

**International Society for Soil Mechanics and Geotechnical Engineering**

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TC Corner

State-of-the-art review of inherent variability and uncertainty in geotechnical properties and models, by TC304

The European Committee for Standardization (CEN) committee TC250 is currently working on an update of the Eurocodes. Sub-committee SC10, in charge of updating EN 1990 (Basis of structural and geotechnical design), has installed a working group to produce a background document with the working title “*Reliability Backgrounds of the Eurocodes*”, with the intention to document and explain the reliability framework underlying all Eurocodes and the implementation of reliability aspects in them.

As part of that effort, quantitative information on the inherent variability and uncertainty in loads, material properties and models is compiled. ISSMGE TC304 identified this as an opportunity to provide an overview of the relevant information available in the geotechnical literature such as the statistics of soil/rock properties.

The EPRI TR-105000 report (Phoon et al. 1995) provided an overview of the statistics of inherent soil properties and measurement errors, but these statistics have not yet been updated systematically since 1995. Also, rock properties were not covered by the TR-105000 report. Other than soil/rock properties and measurement errors, there are also other important statistics, such as the statistics of transformation uncertainties and model factors.

This state-of-the-art report is entitled “State-of-the-Art Review of Inherent Variability and Uncertainty in Geotechnical Properties and Models”. It contains the following seven chapters as shown in Table 1.

TC Corner

State-of-the-art review of inherent variability and uncertainty in geotechnical properties and models, by TC304 (Con't)

Table 1. Titles of the seven chapters in the report

Chap	Title	Contributors
1	Site-specific statistics for geotechnical properties	Zheng Guan, Yu-Chi Chang, Yu Wang (lead), Adeyemi Aladejare, Dongming Zhang, and Jianye Ching
2	Site-specific correlations between soil/rock properties	Yelu Zhou, Dongming Zhang (lead), and Jianye Ching
3	Summary of random field parameters of geotechnical properties	Armin W. Stuedlein (lead), Brigid Cami, Diego Di Curzio, Sina Javankhoshdel, Shin-ichi Nishimura, Wojciech Pula, Giovanna Vessia, Yu Wang, and Jianye Ching
4	Statistics for geotechnical design model factors	Chong Tang (lead) and Richard Bathurst
5	Statistics for transformation uncertainties	Jianye Ching (lead) and Ali Noorzad
6	Determining characteristic values of geotechnical parameters and resistance: an overview	Zi-Jun Cao (lead), Jianye Ching, Guo-Hui Gao, Mikhail Kholmyansky, Ali Noorzad, Timo Schweckendiek, Johan Spross, Mohammad Tabarroki, Xiaohui Tan, Yu Wang, Tengyuan Zhao, and Yan-Guo Zhou
7	Numerical evidences for worst-case scale of fluctuation	Giovanna Vessia (lead), Yan-Guo Zhou, Andy Leung, Wojciech Pula, Diego Di Curzio, Mohammad Tabarroki, and Jianye Ching

This state-of-the-art report has the following features:

1. It serves as an update for the TR-105000 report on the statistics of inherent soil properties. Chapter 1 compiles the site-specific statistics for univariate soil properties. For instance, Figure 1 shows the site-specific mean and coefficient of variation (COV) for the modulus of a clay. Chapter 3 compiles the random field parameters (e.g., the scales of fluctuation) for spatial variability of soils. Figure 2 shows the ranges of vertical and horizontal scales of fluctuation (SOF) for various tests. Many of the statistics are new.

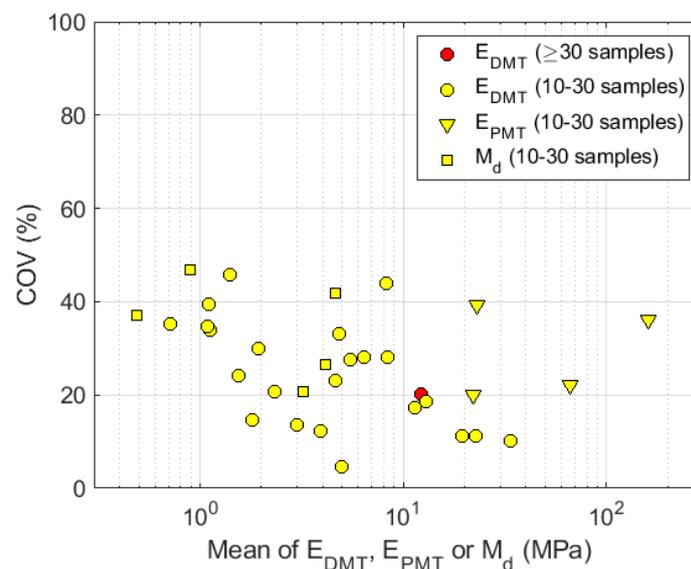


Figure 1. Site-specific statistics for E_{DMT} , E_{PMT} , and M_d of clays (DMT and PMT stand for dilatometer and pressuremeter; M_d is the constrained modulus)

TC Corner

State-of-the-art review of inherent variability and uncertainty in geotechnical properties and models, by TC304 (Con't)

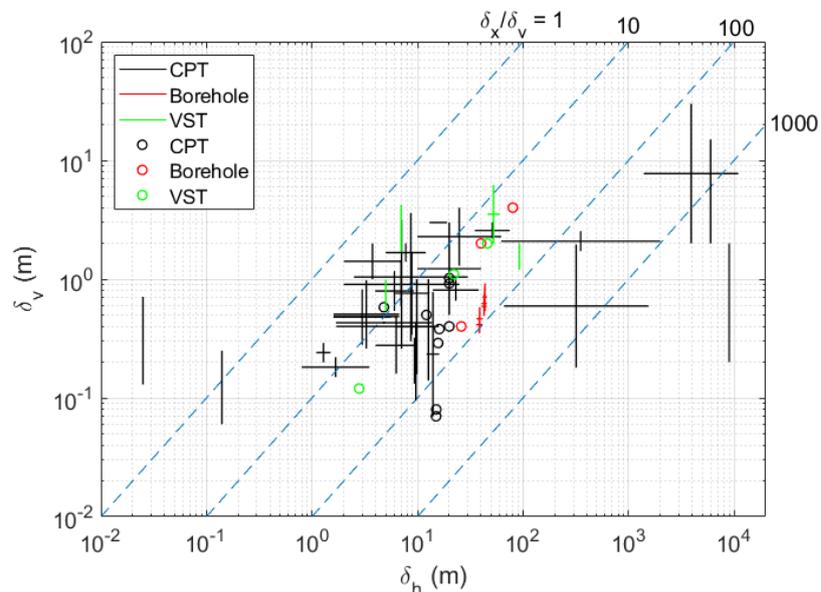


Figure 2. Ranges of vertical SOF (δ_v) and horizontal SOF (δ_h) for various in-situ tests

- It contains statistics that are not covered by the TR-105000 report. Chapter 1 compiles the site-specific statistics for some rock and rock mass properties. Figure 3 shows the site-specific mean and COV for the unconfined compressive strength of an intact rock. Chapter 2 compiles the site-specific correlations between soil/rock properties. Chapter 5 compiles the statistics for transformation uncertainties.

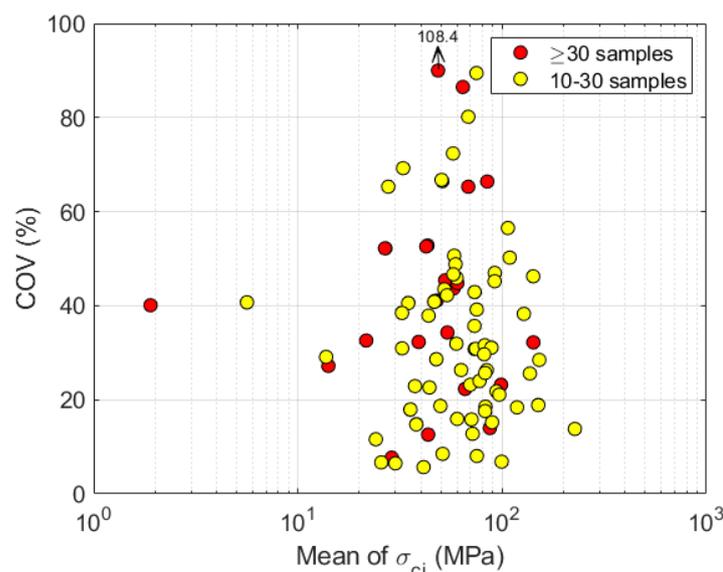


Figure 3. Site-specific statistics for uniaxial compressive strength (σ_{ci}) of an intact rock

- Chapter 4 compiles the statistics of geotechnical design model factors. Chapter 6 reviews methods that determine the characteristic value defined by the Eurocode 7. Chapter 7 reviews some numerical evidences for the worst-case scale of fluctuation.

