IGS NEWS

A Bulletin of the Indian Geotechnical Society

FOR PRIVATE CIRCULATION ONLY

Volume 55
No. 02
April-June 2023

Contents

Message from President

Dear Distinguished Members,

It has been six months since I had the privilege to be the President of IGS, and I would like to thank you all for allowing me to lead the society in this historical milestone of the 75th year of formation. We had many activities in IGS during the second quarter also and would like to congratulate Honorary Secretary Dr. A.P. Singh, the team of NEC members and local chapters for the same.

The preparation of the new IGS Website is in progress. I want to congratulate the SC1 team led by Ms. Aarti Bhargava for the hard work and dedication in making a new dynamic website for the organisation. To encourage members to our forum, the SC2 team led by Prof. S.K. Prasad have introduced a 25% discount on the life memberships rate for the 75th-year celebrations, and the offer is valid till November 30, 2023. I am happy to inform you that during this period, 122 new members have joined our society; I request that all of you promote the membership drive. The professional forum SC3, led by Dr. Jaykumar Shukla, is coming out with various joint activities with organisations, such as Structural Engineers Forum and Indian Concrete Institute. Thanks to the finance committee SC4, led by Er Ravi Kiran, for the financial budget planning of the society.

On behalf of the Indian Geotechnical Society, participated in the ISSMGE Special Asian Council Meeting on April 3, 2023, and submitted a proposal for hosting the 10th Asian Young Geotechnical Engineers Conference in 2024. India, Indonesia, Korea, and Uzbekistan submitted bids for the same. Online voting was done, and Indonesia was chosen to host the 10th AYGEC. I had the opportunity to attend the Asian Regional Technical Committee 19, International Workshop on Geotechnical Engineering for Cultural Heritage Geo-SAKURA 2023 on April 15-16, 2023, in Nara, Japan. Efforts are in progress to bring the time capsule report of various technical committees, and we would like to congratulate Prof. Neelima Satyam and the team of SC5 for their dedicated efforts. A meeting of the Korean Geotechnical Society, the Japanese Geotechnical Society, and the Indian Geotechnical Society was held, and it was decided to start joint biennial workshops with JGS, KGS, and IGS. The first workshop is proposed on May 11, 2024, in Osaka, Japan. The second workshop will take place in Korea in 2026, and the third session will be in India in 2028. Thanks to Prof. Murali Krishna and the team SC6 for coordinating the meeting. Attended online Srilankan Geotechnical Society project day on April 20, 2023. SLGS Project Day is the annual event organised to promote research and enhance the presentation skills of Civil Engineering students in Sri Lankan Universities, and the program commenced in the year 2000. The event was inaugurated by Dr. Marc Ballouz, President – ISSMGE. Visited the geotechnical laboratory of the Centre for Infrastructure Renewal at Texas A&M University, USA, on May 12, 2023, headed by the Director, Prof. Anand Puppala. A meeting with a core team of Srilankan Geotechnical Society led by Er Sahabandu, President SLGS, was held at Colombo on May 25, 2023. A draft MOU of collaboration between the Indian Geotechnical Society and the Srilankan Geotechnical Society was discussed during the meeting. Had a meeting

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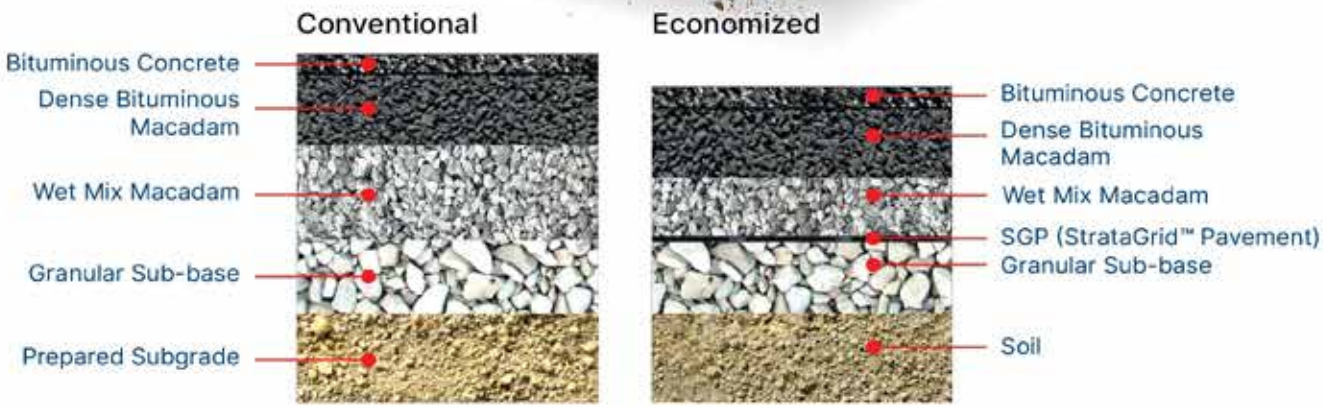

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with Paul Burton, Secretary TC220 of ISSMGE at Auckland, New Zealand, on June 5, 2023. Updated the activities of TC 220 and briefed regarding the planning for ISFMG 2026 to be held at IIT Indore.

SC7 team led by Prof Ashish Juneja is trying to revamp the local chapters. Thanks to Honorary Secretary Dr. A.P. Singh for attending the valedictory session of the two weeks hands-on training program on testing Geomaterials for Geotechnical and Transportation Engineering application held at NIT Raipur by IGS Raipur Chapter. The 51st local chapter of IGS was inaugurated at NIT Calicut on April 25, 2023, in the presence of Dr. A.P. Singh - best wishes for the chapter's activities and congratulations to the team led by Prof. S. Chandrakaran. The planning is underway for opening local chapters at Ujjain, Lucknow, Aligarh, Madurai, Gorakhpur and Palakkad. Thanks to the SC8 team led by Prof. Dasaka Murthy for the efforts. Thanks to SC9 team led by Prof. G. Sridevi for bringing up guidelines for the functioning of IGS Student chapters. On April 27, 2023, I participated in a national-level workshop and quiz competition at KPR Institute of Engineering and Technology in Coimbatore, organised by the various IGS Students Chapters in Coimbatore. Congratulations to the IGS Coimbatore chapter's Chairman, Prof. Paul Daniel Arumairaj, and Hon. Secretary, Prof Jeyapriya Sathish, for organising the event. Participated virtually in the IGS Student chapter inauguration at Global Academy of Technology, Bangalore, on May 30, 2023. Congratulations to Prof. Madhavi Latha and the team of the Bangalore chapter. The IGS student chapter at Palakkad was inaugurated on June 14, 2023, in the presence of Er. A.V.S Chakravarthi, Hon. Secretary, IGS Kochi chapter at Govt. Engineering College, Palakkad.

The SC10 team, led by Prof Thyagaraj, plans various activities to promote the young geotechnical engineering fraternity. Happy to inform you that Dr Durgadevi Shanmugavel, Associate Professor at SRM Institute of Science and Technology, Chennai, India had the opportunity to participate in the interactive technical talk of ISSMGE TC301 on Conservation of Heritage Structures representing Asian Geotechnical Societies. With the leadership of Prof. B.K Maheshwari and the SC11 team, the documentation and guidance of the IGS virtual university are in progress. I am glad to inform you that Indian Geotechnical Journal has received an Impact Factor of 1.4. Congratulations to the excellent leadership of Prof Madhavi Latha, Prof Deepankar Choudhury, team SC12 and the editorial board, authors, reviewers and everyone associated with our journal. Thanks to Prof. Ravi Jakka and team SC13 for their sincere efforts in publishing our newsletter with rich content.

Happy to inform you that the Indian Geotechnical Society has nominated Prof. H.N. Ramesh, Dr Jaykumar Shukla and Prof. Neelima Satyam to be the three Members of the Panel of Soil and Foundation Sectional Committee CED 43 of the Bureau of Indian Standards. I want to congratulate the team SC14 led by Prof. H.N Ramesh, for the efforts taken in supporting the BIS activities. The planning for the special issue of Women in Geotechnical Engineering is in progress, and the efforts to bring out a book on 75 Indian Women in Geotechnical Engineering is advancing. I appreciate the efforts of Prof G Madhavi Latha and the team SC15. The infrastructure development committee SC16, headed by Dr A.P. Singh and Dr Abhay Gupta, is doing an excellent job of identifying plots for the proposed IGS House in Delhi NCR. The formation of the Indian Geotechnical Institute is in progress under the leadership of Prof. R. Ayothiraman and team SC17. The Skill Development Committee, under the leadership of Prof. K. Balan and the team of SC18, is planning to come up with a training programme for laboratory personnel and the field investigation crew. Efforts for a tie-up with the Construction Industry Development Council are in progress in this regard. Interactive sessions with NABL are planned to raise the calibre of lab testing and ensure the lab has the necessary testing equipment before the facility can receive accreditation for geotechnical testing. I appreciate the team SC19 led by Prof. K. Muthukumaran for their efforts. The Social Media Development team SC20 led by Prof Anitha G. Pillai, with the support of IGS headquarters, is doing an excellent job of improving the visibility of our Society. Discussions are underway to develop a data bank of soil profiles of various terrains led by Prof. N. Unnikrishnan and team SC21. Happy to note that the software operations committee SC 22, led by Prof. Ravi Shankar Jakka, is trying to support the student community in their academic requirements. 75th-year Celebration Committee SC23, under the leadership of Prof. N.K Samadhiya, is planning major events to improve the visibility of our society jointly with the local chapters of different states. Preparation of the events is in progress in Maharashtra, Karnataka, Kerala and Tamilnadu. Request all local chapters to conduct special activities as part of the celebrations.

During this period, I had the opportunity to attend various events conducted by local chapters. Attended the technical presentation on "Overview of Piezocone Penetration Testing" given by Mr Harsha Gamidi on April 29, 2023, at IIT Bombay,organised by the IGS Mumbai Chapter. Participated in CONFEST 2023, a three-day event from May 19–21, 2023, at Marine Drive Kochi,organised by the IGS Kochi Chapter in collaboration with the renowned Construction Philosophy magazine. The CONFEST 2023 intends to unite a community of business owners, programmers, inventors, and designers. The exhibition featured cutting-edge construction technology, including mechanisation, contemporary techniques, and materials, among others. Also had the opportunity to attend and be part of the 2-day Workshop on Geosynthetics for Sustainable Civil Infrastructure on 16th and 17th June 2023 at the School of Infrastructure, IIT Bhubaneswar organised in association with Indian Geotechnical Society, Bhubaneswar Chapter and Department of Civil Engineering, C. V. Raman Global University. Congratulations to the organising team led by Er. Laxmikanta Tripathy, Prof. G. Sridevi, Prof. Sumanta Haldar and Asst. Prof. Shantanu Patra. The 235th National Executive Committee Meeting of IGS was held on June 17, 2023, at IIT Bhubaneswar. Thanks to IGS Bhubaneswar Chapter for organising the meeting at IIT Bhubaneswar. On June 20, 2023, participated in the technical talk organised by IGS Kochi chapter on "Construction of Sea Wall at Chellanam: An Overview" by Er. Aswin Subhan. I had the opportunity to visit Dr R Kuberan on April 9, 2023 and Dr N.V. Nayak on April 29, 2023, at their residences to honour them as Indian GeolegendS for their outstanding contributions to Geotechnical Engineering and the Indian Geotechnical Society. We had the sad demise of Dr. R. Kuberan on May 8, 2023. I express my deep condolence and pray to the almighty to give strength to the family to bear the loss, and may the departed soul rest in peace.

Looking forward to the upcoming events organised by local chapters of each state as part of the 75th-year Celebrations of IGS, and wishing all the very best for our prestigious annual conference IGC 2023, at IIT Roorkee. The IGS events will be a massive success with your support and participation. I conclude with the quote of Dr. A.P.J Abdul Kalam, "Dream, Dream, Dream, Dreams transform into thoughts. And thoughts result in action". 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

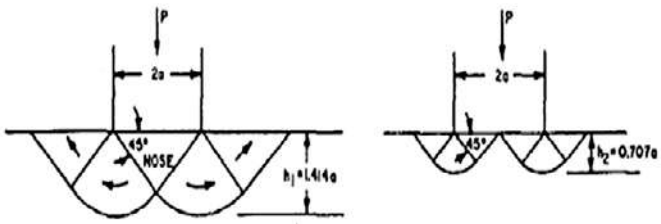
Ground is Not Rigid Plastic

Madhira R. Madhav[1]* and Baadiga Ramu[2]

Historical perspective

Karl Terzaghi is well known as the Father of Geotechnical Engineering. However, what is not appreciated as much is his ability to cross-fertilize ideas from his parent discipline, Mechanical Engineering, of which he was a graduate. Terzaghi's brilliance can be gauged from the famous theory of consolidation following the *'principle of effective stress'*, which is based on the theory of the conduction of heat in solids, which was probably taught to him while he was studying for his degree. Terzaghi had the ability to keep abreast of the latest developments even while he was practicing several years after his undergraduate studies. The classical work of Prandtl (1920) identified that the mean stress under a flat punch during indentation is several times larger than the uniaxial compressive strength for metals, particularly in *steel*. Prandtl's theory is based on the premise that steel, which is a very strong and stiff material, behaves as rigid-plastic material, which implies each wedge moves as a rigid body. The classical book 'Theoretical Soil Mechanics' by Terzaghi appeared in 1942 which details the application of Prandtl's mechanism for c - ϕ materials (soils). The mechanism which was later termed as *'slip-line fields'* was the basis on which Terzaghi borrowed and successfully applied Prandtl mechanism to our classical problem of bearing capacity of foundations on soil which became sacrosanct to all further studies since then.

