International Press-in Association
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News Letter

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Editorial Board

Message from the Chairman

Dr. Osamu Kusakabe

IPA is a unique engineering association. Unique because IPA aims a multi-disciplinary association, covering a variety of engineering disciplines: mechanical engineering, control engineering, geotechnical engineering, environmental engineering, measurement engineering and others. Dialogue among experts in these various fields, for example, dialogue between mechanical engineers and geotechnical engineers, therefore, will be an important activity of IPA.

Concept of Internet of Things (IoT) has widely spread to all industrial sectors. Recent rapid advances in artificial intelligence imply that days will come soon where most construction works are carried out by construction robots. The way forward of IPA activities must be along this line. The following issue of the IPA Newsletter will invite an expert on construction robots to make a special contribution.

Unique because IPA is a meeting point between technological development and workmanship. Feedback from operators on site is of vital importance to further improvement of machineries as well execution methods. This issue of the IPA Newsletter includes an article of “On-Site Interview”, in which experienced operators tell us their experiences of Press-in piling operation.

As was reported in the previous issue of the IPA Newsletter, Kumamoto Earthquake occurred in April, 2016. Thick soft deposits prevail over the south-western part of Kumamoto Prefecture with two major rivers. The project of raising river bank along these two rivers has continued over a long period of time to mitigate water-related disaster mainly due to storm surge. To avoid the excess influence of consolidation settlement due to the raising bank on residential areas outside the river bank, a series of steel sheet piles have been installed along the toe of the bank slope on the residential side. Although this project did not originally aim to mitigate earthquake damages, the initial field investigation after the earthquake suggests that extensive damages of the river embankment are concentrated in the areas where no sheep pile was installed. This suggests that the sheet piles are effective in mitigating earthquake damages as well. IPA has recently formed a Technical Committee on sheet pile installed in a soft deposit, looking into the behavior of the sheet pile during earthquakes. More than several million people live below the sea level in Japan. Maintenance and reinforcement of the river bank system is one of the crucial issues for mitigation plans against large earthquakes anticipated to occur in the near future.

Increasing urbanization poses a congested construction environment. Press-in piling using Silent Piler has a significant advantage in installing piles in a limited space. Retaining structures of self-standing type, by adopting large diameter steel tubular piles, are often constructed in such a congested construction environment. IPA has also established another Technical Committee on design of retaining structures of large diameter tubular pipe piles socked into a stiff layer.

Launching the quarterly IPA Newsletter and establishing Technical Committees will certainly enhance IPA activities.

Message from the Vice Chairman

Prof. Limin Zhang

Professor of Geotechnical Engineering
Director of Geotechnical Centrifuge Facility
Department of Civil and Environmental Engineering
The Hong Kong University of Science and Technology

It has been nearly 10 years since the inauguration of the International Press-In Association, IPA, in Cambridge in 2007. IPA has been extremely active, hosting annual ordinary general assemblies, annual Press-in engineering seminars, international workshops, and international workshops for young researchers. The 9th Press-in Engineering Seminar was held in Kochi, Japan in July 2016 and the 5th IPA International Workshop was held in December 2014 in Ho Chi Minh City, Viet Nam.

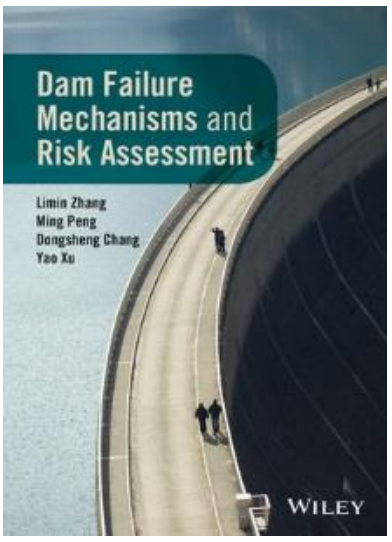
The Press-in technology has achieved silent and vibration-free pile installation by hydraulically controlling pile movements and automatically measuring valuable ground information during pile penetration. Over the years the Press-in technology has provided a means of environmental-friendly construction method for urban retaining structures and foundations, particularly in Japan, USA, China and Southeast Asia. Recently this new technology has been extended to costal and earthquake hazards mitigation. In fact, the Press-in technology has been applied extensively to the costal defense facilities in the US after Hurricane Katrina in 2005 and in Japan after the Great East Japan Earthquake in 2011. A handbook of Press-in retaining structures was published by IPA in 2016 to help standard various applications of the Press-in technology.

The IPA has granted 5 rounds of research awards in the 2015 fiscal year to boost improving the quality, sustainability, safety, environmental friendliness and economic efficiency in foundation engineering, promote the Press-in technology worldwide, and foster young researchers and student education. These research awards were made possible by the generous support from the Kochi-based high-tech company, Giken LTD.

I am confident IPA will continue to contribute to the sustainable developments of society in the years to come.

