizing on components of remote sensing system, applications, websites, remote sensing data classification and interpretation.

IGS PC Team with Dignitaries and APCOER team during Inauguration

IGS Surat Chapter

Indian Geotechnical Society Surat Chapter in association with Department of Civil Engineering, SVNIT, Surat and CSIR- Central Road Research Institute (CRRI), New Delhi organised One Day National Seminar on Geotechnics for Transportation Infrastructure on 25th March 2023 at SVNIT Surat. Seven Speakers namely Dr. Anil Joseph, President IGS, Dr. Kanwar Singh, Senior Principal Scientist, CSIR-CRRI, Dr. Amit Prashant, Dean, Research and Development & Professor, IIT Gandhinagar, Dr. Satyajit Patel, Associate Professor, SVNIT Surat, Dr. P. S. Prasad, Senior Principal Scientist, CSIR-CRRI, Er. Amit Solanki, Assistant Professor, SVNIT Surat and Er. Minimol Korulla, Head - Strategic Initiatives & Projects - ISEAP at Maccaferri delivered expert talks on the theme of the seminar. The seminar was made successful with 153 registrations from all over India. The seminar was successfully coordinated by Dr. C. H. Solanki and Er. Hitesh Desai.

IGS Trichy Chapter

IGS Trichy Chapter in association with Department of Civil Engineering, M.I.E.T. Engineering College conducted One-day workshop on "The importance of Geotechnical Engineering" and inaugurated the Indian Geotechnical Society (IGS) student chapter (8th Student Chapter by IGS Trichy) on 17th February 2023. The workshop aimed to emphasize the importance of Geotechnical Engineering and its applications in various streams of Civil Engineering. Dr. K. Muthukkumaran, Professor, Department of Civil Engineering, National Institute of Technology, Trichy (NITT) and Chairman, IGS Trichy Chapter was the Chief Guest. Dr. A. Naveen Sait, Principal and Dr. P. Shahul Hameed, Research Advisor offered felicitation. Followed by the inaugural ceremony, Prof. Muthukkumaran delivered a lecture on the topic "Piles on soft clay – Theory and Practices". In the afternoon session, Mr. Shanmugasundaram Raju, of JSW Cements Limited delivered a lecture on the topic "The use of Ground Granulated Blast-furnace Slag (GGBS) for Green and Sustainable Concrete".

IGS Institutional Membership Charter given to Dr. A. Naveen Sait Principal, M.I.E.T. Engineering College

IGS Trichy chapter in association with Department of Civil Engineering, NIT Trichy organized a guest lecture on 23rd February 2023 by Prof. B. Umashankar, IIT Hyderabad. Prof. Umashankar delivered a lecture on "Experiences from design and construction of barrage structures". He highlighted how theories are being used in the field with field specific problems.

Guest lecture delivered by Prof. B. Umashankar, IIT Hyderabad

The Department of Civil Engineering of CARE College of Engineering, Trichy organized the inaugural of the IGS Student Chapter on 11th March 2023. Dr. S. Shanthi, Principal of the college presided over the function and the office bearers of the student chapter were introduced. The chief guest for the event was the Chairman of IGS Trichy Chapter, Dr. K. Muthukkumaran, Professor - NIT Trichy. Dr. K. Muthukkumaran, delivered a lecture on the role of Geotechnics in Infrastructure Development. He highlighted the importance of geotechnical engineering in the design and construction of civil engineering structures.

IGS Institutional Membership Charter given to Dr. S. Shanthi, Principal, CARE College of Engineering

IGS Vellore Chapter

Indian Geotechnical Society in association with Vellore Institute of Technology (VIT) Vellore organized one-day field trip to underground metro rail construction at Chennai on 18.02.2023. The underground construction was carried out by Chennai Metro Rail Limited (CMRL). The field trip was organized to provide practical exposure to the student on the geotechnical challenges and the advanced construction techniques adopted in the underground metro rail construction. The visit was concluded by offering thanks to the General Manager Mr. R. Ranganathan and the resident engineer Mr. Vadivel for providing permission to visit the site. The faculty members Dr. M. Muthukumar and Dr. Omsuganya accompanied the students for the visit. The students gave positive feedbacks about the visit.

An expert lecture titled "Natural Geosynthetics for Geotechnical Engineering Applications" was organized on 20.03.2023. The lecture was delivered by Shri Pradip Kumar Choudhury, Consultant and Former Principal Scientist, National Jute Board, Ministry of Textiles, Government of India. Shri Pradeep Kumar Choudhury explained the general applications of Jute fibres in Civil Engineering, detailing applications of jute in the strengthening and maintenance of low-volume roads. He briefed about the physical and mechanical properties of jute fibres and also the various types of jute textiles available.