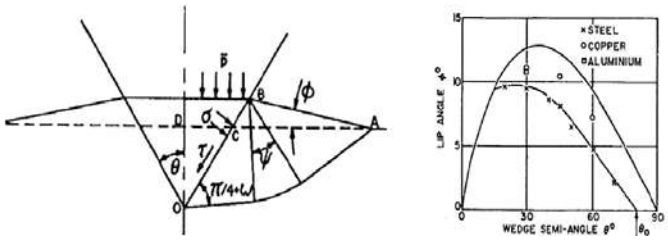
Strangely and rather unfortunately, the profession did not keep abreast of further developments on the same topic. Bishop et al. (1945) and Hill et al. (1947) identified and incorporated the concept of plastic flow into their analysis. Hill et al. (1947) came out with the *'Theory of Wedge Indentation of Ductile Materials'*. **Figure 1** shows the slip-line mechanisms of the flat punch studied by Prandtl (Fig. 1a) and Hill (Fig. 1b). This work incorporated the deformability of the material.



(a) (b)

Fig. 1: Slip-line fields for flat punch due to (a) Prandtl and (b) Hill (1950)

In particular, even though the same mechanism holds good for materials less stiff and less strong than steel, such as aluminum and copper, the wedge configuration is affected (**Figure 2**). The Lip-angle, defined as the slope of the passive wedge with respect to the horizontal, is higher for copper and aluminum compared to steel for all wedge semi-angles. This appears to be the first recognition of the concept that Prandtl's mechanism is not unique but is sensitive to the deformation properties of the material.



(a) (b)

Fig. 2: (a) Definition sketch for semi-wedge angle θ, and Lip Angle, ϕ and (b) Lip Angle vs. semi-wedge angle for different metals

Several studies extend the Prandtl and Hill mechanisms, e.g., Shaw and DeSalvo (1970) demonstrated (**Figure 3**) the effects of friction angle and strain-hardening not only on the wedge semi-angle but on the constraint factor (bearing capacity in our terminology), which increases with increasing friction and strain-hardening.

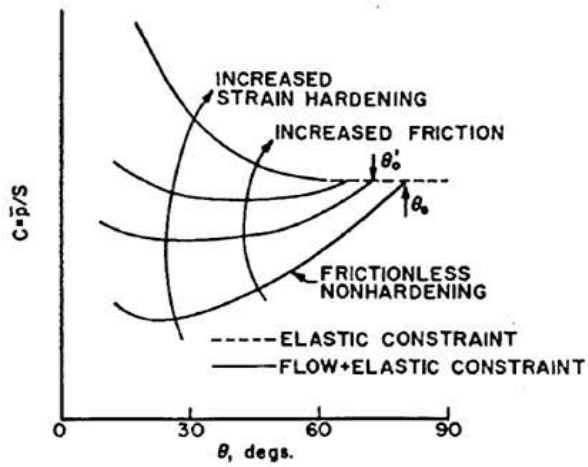


Fig. 3: Effect of friction and strain hardening on constraint factor (bearing capacity) after Shaw and DeSalvo (1970)

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Concept of local shear failure

Parallel to these developments in the theory of plasticity, Terzaghi and Peck (1948) realized the limitations of the rigid-plastic theory for soils other than dense to very dense sands, such as medium dense to loose sands, which are more compressible than the dense or very dense sands. A new concept of *'local shear failure'* instead of *'general shear failure'* was proposed with the provision that the angle of shearing resistance to be used for the lower estimate of bearing capacity of medium dense to loose soils is to be inverse of a tangent of ϕ, the angle of shearing resistance of the sand. It should be noted that this proposal is purely empirical and was based on their experience. The profession has continued to adopt and use this since then (1948), including even our IS Code to the present day!

It took more than twenty years for the profession to realize and accept that this binary classification is inadequate following Vesic's meticulously conducted model tests at Georgia Tech. Vesic (1971) established from his experimental work that failures of foundations on or in the ground can be classified into *general, local,* and *punching* shear failures. **Figure 4** shows the modes of failure with respect to the relative density, Dr, and D/B, the depth to width ratio of the foundation. The bounds for each of these three mechanisms have been identified in terms of the relative density of sand and relative depth, D/B, of the foundation. Punching shear failure is subscribed to loose (relative density < 35%) sand and relatively deep footings, local shear failure to medium dense (relative density 35 to 75%) sands with a relative depth range of 0 to 4.0 and general shear failure restricted to dense to very dense (relative density > 75%) sands and only to foundations at shallow depths of the order of two to three times the width.

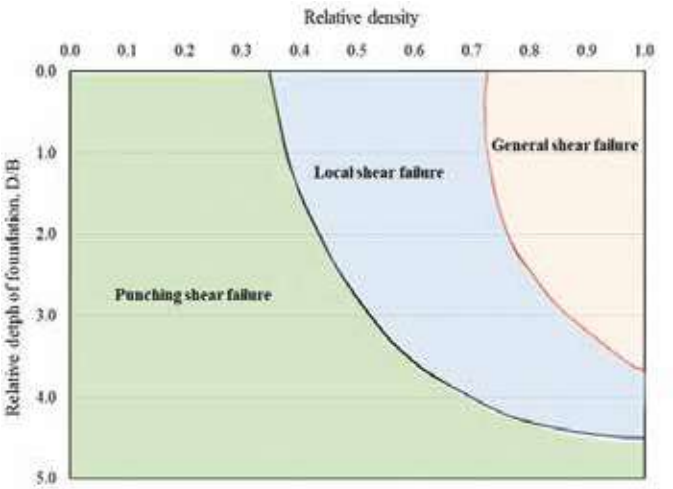

Fig. 4: Modes of failure

Cavity expansion theory

While the above chart is very useful, it still categorizes the failure modes into distinctly different ones. Ground does not exhibit no such behavior with sharp transitions from 'punching' to 'local' to 'general' shear failures. What is needed is a procedure that encompasses the response of the foundation on the loose to very dense ground with gradual or smooth transition. **Figure 5** shows the pressuremeter test procedure. While analyzing the pressuremeter test results in undrained clay, Gibson and Anderson (1961) modelled it as an expansion of a cylindrical cavity, and the following relation for the limit pressure, p_l, obtained as

$$p_l = c_u.Nc^* + \sigma_h \quad (1)$$

where $N_c^* = 1 + \ln(G/c_u)$, G and c_u – shear modulus and undrained strength, respectively, of in situ soil and σ_h – total lateral stress at the depth of the test.

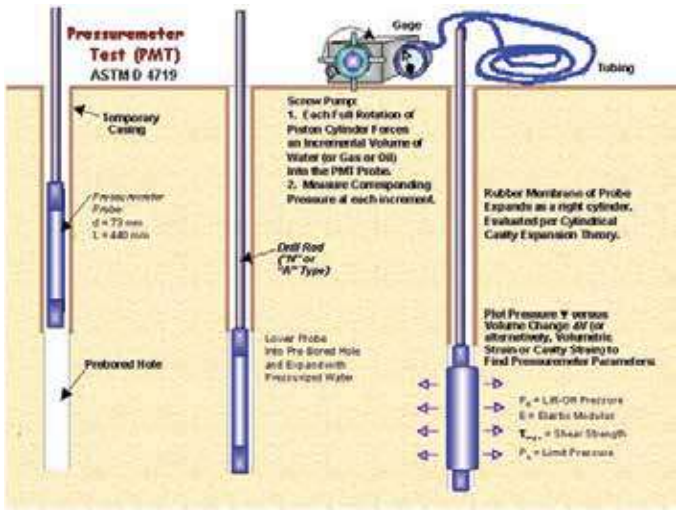

Fig. 5: Pressuremeter test

Eq. (1) can be recognized as very similar to the equation for undrained bearing capacity, q_u, of foundation on or in clay which is

$$q_u = c_u.N_c + q_0 \quad (2)$$

where N_c – is the bearing capacity factor and q_0 – is the surcharge stress at the level of the foundation. Even though both Eqs. (1) and (2) are very similar, one can note that while N_c based on rigid plastic theory is just a number, while N_c^* is a function of the relative stiffness ratio, G/c_u. Finally, the bearing capacity factor, N_c^* is now shown to be a function of the deformation parameter instead of being just a constant. **Figure 6** shows the limit pressure versus relative stiffness, G/c_u, of undrained cohesive soil. G/c_u can vary over a large range of 100 for highly overconsolidated soils and 1,000 for soft-sensitive soils. Normalized limit pressure increases from about 3.8 for G/c_u of 100 to nearly 8.3 for G/c_u of 1000 for a test at shallow depth, σ_h/c_u of 0.5. Normalized limit pressures at these two extreme values of G/c_u increase to 5.3 and to about 9.5 for σ_h/c_u of 2.0, corresponding to response at a deeper depth. The above result clearly supports the concept that the bearing capacity of foundations on or in the deformable or compressible ground is a function of not only the strength parameters as per Prandtl and Terzaghi (the classical concept) but also of the deformability parameter, G, the shear modulus of the ground. This is a significant improvement in our understanding of the mechanics of the problem, which is closer to reality and thus needs to be implemented for the practice by our professionals.

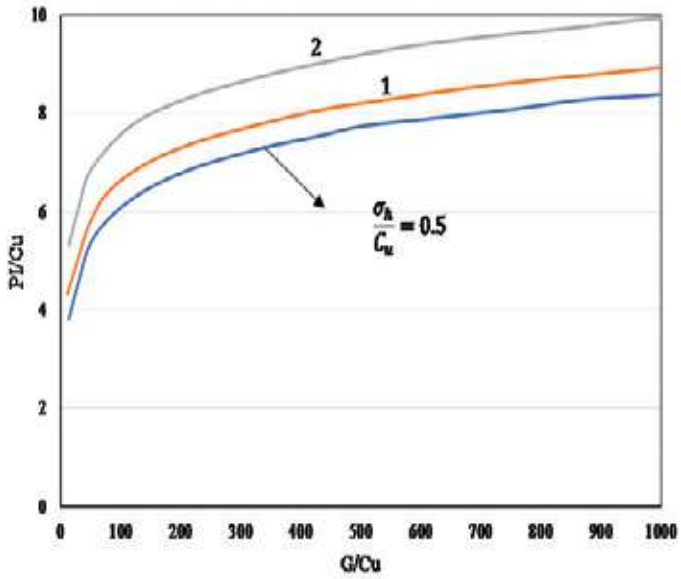

Fig. 6: Limit pressure, p_l, versus relative stiffness, G/c_u of undrained cohesive soil

Vesic (1971) needs to be given the credit for transforming the cylindrical cavity of pressuremeter test to a flat thin cavity between the footing and the ground and thus apply the so-called *'cavity expansion theory'* for the estimation of the bearing capacity of foundations on or in the ground for c - ϕ soils. The classical book by Das (2016) gives the equation for ultimate bearing capacity, q_u, inclusive of the effect of compressibility, as

$$q_a = C'N_c F_{cs} F_{cd} F_{cc} + qN_q F_{qs} F_{qd} F_{qc} + 1/2\ \gamma B N_\gamma F_{\gamma S} F_{\gamma d} F_{\gamma c} \quad (3)$$

where in F_{cc}, F_{qc}, and $F_{\gamma c}$ are the correction factors for compressibility effect for cohesion, surcharge, and unit weight/ width of footing terms in terms of rigidity index, I_r, defined as

$$Ir = \frac{Gs}{(c'+q'tan\phi')} \quad (4)$$

where G_s – is the shear modulus of the soil, q' – effective overburden stress at a depth equal to $(B/2+ d_f)$, and d_f – depth of the footing. Further, a critical rigidity index, $I_{r(cr)}$ is defined as a function of the shape of the footing and angle of shearing resistance of the soil, as

$$I_{i(cr)} = \frac{1}{2}\left\{exp\left[\left(3.30 - 0.45\frac{B}{L}\right)cot\left(45 - \frac{\phi'}{2}\right)\right]\right\} \quad (5)$$

It should be noted that compressibility of the soil has no effect, and general shear failure is applicable only if $I_r \geq I_{r(cr)}$ with $F_{cc} = F_{qc} = F_{\gamma c} == 1$

For $I_r \leq I_{r(cr)}$, the compressibility factors are

$$F_{\gamma c} = F_{qc} = exp\left\{\left(-4.4 + 0.6\frac{B}{L}\right)tan\phi' + \left[\frac{(3.07 sin\phi')(log 2I_r)}{1+sin\phi'}\right]\right\} \quad (6)$$

and $F_{cc} = 0.32 + 0.12\frac{B}{L} + 0.60 log I_r \quad (7)$

Figures 7 and **8** illustrate the significant variation of normalized bearing capacity, q_u/q_{ur}, the ratio of bearing capacity for a given rigidity index, I_r, with respect to the bearing capacity corresponding to general shear failure based on rigid plastic behavior of soil/ground with rigidity index, I_r.