Biography of Dr. Limin Zhang

Dr. Limin Zhang is a Professor of Geotechnical Engineering and Director of Geotechnical Centrifuge Facility at the Hong Kong University of Science and Technology. His research areas include dams and slopes, geotechnical risk assessment, pile foundations, multiphase flows and centrifuge modeling. Dr. Zhang is Past Chair of Geotechnical Safety Network (GEOSNet), Past President of the ASCE Hong Kong Section, Vice Chair of ASCE's Risk Assessment and Management Committee, Editor-in-Chief of Georisk, Associate Editor of ASCE's Journal of Geotechnical and Geoenvironmental Engineering, and an editorial board member of Computers and Geotechnics and several other journals. He is an active member of ISSMGE's TC205, TC212, TC302 and TC304. His latest book "Dam Failure Mechanisms and Risk Assessment" was published in June 2016 by John Wiley & Sons, as shown in Picture 1.



Picture 1

Case History

Seismic and Liquefaction Countermeasures in Kochi Coast, Japan

Mr. Sachio Shintaku

Kochi Office of River and National Highway,
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Kochi Office of River and National Highway has mainly three objectives to conduct countermeasures for river, coast and road. The 'river' project includes River improvement and maintenance of Monobe and Niyodo Rivers, control of the landside water along Uji and Kusaka Rivers, survey of the hydrology and water quality, and making flood warning and flood forecast. In 'coast' project, we construct coast protection facilities and make flood warning in Kochi Coast. In 'road' project, we construct sidewalks in Tosa City.

Kochi Coast is about 30km long, from Konan City to Tosa City in the central part of Kochi Prefecture. Coast section under the jurisdiction of MLIT are 13.3 km long. It is sandy coasts, lying from Nankoku City to Tosa City. As Kochi Coast is shaped like a fan and is opened toward the south, it is susceptible to a typhoon, and regardless of the course of typhoon, waves tend to converge and their height increases. Sources of sand in the coasts are Monobe and Niyodo River, located in the east and west of the coast.

In the past, beautiful sand beaches spread in Kochi Coast. However, costal erosion has progressed due to a massive consumption of sea sand and gravels. Due to the disappearance of sand beach and the high waves, the frequency of occurrence of disaster has increased. Collapse of coastal levee and the closed traffic of the prefectural road have occurred frequently in recent years.

