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Presidential Candidates

INSIDE THIS ISSUE

EDITORIAL BOARD

Vote for the election of new President of ISSMGE during the period 2009 – 2013 will be taken at the ISSMGE Council Meeting, which will be held at Alexandria, Egypt on October 4, 2009. The following messages have been received from the two nominees as Presidential candidates: Professor Jean-Louis Briaud and Professor Waldemar Hachich.

Professor Jean-Louis BRIAUD

Dear Colleagues,

I was born and educated in France, got my higher degrees in Canada, and have been a Professor of Geotechnical Engineering at Texas A&M University in the USA since then. I was President of the Association of Geotechnical Professors (USUCGER) in the USA from 2003 to 2005. I am President of the Geo-Institute of the American Society of Civil Engineers (ASCE) from 2008 to 2009. The Geo-Institute has 11,000 members from the USA and many other countries. I have managed large research projects, am active in consulting, and enjoy all topics in geotechnical engineering. I play a lot of tennis, a bit of piano, and used to play rugby and soccer. I have been fortunate to win many awards. the most prestigious being the ASCE Ralph Peck Lecture from the USA and the CGS Geoffrey Meyerhof Award from Canada. I believe that ISSMGE is our international family and that it is our duty to support it and to be active in it. Talking about family, Janet is my wife, Natalie and Patrick are my children.

As soon as I became a candidate for the position of President of ISSMGE, I became a "citizen" of 84 countries. As a "citizen" of your country, I am interested in helping you with any request you have for changes in ISSMGE. The overarching idea of my candidacy is to engage the members in participating in ISSMGE and shaping its future. I will listen to your requests and try to implement them as much as possible. In the meantime, I propose to work on the following issues.

1. **Membership**: There are about 250 countries in the world and 84 are members of ISSMGE. We need to reach out and increase our membership. We also need to take care of countries which have difficulties.
2. **Conferences**: we need to focus on quality and affordability.
3. **Journals**: we need to support our new electronic International Journal of Geo-Engineering Case Histories. It is a high quality free Journal available to everyone in the world on the internet.
4. **Technical Committees**. Technical Committees should be renewed automatically every four years. New committees should be encouraged. All TCs must be active and their leadership well distributed geographically.
5. **Continuing Education**: webinars are the way to the future. They consist of listening to the speaker on your telephone while watching the slides on your computer screen through an internet connection.
6. **Dues**. Dues are fine as they are.

Presidential Candidates (continued)

7. **Students and Young members**: we need to get them more involved in ISSMGE and I have a number of ideas on how to do that efficiently.
8. **Internet**: we need to develop our website to be very useful to our members as a technical resource.
9. **Industry partners**: we need to continue to develop our relationship with our industry partners
10. **Geo-Engineers Without Borders**: this is a great way to be helpful the developing countries and engage our younger members.
11. **One country one vote**. It is plain and simple, I am for one country, one vote.
12. **FedIGS**. We need a light, efficient, and inexpensive FedIGS.
13. **Innovations**. We need to force ourselves from time to time to innovate and not to be satisfied with the status quo. I have a number of ideas on how to do this.
14. **Languages**. Having English and French as our official languages shows that we are truly international. We must find ways to decrease the language barrier problem. Improving our Geotechnical vocabulary lexicon to include more words and more languages is a good start.

You can find more on my vision and my CV in several languages on my website at http://ceprofs.tamu.edu/briaud/.

I look forward to seeing all of you in Alexandria. I hope you will contact me and let me know what is important to you so that, if I am elected, I can work on your ideas as well. The dialog has started. You can reach me at briaud@tamu.edu, my office direct line is 979-845-3795 and my cell phone number is 979-777-1692.

Jean-Louis Briaud

(Received on June 8, 2009)

Professor Waldemar Hachich

Dear friends of the ISSMGE,

No need to repeat here the points made in the messages you received from ABMS or from myself. I shall keep in direct contact with you till Alexandria. I also invite you to keep visiting regularly www.abms.com.br, as new information and plans continue to be posted there.

mailto: whachich@usp.br

You are not faced with a superficial decision between countries or regions, but a fundamental decision about who is better prepared to face the challenge of remodeling the relationship between the ISSMGE and its individual members, while strengthening the ties with Member Societies, common interest societies (IGS, IACMAG, iNEER, to name a few others than ISRM, IAEG and FIGS), and the society at large.

I can offer the experience of four dedicated years in the ISSMGE Board, active participation in five ISSMGE Council meetings (including the 2003 meeting, when my intervention has been instrumental in preventing the approval of a quite unfair fee structure proposed by the Board), six years as President and Vice-President of ABMS, one of the largest and most active Member Societies, four years as President of its largest chapter and over 20 years as one of the 50+ elected members of the ABMS Council, active membership in the organising committees of innumerable conferences, including three regional and two international ones.

Recognition of my productive dedication to voluntary work prompted some officers of the previous administration of the ISSMGE to encourage me to run for the office of Vice-President for South America. I do not, by any means, regret my decision to accept the challenge. The current Board of the ISSMGE generously offered me the means to better serve the geotechnical community.

Presidential Candidates (continued)

I have worked hard on proposals to improve our Statutes and By-Laws, on guidelines for our ISSMGE International Seminars, on specifications to upgrade our website and make it more useful (do visit the ISSMGE Knowledge Network!). I have co-organised five ISSMGE International Seminars and helped in the process of affiliation of three new Member Societies (Cuba, El Salvador and Dominican Republic).

Now, colleagues in many countries believe I am ready to tackle a more demanding challenge. I shall not disappoint them (or you!). The current experience in the Board gave me the perspective to recognize what else must be done and, most importantly, how to do it. During my term as President you may expect to see:

1) Emphasis on engaging people and fostering their sense of belonging, with better and more efficient communication at all levels, especially taking full advantage of IT;
2) ISSMGE website becoming the main Internet portal to valuable geotechnical information;
3) ISSMGE website putting managerial tools at the disposal of Member Societies, Technical Committees and Discussion Groups (the latter to keep the doors permanently open to new talents and innovative topics);
4) Technical Committees and ISSMGE International Seminars at the centre of integrative initiatives apt to strengthen the links between emerging societies and solidly established ones;
5) Participative decision making and delegation of follow-up on all societal matters, meetings transformed into value time for nourishing innovative ideas.

If you are not among those who have already done so, I urge you to send new ideas for Technical Committees. This is the right time for planning activities for the next four years. We must expedite the transition. ISSMGE must become more agile.

A mes amis francophones, j'assure que vous pourrez toujours vous adresser à moi en Français. Même si à présent vous vous débrouillez fort bien en Anglais, le Français restera emblématique de l'esprit éclectique de la SIMSG.

Voy a intentar mantener mis contactos en Español con todos mis amigos de lengua española, simplemente para estimularlos a aceptar el reto de evolucionar en el dominio del Inglés, esencial para la completa inserción en los comités técnicos y otras actividades de la SIMSIG.

Amigos da comunidade geotécnica de países de Língua Portuguesa, em 4 continentes! Juntos trabalharemos para disseminar nossas ricas tradições culturais de integração internacional e tolerância.

I am looking forward to meeting you all in Alexandria and discussing topics of mutual interest before the Council meeting. I shall be staying at the hotel reserved for the Board (Mediterranean Azur, tel.: +2 03 5226001). And you can always reach me by telephone (+55 11 9758-5555), Skype (Id: whachich) or e-mail (whachich@usp.br).

Do accept my warmest regards,

Waldemar Hachich

(Received on June 22, 2009)

Views of Young Geotechnical Engineers

Young Geotechnical Engineers: Welcome Message by New Editorial Member

As a new member of the extended editorial board of ISSMGE Bulletin and Coorinator for Asia, I convey my sincere greetings to the entire Geotechnical faternity of the world.

As per the invitation and approval letter dated March 6, 2009, by Prof. Pinto, President ISSMGE and other board members, we following six young geotechnical engineer will act as coordinator of respective region for ISSMGE Bulletin during a period of four years from 2009. As felt by ISSMGE board members, inclusion of us, from geographical areas like Africa, Asia, Australasia, Europe and America, in the editorial board of ISSMGE Bulletin will reinforce the management of the board in near future.

On behalf of my other colleagues, representing different regions, we all welcome this new extended editorial board of the bulletin and thank ISSMGE board for this new selection. It will definitely provide and maintain a strong connection between the experineced and young geotechnical engineers throughout the world using this bulletin.

As a team, we all will work together under the leadership of Prof. Kusakabe, Board member and Editor-in-Chief of ISSMGE Bulletin. However, the responsibility for collection of materials for each issue of the bulletin will be taken by each one of us, in rotation.

To promote the geotechnical news, which are of important concern for our worldwide faternity, we request all the members and non-members to communicate us for possible wide circulation of the material through this bulletin. We solicit all of your valuable suggestions, observations, extract and notices for making this bulletin more helpful and useful to our geotechnical world. The details of the new regional coordinators for communication are given below,

Head of Coordinators
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Khon Kaen University, Thailand
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Coordinator for Asia
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Reported by Deepankar Choudhury, Coordinator for Asia, ISSMGE Bulletin, Associate Professor, Indian Institute of Technology Bombay, Mumbai, India (Email: dc@civil.iitb.ac.in, dchoudhury@iitb.ac.in)

Views of Young Geotechnical Engineers

III South-American Conference of Young Geotechnical Engineers

The 3rd South-American Conference of Young Geotechnical Engineers was organized by the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), the Argentinean Society of Geotechnical Engineering (SAIG), the Argentinean National Scientific and Technical Research Council (CONICET) and the National University of Córdoba (UNC). This event took place in Córdoba (Argentina) from March 30 to April 1, in the facilities of the Engineering School of the UNC. During the Conference, authorities of Cordoba Province, of the Engineering School of UNC and of the ISSMGE spoke about the importance of research, transference of technology and professional formation to promote novel solutions and knowledge within the geotechnical field.

Opening ceremony: From left to right, Prof. Gabriel Tavella (president of the Engineering School, UNC), Prof. Waldemar Hachich (Vice-President of ISSMGE), Prof Pedro Sêco e Pinto (President of ISSMGE), P.E. Hugo Testa (representing the government of Córdoba Province) and Prof. Franco Francisca (Chair of the Local Organizing Committee).

The conference brought together over 86 participants from 9 different countries. Also attend to the conference the President of the ISSMGE (Prof. Pedro Sêco e Pinto), the Vice-President for South America (Prof. Waldemar Hachich), authorities of the Argentinean Society of Geotechnical Engineering (SAIG), authorities of the professional council of Civil Engineers of Córdoba City and authorities and professors of the National University of Córdoba.

Professor Pedro Sêco e Pinto opens the conference with a speech including also relevant aspect and current activities of the ISSMGE. During Monday and Tuesday 51 articles were presented by the delegates from different countries which were organized in six different sessions: Soil Mechanics, Foundations, Environmental Geotechnics, Site and Laboratory Investigations, Embankments and Retaining Structures, and Computational Geomechanics. There were also 5 special keynote lectures: Prof. Ricardo Rocca spoke about of the Unicity in Geotecnical Engineering, Prof. Waldemar Hachich presented a numerical study of soil nailing, Prof. Roberto Terzariol referred to the advances in the study of collapsible soils performed by the geotechnical group of the UNC during the last 40 years, Prof. Pedro Arduino focus on the lateral loaded pile design and Prof. Sêco e Pinto close the Conference with a lecture of lessons learned from two case histories of retaining structures.