A Brief Report of

Geotechnical Earthquake Engineering Webinars

The Dept. of Earthquake Engineering, IIT Roorkee, and the Indian Society of Earthquake Technology (ISET) has organized the webinars under Shamsher Prakash Chair, IIT Roorkee from December 2021 to December 2022. These webinars are also supported by the Indian Geotechnical Society (IGS) Roorkee Chapter, CSIR - Central Building Research Institute (CBRI), Roorkee, and TC203 of ISSMGE.

This webinar series was in Honour of **Dr. Shamsher Prakash**, Professor Emeritus, Missouri Science and Technology for his contributions to Geotechnical Earthquake Engineering. Prof. Prakash is an international expert in soil dynamics and earthquake engineering. He has published three books in India and four books in the USA as well as over three hundred technical papers.

Prof. Kenji Ishihara, Chuo University, Japan has inaugurated the GEE webinars on December 8, 2021. He has been affiliated with the University of Tokyo since 1977, taking the post of professorship in geotechnical engineering. In 1995 he took up the post of Professor of Geotechnical Engineering at the Tokyo University of Science and then at Chuo University.

1st GEE Inaugural Webinar lecture has been delivered by **Prof. Misko Cubrinovski**, University of Canterbury, New Zealand, and Chair of TC203 of ISSMGE entitled **"Mechanics-based Evaluation of Soil Liquefaction"** on December 8, 2021.

2nd GEE Webinar lecture has been delivered by **Prof. Ikuo Towhata**, Prof. Emeritus, University of Tokyo, Japan entitled **"Ground Water is More Important in Triggering Landslides than so far Supposed"** on January 27, 2022.

3rd GEE Webinar lecture has been delivered **by Prof. Scott J. Brandenberg**, University of California at Los Angeles, USA entitled **"Seismic Analysis of Levee Systems"** on February 10, 2022.

4th GEE Webinar lecture has been delivered by **Prof. Sebastiano Foti**, Politecnico di Torino, Italy entitled **"Stochastic Analysis of Seismic Ground Response"** on March 24, 2022.

5th GEE Webinar lecture has been delivered by **Prof. Ioannis Anastasopoulos**, ETH Zurich, Switzerland entitled **"Vulnerability Assessment and Retrofit of Existing Bridge Foundations"** on April 13, 2022.

6th GEE Webinar lecture has been delivered by **Prof. Jonathan D. Bray**, University of California, Berkeley, USA entitled **"Selection of Seismic Coefficient in Assessing Seismic Slope Stability"** on May 11, 2022.

7th GEE Webinar lecture has been delivered by **Prof. Deepankar Choudhury**, Prof. T. Kant Chair Professor, IIT Bombay entitled **"Design Solutions for Complex Geostructures under Dynamic Loadings: Case Studies"** on June 07, 2022.

8th GEE Webinar lecture has been delivered by **Prof. Kyle Rollins**, Brigham Young University, USA entitled **"Liquefaction - Induced Downdrag in Single Piles and Pile Groups"** on July 28, 2022.

9th GEE Webinar lecture has been delivered by **Prof. T.G. Sitharam**, Indian Institute of Technology Guwahati, India entitled **"Engineering Preparedness for Earthquake Disaster Mitigation - Towards Disaster Resilience Society"** on August 26, 2022.

10th GEE Webinar lecture has been delivered by **Prof. George Gazetas**, National Technical Univ. of Athens, Greece entitled **"Design of Rocking Foundations for Seismic Safety and Resilience"** on September 20, 2022.

11th GEE Webinar lecture has been delivered by **Prof. M. Hesham El Naggar**, Distinguished University Professor, Canada entitled **"Performance-Based Design of Extended Pile Shafts Subjected to Cyclic Loading"** on November 22, 2022.

Prof. Izzat M. Idriss, University of California Davis, USA was the chief guest and **Prof. Kenji Ishihara** was the guest of honor for the valedictory ceremony on December 9, 2022.

A panel discussion was organized followed by valedictory ceremony with the speakers of GEE webinar series and moderated by **Prof. Misko Cubrinovski**.