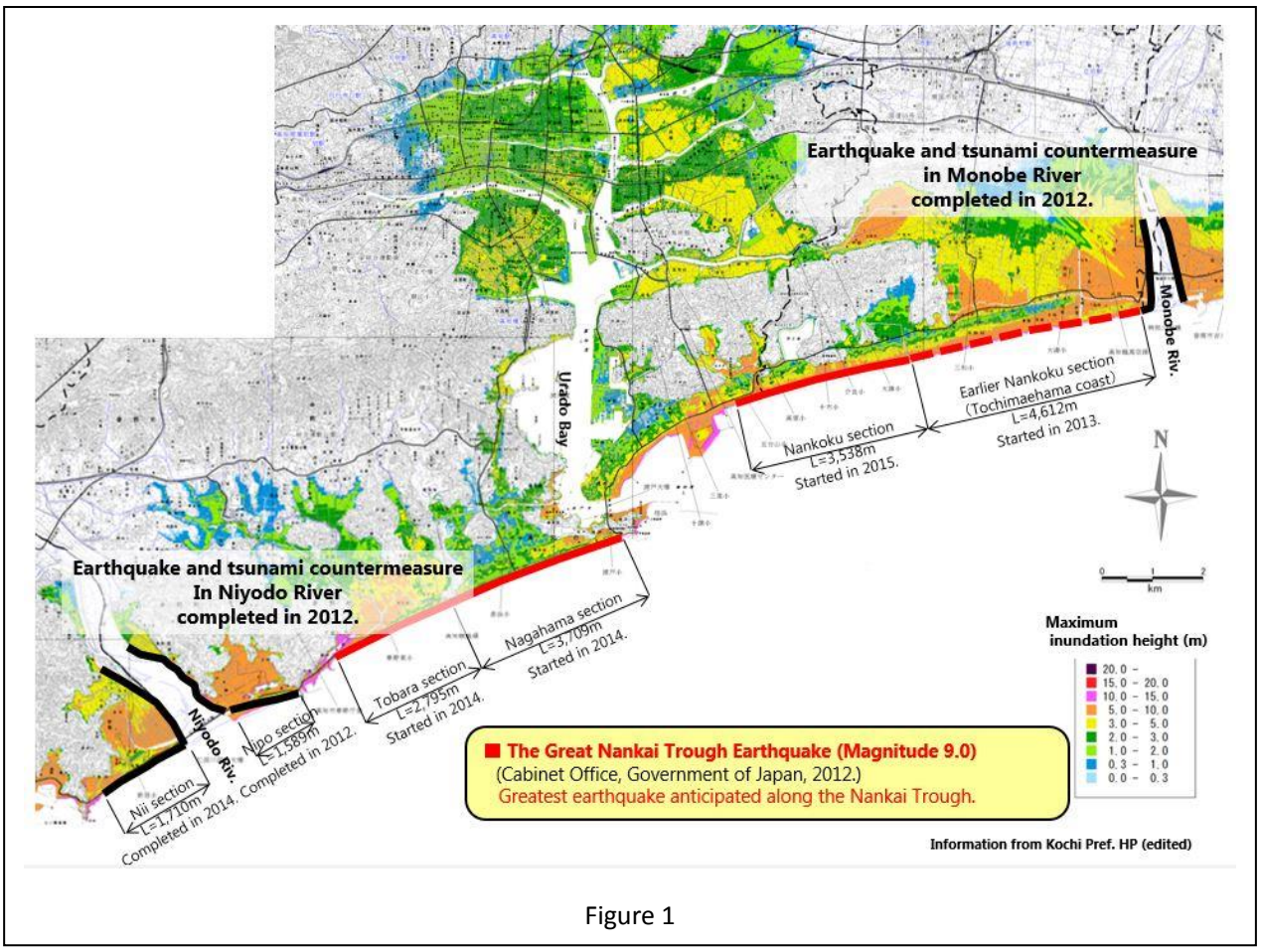


Figure 1

There are several types of countermeasures against storm surge and erosion in Kochi Coast: the offshore breakwater, the headland defense, the artificial reef and the artificial nourishment.

The estimation of damage due to tsunami in Kochi Prefecture, published by the Cabinet Office of the Government of Japan in 2012, is shown in Figure 1. The inundation areas are painted with colors. For examples, red means 15 to 20 meters height, orange 5 to 10, yellow 3 to 5 and green 2 to 3. Seismic and tsunami countermeasures in Niyodo River and Monobe River were completed in 2012 respectively. Along the coast, there are five sections, and two of them in Nii and Nino were completed in 2014 and 2012.

In designing the structures in Kochi Coast, the earthquake and tsunami are assumed to be the ones determined by 'Kochi Prefectural Committee of Earthquake and Tsunami Disaster Prevention Technologies'. The assumed earthquake is Tonankai and Nankai Earthquakes with the magnitude of 8.6. The planned height is determined as the highest of the heights assumed in each coastal region. It is 8.0m in Kochi Central Coast and in Nankoku Konan Coast. For tsunami with relatively high frequency of occurrence, the basic policy is to construct the coastal protection facilities such as coastal levees. For tsunami with largest scale, the basic policy is to integrate the structural and non-structural countermeasures, and the main option will be the evacuation.

The examples of seismic and tsunami countermeasures in Kochi Coast are shown in Figure 2. The construction methods were selected in terms of the workability and economic efficiency, taking into account the ground conditions in each area. In Nii section, tubular pile wall and double sheet pile walls were adopted, taking into consideration the shape of the levee and the ground conditions. In Nagahama and Tobara sections, a tubular pile wall was adopted, as the construction space was limited due to the adjacent houses. In Nankoku section, a tubular pile wall was adopted, as the construction space was limited due to the adjacent houses and plastic greenhouses.

There are two advantages in the tubular pile method. Firstly, the space required for construction is smaller, compared with other methods. Secondly, smaller construction space reduces the influence on adjacent structures and traffics. The construction procedure of the tubular pile method is as follows. Firstly, the construction of temporary works. Secondly, earthwork and construction of retaining wall. Thirdly, emplacement of materials. Fourthly, installation of tubular piles by the Gyropress Method.