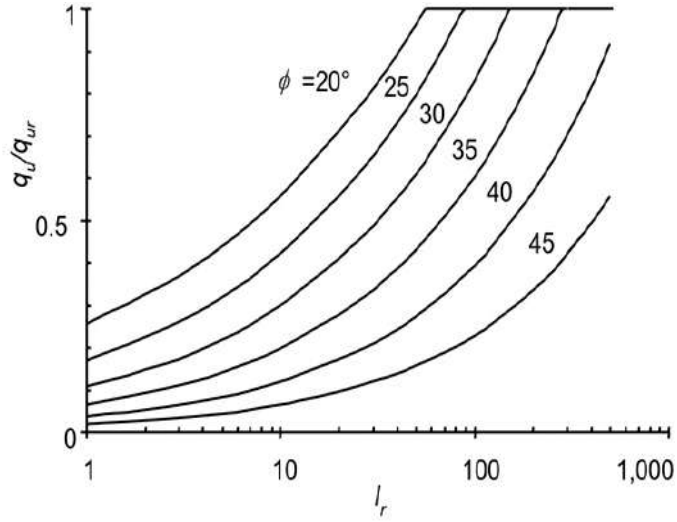

Fig. 7: q_u/q_{ur} with I_r and f for B/L=0, c'/γB=0, D/B=1

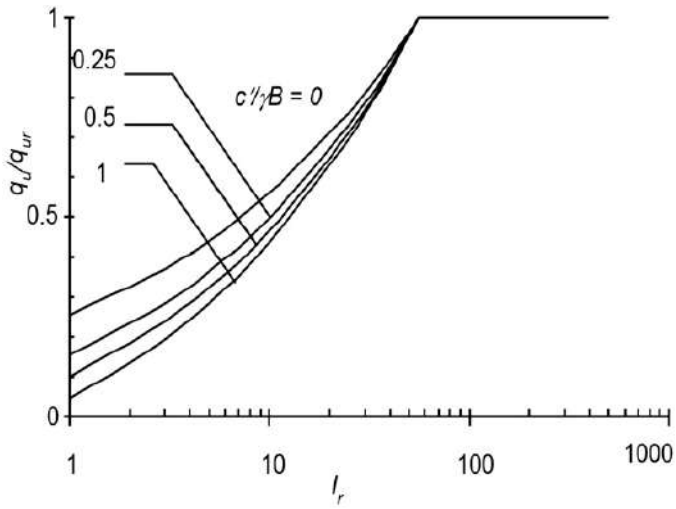

Fig. 8: q_u/q_{ur} vs. I_r and c'/γB for B/L=0, f=20°, D/B=1

For loose sands with ϕ of 25°, the ratio, q_u/q_{ur}, for strip footing on non-cohesive soil, increases **(Fig. 7)** from 0.4 to 1.0 for I_r increasing from 10 to 200, while for very dense soils with ϕ of 45°, the effect of compressibility is very significant with the ratio, q_u/q_{ur}, increasing from 0.05 to 0.5 for I_r increasing from 10 to 600. A similar effect of normalized bearing stress increasing with I_r for a strip footing at depth equal to width is noted in **Fig. 8**, for ϕ equal to 45° and normalized cohesion, c'/γB values of 0 to 1.0. Similar charts can be prepared for various other cases of circular, square or rectangular foundations, but that is not the intention here.

Several charts and test methods are readily available for estimating cohesion, c_u, and angle of shearing resistance, ϕ of soils, but similar correlations or simple tests are not available in most textbooks and in practice for the estimation of shear modulus, G. Hence **Tables 1** and **2** are extracted from Look (2014) for ready reference. Shear or deformation modulus can be interpolated from these tables to arrive at the required rigidity index for the case on hand.

Table 1. Deformation parameters for various soils (after Look, 2014)

Type	Strength of Soil	Elastic Modulus, E (MPa)	
		Short Term	Long Term
Gravel	Loose	25-50	
	Medium	50-100	
	Dense	100-200	
Medium to coarse sand	Very Loose	<5	
	Loose	3-10	
	Medium dense	8-30	
	Dense	25-50	
	Very dense	40-100	
Fine sand	Loose	5-10	
	Medium	10-25	
	Dense	25-50	
Silt	Soft	<10	<8
	Stiff	10-20	8-15
	Hard	>20	>15
Clay	Very Soft	<3	<2
	Soft	2-7	1-5
	Firm	5-12	4-8
	Stiff	10-25	7-20
	Very Stiff	20-50	15-35
	Hard	40-80	30-60

Table 2. Typical values of small strain shear modulus for soils (after Look, 2014)

Shear Modulus, G	Small–strain Shear Modulus, G_0 (MPa)
Soft Clays	3 to 15
Firm clays	7 to 35
Silty sands	30 to 140
Dense sands and gravels	70 to 350

- For large strains Gls = F/2.5.
- For small strains Gss = 2E = 5 Gls.

Conclusions

1. There is an urgent need to revise IS 6403 – 1981 and do away with the arbitrary division of the bearing capacity failure into just general and local shear failures for the estimation of bearing capacity of foundations.
2. Ground/Soils are compressible or deformable and not rigid – plastic as was considered by Terzaghi in 1942.
3. The profession needs to update their practice with the precepts described above.

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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.

SUMMARY OF Ph.D THESES

Title of Thesis: **Seismic Hazard Analysis and Microzonation Studies for Bharuch City and Surrounding Region**

Name of the Student: Dr. Manali S. Patel

Supervisor: Dr. Chandresh Solanki

Department & Institute: Department of Civil Engineering, S.V. NIT Surat, Gujarat

SUMMARY: This research makes an innovative study on seismic hazard analysis for Bharuch region and the geophysical site characterization through Multi-channel Analysis of Surface Wave (MASW) at 96 locations in and around Bharuch, Ankleshwar and Dahej region. An attempt also has been made to evaluate the peak ground acceleration by using equivalent 1-D ground response analysis. From the detailed study, it has been found that the average peak ground acceleration values at surface level in the study area are ranging from 0.07-0.37g and 0.08-0.29g from near and far field earthquake sources. The developed microzonation maps and generated correlations from the current research will be useful for prevention of pre and post disaster in the scenario of upcoming earthquake activities.

Title of Thesis: **Experimental and Numerical Investigations on Vibration Screening and Attenuation Characteristics of Bamboo in-filled Wave Barriers**

Name of the Student: Dr. Sreyashrao Surapreddi

Supervisor: Prof. Priyanka Ghosh

Department & Institute: Department of Civil Engineering, IIT Kanpur, Uttar Pradesh

SUMMARY: This research focuses on the use of bamboo as an environmental-friendly and cost-effective in-filled material for wave barriers to mitigate ground-borne vibrations. Extensive field-scale vibration tests and numerical investigations were conducted to evaluate the vibration screening and attenuation characteristics of bamboo in-filled wave barriers. Further, the impact of excitation frequency, barrier location, barrier configuration, barrier dimensions, and foundation geometry on the vibration screening characteristics is thoroughly evaluated. Results obtained from the investigations revealed that bamboo in-filled wave barriers are very effective in mitigating ground-borne vibrations and offer several advantages over traditional methods. This technology could benefit construction industries, housing societies, and urban residents affected by unwanted vibrations.

Title of Thesis: **Performance Evaluation of Steel Slag as a Sustainable Alternative to Natural Railway Ballast and Sub-ballast**

Name of Student: Dr. Pawan Kumar Chamling

Supervisor: Prof. Sumanta Haldar and Dr. Shantanu Patra

Department & Institute: Department of Civil Engineering, School of Infrastructure, Indian Institute of Technology Bhubaneswar, Odisha

SUMMARY: This study explores the suitability of steel slag as railway ballast and sub-ballast through laboratory testing and numerical modelling. Results indicate that steel slag meets physical and mechanical property standards established by major countries. However, its higher water absorption compared to granite affects its mechanical behavior under saturation. The study examines the impact of water saturation on steel slag ballast, including shear strength, resilient modulus, deformation, damping ratio, and crushing strength. Design charts are proposed for determining the minimum required thickness of steel slag ballast and sub-ballast based on subgrade strength, axle loads, and train speeds. Furthermore, a novel design methodology is introduced to incorporate steel slag as a ballast or sub-ballast layer.

Title of Thesis: **Seismic Behaviour of Shallow Foundation on Slopes**

Name of Student: Dr. Sukanta Das

Supervisor: Prof. B.K. Maheshwari

Department & Institute: Department of Earthquake Engineering, Institute of Technology Roorkee, Uttarakhand

SUMMARY: This study aims to develop an understanding about the failure mechanism of slopes and foundations on slopes. The foundation of the building located at the face of the slope is considered in the present study. The static and seismic bearing capacity of foundations on slopes under different loading conditions is examined using experimental and numerical methods. The Digital Image Correlation (DIC) technique is used to understand the failure modes from experimental tests. The influence of topographic amplification on hill buildings is also reported in this thesis as a Topographic Soil Structure Interaction (T-SSI).

Title of Thesis: **Evaluation of Soil Properties affected due to Land Use Change using Geospatial and Geotechnical Techniques for Nagpur District, Maharashtra**

Name of Student: Dr. Farhan Khan

Supervisor: Dr. Bhumika Das and Dr. R.K. Mishra

Department & Institute: School of Engineering and IT, MATS University, Raipur, Chhattisgarh

SUMMARY: In this thesis, analysis of the geotechnical properties viz., direct shear test, UCS, Free swell index, specific gravity, Atterberg's limit was performed by collecting five samples from each area totaling to 70 soil samples of Nagpur district. Along with this, the GIS technique is used to create geo database to organize the soil data according to the geographical location of sample. Using GIS and remote sensing (ArcGIS), the land cover of past two decades are determined along with temperature variation which is affecting the urban sprawl. It is concluded that using the GIS technique with large volume of data, prediction of strength parameters or other properties can be performed in Geotechnical field.

Title of Thesis: **Seismic Hazard and Geotechnical Vulnerability Assessment of the Soils in the Kashmir Region, Jammu and Kashmir**

Name of Student: Dr. Falak Zahoor

Supervisor: Prof. K.S. Rao and Prof. Neelima Satyam

Department & Institute: Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi

SUMMARY: The thesis aims at providing generalised recommendations for the selection of suitable foundation systems and ground improvement strategies for the soil conditions in the Kashmir Valley, Jammu and Kashmir. Seismic hazard assessment and geotechnical site characterization including static and seismic bearing capacity assessment of soils combined with liquefaction hazard studies form an essential component of the decision-making. As an application of the proposed methodology, the Greater Srinagar region has been divided into vulnerability zones based on an integrated hazard index (IHI) estimated through a combination of bearing capacity hazard index (BCHI) and liquefaction hazard index (LHI) for the region.

Title of Thesis: **Effects of Heterogeneity on Static and Dynamic Behavior of Coal Mine Overburden Dump Slopes**

Name of Student: Dr. Madhumita Mohanty

Supervisor: Dr. Rajib Sarkar and Prof. Sarat Kumar Das

Department & Institute: Department of Civil Engineering, IIT(ISM) Dhanbad, Jharkhand

SUMMARY: The study investigates the effects of heterogeneity on the static and dynamic performance of coal mine overburden (OB) dump slopes. Voronoi tessellation scheme was implemented for simulation of heterogeneity of OB dump materials the

software, UDEC. A prediction model was framed for the factor of safety of heterogeneous slope under gravity loading. Further, performance of OB dump slopes under blast induced ground vibration was investigated. The effects of spatial heterogeneity on the pseudostatic stability of an OB slope were investigated. Finally, the performance of OB dump slopes under earthquake excitations with a wide range of strong motion parameters was investigated.

Title of Thesis: **A Rapid Modeling Approach for Development of Storage Yield Reliability Relationship for Indian Rivers**

Name of Student: Dr. Rewa Bochare

Supervisor: Dr. R.K. Shrivastava

Department & Institute: Department of Civil Engineering, Rajiv Gandhi Prodyogiki Vishwavidhyalaya, Bhopal, Madhya Pradesh

SUMMARY: In this study, a comprehensive dataset of annual virgin stream flow values of 112 rivers in India was analyzed to recalibrate the globally proposed storage-yield-reliability models. Also, a reliability model has been proposed here for the first time, which is a novelty. Sequent peak algorithms and behavior analysis were employed for assessing the storage sizes of hypothetical reservoirs. High coefficient of determination values was obtained for these established rapid mathematical models. Also, using the L-moment approach, the best-fit distribution to the flow dataset was identified as log Pearson type III. Popular performance metrics, reliability, resilience, and vulnerability, were used to assess the performance of the proposed hypothetical reservoirs in the study area. The established models were proposed for quick but tentative estimation of practicability of providing a reservoir.