GEE Webinar Series has been organized and chaired by **Prof. B.K. Maheshwari**, Vice-President ISET and Shamsher Prakash Chair Professor, IIT Roorkee. GEE webinar series is co-chaired by **Dr. Ravi Jakka**, Editor, ISET Journal of Earthquake Technology and Associate Professor, Dept. of Earthquake Engg., IIT Roorkee, **Dr. Rajib Sarkar**, Associate Professor, Civil Engg. Dept., IIT Dhanbad and others. **Abstract Volume of 1st Webinar Series on Geotechnical Earthquake Engineering (GEE)** can be viewed at https://www.iitr.ac.in/geewebinars/pdf/book.pdf

BRIEF REPORT ON

NINTH INDIAN YOUNG GEOTECHNICAL ENGINEERS CONFERENCE 2023 (9IYGEC 2023)

March 21-22, 2023, Aurangabad

The Ninth Indian Young Geotechnical Engineers Conference (9IYGEC) was organized by IGS Aurangabad Chapter and Civil Engineering Department, MIT on 21-22 March 2023. Inauguration ceremony was organized on 21st March 2023 at 10:30am. Er. Vikas Ramgude, Chief Engineer, PWD Mumbai was the chief guest. Dr. Anil Joseph, President, IGS-Delhi, Dr. A.P. Singh, Hon. Secretary, IGS - Delhi, Dr. Santosh Bhosle- Director, MIT, Dr. Uttam Kalwane- Chairman, IGS Aurangabad Chapter and Dr. Manish Dixit- Hon. Secretary- IGS Aurangabad Chapter graced the stage. 10 Stalls were arranged for sponsors and other delegates to showcase their products.

Special invite/ Keynote session/ Expert talk were arranged in the conference. Prof. Krishna R. Reddy, Director, Geotechnical & Geo-environmental Engineering Laboratory & Sustainable Engineering Research Laboratory, Civil, Materials, and Environmental Engineering, university of Illinois Chicago gave special invited lecture. Keynotes were delivered by Dr. Aditya Singh, IIT Roorkee; Dr. Saurav Rukhaiyar, Scientist, CSIR Central Institute of Mining & Fuel Research Nagpur; and Mr. Tiru Kulkarni, President, Garware Technical Fibres, Pune. Expert lectures were delivered by Er. Shubhada Jagtap, Mumbai; Dr. Meghna Sharma, Post-Doc fellow, IIT Powai, Mumbai.; Dr.S.S. Basarkar, Afcons, India; Dr. Priti Maheshwari, IIT Roorkee and Dr. Pratik Negi, NIT Calicut. Online keynotes were delivered by Dr. Misko Cubrinovski, University of Canterbury, New Zealand; Dr. Minu Treesa Abraham, Germany and Dr. Sparsha Nagula, Technical University of Hamburg, Germany.

In total 70 full length papers were received for the conference and 65 Research scholars/ M.Tech Students presented their paper. Eminent and well qualified Professors from IIT/ NIT/ Prestigious Private college were Chair and Co-Chair for 10 different themes organized in 9IYGEC. Ten participants were awarded with “Best paper award” under the themes they participated.

The programme concluded with a Valedictory function on 22-03-2023 at 17:30 hrs. Er. Vikas Patil and Dr. A.P. Singh were present. The best paper in each theme was judged and meritorious students were awarded certificates and memento.

234th Executive Committee meeting of IGS was also conducted on 21st March 2023 at 2:00pm in Civil Engineering Department, MIT, Aurangabad.

The 9IYGEC was conducted under the guidance of Organizing Chaiman, Dr. Manish S. Dixit, Hon. Secretary, IGS Aurangabad chapter. Huge efforts were taken by Prof. Quadri S.G.- Hon. Joint Secretary, Prof. S.T. Patil – Treasurer, Prof. Yogesh Shermale-Member, Prof. Archana Pathak –Member of IGS Aurangabad Chapter. Prof. S.N. Pawar, Prof. A.P. Jaiswal, Prof. A.A. Ratnaparkhi, Prof. Sagar Deshmukh and Prof Umesh Salunke worked hard for the success of the programme.


Ninth Indian Young Geotechnica
Engineers Conference
9IYGEC-2023


Ninth Indian Young Geotechn
Engineers Conference
Harsh
Engineering Department


Engineers Conference


GARWARE

CALL FOR NOMINATION

IGS Forensic Geotechnical Engineering Award 2023

IGS Forensic Geotechnical Engineering Award is presented biennially. The award carries a cash prize of Rs. 15,000, a plaque and certificate. The award will be presented at the IGS Annual General Session at Roorkee in December 2023. Nominations for the award are invited from an IGS Member. The followings are the eligibility criteria for the Award:

- It is open to all members of IGS - academicians, researchers, practicing engineers and professionals.
- Applicant should be a member of IGS for a period of at least 3 years before application.
- The project / case study should pertain to forensic geotechnical engineering investigations / evaluations performed on a project in India within previous three years.
- Interested people should submit a duly signed nomination to IGS
- Along with nomination, a 2-3 page note on the technical contribution on the forensic study performed should be submitted. It may include project details, calculations, photographs, etc.
- Paper(s) published (if any) during the last two years in reputed journals or conference proceedings related to the project on which forensic evaluation was done may be submitted for consideration.

All interested eligible IGS Members are requested to submit their Nomination on or before July 31, 2023 at the IGS Secretariat.