Delegates and Invitees of the 3rd SACYGE.

The different sessions were chaired by geotechnical engineers and professors with a recognized trajectory and assisted by a young delegate. The work was intense, and there were enriching discussions of different topics that many times continue during the coffee breaks. At Monday evening all the attendants visit the geotechnical laboratory at the UNC where there was also time for a confraternity reception. At Tuesday night all the participants shared a dinner tasting a typical barbecue and different wines from Argentina. During the dinner Professor Sêco e Pinto encouraged the Colombian Society to be the organizer of the next South-American Conference of Young Geotechnical Engineers in 2012. On Wednesday there were a field trip where the attendants visited the Cerro Pelado Hydroelectric Power plant, shared a lunch in Villa General Belgrano, visited a regional beer manufacturing. Finally this conference ended with a touristic visit to the Alta Gracia's Jesuitical Ranch (UNESCO World Heritage).

Visit to Cerro Pelado Hydroelectric power plant

Reported by Franco Francisca Chair of the Local Organizing Committee, Adjunct Professor at the National University of Cordoba and Adjunct Researcher of the Argentinean National Scientific and Technical Research Council. Email: ffrancis@efn.uncor.edu

TC Activity

TC41: Third Meeting

The 3rd meeting of TC41, chaired by Dr. Arsenio Negro, chairman of TC41, took place during the Conference "Modern Architecture, Construction and Transport: Situation and Perspectives of Development" in the Eurasian National University in Astana, Kazakhstan, on the 12th and 13th of May, 2009. Picture taken during the site visit to the construction of the Khan Shatyr Project by architect Norman Foster (www.khanshatyr.com) organized after the Third TC41 Meeting. The Conference was made possible by the President of Kazahstan Geotechnical Society, Prof. Askar Zhusupbekov (third from left on front row). Contributions to the TC41 Meeting on "Geotechnical Infrastructure of Megacities and New Capitals" included lectures by ISSMGE President Dr. Pedro Seco e Pinto (seventh from left on back row) on "Underpinning and retaining wall in Portugal", by TC41 Chairman Dr. Arsenio Negro (first from the right on front row) on "A case history of a large cut and cover station of Sao Paulo Metro System", by Prof. Tadatsugu Tanaka (second from the right, standing), President of JARUS, Japan, on "Viscoplastic finite element analyses of geotechnical structures", by TC41 Core Member Prof. Eun Chul Shin (fourth from right back row) on the "Songdo Economic Free Zone Project in Korea" and by Prof. Askar on "Geotechnical problems of megaprojects in Kazakhstan". The background illustrates the modern skyline of the beautiful city of Astana.

Reported by Makoto Namba, Bureau de Projetos e Consultoria Ltda. São Paulo – Brazil, email: makoto@bureauprojetos.com.br

Activity of Member

Indian Geotechnical Society

On behalf of Indian Geotechnical Society (IGS), I convey my sincere greetings to all the Geotechnical Engineers. After an eventful year 2008, the tempo of activities is in full gear during this year, 2009, also.

New office bearers with a blend of both Young and Seniors have been elected to the Executive Committee of the Indian Geotechnical Society (IGS). A number of activities have been planned for the year2009 to promote the aims of the Society. The 31st Local Chapter of IGS was inaugurated on April 25, 2009 at Kochi in Kerala which was unrepresented in the IGS Map. This breakthrough was possible due to the untiring efforts of our Executive Committee Member, Mr. M.D. Nair and the support extended by Prof. Benny J. Abraham and Prof. Babu T. Jose of Cochin University of Science and Technology.

IGS-Guntur Chapter which is co-hosting forthcoming IGC-2009 in December, 2009, organized a one day National Seminar on "Ground Amelioration Techniques" on 13th March 2009 along with the Executive Committee meeting of IGS. The 2nd Indian Young Geotechnical Engineers' Conference was held at Kakinada on 14th March 2009 jointly organized by IGS-Kakinada Chapter under the Chairmanship of Prof. A. Sreerama Rao and Department of Civil Engineering, JNT University College of Enginering, Kakinada. Over 100 Young Geotechnical Engineers participated in this Conference. 21 papers were received of which 19 authors made personal presentations. IGS-Visakhapatnam Chapter conducted jointly with Andhra University, Visakhapatnam, a one day National Seminar on "Deep Foundations". IGS-Kolkata Chapter hosted 2 day Workshop on "Emerging Trends in Ground Improvement" during May 22-23, 2009. The next year's annual conference, IGC-2010 is scheduled to be hosted by IGS-Mumbai Chapter during December 16 to 18, 2010 at IIT Bombay, Powai, Mumbai under the Chairmanship of Mr. S. P. Bagli.

Preparations are in full swing for the 6th ICEG 2010 scheduled at New Delhi during November 8-12, 2010, under the Chairmanship of Prof. Manoj Datta, Director, PEC, Chandigarh.

The full text of lecture delivered *by* Prof. Harry G. Poulos during IGS-Ferroco Terzaghi Oration on October 04, 2008 is being featured in our society's news letter.

Reported by Mahavir Bidasaria, President, Indian Geotechnical Society (IGS), New Delhi, India.

Reminiscences - I

Professor Ramanath Keshavarao Katti, Professor Emeritus, IIT Bombay, India.

Interviewer: Madhira R. Madhav, Vice President (Asia), ISSMGE and Professor Emeritus, J.N.T. University, Hyderabad, India (Email: madhavmr@gmail.com)

Madhav: Prof. Katti, it is indeed very nice of you to give this interview. I thank you on behalf of ISSMGE, Prof. Kusakabe, Editor of the Bulletin and Dr. Choudhury, Managing Editor of June 2009 issue of the Bulletin. Can you share your beginnings and entry in to the nascent field of Geotechnical Engineering of which you are a pioneer especially in India?

Prof. Katti: I was born during the British Raj in Bijapur, Bombay presidency in 1928. My father was an overseer after his Diploma from Poona Engineering College in 1915. I completed my matriculation with high marks in Mathematics, Sciences and Sanskrit. I was keen to go for Arts and pursue my studies in Sanskrit. However, I heeded the advice of my parents to go for Science. I joined Fergusson College and completed my Inter-Science in First Class. I was admitted to Mechanical Engineering but changed over to Civil after the first year even though I was doing very well in Mechanical and Electrical Engineering subjects, because opportunities in Mechanical Engineering were then limited. I joined Kakrapara project, a part of Tapti River Valley Project in 1952. I was posted as a junior engineer at Mahuva, Navasari, in charge of Irrigation Colony. I encountered black cotton soil deposit for the first time and was told that the buildings being constructed would get lifted up when it gets wet instead of settling and in the process walls will crack and floors would be lifted up. When the foundation was cast for the first building and water sprinkled for curing the base course got lifted up and hence cracked. Mr. Nayegamwala, Head of the department at Poona Engineering College, posted as executive engineer on the project told me that there was no solution to construct stable structures on black cotton soils. My elder brother was working for his Ph. D. and I realised that some research is needed to solve this problem. I got admission to Iowa State College, Ames, Iowa USA, soon after to pursue graduate studies under Exchange Visitor Programme. Thus I switched from professional career to academics.

I left India in 1953 by boat and reached Ames after 35 days of travel. Prof. Davidson, my guide, asked me to meet Prof. Stewart, the Head of the Department, to finalise my course programme for the fall session. He put me in structural engineering stream. However, it became necessary for me to pursue my graduate studies in Highway Engineering or Soil Engineering as an assistantship was available only in a Highway Research Board sponsored research. I took Highway Engineering as a major and Soil Engineering and Earth Sciences as minors. The topic for my Masters dissertation was Soil Stabilization with Bituminous Materials. For this purpose I had to take courses in organic chemistry, physical chemistry, electro chemistry, soil genesis and classification, clay mineralogy, in addition to my engineering subjects. These subjects helped me in providing a strong science based research programme for Ph. D. thesis in soil engineering and for solving problems due to expansive soil on scientific basis. They helped me in analysing large organic cations with silica surfaces in the form of thin films, free energy interaction between silica surfaces and water and silica surfaces and large organic chains. At certain conditions thin films of large organic chains can replace thin water films. This was unconventional behaviour but scientifically acceptable. Thus in dealing with unconventional behaviour soil one should consider soil particles as matter and apply thermodynamics, physical chemistry and earth science principles to solve stress - deformation problems. My outlook towards solving unconventional behaviour of soil water system or stabilized soil changed forever. I was awarded National Scholastic Honour. Several papers based on my work were accepted for presentation and published in HRB journal.

Madhav: Could you apply your research on expansive soils in US while working for your Ph.D.?

Prof. Katti: Dr. Davidson got a large consulting project to develop methods to utilize fly ash for stabilization of road bases on various types of soil deposits in Detroit Edison power plant area. 700,000 tonnes of fly ash was being produced per year as a waste product. One dollar per tonne was being spent for disposal. The project involved development of a method to stabilize soils for road building and construction methods including equipment for field construction. The studies were to be conducted both in the laboratory and in the field. The entire work was to be completed in 55 days. The temperature in the field could go below 55° F and the mix would not harden. Many of my colleagues refused to work on the project because of time constraint but I offered to work on it and the project was completed on time. Detroit Edison Co. started selling the fly ash at factory outlet for 1.5 $ per tonne. I had to sacrifice a term but it paid off in my future life as I could handle any difficult problem.

Reminiscences (continued)

Madhav: Why didn't you continue in USA with this kind of experience? You would have been in great demand?

Prof. Katti: I had just completed my defence and waiting for the graduation ceremony. I received a call from our embassy at Washington D.C. asking whether I would be ready to join as staff at civil engineering department at Indian Institute of Technology at Powai, Bombay. I was told to develop science oriented engineering programme in my subject. This fitted well with my background and I accepted the offer. I took the opportunity to collect educational data not only from Iowa State but also from M.I.T., Caltech, and other leading universities. I left Ames, visited Glasgow and Imperial College London, etc., on the way and joined IIT temporarily in July 1958. I was told that it would take around two years to shift to Powai where IIT will be situated. By August 1959 some sheds were constructed and I established temporarily a soil engineering laboratories. I proposed to AIMIL that I would give the design and they should provide the equipment at Soil Test equipment listed price and, if the equipment turns out to be defective, they should replace it at their cost.

Madhav: Can you please tell when and how you started the graduate program in Geotechnical engineering? Is the work on expansive soil started as soon?

Prof. Katti: I started my post graduate activities immediately after I returned from U.S.A. I visited Mahuva site where I constructed the buildings on expansive soil. Floors had heaved up, walls and roofs had cracked. I felt sad. I started working on stabilization of black cotton soil with chemical additives and on basic properties of soil and soil fraction using X-Ray, D.T.A. and Gravimetric analysis.
IIT started M. Tech. programmes right from day one. Without Russian expert Prof. Bose encouraged me start M.Tech. programme in 1959. It was the second P.G. programme on the campus in temporary sheds. I was the first Ph. D. in India in soil mechanics and foundation engineering.