Title of Thesis: **Analysis off Soil Investigation Data and Development of Soil Design Charts of Punjab State**

Name of Student: Late Sh. Parveen Chander

Supervisor: Dr. Rajiv Chauhan and Dr. Rajesh Kumar

Department & Institute: Department of Civil Engineering, Main Campus, Kapurthala, IKG Punjab Technical University, Jalandhar, Kapurthala, Punjab

SUMMARY: In the present study, Standard Penetration Test (SPT) data was used in Geographic Information System (GIS) for Study area of Punjab. Covering all the 22 districts, a total of 1276 different locations spread over entire state, were selected. Zoning charts have been developed for different depths from the available data of the area by using the Spatial Analyst, Inverse Distance Weighting (IDW) interpolation technique from 1.5 m to 15m depth. The Zoning charts show soil types in study area include CL, ML/CL, ML, SM, SP, GP, GM and GC. The zoning and pie charts show that upto 1.5 m depth the major soil type is silty soil occupying 50.02% of the total area and 6.10% of the study area has ground water table in the range of 0-3 m. Some correlations have also been developed between depth of strata and different parameters. These zonation maps, charts and graphs developed from the specific area will be useful for planning infrastructure growth of the state.

Title of Thesis: **Seismic Hazard Evaluation of Jammu Region and Risk Assessment of Tunnels in the Himalayas**

Name of Student: Dr. Ansari Abdullah Momin Mohammed Ameen

Supervisor: Prof. K.S. Rao, Prof. A.K. Jain and Prof. D. Shirole

Department & Institute: Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi

SUMMARY: The initial part of the thesis focused the deterministic and probabilistic seismic hazard, geophysical testing based site characterization, seismic response analysis, and liquefaction hazard assessment in Jammu Region (JR) of north-western part of the Himalayas. The second half of the work focused on the seismic performance and vulnerability of circular tunnels using the fragility function for the different seismic environments. Seismic risk of 345 km long Udhampur Srinagar Baramulla Rail Link (USBRL) project is also examined. Further, the Seismic Tunnel Damage Prediction (STDP) model proposed based on Deep Learning (DL) approach. These findings will be useful for analysing and designing underground structures in earthquake-prone areas.

Title of Thesis: **Dynamic Response of an Anisotropic Rock and its Application to a Blast Loading Problem**

Name of Student: Dr. Venkatesh Madhukar Deshpande

Supervisor: Prof. Tanusree Chakraborty

Department & Institute: Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi

SUMMARY: The present work investigates the dynamic mechanical behaviour of an anisotropic rock, namely Jhiri shale, at five anisotropy angles (0°, 30°, 45°, 60°, and 90°) through experiments and numerical analysis. Experiments are performed in a large diameter (76 mm) split Hopkinson pressure bar. Initially, the dimensions of a copper pulse shaper glued on the incident bar face are optimized. Numerical simulations of the dynamic experiments are performed using the discrete element method through which micro-crack propagation is examined. The rock grains are generated as Voronoi blocks. The results are applied to study the stability of a tunnel subjected to blast loading.

Title of Thesis: **Pull-out Resistance of Pressure-grouted Soil Nails – A Cavity Expansion Approach**

Name of Student: Dr. Alpha Lukose

Supervisor: Dr. Sudheesh T.K.

Department & Institute: Department of Civil Engineering, Indian Institute of Technology, Palakkad, Kerala

SUMMARY: New cavity expansion and contraction solutions were developed for sand incorporating non-linear soil response in the plastic zone, applicable for both cavity creation and expansion problems, that can predict the entire soil state at any stage of expansion and subsequent contraction. These new analytical solutions were then extended for unsaturated residual soils. Further, the newly formulated solutions were utilized for predicting the evolution of the soil-state throughout various stages of installation and pull-out testing of drilled and pressure-grouted soil nails and thus the maximum pull-out shear stress. The approach was validated using the results of experimental studies. Finally, a new membrane-confined pressure-grouted soil nail system was developed and experimentally validated, which overcomes the drawbacks of conventional pressure grouting and improves the pull-out shear resistance significantly.

Title of Thesis: **Improved Methods for Filtration, Drainage and Structural Evaluations with and without Geocomposites for Subsurface Drainage of Pavements**

Name of Student: Dr. Kalore Shubham Arun

Supervisor: Prof. G.L. Sivakumar Babu

Department & Institute: Department of Civil Engineering, Indian Institute of Science, Bengaluru, Karnataka

SUMMARY: In this thesis, improved methods for filtration, drainage and structural evaluations with and without geocomposites are developed. This study investigates the practical utility of Cu and Cc in evaluating the internal stability of soils. A theoretical approach for predicting critical hydraulic gradients is developed based on the notion of differential void states of fine fraction of internally unstable soils. Granular and geotextile filters are provided in the subsurface drainage systems to limit soil erosion and allow unimpeded water seepage. Improved design criteria are developed for the filter requirements of soil retention, hydraulic conductivity, and clogging. A new approach based on the demand-capacity model is developed for the hydraulic design of granular and granular-cum-geocomposites drainage layers in pavements. The influence of the granular filter characteristics and geocomposite on the modulus of the subgrade-subbase interface is investigated based on the Resilient Modulus tests of composite samples. Specifications for subsurface drainage of pavements are suggested to modify current codal provisions.

Title of Thesis: **Soft Computing Technique for Predicting Rock Strain under Uniaxial Compression**

Name of Student: Dr. Pradeep T.

Supervisor: Prof. Pijush Samui

Department & Institute: Department of Civil Engineering, NIT Patna, Bihar

SUMMARY: Machine learning techniques have shown promise in predicting rock strain, a critical factor in various geotechnical

and geological applications. By training models on historical data comprising rock properties, stress conditions, and strain measurements, accurate predictions can be made. These models leverage algorithms to capture complex relationships between input variables and strain. Features like position of strain gauges, stress magnitude, and strain rate are considered in the training process. Such predictive models offer significant advantages, including faster and cost-effective assessments of rock behavior, aiding in the design and planning of engineering projects, and enhancing understanding of geological processes.

Title of Thesis: **Probabilistic Analysis of Heavy-Haul Railway Corridor**

Name of Student: Dr. Abidhan Bardhan

Supervisor: Prof. Pijush Samui

Department& Institute: Department of Civil Engineering, NIT Patna, Bihar

SUMMARY: In this study, probabilistic analysis of heavy-haul railway corridor has been performed from three different perspectives including slope stability, bearing capacity, and sub-soil settlement. For this purpose, real-life database was collected from a project of Dedicated Freight Corridor of Indian Railways. The probabilistic analysis against slope stability was performed under seismic and non-seismic conditions using hybrid computational paradigms. Probabilistic analyses against bearing capacity and sub-soil settlement were estimated directly using first-order-second-moment method. Additionally, numerous hybrid intelligence models of ANN, ANFIS, ELM, and standard/modified meta-heuristic optimization algorithms were constructed and validated to estimate the consolidation and shear strength parameters of soils.

Title of Thesis: **Experimental and Numerical Investigations of Liquefaction based Failure of Stratified Soil**

Name of Student: Dr. Arpit Jain

Supervisor: Prof. Satyendra Mittal and Prof. Sanjay Kumar Shukla

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

SUMMARY: In this research work, the role of soil-stratification during liquefaction-induced damages has been investigated. Soil strata was prepared with the combination of sandy and silty soil mass. It has been noticed that the silt-interlayered sandy soil mass has strong correlations with the thickness, location and number of silt layers. Recently, many researchers have focused on the more conservative approach of energy-based failure mechanism. Therefore, this approach had been incorporated and compared with the stress and strain based models and suitable regression models were developed for the prediction of liquefaction resistance and energy dissipation. Usage of waste plastic bottle fibers as a mitigation against liquefaction-induced damages have been studied. Different percentages of plastic fibers contents were added to the Solani river sand and liquefaction triggering has been considered for different parameters. Few more tests were conducted to understand the pre and post-liquefaction nature of sandy and silty soil. The test outcome suggested the critical role of silt layer presence and its characteristics. The modeling has been performed using UBC3D-PLM model.

Title of Thesis: **Seismic Microzonation of Chennai City using Fuzzy Hazard and Ground Response Analyses**

Name of Student: Dr. K. Menaka

Supervisor: Prof. Dr. G.R. Dodagoudar

Department& Institute: Department of Civil Engineering, IIT Madras, Tamilnadu

SUMMARY: The site-specific results of seismic hazard and ground response analyses are useful to develop the seismic microzonation maps. The challenge in the conventional seismic hazard and ground response analyses is to account for the ambiguity and lack of knowledge that exists in the form of epistemic uncertainties. These types of uncertainties are represented using the fuzzy sets and fuzzy logic. The epistemic uncertainty in the hazard analysis is accounted for via the fuzzy-probabilistic seismic hazard analysis (FPSHA). The fuzzy approach is used for performing the one-dimensional (1D) equivalent linear ground response analysis. The microzonation maps depict the spatial variation of the PGA in Chennai city at ground level, 2, 4, 6, 8, and 10 m from the ground surface and at the bedrock and also the spatial variations of amplification factors, peak spectral accelerations and predominant site periods are also obtained in the present study.

IGS Ahmedabad Chapter

The one day seminar on "Current Field Practices in Geotechnical Engineering" was organized by the Applied Mechanics Department, Vishwakarma Government Engineering College under IGS-VGEC Student Chapter at Vishveshvariya Auditorium, VGEC, Chandkheda on 12th May, 2023. On this occasion, Dr. N. N. Bhuptani, Principal VGEC was the Patron of the event. Dr. Shweta P Dave, Principal Govt. Engineering College, Gandhinagar was invited as the chief guest. The seminar was inaugurated by the dignitaries with prayer and lamp lighting. Dr. K.L. Timani, Head, Applied Mechanics Department, welcomed the august gathering and narrated the objectives and importance of IGS student chapter & seminar. After the inaugural session, the technical sessions were delivered by Mr. Himanshu Kotak, Founder and Director, C-Phi Consultant, Pvt. Ltd., Ahmedabad and Dr. Kannan Iyer, Assistant Professor, Civil Engineering Department, IITRAM, Ahmedabad and talked about current geotechnical engineering practice taken up in the field with various case studies. Emphases were given by the experts about geotechnical investigation, testing and field instrumentation in the geotechnical construction projects. One corporate presentation was also arranged during this seminar by IMS, Ahmedabad about opportunities and avenues available after UG studies to make students aware about their future prospects. All the faculty members of Civil Engineering and Applied Mechanics Department attended the program. 33 IGS student members alognwith 110 UG students attended the program and enriched their knowledge. The seminar ended by the vote of thanks presented by Dr. B. G. Buddhdev Co-ordinator of seminar followed by event group photograph.

IGS Aurangabad Chapter

The Civil Engineering Department MIT, along with IGS Aurangabad Chapter Conducted Saptaranga-2K23 Event from 24th to 26th April 2023. This Year Saptarang-2K23 received an overwhelming response in all its events and was a grand success. Saptarnag-2K23 was mainly organized to encourage all-round growth of students.

Participants from all Engineering Colleges of Chhatrapati Sambhajinagar (Aurangabad) were invited to the event. Saptarang-2K23 started on 24/04/2023 at 10.00am in hall no. 110 with the inauguration ceremony. Dr. V. G. Achwal & Dr. U. B. Shinde were chief guests for the event. The Faculty Coordinators for the event were Prof. Ajay Ratnaparkhi, Prof. Sagar Deshmukh, Prof. V.R. Upadhye & all staff of Civil Engineering Department supported in coordinating Saptarang-2K23.

Poster Presentation, CAD Mania, Bridge Making, Survey Master, Technical Quiz, Chess, and Rangoli competition were conducted during Saptaranga-2K23. The winners were awarded cash prizes: 1st winner received Rs. 2500, 2nd winner received Rs. 1500, 3rd winner received Rs. 1000. The faculty members & students of the Civil Engineering Department are thankful for the support from MIT Institute, Dr. U.B. Kalwane, Dr. M.S. Dixit, IGS Aurangabad Chapter & all other sponsors.

IGS Bangalore Chapter

Indian Institute of Science in association with the IGS Bangalore Chapter has conducted a self-supported short course entitled "Soil Constitutive Models" between 15th May through 19th May 2023. There were 23 attendees, mostly comprising of middle to senior level Phd students from various research institutes. The instructors were Prof. Tejas G Murthy (IISc Bangalore), Prof. Arghya Das (IIT Kanpur), Prof. Mousumi Mukherjee (IIT Mandi), and Prof. Ramesh Kandasami (IIT Madras).

