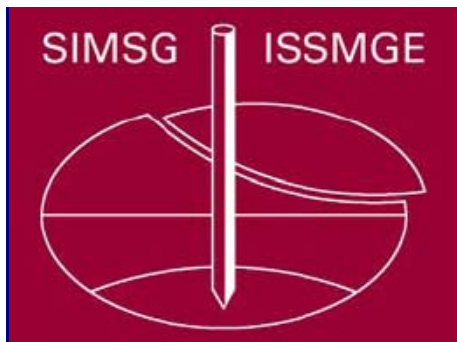




ISSMGE Bulletin

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International Society for Soil Mechanics and Geotechnical Engineering

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MESSAGE FROM TC101 ON Laboratory Stress Strength Testing of Geomaterials

Prof. Junichi Koseki, Chair of TC101

Dear Members of ISSMGE,
Dear Colleagues,

ISSMGE TC 101 (formerly TC-29) was founded in 1994, after the successful 1st International Symposium (IS) on the Pre-failure Deformation Characteristics of Geomaterials held in Sapporo, Hokkaido, Japan. To date, it has completed full five terms: two with Professor F. Tatsuoka as Chairman (1994-2001), another two with Professor R. Jardine (2001-2009) and one with Professor H. di Benedetto (2009-2013). At present in the sixth term (2013-2017), 41 members from 25 member societies are serving as the active members of TC101.

Under the terms of reference as shown in what follows, TC 101 covers all aspects of laboratory testing. It has thus organized many International Symposia (ISs) and workshops, and provides opportunities for international exchanges, through regular ISs and workshop meetings.

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Photo 1 Chair (Junichi Koseki, Japan in the center), Vice chair (Lyesse Laloui, Switzerland, on the left) and Secretary (Erdin Ibraim, UK on the right) of TC101

Message from the new ISSMGE TC 101 Chair (CONTINUED)

Its mission is:

- To promote co-operation and exchange of information concerning research and developments in advanced laboratory geotechnical testing, including apparatus, techniques, data acquisition and interpretation.
- To encourage the application of advanced laboratory testing in research; in integrated site characterization studies; and in ground modelling.
- To explore how advanced testing can be used most constructively in practical geotechnical engineering.
- To advance the above aims through collaboration with specialists working in laboratory and field testing, sampling, theoretical and numerical analysis, and in project engineering and full scale observation. This will involve close liaison with other ISSMGE Technical Committees.

For example, refer to Fig. 1.



Photo 2 Meeting of TC101 held in Bristol, UK (March, 2014)

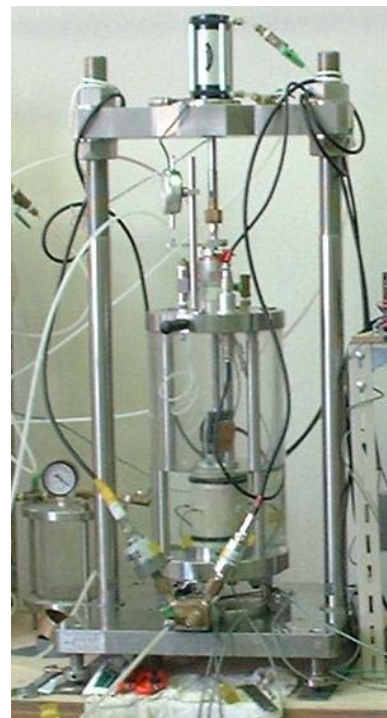
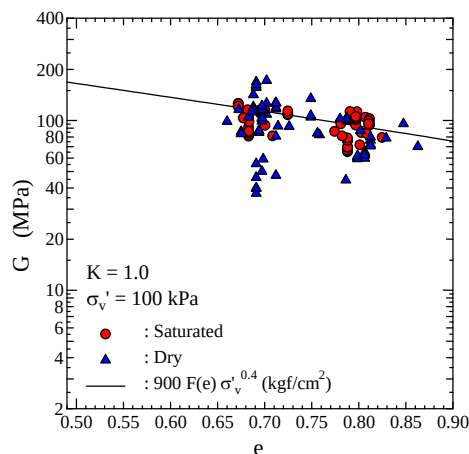


Figure 1 Typical results from international parallel tests on the measurement of $G_{\max}$ using Bender elements (Yamashita et al., 2008) and a triaxial test apparatus with Bender elements at Kitami Institute of Technology, Japan (by courtesy of Prof. S. Yamashita)

Message from the new ISSMGE TC 101 Chair (CONTINUED)

TC101 established Bishop Lecture in commemoration of late Professor Alan W. Bishop, which is delivered by the world's most distinguished figures in experimental soil mechanics. The 1st Bishop Lecture was delivered by Professor Fumio Tatsuoka at the 5th International Symposium on Deformation Characteristics of Geomaterials in Seoul, Korea, 2011 (Photo 3). The 2nd Bishop Lecture was delivered by Professor Richard Jardine at the 18th International Conference on Soil Mechanics and Geotechnical Engineering in Paris, France, 2013 (Photo 4). The lecture slides can be downloaded from <http://tc101.iis.u-tokyo.ac.jp/bishop.html>

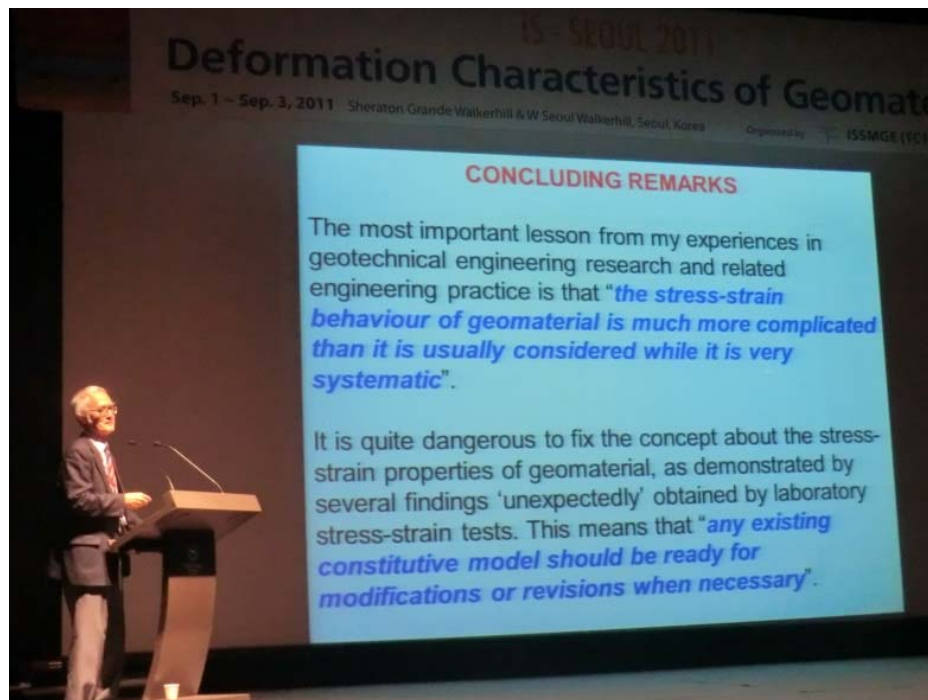


Photo 3 The 1st Bishop Lecture by Prof. F. Tatsuoka in 2011



Photo 4 The 2nd Bishop Lecture by Prof. R. Jardine in 2013 (by courtesy of Prof. R.Kuwano)

Message from the new ISSMGE TC 101 Chair (CONTINUED)

In 2015, TC101 will organize the 6th International Symposium on Deformation Characteristics of Geomaterials in Buenos Aires, Argentina (Photo 5), in collaboration with La Sociedad Argentina de Ingeniería Geotécnica (SAIG), where the 3rd Bishop Lecture will be delivered by Prof. H. di Benedetto. On-line submission of abstracts for this symposium is open until July 1, 2014

<http://conferencesba2015.com.ar/website/sixt-international-symposium-on-deformation-characteristics-of-geomaterial/welcome/>



Photo 5 View of Buenos Aires (by courtesy of Prof. V. Rinaldi)

For further information on the activities of TC101, please visit our web site at

<http://tc101.iis.u-tokyo.ac.jp/index.html>

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New Elected President of the Federation of International Geo-engineering Societies (FedIGS) Professor Jean-Louis BRIAUD

Professor Briaud was very recently elected President of the Federation of International Geo-engineering Societies (FedIGS) for the 2014-2018 term. FedIGS regroups the following international societies

1. ISSMGE: Int. Society for Soil Mechanics and Geotechnical Engineering
2. ISRM: Int. Society for Rock Mechanics
3. IAEG: Int. Association for Engineering Geology and the Environment
4. IGS: Int. Geosynthetics Society

Dr. Briaud is a former president of ISSMGE (2009-2013). As President of FedIGS, Briaud plans to foster cooperation and strengthen the links between the four societies while remaining conscious of each society's freedom. Briaud also wishes to strengthen the group by inviting other geo-engineering societies to join FedIGS. Briaud says that this prestigious and humbling position will give him a chance to broaden his horizons and learn more about rock mechanics, engineering geology, geosynthetics, and other aspects of the rich geoworld. Briaud also plans to work on enhancing the image of the geo-profession which he sees as a long term but very important goal.



Dr. Briaud is Professor and Holder of the Buchanan Chair in the Zachry Department of Civil Engineering at Texas A&M University. He received his Bachelor's degree in France in 1972 and his Ph.D. degree from the University of Ottawa in Canada in 1978. His expertise is in foundation engineering and more generally geotechnical engineering. He has served as President of the Association of Geotechnical Engineering Professors in the USA, President of the Geo-Institute of the American Society of Civil Engineers, and President of the International Society for Soil Mechanics and Geotechnical Engineering. Among other awards, he has received the ASCE Ralph Peck Award, the CGS Geoffrey Meyerhof Foundation Engineering Award, the ASTM Hogentogler Award, the ASCE Huber Research Prize, and the ASCE Martin Kapp Award. Over the last 30 years, Dr. Briaud has conducted about 8.5 million dollars of research mostly on foundations and retaining walls. He has supervised 49 PhD students and 90 Master students. He has been a consultant on many projects in several countries. He is the author of the 1992 book on "the pressuremeter" and the 2013 book on "geotechnical engineering: unsaturated and saturated soils". He has published about 300 articles and reports in geotechnical engineering and has lectured worldwide.

TECHNICAL ARTICLE – 1

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

E. Pimentel and G. Anagnostou
ETH Zurich, Switzerland

Introduction

The present paper addresses the laboratory testing of weak rocks for the Gotthard Base Tunnel - the longest traffic tunnel in the world - and the planned Gibraltar Strait tunnel - a future cutting-edge project. One common aspect of these tunnels is heavily squeezing conditions resulting from the presence of weak rocks at great depth under high pore water pressure. Squeezing is the phenomenon of large time-dependent deformations of the ground around the opening. The assessment of squeezing potential and the planning of remedial measures require knowledge about the strength and deformability of the rock. In contrast to common rock mechanics tests, the mechanical properties of the rocks were investigated by means of triaxial tests involving control of the pore water pressure. Due to the nature of the ground, new developments were necessary in the triaxial testing equipment and procedures.

Gotthard Base Tunnel Project

The Gotthard Base Tunnel (GBT) consists of two single-track high-speed railway tunnels, each of them with a length of 57 km, with several cross-overs and two multifunction stations (Ehrbar, 2008). The main tunnels have - depending on the geological conditions and the support requirements - a variable excavation diameter of up to 12.4 m and they cross four crystalline rock formations: the Aar Massif in the north, the Tavetsch Intermediate Massif (TzM) and the Gotthard Massif in the central part and the Pennine gneiss zone in the south (Fig. 1). These formations are separated by sedimentary or metamorphic rocks. The separation located between the Aar Massif and the TzM is called Clavaniev Zone (CVZ).

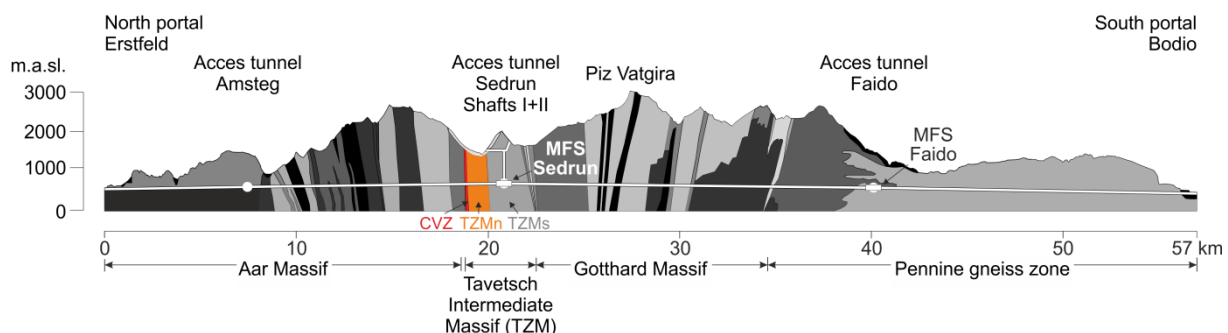


Figure 1 Geological profile of the Gotthard Base Tunnel (courtesy AlpTransit AG)

Most of the rocks in the project area are competent and generally favourable for tunnel construction. The main tunnels were therefore excavated using tunnel boring machines, with the exception of the TzM and the CVZ, which were constructed conventionally. In the past the TzM has been subjected to considerable tectonic shearing, leading to greater deformation of the northern part (TzMn) than the southern part (TZMs) (Guntli, 2005). From the early stages of the project, the TzMn and the CVZ were identified as the most problematic zones. These formations have a length of about 1100 m and an overburden of 1000 m. They can be characterized as an extended fault zone, where steeply-inclined rock packages of compact gneiss with a thickness of a few decimeters up to some tens of meters alternate with kakiritic gneisses, slates and phyllites of similar thickness (Guntli and Weber, 2009). The term “kikirite” denotes a tectonically sheared and crushed rock which has lost a large part of its original strength (Heitzmann, 1985).