The Director (Prof. Bose) permitted me to start M. Tech programme in soil engineering as I had helped in guiding 13 M. Tech. students, at Iowa State. It was a three semester programme, of which two semesters were meant for course work and one semester for dissertation. Five students joined the programme in the first year. Programmed research on expansive black cotton soil was initiated soon after as part of dissertations. I established soil storage, soil mechanics, foundation engineering, soil stabilization, soil physics, soil chemistry, and earth dam laboratories in the newly constructed building. Ample space was available to conduct large scale experiments.

I published papers in Highway Research Board or Industrial Research journals. Annual general meeting of Indian National Society of Soil Mechanics and Foundation Engineering was held in 1960 with CBI&P research session. I came in contact with engineers facing problems in river valley projects especially in Black Cotton deposits area. I also started taking part in the activities of ISSMFE.

Madhav: You were probably the first Geotechnical consultant. How this opportunity did arise?

Prof. Katti: Atomic energy commission faced problems of subsurface exploration and design of foundations for Tarapur Atomic Energy Power Station, one of the most important national project. Tarapur Power Plant foundation problems were referred to IIT Bombay in 1960 as I had worked on Enrico Fermy Atomic Power Project along with Prof. Davidson and my co-worker Dr R L Handy. The report for all the aspects was submitted to the Department of Atomic Energy in 1961. The report was forwarded to Bechtel's the turnkey contractors for constructing the Power Plant. They in turn sent it to Boston. Boston sent a query regarding, Specific gravity. They said that they have never come across specific gravity of 2.81 in US. I conducted heavy mineral and light mineral analysis and sent the reply that Hematite content of our soil is higher than Boston Blue clay which had a specific gravity of 2.67. Bechtel's then relied completely on our report. This showed that Indians could do soil testing of internationally accepted standards. I encouraged Indian companies to set up soil testing facilities with equipment manufactured in India.

In 1964 Mr. Karpa of Bechtel complained to Department of Atomic Energy (DAE) that they are not getting the rocks at foundation levels as described in the report. DAE asked him to meet me directly and get the clarification. We visited the site jointly. I told them that I have mentioned that rock will be encountered at R.L. 93 with light house plinth at R.L. 100. When levels were taken jointly by both the parties the rock strata were encountered at R.L. 93 as predicted thus establishing the competence of Indian consultants. The location of heavy reactor unfortunately fell at a point where the rock encountered was tuff and the bearing capacity was just adequate with factor of safety of 3. DAE and Bechtel asked me whether I would take responsibility for the safety of the foundation and after recalculation I agreed to pour the first basket of concrete. The foundations of reactors are functioning satisfactorily till to date even though they have gone through a few earthquake tremors. I told them that if I could be correct in U.S., there is no reason why I should be wrong in India. DAE wanted foundations be designed for zero settlement but I told them that it was not possible to design foundations on weathered or boulder strata at zero settlement and they have to design their mechanical parts to take care of the allowable settlements. USA counterparts concurred with my observations.

Madhav: Prof. Katti can you please elaborate your contributions to research on expansive soils?

Reminiscences (continued)

Prof. Katti: Large scale failures I noticed in Kakrapara river valley project I programmed the research in the following way: (I) Analyse the properties of Expansive Black cotton soils and their constituents physically, chemically and engineering wise. This gave a direction for my further stabilization research as the soils contained MT clay mineral with expanding lattice. (II) Started developing open system and close system swelling pressure and heave equipment and also tri axial testing equipment to measure ratio between axial and lateral swelling pressure and heave These studies were conducted on soil fractions.. They were conducted with varying densities and moisture content. These studies conclusively proved that MT clay minerals are responsible for swelling pressure and heave and not sand or silt. Prof Bose wanted me to evolve a method at College of Military Engineering (CME) to stabilize expansive black cotton soil for military purposes. Here to decide about depth to which stabilization should be carried out, my student observed that the change in density took place within 1m to 1.5m and then the density remained the same both during rainy season and summer. This I presented it in conference held at CME and also at IISc Bangalore. (III)Later large number of people from academic institutions as Ph.D. or M.Tech projects, and immediately applied by Malaprabha authorities in the field. Nalini, my wife used to help me taking down dictation between 3 am and 5 am and in correcting students' works. She would feed them with refreshments while working late nights. I could not have done so much work in research, development, consultancy, postgraduate education, etc. without her unstinted help and devotion.

Extremely divergent swelling pressure tests were reported in one of the meetings of I.R.C. I was convinced that one should study the mineralogical constituents using available X-Ray, D.T.A, Index properties and gravimetric methods. A large number of graduate students based on scientific approach proved that tests under different conditions gave different swelling pressure in axial and radial directions. We tried to ascertain the depth up to which the swelling takes place. Mr Ketkar, my graduate student, observed that density remains constant beyond a depth of 1.5 to 2.0 m throughout the year. IIT funded earlier research work with large scale models. Large scale models, 1.5 m wide, 3 to 4 m long and 4 to 6 m in height were required to simulate field conditions. Indian Road Congress was active in promoting research in the area of soil stabilization and published a bulletin entitled 'Research on black cotton soil without and with inorganic additives'. This gave impetuous to our research in the area of black cotton soil.

Madhav: What was your role and contribution to Indian National Society of SM & FE?

Prof. Katti: Some annual general meetings of INS SMFE (later to become IGS) were held with IRC. Papers on soil mechanics were presented on one day during the conference. INS SMFE became an independent body with proper constitution around 1968 or 69. Dinesh Mohan, Shamsher Prakash, Ramamurty, etc. participated in drafting the constitution of IGS. Prof. Ramamurthy, Prof. Gulhati and others participated in the development of IGS. Dinesh Mohan took over as president; he was followed by Ramamurthy and Jagdish Narayan. I took over as president of IGS in1977. I encouraged a large number of people to participate in various committees. Indian Geotechnical Conference (IGC) was successfully held in Bombay In 1970, under the auspices of IIT, supported by several organisations in Mumbai. Subsequently IGC's were hold in Bombay in 1980, 1990 and 2000. I understand that IGC2010 would be held in Mumbai. This will be a Golden Jubilee conference at Mumbai. I retired from IIT Bombay 20 years ago. The light is kept burning, the torch of Geotechnical engineering taken over by the younger generation. It is encouraging to see the growth of IGS which has attained international recognition and participation. Geotechnical Engineering is growing in all aspects of profession with professionals actively participating in the growth and dissemination of knowledge.

Madhav: Your name is synonymous with CNS (Cohesive Non Swelling Soil) layer. Can you describe its development and application?

Prof. Katti: CNS technology has been found economical for constructing earth dams, foundations of both light and heavy civil engineering structure, roads, retaining walls and irrigation canal structures. CBI&P supported the work with adequate research grants. Malaprabha River valley project authorities conducted field trials and used it for lining of 108 km long canals passing through deep seated expansive soil. CWC, World Bank, USAID and CBI&P approved the technology as a viable technology for construction in expansive soils. BIS has brought out standards. The technology performed satisfactorily for more than 4 decades. The technology was extended for the construction of canal lining and cross drainage structures in Indira Gandhi Nehar in Rajasthan on deep seated bentonite having high swelling pressure and heave. Government of India established several IITs and regional engineering colleges between 1960 and 1970. IITs were expected to work on emerging areas and give support to engineering and science based technologies. I was a member of delegation to visit various universities in U.S.A. and study the patterns of programmes there. I visited several Institutes conducting research on soil engineering in general and expansive soil in particular under a programme supported NSF. This helped me in formulating post graduate research and educational programmes.

Picture of Prof. Katti at Malaprabha River Valley Project

Reminiscences (continued)

Madhav: Prof. Katti, you were instrumental in developing New Bombay in 1970s. What was your contribution to it and other works?

Prof. Katti: Government of Maharashtra was planning to develop New Bombay area along a coastal stretch. Depth of marine clay varied from 1 m to more than 20 m. The soil has high liquid limit and void ratio making soil-water system close to slurry when the structure is disturbed. The engineers had advised them to avoid the area and develop New Mumbai on murum (residual soil) deposits. I was asked to give geotechnical appraisal for the entire area as I indicated to them that it is possible to construct civil structure using ground improvement techniques and also develop new techniques to construct light to heavy facilities. We developed air photo interpretation techniques coupled with modified pedalogical classification to suit the engineering attributes for the Geotechnical appraisal of the entire New Mumbai area. This also helped in solving offshore exploration and foundation problems, prevented ONGC from abandoning the site for oil exploration and facilitated CIDCO in developing New Mumbai on vast coastal deposits.

ONGC found that Sagar Samrat, a fixed exploratory vessel, started sinking more than permissible. Unfortunately vane shear strength of 750 psi was assumed against 150 psi observed by IIT during CIDCO work. Side sonar's were used to assess whether the depth of soft marine clay was less than 15 m. We succeeded in relocating the rig in a stable location. Subsequently we designed the foundations of six platforms. Cementation Co. helped in mounting the drill on the side of the ship to drill in 90 m of water followed by another 90 m in mud and sand stone or lime stone and retrieve soil samples and test them to obtain design parameters. This again proved the competence of Indian geotechnical professionals in handling offshore jobs.

In 1988 just before my retirement, Simplex Concrete piles India Ltd. offered me to be adviser and consultant to help them in bidding for the jobs involving emerging technologies. I agreed to work on their job for three days in a week and devote the remaining time on my research. During this period I brought out treatises on work done by me on expansive soils.

I have spent 52 years of my active professional life in various aspects of geotechnical engineering in India. Today mind is still alert but the body is failing.

Madhav: Can you please give a message to our community?

Prof. Katti: No problem in Geotechnical engineering is difficult as it can be solved using principles of sciences and earth sciences.

Reminiscences - II

Monsieur Michel (Mike) Gambin, France.

Interviewer: Roger Frank, Ecole des Ponts ParisTech (ENPC) and Vice President (Europe), ISSMGE (Email: frank@cermes.enpc.fr)

Personal history of Mike: Civil Engineer (ENPC, 1954) MA (Harvard, 1955).
Born 2 Dec. 1930.
EDUCATION: Lycée Janson de Sailly, Paris (1936 – 1951), ENPC, Harvard.
CAREER: Director Les Pressiomètres Ménard (1958 – 1962), Director Techniques Louis Ménard (1962 – 1978), Division Head Solétanche (1982 – 1992), Adviser Apagéo (1992 to date).
PUBLICATIONS: more than 200 papers on in situ testing, PMT, Dynamic Compaction, vibrations in soils, soil liquefaction, etc.
E-MAIL: mgambin@magic.fr

Frank: Dear Mike, we thought that as your education was completed more than 50 years ago in several countries, France, UK and USA, and that you have worked all over the world, you could bring an unusual perspective to the Geotechnical community. This interview will be a stone in the arch of your Golden Jubilee.