Indian Geotechnical Society Bangalore & Surathkal Chapters in association with National Jute Board, Indian Institute of Science (IISc) and National Institute of Technology Karnataka (NITK) organized a national conference on "Jute Geotextile as a Sustainable Solution for Civil Engineering Applications, including Rural Infrastructure Development." The conference was held on 18th May at IISc, Bangalore. The conference is aimed at bringing awareness on the use of jute geotextiles and highlighting the potential of jute geotextiles as an eco-friendly and cost-effective solution for various civil engineering applications, particularly in the context of rural infrastructure development. The conference was inaugurated by Prof Vinod Chandra Menon, the International Coordinator of G20 C20 Working Group on Sustainable and Resilient Communities: Climate Environment and Net Zero Targets. Prof G L Sivakumar Babu, Chairman of the conference, has given the welcome address. Cmde A K Jolly, Chairman and Managing Director of The Jute Corporation of India Ltd. has highlighted the country's Jute farming and manufacturing scenarios. Jute Commissioner Shri Moloy Chandan Chakraborty presided over the function and highlighted the importance of jute in carbon neutrality. Shri Mahesh Hiremat, Ex COO KRRDA & Ex-Director, NRIDA, Dr. Mahadeb Datta, Deputy Director (Technical) and Head of the Technical Division of the National Jute Board, Shri. Monimoy Das, Technical Officer Gr. I in the National Jute Board, Shri P. K. Choudhury, Advisor for the National Jute Board, Prof. G Madhavi Latha, Chair of the Centre for Sustainable Technologies at IISc & Chair of the IGS Bangalore Chapter, Shri Abu Riyaz Zaffar, Secretary of the Indian Jute Mills Association, Dr. S. Manivanan, Principal Scientist at ICAR, Dr. Malay Kumar Deb, Director of the Civil Engineering Consultancy Services Pvt. Ltd., Dr. Minimol Korulla, Vice President & Head of Strategic Projects at Maccaferri India, Dr. Supriya Pal, Associate Professor at NIT Durgapur, Dr. Sreevalsa Kolathayar, Assistant Professor at NIT Surathkal & Secretary of IGS Surathkal Chapter were the speakers of the conference. The conference ended with a panel discussion on potential challenges associated with the adoption of jute geotextiles in civil engineering and environmental projects. The conference was attended by 200 delegates, including officials/ engineers from Govt departments like PWD, KRRDA, KHRI, CWRDM etc., and from industry, Jute mills, and researchers from academic institutions from different parts of the country. Full report of the conference is available at:

https://drive.google.com/file/d/1k_EBTj7WKhMQQgqSFhHsXUiB_o3qzdvx/view?usp=drive_link

Release of the proceedings of the National Conference on National Jute Geotextiles

A new student chapter of IGS was inaugurated at Global Academy of Technology, Bangalore on 30th May 2023. Ms. Pallavi, H. J., Assistant Professor in the Department of Civil Engineering is the faculty coordinator of the Chapter, with Ms. Suraksha P Gowda of 6th Semester B.E. and Ms. Merlin Stephen of 4th Semester B.E. in Civil Engineering as the Chair and Vice-Chair of the Chapter, respectively. Dr. Allamprabhu, Head of the Department of Civil Engineering, has given the welcome address. The inauguration commenced with the Introduction to IGS Bangalore Chapter by Prof. Madhavi Latha G, Chair of the IGS Bangalore Chapter and video message from Dr. Anil Joseph, President, IGS. Dr. N. Ranapratap Reddy, Principal of the Institute, has urged the students to organize many technical activities.

The inaugural session was followed by a technical session in which Prof. Shivkumar Babu talked on "Geotechnical Engineering – Introduction, Measures of safety, opportunities" and Prof. Madhavi Latha talked on "Extreme Geotechnical Engineering". Full report of the event can be found at:

https://drive.google.com/file/d/1wh0cYIIRPMFJfBqyME26id0gKD9CFRQ3/view?usp=sharing

Members of the newly inaugurated student chapter

IGS Baroda Chapter

A one-day seminar on the Geotechnical Aspects of High-Rise Structures (GAHRS-23) was organized on 24/06/2023 at Seminar Hall of Textile Engineering Department, F.T.E, Vadodara.The seminar aimed to explore and discuss the unique challenges and considerations associated with the geotechnical aspects of constructing high-rise structures. Total 87 participant from academic, research scholar and industry attended the seminar. The event brought together industry experts, researchers, and professionals in the field of geotechnical engineering. The seminar commenced by lighting a lamp by Dr. Dhanesh Patel, Dean of the Faculty of Technology and Engineering, MSU, Baroda. The dignitaries like, Dr. A.V. Shroff, Patron, IGS Baroda Chapter, Er. Ravikiran Vaidya, Co-Chairman, IGS Baroda Chapter and Dr. J.D. Rathod, Head of Applied Mechanics Department, MSU, Baroda were present during the Seminar. The dignitaries delivered an opening address, highlighting the significance of the seminar in fostering knowledge exchange and professional development in the field.

Participants in the seminar

Total four keynote speakers presented a comprehensive overview of their respective topics. Er. Nikunj Amin discussed various site investigation techniques employed in geotechnical studies for high-rise structures. The fundamentals of site-specific investigations were thoroughly covered by Dr. Tejaskumar Thaker. He also discussed parameters for site-specific analysis such as seismic hazard analysis, a PGA model at rock level, seismic hazard data, and a ground response analysis. Prof. K.N. Sheth talks about a number of different techniques for supporting deep excavation, including segmental diaphragm walls, single anchored diaphragm wall, multiple anchored diaphragm wall and also covered the design of prestressed ground anchors. Dr. Kannan Iyer delivered a lecture on the piled raft foundation concept. He discussed the Burlands approach to pile raft design and provided insight into various theories of Poulos & Davis, Randolph, and other concepts.

IGS Bhubaneshwar Chapter

School of Infrastructure (SIF) of Indian Institute of Technology Bhubaneswar organised a Two-day Workshop on Geosynthetics for Sustainable Civil Infrastructure. The event "Workshop on Geosynthetics for Sustainable Civil Infrastructure" was held at IIT Bhubaneswar during June 16-17, 2023 in association with Indian Geotechnical Society, Bhubaneswar Chapter and C. V. Raman Global University, Bhubaneswar. Shri Ashutosh Dash, Engineer-in-Chief, Interstate Issues and Legal Matters, Govt. of Odisha was the chief guest of the inaugural function. The workshop started off with a welcome address by Prof. Sumanta Haldar, organizing secretary and Head of the School of Infrastructure, IIT Bhubaneswar. This was followed by addresses by Prof. Sujit Roy, Dean, Continuing Education, IIT Bhubaneswar, Dr. Anil Joseph, President, Indian Geotechnical Society, Shri. L.K. Tripathy, Hon. Secretary, Indian Geotechnical Society, Bhubaneswar Chapter, Prof. G. Sridevi, Professor in Civil Engineering, C.V. Raman Global University, and vote of thanks by Dr. Shantanu Patra, Joint Organising Secretary. Application of geosynthetics in pavement, railroads, embankments, retaining structures, reservoirs, canals, dams, landfill liners and covers were discussed during the event. The workshop also promoted the uses of sustainable geosynthetics, such as jute and coir geosynthetics in various civil infrastructure projects. More than 150 delegates attended from various organisations, such as Department of Water Resources, Minor Irrigation, Works Department (Govt. of Odisha), and National Jute Board. Several expert lectures were delivered by prominent academicians. Case studies were presented by various organisations, such as, FlexiTuff ventures, Garware Technical Fibres Ltd., Best Geotechnics Pvt. Ltd., Terre Armee, Maccaferri India, TechFab India, G-CUBE Engg. Pvt. Ltd. and Sagar Cement. The event was immensely beneficial for students, academicians,

Two-day workshop on Geosynthetics for Sustainable Civil Infrastructure

researchers, professionals from various public and private sector and industries. Mr. Ajay Kumar Pradhan, Chief Engg., M&ERO, Govt. of Odisha graced the event as a guest of honour during the panel discussion. The program ended with closing remarks by Dr. Shantanu Patra, Joint Organising Secretary. The 235th Executive Committee meeting of Indian Geotechnical Society was also hosted by School of Infrastructure, IIT Bhubaneswar on June 17, 2023.

235th Executive Committee meeting of Indian Geotechnical Society

IGS Coimbatore Chapter

The CSI College of Engineering, Ketti in association with the Indian Geo Technical Society (IGS), Coimbatore chapter organized Two days National Workshop on "Soil Taxonomy and Selection of Foundation in Hill Slopes" on 18.04.2023 and 19.04.2023. The main objective of the two days workshop was to impart practical exposure on field exploration, laboratory soil investigation and selection of foundation on hill slopes. Dr. P. D. Arumairaj, Chairman IGS Coimbatore delivered an informative talk with valuable insights and knowledge. His expertise, both in theory and practice, was very much useful to the participants.

The participants were then taken to the field where soil exploration was in progress during the two days and were explained of its features by Er. R. Mohanraj from Alzum group. The teaching faculty in CSI College of Engineering, Ketti trained the participants in all laboratory tests.

In conclusion, the two days national Level Workshop was very much useful for participants in understanding the difficult terrain of slopes and its solution to the foundations.

Organising team along with the President, IGS and Officials of IGS Coimbatore Chapter

The Department of Civil Engineering, KPR Institute of Engineering and Technology (KPRIET), Coimbatore in association with the Indian Geotechnical Society, Coimbatore Chapter organized a National Level Workshop on "Sustainable Geotechniques" and a Quiz Contest – QFIESTA 2023 on 27.04.2023. The event received an overwhelming response from 110 students, including participants from 15 different colleges.

Dr. Anil Joseph, the President of IGS, delivered an inspiring and informative lecture on "Sustainable Geotechniques and Case Studies on failures of Bridge Works and Embankments". His presentation on three case studies provided insights on his field expertise and was truly motivating to all the participants. The chairman of IGS Coimbatore Chapter Dr. P. D. Arumairaj shared his experiences and provided valuable guidance throughout the workshop and was the key person to conduct Quiz programme among the student participants. Dr. S.P. Jeyapriya, Honorary Secretary, IGS Coimbatore Chapter, delivered an informative talk on IGS and its activities, a brief introduction of the activities carried out so far by Coimbatore chapter helped the participants to gain a better understanding of the organization and its objectives. The Principal of KPRIET and the Patron of the Programme Dr.M.Akila extended all the guidance and support to the organising team headed by Dr. G.Anusha, the Head of the Department and the Co-ordinators of the Programme Dr. K.S. Elango and Mr. S. Vinothkumar

The highlight of the event was the quiz contest. Certificates and Cash prizes were given to the winners of Quiz contest while the other participants were given participation certificates. The participants have not only gained valuable knowledge, but they have also had the opportunity to connect with professionals and learn from their experiences.

IGS Goa Chapter

IGS Goa Chapter conducted a half day seminar on "Tsunami Defence Structures for Coastal Protection" on 17th May 2023 at 2.30pm. Dr. Babloo Chaudhary, Asst. Professor, NITK Surathkal was the chief guest. He delivered very informative and enlightening talk on tsunami defence structures. The new committee of IGS Goa GEC students chapter for the year 2023 was installed in his presence. The office bearers were Ms. Srishti Kolvenkar as president, Shri. Shivesh Rane as vice president, Ms. Joevita Lourenco as Secretary, Ms. Vaishnavi Naik as Treasurer and Ms. Judith Fernandes and Shri. Myron Rocha as members. Dr. Purnanand Savoikar, Chairman, IGS Goa Chapter and Er. Umesh Kulkarni, Secretary, IGS Goa chapter, also spoke on the occasion. Ms. Srishti Kolvenkar welcomed the gathering. Prof. Smita Aldonkar coordinated the event and Ms. Shauree Aldonkar compered the event. Ms. Maithily Hadfadkar introduced the chief guest and Ms. Joevita Lourenco proposed the vote of thanks. Seminar was attended by over 100 faculty and student delegates.

Office bearers of IGS Goa chapter along with faculty and students visited the soil nailing site at Shree Chandreshwar Bhutnath hill at Gudi Paroda Goa, one of the highest point in Goa, where landslide had occurred last year. About 70 faculty and students visited the site and observed the ongoing works. The visit was coordinated by Ms. Sneha Korde, Ms. Srishri Kolvenkar and Ms. Joevita Lourenco.

IGS Goa Chapter conducted a seminar on "Recent Trends in Design, Construction and Testing of Pile Foundations" on 10th June 2023 at Goa Engineering college in the seminar series on Geotechnical Engineering for Infrastructure Development which the chapter had started in 2022. Er. Ravikiran Vaidya and Dr. Jaykumar Shukla, Principal Engineers from Geodynamics, Vadodara were the resource persons. Dr Jaykumar Shukla delivered the talk on "Investigations and Design & Construction of Pile Foundation" while Er. Ravikiran Vaidya delivered a talk on "Recent Advances in Deep Foundation Testing". Both the talks were very informative. Er. Ravikiran and Dr. Jaykumar were felicitated at the hands of Dr. M.S. Krupashankara, Principal, Goa Engineering College and Dr. K.G. Guptha on the occasion of completing 25 years of Geodynamics. Dr. Purnanand Savoikar welcomed the delegates. Dr. Nisha Naik coordinated the event. Entire programme was compered by Ms. Shauree Aldonkar. Ms Srishti Kolvenkar and Ms. Joevita Lourenco introduced the resource persons. Ms. Srishti Kolvenkar proposed the vote of thanks.

IGS Jabalpur Chapter

The Jabalpur chapter conducted three events, a field visit, a motivational seminar, and a national webinar in the second quarter of the year 2023. A field visit was conducted to the students of the Takshshila Institute of Engineering and Technology Students' Chapter. In this field visit, students visited an under-construction Cable Stayed Bridge over the river Narmada at Lameta Ghat Location in Jabalpur. At this construction site, about 40 students learned the construction of pylons and the use of heavy machinery in bridge construction. IGS Jabalpur Chapter organized a one-day Seminar "A Talk with Technocrats" on 18th April for the students of the TIET students' Chapter. This seminar was conducted in association with IEI JLC, ICI, IOV, and PEA Jabalpur Centers. The students interacted with the Chairmen and Secretaries of these technical institutions.