TC Corner**State-of-the-art review of inherent variability and uncertainty in geotechnical properties and models, by TC304 (Con't)**

Many of the new updates in #1 and #2 above are based on the databases in 304dB, an open-access database sharing initiative developed by ISSMGE TC304:
<http://140.112.12.21/issmge/tc304.htm?=6>

While updating of the Eurocodes triggered the work on the present state-of-the-art review, we trust that the information contained will be a valuable resource for other codes of practice as well as for researchers and practitioners in the field of geotechnical reliability.

The editors of this state-of-the-art report (Jianye Ching & Timo Schweckendiek) would like to acknowledge the tremendous efforts contributed by the seven groups of experts. This report would not be possible without their efforts.

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TC Corner

Inaugural HDR Workshop hosted by the Transport Research Centre, UTS (TC211 and TC202)

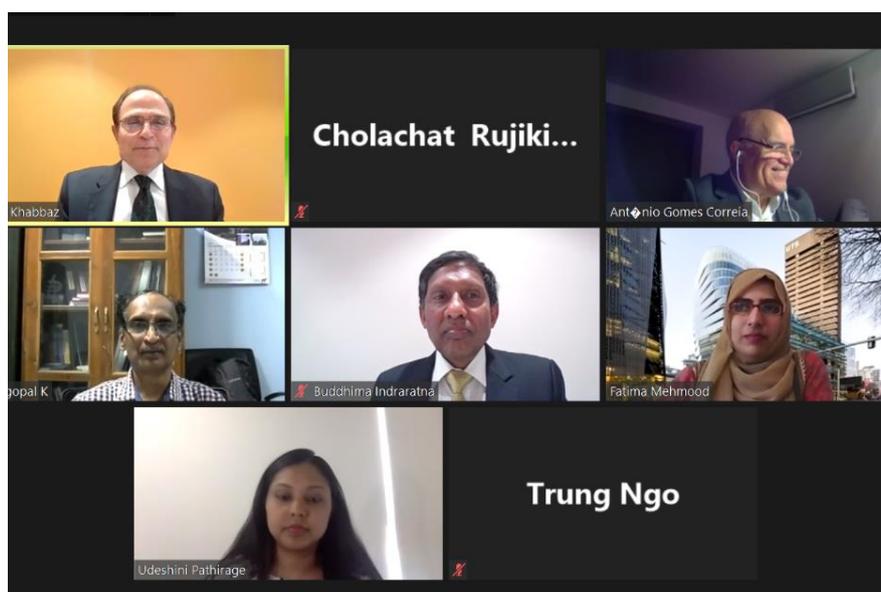
Under the directorship of Distinguished Professor Buddhima Indraratna, the Transport Research Centre (TRC), University of Technology Sydney (UTS) organised an inaugural Higher Degree Research (HDR) workshop in the field of Transport Infrastructure with special reference to ground engineering on Wednesday, 18th of November 2020. The online workshop was held at the UTS-Tech Lab in Botany.

This workshop provided a platform for HDR students, professional and academic researchers to present and discuss their research work on various topics, including:

- (1) Track Infrastructure Design and Analysis,
- (2) R&D efforts on marginal and industrial waste materials,
- (3) Big Data Analytics - applications in Transport Infrastructure; and
- (4) Industry supported Field Trials.

The workshop was delivered online as an interactive event and attracted more than 130 young professionals (mainly PhD students) worldwide. Professor David McGloin (FEIT Director, Research Programs) delivered a Welcome Address on behalf of the Dean of Engineering and Information Technology (FEIT) followed by Distinguished Professor Buddhima Indraratna, Director TRC, who presented an introduction to the UTS Transport Research Centre (TRC) programs embracing the impressive research environment for iconic large-scale physical modelling and a wide array of geotechnical facilities available at the TechLab. Associate Professor Ray Kirby (Director, UTS Tech Lab Operations) gave an Introduction to the multidisciplinary technological facilities at the TechLab and Future Plans for expansion of engineering research. Prof Arul Arulrajah (Swinburne University of Technology) delivered an insightful talk on salient aspects of Training of Young Professionals - Tips, Treats and Tricks.

There were two invited industry guests, Dr Richard Kelly (SMEC) and Dr Zaman Kamaruzzaman (Transport for NSW) covering various real-life challenges and case studies of transport infrastructure projects and modern-day design methods and ground improvement approaches. A total of 28 presentations were delivered by HDR students from different universities including various Australian universities (UTS, UniSyd, UNSW, Swinburne, UOW, QUT, Curtin, USyd, WSU, etc.), as well as some overseas PhD students from University of Minho (Portugal), and MEI-Brazil.



Screenshot during the panel discussion

TC Corner

Inaugural HDR Workshop hosted by the Transport Research Centre, UTS (TC211 and TC202) (Con't)

The workshop ended with a dynamic and interactive Panel discussion chaired by Associate Professor Hadi Khabbaz (Deputy Head of School Research, School of Civil and Environmental Engineering, UTS). The invited panelists Professor António Gomes Correia (University of Minho-Portugal) and Professor Rajagopal Karpurapu (Indian Institute of Technology Madras) presented their views and long-term experiences on training HDR students for complex projects and challenges in transport infrastructure, while Dr (Ms) Udeshini Pathirage (Geotechnical Engineer, Golder Associates) shared her own experience how doctoral training had shaped her career in geotechnical industry. The audience participation facilitated by A/Prof Hadi Khabbaz led to fruitful and enlivened discussions on advanced skills of PhD-trained young professionals.



A photo during lunch break at the TechLab, UTS

Acknowledging the sophistication and high-quality of all presentations, Distinguished Professor Buddhima Indraratna concluded the Workshop with key specific points in a nutshell from all presenters: (i) Track Infrastructure Design and Analysis; (ii) R&D efforts on Marginal Materials, and (iii) the imperative need for continual training of the next generation of HDR students for the future economic prosperity and technological advancement. He epitomized showcases such as this as an ideal vehicle for HDR students to be inspired by the work of each other, and highlighted the importance of learning through the feedback of experienced mentors and adhering to sound supervision practices, in order to sustain motivation and sound research progress.

Major project

Seismic site classification proposed for Chile

Abstract:

In spite of the advances in the field of earthquake engineering, economic losses left by large recent earthquakes are still considerable, far from any socio-economically satisfactory standard. According to the Chilean experience, a crucial factor that governs the resulting seismic damages is associated with the local ground conditions. Therefore, a key issue in the seismic regulations is an appropriate seismic site classification. An alternative seismic site classification has been proposed in Chile, which incorporates two important dynamic parameters of the ground: the classical shear wave velocity, V_{s30} , and the predominant period of the soil deposit, which is estimated via the H/V spectral ratio of ambient vibrations, or Nakamura's procedure. The site classification first uses the V_{s30} , and then the class has to be corroborated by the predominant period of the site.

1. Introduction

Unfortunately, societies around the world continue to suffer significant economic losses and victims due to large and medium earthquakes. An important part of these losses and casualties is attributed to the severe damages experienced by buildings (residential, commercial, governmental, educational, cultural, hospital, etc.), infrastructure and industrial structures. Therefore, in spite of the tremendous advances in the field of earthquake engineering, economic losses are still considerable far from any socio-economically satisfactory standard. Furthermore, it is important to understand that modern society not only wants protection of life, but also it demands that buildings can be occupied and function after a strong earthquake. This also means that water, electricity, gas, and other services have to be operational as well. Therefore, the challenge is to reduce the tremendous economic impact that earthquakes still have on the community, and accordingly, resilience and reliability of structures is an important issue (Cimellaro, 2017).