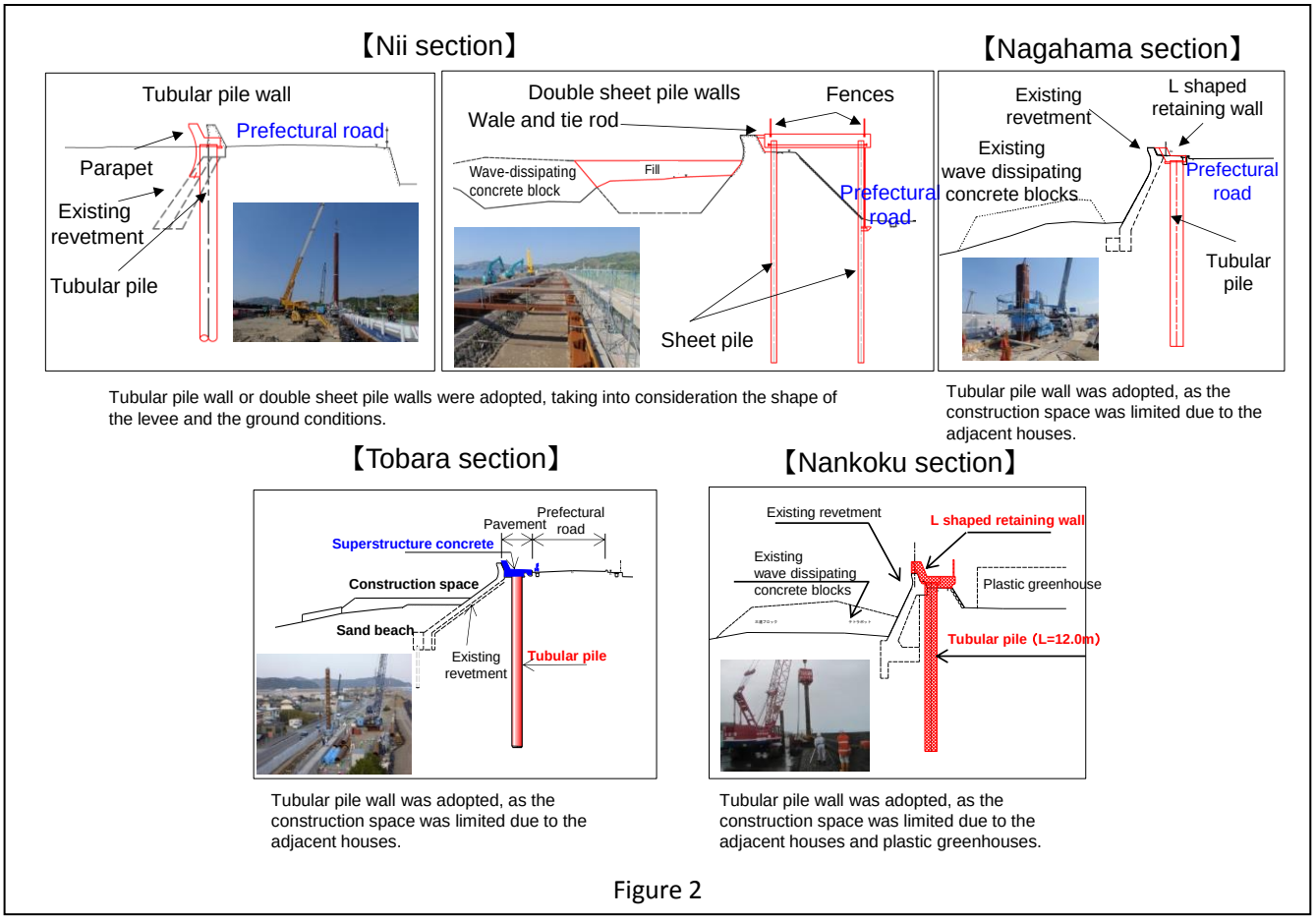


Figure 2

Finally, construction of superstructure. There were three difficulties in this construction. Firstly, consideration of safety of traffic was necessary because of the limited construction space. Secondly, it was necessary to cope with the obstacles such as the existing levees. Thirdly, it was a hard work to secure the press-in machines, as they were frequently occupied in other projects.

Picture 1

Picture 2

The situation after the completion of construction is shown in Picture 1. The left one is the double sheet pile wall method in Nii section. The right one is the tubular pile method in Tobara section.

The situation during the construction in Nagahama section is shown in Picture 2. The left one is the view of Nagahama section. The right one is GRB Non-staging Method.

Finally, the seismic and tsunami countermeasures in Kochi Port is based on the plans of 'triple protection' with three lines of protection, which has been shown by the country and the prefecture. The first protection line is the breakwaters which are expected to reduce the energy of tsunami and conserve the function of Kochi New Port. The second protection line is the outer edge and mouth of Urado Bay, which is expected to prevent or reduce the intrusion of tsunami. The third protection line is the revetments in Urado Bay, which is expected to prevent the collapse of revetments or the inundation of inland. We are going to push these plans forward in the future.

※ This case history is based on the presentation at "9th IPA press-in Engineering Seminar in Kochi 2016", which was held in July 2016.

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Report

A new Silent Piler F301 is introduced in Singapore

Mr. Seichiro Oiyama

Giken Seisakusho Asia Pte. Ltd.

A newly developed Silent Piler F301 is introduced with 900mm width hat type sheet piles in Singapore and that is currently working on a drainage project. The project is to widen and deepen the existing drainage for flood protection by utilizing hat type sheet piles. F301, which is developed to install hat type sheet piles, was adopted since this site locates in a congested urban area where the introduction of conventional installation methods with large machines is impossible.

F301 is available in standard mode, and water jetting and super crush mode by simply changing the chuck and chuck frame as well as auxiliary equipment. The machine can be adjusted to suit for various soil conditions and working environments.

F301 is also equipped with the implemented control system to manage not only its proper positioning but the press-in force as well as the phase less linear auger torque control during press-in operation, therefore the durability of each machine component is maximized.

The power unit of F301 equips high combustion efficiency and hydraulic control technology so that it complies with strict environment requirements. F301 also uses biodegradable oil and grease so that environmental damage is eliminated even if hydraulic oil or grease is spilled into soil or water.