Students' Chapter Visit at Lameta Ghat Bridge

On the celebration of the 75th year's platinum jubilee of IGS, a National

Webinar as Dr. Dinesh Khare's Memorial Lecture jointly organized by IGS Jabalpur Chapter and Students' Chapter TIET on 2nd July 2023. The guest speaker of this webinar Dr. Abhishek Sharma, NIT Jalandhar presented a lecture on the topic of Bridge Construction Practices and Challenges in India. Dr. Sharma presented useful information about foundation design for safe bridge construction and the

National Webinar : Bridge Practice In India: Practice and Challenges'

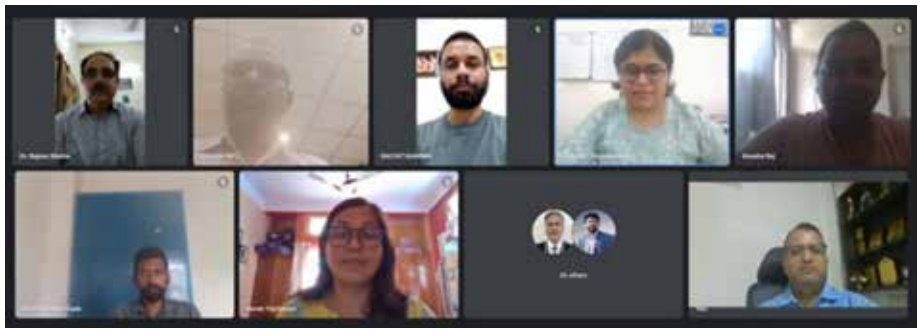
construction of strong bridges using modern techniques. Er. Sanjeev Verma, Chairman of the organization, presented the welcome address and Secretary Dr. Sanjay Verma presented a brief report of the Jabalpur Chapter's activities. Former National President of the IGS Dr. N.K. Samadhiya and present National Secretary Dr. A.P. Singh called this event socially useful and a need of the present time.

IGS Jalandhar Chapter

The Faculty Development Program on Advances in Geotechnical Earthquake Engineering was a five-day event (online mode). The speakers for this event were Prof. Neelima Satyam, Prof. V A Sawant, Prof. G R Dodagoudar and Dr. Meghana Sharma organised by Department of Civil Engineering, Dr B R Ambedkar NIT Jalandhar in association with IGS Jalandhar Chapter.The inaugural ceremony was graced by Dr. A P Singh (Honorary Secretary of IGS), Prof. B.K. Kanaujia, Director, NIT Jalandhar, Prof. A K Agnihotri (Head, Civil Engineering and Chairman IGS Jalandhar Chapter), Dr. H.S. Chore (Convenor), Dr. S. Rupali and Dr. K. Senthil (organising secretary), other faculty members and participants.

The program focused on enhancing knowledge and understanding of geotechnical earthquake engineering. The program aimed to equip participants with valuable insights and practical knowledge to address the challenges associated with earthquakes and ensure the safety and resilience of the built environment. The program covered earthquake fundamentals, seismic hazard analysis and risk assessment. Participants learned ground response analysis and accurate prediction of ground motions to enhance structural safety. Seismic analysis of tunnels and mitigation measures for underground structures were emphasized. Liquefaction potential assessment and mitigation techniques, such as stone column application, were explored. Soil-structure interaction was thoroughly discussed for optimizing designs against seismic forces. Real-world case studies shared by esteemed experts demonstrated the practical application of geotechnical earthquake engineering principles. The program also highlighted nature-based solutions for liquefaction mitigation and sustainable infrastructure development. Overall, participants gained comprehensive knowledge in geotechnical earthquake engineering principles and their practical implications.

Overall, the program aimed to equip participants with comprehensive knowledge and practical skills in geotechnical earthquake engineering. By collaborating with experts from various fields and embracing the interdisciplinary nature of the subject, participants were encouraged to apply their newfound knowledge in research, design, and professional endeavors. The program fostered a deeper understanding of the complexities of earthquake engineering and empowered participants to contribute towards building safer and more resilient communities.



IGS Kochi Chapter

Kochi chapter collaborated with the management of Construction Philosophy Magazine of Kochi to conduct a 3 day premium conclave CONFEST. It is an event for the benefit of construction industry which was organized along with some more prestigious technical associations from Kochi. The event was conducted from 19th to 21st May 2023 at Kochi. Several Technical talks were arranged by experts from different areas by each associated organization.

Dr. Jimmy Thomas, Vice Chairman of IGS Kochi Chapter has delivered a talk on "Investigating Soil Variability and Complexity & its Implications in Sustainable Construction Practices".

A student chapter is inaugurated at Govt. Engineering College, Palakkad, Kerala under the aegis of Kochi chapter on 14th June 2023. Dr. Anil Joseph, President IGS was the Chief Guest and Er. A.V.S. Chakravarti, Hon. Secretary IGS Kochi

Chapter was the Guest of Honour. The Student Chapter was formed with about 100 students with Er. Sandeep as the faculty coordinator.

Dr. Meenakshy K, Principal of GEC Palakkad has presided over the function. Dr. Shibu A, HOD, Dept. of Civil Engg, and Dr. Abdul Samad, HOD, Dept, of Mech Engg have also participated in the inaugural function.

Guest of Honour Er. Abbas B addressing the gathering

After the inauguration ceremony, Dr. Anil Joseph has delivered a talk on "Potential of Professional Geotechnical Practice". He motivated the students to excel in the field of geotechnical engineering by explaining some challenging case studies.

A technical talk on "Construction of Sea Wall at Chellanam – An overview" by Er. Aswin, Irrigation Department was organized on 20th June 2023. Er. Abbas. B, Executive Engineer, Irrigation Dept. was the Guest of Honour and Dr. Anil Joseph, National President IGS presided over the function. Er. Aswin, in his talk, has explained the necessity of shore protection in Chellanam. Details as how the designs of Sea wall construction is finalized and construction activities and materials used were explained in detail.

IGS Pune Chapter

Women Engineer's Cell of the IGS PUNE CHAPTER and AGCOE satara organized Webinar by Er. GAYATHRI, Design Engineer, AECOM on "Challenges in Selection of Foundations: Colombo Port" on 5th Apr 2023.

24th student chapter inauguration at SND Yeola, was held on 12 Apr 2023 with guest lecture by Er. Vikas Patil, Chairman IGS Pune Chapter on "Graviloft Technology-Earth Retention Solution". The lecture highlighted the importance of retaining walls in various engineering projects and explored the advancements in technology that have revolutionized the design, construction, and maintenance of these structures.

25th student chapter was inaugurated at WCE Sangli on 13th April, 2023 with guest speaker Er. Shubhdha Jagtap, Mruda Cosultants delivering a talk on "Role of Geotechnical Engineers in Infrastructure Development" keeping in mind the audience who can opt for Geotechnical Engineering as their career option and also to highlight the crucial role that we play in every infra project.

On April 15, 2023, inauguration of the 26th Student Chapter of the Indian Geotechnical Society (IGS) - Pune Chapter was organized by Department of Geology, Savitribai Phule Pune University. This programme was held under the chairmanship of professor S.J. Sangode, HOD, Dept. of Geology, SPPU and in presence of esteemed guests Prof. Suman Jain (Hon. Secretary IGS, Pune Chapter), Prof. Y.R. Dhar (IITISM Dhanbad), Ms. Junagade (EC Member IGS-Pune chapter), Mr. Navghare (Treasure IGS-Pune chapter) and other professors from the department of Geology, SPPU. Dr. D.P. Mohanty, faculty coordinator of the IGS-SPPU student chapter, welcomed all the guests, student members and other participants. The event was anchored by Ms. Sharayu Armal of M.Sc. part

II Geology. The event was followed by an excellent guest lecture by Prof. Y.R. Dhar (IIT-ISM Dhanbad) on the topic "Scope of Engineering Geology and Geotechnology with Reference to Infrastructure Developments in India".

One day Workshop on Advances in Civil Engineering was organised at VPKBIET, Baramati with IGS Pune Chapter on 17 April, 2023. Dr. Sachin Jain delivered a Session on ML and AI in Construction Industry and Er. Suman Jain on Liquefaction Hazard and its Mitigation and Deepali Kulkarni delivered a session on River Training works at VBKBIET, Baramati in a one-day workshop on "Recent Advances in Civil Engineering" organised by VPKBIET's IGS Student Chapter and IGS Pune Local Chapter. IGS Pune Chapter is thankful to Management, Vidya Pratishthan Baramati, Dr. Bichakar, Principal, HOD-Dr. Chittaranjan Nayak , Mrs Pallavi Boke, coordinator and other faculty members for organising such a great event.

Guest lecture was organised at Bharti VDU COE with IGS Pune Chapter on Field and Lab tests for shear strength determination by Er. Suman Jain, Secretary on 24th April 2023 for undergraduate students.

Inauguration of 27th student chapter at School of Engg. and Science, MIT-ADT Univ, Loni was held on 25 April 2023 along with lecture by Er. Vikas Patil on Prospects in Geotechnical Engineering.

PCCOE along with PCCOER and IGS Pune Chapter organised a Guest lecture by Vikas Ramgude, Chief Engineer, PWD, Maharashtra on "Geotechnical Engg. Applications in Bridge Foundations" on 27 April 2023.

The non-destructive testing (NDT) workshop was organised by the Civil Engineering Department, SND COERC, Yeola in association with IGS Pune Chapter on 27 April 2023. Er. Ganesh Jadhav aimed to provide participants with a comprehensive understanding of various NDT techniques and their applications in the field of Engineering.

One day FDP titled "Perspective on Research Problem and Formulation" by Vasant Matsagar, Dogra Chair professor, IIT Delhi on 29 Apr 2023 was organised at SND COERC, Yeola in association with IGS Pune Chapter. The expert for the same was Dr Vasant A. Matsagar. The expert taught the basics of earthquakes, types of seismic hazards, understanding structural vulnerabilities, risk assessment, and effective mitigation strategies.

Inauguration of 28th student chapter at School of Engg. and Science, Ajinkya Dr. D.Y. Patil Univ, Charoli, in association with IGS Pune Chapter on 04 May 2023. On this occasion Guest lecture was delivered on "Advanced Pile Testing" by Siddharth Kulkarni, Director - Soiltech (I) Pvt. Ltd.

IGS Mumbai Chapter

The first session was delivered by Mr. Sajith Sreedharan, Managing Director, Eka Infra Consultants, Mumbai on 18/03/23. He spoke on "Geotechnical Challenges on the Margins of Land and Sea". Mr. Sreedharan discussed the infrastructure created along coastlines that supports the economic activities of the nation. With India's vast coastline, civil engineers have an opportunity to address the many challenges posed by geography, geology, and topography. The lecture was focused on four key activities: dredging, breakwaters, berth/ storage yard, and climate adaptation. Mr. Sreedharan emphasized the importance of high-quality geotechnical data in the design of near shore infrastructure. Overall, Mr. Sreedharan's presentation highlighted the challenges that civil engineers face when designing infrastructure along coastlines, and the critical role that geotechnical data plays in ensuring the success of these projects.

The second session was delivered by Mr. Harsha Gamidi, Superintending Engineer, IEOT, ONGC, India on 29/04/23. He spoke on "Overview of Piezocone Pentration Testing" and presented its reliability and versatility for geotechnical problems. His presentation included lots of applications in ground improvement and foundation design problems along with discussion on published correlations. His presentation also covered the existing practices being followed in CPTU equipment, operating procedures (onshore and offshore) and quality control techniques followed by a few important CPTU based soil classification systems, their advantages and limitations. The webinar was stimulating and had lively Q&A sessions. Honorable President of IGS, Mr. Anil Jospeh was present for the session.

IGS Surat Chapter

Indian Geotechnical Society Student Chapter SVNIT in association with Indian Geotechnical Society Surat Chapter organised an interaction session on topic "Environmental Geotechnics" by Prof. D. N. Singh, D. L. Shah Chair Professor for Innovation, Department of Civil Engineering, IIT Bombay along with his PhD Research Scholars on 24/04/2023. Dr. C. H. Solanki, Professor, DoCE SVNIT, Surat welcomed all the participants who had gathered for the interaction session. The session was attended by the M.Tech and Ph.D students and faculty members from Geotechnical Engineering Section, Department of Civil Engineering, SVNIT Surat and Er. Hitesh H. Desai, Chairman, IGS Surat chapter. The current trend in Environmental Geotechnics was discussed by Prof. D. N. Singh and his research scholars during the interaction. The extraction of gas hydration, geothermal energy, soil pore-chemistry, innovative solutions to stabilise the leachate problems in landfills, and other relevant topics related to environmental geotechnics were discussed. The session ended with a vote of thanks from Dr. Jitesh T. Chavda.

Department of Civil Engineering, SVNIT Surat in association with Indian Geotechnical Society Student Chapter SVNIT and Indian Geotechnical Society Surat Chapter organised an interaction session on topic "Earthquake Geotechnical Engineering" by Prof. Deepankar Choudhury, Prof. T. Kant Chair Professor (HAG) and Head, Department of Civil Engineering, IIT Bombay along with his Ph.D Research Scholars on 19/05/2023. Dr. C.H. Solanki, Professor, DoCE SVNIT, Surat welcomed all the participants who had gathered for the interaction session. The current trend and practices related to earthquake geotechnics were discussed by Prof. Deepankar Choudhury. In detail, he discussed site-specific hazard evaluation, seismic site characterisation, site compatible ground motion, ground response analysis, challenges for the geotechnical earthquake engineers to account the site-specific seismic inputs for the design of important structure, and accounting the use of peak particle velocity (PPV) for estimating the hazard to existing heritage structures. His research scholars presented the research work they are currently carrying out during the interaction. The session ended with a vote of thanks from Dr. Jitesh T. Chavda.