Best Teacher of Geotechnical Engineering Award 2023

Best Teacher of Geotechnical Engineering Award sponsored by Prof. Dr. B.J. Kasmalkar is presented annually. The award carries a cash prize of Rs. 25,000, a plaque and certificate. The award will be presented at the IGS Annual General Session at Roorkee in December 2023. Nominations for the Award are invited from an IGS Member of Indian Nationality who have made outstanding contribution in Geotechnical Engineering. Nominations for the Award should be on the prescribed form available on IGS Portal. The following are the eligibility criteria for the Award:

- The candidate should have minimum 15 years teaching experience in India at B.Tech/M.Tech level (or equivalent) in IIT's, IISc, NIT, recognized universities, deemed universities, government and private engineering colleges affiliated to universities and AICTE approved or accredited.
- Those teaching at Diploma level shall not be eligible.
- The candidate should not be more than 60 years of age on 31st December during the year of application.
- The candidate should have an M.Tech or Ph.D degree in Civil Engineering (or equivalent).
- The candidate should be an Indian national.
- Candidate should be a member of IGS (national body) for a minimum period of ten years.

The completed Nomination Form should reach at IGS Secretariat on or before July 31, 2023.

45th IGS ANNUAL LECTURE 2023

The prestigious

45th IGS Annual Lecture 2023

will be delivered by Prof. G.L. Sivakumar Babu, Professor,
Civil Engineering Department, Indian Institute of Science, Bangalore,
during IGC-2023, Roorkee.

The topic of his lecture is

"Reliability and Risk analysis in Geotechnical and Geoenvironmental Practice"

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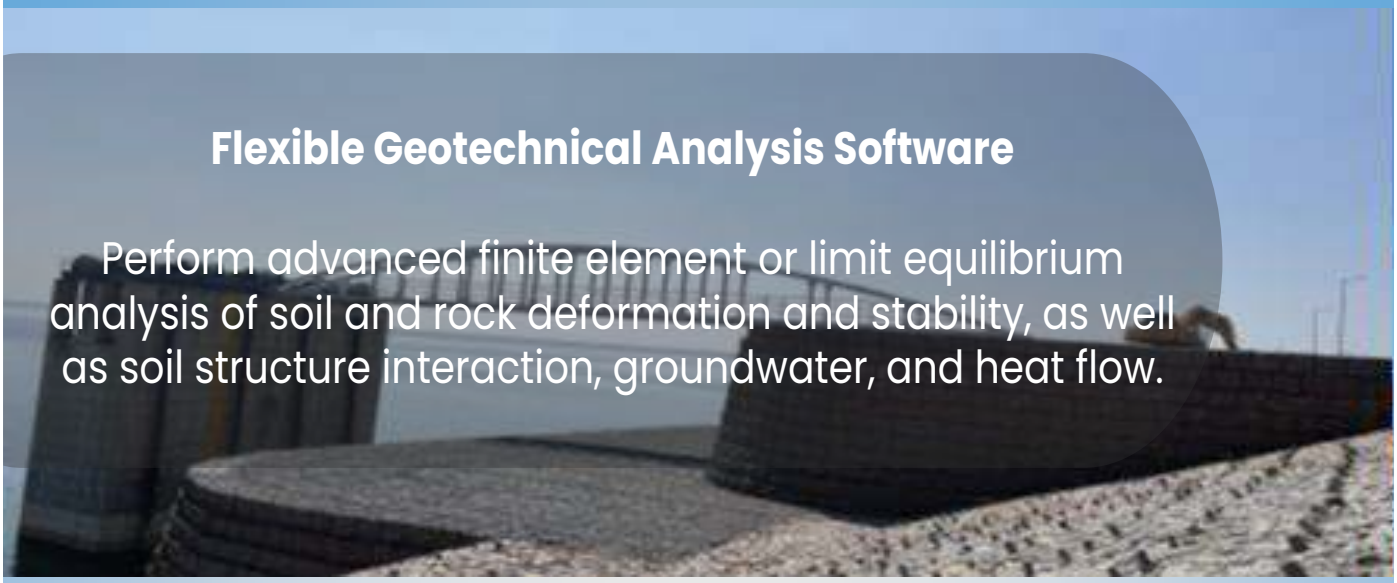

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Licenses will be allocated to students and research scholars after receipt of the relevant application form and documents, and upon approval of the operational committee.