In order to achieve a better seismic behavior of the structures, among other factors, it is necessary to identify the ground conditions that govern the seismic loads that will be induced to the structures. The effect of local soil conditions on ground surface motions has been widely recognized from both theoretical and empirical points of view. An example of this has been observed in the recent large earthquakes that have hit Chile, where, in general, an excellent performance of the structures was observed. However, there were exceptions that are mainly attributed to a deficient site characterization. Accordingly, the country was forced to develop a more efficient seismic site classification, which is briefly explained in this article.

2. Historical evidence of seismic amplification

Systematically, large earthquakes have shown that the intensity of the motion developed at the ground surface is strongly controlled by both the geotechnical characteristics and thickness of the sediments. A remarkable case of amplification is the one observed during the 1985 Mexico City earthquake of Magnitude 8.1, where the shaking was amplified by a factor of 20, or even more, on sites constituted by deep soil deposits of soft fines materials (Celebi et al. 1987; Singh et al. 1988). On the other hand, rock outcrops and stiff soil deposits have shown a significant reduction in the shaking intensity (Montessus de Ballore, 1911; Watanabe et al. 1960; Borchardt, 1970; Seed et al. 1988). An important Chilean experience that showed the site effect took place in the 1906 Valparaíso Earthquake of Magnitude 8.2. This strong ground motion occurred approximately 4 months after the San Francisco Earthquake, where similar site effects were observed (Borchardt et al. 1976). In Fig. 1 is shown the general geology of Valparaíso, which basically consists on a massive rock outcrop of the Coastal Range and a rather small flat area constituted mainly by medium to dense sandy soils. A borehole performed near to the National Congress (Fig. 2) found the bedrock at a depth of 57 m.

Major project

Seismic site classification proposed for Chile (Con't)

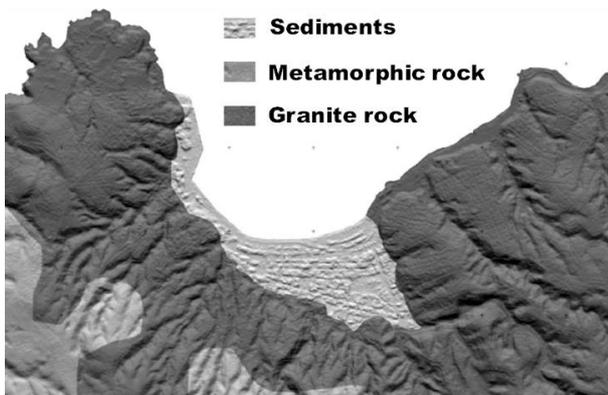


Figure 1. General geology of Valparaiso (Indirli et al. 2010)



Figure 2. Location of buildings with and without damages, 1906 Earthquake

Among the few buildings that underwent minor damages during the 1906 Valparaiso Earthquake are Aduana and Palacio Lyon. The Aduana building is founded on rock outcrop and Palacio Lyon is founded only few meters above the bedrock. These two historical buildings still exist today as shown the photos of Fig. 3, which means that they have responded appropriately to the series of shaking that have occurred in the area after their construction: Valparaiso 1906 ($M = 8.2$); 1985 ($M_w = 8.0$) and 2010 ($M_w = 8.8$).

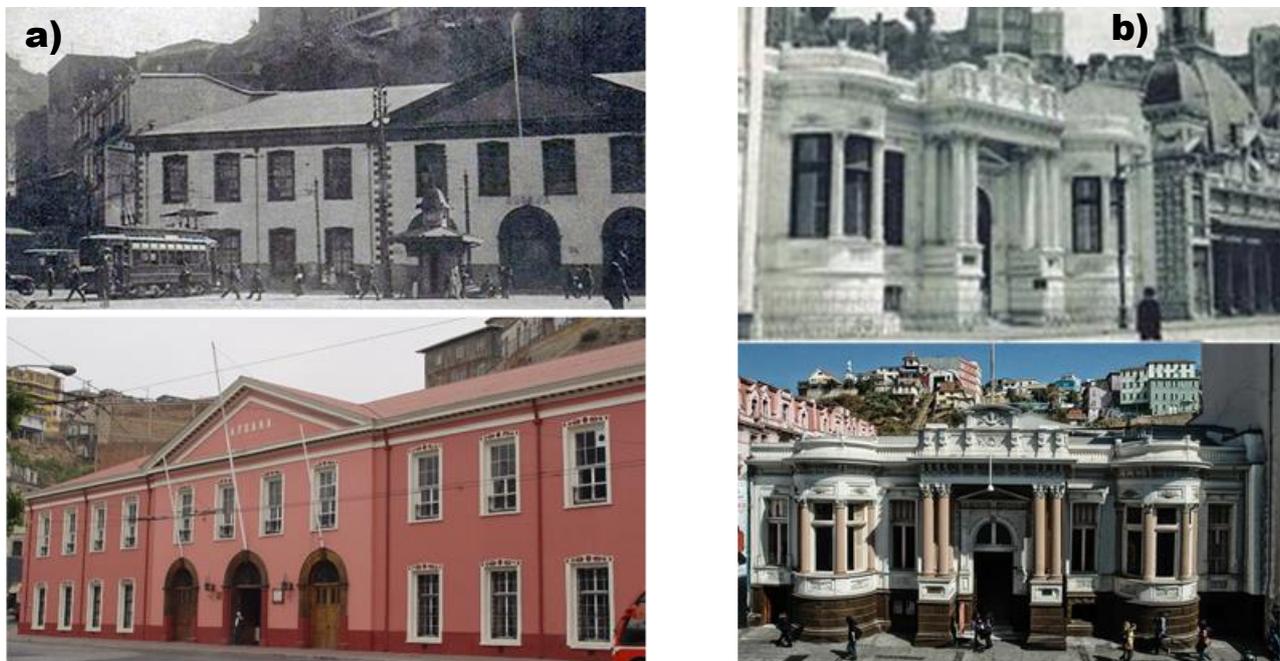


Figure 3. Buildings without seismic damages a) Aduana and b) Palacio Lyon.

On the other hand, a severe destruction of buildings located in the soil deposit was reported. Two emblematic buildings: Theater Victoria, built in 1886 (Figs. 2 and 4), and La Merced Church, built in 1893 (Fig. 2), collapsed during the 1906 Earthquake.

Major project

Seismic site classification proposed for Chile (Con't)



Figure 4. Victoria Theater before and after 1906 Valparaiso Earthquake (Rodriguez et al 1906)

After the effects of the 1906 Earthquake, Henriquez (1907) and Montessus de Ballore (1911) concluded that geological conditions are fundamental in the observed damages. They reported that buildings placed on soils deposits presented heavy damage, while constructions placed on the hills (rock outcrop) experienced no damage or it was negligible. This is confirmed in the photo of refugees of Fig. 5, where in the hilly area there are undamaged buildings that amazingly remained after the earthquake. Conversely, the photos of Fig. 6 expose the total destruction that took place in the area of sandy soil deposits (no evidence of liquefaction was reported). This important lesson of significantly better seismic performance of structures founded on rock or competent soils has been systematically observed in large earthquakes.



Figure 5. Hilly area, undamaged buildings.



Figure 6. Heavy destruction, soil site

Empirical and theoretical observations suggest that the intensity of ground surface motion strongly depends on the site characteristics such as soil type, soil properties, as well as the thickness of the soil deposit (Montessus de Ballore 1911, Seed et al, 1976, Pitilakis et al, 1998, among many others). On one hand, the evidence indicates that, after large earthquakes, sites with rock outcrops or stiff soil present limited or null damage in structures placed on this type of ground. On the other hand, significant damage is observed on sites consisting of deep deposits of soft soils (Borcherdt 1970; Seed et al., 1988, Singh et al. 1988). Nevertheless, it is important to recognize that soil sites tend to amplify the shaking at low frequencies (high period), but rock sites tend to have more intensity at high frequencies (low periods). Thus, the Chilean and international experience is that, site conditions determine the motion at the ground surface, in addition to the characteristics of the seismic sources/mechanisms.