TECHNICAL ARTICLE – 1 (Continued)

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

The TZMn and CVZ formations are water-bearing, with high initial pore pressure (Vogelhuber et al., 2004). Rocks of poor quality under high overburden and pore pressure are particularly prone to squeezing (Kovári et al., 2000), i.e. to large long-term deformations or to the development of a high rock pressure upon the lining. The adverse effects of high pore pressure (and the stabilizing effects of pore pressure relief by drainage) are well known from earlier tunnels (e.g. the Simplon railway tunnel and the Gotthard motorway tunnel, cf. Anagnostou 2010). Due to the great depth of cover in the TZMn and CVZ, it was necessary to apply a yielding support, i.e. a support that allows deformations to occur, thus enabling reduction of the rock pressure. The main elements of the construction method were: circular tunnel cross-section; full face excavation (Fig. 2, left); systematic anchoring of the face; over-excavation to accommodate the convergences; ring-shaped steel arches with sliding connections (Fig. 2, right); systematic anchoring around the cross section; construction of a closed shotcrete ring a few diameters behind the face (Kovári et al., 2000).

The design of the yielding support required an estimate of the relationship between rock pressure and deformation. This so-called ground response curve can be estimated by means of continuum mechanical analyses, which presuppose knowledge of the mechanical behaviour of the rock.

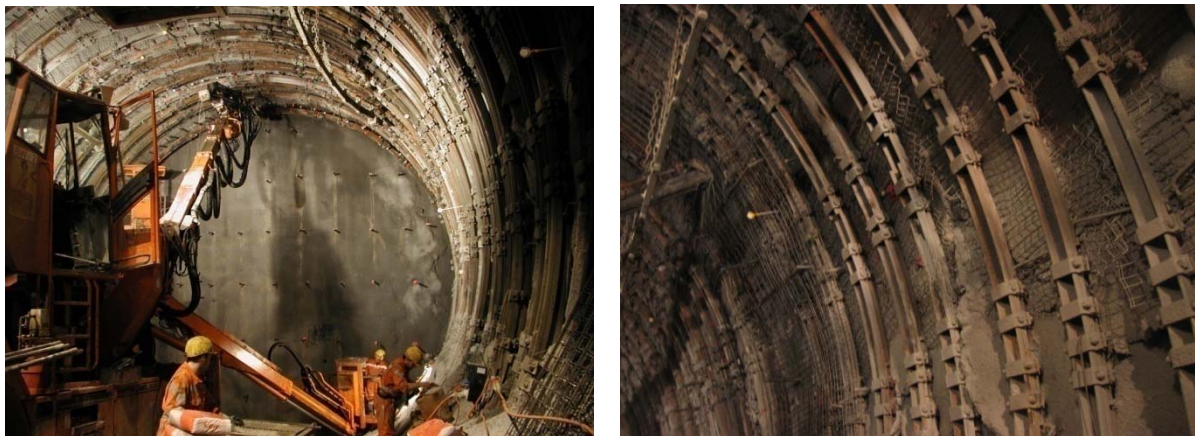


Figure 2 Full face excavation of the circular cross-section (left) and yielding support consisting of steel sets with sliding connections (right)

Laboratory testing

For this reason the rocks in the TZMn and the CVZ were subjected to detailed investigations. During the first exploratory campaign in 1993, more than 30 triaxial tests were performed following standard rock mechanics testing procedures, i.e. without control of pore pressure, on specimens obtained from a deep inclined borehole (Tisa et al., 1994). The results exhibited a large scatter, which could not be explained by the natural heterogeneity of the material.

One hypothesis for explaining the variability of the results was that the pre-testing conditions of the specimens differed and were affected by the sampling, storage and specimen preparation procedures. More specifically, the specimens might have exhibited higher or lower strength depending on whether they were dried up or wetted before testing. This hypothesis in combination with the presumably considerable effect of pore pressure on the mechanical response and the high in-situ pore pressures made it necessary to re-design the testing procedure in order to control the pore pressure and then to evaluate the test results in terms of effective stresses as is usual in soil mechanics. This task was undertaken in the second exploratory stage between 1997 and 1998 by Vogelhuber (2007). It included the performance of 8 CU-tests and 55 CD-tests. The tests required modifications of the triaxial rock testing equipment in order to impose (CD-tests) or measure (CU-tests) pore pressure. Standard testing equipment for soil materials could not be used since it allows loads and pressures of about one to two orders of magnitude lower than necessary for these rock specimens.

TECHNICAL ARTICLE – 1 (Continued)

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

The exploratory stage provided a reliable database for the geomechanical characterization of the kakirites, while showing that they obey Terzaghi's classic principle of effective stress and illustrating the effect of pre-test wetting or drying on the results. Furthermore, it was shown that, for obtaining reliable and reproducible results from CD-tests, a sufficiently high partial saturation can be achieved simply by subjecting the specimens to seepage flow before triaxial testing, i.e. without a time-consuming saturation phase via the application of a backpressure.

The third exploratory campaign was performed during the construction of the tunnel in order to obtain more precise information about the mechanical properties of the rocks thus enabling an adequate selection of the support system. In contrast to the first two exploratory campaigns, where the boreholes were drilled from the surface, specimens were obtained in the third campaign by means of advanced probing from the tunnel face. To ensure that results were obtained in time, CD-tests on partially saturated specimens were performed using the seepage flow procedure established in the second campaign. Some components of the testing equipment were also improved. More specifically, a fully digital control and data acquisition unit were implemented, the pore pressure conditions were controlled using electromechanical equipment (Fig. 3) and the specimens were cut with an electronically controlled diamond band saw (Fig. 4). A total of 46 multi-stage CD-tests were performed.

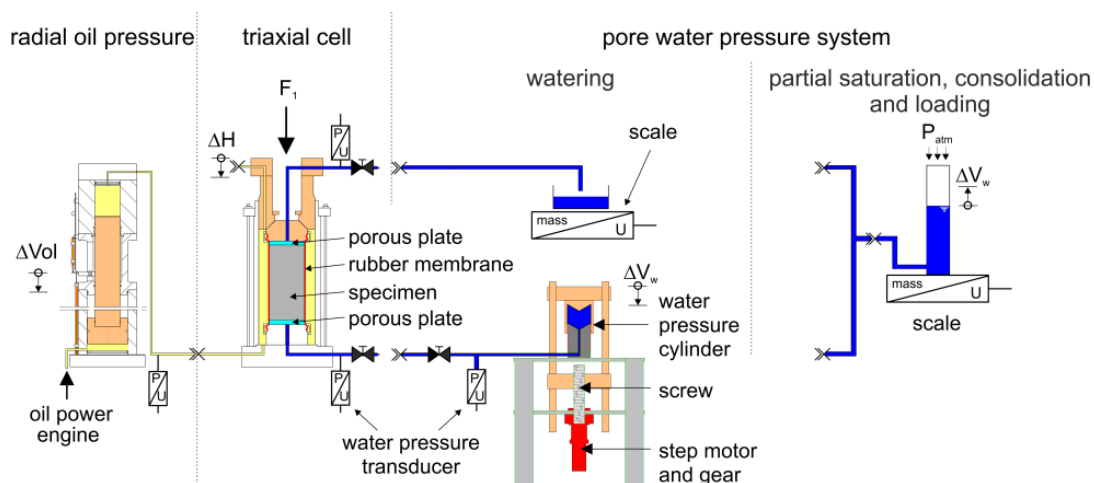


Figure 3 Schematic view of the testing equipment



Figure 4 Electronically controlled diamond band saw



Figure 5 Kakirite specimen before and after CD-test

TECHNICAL ARTICLE – 1 (Continued)

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

Figure 5 shows a kakirite specimen before and after triaxial testing and illustrates the high deformability of this material. The results of the CD-tests exhibited a relatively moderate scatter. The measured permeability values were between 1×10^{-8} and 2×10^{-10} m/s (Fig. 6). The behaviour of the samples was initially contractant and changed to dilatant before full mobilization of the shear strength (Fig. 7). The strength can be described accurately enough in terms of a Mohr-Coulomb failure criterion, and a stress-dependent stiffness was observed. Fig. 8 shows the measured strength for the three load stages of all tests.

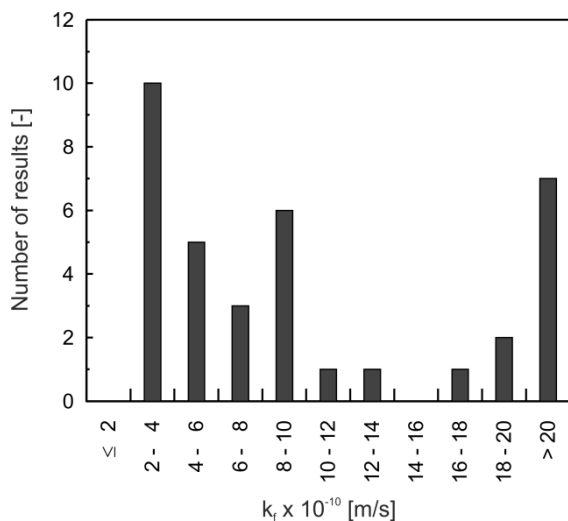


Figure 6 Hydraulic conductivity of the kakirites (third exploratory campaign)

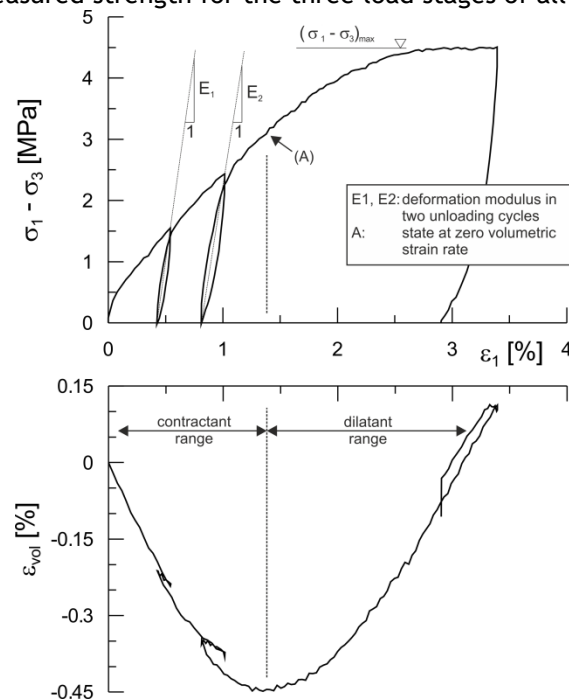


Figure 7 Stress deviator and volumetric strain over axial strain (first load stage, $\sigma_3' = 2$ MPa)

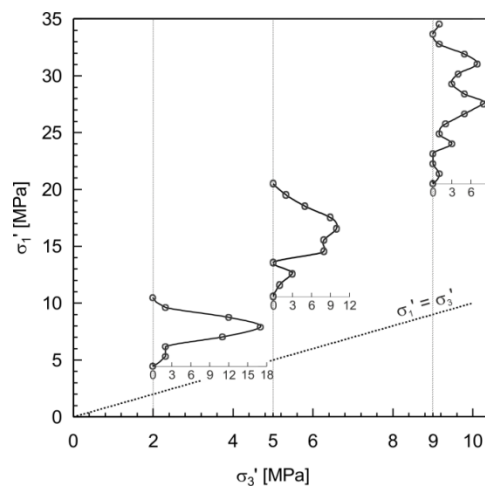


Figure 8 Principal stress diagram with frequency distribution of the maximum effective axial stress at three load stages ($\sigma_3' = 2, 5$ and 9 MPa; CD-tests of the third exploratory campaign)

TECHNICAL ARTICLE – 1 (Continued)

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

Gibraltar Strait Tunnel Project

The project under investigation for the Gibraltar Strait crossing foresees a 38 km long bored tunnel. About 28 km will be under the sea (Pliego 2005, SNED & SECEG, 2007). The largest part of the tunnel is located in Flysch. In the middle of the alignment, the tunnel will cross two so-called paleochannels filled with clayey breccias of extremely poor quality. In this tunnel section, the sea is 300 m deep and the overburden amounts to approximately 200 m (Fig. 9). The very low strength and high deformability of the breccias in combination with the 50 bar high pore pressures prevailing at the depth of the tunnel may cause large squeezing deformations and pressures (cf. Ramoni and Anagnostou, 2011). Crossing the breccias represents the major technical challenge of the project (Russo et al., 2008). Besides being a motor for technological progress, the Gibraltar project also provides an opportunity to advance the science of tunnelling. In the following, the laboratory testing of the breccias will be addressed. More detailed information can be found in Dong et al. (2013).