IGS Surathkal Chapter

Two-day International Conference on "Sustainable Infrastructure: Innovation, Opportunities and Challenges – 2023 (SIIOC – 2023)" was organized by Department of Civil Engineering, NITK on 20 – 21 April, 2023, in association with IGS Surathkal Chapter and ISET. The conference was held at NIT Surathkal and was listed as an event under the Civil20 sub-group of G20. The conference began on 20th April with a formal inauguration ceremony. Prof. Vinod Chandra Menon, Founder Member,NDMA, was the chief guest and Prof. Darren Chian Siau Chen, the Guest of Honour during the inauguration ceremony presided by Prof. Prasad Krishna, Director, NITK. Five keynote lectures were delivered during the conference by eminent speakers like Prof. Darren Chian Siau Chen from National University of Singapore, Prof. K S Nanjunda Rao from Indian Institute of Science, Bangalore, Prof. M V L R Anjaneyulu from National Institute of Technology Calicut, Prof Kevin Paine from University of Bath and Prof Fadi Aldakheel from Leibniz University, Hanover. Prof. Kevin and Prof. Fadi delivered the talk in online mode. Participants from all over the country and abroad participated in the conference. There were about 250 paper presentations made by participants spread over four sessions,

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with each session having twelve parallel sessions (six online and six offline modes of presentation). Research papers were presented focussing on Structural Engineering, Transportation Engineering, Geotechnical Engineering, Environmental Engineering and Water Resources Engineering. A total of 21 offline sessions were held during the two-day international conference. One best paper award was awarded for the most innovative research work presented during each offline session. The award was sponsored by Springer Nature and carried a cash prize of 75 euros and a certificate from the organizers. Selected full-length papers presented during the conference will be published as a

Scopus Indexed book chapter published by Springer. The conference received sponsorship from Chaitanya Projects Private Limited, Ramco Cements and TRN Constructions Ltd. The conference received support from professional societies like Indian Geotechnical Society Surathkal chapter and Indian Society of Earthquake Technology.

IGS Srinagar Chapter

IGS Srinagar Chapter in Association with Department of Civil Engineering National Institute of Technology Srinagar, J&K, organized One Day Seminar on "Advances in Geotechnical Engineering for Sustainable Development (ACESD 2023)" on 10 April 2023, at NIT Srinagar. This Seminar aimed to provide a forum for the dissemination of modern knowledge on civil and infrastructure engineering by scholars, and researchers to share and exchange knowledge and experience in research on sustainable development related to Geotechnical applications in Civil Engineering Practice. Prof. (Dr.) M.R. Madhav, AICTE-INAE Distinguished Visiting Professor IIT, Hyderabad, Professor Emeritus, J.N.T.U, Hyderabad delivered an inaugural lecture on various Case histories in Geotech. Engg. Practice in India & abroad. The lecture was very much fruitful for the attendees. After the lecture, Prof Madhav had a very fruitful interaction with Ph.D. & M.Tech Scholars of Geotechnical Engg. Division. Prof. B.A. Mir,Hon. Secretary IGS Srinagar Chapter delivered a lecture on "Soil Bio-engineering: a Sustainable Ground Improvement Technique for Stabilization of Marginal Soils". Among other Speakers, Dr. Majid Hussain,Asst. Professor, Civil Engg. and Dr. R. P. Shukla, Asst. Professor, Civil Engg. also delivered lectures in the One Day Seminar.

45th IGS ANNUAL LECTURE 2023

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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"

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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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

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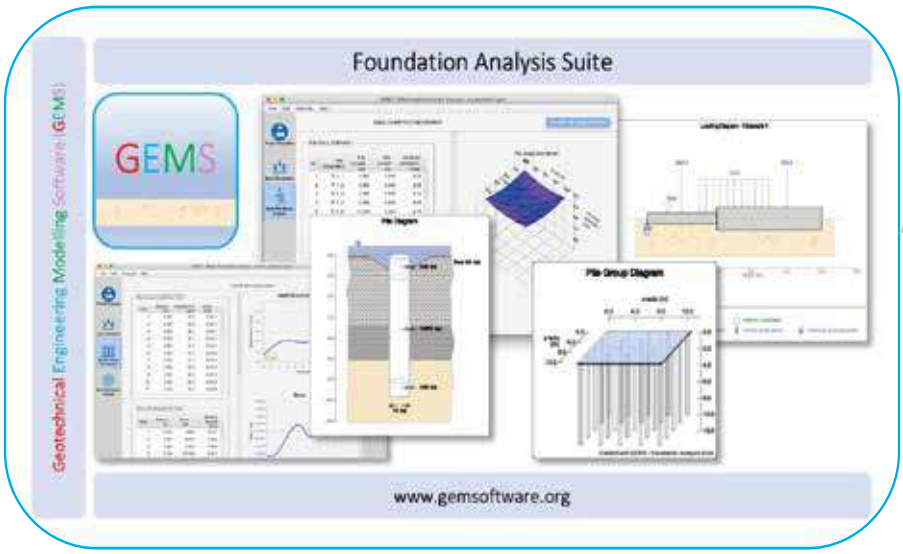

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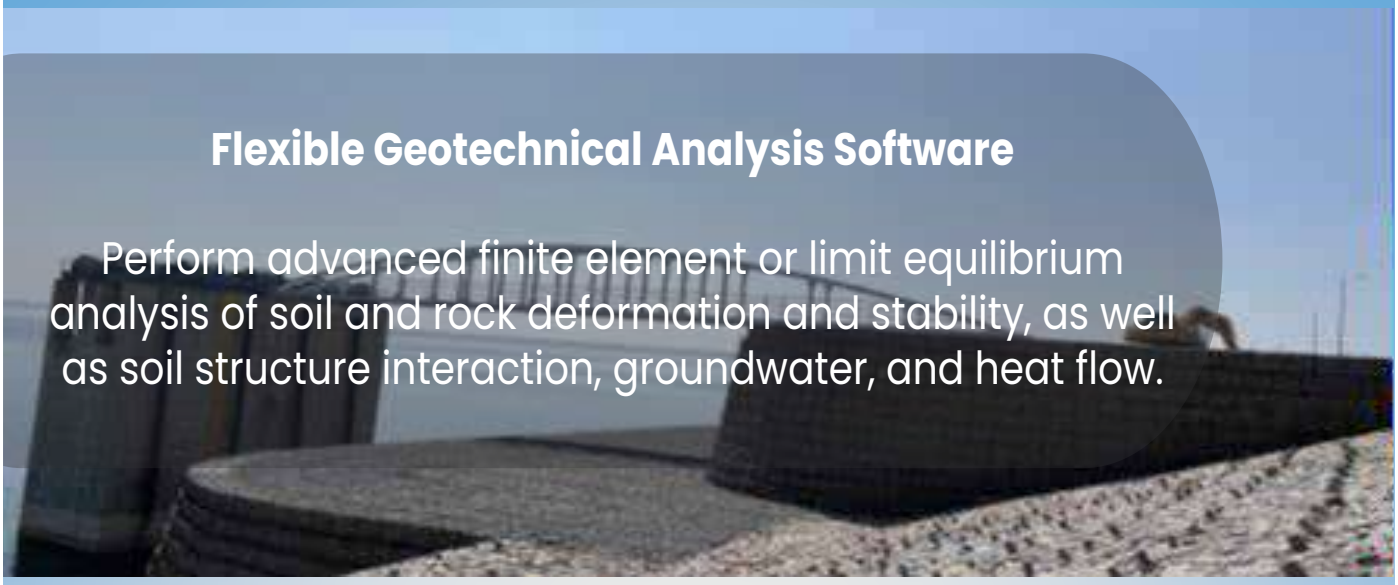

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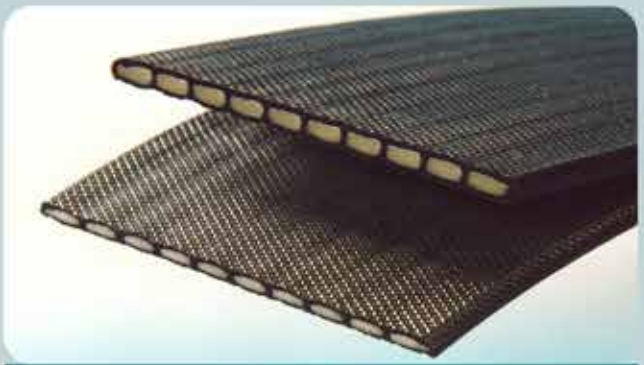

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MEMBERS' NEWS

Prof. B.K. Maheshwari
(LF-0534)

Prof. B.K. Maheshwari has taken charge of the President of the ISET along with other office bearers of Executive Committee on April 26, 2023 for a term 2023-2025. Prof. Maheshwari is the National Delegate representing India on International Association for Earthquake Engineering. Prof. Maheshwari has served the Society (ISET) in various capacities in the past; as ISET Co-Editor (April 2005 to March 2007), as Secretary (April 2007 to March 2011), as Editor of the ISET Journal of Earthquake Technology (April 2013 to March 2017) and as ISET Vice-President (April 2019 to March 2023).

Prof. Ravi S. Jakka
(LM-3367)

Prof. Ravi S. Jakka has taken the role of Editor, ISET Journal of Earthquake Technology. The Indian Society of Earthquake Technology (**ISET**) **journal** is one of the oldest and internationally reputed journals **publishing since 1964**, also **listed** in the **UGC Care** list. I extend a **cordial invitation** to the members of the IGS for **submitting manuscripts to the journal**. Prof. Jakka is currently working as a Professor in the Department of Earthquake Technology at IIT Roorkee. Previously, he served as the Secretary of ISET for two terms (2017-2019 & 2019-2021). He was also the organizing secretary of 7ICRAGEE, a quadrennial international conference organized by ISET.

GEOTECHNICAL EVENTS CALENDAR

ABROAD

2023

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:
Organizing Secretaries
IGC-2023
Department of Civil Engineering
Indian Institute of Technology, Roorkee
Roorkee-247667 Uttarakhand, India
Mobile: +91-9410327328,
+91-7669038736
Ph: 01332-285892; 283438
E-mail: igc2023roorkee@gmail.com

IGC - 2025

IGC-2025 would be hosted by

IGS-Jalandhar Chapter

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

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ELECTROMECHNICAL CYCLIC TRIAXIAL SYSTEM

Brief Introduction About The System

Dynamic triaxial cum resilient modulus testing system complies with the following standard codal specifications: IS 2720-12, ASTM D3999, ASTM D5311, ASTM D7181, ASTM D2850, AASHTO T-307-99, BS 1377:7 and BS 1377:8. It covers the determination of the modulus and damping properties of soils in either intact or reconstituted states by either load or stroke controlled cyclic triaxial techniques.

The system also performs traditional triaxial tests such as UU, CU, and CD as well as more advanced tests such as stress paths, K0 and anisotropic conditions

Technical Specification of the Primary System :

Load Frame – 01 Number

Robust, high-strength and compact two column reaction frame load frame with beam mounted electro-mechanical dynamic actuator of the following specification :

- 100mm Stroke Length
- In-built Feedback mechanism to measure displacement
- Axial Loading : +/-10kN
- Frequency : 0-5Hz

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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	30.08.2023
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

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Category of Sponsorship	Up to October 31, 2023	Free Delegates	Free Advertisement
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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
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ROORKEE-247667 Uttarakhand, INDIA
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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.

DONOR FELLOW

ANIL JOSEPH	DF-0053

LIFE FELLOWS

VENUGOPAL C	LF-0645
RAJESH MURLIDHAR MORE	LF-0646
ABHAY NAMDEORAO BAMBOLE	LF-0647

LIFE MEMBERS

N C BALAJI	LM-5217
ANTHONY T.C.	LM-5218
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ASHOOTOSH SAKHARAM MANDPE	LM-5228
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SAFEENA NAZEER	LM-5253
SHIBENDRA KUMAR PATEL	LM-5254

STUDENT MEMBERS

SUMIT KUMAR	SM-0328
ROHIT RAJ	SM-0329
JITHIN S KUMAR	SM-0330
ATISH KUMAR DAS	SM-0331
VIPIN CM	SM-0332

मिट्टी की है बात निराली

मिट्टी की है बात निराली,
लाल, पीली कहीं मिट्टी काली,
हमने जहां भी नजरें डाली,
मिट्टी ना समझ में आने वाली...
मिट्टी ना समझ में आने वाली...

कहीं नरम है, कहीं कठोर,
कहीं पर सख्त, कहीं कमजोर...
बड़ा कठिन है इसका खेल,
Settlement, तो कभी Shear में Fail...
हमने कितनी बुद्धि लगाई,
पर ना निकला C और Φ...
आंखें अश्रु से भर आईं,
पर ना निकला C और Φ...