3. Design spectra, site effects and seismic hazard

In seismic countries, all structures must be designed to withstand the dynamic disturbances generated by earthquakes. For ordinary structures, seismic loads can be computed using the modal spectral analysis, where the seismic demand is characterized through a design spectrum. The particular ground conditions can drastically modify both the shape and amplitude of the design spectrum. Because of this, the design spectra are defined as function of the site characteristics.

Major project

Seismic site classification proposed for Chile (Con't)

The seismic provisions available worldwide have established a Soil Class classification taking into account the soil properties of the upper 30 m of the ground, regardless of the actual thickness of the soil deposits and properties of the existing soils below a depth of 30 m. This simplification can lead to significant errors in the evaluation of the main characteristics of the seismic response at the ground surface. Consequently, for a rational site characterization, it is imperative to include a parameter that allows obtaining relevant information associated with the seismic response of the entire soil deposit.

For fairly flat ground conditions, and from the point of view of wave propagation, it results evident that strength parameters are not really suitable to evaluate the seismic amplification. However, parameters associated with the soil strength as N-SPT or unconfined resistance are usually considered by the codes to evaluate the seismic site classification. However, from a theoretical point of view, the site amplification is mainly controlled by soil stiffness, sequence of soil layers, thickness of the soil deposit, dumping, impedance (sediments-bedrock). Therefore, a site classification should be based primarily on parameters associated with the dynamic response and leave out resistance parameters.

Besides the site effect, another important issue is the level of seismic hazard to consider, which is associated with the recurrence interval and corresponding probability of occurrence. It is interesting to point out that most of the existing seismic codes are based on probabilistic or deterministic seismic hazard analyses. The EC8 applied a probabilistic analysis approach, whereas the Japanese codes are based on a deterministic seismic hazard analysis. USA represents a singular case, where both approaches have been applied, and the maximum credible earthquake ground motion for a site is selected as the lesser output from these two analyses. The probabilistic and deterministic methods for the assessment of seismic hazard are usually presented as antagonistic approaches. However, they may certainly complement each other for estimating the ground motions for design. In regions where continental active faults and/or tectonic boundaries generate the largest seismic events expected to occur every 100-200 years, the deterministic seismic hazard analysis is more suitable, providing valuable empirical information about the ground motion. It is possible to indicate that the present Chilean code is also based in a combination of both probabilistic and deterministic methods.

4. Brief synthesis of Chilean seismicity

The seismic activity of Chile is mainly the result of the subductive seismic environment generated by the collision between the Nazca and South American tectonic plates, which are converging at an estimated rate of 65 to 80 mm per year. The Nazca plate is subducting under the South American plate, moving down and landward. Accordingly, four types of seismic mechanisms in the Chilean subductive seismic environment can be identified: outer rise (outside trench, in the bending zone of the Nazca Plate), interplate or thrust-faulting type that occurred on the interface between the plates, intraplate that take place inside the Nazca Plate, and cortical (faults on the South American Plate). From an engineering point of view, the most important earthquakes are the interplates of large magnitudes. Although the intraplates and corticals are important too, their severe effect is restricted to a rather limited zone close to the epicenter. Therefore, in the practice intraplate earthquakes are those considered by Chilean seismic codes.

In Fig. 7 are summarized the earthquakes of magnitude greater than 7.5 that have struck the country since 1906. It is interesting to observe that the high seismic activity of Chile is reflected by the presence of two large events in the list of the top 10 world earthquake: the top 1 (Valdivia Earthquake) and the top 6 (Maule Earthquake).

The most recent large interplate earthquake that hit the country is the Maule earthquake, of moment magnitude $M_w = 8.8$. It is the sixth largest seismic event instrumentally recorded in the world. It struck the south-central part of Chile on February 27th, 2010 (3:34 am local time). It compromised a rupture area at the interface between the plates, at an average depth of 35 km, with an approximately rectangular zone, of 550 km long and 170 km wide.

Major project

Seismic site classification proposed for Chile (Con't)

Earthquakes of $M \geq 7.5$ since 1906

Date	Lat.	Long.	Depth (km)	M
16-09-2015	-31,572	-71,674	22.4	8.3
03-04-2014	-20,570	-70,493	22.4	7.7
01-04-2014	-19,609	-70,769	25	8.2
27-02-2010	-36.122	-72.898	22.9	8.8
14-11-2007	-22.247	-69.890	40	7.7
13-06-2005	-19.987	-69.197	115	7.8
30-07-1995	-23.340	-70.294	45.6	8.0
05-03-1987	-24.388	-70.161	62.3	7.6
03-03-1985	-33.135	-71.871	33	8.0
10-05-1975	-38.183	-73.232	6	7.7
09-07-1971	-32.601	-71.076	60.3	7.8
28-12-1966	-25.494	-70.550	25	7.7
22-05-1960	-38.143	-73.407	25	9.5
22-05-1960	-38.061	-73.039	25	7.8
21-05-1960	-37.824	-73.353	25	8.1
06-05-1953	-37.093	-72.866	66	7.5
06-04-1943	-31.432	-71.475	35	8.1
25-01-1939	-36.305	-72.315	35	7.8
13-07-1936	-24.720	-70.110	35	7.5
01-12-1928	-35.155	-72.105	35	7.7
11-11-1922	-28.293	-69.852	70	8.5
04-12-1918	-26.538	-70.608	40	7.8
17-08-1906	-32.400	-71.400	35	8.2

Figure 7.- Chilean earthquakes of $M \geq 7.5$ since 1906 (Valenzuela et al 2020)

The fundamental implication of the large rupture zone involved in a mega-earthquake is associated with the obsolescence of the usual concept of hypocenter, which is commonly seen as a point from where the seismic energy is generated, and from where the attenuation of the shaking with the distance is evaluated. Mega-earthquakes present an extensive zone from where the seismic energy is released. From this perspective, near to this zone, the attenuation is significantly less relevant than the site amplification due to local characteristics of soil deposits.

The horizontal peak ground accelerations recorded on rock outcrops and soil deposits are indicated in Fig. 8 (the rectangular area corresponds to the rupture zone of these mega-earthquake). These records show that the common expected attenuation of the peak accelerations with the distance is not observed. In this context, it is interesting that the largest peak acceleration of the ground, 0.94g, was recorded in Angol, located to the south of the rupture, whereas the second largest peak acceleration, 0.78g, was recorded in Melipilla, to the north of the rupture, while in Talca, located between the previous two stations, the horizontal peak acceleration reached a value of 0.47g. In any case, away from the rupture zone, the seismological theory and observations indicating that ground motion intensity decreases with increasing distance from the source hold valid.

Major project

Seismic site classification proposed for Chile (Con't)

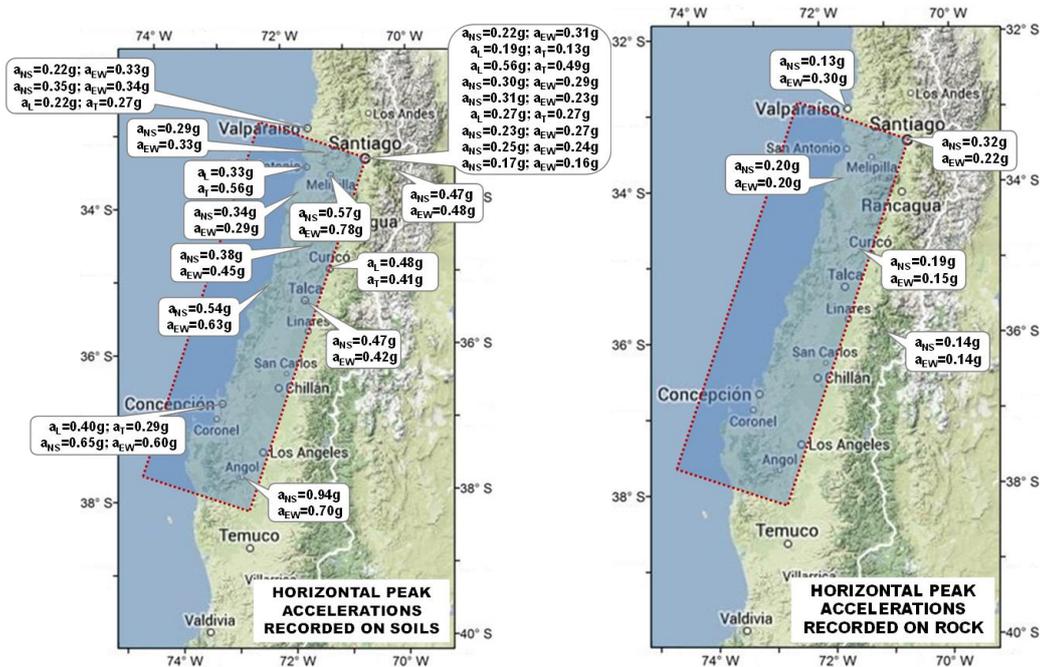


Figure 8. Recorded peak horizontal accelerations of Maule Earthquake

5. Amplification: key parameters that can be measured

From a theoretical perspective, the parameters that govern the phenomenon of amplification of seismic waves in a soil deposits are reasonably well known. However, for practical purposes most of them are difficult to obtain due to cost and time limitations. Therefore, it is necessary to use key parameters that can actually be measured in practice.