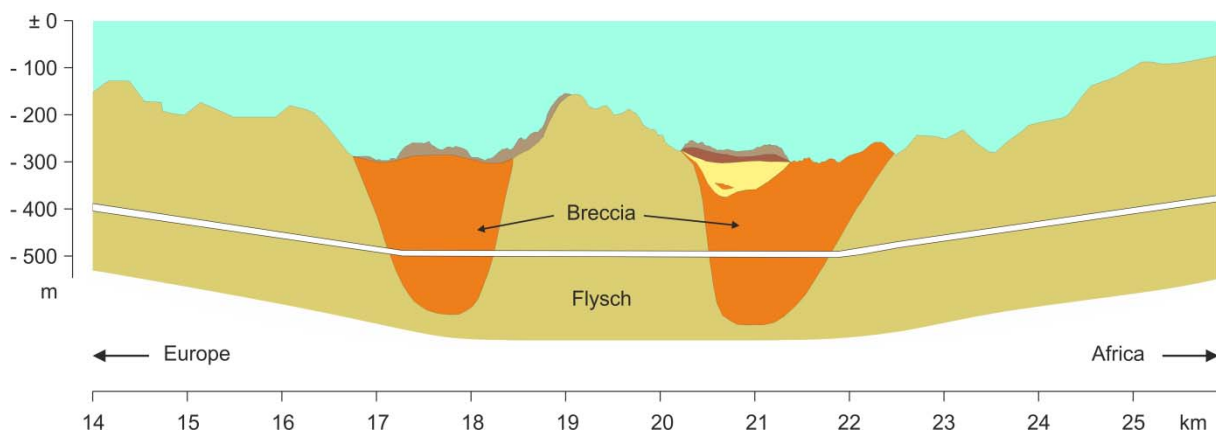


Figure 9 Longitudinal profile of the Gibraltar Strait railway tunnel (after Pliego 2005, SNED & SECEG, 2007)

Laboratory testing

Within the framework of research co-operation with the state organisations, SECEG SA and SNED, which supervise and co-ordinate studies concerning the Gibraltar Strait tunnel, the ETH Zurich is investigating the mechanical behaviour of the breccias under triaxial testing conditions with control of the pore pressure. Such consolidated drained (CD) and consolidated undrained (CU) tests are very important for reducing the prediction uncertainties concerning the squeezing of the ground.

Due to the structure and permeability of the breccia as well as the high in-situ pore pressures and effective stresses, the tests are particularly demanding. The presence of hard, gravel-size inclusions within a very soft clayey matrix (Fig. 10) in combination with the low permeability, which renders the testing of large samples impossible, makes the selection of representative specimens difficult. Due to the weakly embedded hard inclusions, specimen preparation is very demanding. Very good results have been achieved by combining the core cutting with air-flushing through the use of an electronically controlled high-precision diamond band saw (Fig. 4).



Figure 10 Section of a breccia specimen from the Gibraltar strait with visible hard inclusions

TECHNICAL ARTICLE – 1 (Continued)

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

Due to the high in-situ pore pressures and effective stresses, testing must be carried out under pressures which are relatively high for breccia (in reality a soil-like material), necessitating high nominal loads on the testing equipment. (Basically, it is almost a matter of soil-mechanics testing under conditions which are more typically associated with rock mechanics problems.) At the same time, despite the high nominal loads, the strain rate has to be tuned finely within an extremely low range, due to the low permeability of the material. Therefore, the control system of the electromechanical pressure unit (which had a nominal load of 600 kN) was linked to an external high-precision digital strain gauge in order to guarantee loading rates as low as $0.1 \mu\text{m}/\text{min}$. It should be noted, that, as a consequence of the extremely low permeability of the breccias ($k = 4.10^{-13} - 2.10^{-11} \text{ m/s}$), each triaxial test takes 4 - 8 weeks.

Figure 11 illustrates the deformability of the material, while Figure 12 shows typical results of CD- and CU-tests in the principal stress diagram. In addition to the low strength values, it is immediately obvious from the CU-tests that pore pressure continues to decrease at failure, thus indicating only contractant behaviour, which is typical for normal-consolidated (or underconsolidated) materials.



Figure 11 Breccia specimen before and after CD-testing (from Anagnostou *et al.*, 2012)

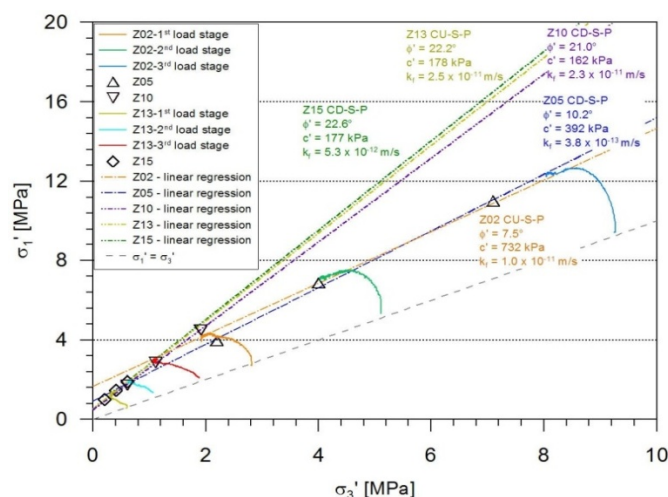


Figure 12 Results of triaxial tests in the principal stress diagram

TECHNICAL ARTICLE – 1 (Continued)

Advanced Geomechanical Testing for Two Large Tunnelling Projects in Heavily Squeezing Conditions

Closing remarks

The two projects discussed are different with respect to prevailing geological formations, depth of cover and pore pressure. Both tunnels present, however, the problem of heavy squeezing and they cross geomaterials, whose mechanical behaviour and response to tunnelling depends essentially on the pore pressure. This makes it necessary to modify the standard rock mechanical testing methods, to evaluate the test results according to the principle of effective stresses and to apply appropriate geomechanical analysis methods which can account for the tunnelling-induced generation and subsequent dissipation of excess pore pressure.

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Acknowledgements

The authors thank AlpTransit AG, SECEG SA and SNED for the permission to publish the test results.

TECHNICAL ARTICLE – 2

Railway Crossing the Bosphorus Strait — Realizing the 150-Year Turkish Dream of Connecting Asia and Europe —

Toru Sueoka, President of the Japanese Geotechnical Society / Executive Engineer,
Taisei Technology Center,

Hidemi Omi, Masahiko Tsuchiya, Fumio Koyama, Takashi Imaishi, Masahiro Iwano
and Kazunori Ito (Taisei Corporation)

1. Introduction

Istanbul, the largest city in the Republic of Turkey, is a historic strategic point connecting Asia and Europe, and it is divided east-west by the Bosphorus Strait. The Railway Project to cross the Bosphorus Strait (Marmaray Project) constructed a railway connecting Europe and Asia, with the objectives of relieving traffic congestion in the Greater Istanbul area that has a population of 14 million, and reducing the atmospheric pollution caused by this traffic. This project was a 150-year dream of the Turkish people, and in this article the design and construction of the 13.6-km underground railway project including the tunnel across the Strait are described. In August, 2004, construction by the Taisei Gama Nurol Joint Venture commenced, and in October 2013 the opening ceremony for the underground railway was held. The clients were the Ministry of Transport, Maritime Affairs and Communications of the Republic of Turkey and the Railway, Ports and Airports Construction Bureau, while the client's representative was AVR which was a joint venture of the Oriental Consultants, Japan International Consultants for Transportation Co., Ltd., and YükselProjeUluslararası A.Ş.

2. Outline of the Project

Fig. 2-1 shows the location of the Bosphorus Strait, and Fig. 2-2 illustrates the route plan. From the civil and geotechnical engineering points of view, this project was a large project simultaneously using 3 tunneling methods; immersed, shield and mountain tunneling methods. Also, the project included the operation of the world's deepest immersed tunnel, the world's first direct submarine connection of immersed tunnels and the shield tunneling without a vertical shaft, so the degree of technical difficulty of the construction work was significant. As demonstrated in Fig. 2-3, out of the total length of 13.6 km of twin parallel tunnels, 1.4 km under the sea was an immersed tunnel, the remaining portion on land was shield tunnel, whereas the portion around Sirkeci Station was constructed mainly by the mountain tunneling method.



Fig. 2-1 Location of Bosphorus Strait

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait — Realizing the 150-Year Turkish Dream of Connecting Asia and Europe —



Fig. 2-2 Route plan

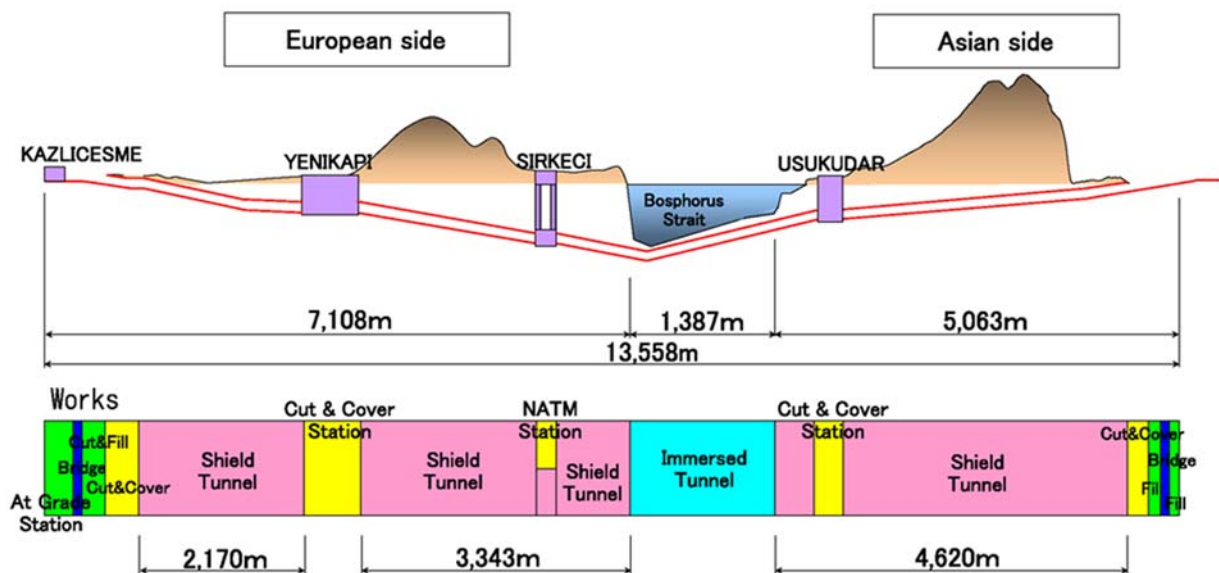


Fig. 2-3 Overall longitudinal section of the project including the tunnel across the Strait

3. Construction of Immersed Tunnel at the World's Greatest Water Depth under Rapid Tidal Flows

In the immersed section of the tunnel under the Bosphorus Strait, 11 segments were placed on the bottom of the sea at the maximum depth of 60 m, as shown in Fig. 3-1. As demonstrated in Fig. 3-2, the construction depth of the immersed tunnel was 60 m in the sea which is the deepest in the world.

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait

— Realizing the 150-Year Turkish Dream of Connecting Asia and Europe —

Because the maximum tidal flow is 3 m/s on the surface layer and -1 m/s in the lower layers (negative velocity means the opposite direction of water flow), the placement of tunnel segments in the Bosphorus Strait required tidal flows to be predicted 36 hours in advance. Therefore, a tidal flow analysis and prediction system were developed based on various local measurement data including long term local weather data. Moreover, the tidal flows for 36 hours after start of towing were predicted using various data prior to the initiation of tunnel installation, and the predicted flow velocity was sent through internet to engineers in both Turkey and Japan so that the information would be shared (Fig. 3-3). The specification for the immersion operation vessel and the operating procedures for the immersion operations were determined by repeated hydraulic model tests at the Taisei Technology Center (Fig. 3-4). Furthermore, when immersing the segments, the foundation mat was constructed using a newly developed underwater leveling robot (Fig. 3-5). The joint between the immersed tunnel and the shield tunnel, which is described later, was constructed by providing a sleeve pipe at the end of the segment; see Fig. 3-6.

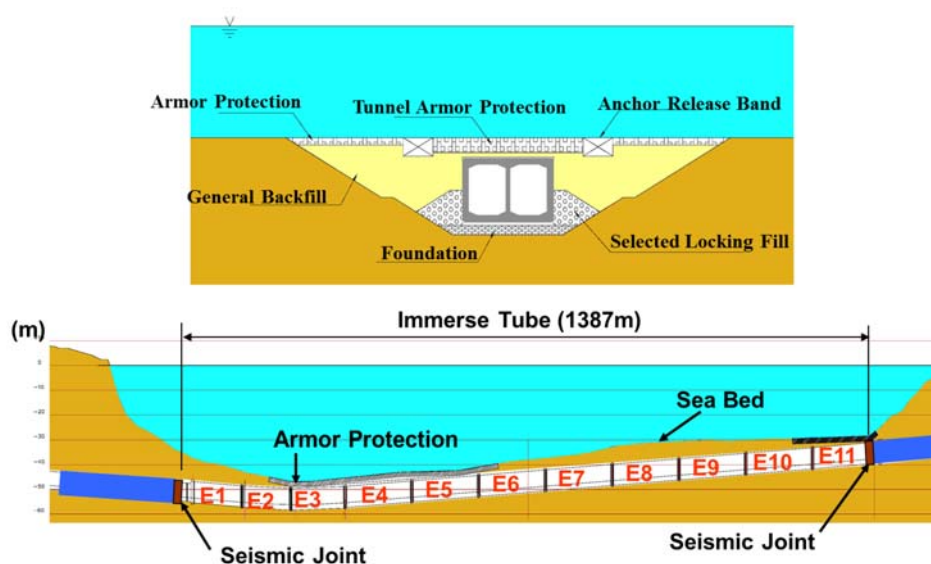


Fig. 3-1 Longitudinal and transverse sections of the immersed tunnel

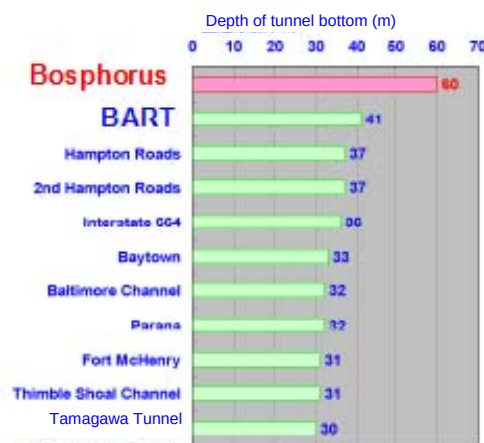


Fig. 3-2 Water depth of Immersed tunnel constructions (as of 2004)