F301 ensures high quality pile installation due to two following reasons. Firstly, there are two press-in points to grip the sheet pile in the chuck, compared to Piler for U shape sheet piles, thus the press-in force is effectively transferred to each sheet pile. Secondly, the clamping on reaction piles to obtain reaction force at interlock positions optimizes the stability of the reaction base. Those features are shown in Figure 1.

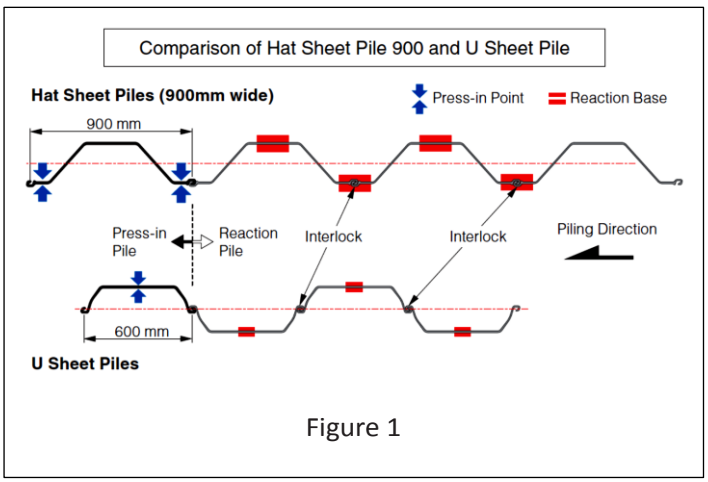


Figure 1

Picture 1: F301 Silent Piler with 900mm width hat type sheet pile being used on a drainage project in Singapore.

Picture 2: F301 can install 900mm width hat type sheet pile by 750mm space between an existing structure and a pile center.

The 900mm width hat type sheet pile is available, with various different heights for 230mm to 370mm in profiles, therefore the most suitable material can be selected based on the required cross-sectional performance for each project. The hat type sheet pile has high structural reliability, compared to 400mm width U shape sheet piles, as no reduction is required in cross-sectional performance to consider the possible lack of shear force transmission at the interlocks. Furthermore, the total volume of steel can be reduced so that it is resulted in total cost improvement.

The F301 Silent Piler with hat type sheet pile has been introduced recently in other ASEAN countries such as Philippines and Indonesia as well.

Picture 4:
Side view of F301

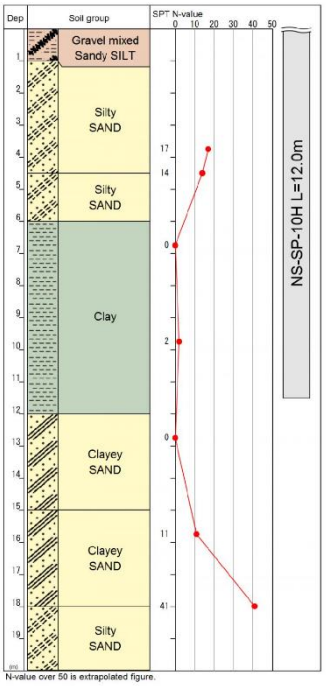
Picture 5: Front view of F301

Picture 3: A site visit has been held as inviting Government Agencies, Design Consultants and Construction Companies.

Project outline

Construction objective	Drainage improvement
Location of construction	Lucky Heights Estate, Singapore
Construction machine used	Silent Piler F301-900
Type/Dimension	278 Hat-shaped steel sheet piles NS-SP-10H, W = 900 mm, L = 12.0 m
Features/Effects	Hat sheet pile with the Press-in Method achieves higher installation efficiency and productivity compared to U sheet pile. 1. Press-in force can be transferred efficiently by gripping the pile with two points. 2. Clamping reaction pile at Interlock positions optimizes the stability of the reaction base. 3. Productivity of Hat sheet pile can be higher than U sheet pile (type III or IV) by 50-80%.

Soil boring log



Report

Seminar on Geotechnical and Foundation Engineering at Le Quy Don Technical University in Hanoi, Vietnam

Mr. Yukihiro Ishihara
IPA Secretariat

On 23rd of November 2016, "Seminar on Geotechnical and Foundation Engineering" was held at the meeting hall of Institute of Techniques for Special Engineering in Le Quy Don Technical University in Hanoi, Vietnam. The seminar was planned by Associate Professor Nguyen Tri Ta and Associate Professor Nguyen Tuong Lai at Le Quy Don Technical University and Prof. Tatsunori Matsumoto and Mr. Vu Anh Tuan at Kanazawa University. The main objectives of the seminar were to share knowledge and discuss the possibility of future cooperation on the issues of geotechnical and foundation engineering. Four presentations were made, and about 50 engineers and students at the university attended, as shown in Picture 1.