Accepting that a soil deposit has a fundamental period of vibration, identified by the maximum amplification of the transfer function (ratio between Fourier spectra of ground surface to bedrock), the question is whether the Nakamura, or H/V spectral ratio (HVSr) procedure using ambient vibration can capture this predominant period. Measurements carried out on sites where seismic stations recorded recent large earthquakes in Chile confirmed that the HVSr provides a robust procedure to evaluate the predominant period of a site (Verdugo et al 2016). In Fig. 9 are presented the different types of HVSr depending on the site conditions. When a clear peak is observed, the site corresponds to a soft soil deposit with medium to large values of predominant period. On the contrary, flat curves of HVSr are observed in stiff soil deposits, where a clear predominant period does not exist, and a wide range of periods (or frequencies) are amplified. This important result makes possible the identification of those sites that are not conflicted from the point of view of their seismic response. Additionally, it allows evaluation of the predominant periods of soft sites, which are sites that can be problematic.

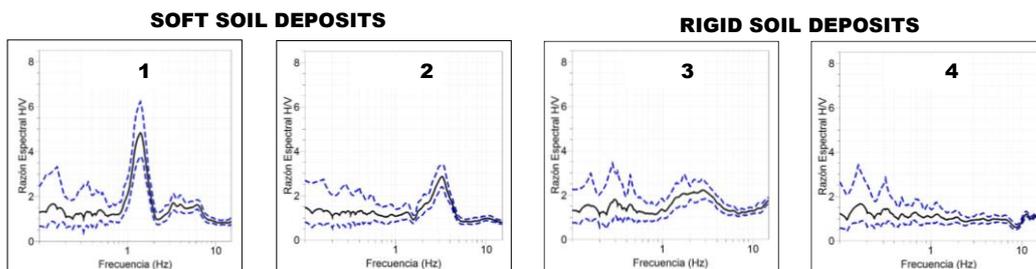


Figure 9. Different HVSr curves, depending on type of site

Major project

Seismic site classification proposed for Chile (Con't)

On the other hand, the upper 30 m of a site represents the crust that is also important in the amplification of the motion resulting at the surface. Therefore, the classical parameter, VS30, which reproduces the vertical travel time of the shear wave propagating throughout the top 30 m of the ground is also suitable for characterizing a site from its dynamic response at the surface.

6. Seismic site classification proposed in Chile

It is important to keep in mind that during large earthquakes, rigid soil deposits, such as rock outcrops, cemented soils or very dense gravels, have shown negligible, or no damages on structures. On the contrary, soft soil deposits, as for example, the clayey material of Mexico City, or the bay mud of San Francisco, or the sandy soils of Valparaíso, have shown a dramatic number of damaged structures as well as fully collapsed ones. This means that the classification goes from good sites to complex sites where high amplification and potential damages are expected. In this scenario, the proposed site classification considers that the VS30 is the fundamental parameter, but it has to be corroborated, or verified, by the predominant period obtained via ambient vibrations using the HVSR procedure. If the predominant period does not confirm the site class, then the site classification is degraded in one step. Accordingly, the proposed site classification in Chile is summarized in Table No. 1.

Table 1. Site Classification

Site Class	General description	FIRST REQUIREMENT	NECESSARY CONDITION
		V_{S30-E} (m/s)	$T_{H/V}$ (s)
A	Rock	≥ 900	< 0.15 (or HVSR flat)
B	Very dense soils	≥ 500	< 0.30 (or HVSR flat)
C	Dense, firm soils	≥ 350	< 0.40 (or HVSR flat)
D	Medium-dense or medium-firm soils	≥ 180	< 1.00 (or HVSR flat)
E	Soft soils	< 180	/
F	Special soils	-	

The proposed classification is the result of long discussions and meetings where several Chilean engineers, practitioners and academicians, interacted looking for a better and safer code.

Acknowledgements

The author acknowledges the valuable initiative of the Chilean Geotechnical Society to carry out the studies and discussions to propose a new site classification.

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Ramon Verdugo
CMGI Ltda., Chile
Past President of the Chilean's Geotechnical Society

Hot news

Grishmanov Award 2020

Ivan Grishmanov Award (hereafter the «Award») has been established to encourage the experts who have contributed significantly to science, technology, professional education, organization of production of building materials and structures.

Ivan Grishmanov was born on 17 October 1906 (Gregorian calendar) in the village Tatarinovo, Tver' gubernia (Russia), in a peasant's family.

He started working in 1924 as a carpenter in a repair and construction organization in the town of Ostashkov, then continued to work at the Vorovsky plant in Leningrad (Russia). In 1936, he graduated from Leningrad Institute of Engineers of Public Construction and worked as a foreman and a chief engineer in construction organizations in Leningrad. In 1944, he was appointed as a director of Pskovstroy trust, then was a head of trusts Lenkirovotractorostroy and Kirovstroy (Russia). Between 1949-1951, he was the Chairman of executive committee of Kirovskiy district in Leningrad. Between 1951-1955, he was the first deputy Chairman of the Leningrad city executive committee. In 1955, he was transferred to Moscow as a Head of the Construction department of the CPSU Central Committee, where he worked until 1961. Since January 1961, he was the Chairman of the State Committee of the Council of Ministers of the USSR for Construction (USSR Gosstroy). From 1963 January to 1965, he was the Chairman of the State Committee on the building materials industry under the USSR Committee for Construction (Gosstroy), and from 1965 October – the Minister of building materials industry of the USSR.



Mr. Ivan Grishmanov, the Minister of building materials industry of the USSR

He placed great emphasis on the development of the construction industry, strived for the accelerated expansion of the branch, increase of its technical level, and creation of conditions for meeting the needs of the national economy in Industrial and Civil Engineering. He was awarded with the title of Hero of Socialist Labor, three Orders of Lenin, the Orders of the October Revolution, Red Banner of Labor, Badge of Honor, and several medals.

Ivan Grishmanov died on 4 January 1979 and was buried at Novodevichye cemetery in Moscow.

The founder of the Award is the **Russian Engineering Academy**. The Award is given to employees of enterprises, associations, organizations and institutions of industry of building materials and structures, construction industry, project, scientific and educational institutions of the branch, who have been working in this field for more than 10 years, and also to other persons who have made a significant contribution to the development of the branch:

- for many years of work and services in the industry of building materials and structures, and construction industry;
- for development and introduction of new equipments and geotechnologies in geotechnical engineering area, using of advanced forms and methods of organizing industrial production having a significant economic effect;
- for services in training engineering personnel and skilled workers for the industry of building materials and construction industry.

The Award includes a diploma, lapel badge «Ivan Grishmanov Award laureate», and a wall diploma is presented. The Award is given annually and only once to a person.