***Note**: The licenses are exclusively for Academic Research, and cannot be used for any Consultancy/Commercial Projects as well as Sponsored Research*

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INDIAN GEOTECHNICAL JOURNAL
Volume 52, Issue 6, December 2022

CONTENTS

ORIGINAL PAPERS

TECHNICAL NOTES

Geotechnical Engineering Modelling Software (GEMS)

Advanced and intuitive computer aided design and engineering (CAD & E) software for foundation analysis and design

Pile Foundation (Land, Bridge & Waterfront structures)

- Pile capacity estimation
- Axial load settlement analysis
- Lateral load analysis – Defl, BM and SF
- Driven, Bored, Driven cast-insitu, CFA piles
- Piles of various cross-sections
- IS-2911, API-2011, API-2000 and other methods for analysis

Offshore Pile Foundation

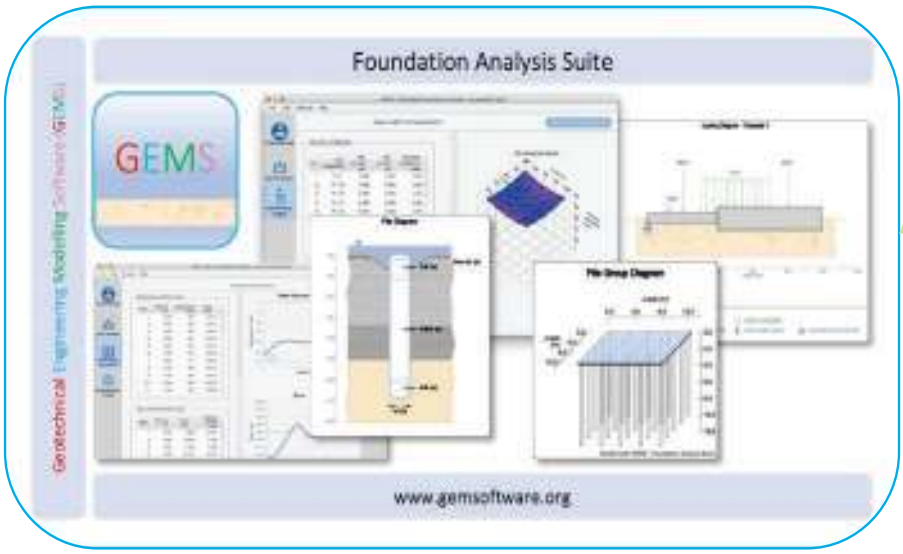
- Pile capacity estimation
- Axial load settlement analysis
- Lateral load analysis – Defl, BM and SF
- API-2011, API-2000, REESE and other methods for analysis
- p-y, t-z and Q-z curves based on soil properties
- Static and cyclic loading scenarios

Pile Group Settlement Analysis

- Pile group settlement
- Design load estimate
- Facility to use load test results
- Analysis of rigid and flexible cap piles
- Driven, Bored, Driven cast-insitu, CFA Piles
- IS-2911, API-2011, API-2000 and other methods for analysis

Beam Foundation

- Discrete spring-bed model (Winkler)
- Elastic half-space model
- Concentrated loads, moments, uniformly distributed loads. Prescribed displacements and rotations, variable flexural rigidity



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ANNOUNCEMENT

IGS-MR. H.C. VERMA DIAMOND JUBILEE AWARD

Title : **IGS-Mr. H.C. Verma Diamond Jubilee Award for Innovative Instrument Design**

Frequency: **Biennial**

Award: **Rs. 25,000/- Cash, Memento and Citation to be awarded in 2023**

A biennial award namely IGS-Mr. H.C. Verma Diamond Jubilee Award for Innovative Instrument Design is instituted by M/s AIMIL LTD., New Delhi a pioneering Instrument Organisation, in memory of their late Founder and Chairman Mr. H.C. Verma. The award carries a cash prize of Rs. 25,000/- a memento and certificate.

The nature of this award is different from other IGS Awards since this is intended to be neither a best paper published/ thesis presented model nor is it based on the achievements of individuals over a period of time.

Those wishing to be nominated for this award will have to submit details of their instrument design to the IGS Secretariat for the due selection process. Nominations for the year 2023 are invited and interested persons may submit their entries to IGS Secretariat latest by July 31, 2023.

GUIDELINES:

The entries should include:

- Detailed description of the instrument.
- Its need, utility and detailed design.
- Fabrication and calibration procedures
- Procedure for its use, limitations
- Results obtained and their validation
- Schematic sections/diagrams/photographs
- Papers/ reports/ documents related to the instrument
- Names and Address of 3 Referees who are familiar with the work.

IGS-SARDAR RESHAM SINGH MEMORIAL AWARD 2023

A biennial award namely IGS-Sardar Resham Singh Memorial Award for Innovative Original Research Applications/Procedures to Benefit Infrastructure Projects in the field has been instituted by M/s HEICO LTD., New Delhi a pioneering Instrument Organisation, in memory of their late Founder and Chairman Sardar Resham Singh. The award carries a cash prize of Rs. 50,000/- a memento and citation.