Picture 1

The first presentation was made by Assoc. Prof. Lai, as shown in Picture 2. He introduced the outline of Institute of Techniques for Special Engineering in Le Quy Don Technical University, including the three on-going projects of piled foundation in coral and calcareous media under cyclic loading, development of piling equipment integrated on excavator for tubular piles, and development of tools for laboratory tests. Four cooperation topics as well as possible approaches for cooperation were also proposed.

Picture 2

The second presentation was from Dr. Osamu Kusakabe at International Press-in Association, titled as "Towards resilient society against natural disasters - Japanese experiences-". The experiences of Japanese engineers related to earthquakes and tsunamis were introduced, and the importance of 'awareness of living people' on the risk of disasters as well as the engineer's efforts to prevent them was emphasized. Although the risk of earthquake is much smaller than Vietnam, he pointed out some risks that Vietnam and Japan similarly have; for example, the risk of flooding brought about by the recent climate changes.

The third presentation was from myself, titled as "Research examples on Press-in technology and Implant structure". The basic information of the Press-in Method as well as its application examples as the Implant structures were explained in the first place. Then the research on the use of piling data to estimate the subsurface information was introduced. The final presentation was made by Prof. Tatsunori Matsumoto, titled as "Research activity at Geotechnical Laboratory of Kanazawa University". Detailed information on the methods and results of the researches at Kanazawa University on piled rafts, influence of pile penetration on buried pipes, the performance of tunnels and the comparison of jacked and vibro-hammered piles were explained.

Continuous interaction and cooperation will be expected from now on among the engineers at Le Quy Don Technical University, Kanazawa University, Giken Ltd. and International Press-in Association.

Report

GEOTEC HANOI 2016

Mr. Yukihiro Ishihara
IPA Secretariat

On 24th and 25th of November 2016, "GEOTEC HANOI 2016 – the 3rd International Conference on Geotechnics for Sustainable Infrastructure Development" was held at JW Marriott Hotel in Hanoi, Vietnam. The conference was organized by FECON Corporation, the Vietnamese Society for Soil Mechanics and Geotechnical Engineering (VSSMGE) and the Japanese Geotechnical Society (JGS). 10 sponsors, 45 exhibitors and nearly 600 experts and attendees from more than 30 countries participated, according to the organizing committee of the conference.

Five themes were dealt with in the conference: 1) Deep foundations, 2) Underground construction & tunneling, 3) Ground improvement for infrastructure projects, 4) Coastal geotechnics for climate change and 5) Monitoring, inspection and maintenance. Keynote lectures were made with respect to these five themes: 1) "The Unified Design of Piled Foundations" by Prof. Bengt H. Fellenius, 2) "Evaluation of three different measures in reducing the movements in deep excavations" by Prof. Chang-Yu Ou, 3) "Recent Development in Soft Ground Improvement using PVD and Vacuum Application" by Prof. Buddhima Indraratna, 4) "Geotechnical Responses to Natural Disasters and Environmental Impacts in the Context of Climate Change" by Prof. Kazuya Yasuhara and 5) "Monitoring ground and structural response to tunneling – lessons learnt from three major projects in London" by Prof. Jamie Standing.

I made 2 presentations at the 'Deep foundations' session, subjected as "Model test and full-scale field test on vertical and horizontal resistance of hatted tubular pile" and "Pull-out resistance of a large diameter steel tubular pile installed by Rotary Cutting Press-in". It was a good opportunity to inform the engineers, especially in Vietnam of these latest technologies related to press-in. In the same session, there were another two presenters who have been contributing to IPA activities: Mr. Vu Anh Tuan at Kanazawa University and Mr. Yoshiro Ishihama at Nippon Steel & Sumitomo Metal Corporation. The titles of their presentations were "Experimental and numerical study on small-size piled raft foundation models subjected to cyclic horizontal loading" and "Development and application of steel pipe pile installation by inner excavation with enlarged foot protection" respectively. On the other hand, I was able to see the latest technologies in the exhibition hall. The fields of the 45 exhibitors can be classified into five, in my personal point of view: piling, ground improvement, measurement devices (mainly those for site investigation), numerical analysis and others.

In summary, the conference have successfully gathered nearly 600 people working on geotechnical issues, providing them good opportunities to receive both classical and new information on the five conference themes and to let each other know what he or she is doing. It was a good opportunity for me to inform the engineers of the latest technologies of press-in.

Opening ceremony

Exhibition

Report

9th All-Ukrainian Scientific-Technical Conference "Soil Mechanics, Geotechnics and Foundation Engineering"

Prof., Dr. Michael Doubrovsky
Head of Department "Sea, River Ports and Waterways"
Odessa National Maritime University.

The ninth edition of this conference devoted to geotechnical innovations and implementation of Eurocodes in Ukraine took place in Dnipro-city, Ukraine 3-7 October 2016.

In spite of the title "All-Ukrainian" the conference was rather "International" because participants from 10 countries representing Europe, Asia and Africa took part in different conference's activities. Scientists and experts from Ukraine, France, Czech Republic, Germany, Poland, Byelorussia, Azerbaijan, Kazakhstan, Iraq and Mauritius presented their innovations and interesting case histories. Totally 134 papers were published in the conference proceedings.