Mike: Yes, I did receive my education from some famous Engineers. Jean Kérisel who was President of the ISSMFE from 1973-1977 was my teacher at ENPC in Paris (1952-1953). Secondly I studied with Arthur Casagrande and Karl Terzaghi at the Graduate School of Arts and Sciences Harvard University where I was the recipient of the Augustus Clifford Tower Fellowship for the year 1954-1955. I was also granted a partial enrollment at MIT where I received additional lectures from two distinguished teachers, namely Prof. D. W. Taylor in Soil Mechanics and T. W. Lamb on clay mineralogy. I was also trained in the UK with the contracting firm McAlpine in 1953 working on the foundations of Broms Hall II Power Station near Birmingham and, at Easter 1954, I visited Egypt, landing at Alexandria from a Lloyd-Triestino regular steamer to visit Aswan Dam III under construction some years before the High Dam started. Nowadays young students get scholarships to foreign countries very easily, and fly everywhere. In 1954, I reached New York City on SS *Ile-de-France* and the trip back to my home country in 1955 was on the brand new MS *United-States*.

Casagrande and Terzaghi I still remember well, both were great men. Casagrande was a marvellous teacher: every student easily understood his courses and his English was good. He would often refer to the experiences gained from his German colleagues before WWII and to the theories of Prandtl, Hvorslev and others. His course on pore pressures and sand liquefaction was unforgettable.

Karl Terzaghi was teaching Engineering Geology which included site investigation. He was presenting his own expertise from dam sites all across the world. He also talked about SPT and CPT and explained how the cone penetration test results could be improved by various unusual techniques, such as slurry flushed upward above the tip.

His English was awful and I had to give my notes to my classmates for them to get a better understanding. What surprised me most was the following advice: “Do not buy my book on Theoretical Soil Mechanics; what you really need to know is in my second book written with Prof. Peck”. He would also say “These days, I spend more time and effort preventing design engineers using my theories wrongly, especially that on the consolidation of thin normally consolidated clay layers, than I do on new research work”. I never asked Harry Seed (class of 1947-1948) or Jim Mitchell (class of 1952-1953) if they remembered he had said so in years before. These statements, however, are supported by a personal communication from Prof. Peck to the authors of a Technical Note in Volume XXXII of “Géotechnique” (December 1982): “[Terzaghi] was not, as he was the first to admit, a theorist beyond the extent that seemed necessary to understand the behaviour of earth material. (…) It might well be that, in Vienna, when Frölich and Terzaghi were cooperating on their book, Terzaghi was more than happy to let Frölich elaborate on and manipulate the theory as much as he desired”.

Frank: You then spent 30 months in the French Army for your National Service, being, during the last year, a Lieutenant in the Corps of Engineers, partially acting as an instructor at the French Army School of Engineers in Angers. What then ?

Mike: I had been contacted by Prof. Kérisel to work with him at his newly opened Consulting Firm Simecsol in Paris, but the shareholders of the recently incorporated company *Les Pressiomètres Louis Ménard* convinced me to join my younger ENPC classmate Louis Ménard who had yet to perform his military service. In this way my professional life started and I am still in the same business, more than 50 years later.

After his initial military training period, Louis got a good position with my help at the Army Fortification and Building Design Office in Paris for the rest of his 30 months obligations and we could meet every day to run the company.

I knew about the patent that Louis had been granted for a new instrument to test the soil by borehole expansion, his pressuremeter, but I had never seen the equipment. As a man of vision, in the draft of the patent he had said: “the equipment is used to characterize the ground by a bearing factor” (see the facsimile of the handwritten draft in ISP5, Volume 2, p.55, lines 5 & 6 of the introduction). This is what he demonstrated as early as 1962.

Reminiscences (continued)

I found him drilling holes – 60 mm in diameter - with a hand auger up to 10 metres depth to insert his rubber clad pressuremeter probe, and that by hand too. We soon started developing a drilling technique involving mud circulation to create a non-caving cavity to perform pressuremeter tests (PMT) in loose sandy soils below water table. We tested the technique at various locations using portable hand pumps as for plant treatment in gardens. We also tested larger probes in larger holes but we then got too many bursts. After that, we started using conventional drill rigs with drag bits and also compressed air drifters since our aim was not to retrieve core samples before testing but to get a borehole wall as intact as possible in all types of ground. I had to educate young farmers to become drillers and pressuremeter operators. The fact that I had enlisted as a private in the Army helped me a lot. I had learnt how to control men and equipment. We had more and more clients for site investigations with PMTs, mostly brought by the same shareholders, since they had good contacts with the Paris Ministry of Public Works, with architects and with contractors.

At the same time as we improved the testing techniques, we had to develop the derivation of the parameters, the E-modulus, derived from a G-modulus and now called E_M and the limit pressure p_{LM}. Then the theory behind these parameters had to be refined, and the method of using these results in foundation design to be worked out. Louis Ménard's main concern was to develop a foundation design based on allowable differential settlement between footings by following the advice of Prof. Terzaghi (as in Article 54 of his book with Prof. Peck) and using the results of our tests.

For this reason the first papers were written on "the E-modulus as a function of the stress or strain level" (Paris 5th ICSMFE, 1961) and "Settlements, New Trends" (Sols-Soils, 1962). They incorporated the decline (the American Geotechnical Engineers would say: degradation) of E_M as a function of strain level (with the first diagram of that sort in the geotechnical literature) and the importance of the shear effect on the settlement of footings on relatively homogeneous soils. Unfortunately, these papers were written in French and were barely noticed in the Anglo-Saxon world. Still, it was the start of a new vision of soil "elasticity".

We undertook a large number of full scale vertical bearing capacity and settlement tests on shallow footings and piles in the basement of our newly built office building at our *Centre d'Etudes Géotechnique*s near Paris, using its huge specially designed beams to provide the required reaction. The whole building would hiss each time the ultimate load was reached. Then papers on "bearing capacity at failure from PMT" were published (Montreal 6th ICSMFE, 1965) where the replacement was proposed of the Terzaghi bearing capacity equation by one involving (1) the soil reaction to borehole expansion as defined by p_{LM} and (2) a "relative depth" concept. A paper on the "Settlement of piles" (Sols-Soils No.7) followed based on a totally new concept far from that of Gorbunov-Posadov.

Geotechnical Engineering was greatly changed. Not only were clients flocking into our offices but Engineers from all over the world came to listen to us. Prof. J. Schmertmann probably wrote his paper on settlement prediction from CPT results after his meeting with Louis in the late 1960s. Nevertheless, old habits remained and only a few adopted our views, which were before their time.
At this time we submitted geotechnical reports based on the results of PMTs to design most of the underpasses and overpasses of the well-known *Boulevard Périphérique* of Paris, the riverside *Voie Express Georges Pompidou*, and the A1, A7, A10, A11, A13 motorways radiating from Paris. Our partners did the same in the other regions of France. Among them, the network of the LPC (our FHWA), was very active. They undertook research work, either on theoretical points or on more load tests on prototype foundations. You will remember, Roger, your PhD work at that time on modelling pile settlements and its further developments.

Frank: Your team was one of the first to undertake full scale horizontal loading tests on piles and on sheet piles ?

Mike: Yes we were. After a first series of lateral loading tests on piles performed in the quicksands of Mont St. Michel Bay by Louis Ménard, a second series was undertaken at the *Centre d'Etudes*, and completed by tests in Japan by Dr. H. Mori. That was only a few years after Ken Roscoe had said "[at that time] Soil Mechanics theories did not contain any mention of displacement, except for vertical settlement. Presumably the designer was meant to assume that the foundation did not move until the soil failed and then the movements were catastrophic". The research work on the application of the results of PMTs to the design of laterally loaded structures lasted until the late 1960s with several papers, among them "Lateral loading of short piers" and "Lateral loading of flexible piles". The "Design of Sheet Pile Walls" followed involving new computer programs developed by our team.

Frank: In the same time you became busy at sea ?

Mike: Yes, in the mid 1960s Insurance experts started to ask us to check the security of exploratory jack-up drilling barges at sea for the oil industry. The soil response to a pressuremeter test was very similar to the soil response under each jack-up barge spud leg when the whole barge is ballasted so long as each leg is forced down in turn to refusal. I remember that once we predicted a spud depth penetration below mud line, not knowing the platform was of a new design where the 4 legs are pushed together. Further, the barge was tugged to its location as the monsoon was starting. The soil liquefied simultaneously under all the spuds due to the effect of the ocean swell and the oil company had to return the barge to port, and wait for the next dry season.

For that sort of soil investigation, we developed a hydraulic vibro-hammer which could drive the PMT probe deep enough below the spud depth penetration and could easily work from any ship. We also used the pressuremeter for many other types of off-shore jobs: not only for oil production platforms in the Mediterranean Sea, the Arabian Gulf, or the South-East Asian Seas, but also for floating-storage-and-offloading buoy anchors. The vertical forces on these piles and the tractive efforts on the anchors is up to ten times that which we find on land. Dimensions are according, i.e. piles of 2 metres and more in diameter. Soil liquefaction could occasionally occur. Off-shore Tunisia a pile designed for an embedment of 45 m sank in seconds to 100 m below mud line. In the Macassar Strait the owner followed our recommendation. He stopped driving piles at the recommended depth and without observing refusal. Next month, none of the piles would move when re-driven.

Reminiscences (continued)

In 1969 I was also involved in the design of one of the first submarine off-shore oil reservoir in the Trucial States – now the United Arab Emirates. Not a single private automobile on land but one traffic light. To cross the creek, you had to whistle the ferryman. Then, we slept on the floating pontoon in portacabins. One night, a strong gale arose, the anchors and the electric generator failed and then no radio. We finished stranded along the Sir Bu Nu'air Island, a territory claimed by Iran… Next afternoon, a search boat found us.

Piers for bridges crossing straits can also raise problems. I remember arriving at the Messina Strait in 1969: "- Where is the platform ?", " – Oh, my gosh, it has disappeared !". It was a monopod platform resting in 100 m of water and tied by 12 anchors. One failed and the monopod crashed to the sea bottom. We returned a few months later for PMTs up to 160 m depth under a 4 leg platform. The bridge is not yet constructed, but it is now designed for piers on land.

I must say, each off-shore site investigation was a real adventure.

Frank: Coming back to land, what about Dynamic Compaction ?

Mike: This is another series of patents of Louis Ménard's, which might have been based on two Soviet processes, one to treat loess where you tamp the soil with a heavy pounder and the other to densify thick layers of granular fills below water level – as sea dikes – by using explosives. The second method had been tried during the construction of Franklin Dam in the USA in the 1930s but with no follow up. The secret was to have discrete tamping points on the ground surface and to tamp a defined number of blows at each spot. Prints can be more than 2 metres deep, the car gives the scale of the prints on the photograph. Densification is not just obtained by compression, but more by the shear effect, a point which is not always understood. Success came immediately because Louis checked the resulting improvement by using his pressuremeter. Had he not be able to, it would have taken years before international recognition. Dynamic compaction is mostly aimed at increasing the E_M yielded by PMTs. Bearing capacity at failure can also be increased but generally at a lesser rate. CPT is not a suitable tool for that sort of quality control, since it only yields a failure parameter q_c. Further, when the soil went through a liquefaction phase, liquefaction may re-appear and q_c dramatically decrease during acceptance tests.