...फिर ...फिर क्या...
फिर हमने IGS से Training पा ली,
आई चेहरे पर खुशहाली...
मिट्टी की है बात निराली,
मिट्टी ना समझ में आने वाली...
मिट्टी ना समझ में आने वाली...

अब तो Triaxial CBR, UCS से हो गया प्यार...
संसार बना इस मिट्टी से,
हम मिट्टी का समझ रहे संसार...
मिट्टी का समझ रहे संसार...
तो आओ समझें इस मिट्टी को,
और करें इसकी रखवाली,
क्योंकि...
मिट्टी की है बात निराली,
मिट्टी ना समझ में आने वाली...
मिट्टी ना समझ में आने वाली...

– अनिल राय
रिसर्च स्कॉलर,
छत्तीसगढ़ स्वामी विवेकानंद तकनीकी विश्वविद्यालय,
भिलाई, छत्तीसगढ़

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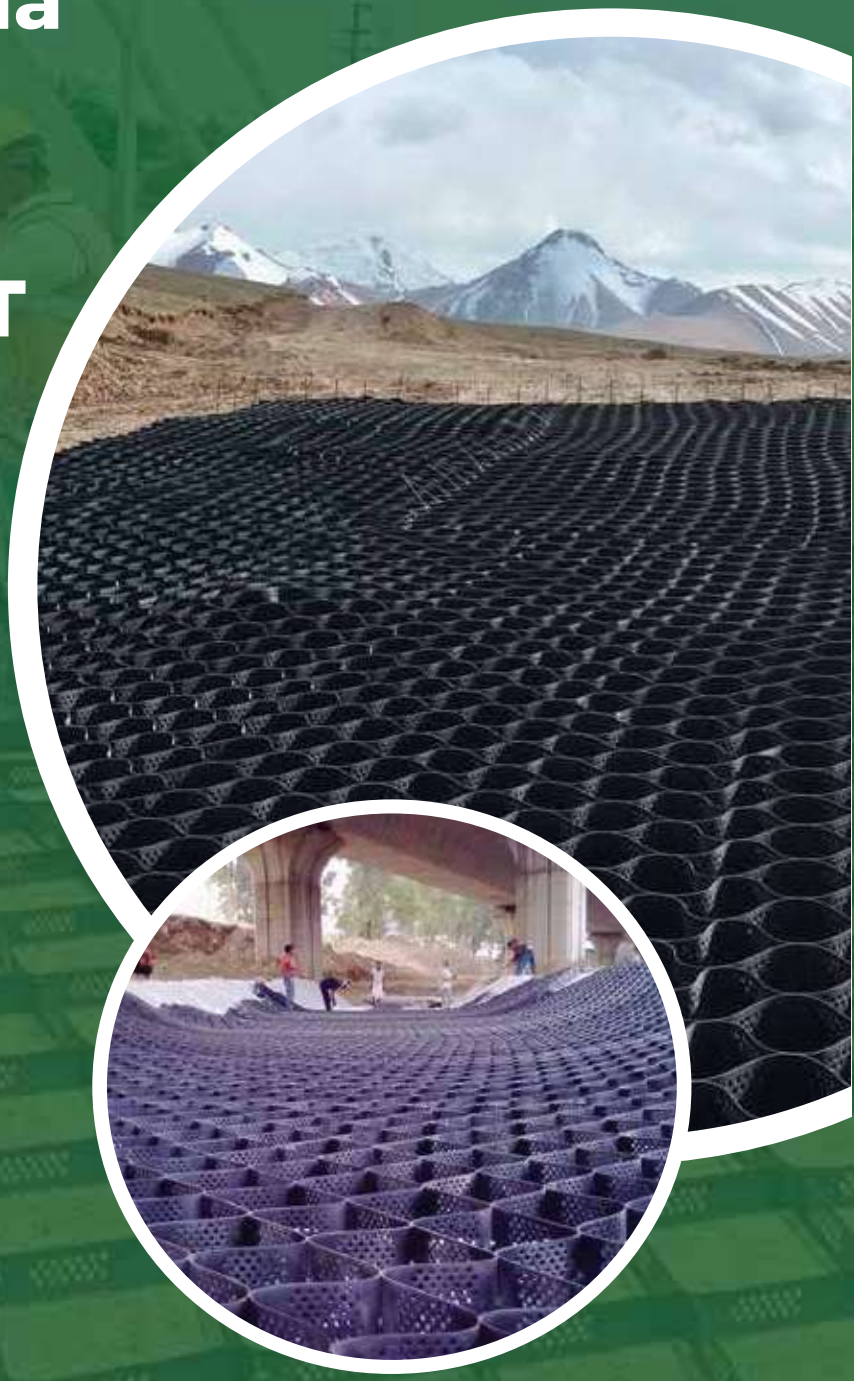

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Retaining Wall (Green, Sand & Black Facia)	445 mm	150 mm, 200 mm, 300 mm

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Award of Ph.D Degree Posthumously

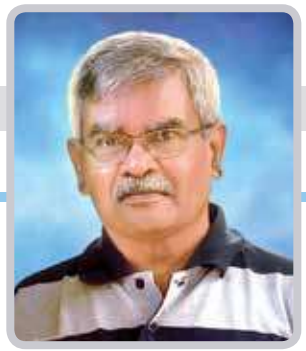
Mr. Parveen Chander was a PhD research Scholar in IKG Punjab Technical University, Jalandhar under me and submitted his thesis in Aug 2020 at the age of 51. Unfortunately, he expired due to a tumor in Liver on 15 Feb 21. Mr. Parveen Chander worked on developing Soil design charts for design of Engineering properties for the state of Punjab. He conducted and collected SPT soil test upto 15m (1276 bore hole locations) and with the use of GIS developed soil charts for properties like cohesion, SPT value, Shear , Bulk density at every depth.

Being the Supervisor I, Dr. Rajiv Chauhan initiated the process for award of degree posthumously.

The matter was taken up in the Academic council then Chairman and Ex VC Sh. Rahul Bhsndari of PTU allowed it after making required regulations subject to the condition that the supervisor will defend the viva. The thesis was sent to a panel of 02 examiners the same was evaluated and On 29th May, 2023, the viva was held and defended by me (Dr. Rajiv chauhan). The degree was awarded to his son Mr. Mehakansh working in Canada and wife working as Teacher in Govt. School, Bathinda, Punjab.

The same storey was published in BBC the link: is https://www.bbc.com/punjabi/articles/c7294el4zjpo

OBITUARY



Dr. Ramathilagam Kuberan

(September 23, 1950 – May 8, 2023)

Dr. R. Kuberan passed away peacefully on May 8, 2023 at the age of 73 with his beloved wife of 48 years at his side in Coimbatore, Tamil Nadu - his chosen place for retirement. His battle with multiple health issues in recent years showed his courage in facing life challenges with a smile. Despite the trials, he stayed kind, strong and grateful until the end.

Since childhood, Dr. Kuberan was known for his love for learning, diligence, and sense of humour. He was passionate about giving back to the community with his personal and professional contributions to an enriched and fulfilling life.

Ramathilagam Kuberan was born on September 23rd 1950 in the town of Sivakasi, known for its fireworks and match factories. Being an excellent student, he stood first in Madras University completing a B.E. (Hons.) degree in Civil Engineering from the Government College of Technology in Coimbatore in 1972. He spent his graduation year as a faculty with the same college. Selected by the Union Public Service Commission, he joined the Water Engineering Service of the Government of India in New Delhi in 1974. His work focused on soil mechanics, rock mechanics and geophysical investigations for water resources projects.

He balanced his passion for higher learning by pursuing Masters and Doctoral Research work at the Indian Institute of Technology in Geotechnical Engineering while working full time to support his young family. The Indian Geotechnical Society (IGS) honoured him with the IGS Prof Leonards award for the best thesis. He was the longest serving Honorary secretary for 7 years and was awarded the title of Geolegend by IGS in 2022. During his tenure, he organized the International Conference of Soil Mechanics and Foundation Engineering in New Delhi in 1994. He was also the Organizing Secretary for the Indian Geotechnical Conferences held in New Delhi in 1998 and 2012.

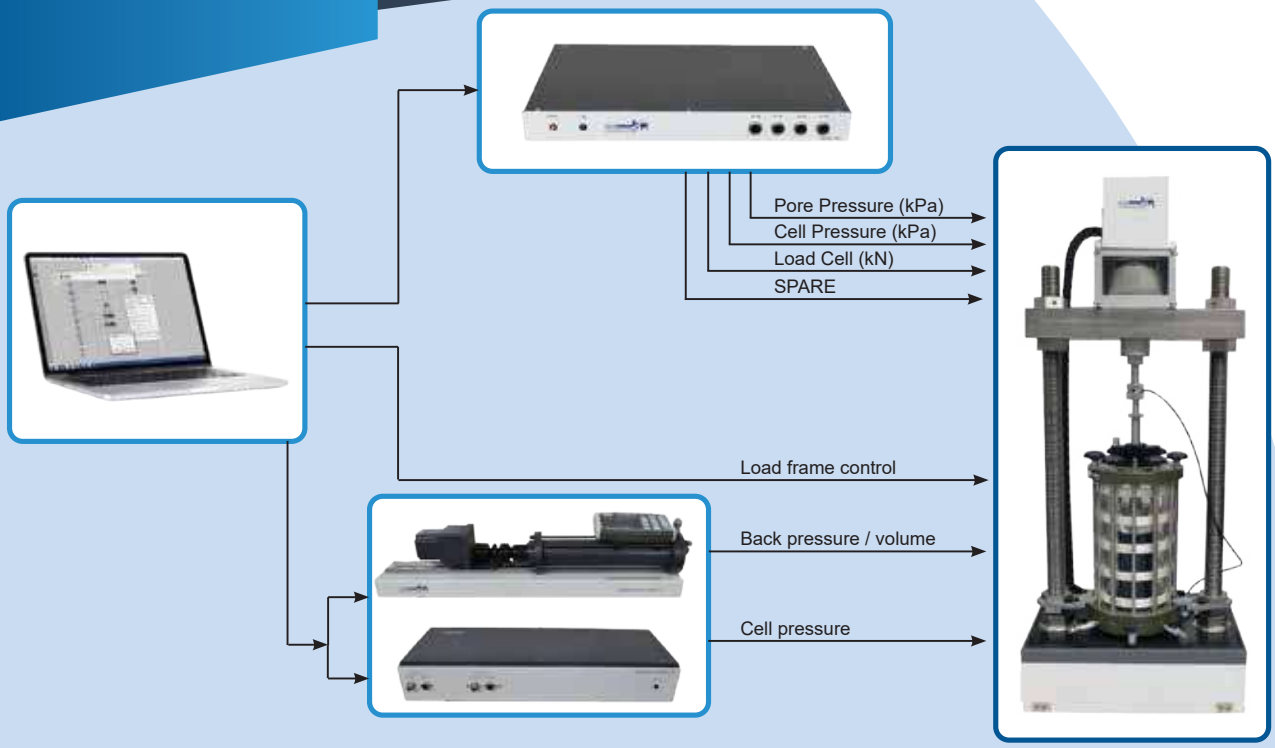
He voluntarily retired from government service after 20 years to pursue the opportunity of serving the United Nations Development Programme in Vietnam in the field of Construction and Quality Control of Flood Control Structures and Disaster Management. Continuing his love for giving back to the community, he joined forces in 2003 with Sustainable Environment and Ecological Development Society SEEDS, a non-profit organization that enables community resilience through practical solutions for disaster readiness, response, and rehabilitation. His work at SEEDs included Disaster Management training for school children and teachers in the state of Gujarat affected by the Bhuj Earthquake as well as a one year visit to Afghanistan to help government officials develop Disaster Management plans for several provinces.

He was well travelled within India and internationally including several countries in South East Asia, Europe and North America. He is survived by his wife Bhooma, his two daughters Gyana Geetha and Gyana Meera, granddaughter Gayatri Saravanan and grandsons Pranava Saravanan and Krishnan Vijayan.

Enterprise Level Dynamic Triaxial Testing System (ELDYN)

The GDS Enterprise Level Dynamic Triaxial Testing System (ELDYN) is an entry level dynamic triaxial system, based on an axially-stiff load frame with a beam mounted electro-mechanical actuator.

The ELDYN has been designed to fulfill the demand within the geotechnical laboratory testing industry for a lower cost, more basic dynamic triaxial testing system, yet still perform to the very advanced standards.



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Editor : Dr. A.P. Singh, Hon. Secretary, IGS & Director, Explore Engineering Consultants Pvt. Ltd., C-273, Sector 63, Noida, Uttar Pradesh 201301

Assoc. Editor : Mr. Sanjay Arora, Exec. Secretary, Indian Geotechnical Society, 206, Manisha, 75-76, Nehru Place, New Delhi-110019

Published by : Indian Geotechnical Society (Regn. No. S/18957), 206, Manisha, 75-76, Nehru Place, New Delhi-110019
Email : admin@igs.org.in, igsheadquarter@gmail.com, Website: www.igs.org.in, Ph. : 011-26210361

Printed by : Pushpak Press Pvt. Ltd., 203-204, DSIDC Complex, Okhla Phase-I, New Delhi-110020