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait

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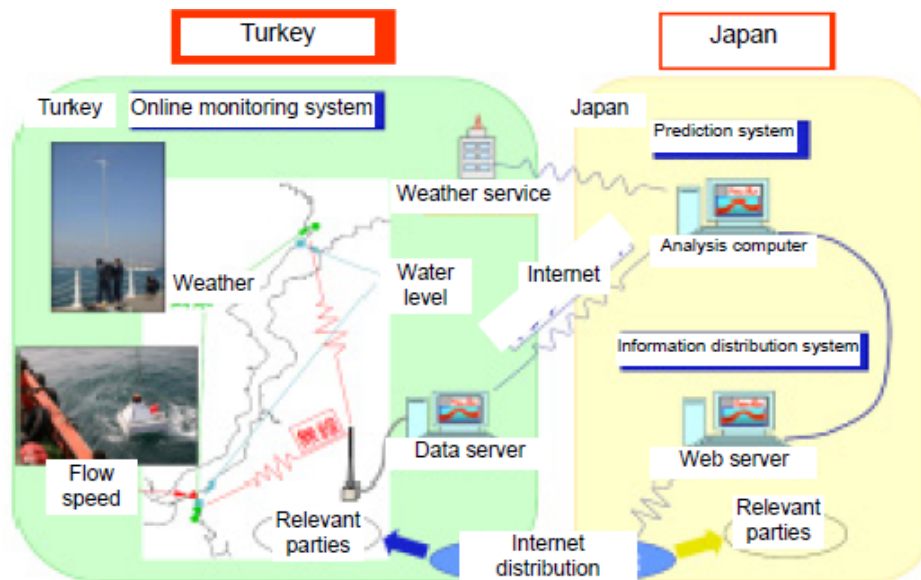


Fig. 3-3 Outline of the tidal flow prediction system

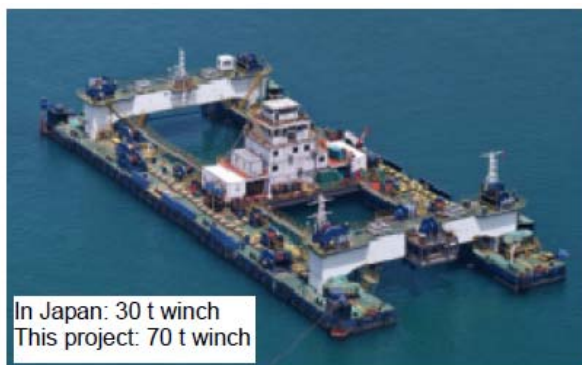


Fig. 3-4 Immersion operation vessel and hydraulic model tests to confirm the immersion procedures (Taisei Technology Center)

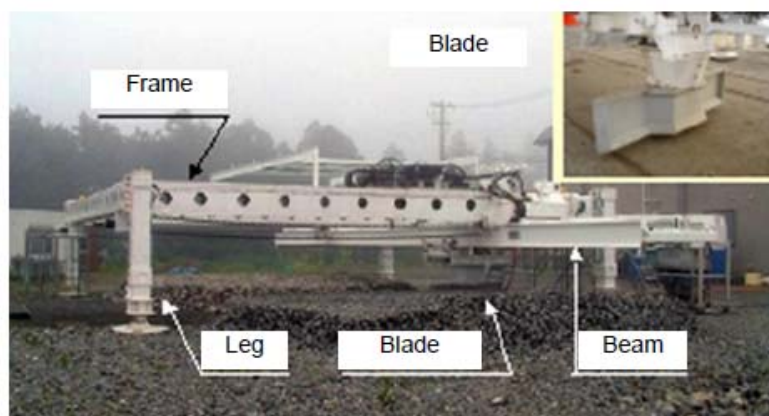


Fig. 3-5 Underwater leveling robot used in the construction

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait

— Realizing the 150-Year Turkish Dream of Connecting Asia and Europe —

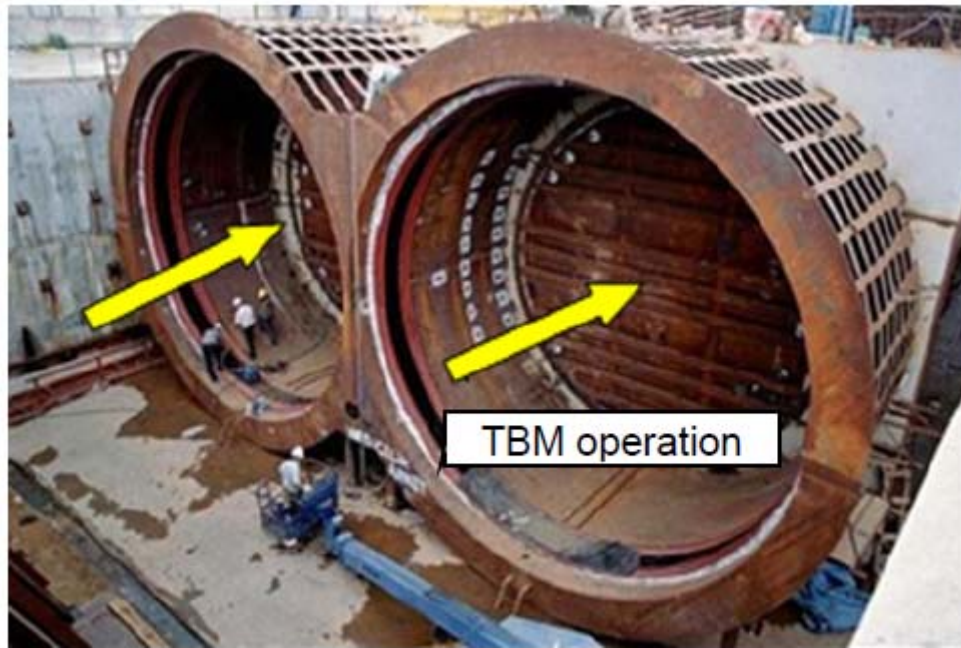


Fig. 3-6 Sleeve pipes at the end of immersion segment

4. Construction of Sirkeci Station and the Mountain Tunneling Method

Sirkeci Station is located in a historical tourist and commercial district near to Topkapi Palace. Fig. 4-1 demonstrates the land use above ground at the planned location of Sirkeci Station. Excavation directly under many densely-built commercial buildings, hotels, etc. was carried out from vertical shafts that were made in a small construction space. In other words, it was a construction environment that required great attention to the local traffic situation and the neighboring environment. Fig. 4-2 shows a perspective view of the underground part of Sirkeci Station. Because this complex underground structure was mainly constructed by the mountain tunneling method, the construction procedures and the construction schedule were extremely complex. Also, the lining concrete was required to be water tight, so it was necessary to investigate the lining structure in detail using a 3-dimensional structural analysis model that precisely reproduced the real structure; see Fig. 4-3.



Fig. 4-1 Land use directly above Sirkeci Station

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait

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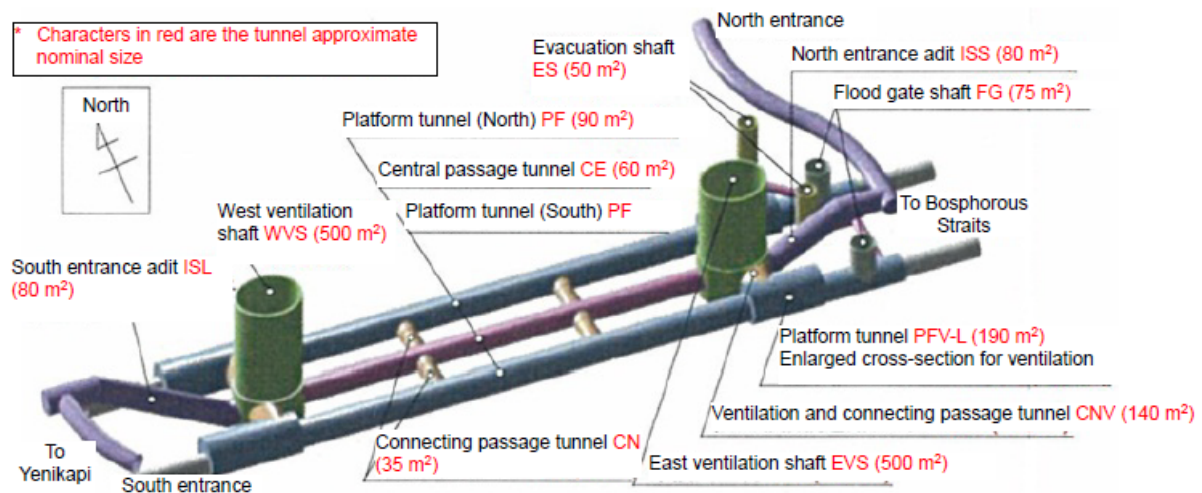


Fig. 4-2 Isometric view of the underground part of Sirkeci Station

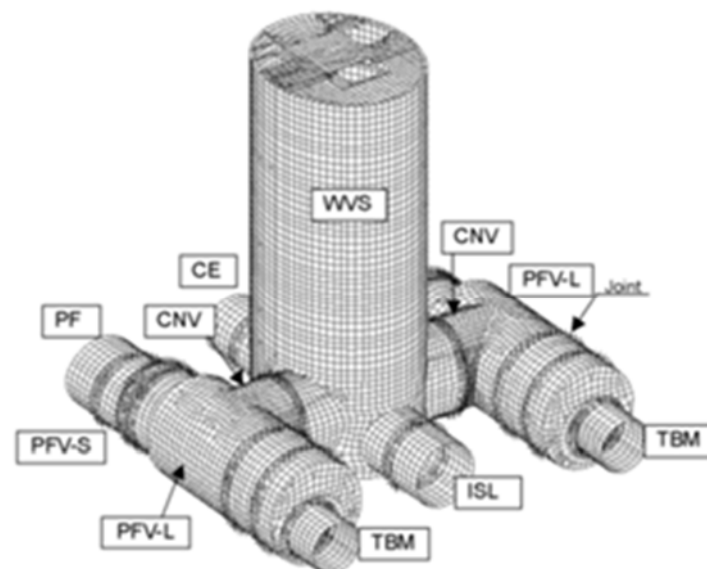


Fig. 4-3 Structural model for analysis of the ventilation shafts

5. TBM Tunneling Method of Slurry Type

The shield tunneling method was adopted for 10.1 km (in each direction) out of the total of 13.6 km of the Bosphorus Strait crossing railway construction project (Fig. 2-3). Under thin soil cover, construction in sandy soil was carried out by the mud pressure method, and under large depths construction in rock was carried out by the muddy water method. Outside Japan there is no differentiation made between the TBM and shield methods, so in this paper the muddy water shield method is referred to as the slurry-type TBM method. Fig. 5-1 shows a slurry-type TBM. As shown in Fig. 5-2, this excavation method was used mainly in urban areas, and technical efforts were made to minimize the effects on houses etc.

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait

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Fig. 5-1 Slurry-type TBM



Fig. 5-2 Excavation in an urban area

6. Conclusions

The Bosphorus Strait Construction Project was started in August 2004. Because Istanbul is a famous World Heritage and during construction many archeological relics were found. As a result the construction was substantially delayed. The opening ceremony was held on 29th of October 2013 which was the 90th anniversary of the founding of the Republic of Turkey. This ceremony was attended by Prime Minister Erdogan (Turkey) and Prime Minister Abe (Japan), as shown in Fig. 6-1.

TECHNICAL ARTICLE – 2 (Continued)

Railway Crossing the Bosphorus Strait

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This project was realized through the great understanding and cooperation of not only Taisei Corporation, Gamma, Nuro, who carried out the design and construction, but also the Client's Representative, AVR, the Turkish Ministry of Transport and the Turkish Government, JICA, and the Japanese Government. Above all, the greatest satisfaction for all those involved in the construction was the heartfelt celebration remark of the residents of Istanbul and the Turkish people that the project, which they had longed for, was completed. Details of the construction including the geotechnical aspects will be presented during the Asian Regional Conference on Soil Mechanics and Geotechnical Engineering in November 2015, Fukuoka, Japan. (<http://www.15arc.org/>)



Fig. 6-1 Opening ceremony of the submarine railway attended by Prime Minister Erdogan (Turkey), Prime Minister Abe (Japan), and other dignitaries

Last but not least, the authors express their sincere thanks to the great assistance from Professor Ikuo Towhata (VP of ISSMGE for Asia), University of Tokyo, and Mr. Nobuhiro Akisato, Dr. Kenichi Horikoshi, Mr. Hiroyasu Ishii of Taisei Corporation during the preparation of this article.

TECHNICAL ARTICLE – 3

Taoyuan International Airport Link Project in Taiwan

Benson Hsiung, Deputy Secretary, Chinese Taipei Geotechnical Society

The Taoyuan International Airport Link (TIAL) is a metro system stretching from Taipei city center to Taoyuan International Airport with a total length of 51.0 km, which comprises 8 underground stations constructed by cut and cover method and 15 elevated stations. CECI Engineering Consultants, Inc. in Taiwan is in charge of detailed designs and primary construction supervision works on Packages DA115, DU01, DU02 and DE01. Some special issues about geotechnical design works in TIAL are introduced in this article.