Hot news

Grishmanov Award 2020 (Con't)

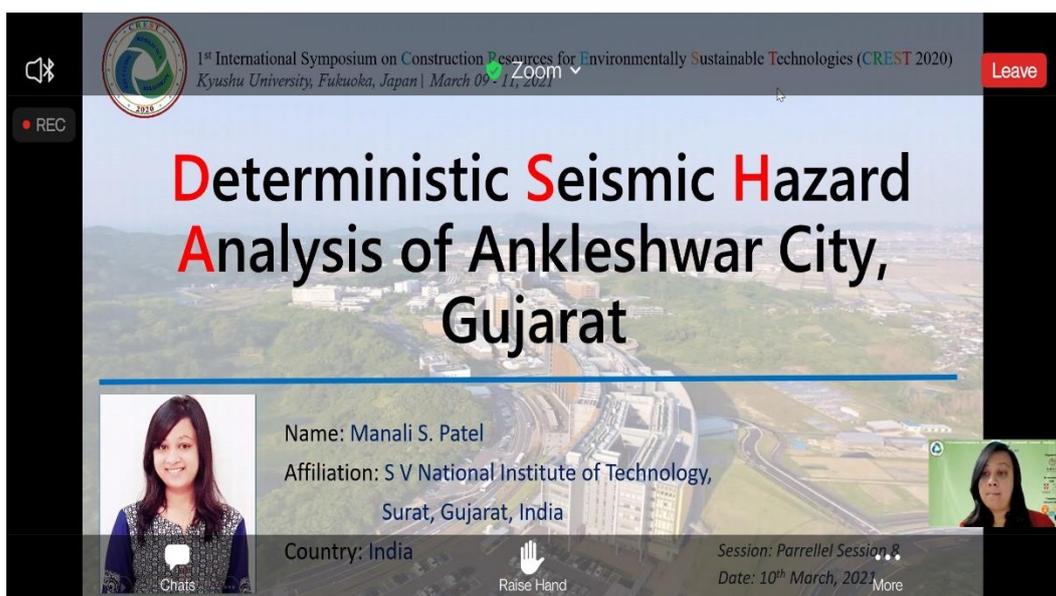
The Competition Commission of the Board of the Russian Engineering Academy awarded the 2020 I.A. Grishmanov Prize in the field of science, technology and the construction to Professor Askar Zhussupbekov (President of Kazakhstan Geotechnical Society). Dr. Zhussupbekov was recognized for his many years of work and accomplishments in the construction of pile foundations by using of advanced geotechnologies in problematical soil conditions, and also advising for using of pile foundations for the mega structures in the cities of Nur-Sultan, Karaganda, Aktau and Almaty in Kazakhstan, and St. Petersburg, Moscow and Yuzhno-Sakhalinsk in Russia. The award ceremony was held on December 17, 2020 in the Council hall of the Board of the Russian Engineering Academy (Moscow, Russia).



2020 I.A. Grishmanov Award Ceremony in Moscow. From left to right: Vice-President of the Russian Engineering Academy Prof. Leonid Ivanov, President of the Kazakhstan Geotechnical Society, Prof. Askar Zhussupbekov

ISSMGE Foundation reports

First of all, I would like to acknowledge the ISSMGE foundation for providing me this prestigious award in attending the international conference CREST2020 at Kyushu University at Fukuoka, Japan during 9-11 March 2021. The main focus of the conference was material recycling in Geo Engineering, Natural disaster and resiliency. Plenty of research was done in low cost and low carbon construction techniques, recycled materials in geotechnical construction, mechanical and consecutive properties of recycled materials, management and utilization of disaster wastes, climate change related to natural disasters, climate change independent natural disasters, physical and numerical modelling of disaster mitigation techniques, information based measures against natural disaster mitigation, natural disasters caused by climate change, natural disaster not caused by climate change, physical and numerical modelling of disaster prevention technology, natural disaster countermeasures using IoT and artificial intelligence, innovative techniques towards low carbon footprint, innovative case studies for sustainable design and construction, socio-economic and environmental aspects in sustainable construction and geological and hydrological aspects. My interest was to understand the natural disaster and its prevention. The conference was an eye opener for me in learning new aspects of construction resources, sustainability and natural disasters and resiliency. Although it was an online conference, it has still maintained the standard in every aspect. There were 11 Keynote Lectures and 2 Plenary Lectures in the conference. On the very first day, Prof. Ikuo Towhata gave his views on Recent Rainfall-Induced Slope Disasters and floods, Prof. Charles Wang-wai Ng gave useful information regarding a novel waste-cover-waste landfill system without geo-membrane. Also Prof. Takaji Kokusho provided very much useful information on Liquefaction-induced Flow failure of Gentle Slopes of Fines-containing loose sands by his case histories and laboratory studies. On the second day, Prof. Kenji Ishihara from Chuo University, Japan highlighted on Post-liquefaction flow slides and residual strength of sandy soils. Moreover, Prof. Masyhur Irsyam from Bandung Institute of Technology, Indonesia gave his views on The Role of the Indonesian Society for Geotechnical Engineering in Supporting the Development of Sustainable Earthquake-Resilience Infrastructure in Recent Years. As a result, the conference was very informative and an eye opener for young researchers like me. I would be very much grateful to the ISSMGE foundation for providing me the financial support in making my wish true for attending the international conference.



During my online presentation

Manali S. Patel
S V National Institute of Technology, Surat, Gujarat, India

ISSMGE Foundation reports (Con't)

First of all, I would like to thank ISSMGE Foundation for providing me with this prestigious award in terms of financial support for attending the international symposium CREST-2020 at Kyushu University, Japan during 9-11 March, 2021. The main focus of the symposium was sustainability by promoting new ideas and innovations in the design, construction and maintenance of geotechnical structures to contribute towards climate change adaptation and disaster resiliency. My interest was to understand the influence of waste product utilization on problematic soils. As I am working in the area of utilization of waste tyre products for the improvement of cohesive soil, I got numerous ideas through this symposium. I would like to highlight one or two lectures that are very close to my area of interest. The CREST 2020 organizer Prof. Hemanta Hazarika himself presented a lecture on “Sustainability and Disaster Mitigation through Cascaded Recycling of Waste Tyres - Climate Change Adaptation Techniques from Geotechnical Perspective”. Even Prof. Buddhima Indraratna talked about the use of recycled rubber products used in the rail track. The geotechnical aspects in terms of mechanics, mineralogy and microstructure of various materials were also discussed by various experts/authors. Previously a year back the symposium was about to held in a face to face mode. So as a PhD student it was great excitement to visit Japan, the highly advanced country in all types of technology. But due to COVID circumstances, it was held in online mode, still, they have organized it in a great manner. The main two features I liked the most. The first one was they have asked video recording of all presenters in advance. So that if anyone will fail to present during the allotted slot then organizers can play their recording. So that all participants will not miss any topic to attend. And another feature I liked the most was the organizers have provided the facility of a review room to each participant to check their presentation. Even I got an opportunity to discuss with experts through email more in detail about their research and current scenario which is also related to my research work. In such a way I have connected the links associated with my research-related issues. Through this symposium, I got contacts of various experts in the geotechnical field to whom I can approach for my post-doctoral study. As an output of attending this symposium, the inputs which I got was plenteous for my current research and also the future research to be conducted.



Inaugural session of the conference

Mohit K. Mistry
S V National Institute of Technology, Surat, Gujarat, India

ISSMGE Foundation reports (Con't)

The XIII International Symposium on Landslide was supposed to be held in Cartagena, Colombia. Because of the Sarsc-Cov-2 pandemic, the modality of the event was changed from presential to virtual. Although virtual modality doesn't allow the participants to meet in person and to have very valuable moments of talking in between sessions, the event was very successful. It was a great opportunity to attend to lectures of remarkable researchers, such as Prof. Luciano Picarelli, Prof. Dave Petley and Prof. Nuria Pyniol, and to exchange ideas with them during the Q&A sessions. Although some problems happened before the Conference (as it happens in all conferences), like providing access to the videos before the event started, it was very well organized and some adjustments were made during the event, like giving some minutes to switch from one room to another. The videos were available to be watched after the end of every conference's day and during a fortnight after the end of it, giving the opportunity to the participants to watch again or to watch those videos that was not possible to watch during the event. Personally, the Conference opened my mind to some topics very relevant for my research, such as 3D slope stability modelling (Prof. Nuria Pyniol key lecture), geotechnical instrumentation (Prof. Ken Ho key lecture) and laboratory landslide simulation (Prof. Luciano Picarelli key lecture). Closure session with Prof. Luciano Picarelli highlighted the importance of properly publish conference's paper in order to give them more relevance, in a way to encourage more researchers to send their papers.