Those wishing to be nominated for this award shall submit their original Innovative Research/Applications/ Procedures duly referenced by two eminent Referees on the subject. The applicant must be a member of Indian Geotechnical Society. Nominations for the year 2023 are invited and interested persons may submit their entries to IGS Secretariat latest by July 31, 2023.

GUIDELINES:

The entries should include:

- Original Innovative Research/ Applications/ Procedures
- Benefits to Infrastructure Projects
- Reduction in ill effects of natural disasters
- Any other related advantage.

IMPORTANT NEWS

- ✓ **Indian Geotechnical Journal is being published in 6 issues from 2019. February-April-June-August-October-December.**
- ✓ **Cover page of the Indian Geotechnical Journal has changed.**

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Young Geotechnical Engineer (YGE) Best Paper Awards-2023

INVITATION FOR SUBMISSION OF PAPERS

To motivate and encourage Young Geotechnical Engineers to get involved and participate in Geotechnical research and field work, biennial Best Paper Awards especially for YGE have been instituted for best papers in various areas of Geotechnical Engineering. All interested YGE are requested to participate and submit their papers **on or before 31st July, 2023**. The following seven (7) odd-year Awards will be given during IGC-2023 at Roorkee.

1. IGS-Soiltech India Pvt Ltd, Pune YGE Award for Best Paper on Shallow Foundations.
2. IGS-AIMIL-HCV YGE Award for Best Paper on Geotechnical Investigation and Testing.
3. IGS-Bangalore Chapter YGE Award for Best Paper on Environmental Geotechnology.
4. IGS-Roorkee Chapter YGE Award for Best Paper on Rock Mechanics and Rock Engineering.
5. IGS-Chennai Chapter YGE Award for Best Paper on Solutions of Problematic Soils.
6. IGS-Kakinada Chapter YGE Award for Best Paper on Deep Excavations and Underground Structures.
7. IGS-Kolkata Chapter YGE Award for Best Paper on Earth Retaining Structures.

RULES AND SUBMISSION PROCEDURE

1. The Awards will be awarded to YGEs during IGS Annual General Session conducted at the time of Indian Geotechnical Conference-2023 (IGC-2023).
2. The Award carries a Memento and Certificate. In case of more than one YGE author, the Award shall be given to YGE listed first on the paper.
3. For the purpose of the Awards, YGE is defined as an Engineer of Indian origin who is of the age of thirty-five (35) years or less as on 1st January, 2022.
4. The paper may have more than one author and author/s above the age as defined for YGE, however, at least one of the authors shall be YGE.
5. Papers published in following Proceedings/Journals shall be eligible for the Awards.
   (i) Proceedings of immediate past IGS IYGE Conference (IYGEC-2022 at Chennai)
   (ii) Indian Geotechnical Journal (IGJ) of the last two years (2021 & 2022).
   (iii) Proceedings of the last two IGCs (IGC 2021 & 2022).
   (iv) Proceedings of ISSMGE sponsored Conferences such as ICSMGE, ARCs, iYGEC and Seminar/Workshop/ Symposium organized by ISSMGE-TCs during last four years (2019, 2020, 2021 & 2022).
   (v) Proceedings of National Conference/Seminar/Workshop conducted in India by any institute/organizations in last two years (2021 & 2022)
   (vi) Any paper identified by IGS Secretariat by suitable means published in last two years (2021& 2022).
6. Nominations (submission of papers on behalf of author/s) from the following are also invited.
   (i) IGS Executive Committee members
   (ii) Chairmen/Secretaries of IGS Local Chapters.
   (iii) Heads of Civil Engineering Departments of IITs, IISc and any technical institute in India.
7. While submitting the papers, the **Date of Birth** and proof thereof of YGE author/s of the paper must be provided. The author/s shall provide all related information including the source and date of publication. ***It shall also mention the name of the Award for which the paper is submitted.*** The contact details such as full address, mobile number, email ID etc. shall also be provided.
8. The author can submit more than one paper for an Award. Also the same paper can be submitted for more than one Award if content of the paper is related to the areas of more than one Award. However, only one Award shall be given to the same paper and/or the same author for the given year.
9. **Last date for submission/ nomination of papers is 31st July, 2023.**

Format for Submission of Paper for YGE Best Paper Award

Name of YGE author : .....

Date of Birth (dd/mm/yyyy) : ..... Age as on 01-01-2022 .....

Proof of age (copy of Driving license/ School leaving cert./ Adhaar card/ PAN card etc.: .....

Mobile No. : ..... E-mail: .....

Postal Address: .....

Name of Award for which paper is submitted: .....

Title of Paper: .....

Source and Date of publication: .....

.....