I designed many big jobs in France and around the world: the new air-strip at Nice on French Riviera, on crushed rock, the first phase of the new Changi Airport at Singapore on sand fill over marine clay, new ship-building yards in Sweden, Nigeria, Iran, etc. Also the soil treatment for large factories or warehouses in Sweden again, in Bangladesh, Indonesia, Korea, mainland China, etc. I was involved in the design and construction of the Chek Lap Kok airport of Hong-Kong, and various dams foundation in Mexico, Thailand, etc. I remember having to design a soil improvement scheme in South-East Asia based on a soil report submitted by a Western firm. Identification parameters were fine, except everyone forgot about quoting bulk density. The first time I visited the site I was horrified for it was pumice and we never could have achieved the expected E_M. However, the owner was so satisfied that I worked for him as a consulting engineer on many other big projects.

Frank: What about your experience as a Managing Director overseas ?

Mike: In the mid-seventies I was in charge of Ménard Techniques Ltd, in Aylesbury, North-West of London and I designed several dynamic compaction jobs over old fills for new roads projects around London. I was helped by Malcolm Puller and Turlough Bamber. We had Joint Venture agreements with Cementation Piling and GKN who later bought up Keller. In the late seventies, especially after the untimely death of Louis Ménard, I managed Ménard Inc. in Pittsburgh, at that time the heart of soil improvement, with the head offices of Vibroflotation Inc. and Hayward-Baker Inc., which later was also bought by GKN-Keller. There, Techniques Louis Ménard Company had a joint venture with Elio D'Appolonia Inc. and we got much support from his son David. I undertook 3 jobs then, one in Santa Cruz south of San Francisco for the State of California, one east of Chicago along Lake Erie for a large tank farm and one in Baltimore, all based on the experience of a first job in Jacksonville, Florida. American Engineers did not waste time and started imitating us, initially for densification of old fills on FHWA projects. Now, several big American firms offer this method which has become public property.

Frank: Mike, I think that during all these years you always had extra-curricular activities ?

Reminiscences (continued)

Mike: You are right, Roger. Already, at high school, I was editing a weekly newspaper *Le Lycéen* on mimeographed sheets and which included an editorial, detective stories, games, a movie chronicle, etc. Some years later I was involved in many student associations. This is how I was in the French delegation invited by Frei Universität Berlin in 1951 to counterbalance the gigantic World Peace Youth Meeting organized by the USSR in Berlin. There I was really impressed by the power of the USSR and decided to learn more about it. This is why I learned Russian during my military service, which helped me much later to win a court case for patent infringement as a defendant, since the patent method on which the plaintiff based his action was partially described in the Soviet Geotechnical Magazine the year before his patent application.

I was an active member of the UGE, the French Engineering Students Association, and I represented the UGE at the first meeting of the European Federation of Engineering Students in 1953 in Ghent. I rapidly became Vice-President of the Paris Division of the Mutuelle Nationale des Etudiants de France (MNEF) which was running the social security for students and later I became Secretary General at the national level of the MNEF.

I don't know whether my involvement in the editing and publication of Sols-Soils magazine from 1962 to 1980 can be considered as extra-curricular or not. The 35 issues not only contained prominent papers either in French or in English on Geotechnical Engineering but also included abridged translations of papers published in German, Russian and even Japanese.
The same question occurs with my introducing an additional Working Group (No.5) to CEN TC341 to write the EN ISO Standards on Expansion Tests in Boreholes, which naturally includes the Ménard pressuremeter test.

During all my years of demanding professional activity from 1958 to 1992, I could not commit myself to participate in associations on a voluntary basis. We could simply entertain friends and clients in our flat overlooking the River Seine on the *Isle Saint-Louis*. Among many others, delegates of Japan, USSR and China would often visit me.

Frank: Now, what about your involvement within ISSMGE ?

Mike: As I said, my activities would not permit any large commitment to any type of Association or Learned Society. However, as early as 1987 I initiated a European Regional Technical Committee No.4 on Pressuremeters which produced a report for the European Conference held in Florence in 1991. This Committee became ISSMGE Technical Committee No. 27 (see the photo) which produced another report for the first International Conference on Site Characterisation in Atlanta (1998). TC 27 was merged with TC 16 which thus became devoted to all types of in situ testing. I was a member of TC 16 until 2001, and I remain a friend.
From 1998 to 2002, I was Vice President of CFMS, the French Geotechnical Society and from 2001 to 2005 I was an appointed member of the ISSMGE Board.

Being a francophone Engineer, I thought it my duty to transfer our Geotechnical knowledge to our friends in Africa and to some other, more isolated places, I am thinking of Haïti for instance. So, with the help of the newly formed CFMS Committee for a Francophone Cooperation, which included academics and engineers from Belgium, Switzerland and Canada, we collected the addresses of francophone higher education establishments overseas. The first Francophone Geotechnical Libraries partially funded by ISSMGE were distributed during a first meeting held in Marrakech, Morocco, in September 1996. In the meantime I had started to translate the "ISSMFE News" and mail it. Then from December 1995 on, I edited, with the financial help of ISSMGE, a quarterly *Lettre de la Géotechnique* which is still in existence and now posted on the ISSMGE website. After that, I thought it necessary to set up an ISSMGE Member Society representing the French speaking African Geotechnical Engineers and Academics: the CTGA or Trans-national African Geotechnical Society which gathers those dwelling in the 20 African francophone countries - excluding the 3 North African ones who have their own Society. Finally, in 1998, with the help of my former college ENPC, and with you, Roger, I set up a yearly 3-week program of Continuing Education for African Engineers, held in Paris. Along the same line, I tried to bring francophone lecturers to the Annual General Meetings of the CTGA to help the development of sound geotechnical engineering in Africa.

Frank: And in conclusion ?

Mike: My task, I think, will last as long as my life. It is difficult for me to see that the message from Louis Ménard dating back to the early 1960s has not yet been accepted by the whole Geotechnical Community, although the number of instruments sold has now passed the 1000 mark. Sometimes, I hear "what is new with foundation design using PMT ?". The answer is "The whole basis was set up in the 1960s and only refinements can be worked on". A few books were devoted to the pressuremeter and its use in design, but none of them really stressed the basis on which Louis Ménard developed his 2 simple equations on soil displacement and soil failure under load based on PMT results. Even now, teachers and students are still much too happy to work on mathematical theories they enjoyed so much during their college years and forget about the reality of soil. Use of more and more effective computer software makes them think that soil behaviour is in the memory of their electronic devices. I was very puzzled when I saw the cover of an ASCE magazine on student theses showing a young student in front of a computer key-board !

Last year I wrote a paper on the fallacy of the Terzaghi (or Frölich ?) equation for footing bearing capacity (ISC'3). This was already implied in the Terzaghi and Peck book, page.420-422 (1948 edition). Since 1994, J.-L. Briaud has worked on this subject and has reached the same conclusion. This year or next year, health permitting, I shall write a paper on "Settlement and shear". For the first International Conference on Education in Geotechnical Engineering, in 2000, I have written a paper on the history of defunct Soil Mechanics theories. I would like the theories of the first half of the 20th Century to be at least limited to their own region of application and, better, superseded by newer concepts in these days of sustainable development.

Case History

Incheon Bridge Construction – Geotechnical Challenges

By Sung-Min Cho (Technical Advisory Director, Incheon Bridge Construction Office, Korea Expressway Corporation, Email: *chosmin@ex.co.kr*) and Chungsik Yoo (Professor, Dept. of Civil and Environmental Engineering, Sungkyunkwan University, Email: *csyoo@skku.edu*)

Introduction

Despite the recent worldwide economic downturn, mega construction projects such as long span bridges and high rise buildings are still being planned due to the positive effects on the global economy. In long span bridge construction, in particular, China and Korea are emerging as strong competitors to European countries as well as Japan in terms of technology as well as number of projects. Korea has gained core technologies in this field during the recently completed Seohae Bridge, the longest cable stayed bridge in Korea. Other examples of recent long span bridge construction projects in Korea include GK fixed link project which consists of an immersed tunnel and a cable stayed bridge, Yisunshin bridge project, a 1.5 km long suspension bridge.

Incheon Bridge construction project is one of the on-going construction projects, which connects New Songdo city to the main expressway networks (Figure 1). The Incheon Bridge construction project, which was designated as one of the 10 wonders of the construction world in 2005, is highlighted by the 18.4 km long sea-crossing bridge which includes the 5th longest cable stayed bridge in the world. Recently a government funded research center, Center for Super-Long Span bridge, has been established to promote the related technology development and to take initiatives in the global market in long-span bridge construction.

Construction of a long span bridge encompasses a host of civil engineering technologies including structural engineering, geotechnical engineering, and hydraulics engineering, among others. Although not easily recognized by public, the geotechnical engineering provides essential parts in the long span construction that insure the integrity of a bridge. In this article geotechnical aspects of the Incheon Bridge construction project are introduced with emphasis on the deep foundation systems and coofferdams.

Glimpse of Incheon Bridge

The Incheon Bridge project involves construction of a 21.27 km long national expressway that connects newly built New Songdo City to Incheon International airport. The project has been going on for almost 52 months and is expected to be completed in coming October. The 21.27 km long expressway consists of a 18.4 km long bridge, the main span of which is 800 m long crossing the main navigation channel in and out of the Incheon Port. The Incheon Bridge is the integration of several special featured bridges along its route. The main section of the Incheon Bridge is the 1.48 km long cable stayed bridge with 2 pylons. A 2.02 km long precast segmental PSC box girder bridge by free cantilever method (FCM) and a 8.40 km precast PSC box girder bridge by full span launching method (FSLM) are also being constructed alongside of the main bridge. Also included are the longest continuous bridge, a 1.25 km long PSC box girder bridge by incremental launching method (ILM), a 0.21 km long hybrid through arch bridge, a 2.21 km long PSC box girder bridge with struts by movable scaffolding method (MSS), a 0.23 km long cable stayed bridge with V-shaped pylon, and a 0.32 km long extradosed bridge by FCM, among others. Foundation systems of Incheon Bridge mainly include large diameter drilled shafts with some steel pipe piles and prestressed high strength concrete piles for IC ramps. Special features such as dolphin type ship impact protection systems and rip-raps for scour protection were also constructed.

Figure 1. Bird's eye view of Incheon Bridge

Construction cost almost approaches to 16 billion USD, 60% of which came from private financing including government subsidies with the remaining 40% from the government financing. For the private financing, AMEC in UK is one of the concessionaire, making the first of foreign concessionaire in SOC project in Korea. To expedite the construction, the project is being executed as fast track in which design and construction are being doing in parallel. Korea Expressway Corporation, a government corporation and authority for national expressway, manages the whole project at the government side. Major contractors in Korea are participating the project with approximately 90% of work progress as of March of 2009.