I would like to congratulate Sociedad Colombiana de Geotecnia for the effort that they made to make this conference possible in such challenging conditions and I would like to thank the ISSMGE Foundation Award Committee for giving me the opportunity to attend to the XIII International Symposium on Landslides.



Before my presentation in the S1 Themed Session on 24th Feb.

Malena D'Elia Otero
Campinas State University (UNICAMP)

Event Diary

ISSMGE EVENTS

Please refer to the specific conference website for full details and latest information.

2021

4th International Conference on Transportation Geotechnics (4th ICTG)

Location: Sheraton Grand Chicago, USA

Date: 23-05-2021 - 26-05-2021

Organiser: Professor Erol Tutumluer, 4th ICTG Chairman and Chair of ISSMGE TC 202,

Contact Information: Professor Erol Tutumluer,

Address: 1205 Newmark CEE Laboratory, MC-250 205 N. Mathews,

Phone: +1 (217) 333-8637,

Email: CITL-ICTG2020@illinois.edu,

Website: <http://www.conferences.illinois.edu/ICTG2020>

XXV Congreso Argentino de Ingeniería Geotécnica - CAMSIG

Location: Parque del Conocimiento - Posadas, Misiones, Argentina

Dates: 26-05-2021 - 28-05-2021

Language: Spanish

Organiser: Sociedad Argentina de Ingeniería Geotécnica

Contact person: Andres Ayala

Address: Av. Ulises López, N3300 Posadas,

Email: camsig2020.misiones@gmail.com; secretariat@saig.org.ar

Website: <https://camsig2020.com/>

Mediterranean Symposium on Landslides

Location: Congressi Partenope, Naples, Italy, Naples

Date: 07-06-2021 - 09-06-2021

Language: English

Organiser: Gianfranco Urciuoli (Università di Napoli Federico II), Giovanni Crosta (Università di Milano Bicocca), Luciano Picarelli (Università della Campania L. Vanvitelli)

Contact person: Università di Napoli Federico II

Email: medsymplandslides@gmail.com

Website: <https://medsymplandslides.wixsite.com/mssl2021>

The 2nd International Conference on Press-In Engineering 2021, Kochi

Location : Kami Campus, Kochi University of Technology, Japan

Dates: 19-21 June, 2021

Language : English

Organiser : International Press-in Association (IPA)

Contact person: ICPE2021 Organizing Committee

Address: 5F, Sanwa Konan Bldg, 2-4-3 Konan, 2-4-3 Konan, Minato-ku

Phone: +81-(0)3-5461-1191

Fax: +81-(0)3-5461-1192

Email: icpe2021@gmail.com

Website: <https://icpe-ipa.org/>

Event Diary (Con't)

The 1st International Conference on Sustainability in Geotechnical Engineering - Geodiversity & Resilience (1ST ICSGE'21) - POSTPONED : no dates announced

Location: The Congress Center of LNEC Lisbon, Portugal , Lisboa

Date:

Organiser: The National Laboratory for Civil Engineering (LNEC)

Contact person: LNEC Congress Centre Secretariat

Address: Avenida do Brasil, 101 1700-066 Lisboa

Phone: (+351) 218 443 483

Email: formacao@lnec.pt

Website: <http://icsge.lnec.pt/>

6th Geochina International Conference 2021

Location: NanChang, China

Date : 19-07-2021 - 21-07-2021

Organiser : East China Jia Tong University in Cooperation with Chinese Ministry of Education, GeoChina Civil Infrastructure Association, University of Oklahoma

Contact person: Dr. Dar Hao Chen ; Address: Texas Transportation Institute ; Email: d-chen@tti.tamu.edu;

Website : <http://geochina2021.geoconf.org>; Email : geochina.adm@gmail.com

3rd Pan-American Conference on Unsaturated Soils

Location: PUC-Rio, in Rio de Janeiro, Brazil,

Date: 25-07-2021 - 28-07-2021

Organiser: Tácio de Campos (PUC-Rio), Fernando Marinho (USP), Gilson Gitirana (UFG)

Contact person: Tácio de Campos

Email: panam2021unsat@puc-rio.br

Website: <https://panamunsat2021.com>

The 10th International Conference on Scour and Erosion

Location: DoubleTree Washington DC - Crystal City, USA,

Date: 17-20 October 2021

Language: English

Organiser: Geotechnics of Soil Erosion Committee, ASCE Geo-Institute ; Contact person: Ming Xiao (ICSE-10 Chair); Address: Pennsylvania State University ; Phone: 010-814-865-8056 ;

Email: mxiao@engr.psu.edu;

Website: <https://www.engr.psu.edu/xiao/ICSE-10%20Call%20for%20abstract.pdf>

3rd International Conference on Geotechnical Engineering - New Dates

Location: Cinnamon Grand, Colombo , Sri Lanka ;

Dates: 06-12-2021 - 07-12-2021

Language: English ;

Organiser: Sri Lankan Geotechnical Society ;

Contact person: Dr. JSM Fowze ;

Address: 415, Baudhdhaloka Mawatha ;

Phone: +94-71-417-1239 ;

Fax: +94-11-266-8956 ;

Email: slgssecretariat@gmail.com;

Website: <http://icgecolombo.org/2020/index.php>

Event Diary (Con't)

4th International Symposium on Frontiers in Offshore Geotechnics

Location: University of Texas, Austin, United States

Date: 08-11-2021 - 11-11-2021

Language: English

Organizer: ISFOG 2020 Organising Committee

Contact person: Phil Watson

Address: The University of Western Australia

Phone: 0418881280

Email: phillip.watson@uwa.edu.au

Website: <http://www.isfog2020.org>

XI Congreso Chileno de Geotecnia

Location: Universidad de Talca, Chile

Dates: Talca 22-11-2021 - 24-11-2021

Language: Spanish

Organiser: Chilean Geotechnical Society

Contact Information

Contact person: Macarena Tugas

Email: coordinadorasochige@gmail.com

Website: <http://www.sochige.cl>

Email: directorio@sochige.cl

3rd International Conference on Geotechnical Engineering

Location: Cinnamon Grand, Colombo , Sri Lanka

Dates: 06-12-2021 - 07-12-2021

Language: English

Organiser: Sri Lankan Geotechnical Society

Contact person: Dr. JSM Fowze

Email: slgssecretariat@gmail.com;

Website : <http://icgecolombo.org/2020/index.php>

2022

2nd International Conference on Energy Geotechnics

Location: Robert Paine Scripps Forum for Science, Society and the Environment. La Jolla, CA, USA.

Date : 10-04-2022- 13-04-2022

Language: English

Organiser: John McCartney (UC San Diego, USA) and Ingrid Tomac (UC San Diego, USA),

Contact Information: ICEGT-2020 Secretariat,

Address: 9500 Gilman Dr., La Jolla CA,

Phone: +1-858-822-5212,

Fax: +1-858-822-2260,

Email: secretariat@icegt-2020.com,

Website: <https://icegt-2020.eng.ucsd.edu/home>

Event Diary (Con't)

7th International Young Geotechnical Engineers Conference

Location : International Convention Centre, Sydney, Australia

Dates : 29-04-2022 - 01-05-2022

Language : English

Organiser : Australian Geomechanics Society

Contact person: ICMS Australasia

Address: Level 9, 234 George Street, Sydney NSW, 2000

Phone: (+61 2) 9254 5000

Email: info@icsmge2021.com

Website : <http://icsmge2021.org/7iygec/>

20th International Conference on Soil Mechanics and Geotechnical Engineering

Location: International Convention Centre Sydney, Australia

Date :01-05-2022 - 05-05-2022

Language: English

Organiser: The Australian Geomechanics Society;

Contact person: ICMS Australasia;

Address: Level 9, 234 George Street Sydney NSW 200 ;

Email: emmab@icmsaust.com.au;

Website: <http://www.icsmge2021.org/>

5th International Symposium on Cone Penetration Testing (CPT'22)

Location: Centro Congressi CNR, Bologna, Italy

Dates: 26-06-2022 - 29-06-2022

Language: English

Organiser: Italian Geotechnical Society (AGI) and University of Bologna (endorsed by TC102)