1. Large-scale Excavation For A1 Station And Joint Development Buildings

A1 terminal station of TIAL is located asides the Taipei Main Station. The excavation was performed in very soft ground with high groundwater level and an aquifer underlying the excavation. A large-scale excavation with 27.2 m in depth and 26,000 square meters in area was constructed for A1 station as well as for the basement of joint development buildings having 76 stories and 56 stories, respectively. As indicated in Figure 1, the excavation site is situated next to many sensitive underground and above-ground structures, such as Taipei City Mall, viaduct, High Speed Rail (THSRC) and Taiwan Railway Administration tunnels etc., on which no adverse effects were allowed in order to ensure the normal operation. Protection measures, such as buttress and full height cross walls for diaphragm wall system and groundwater withdrawal from the underlying aquifer with intensive monitoring were employed to reduce deformation induced by the excavation and ensure the basal stability of excavation. Observations showed that lateral deformation up to 40 mm for diaphragm wall and surface settlement of 27 mm were found at the end of excavation.

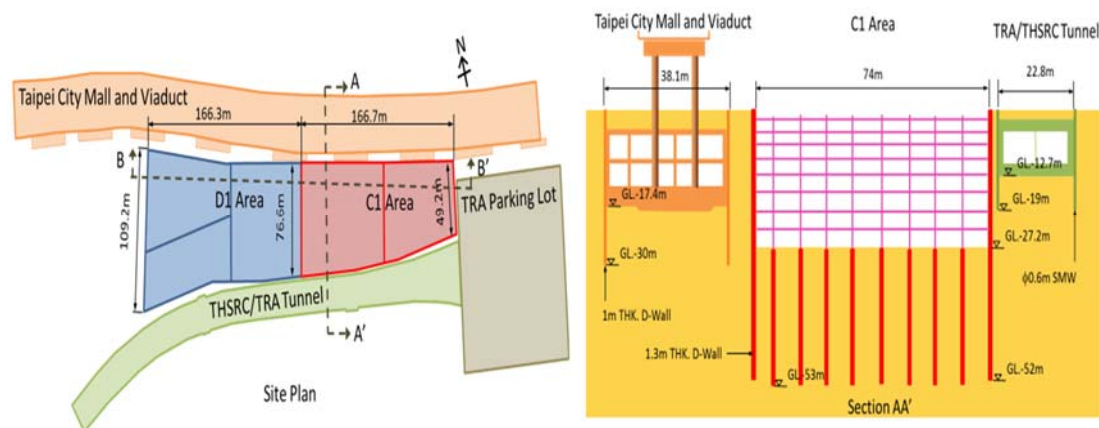


Figure 1 Large-scale excavation for the terminal station of TIAL

2. DOT Tunnel Crossing Dan-Shui River

A tunnel works with a total length of 1580m will be performed to cross Dan-Shui River and connect Taipei main station and San Chong City. If twin bored tunnels are employed, up to six cross passages shall be installed according to Fire Protection Regulation. In order to eliminate risk in construction of cross passages as well as to save land compensation for the route running underneath residential houses located, a Double-O-Tube (DOT) shield machine was employed to replace twin bored tunnels through elaborative assessment (refer to Figure 2). Similar machine was successfully adopted in Japan and Shanghai, Mainland China before. The tunnel was mainly bored in silty clay and occasionally in sand, as shown in Figure 2. The maximum vertical slope and minimum horizontal curvature radius of the alignment is 4.9% and 277.0 m, respectively. DOT shield machine was launched from San Chong end in December 2009 and arrived at Taipei end in December 2010.

TECHNICAL ARTICLE – 3 (Continued)

Taoyuan International Airport Link Project in Taiwan

3. Tunnel Works Under Airport Facilities

Underground stations and tunnels of TIAL are to be constructed beneath the parking lot of terminal, control tower and taxi way of Taoyuan International Airport without interrupting operation. Special cares thus were taken for both design and construction. Therefore, additional protection measures together with real-time monitoring system were employed before and during the construction so that flight safety and normal operation could be achieved. Figure 3 shows activities carried out before start of excavation and Figure 4 presents construction of tunnel under Terminal 2 which is in operation.

4. Special Excavation Method for Shaft Foundation on Slope

Bamboo-cutting method (BCM) was adopted for the excavation of shaft foundation of viaducts situated on slope (see Figure 5). Figure 6 presents the difference between the BCM and conventional excavation for the shaft foundation of viaduct. BCM foundation consists of a central column and its foundation is surrounded by an outer ring that is retained by necessary earth anchors with shotcrete on the excavated face. It can be therein seen that the excavated area by BCM is much smaller than that by conventional excavation so the amount of excavated earth is significantly reduced. By the same reason, the BCM is more advantageous to reduce both construction cost and impact on environment.

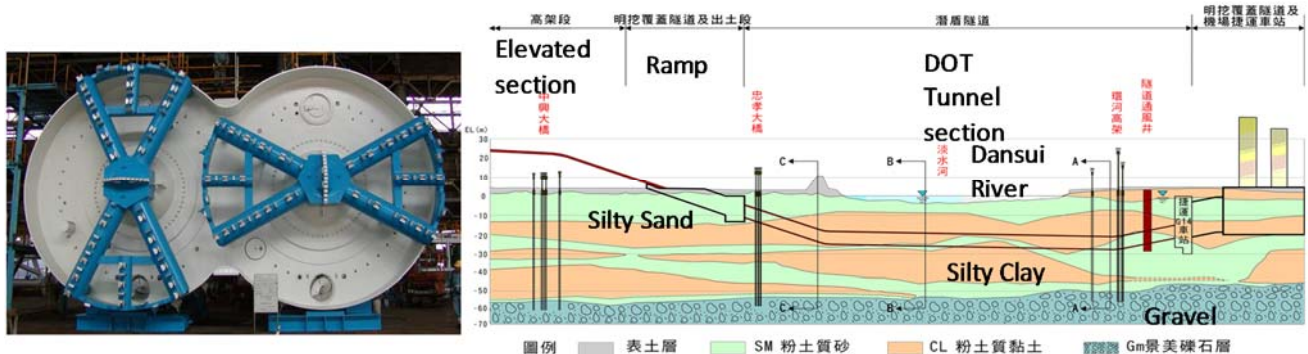


Figure 2 DOT shield used and longitudinal and ground profile of tunnel



(a) Installation of underpinning of underground car park structure



(b) Use of low vibration diamond saw for concrete cutting

Figure 3 Photos of preparing works for the enlargement of existing tunnel under Terminal 2

TECHNICAL ARTICLE – 3 (Continued)

Taoyuan International Airport Link Project in Taiwan



(a) Excavation

(b) Cutting of side wall

Figure 4 Construction photos of the enlargement of existing tunnel under Terminal 2



Figure 5 Photo of bamboo-cutting method of shaft foundation



(a) Conventional excavation for shaft foundation



(b) Bamboo-cutting method for shaft

Figure 6 Comparison of different excavation methods for shaft foundation on slope

CONFERENCE REPORT: XXth Károly Széchy Memorial Session and XIIIth Geotechnical Evening Forum Budapest, 14th of February, 2014

The Hungarian National Committee of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) jointly with the Engineering Section of the Hungarian Academy of Sciences and the Geotechnical Section of the Hungarian Chamber of Engineers celebrated the XXth Károly Széchy Memorial Session on the 14th February, 2014 at the Great Lecture Hall of the Hungarian Academy of Sciences, with over 230 persons attending the event (Fig. 1). The event has been organized 20 times since 1994.



Fig. 1 International guests with the hosts on the Széchy Memorial Session; 1) János Józsa - academic of the HAS -Hungary; 2) Péter Görög - vice president of the Hungarian Geotechnical Society and ISSMGE HNC; 3) Ferenc Friedler - Rector of the University of Pannonia; 4) Dietmar Adam - professor TU Vienna; 5) Ivan Vrkljan - Zagreb - president of the Croatian Geotechnical Society (CGS) -vice president of International Society of Rock Mechanics ISR; 6) Antonio Gens - ISSMGE vice president for Europe; 7) László Nagy - Head of Geotechnical Department of TU Budapest- lecturer; 8) Heinz Brandl - em. professor TU Vienna - Head of Austrian Society of Civil Engineers and Architectures; 9) József Mecsi - president of the Hungarian Geotechnical Society and ISSMGE HNC; 10) Zoltan Melitz - Rector of the ETJ Colleges Baja city; 11) Roger Frank - president of the ISSMGE; 12) Carlo Viggiani - em. professor Naples - lecturer; 13) Peter Turček - professor TU Bratislava; 14) László Szilvágyi - president of the Geotechnical Session of Hungarian Chamber of Engineers; 15) Jana Frankovska - president of the Czech and Slovak ISSMGE National Committee; 16) Ákos Török - president of the Hungarian National Group of International Society for Rock Mechanics

CONFERENCE REPORT: (Continued)
XXth Károly Széchy Memorial Session and
XIIIth Geotechnical Evening Forum
Budapest, 14th of February, 2014



Fig. 2 "Working lunch" at the Club of the Hungarian Academy of Sciences before the Széchy Memorial Lectures

On the jubilee occasion the Hungarian Geotechnical Society presented a book of 200 pages, containing documents, biographical disclosures, commemoration of Professor Széchy, and also a set of pictures of the all-day events of the commemorative lecture session. The book was published in Hungarian; the English version will follow soon, for preview it will be available on the ISSMGE HNC website:

<http://issmge-hungary.net>

This series of festive gatherings has been highlighted from the beginning by lectures delivered by the most illustrious professors paying tribute to the memory of the Hungarian professor, Károly Széchy. This year, the guest speaker from abroad was Prof. Dr. Carlo Viggiani (University of Naples Federico II, Department of Hydraulic, Geotechnical and Environmental Engineering, Napoli, Italy) in Fig. 4. The presentation's title was **"The relations between Science and Geotechnical Engineering"**.



Fig.3 Cover page of the book



Fig. 4 Prof. Carlo Viggiani



Fig. 5 The audience at the memorial meeting

CONFERENCE REPORT: (Continued)

XXth Károly Széchy Memorial Session and XIIIth Geotechnical Evening Forum Budapest, 14th of February, 2014

The speaker from Hungary was Dr. László Nagy (Budapest University of Technology, Department of Geotechnics, Budapest, Hungary) whose topic was “**Danger, probability and risk in geotechnics**”.

In keeping with tradition, a young engineer who has excelled as the best junior speaker at the annual national geotechnical conference is offered the opportunity to introduce himself by a lecture at the Memorial Session. This year the candidate was Ákos Tóth. The title of the presentation was “TBM performance forecast in mixed ground conditions”. **About the event you can see the presentations and photos on the following website:** <http://www.issmge-hungary.net>

Again, as is traditional in these events, the Károly Széchy memorial plaque and prize were delivered. This year the recipient was the Diamond Anniversary Diploma holder engineer, retired college professor, forensic expert Dr. György Gabos. See Fig. 6.



Dr. László Nagy



Dr. Ákos Tóth



Dr. György Gabos

Fig. 6 Photographs of important speakers

The professional events were concluded with an informal dinner. The joyful spirits of the evening was enhanced by the toasts and the amusing speeches given by the recipient of the awards (Fig. 7).

CONFERENCE REPORT: (Continued)

XXth Károly Széchy Memorial Session and XIIIth Geotechnical Evening Forum Budapest, 14th of February, 2014



Photos: J. Philip



Welcome speech by Professor Heinz Brandl, J. Mecsi, Roger Frank and Antonio Gens from the left

Fig. 7 Joyful dinner party

(Compiled by József Mecsi)

Interview

Questioner: József Mecsi

Question 1:

Prof. Viggiani, you are the chairman of the Technical Committee 301 (Preservation of Monuments and Historic Sites) of the International Society for Soil Mechanics and Geotechnical Engineering; you have been a component of the International Committee for the Safeguard of the Leaning Tower of Pisa. In relation to the safeguard of Heritage, what do you think of the relationship between geotechnical engineering and other professions (e.g. structural engineering, but above all archaeology, historic preservation etc.)? What are the difficulties and the opportunities for cooperation?

First of all, I believe that maintaining, preserving, conserving, restoring, and improving monuments and historic sites may be the most significant contribution that Civil Engineering can give to mankind in our time. The conservation of Heritage, however, is one of the most challenging problems facing modern civilization. It involves a number of factors belonging to different fields (cultural, humanistic, social, technical, economic and administrative), intertwining in inextricable patterns. Accordingly, for a satisfactory solution an interdisciplinary approach is mandatory. A common work among different specialists is easier to auspicate than to practice because of the different cultures and even languages; it is lengthy and often conflict, but at the end it reveals fruitful and rewarding.

CONFERENCE REPORT: (Continued)

XXth Károly Széchy Memorial Session and XIIIth Geotechnical Evening Forum Budapest, 14th of February, 2014

Question 2:

What is your vision about the future technical, organisational and structural issues of underground construction sites in historical environment? Some of the geotechnical engineers fear that because of legal aspects construction in historic environment is going to be the "hunting field" of lawyers. Do you share this view?

Underground construction in historical environment is becoming more and more frequent; the subsoil of practically all the large cities all over the world is interested in by the construction of a network of transportation and other underground infrastructures. This is indeed one of the most challenging sectors of civil engineering in our time, because of the difficult design and construction problems to be faced and because of the need of preserving the surface built environment, often rich of monuments and historic sites. It is to underline that the basic reason for constructing underground facilities is to make the cities comfortable, but obviously without altering the specific features of the historic cities themselves. I do not believe that one must be too much concerned about lawyers; they are hunting everywhere, and we engineers are in any case exposed to their attention. The possible remedial measures include obviously high level design, transparency in the prediction of possible effects and research of a preliminary consensus on the projects.