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

Figure 2. Route map of the Incheon Bridge and the cable stayed portion as its main section

Design Specifications

New concepts have been being implemented for design and construction of Incheon Bridge due to its mega scale. For the private financing section in particular, it was necessary to adopt international design specifications, resulting in super and substructure designs based on the AASHTO design specifications which are based on the load and resistance factor design (LRFD). For the government financing section, however, Korea Highway Bridge Design Code (KHBDC) was adopted, which is based on the allowable stress design (ASD) concept. A number of full-scale pile load tests were conducted for all sections not only to determine site specific load resistance factors in the LRFD implemented sections but also to remove any conservativeness in the ASD implemented sections. Also conducted were lateral load tests on reduced scale as well as full-scale piles with due consideration of possible loading situations in which the actual piles, having substantial lengths above seabed with pile-bent, are expected to subject to large dynamic hydraulic pressure and lateral loads during the bridge's life time.

Design and construction of Bridge Foundation

Incheon Bridge, a part of six-lane expressway, is supported by large diameter (up to 3 m) drilled shafts socketed into a base rock layer. In the full scale pile load tests, eight bi-directional load tests including the Osterberg cell tests were conducted in order to establish a criteria for bearing capacity evaluation (Figure 3). In the tests, world-record maximum compressive load over 30,000 tonf per a pile was applied and the 1% of pile diameter criterion was used to determine the resistance of the pile. For cases where the pile shaft displacement exceeded 10 mm, the frictional resistance was also considered in addition to the end bearing capacity for the bearing capacity estimation. The results of the load tests were thoroughly analyzed by a number of experts to determine the resistance factor, giving a unique opportunity to improve the current LRFD concept. During construction an additional proof load test was conducted to confirm the design assumptions in addition to a series of lateral load tests on three reduced-scale piles and nine as-constructed piles at the site to confirm the lateral load carrying capacity. For the bridge section constructed by FSLM, the load-transfer characteristics were additionally examined by instruments installed at a pile with pile-bent to confirm whether or not the load from the supper structure is transferred to the foundation.

The drilled shafts were constructed by a number of methods with due consideration of the site and ground conditions, such as the RCD method, Beneto method, rotating method, earth drill method, etc. During the construction of drilled shafts, steel casing pipes were first installed in the decomposed rock layer using a vibratory hammer with concurrent excavation of the materials inside of the casings. A rather strict control of the steel casing installation was adopted by using limits of 1% in verticality with 75 mm of deviation in the actual drawing.

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

Toe locations of the drill shafts were determined based on the rock quality inspection procedure set by the owner. For a selected inspection pile for each pier, the committee on rock quality inspection directly inspected the rock quality. A special care was exercised for foundations with a pile-bent system as they require strict quality control. After excavation, excavated soils and rock fragments were removed and a rebar cage was installed after which underwater concrete was poured using a tremie pipe to complete a shaft. A crosshole sonic logging (CSL) was conducted seven days after the shaft completion to check the pile integrity. CSL was conducted for all shafts supporting the V-shaped pylon and those with the pile-bent in the main navigation channel of Incheon Port. For those approach bridge sections and the vidaduct section with pile caps, the CSL was conducted on selected piles. Figure 4 and 5 show photos of construction stages and lateral load test on piles with pile-bent system, respectively. The pile caps were constructed after installing a PC house using a floating crane (Figure 6). Figure 7 shows a photo taken during driving of 1.8 m diameter steel pipe piles as the foundation of the temporary bent for the large block lifting at the side span of the cable stayed portion.

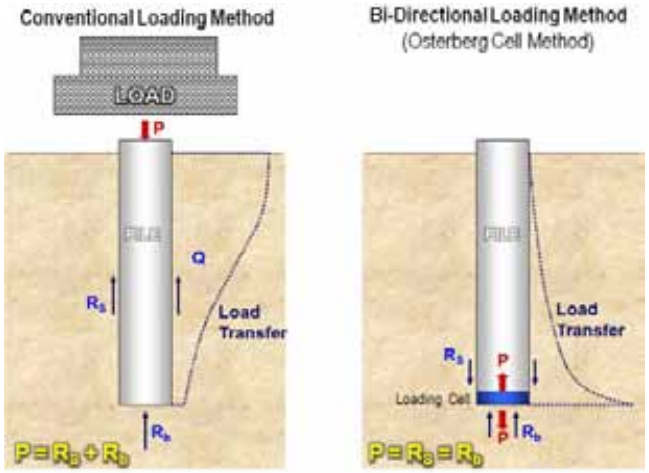

Figure 3. Conventional load test vs. bi-direction load test

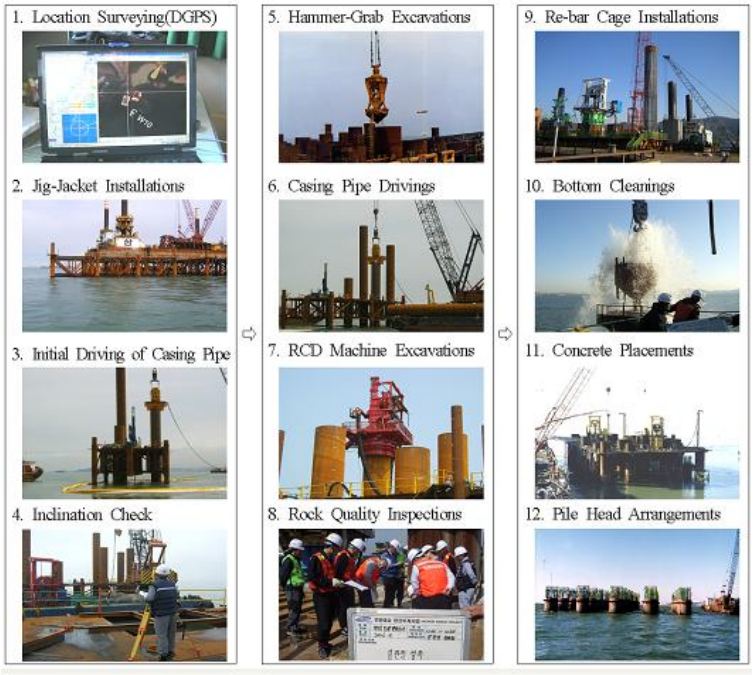

Figure 4. Construction steps for piles

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

Figure 5. Lateral load test on piles with pile-bent system

In addition to the drilled shafts, a number of steel pipe piles with 2.4 m and 1.8 m in diameter were installed for the overhead crane and the large block erections for the side span of cable stayed bridge, jacket platforms, trestle, ship impact protection dolphins. For the steel pipe piles, dynamic load tests were performed to estimate the ultimate bearing capacity.

Figure 6. Installation of pile cap using PC House method

Figure 7. Driving the steel pipe pile of 1.8 m diameter using hydraulic hammer system

Ship Impact Protection Systems

The collapse of the Sunshine Skyway Bridge, US in 1984 was a significant turning point in the development of vessel collision design for waterway crossing bridges. As a result of several severe accidents, increased concern over the safety of bridges crossing navigable waterways has arisen and a great deal of effort into the establishment the design criteria for the vessel collision problem has been made by bridge engineers in the world. As provided by design specifications like as AASHTO LRFD Bridge Design Specifications, or, Korea Highway Bridge Design Code, all bridge components in a navigable waterway crossing, located in design water depths not less than 600 mm, shall be designed for vessel impact. In waterways where ship collision is anticipated, bridges shall be designed to resist ship impact forces, and/or, adequately protected by ship impact protection(SIP) systems including dolphins, berms, islands, fenders or other sacrificable devices. For the Incheon Bridge, large diameter circular dolphins are constructed at 44 locations of the both side of the main span around the piers of the cable stayed span. In compliance with the agreements for the project and related specifications, these dolphin type SIP systems should protect the Incheon Bridge against the collision with 100,000 DWT tanker navigating the channel with speed of 10 knots. Figure 8 shows the layout and cross-section of the SIPs. Diameter of the dolphin is 25 m, or 20 m according to its location. Navigable passage width for main channel is 625.5 m under the main span deck of the cable stayed bridge and 140 m for auxiliary channel at side span behind the pylon.

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

Vessel collision risk was assessed by probability based analysis procedure on the basis of AASHTO Method II. Annual frequency of bridge collapse (AF) was computed for each bridge component and vessel classification. The AF can be taken as multiplication value of the annual number of vessel, the probability of vessel aberrancy, the geometric probability of a collision between an aberrant vessel and a bridge pier, and the probability of bridge collapse due to a collision with an aberrant vessel. The AF for the total bridge is the sum of all component AFs. For the design of the Incheon Bridge as a critical structure, the maximum AF shall be less than 0.0001. The inverse of the AF, 1/AF, is equal to the return period in years. The computed AF of the Incheon Bridge through the risk analysis for 71,370 cases of the impact scenario was less than 0.00005 and satisfies design requirements.

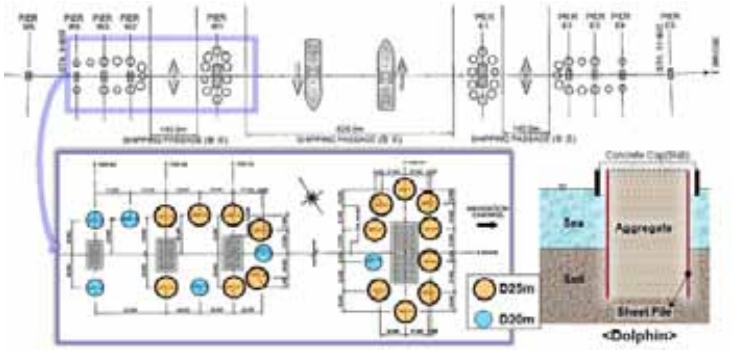

Figure 8. Layout of the dolphins

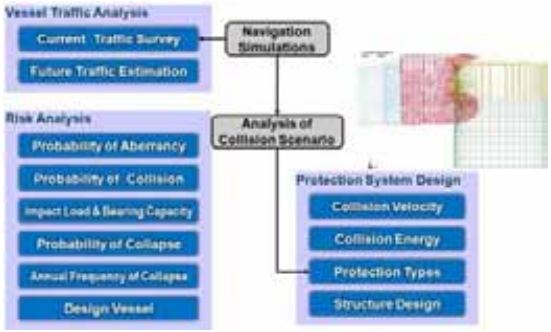

Figure 9. Flow chart of the SIP design procedure

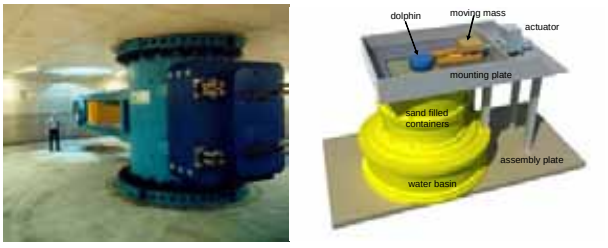

Figure 10. Geo-centrifugal testing equipment and device (GeoDelft)

The SIP dolphin is the circular sheet pile web structure filled with crushed rock and closed at the top with a robust concrete cap. Yield strength of straight steel sheet pile is 355 MPa according to EN10248 and thickness is 12.7 mm. The dolphins are sacrificable structures that will be partly, or fully destroyed in a severe ship impact. The verification of stopping capability of the dolphins therefore involves consideration of significant deformations. The design of the structure was performed with numerical analyses of which constitutional model had been verified by the physical model experiment using the geocentrifuge equipment. 7 quasi-static and 11 dynamic model tests for 2 different prototype dolphins were carried out in a scaling of 1:200. The 3 dimensional non-linear finite element models were used to analyze the structural response and energy-dissipating capability of dolphins which is deeply embedded in the seabed. As a result of comparison between numerical analyses and model tests, a very convincing correspondence was observed along the entire displacement range and it seems that assessing dolphin behavior by FEM model give more conservative results than actual dynamic behavior.