Date and Signature of author/person submitting the paper

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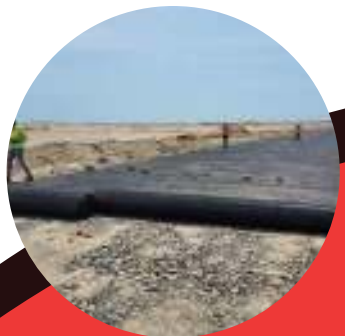

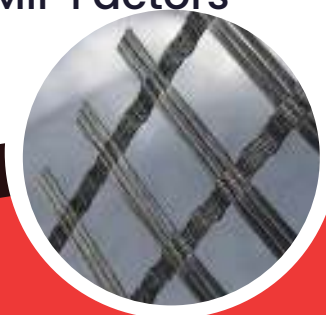

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CALL FOR ENTRIES

IGS-PROF. G.A. LEONARDS' BEST PH.D THESIS PRIZE

IGS-Prof. G.A. Leonards' prize for the best Ph.D Thesis in Geotechnical Engineering is open to all Indian Universities/ Institutions. Nominations for the prize to be awarded during IGC-2023 at Roorkee are invited. Ph.D. thesis awarded by the Universities/Institutions during the year 2022 alongwith a certificate from the University/Institution regarding the award may be sent to the IGS Secretariat latest by July 31, 2023.

IGS-BEST DOCTORAL THESIS AWARD FROM NON-PREMIER INSTITUTIONS SPONSORED BY PROF. M.R. MADHAV

IGS-Best Doctoral Thesis Award from Non-Premier Institutions sponsored by Prof. M.R. Madhav for the best thesis in Geotechnical Engineering is open to all Indian Universities/ Institutions (non-premier). Nominations for the prize to be awarded during IGC-2023 at Roorkee are invited. Ph.D. thesis awarded by the Universities/Institutions (non-premier) during the year 2022 alongwith a certificate from the University/Institution (non-premier) regarding the award may be sent to the IGS Secretariat latest by July 31, 2023.

GEOTECHNICAL EVENTS CALENDAR

ABROAD

2023

June 25-28
Crete, Greece

9th International Congress of Environmental Geotechnics Conference (ICEG).

For Details:
Email: dzekkos@geoengineer.org

October 04-07
Moscow, Russia

28th European Young Geotechnical Engineers Conference and GeoGames.

For Details:
Website: www.eygec28.com

October 25-27
Bangkok, Thailand

21st Southeast Asian Geotechnical Conference (SEAGC 2023).

For Details:
Website: www.seags.ait.ac.th
Email: seags@ait.ac.th

November 20-22
Fukuoka, Japan

2nd International Conference on Construction Resources for Environmentally Sustainable Technologies (CREST 2023).

For Details:
Website: www.ic-crest.com
Email: info@ic-crest.com

2024

May 7-10
Osaka, Japan

8th International Conference on Earthquake Geotechnical Engineering (8ICEGE).

For Details:
Website : https://confit.atlas.jp/icege8?lang=en

August 26-30
Lisbon (Portugal)

XVIII European Conference on Soil Mechanics and Geotechnical Engineering (ECSMGE 2024).

For Details:
Email : spg@lnec.pt

November 18-20
Sydney, Australia

5th International Conference on Transportation Geotechnics, Ground Improvement and Evolving Technologies for Sustainable Transport Infrastructure.

For Details:
Website : https://ictg2024-c10000.eorganiser.com.au/

INDIA

2023

December 14-16
IIT Roorkee

Indian Geotechnical Conference (IGC-2023) on 'Geotechnical Advances in Sustainable Infrastructure Development and Risk Reduction' organized by Indian Geotechnical Society, Roorkee Chapter, Indian Institute of Technology, Roorkee and CSIR-Central Building Research Institute, Roorkee.

For More Details Visit:
Website: https://igc2023.com/

Address for Correspondence:
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IGC-2023
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Indian Institute of Technology, Roorkee
Roorkee-247667 Uttarakhand, India
Mobile: +91-9410327328,
+91-7669038736
Ph: 01332-285892; 283438
E-mail: igc2023roorkee@gmail.com

IGC - 2024

IGC-2024 would be hosted by

IGS-Aurangabad Chapter

The Venue, Theme, scheduled dates etc. are being worked out and shall be announced soon.