Question 3:

What farewell message would you give for the present young generation of geotechnical engineers?

There are two messages that, in my opinion, are worth considering for a young geotechnical engineer.

1. Civil engineering, and particularly geotechnical engineering, may be perhaps not very rewarding in terms of social success and financial achievements. The contents of the profession, however, are very stimulating. In fact, the typical process of investigating, modelling, conceiving a solution, analysing and designing appears very different from the typical tasks of other profession, in the sense that it has new characters in each new case and stimulates originality and creativity.

2. We engineers are holder of a rational culture, based on science: mechanics, thermodynamics, chemistry etc.. A proper use of scientific theories is at the origin of the spectacular advances in engineering (and in the whole welfare of human kind) in last centuries. At present, paradoxically, the rapid developments in sectors as the new construction technologies and the numerical methods of analysis coupled to the powerful computing resources now currently available, often clouds the rational bases of engineering, with very detrimental consequences on the quality of our profession. I believe that we should always have in mind the warning of the great Immanuel Kant: "nothing is more practical than a good theory".



Széchy Memorial Lecturers 1994-2014

- 1994 FAZAKAS György (Budapest, Hungary), MISTÉTH Endre (Budapest, Hungary), VARGA László (Győr, Hungary), Heinz BRANDL (Wien, Austria), FARKAS József (Budapest, Hungary)
- 1996 KOVÁRI Kálmán (Zürich, Switzerland)
- 1997 VARGA László (Győr, Hungary), LAZÁNYI István (Budapest, Hungary)
- 1998 Heinz DUDDECK (Braunschweig, Germany), GRESCHIK Gyula (Budapest, Hungary)
- 1999 Ulrich SMOLTCZYK (Stuttgart, Germany), SCHARLE Péter (Budapest, Hungary)
- 2000 DULÁCSKA Endre (Budapest, Hungary), Marta DOLEŽALOVÁ (Praha, Czech Rep.)
- 2001 Robert MAIR (Cambridge, United Kingdom), MÜLLER Miklós (Budapest, Hungary)
- 2002 Michele JAMIOŁKOWSKI (Torino, Italy), NAGY János (Budapest, Hungary)

CONFERENCE REPORT: (Continued)

XXth Károly Széchy Memorial Session and XIIIth Geotechnical Evening Forum Budapest, 14th of February, 2014

2003 Jubilee session

- James K. MITCHELL (Blacksburg, VA USA)
 POSGAY György (Budapest, Hungary),
 TRÄGER Herbert (Budapest, Hungary)
 MECSI József (Budapest, Hungary),
- 2004 Suzanne LACASSE (Oslo, Norway), SZEPESHÁZI Róbert (Győr, Hungary)
- 2005 Lothar MARTAK (Wien, Austria), SZABÓ Imre (Miskolc, Hungary)
- 2006 SECO E PINTO (Lisbon, Portugal), SZILVÁGYI Imre and SZILVÁGYI László (Budapest, Hungary)
- 2007 Serge VARAKSIN (Paris, France), KLADOS Gusztáv (Budapest and Kuala Lumpur)
- 2008 Roger FRANK (Paris, France), SOÓS Gábor (Budapest, Hungary)
- 2009 Rolf KATZENBACH (Darmstadt, Germany), JUHÁSZ József (Miskolc, Hungary)
- 2010 William VAN IMPE (Ghent, Belgium), BICZÓK Ernő (Budapest and Hamburg)
- 2011 Jean-Louis BRIAUD (USA), ZÁBRÁDI Ernő (Budapest, Hungary)
- 2012 Walter WITKE (Germany), DELI Árpád (Budapest, Hungary)
- 2013 John BURLAND (UK), KOVÁCS Balázs (Miskolc, Hungary)
- 2014 Carlo VIGGIANI (Italy), NAGY László (Budapest, Hungary)

Károly Széchy

- 1903 born in Budapest on 17th December as the son of Ilona Zwerencz and Károly Széchy, MSc in Civ. Eng. chief inspector at the Hungarian Railway and
- 1922 matured at the Secondary School "Árpád" in Budapest
- 1926 MSc Degree in Civil Engineering at the Technical University Palatine József in Budapest
- 1926-27 Assistant Professor at the Water Engineering Department of the same University
- 1927-28 scholar at the University College London
- 1928-32 private engineer, construction manager
- 1930 married, wife Margit Kókai, son Károly Széchy(1930) MSc in Civ. Eng. and Edit Sós (1932) pharmacist
- 1932-45 various posts at the Bridge Department in the Hungarian Ministry for Transport and Communication
- 1933 Doctor of Law
- 1935-37 management the Widening of the Margaret-Bridge
- 1937-39 leader of the General Planning of the Árpád-Bridge
- 1938 supervisor for the Modernizing of the Ferenc József-Bridge (today Freedom-Bridge)
- 1939-43 management the Construction of the Árpád-Bridge
- 1944 Dr. Techn.
- 1945-51 Head of the Bridge Department in the Hungarian Ministry for Transport and Communication, administrative leader for the reconstruction of bridges blasted in W.W.II.
- 1945-46 leader of the Planning and Construction of the Kossuth-Bridge (demolished in 1960)
- 1945-46 leader of the Temporary and the Final Repairing of the Ferenc József-Bridge
- 1945-47 leader of the Reconstruction of the Margaret-Bridge
- 1947-49 leader of the Renovation of the Chain-Bridge
- 1946 awarded with Officer's Cross of the Republic-Order
- 1948 awarded with the Golden Grade Kossuth-Prize
- 1948 Honorary Professor at the Technical University of Budapest
- 1948-50 supervisor at the construction of the Árpád-Bridge
- 1949 started the lectures on Foundation Engineering at the TU Budapest
- 1950 The Hungarian Academy of Sciences declares to Technical Fellowship
- 1950-53 General Director for the Underground Railway Investment Co. in Budapest, Leader of the planning and construction of the Metro

CONFERENCE REPORT: (Continued)
XXth Károly Széchy Memorial Session and
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- 1952 The Hungarian Academy of Sciences declares to Corresponding Member Fellowship
- 1952 published the first edition of the book "Foundation Engineering" Volume I and II in Hungarian
- 1952 awarded with "Excellent Worker of Transportation" distinction
- 1953-54 Director of the Underground Railway Construction Co. in Budapest
- 1953 Ordinary Professor of Foundation Engineering and Tunnelling at the Technical University in Budapest
- 1956-57 Head of the Technical Board at the Ministry of Transport and Communication
- 1958 published the first edition of the Book "Foundation failures" in Hungarian
- 1958 Visiting Professor in Egypt for 2 months
- 1959-60 contribution to the Planning of the Renovation of the Elisabeth-bridge
- 1961 published the first edition of the Book „Tunnelling” in Hungarian
- 1964 Visiting Professor in Egypt for 2 months
- 1966 awarded with "Excellent Worker in Higher Education" distinction
- 1966 awarded with Honourable Degree at the Technical University of Helsinki
- 1968 Invited Lecturer for a semester in Canada
- 1970 The Hungarian Academy of Sciences declares his Ordinary Member Fellowship
- 1970 awarded by Budapest Municipality with Distinct "Pro Urbe" for his prominent lifetime activity in the reconstruction of the bridges and the establishment of the Underground Railway network in Budapest
- 1970 awarded with Honourable Degree at the Technical University of Wroclaw
- 1972 died on 22nd May in Budapest

CONFERENCE REPORT: THE FIRST INTERNATIONAL CONFERENCE ON GEOTECHNICS IN BELARUS: SCIENCE AND PRACTICE

From 23rd to 25th, October 2013 in the Belorussian National Technical University (BNTU) was held the First International Scientific and Technical Conference on "Geotechnics in Belarus: Science and Practice" in Minsk of Belarus. This conference was dedicated to the 60th anniversary of the Department of Geotechnics and Ecology in Construction and 90th Anniversary of Memory of Professor Yuri A. Sobolevski. The conference was attended by more than 100 highly qualified specialists in geotechnics from Russia, Ukraine, Kazakhstan, Estonia, Poland and Belarus.

The opening ceremony was held on October 23rd in the auditorium of the main academic building of BNTU. The prorector of BNTU for administrative activities and development, Prof. Gennady Zemlyakov, delivered a welcome greeting speech. Also congratulations were expressed by Prof. D. Sobolevski (son of Prof. Yuri A. Sobolevski) who is the President of the Belorussian Geotechnical Society and Head of the Department of Geotechnics and Ecology in Construction who is Prof. M. Nikitenko. Professor M. Nikitenko gave a speech marking the 60th anniversary of the Department of Geotechnics and Ecology in BNTU. The immediate Past Vice President of ISSMGE, Prof. Askar Zhussupbekov, awarded Prof. Dmitry Sobolevski with a medal of Eurasian National University and KGS (Kazakhstan Geotechnical Society).

Keynote lecturers of this conference were:

- Director of Minskmetroproject Valery Chekanov on the design and construction experience of the subway in Minsk,
- Head of Department of Civil Engineering Geotechnics of SPBGASU, Prof. Rashid Mangushev on "The construction of the underground part of the 2-stage of the Mariinsky State Academic Theatre in St. Petersburg (design, construction technology, monitoring)", and
- President of the Kazakhstan Geotechnical Society, Director of Geotechnical Institute, Head and Professor of Civil Engineering Department of the Eurasian National University, Prof. Askar Zhussupbekov on "Mega projects in the problematic soils in Kazakhstan."

A very interesting special report was made by M.P. Cerepkovski (City Globokay). This report was devoted to the participation of Y.A. Sobolevski in the partisan movement in Belarus during the Second World War (Globokaya's underground youth organization), its front-line path (1941-1945). Moreover, the audience listened with interest to the report of the Director of the drilling company "Delta" N.V. Chernoschey which was dedicated to pile foundation engineering innovations.

The following oral sessions took place after the keynote lectures.

- **Session №.1:** Engineering researches and geotechnical monitoring, chaired by Professor I.A. Busel.
- **Session №.2:** Soil mechanics as a theoretical basis of modern geotechnics, chaired by Professor D.J. Sobolevski.
- **Session №.3:** Design and technology for installation of foundations in complicated geotechnical conditions, Strengthening and reconstruction of Foundations, chaired by Professor M.I. Nikitenko.
- **Session №.4:** Regulation and technical support for design and construction of the foundations, chaired by Ph.D. G.S. Rodkevich.

Further interesting presentations were made by representatives of the company CONTROLS Ltd. Of Italy which is a manufacturer of modern laboratory equipment for testing various types of soils and is a representative of a Russian company "Geosoft" reporting software for geotechnical calculations. In general, the sessions were very interesting, because supplementary discussions were made in addition to the planned program. After the conference technical excursions in Minsk were organized to visit construction projects.

The Conference ended with a solemn closing ceremony and the participants expressed sincere appreciation to the organizing committee for the interesting technical program as well as the opportunity to communicate with colleagues and the Belorussian hospitality.

CONFERENCE REPORT: (Continued)
THE FIRST INTERNATIONAL CONFERENCE ON
GEOTECHNICS IN BELARUS: SCIENCE AND PRACTICE



Welcome opening of the conference: Students Concert at the Stoneworts Chapel



Ceremonial awarding of a medal of the Eurasian National University and KGS (Kazakhstan Geotechnical Society) to Prof. D. Sobolevski

CONFERENCE REPORT: (Continued)

THE FIRST INTERNATIONAL CONFERENCE ON GEOTECHNICS IN BELARUS: SCIENCE AND PRACTICE



Conference participants listening to a general report



From the left, Prof. D. Sobolewski, Professor Askar Zhussupbekov and Prorektor BNTU Gennady Zemlyakov



Speech by Professor Michael Nikitenko about the history of the Department of Geotechnics and Ecology in BNTU



Speech by director Minskmetroproject Valery Chekanov



Keynote lecture by Professor Askar Zhussupbekov on Mega projects in the problematic soils in Kazakhstan

CONFERENCE REPORT: (Continued) THE FIRST INTERNATIONAL CONFERENCE ON GEOTECHNICS IN BELARUS: SCIENCE AND PRACTICE



Congratulations from Professor Rashid Mangushev Professor M. Mets (Estonia), a special lecturer (St. Petersburg, Russia) on the left



Reports, congratulations ... This was an unforgettable moment of the conference

CONFERENCE REPORT: (Continued)

THE FIRST INTERNATIONAL CONFERENCE ON GEOTECHNICS IN BELARUS: SCIENCE AND PRACTICE



Speech by M. Cerepkovski (City Globokay) Speech of the Director of a piling company "Delta" N.V. Chernoschey dedicated to pile foundation engineering innovations in Belarus



Young scientist (Ph.D. Student) from Kazakhstan, Utepov Elbek, addressed the performance of piles in problematical soil ground of Kazakhstan



Representatives from the company CONTROLS, Ltd (Italy) in Exhibition

CONFERENCE REPORT: (Continued)
THE FIRST INTERNATIONAL CONFERENCE ON
GEOTECHNICS IN BELARUS: SCIENCE AND PRACTICE



Participants of The First International Scientific and Technical Conference "Geotechnical Belarus: Science and Practice" at the entrance of the main building BNTU

REPORT TO ISSMGE FOUNDATION ON CONFERENCE ATTENDANCE GEO-CONGRESS 2014, ATLANTA, USA

Renjitha Mary Varghese
Indian Institute of Science, Bangalore, India

ISSMGE Foundation supply financial supports to promising people who are enthusiastic to play important roles internationally but cannot afford necessary costs. This article presents a report of a person who received this support and attended the Geo-Congress 2014 in USA.