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

The dolphin structure formed with sheet piles and filling material shall secure external stability and internal stability for ordinary loads such as wave and current pressure. Considering all the failure mechanism, stability assessment was performed for the strength limit state and service limit state of the dolphins. Geotechnical investigations including in-situ tests and laboratory tests were also performed to find the engineering characteristics of the seabed soils. The friction angle of the crushed stone as a filling material was reduced to 38° considering the possibility of contracting behavior as the impact.

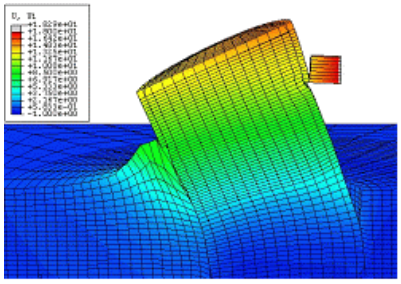

Figure 11. Deformed shape of the dolphin from the FEM analysis

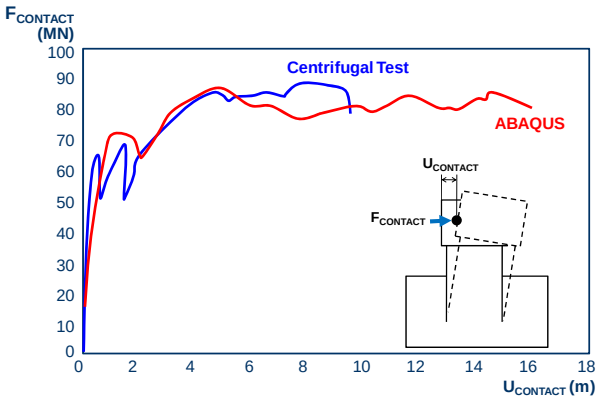

Figure 12. Comparison of the dolphin displacement between numerical analysis and model test

Figure 13. Fabrication and transportation of the dolphin cell

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

Figure 14. SIP constructions around the navigation channel

Scour Protection of the Foundations

A foundation of the bridge shall be embedded below an estimated scour depth, or has an optimal countermeasure against scour. The appropriate measures against the scour can be classified into two types. One is the increasing the resistance of bed materials. The other is the method that weakens the factors which induce scour. The riprap is the most common countermeasure thanks to simple method of constructions and low cost.

Scour protections with the ripraps were planned for piers of the cable stayed span and approach bridge span. All the relevant piers concerned have a group of drilled shafts and the pile cap. Effects of dolphins for the ship impact protection were also considered. Oceanographic investigations, numerical modeling, scour rate test, physical modeling with fixed bed and movable bed, and field monitoring were performed to design the scour protection around the pier. As the riprap is embanked on the seabed, Isbash's formula was used to calculate the stable weight of the riprap for scour protection under the flow. Proposed diameters of the stable stone for the piers around the SIP dolphins are 50-60 (cm) and the gradation of stones in the riprap was suggested. To secure the stability of drilled shafts and dolphins, the lateral extent and the thickness of ripraps were decided by the numerical modeling and the physical experiments. Because the calculated armor stone sizes of all the piers were smaller than the riprap size, additional execution of armor stone would not be necessary.

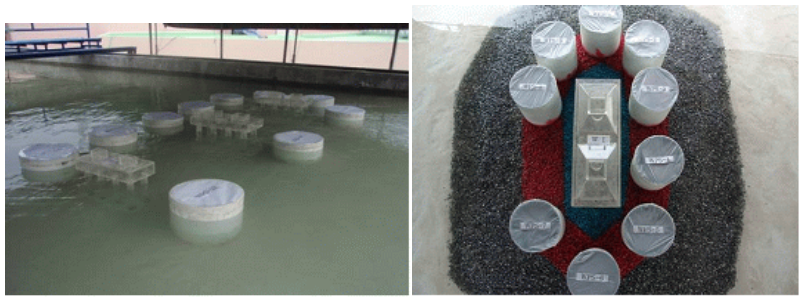

Figure 15. Physical modeling experiments

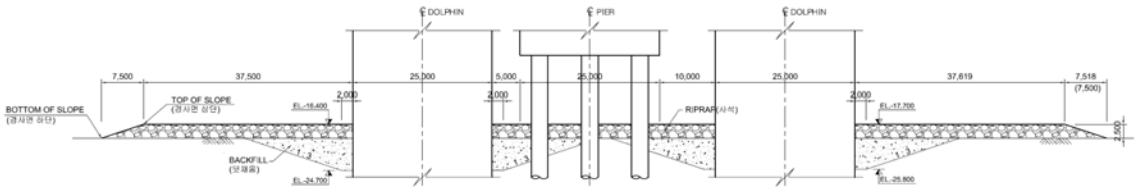

Figure 16. Cross-section of the riprap protection around the pier and dolphins

Construction of Cofferdams

A number of equipments were used for construction of the bridge sections in open sea. For inland sections, however, either trestles or cofferdams were used as shown in Figure 17. For example, trestles were constructed in the sections adjacent to Yeongjong Island and New Songdo city, while geotextile tubes and sheet pile walls were used for areas with thick marine clay deposit near New Songdo city (Figure 18).

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

(a) trestle (b) geotextile tube (c) sheet pile

Figure 17. Trestle and cofferdams

Figure 18. Geotubes and sheet pile walls

The geoxtitle tube method utilizes geosynthetic bags filled with backfill material to act as a structural component (Figure 19). Major advantages of the geotextile tube methods include its low cost, fast construction speed, and environmentally friendliness. For Incheon Bridge construction site, a water-sand mixture of 80:20 by weight was used for backfill with sand forms installed between the top and bottom tubes to increase the frictional resistance. A complete field instrumentation was conducted for earth pressure, pore pressure, and deformation to ensure the stability of the tubes during construction. Figure 20 shows measured earth pressures during construction (Cho et al., 2008).

Figure 19. Hydraulic pumping of filling material into the geotextile tube

Case History (continued)

Incheon Bridge Construction – Geotechnical Challenges

In other sections adjacent to the section adopted the geotextile tubes, sheet pile walls were used in constructing cofferdams (Figure 21). The sheet pile walls were designed to withstand the 10 year recurrent design wave height of 1.76 m. Two rows of sheet piles were required to meet the design requirement. The sheet pile were connected each other using tied cables. The stability of the as-designed sheet pile walls was examined using a series of finite element analysis with due consideration of possible soil-structure interaction. The sheet pile walls were constructed using state-of-the-art no-vibration, no-noise push-in type machines in addition to traditional vibro-hammer type machines (Figure 22). Field instrumentation was also implemented to check the stability against hydraulic pressure and scour. Although moderate scour under the outside sheet pile wall and excessive wall deformations in some sections occurred during construction, the construction was successfully completed with remedial measures.

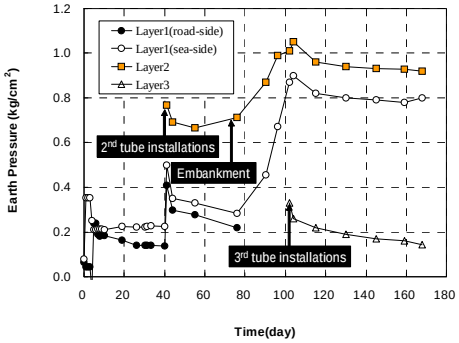

Figure 20. Earth pressure measurements during geotextile tube constructions

Figure 21. Bridge constructions on the temporary site between the sheet pile walls

Figure 22. Push-in type sheet pile installation machines

Miscellaneous Geotechnical Challenges

A number of soft ground improvement techniques were employed to cope with the soft soils encountered during bridge abutment construction, such as vertical drains, Expanded Poly-Styrene (EPS) blocks, and stabilization with admixtures. Prefabricated vertical drains and/or sand compaction piles (SCP) were used to accelerate the soil consolidation settlements with horizontal fiber mats. For sections where SCPs were not implemented due to construction constraints, the deep cement mixing (DCM) method was implemented to improve the stability against lateral spreading of the soft soil. EPS blocks were used to reduce the vertical earth pressure caused by backfilling of area behind the abutment. Also adopted were soil steel bridge using corrugated steel plates to construction open-cut tunnels. Geosynthetic reinforced soil retaining walls were also adopted in addition to top-base piles to improve load carrying capacity of foundation soil.

Concluding Remarks

During planning, design, construction stages of Incheon Bridge project, state-of-the-art geotechnologies have been adopted in various fields, such as foundations, cofferdams, dolphin type ship impact protection systems, and scour protection systems. Technical experiences gained during these stages will be disseminated to the geotechnical engineering community to further improve the current design and construction technologies related to long-span bridge in particular.

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AASHTO(1994) Guide Specification and Commentary for Vessel Collision Design of Highway Bridges.
AASHTO(2007). LRFD Bridge Design Specification, 4th Edition, American Association of State Highway and Transportation Officials, Washington DC.
Kim, J.H., Kim, Z.C., Shin, H.Y., Cho, S.M., Schaminee, P.E.L, and Gluver, H. (2007), "Centrifuge testing for the design of ship impact protection of Incheon Bridge Project", Proceedings of the 16th International Offshore and Polar Engineering Conference Lisbon, Portugal, pp.1613-1618.
Cho, S.M., Jeon, B.S., Park, S.I., and Yoon, H.C. (2008), "Geotextile Tube Application as the Cofferdam at the Foreshore with Large Tidal Range for Incheon Bridge Project", Proceeding of the 4th Asian Regional Conference on Geosynthetics, China.

News

Jan Maertens receives the De Beer Award for the period 2004-2008

Late Professor E. De Beer's friends and colleagues took the initiative in 1982 to publish a memorial volume at the occasion of his retirement. The proceeds of that publication were used to establish the "De Beer Fund" and enable the award of the "De Beer Prize" every four years.

The prize is designed to reward an outstanding engineer who has provided significant contributions to the theoretical, experimental, and design aspects of soil mechanics and foundation engineering. The individual must either hold a civil engineering degree delivered by a Belgian institution or have maintained close collaboration with the Belgian Geotechnical Scene.

Recipients of the award since 1986 have been: Prof. Branko Ladanyi (Canada), Prof. Victor Roisin (Belgium), Dr. Alain Holeyman (USA), Prof. Michele Jamiolkowski (Italy), and Prof. William Van Impe (Belgium).

The Selection Committee, chaired by the current President of the Belgian Member Society of the ISSMGE has bestowed the De Beer Prize for the Period 2004-2008 to Jan Maertens. During the award ceremony held on April 28, 2009, Christophe Bauduin, the current President of the Belgian Member Society, stressed the accomplishments of the selected geotechnical professional.