We had a pleasure to greet as key-speakers Prof. Roger Frank, President of International Society on Soil Mechanics and Geotechnical Engineering and Prof. Ivan Vanichek, ex-Vice-President of ISSMGE. They presented speeches devoted to problems and experience of implementation of Eurocodes.

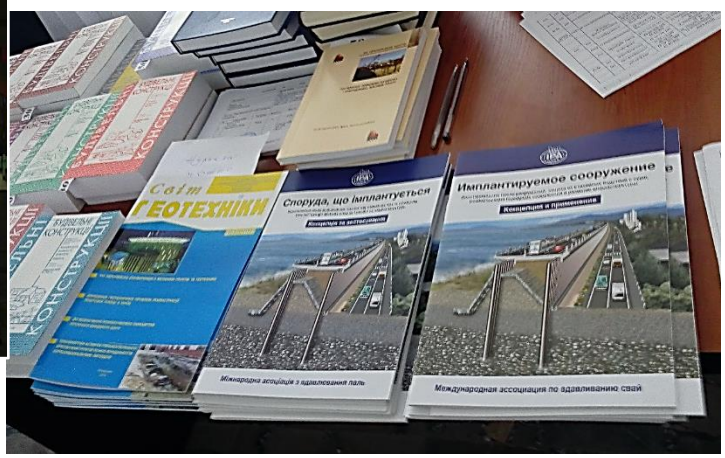
During the Conference fruitful discussions took place at four sections:

- geotechnical innovations and implementation of Eurocodes in Ukraine
- actual problems of soil mechanics and engineering geology
- structure-soil interaction and numerical modeling
- construction in complex soil conditions; modern technologies of fundaments and bases installation

Among new construction related publications presented at the Conference, IPA brochures "Implant Structure" devoted to principles of Construction Revolution and philosophy of Press-In approach (in Ukrainian and Russian languages) were in good demand; these brochures attracted special interest of academicians, researchers and practitioners.

To conclude I would like to express a hope that next Ukrainian conferences on soil mechanics and geotechnical engineering will present also development of Press-in technologies applied to Ukrainian soil conditions and local construction market.

Picture 1: Conference poster



Picture 2: IPA brochures "Implant Structure" published in Ukrainian and Russian languages were in good demand at the Conference.

On-site Interview

Interviewer: Ms. Hongjuan He
IPA Secretariat

IPA has just opened the new corner of the On-Site Interview in the IPA Newsletter. I have interviewed Mr. Morisita and Mr. Okabayashi who are working for Giken Seko Co., Ltd., and have constructed a retaining wall at Hachioji city in Tokyo using large diameter of steel tubular piles by Gyropress (Rotary Cutting Press-in) Method. I thank them for giving us valuable insights during this interview.

Profile of Mr. Takeshi Morishita, Assistant Manager of Giken Seko Co., Ltd.

Mr. Morishita joined the company on April 1993, and has engaged in Press-in Method for over 23 years. He had experienced working on "Steel Tubular Sheet Pile Press-in Method", "Hard Ground Press-in Method", "Gyropress Method" and so on. Also he had also experienced working in Australia. He was engaged as a Chief Site Engineer in this project. He has qualifications of "First-class Press-in Operation Engineer, The Second-class Civil Engineering Works Execution Managing Engineer, Superintendent, Safety and Health Controller" and so on.

Profile of Mr. Kei Okabayashi, Chief of Giken Seko Co.,Ltd.

Mr. Okabayashi joined the company on April 1997 and has over 19 years of field experiences of "Steel Tubular Sheet Pile Press-in Method", "Hard Ground Press-in Method", "Gyropress Method" and so on. He was engaged as a main operator for this project. He has qualifications of "First-class Press-in Operation Engineer, The Second-class Civil Engineering Works Execution Managing Engineer, Superintendent, Safety and Health Controller" and so on.

Q1. Can you tell us why the Gyropress Method was adopted and what are the features of this construction?

Mr. Morishita: Because of the population increase in Hachioji city in recent years, traffic congestion has become a social issue. That's why Ministry of Land, Infrastructure, Transport and Tourism planned to mitigate the traffic congestion by widening the road and decided to order the project. Our scope was to construct a retaining wall by Steel Tubular Pile. The Gyropress Method was adopted because this method is able to reduce total cost with no adverse impact on surrounding environments and regional economy though the project shall be carried out in a narrow site with adjacent housing and road.

Mr. Okabayashi: Feature of the project was to use the ϕ2000mm of Large Diameter Steel Tubular Piles because of the limited construction space due to the adjacent housing where the high retaining wall to bear big earth pressure is required.

Q2. Was the construction carried out smoothly? If there were any difficulties, can you tell us about it and how did you solve it?