Participation in Geo-Congress 2014, Geo-characterization and Modeling for Sustainability *23rd-26th February 2014, Atlanta, Georgia*

Geo-Congress 2014 was organized by Geo-Institute as a part of American Society of Civil Engineers (ASCE) under the leadership of Engineering Geology and Site Characterization Committee. The main theme of the conference was “Geo-Characterization and Modeling for Sustainability”.

The conference started on 23rd of February 2014 with technically rich short courses for interested candidates. It was followed by Bolton Seed award lecture by Dr. W.D.Liam Finn. The main discussion was on the recent developments and consequences of assessing liquefaction potential and emphasized the importance of considering the lateral forces while designing foundations such as pile foundations.

On 24th of February 2014, opening keynote lectures were started with William A Wallace on the solutions to the non-sustainable infrastructure without affecting the project owner's needs. It was followed by keynote lectures given by Dr. Roman D Hryciw, Dr. Sibel Pamukcu and three panel sessions. On the same day, there was an interesting student competition program named Geo-Challenge. Networking breaks during the sessions provided immense opportunity to the participants to widen their knowledge in their research areas by interacting with geotechnical experts. The day was ended with different committee meetings.



During my presentation in Geo-Congress 2014

On 25th, February 2014, there were parallel panel sessions and technical sessions. Panel sessions addressed problems in Geo-characterization from basic methods, report generation and the basic need for geology in geotechnical engineering divisions. There were different technical sessions which gave introduction to the wide variety of researches happening worldwide. The third day was closed with Karl Terzaghi lecture given by Prof. J. Carlos Santamarina. In the era of evolving energy challenge, the presentation focused on the emerging energy geotechnology that was made to reconsider the basic tenets of geotechnical engineering.

The last day of conference was started with interactive poster sessions followed by panel sessions and technical sessions. The closing ceremony was with the Ralph Peck award lecture, delivered by Dr. Youssef M. A. Hashash on the advances in monitoring the deformations near to excavations and techniques to control that. There was lab tour to Georgia Institute of Technology for interested candidates to explore more in the field of laboratory testing techniques.

The conference gave me a right platform to learn and understand different areas of geotechnical engineering and gave opportunity to extend knowledge in my area of research. I would like to express my sincere thanks to ISSMGE Foundation for providing a financial support for participating and presenting my work in the conference.

**REPORT TO ISSMGE FOUNDATION ON CONFERENCE
ATTENDANCE (Continued)
GEO-CONGRESS 2014, ATLANTA, USA**



With Dr. Shobha Bhatia and other delegates



During Geo-Challenge 2014, GeoWall preparation

EVENT DIARY

ISSMGE EVENTS

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

2014

Prague Geotechnical Days "Unsaturated Soil Mechanics in Engineering Practice"

Date: Monday 12 May 2014 - Tuesday 13 May 2014

Location: Czech Academy of Sciences, Narodni Trida 3, Prague, Czech Republic

Language: English

Organizer: Czech and Slovak Society for Soil Mechanics and Geotechnical Engineering; Arcadis, CZ, geotechnical division.

Secretary: David Masin

Address: Albertov 6, 12843, Prague, Czech Republic

Phone: +420221951552

Fax: +420221951556

E-mail: masin@natur.cuni.cz

Website: www.issmge.cz

GeoShanghai 2014

Date: Monday 26 May 2014 - Wednesday 28 May 2014

Location: Shanghai, China

Language: English

Organizer: Tongji University

Contact person: Xiong Zhang

Address: Department of Civil & Environmental Engineering, University of Alaska Fairbanks, 99775, Fairbanks, AK, United States

Phone: +1(907)474-6172

Fax: +1(907)474-6030

E-mail: xzhang11@alaska.edu

Website: www.geoshanghai2014.org

6 èmes Journées Africaines de la Géotechnique

Date: Monday 09 June 2014 - Friday 13 June 2014

Location: Azalaï Hotel, Ouagadougou, Burkina Faso,

Language: French and English

Organizer: CTGA

Contact person: Dr Etienne Marcelin Kana

Address: 5, Rue Monseigneur Graffin, B.P. 20369, Yaounde, Cameroon

Phone: +23799500510

E-mail: emk2cm@yahoo.fr

TC207 Conference on "Soil-Structure Interaction: Retaining Structures"

Date: Monday 16 June 2014 - Wednesday 18 June 2014

Location: St. Petersburg State Transport University, Saint Petersburg, Russia

Language: English

Organizer: TC207 Soil-Structure

Contact person: Michael Lisyuk

Address: Izmaylovsky prosp. 4, of. 414, 190005, Saint Petersburg, Russia

Phone: +7-812-339-35-87

Fax: +7-812-575-36-25

E-mail: lisyuk@gmail.com

Website: <http://www.TC207SSI.org>

EVENT DIARY

ISSMGE EVENTS (Continued)

13th BGA Young Geotechnical Engineers' Symposium

Date: Monday 30 June 2014 - Wednesday 02 July 2014

Location: Staff House Conference Centre, Manchester, United Kingdom

Language: English

Organizer: The University of Manchester

Contact person: Dr Carlos Lam

Address: School of MACE, The University of Manchester, M1 3BB, Manchester, Lancashire, UK

E-mail: yges@manchester.ac.uk

Website: <http://www.mace.manchester.ac.uk/our-research/seminars/yge-symposium/>

The 6th International Conference on Unsaturated Soils UNSAT 2014

Date: Wednesday 02 July 2014 - Friday 04 July 2014

Location: Sydney, Australia

Contact person: Adrian Russell

E-mail: a.russell@unsw.edu.au

Geohubei International Conference 2014

Date: Sunday 20 July 2014 - Tuesday 22 July 2014

Location: Three Georges Dam, Hubei, China

Language: English

Organizer: Geohubei International Conference 2014

Contact person: Dr. Guodong Zhang

Address: Three Gorges University,

E-mail: geohubei.adm@gmail.com

Website: <http://geohubei2014.geoconf.org>

2nd International Conference on Information Technology in Geo-Engineering

Date: Monday 21 July 2014 - Tuesday 22 July 2014

Location: Durham University, Durham, United Kingdom

Language: English

Organizer: Professor David Toll

Contact person: Dr Ashraf Osman

Address: School of Engineering and Computing Sciences, Durham University, DH1 3LE, Durham, United Kingdom

Phone: +44 191 334 2425

Fax: +44 191 334 2408

E-mail: icitg@duram.ac.uk

Website: www.icitg.dur.ac.uk

TC204 ISSMGE International Symposium on "Geotechnical Aspects of Underground Construction in Soft Ground" - IS-Seoul 2014

Date: Monday 25 August 2014 - Wednesday 27 August 2014

Location: Sheraton Grande Walkerhill, Seoul, Korea

Language: English

Organizer: TC204 of ISSMGE and Korean Geotechnical Society

Contact person: Prof. Chungsik Yoo

Address: 300 Chun-Chun Dong, Jang-An Gu, 440-746, Suwon, Kyung-Gi Do, Korea

Phone: +82-32-290-7518

Fax: +82-32-290-7549

E-mail: csyoo@skku.edu

EVENT DIARY**ISSMGE EVENTS (Continued)****International Symposium on Geomechanics from Micro to Macro (TC105)**

Date: Monday 01 September 2014 - Wednesday 03 September 2014
Location: Cambridge University, Cambridge, United Kingdom
Language: English
Organizer: TC105
Contact person: Professor Kenichi Soga
Address: University of Cambridge, Department of Engineering, Trumpington Street, CB2 1PZ, Cambridge, UK
Phone: +44-1223-332713
Fax: +44-1223-339713
E-mail: ks207@cam.ac.uk

XV Danube-European Conference on Geotechnical Engineering

Date: Tuesday 09 September 2014 - Thursday 11 September 2014
Location: Vienna University of Technology, Vienna, Austria
Language: English and German
Organizer: ASSMGE & Vienna University of Technology, Institute of Geotechnics
Contact person: Armin Steurer, GerdaPfleger
Address: Vienna University of Technology, Institute of Geotechnics, Karlsplatz 13/220-2, A-1040, Vienna, Austria
Phone: +43 1 58801 22101
Fax: +43 1 58801 22199
E-mail: igb@tuwien.ac.at
Website: <http://www.decge2014.at>

COBRAMSEG 2014

Date: Tuesday 09 September 2014 - Saturday 13 September 2014
Location: Goiania Convention Center, Goiania, GO, Brazil
Language: Portuguese / English
Organizer: ABMS
Contact person: Qualidade Eventos Especiais Ltda
Address: Rua 3, 800 Salas 805 e 808 - Setor Oeste, 74.115-050, Goiania, GO, Brazil
Phone: +55 (62) 3214-1005
Website: <http://www.qeeventos.com.br/qeeventos/site/cobramseg-2014-en.aspx>

10th International Conference on Geosynthetics (10ICG)

Date: Sunday 21 September 2014 - Thursday 25 September 2014
Location: Estrel Convention Center, Berlin, Germany
Language: English
Organizer: DGGT / German IGS Chapter
Contact person: Gerhard Braeu
Address: Baumbachstrasse 7, 81245, Muenchen, Germany
Phone: +49 89 289 27139
Fax: +49 89 289 27189
E-mail: g.braeu@bv.tum.de

EVENT DIARY

ISSMGE EVENTS (Continued)

XIV Colombian Geotechnical Conference-XIVCGC and IV South American Young Geotechnical Engineers Conference -IVCSIGJ

Date: Wednesday 15 October 2014 - Friday 17 October 2014

Location: Universidad Nacional de Colombia, Bogotá, BOGOTÁ D.C., Colombia

Language: Spanish, Portuguese, English

Organizer: Colombian Geotechnical Society-SCG

Contact person : JUAN MONTERO O.

Address: Calle 12C No.8-79 Of. 512, 11001000, BOGOTÁ D.C., COLOMBIA

Phone: 57-1-3340270

Fax: 57-1-3340270

E-mail: scg1@etb.net.co; scg1@colomsat.net.co

Website: www.scg.org.co

Correspondance and information Ángela Vázquez (Spanish only), scg1@etb.net.co,
scg1@colomsat.net.co Organizing Committee / Juan Montero-Olarte, juanmontero170@gmail.com

7th International Congress on Environmental Geotechnics

Date: Monday 10 November 2014 - Friday 14 November 2014

Location: Melbourne Convention and Exhibition Centre, Melbourne, Victoria, Australia

Language: English

Organizer: Engineers Australia

Contact person: Hayley Le Gros

Address: WSM, 119 Buckhurst Street, Vic 3205, Melbourne, Victoria, Australia

Phone: 61 3 9645 6322

E-mail: 7icg2014@wsm.com.au

Website: www.7icg2014.com

XXVII National Meeting of Geotechnical Engineering

Date: Wednesday 19 November 2014 - Friday 21 November 2014

Location: Puerto Vallarta, Jalisco, Mexico

Language: Español-ingles

Organizer: Sociedad Mexicana de Ingeniería Geotécnica A.C.

Contact person: Eduardo Botero Jaramillo

Address: Valle de Bravo 19 Col. Vergel de Coyoacán Del. Tlalpan, 14340, Distrito Federal, México

Phone: 0155 56773730

Fax: 0155 56793676

E-mail: smmsgerencia@prodigy.net.mx

Website: <http://www.smig.org.mx/en/rnig-en>

Geohazards 2014 International Symposium on Geohazards: Science, Engineering and Management

Date: Thursday 20 November 2014 - Friday 21 November 2014

Location: Kathmandu, Nepal

Language: English

Organizer: Nepal Geotechnical Society

New due date of abstract: End of April, 2014

Secretary and Contact person: Dr. Netra Prakash Bhandary

Address: Dept. Civil Environmental Eng, Ehime University, 790-8577, Matsuyama, Ehime, Japan

Phone: +81-89-927-8566

Fax: +81-89-927-8566

E-mail: netra@ehime-u.ac.jp

Website: <http://www.ngeotechs.org/ngs/index.php/geohazards-2014>

EVENT DIARY**ISSMGE EVENTS (Continued)****VIII Chilean Congress in Geotechnical Engineering**

Date: Wednesday 26 November 2014 - Friday 28 November 2014

Location: Centro de Convenciones Hotel Intercontinental Santiago - Av. Vitacura 2885, Las Condes, Santiago, Chile

Language: Spanish

Organizer: Pontificia Universidad Catolica de Chile

Contact person Christian Ledezma

Address: Vicuna Mackenna 4860, Macul, 7820436, Santiago, Chile

Phone +56(2)2354-4207

E-mail: cledezma@ing.puc.cl

Website: www.sochige2014.cl

7th International Conference on Scour and Erosion (ICSE-7)

Date: Tuesday 02 December 2014 - Thursday 04 December 2014

Location: Rendezvous Grand Hotel Perth, Scarborough, Perth, Western Australia

Language: English

Organizer: ISSMGE TC213 / University of Western Australia

Contact person: Liang Cheng

Address: M051, 35 Stirling Highway, 6009 Perth, Western Australia

Phone: +61 8 6488 3076

Fax: +61 8 6488 1018

E-mail: liang.cheng@uwa.edu.au

Website: <http://www.2014icse.com/index.html>

2015**Sixth International Geotechnical Symposium 2015**

Date: Wednesday 21 January 2015 - Friday 23 January 2015

Location: IIT Madras, Chennai, Tamilnadu, India

Language: English

Organizer: IIT Madras and IGS Chennai

Contact person: Dr. R.G. Robinson

Address: Department of Civil Engineering, IIT Madras, 600036, Chennai, Tamil Nadu, India

Phone: +91-44-22574286

E-mail: robinson@iitm.ac.in

Website: <http://igschennai.in/6igschennai2015>

12th Australia and New Zealand Conference on Geomechanics - The Changing Face of the Earth: Geo-Processes & Human Accelerations