Jan Maertens enjoyed receiving the prize (see Photos with Christophe Bauduin and Alain Holeyman, Secretary of the Awards Committee) and delivered the "De Beer Lecture" on "Special geotechnical observations with regard to the 'Europaterminal' in Antwerp".

Presentation of the award to the laureate professor J. Maertens by professor C. Bauduin (President Belgian Member Society of ISSMGE & President of the E. De Beer Award Committee -left) and professor A. Holeyman (Secretary of the E. De Beer Award Committee – right)

Reported by Noel Huybrechts (Secretary Belgian Member Society, Email: noel.huybrechts@bbri.be)

News

ISSMGE International Seminars at Penhom Penh, Cambodia; Vientiane, Laos and Yangoon, Myanmar

ISSMGE International Seminar took place in Penhom Penh, Cambodia on 9th January 2009, co-ordinated by the ISSMGE President Prof. Pedro Seco e Pinto, with the purpose to enlarge South East Asia Geotechnical Society (SEAGS). This Seminar had the support of Norton University. The lectures were delivered by Prof. Pedro Seco e Pinto, Prof. Madhira Madhav, Vice President for Asia, Prof. Dennes Bergado, Secretary General of SEAGS and Dr. Yit Bunna. Special thanks are due to Dr. Lim Soktay who with Prof. Dennes Bergado had played an important role in organizing this event. This Seminar was attended by 75 participants, showing the great potential in Cambodia, and was considered a great success. This momentum was profited to encourage the colleagues from Cambodia to join SEAGS. The supports from Norton University, and particularly from the Rector Prof. Chan Khieng, are greatly acknowledged.

Participants of the seminar at Penhom Penh, Cambodia

Next ISSMGE International Seminar took place in Vientiane, Laos on 13th January 2009. This Seminar had the support of the Ministry of Public Works and Transports. The lectures were delivered by Prof. Pedro Seco e Pinto, Prof. Madhira Madhav, Vice President for Asia, Prof. Dennes Bergado, Secretary General of SEAGS and Ing. Viengvisa Siviasay. Special thanks are due to Ing. Viengvisa Sivisay who with Prof. Dennes Bergado have played an important role in organizing this event. This Seminar was attended by 40 participants, showing the great interest of our colleague from Vientiane, and was considered a great success. This momentum was profited to encourage the colleagues from Laos to join SEAGS. The support received from the Ministry of Public Works and Transportation and particularly from SDMT State Enterprise from Survey Design and Material Testing is greatly acknowledged.

Participants of seminar in Vientiane, Laos

Dignitaries in dias of seminar in Yangoon, Myanmar

Another ISSMGE International Seminar took place in Yangoon, Myanmar on 15th January 2009. This Seminar had the support of the Myanmar Geoscience Society and Myanmar Engineering Society. The lectures were delivered by Prof. Pedro Seco e Pinto, Prof. Madhira Madhav, Vice President for Asia, Prof. Dennes Bergado, Secretary General of SEAGS and Dr. U Toe Hlaing. Special thanks are due to Dr. Aung Thaik, Dr. Aye Lwin and Dr. U San Lwin who with Prof. Dennes Bergado have played an important role in organizing this event. This Seminar was attended by 125 participants, showing the great potential from Myanmar, and was considered a great success. This momentum was profited to encourage the colleagues from Myanmar to join SEAGS. The support received from the President of Myanmar Geoscience Society Prof. Win Swe and from the Past and Current Presidents of Myanmar Engineering Society Ing. U Than Mynt and Ing. U Han Zaw is greatly acknowledged.

Reported by Pedro Sêco e Pinto, President, ISSMGE (Email: pspinto@lnec.pt)

Event Diary

ISSMGE SPONSORED EVENTS

2009

The 3rd International Geotechnical Symposium (IGS2009) on Geotechnical Engineering for Disaster Prevention and Reduction
Date: 22 - 25 July 2009
Location: Harbin, China
Contact person: Professor MC Zhao,
E-mail: maocai@mail.ru, zhao_maocai@sohu.com
Website: igs2009.hit.edu.cn

International Symposium on Geoenvironmental Engineering - IGSE 2009
Date: 8 - 10 September 2009
Location: Zhejiang University, Hangzhou, China
Contact person: Prof. Xiaowu TANG
E-mail: isge2009@zju.edu.cn
Website: www.ssgeo.zju.edu.cn

4 iYGEC'09 - 4th International Young Geotechnical Engineers' Conference
Date: 2 - 6 October 2009
Location: El-Mahrousa Hotel, Alexandria, Egypt
Contact person: Prof. Fatma Baligh (baligh11@hotmail.com)
E-mail: iygec2009@hamza.org

XVII International Conference for Soil Mechanics and Geotechnical Engineering
Date: 5 - 9 October 2009
Location: Bibliotheca Alexandrina, Alexandria, Egypt
Website: www.2009icsmge-egypt.org/

International Symposium on Geotechnical Engineering, Ground Improvement, and Geosynthetics for Sustainable Mitigation and Adaptation to Climate Change including Global Warming
Date: 3 - 4 December 2009
Location: AIT, Pathumthani, Thailand
Contact person: Prof. Dennes T Bergado
E-mail: bergado@ait.ac.th
Website: www.set.ait.ac.th/acsig/conference

2010

2nd International Symposium on CPT, CPT'10
Date: 9 - 11 May 2010
Location: Hyatt Hotel & Resort, California, United States
Contact person: Dr. Peter Robertson
E-mail: probertson@greggdrilling.com
Website: www.cpt10.com

17th Southeast Asian Geotechnical Conference
Date: 10 - 13 May 2010
Location: Taipei Int'l Convention Centre, Taipei, Taiwan
Contact person: Prof. Der-Wen Chang, Sec. Gen 17SEAGC
E-mail: dwchang@mail.tku.edu.tw

9 International Conference on Geosynthetics
Date: 23 - 27 May 2010
Location: Sofitel Jequitimar Hotel , Guaruja, Brazil
Contact person: Secretaria do Congresso - (ICG - Brazil 2010)
E-mail: info@9icg-brazil2010.info
Website: www.9icg-brazil2010.info

DECGE - 14th Danube-European Conference on Geotechnical Engineering
Date: 2 - 4 June 2010
Location: University of Technology, Bratislava, Slovakia
Contact person: GUARANT International spol. s r. o.
E-mail: decge2010@guarant.cz
Website: www.decge2010.sk

NUMGE2010
Date: 2 - 4 June 2010
Location: Trondheim, Norway
Contact person: Mrs. Astrid Bye
E-mail: numge2010@videre.ntnu.no
Website: www.ntnu.no/numge2010

7th International Conference on Physical Modelling in Geotechnics ICPMG 2010
Date: 28 June - 1 July 2010
Location: ETH Zurich, Zurich, Switzerland
Contact person: Laios Gabriela
E-mail: info@icpmg2010.ch
Website: www.icpmg2010.ch

International Symposium on Geomechanics and Geotechnics: From Micro to Macro
Date: 10 - 12 October 2010
Location: Tongji University , Shanghai, China
Contact person: Prof. Mingjing Jiang
E-mail: mingjing.jiang@tongji.edu.cn
Website: geotec.tongji.edu.cn/is-shanghai2010/

6th International Congress on Environmental Geotechnics
Date: 8 - 12 November 2010
Location: New Delhi, India
Contact person: Dr. G. V. Ramana
E-mail: 6icegdelhi@gmail.com
Website: www.6iceg.org

NON-ISSMGE SPONSORED EVENTS

2009

The 2nd International Seminar on Earthworks in Europe
Date: 3 – 4 June 2009
Location: Royal Geographical Society, London, UK
Contact person: Mrs Tracey Radford
Email: tracey.radford@atkinsglobal.com
Website:http://www.geolsoc.org.uk/gsl/groups/specialist/engineering/page4425.html

Event Diary (continued)

GeoHunan International Conference: Challenges and Recent Advances in Pavement Technologies and Transportation Geotechnics
Date: 3 - 6 August 2009
Contact person: Dar Hao Chen, PhD, PE
E-mail: dchen@dot.state.tx.us

DFI 34th Annual Conference on Deep Foundations
Date: 20 - 23 October 2009
Location: The Westin Crown Center , Kansas City, MO, United States
Contact person: Theresa Rappaport
E-mail: staff@dfi.org
Website: www.deepfoundations09.org

International Symposium on Ground Improvement Technologies and Case Histories
Date: 9 - 11 December 2009
Location: Singapore
E-mail: ISGI09@nus.edu.sg
Website: www.geoss.sg/ISGI09

Indian Geotechnical Conference (IGC-2009)
Date: 17 - 19 December 2009
Location: Guntur, A.P., India
Contact person: Organizing Secretary
E-mail: igc2009.guntur@gmail.com

2010

Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics
Date: 24 - 29 May 2010
Location: Marriott Mission Valley , San Diego, California, United States
Contact person: Lindsay Bagnall
E-mail: geoeqconf2010@mst.edu
Website: 5geoeqconf2010.mst.edu

Geotechnical Challenges in Megacities
Date: 7 - 10 June 2010
Location: Moscow, Russia
Contact person: Mikhail Kholmyansky - Secretary General
E-mail: info@GeoMos2010.ru
Website: www.GeoMos2010.ru/

The 11th Congress of the International Association for Engineering Geology and the Environment. (IAEG2010)
Date: 5 - 10 September 2010
Location: SkyCity Convention Centre , Auckland, New Zealand
Contact person: The Conference Company
E-mail: iaeg2010@tcc.co.nz
Website: www.iaeg2010.com

2nd International Symposium on Frontiers in Offshore Geotechnics (ISFOG)
Date: 8 - 10 November 2010
Location: Perth, Western Australia, Australia
E-mail: ISFOG2010@civil.uwa.edu.au
Website: www.cofs.uwa.edu.au/ISFOG2010/

Indian Geotechnical Conference IGC-2010 (GEO*trendz*-2010)
Date: 16 - 18 December 2010
Organizer: IGS Mumbai Chapter and IIT Bombay
Location: IIT Bombay, Powai, Mumbai, India
Contact person: Organizing Secretary
E-mail: igc2010@civil.iitb.ac.in ; igc2010@gmail.com
Website: www.civil.iitb.ac.in/~igc2010/

Editorial Remarks

The editorial board is pleased to send the ISSMGE members ISSMGE Bulletin Vol.3, Issue 2 in June 2009, which includes the 'Presidential Candidates', 'Views of Young Geotechnical Engineers', 'TC Activity', 'Activity of Member', 'Reminiscences', 'Case History', 'News' and 'Event Diary'. Contributions from member society is very much welcome. Any comments to improve the Bulletin are also welcome. Please contact any member of the editorial board or Vice-President for the region or the Coordinator of the region, or directly by e-mail to Osamu Kusakabe (kusakabe@cv.titech.ac.jp). For comments on this June 2009 issue can also be send to the Chief Editor of this issue and the Coordinator for Asia, Deepankar Choudhury (dc@civil.iitb.ac.in ; dchoudhury@iitb.ac.in).

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