Contact person: Susanna Antonielli (AGI), Prof. Guido Gottardi (University of Bologna)

Email: guido.gottardi2@unibo.it; agi@associazionegeotecnica.it

Geotechnical Engineering for the Preservation of Monuments and Historic Sites

Location: Naples, Italy

Date: 22-24 June 2022

Organizer: TC 301, AGI (Italian Geotechnical Society)

Contact person: Filomena de Silva

Email: secretary@tc301-napoli.org

Website: <http://www.tc301-napoli.org>

9th International Congress on Environmental Geotechnics

Location: Chania, Crete island, Greece,

Dates: 26-06-2022 - 29-06-2022

Language: English

Organiser: Chair: Dimitrios Zekkos, University of California at Berkeley ; zekkos@berkeley.edu

Contact person: Dr. Rallis Kourkoulis

Email: rallisko@grid-engineers.com

Website : <https://www.iceg2022.org/>

Event Diary (Con't)

TC204: Geotechnical Aspects of Underground Construction In Soft Ground - TC204 Cambridge 2021

Location: University of Cambridge, United Kingdom

Date: 28-06-2021 - 30-06-2021

Language: English

Organiser: University of Cambridge

Contact person: Dr Mohammed Elshafie

Address: Laing O'Rourke Centre, Department of Engineering, Cambridge University

Phone: +44(0) 1223 332780

Email: me254@cam.ac.uk

5th International Conference on New Developments in Soil Mechanics and Geotechnical Engineering

Location: Atatürk Cultural and Congress Center Near East University , Nicosia, Turkey ,

Dates: 30-06-2022 - 02-07-2022

Language: English

Organiser: Turkish Society of Soil Mechanics and Geotechnical Engineering and Near East University

Contact person: Cavit ATALAR

Address: Near East Boulevard

Phone: 05338342829

Fax: 00903922236461

Email: cavit.atalar@neu.edu.tr

Website: <http://zm2020.neu.edu.tr>

17th Danube - European Conference on Geotechnical Engineering

Location: Ramada Parc, Bucharest, Romania

Dates: 05-09-2022 - 07-09-2022

Language: English

Description

Organiser: Romanian Society for Geotechnical and Foundation Engineering

Contact person: Ernest Olinic

Address: Bvd. Lacul Tei 124

Email: srgf@utcb.ro

Website: <http://www.17decge.ro>

28th European Young Geotechnical Engineers Conference and Geogames

Location: National Research Moscow State University of Civil Engineering, Russia, Moscow

Date: 15-09-2022 - 17-09-2020 - 19-12-2022

Language: English

Organiser: Russian Society for Soil Mechanics, Geotechnics and Foundation Engineering

Contact person: PhD Ivan Luzin

Address: NR MSUCE, 26 Yaroslavskoye shosse

Phone: +7-495-287-4914 (2384)

Email: youngburo@gmail.com

Additional Information : <https://t.me/EYGEC2020>

Event Diary (Con't)

11th International Conference on Stress Wave Theory and Design and Testing Methods for Deep Foundations

Location: De Doelen, Rotterdam, The Netherlands,

Dates: 20-09-2022 - 23-09-2022

Language: English

Organiser: Royal Netherlands Society of Engineers (KIVI)

Contact person: Angelique van Tongeren

Address: Prinsessegracht 23

Email: SW2022@kivi.nl

Website: <https://www.kivi.nl/afdelingen/geotechniek/stress-wave-conference-2022>

6th International Conference on Geotechnical Engineering

Location: University of Engineering & Technology (UET) Lahore, Pakistan,

Dates: 08-12-2022 - 09-12-2022

Language: English

Description

Organiser: Pakistan Geotechnical Engineering Society (PGES)

Contact person: Dr. Jahanzaib Israr

Address: Civil Engineering Department, University of Engineering & Technology (UET) Lahore (Main Campus), G.T. Road

Email: 16icge@uet.edu.pk

Website: <https://16icge.uet.edu.pk/>

XVIII European Conference on Soil Mechanics and Geotechnical Engineering

Location: Lisbon, Portugal

Dates: 25-08-2024 - 30-08-2024

Language: English

Organiser: SPG

Contact person: SPG

Address: Av. BRASIL, 101

Email: spg@lnec.pt

Website: <http://www.spgeotecnia.pt>

NON-ISSMGE SPONSORED EVENTS

2021

DFI Deep Mixing 2021

Location: Polish Baltic Philharmonic and Congress Centre, Gdansk, Poland

Dates: 05-07-2021 - 08-07-2021

Language: English

Organizer: Deep Foundations Institute

Contact person: Theresa Engler

Address: 326 Lafayette Avenue

Phone: 9734234030

Email: tengler@dfi.org

Website: <http://www.dfi.org/DM2021>

Event Diary (Con't)

6th International Conference on Geotechnical Research and Engineering (ICGRE 2021)

Location: Hotel Real Palácio, Lisbon, Portugal

Dates: 21-06-2021 - 23-06-2021

Language: English

Contact person: Jeeah Park

Address: Orléans, Ontario, Canada

Phone: 6138349999

Email: info@icgre.org

Website: <https://lisbon2021.icgre.org/>

7th International Conf. on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics

Location: The National Science Seminar Complex, Indian Institute of Science Bangalore, India,

Date: 12-07-2021 - 17-07-2021

Organiser: Indian Society of Earthquake Technology

Website: <http://7icragee.org/index.php>

Email: conf@7icragee.org

Fifth World Landslide Forum

Location: Kyoto International Conference Center, Kyoto, Japan

Dates: 02-11-2021 - 06-11-2021

Organizer: International Consortium on Landslides

Contact person: Ryosuke Uzuoka

Address: Gokasho

Phone: +81-774-38-4090

Email: uzuoka.ryosuke.6z@kyoto-u.ac.jp

Website: <http://wlf5.iplhq.org/>

Email: secretariat@iclhq.org

Fourth African Regional Conference on Geosynthetics

Location: Cairo, Egypt

Dates: 21-02-2022 - 24-02-2022

Language: English

Organiser: International Geosynthetics Society- Egypt Chapter

Contact person: Prof. Fatma Baligh

Address: 87 El-Tahrir St., Dokki, Giza, Egypt

Email: Secretariat@geoafrica2021.org; info@geoafrica2021.org

Website <https://geoafrica2021.org/>;

The Third International Conference on Environmental Geotechnology, Recycled Waste Materials and Sustainable Engineering

Location: Dokuz Eylul University, Izmir, Turkey,

Dates: 17-06-2021 - 19-06-2021

Organiser: Dokuz Eylul University

Contact person: Tugce Ozdamar Kul

Address: Dokuz Eylul University

Phone: +905325164800

Email: egrwse2020@gmail.com

Website: <http://www.egrwse2020.com>

Event Diary (Con't)**16th International Conference of the International Association for Computer Methods and Advances in Geomechanics - IACMAG**

Location: Politecnico di Torino Conference Centre, Italy

Dates: 01-08-2022 - 02-09-2022

Language: English

Organiser: Politecnico di Torino

Contact person: Symposium srl

Address: via Gozzano 14

Phone: +390119211467

Email: info@symposium.it, marco.barla@polito.it

12th International Conference on Geosynthetics

Location: Auditorium Parco della Musica, Rome, Italy

Dates: 18-09-2022 - 22-09-2022

Language: English

Organiser: Associazione Geotecnica Italiana - Italian Chapter of IGS

Contact person: Susanna Antonielli

Address: AGI-Viale dell'Università 11

Phone: +39 06 4465569

Fax: +39 06 44361035

Email: info@12icg-roma.org

Website: <http://www.12icg-roma.org>

FOR FURTHER DETAILS, PLEASE REFER TO THE WEBSITE OF THE SPECIFIC CONFERENCE

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China
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799 Pacific Highway
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Cairo-Alexandria Desert Road
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Egypt



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PO Box 177
2600 AB Delft,
THE NETHERLANDS



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2260 AA Leidschendam
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Equipment Specialist*

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124, Jalan Kapar 27/89, Section 27, Taman
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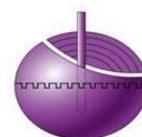
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