Date: Sunday 22 February 2015 - Wednesday 25 February 2015:

Location: Wellington, New Zealand

Contact person: Amanda Blakey

E-mail: secretary@nzgs.org

EVENT DIARY**ISSMGE EVENTS (Continued)****XVI African Regional Conference on Soil Mechanics and Geotechnical Engineering - Innovative Geotechnics for Africa**

Date: Monday 27 April 2015 - Thursday 30 April 2015

Location: Hammamet, Tunisia

Language: English and French

Organizer: ATMS

Contact person: Mehrez Khemakhem

Phone: +216 25 956 012

E-mail: organisation@cramsg2015.org

Website: www.cramsg2015.org

ISP7 - PRESSIO 2015

Date: Friday 01 May 2015 - Saturday 02 May 2015

Location: Hammamet, Tunisia

Organizer: Tunisian Association of Soil Mechanics (ATMS)

Contact person: Dr Wissem Frikha

Address: Enit BP37, 1000 Le Belvedere, Tunis, Tunisia

Phone: +21698594970

E-mail: isp7_organisation@cramsg2015.org

Website: <http://www.cramsg2015.org/isp7-pressio2015/?lang=en>

ISFOG 2015

Date: Wednesday 10 June 2015 - Friday 12 June 2015

Location: Holmenkollen Park Hotel Rica, Oslo, Norway

Language: English

Organizer: NGI

Contact person: Vaughan Meyer - NGI

Address: PO Box 3930 Ullevaal Stadion, N-0806, Oslo, Norway

Phone: +47 22 02 30 00

Fax: +47 22 23 04 48

E-mail: isfog2015@ngi.no

Website: www.isfog2015.no

3rd International Conference on the Flat Dilatometer DMT'15

Date: Monday 15 June 2015 - Wednesday 17 June 2015

Location: Parco dei Principi Grand Hotel & SPA, Rome, Italy

Language: English

Contact person: Simona Rebottini - Studio Prof. Marchetti

Address: via Bracciano 38, 00189 Rome, Italy

Phone: 0039 06 30311240

Fax: 0039 06 30311240

E-mail: simona@marchetti-dmt.it

Website: www.dmt15.com

EVENT DIARY

ISSMGE EVENTS (Continued)

XVI European Conference on Soil Mechanics and Geotechnical Engineering

Date: Sunday 13 September 2015 - Thursday 17 September 2015

Location: Edinburgh International Conference Centre, Edinburgh, Scotland, United Kingdom

Language: English

Organizer: British Geotechnical Association

Contact person: Derek Smith

Address: Coffey Geotechnics Limited, The Malthouse, 1 Northfield Road, Reading, Berkshire, RG1 8AH, Reading, UK

Phone: +44 1189566066

Fax: +44 1189576066

E-mail: derek.smith@coffey.com

Website: <http://www.xvi-ecsmge-2015.org.uk/>

Workshop on Volcanic Rocks & Soils

Date: Thursday 24 September 2015 - Friday 25 September 2015

Location: Isle of Ischia, Italy

Language: English

Organizer: Associazione Geotecnica Italiana (AGI)

Contact person: Ms. Susanna Antonielli

Address: Viale dell'Università 11, 00185, Roma, Italy

Phone: +39 06 4465569 - +39 06 44704349

Fax: +39 06 44361035

E-mail: agi@associazionegeotecnica.it

Website: www.associazionegeotecnica.it

6th International Conference on Earthquake Geotechnical Engineering

Date: Monday 02 November 2015 - Wednesday 04 November 2015

Location: Christchurch, New Zealand

The 15th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering -New Innovations and Sustainability-

Date: Monday 09 November 2015 - Friday 13 November 2015

Location: Fukuoka International Congress Center, Fukuoka, Kyushu, Japan

Language: English

Organizer: The Japanese Geotechnical Society

Contact person: Toshifumi Mukunoki

Address: 2-39-1 Kurokami, Chuou-ku, Kumamoto, JAPAN, 860-8555, Kumamoto, Japan

Phone: +81-96-342-3535

Fax: +81-96-342-3535

E-mail: 15tharc@kumamoto-u.ac.jp

Website: <http://www.jgskyushu.net/uploads/15ARC/>

XV Pan American Conference on Soil Mechanics and Geotechnical Engineering

Date: Sunday 15 November 2015 - Wednesday 18 November 2015

Location: Hilton Hotel, Buenos Aires, Buenos Aires, Argentina

Language: Spanish - Portuguese - English (simultaneous translation)

Organizer: Argentinean Society for Soil Mechanics and Geotechnical Engineering

Contact person: Dr. Alejo Oscar Sfriso

Address: Rivadavia 926 Suite 901, C1002AAU, Buenos Aires, Buenos Aires, Argentina

Phone: +541143425447

Fax: +541143423160

E-mail: presidente@saig.org.ar

Website: www.panam2015.com.ar

EVENT DIARY**ISSMGE EVENTS (Continued)****2016****NGM 2016, The Nordic Geotechnical Meeting**

Date: Wednesday 25 May 2016 - Saturday 28 May 2016

Location: Harpan Conference Centre, Reykjavik, Iceland

Language: English

Organizer: The Icelandic Geotechnical Society

Contact person: Haraldur Sigursteinsson

Address: Vegagerdin, Borgartún 7, IS-109, Reykjavik, Iceland

Phone: +354 522 1236

Fax: +354 522 1259

E-mail: has@vegagerdin.is

Website: <http://www.ngm2016.com>

3rd ICTG International Conference on Transportation Geotechnics

Date: Sunday 04 September 2016 - Wednesday 07 September 2016

Location: Vila Flor Cultural Centre and University of Minho, Guimaraes, Portugal

Language: English

Organizer: Host: Portuguese Geotechnical Society and University of Minho

Secretary:

Contact person: Prof. A. Gomes Correia (Chair)

Address: University of Minho, School of Engineering, 4800-058, Guimarães, Portugal

Phone: +351253510200

Fax: +351253510217

E-mail: agc@civil.uminho.pt

Website: <http://www.webforum.com/tc3>

NON-ISSMGE SPONSORED EVENTS**2014****DFI-EFFC International Conference on Piling and Deep Foundations**

Date: Wednesday 21 May 2014 - Friday 23 May 2014

Location: Stockholmsmässan, Stockholm, Sweden

Language: English

Organizer: DFI & EFFC

Contact person: Deep Foundations Institute

Address: 326 Lafayette Ave, 07506, Hawthorne, New Jersey, United States

Phone: 9734234030

Fax: 9734234031

E-mail: staff@dfi.org

Website: <http://www.regonline.com/builder/site/Default.aspx?EventID=1221506>

12th International Workshop on Micropiles

Date: June 11-14, 2014

Location: Krakow, Poland,

ISM-ADSC-DFI event

website: <http://www.iwm2014.org>

EVENT DIARY

NON-ISSMGE EVENTS (Continued)

8th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE14)

Date: Tuesday 17 June 2014 - Friday 20 June 2014

Location: Delft University of Technology, Delft, Netherlands, The

Language: English

Organizer: Prof. Michael Hicks

Contact person: Mrs. Hannie Zwiers

Address: Delft University of Technology, Faculty of Civil Engineering & Geosciences. Stevinweg 1, 2628, CN Delft, The Netherlands

Phone: +31 15 2788100

E-mail: info@numge2014.org

Website: <http://www.numge2014.org>

5th International Forum on Opto-electronic Sensor-based Monitoring in Geo-engineering (5th OSMG-2014)

Date: Sunday 12 October 2014 - Tuesday 14 October 2014

Location: Nanjing University, Nanjing, China

Language: English and Chinese

Organizer: Nanjing University

Contact person: Hong-Hu Zhu

Address: Mailbox 645. Nanjing University (Xianlin Campus), 163 Xianlin Avenue, 210046, Nanjing, China

Phone: +86-25-83597888

E-mail: osmg2014@nju.edu.cn

Website: <http://www.osmg2014.com/>

Indian Geotechnical Conference IGC-2014

Date: Thursday 18 December 2014 - Saturday 20 December 2014

Location: Kakinada, Andhra Pradesh, India

Language: English

Organizer: Indian Geotechnical Society IGS, New Delhi and IGS Kakinada Chapter

Contact person: Prof. A. Sreerama Rao / Prof. K. Ramu

Address: Department of Civil Engg., University College of Engineering Kakinada, Jawaharlal Nehru Technological University (JNTU) Kakinada, Kakinada - 533 003. Andhra Pradesh, India.

Phone: +91-98482090867; +91-9704198555

E-mail: igc2014kakinada@gmail.com; srajjarapu@yahoo.com

Website: www.igc2014kakinada.org

International Conference in Geotechnical Engineering - ICGE-Colombo 2015

Date: Monday 10 August 2015 - Tuesday 11 August 2015

Location: Colombo, Colombo, Sri Lanka

Language: English

Organizer: Sri Lankan Geotechnical Society

Contact person: Eng. K. L. S. Sahabandu

Address: Central Engineering Consultancy Bureau, 415, Bauddhaloka Mawatha, Colombo 7, Sri Lanka

Phone: +94 11 2668803

Fax: +94 11 2687369

E-mail: gm@cecbsl.com; sahabandukls@gmail.com

Website: www.slgs.lk

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

Corporate Associates



S.N. Apageo S.A.S.
ZA de Gomberville
BP 35 - 78114 MAGNY LES HAMEAUX
FRANCE



Jan de Nul N.V.
Tragel 60, B-9308 Hofstade-Aalst
BELGIUM



Bentley Systems Inc.
Corporate Headquarters
685 Stockton Drive 7710,
Exton PA 19341,
UNITED STATES



Bauer Maschinen GmbH
Wittelsbacherstr. 5
86529 Schrobenhausen
GERMANY



NAUE GmbH Co KG
Gewerbstrasse 2
32339 Espelkamp-Fiestel
GERMANY



Huesker Synthetic GmbH
Fabrikstrasse 13-15
48712 Gescher
GERMANY



Fugro N.V.
PO Box 41
2260 AA Leidschendam
THE NETHERLANDS



Norwegian Geotechnical Institute
P.O. Box 3930 Ullevaal Stadion
N-0806 OSLO
NORWAY



Zetas Zemin Teknolojisi AS
Merkez Mah. Resadiye Cad. No. 69/A
Alemdag, Umraniye
Istanbul, 34794
TURKEY



Deltares
PO Box 177
2600 AB Delft,
THE NETHERLANDS



SOLETANCHE BACHY
SOLETANCHE BACHY SA
133 boulevard National, 92500 Rueil-
Malmaison,
FRANCE



Siemens Energy
Kaiserleistrasse 10
63067 Offenbach
GERMANY



Georeconstruction Engineering Co
Izmaylovsky Prosp. 4., of. 414
Saint Petersburg
RUSSIA



Tensar International Ltd
Cunningham Court
Shadsworth Business Park
Blackburn, BB1 2QX,
UNITED KINGDOM



International I.G.M. s.a.r.l.
P.O.Box: 166129 Achrafieh
Beirut
LEBANON



Golder Associates Inc
1000, 940-6th Avenue S.W.
Calgary, Alberta
CANADA T2P 3T1



Terre Armée
1 bis rue du Petit Clamart
Bâtiment C BP 135 78148 Velizy CEDEX
FRANCE



TenCate Geosynthetics
9, rue Marcel Paul
B.P. 40080
95873 Bezons Cedex
FRANCE

Corporate Associates (Continued)

ODEBRECHT

Construtora Norberto Odebrecht
Av. Rebouças, 3970 - 31º andar
Pinheiros CEP-05402-600
São Paulo/SP
BRAZIL



Coffey Geotechnics
8/12 Mars Road
Lane Cove West
NSW, 2066
AUSTRALIA



TecnoGeo Engenharia e Fundações Ltda
Av. Eliseu de Almeida nº 1415 - Butantã
São Paulo/SP - 05533-000
BRAZIL

Brasfond

Brasfond Fundacoes Especiais SA
Rua Olimpíadas, 200, 13º Andar
Cep: 04551-000 Vila Olímpia
São Paulo / SP
BRAZIL



a.p. van den berg
The CPT factory

A.P. van den Berg
IJzerweg 4
8445 PK Heerenveen
THE NETHERLANDS



Huesker Ltda
Attn: Flavio Teixeira Montez
Rua Romualdo Davoli, 375
Cond. El Dorado
CEP 12238.577 São José dos Campos SP
BRAZIL

AECOM

AECOM Asia Company Ltd
Attn: Dr Axel KL Ng
8/F, Tower 2, Grand Central Plaza
138 Shatin Rural Committee Road
Shatin, NT
HONG KONG

DASAN CONSULTANTS

Dasan Consultants Co. Ltd
Dasan B/D
107 Mujeong-dong, Songpa-gu,
Seoul 138-200
KOREA



Dongha Geological Engineering Co. Ltd
1033-2 Guseo Dong
Geumjeong-gu, Busan
KOREA



Saegil Engineering and Consulting Co Ltd
Hyunmin Building 6F
101 Ogeumno, Songpa-gu
Seoul 138-828
KOREA



Vibropile Australia
Attn: Serhat Baycan
PO Box 253
Mulgrave, VIC 3170
AUSTRALIA



JSC "Kazakhstan Highway Research Institute"
2a Nurpeisov Street Almaty
KAZAKHSTAN



LLC "Bazis Design Academy"
3-A, "Nurly-Tau"
Al - Farabi Ave., 5/1,
Almaty
KAZAKHSTAN

ARUP

Ove Arup & Partners Ltd.
13 Fitzroy Street
London W1T 4BQ
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