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- Sample Preparation Equipment
- Transducers

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  (b) Shear stress v/s Vertical Stress

  (c) Pore Pressure v/s Cycle Number

  (d) Shear Strain v/s Cycle Number

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IGC - 2023

INDIAN GEOTECHNICAL CONFERENCE

ROORKEE CHAPTER

GEOTECHNICAL ADVANCES IN SUSTAINABLE INFRASTRUCTURE DEVELOPMENT AND RISK REDUCTION

Dec. 14 - 16, 2023 | Website: https://igc2023.com/

VENUE:

IIT Roorkee

ORGANIZED BY :

Indian Geotechnical Society, Roorkee Chapter
Indian Institute of Technology, Roorkee
CSIR-Central Building Research Institute , Roorkee

INVITATION

Indian Geotechnical Society, Roorkee Chapter, Indian Institute of Technology Roorkee and, CSIR-Central Building Research Institute , Roorkee extends you a warm invitation to the IGC-2023 to be held at Roorkee.

CONFERENCE THEMES

The main theme of the conference is "Geotechnical Advances in Sustainable Infrastructure Development and Risk Reduction".

CONFERENCE SUB-THEMES

- Geomaterial Characterization, Site Investigation and Exploration.
- Foundation Engineering
- Geo-Environmental Engineering
- Geotechnical Earthquake Engineering
- Dams, Embankments and Retaining Structures
- Landslides and Slope Stability
- Rock Mechanics and Rock Engineering
- Tunneling and Underground Construction.
- Ground Improvement.
- Geosynthetic Engineering.
- Analytical, Physical and Numerical Modeling in Geotechnical Engineering.
- Unsaturated Soil Mechanics
- Sustainability in Geotechnical Engineering.
- Geohazards, Risk Reduction and Probabilistic Analysis.
- Offshore Geotechnical Engineering.
- AI/ML application in Geotechnical Engineering.
- Application of Geoinformatics in Geo-infrastructures.
- Case Studies.

KEY DATES

Last date for Abstract Submission (Extended)	15.05.2023
Intimation of Abstract Acceptance	15.06.2023
Last date for Full Paper Submission	15.08.2023
Intimation of Paper Acceptance	15.10.2023
Submission of Camera Ready Paper	31.10.2023
Last date for Registration of Accepted Papers	31.10.2023

SPONSORSHIP DETAILS

Category of Sponsorship	Up to October 31, 2023	Free Delegates	Free Advertisement
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Silver	Rs. 1,00,000/-	2	Half page : B&W
Bronze	Rs. 50,000/-	1	Half page : B&W
Well Wisher	Rs.25,000/-	1	-

REGISTRATION FEES

Delegate Category	Up to 31st Oct 2023 (INR)	After 31st Oct 2023 (INR)	Foreign Delegates (USD)
IGS Member	6000	7000	400
Non-IGS Member	6500	7500	450
Student	3000	3500	250
Senior Citizen (Retired)	2000	2500	250
Accompanying Person	2000	2000	200

Address for Correspondence :-

Organizing Secretaries
Indian Geotechnical Conference, IGC-2023
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Indian Institute of Technology, Roorkee
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- Lead Penetration Analysis of Jackup Rigs
- Mudmat Analysis
- Liquefaction Potential Assessment
- FEM Based Numerical Analysis
- Soil Structure Interaction Studies
- Design of Pile & Pile Group
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- Project management of offshore and Marine Projects

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- Borehole Tele Viewer
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- Vane Shear Test
- Field Permeability Test including Packer Test
- Pressure Meter Test
- Block Vibration Test
- Plate Load Test
- Field CBR
- Field Density measurement
- SHAPE & SQUID
- Deep foundation Testing (PIT, CSL, TIP, HSDT)

Geophysical Investigation

- MASW
- Electrical Resistivity Test
- Downhole Test
- Crosshole Test

In-house Softwares

- GRL WEAP
- CAPWAP
- PDA PLOT
- PDAWIN
- GINT
- GROUP 8
- L-PILE
- O-PILE
- GEOSLOPE
- PLAXIS-2D & 3D
- ABACUS
- ROC SCIENCE SLIDE





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INDIAN GEOTECHNICAL JOURNAL

Volume 53, Issue 1, February 2023

CONTENTS

ORIGINAL PAPERS

TECHNICAL NOTES

STATE OF THE ART / PRACTICE PAPER

Largest manufacturer of
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ENVIRO GEOSYSTEMS

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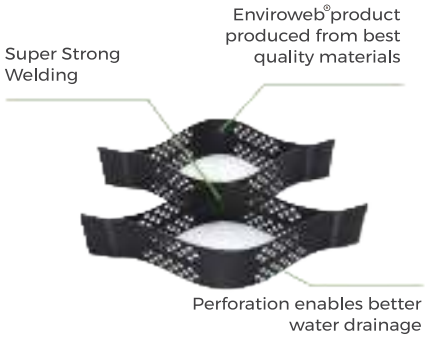

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Welcome to New Members

The Executive Committee of IGS extends hearty welcome to the following members who have been admitted to the Society recently/ elevated to Fellowship.

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