Mr. Okabayashi: Yes, the construction was carried out smoothly, but there were some difficulties because it was the first time to adopt the ϕ2000mm of Large Diameter Steel Tubular Pile, compared to other projects. There are two water-pipes inside a tubular pile for lubrication to assist piling smoothly. We use fixing plates to fasten the water-pipes. On this operation, we considered the ground condition, and found that it was still possible to conduct the piling with less fixing plates than usual. But when we started operation, the soil resistance of large diameter steel tubular pile is larger than the prediction, so it was necessary to increase the number of the fixing plates more than we planned. Through this experience, we found that it is necessary to feed back issues beyond the scope of assumption to the future projects.

Q3. You said that you try predicting the problems before the operation, can you tell me more in detail?

Mr. Morishita: Firstly, the construction promotion section of our company evaluates all information such as ground conditions and site requirements which are given by the client, the prime contractor and the designer then make the appropriate site planning for safe and smooth operation. Secondly, the construction development section which takes charge of site operation, re-examines the planning, then deploys on-site members by providing the meeting to disseminate the site planning. However, it is difficult to predict problems completely in advance, so it is necessary to deal with those unforeseeable problems at site.

Q4. I heard that this project has drawn high attention from project clients, designers and neighborhoods. What is the reason behind there?

Mr. Morishita: The site tour was held many times. The visitors were not only people affiliated with construction but also neighborhoods, parents and children so that we felt their keen interest to the project. I was happy that so many people came to the site tour and it have been good opportunities for them to appreciate the Gyropress Method.

Q5. Please share with us your toughest operational experience.

Mr. Okabayashi: One of the tough projects was the aseismic reinforcement to bridge piers in which sheet piling had been conducted in the river during the mid-winter in Yamagata Prefecture, Japan. It was very freezing since my feet were in the cold river water while I had operated the Silent Piler under the bridge even I had tried my best to warm myself. The other one was the project at shipyard in the Hiroshima Prefecture. Gyropress Method was adopted but the toe bits had been worn out quickly since the piling was conducted throughout bedrock. We had carefully re-examined the situation and had decided to introduce Pre-auguring Pile Method [*1]. This method enables piles to be embedded properly to hard bedrock and we had carefully continued the piling operation.

Pre-auguring Pile Method [*1]: pile(s) specially used for pre-augering when there is an underground obstacle or hard bedrock during Press-in operation with rotary cutting (Gyropress Method)

Mr. Morishita: I have experienced different difficulties through all projects so far and I still can clearly remember my first operation in particular. That was Press-in operation of steel sheet piles. I had learned about Press-in machine before I was assigned to the project, but I didn't have on-site experience. So, I had asked all kinds of questions to my seniors and colleagues to obtain whatever I need to know about Press-in technology.

Photo 1: Gyro Piler is installing a ϕ2000mm large diameter of steel tubular pile.

Q6. Did you have any overseas project experience? What's the difference between Japan and overseas?

Mr. Morishiita: Yes, I had experienced to engage in a subway project in Australia. I had pressed-in steel sheet piles for starting and arrival shaft for shield machine. Languages and cultures were of course different, in addition there were difference in operating time and role allotment. Besides, the strength of Australian sheet piles were weaker than Japanese one, so I had to pay a careful attention to the piles causing no damage during the piling operation.

Photo 2: Site tour

Q7. I believe that the training to local operators for Press-in technology is needed when overseas construction is expected more and more. What are the important things for it in your opinion?

Mr. Morishita: The perspective of pile and piling, for usages and functions, varies in countries, the same as languages, cultures. For example, sheet piles are mostly used for temporary works in Japan, on the other hand those are often used for permanent work in overseas. It is of course important to complete the project as planned but our objective is to complete the project with aesthetic and accuracy. However, we found some cases in overseas projects that aesthetic and accuracy are not concerned as far as the final products perform the required functions. Bear in mind, if each pile is off by 1 cm and the continuation of 10 piles installation ends up with 10 cm off in total. I believe it is very essential to share this basic Press-in concept with local operators for proper understanding. I had conveyed this to local operators while working in Australia, then I had observed that they had become very responsible for piling. But it is a time consuming and costly process if you conduct this through one to one. We can consolidate all the know-how based on whatever we had so far and compile those to the Silent Piler for automated operation, so that we can shorten the time to convey the know-how to local operators effectively and the piling process can be carried out with a simple manner to complete project just as planned.

I understand that GIKEN Ltd. as the manufacture of the Silent Piler has been already in the process for the above together with GTOSS (Giken Total Support System) program for machines and operators so that the Press-in technology to be globally disseminated.

Q8. What is your prediction about the future of Press-in technology?

Mr. Morishita: When I was engaged in overseas projects, I was praised by local staffs because our Silent Piler was very quiet in operation without disturbance to the surrounding ground. They said there are more places where the Press-in technology is applicable. I am looking forward to splendid social environment being brought by adopting the Press-in technology throughout the world.

Mr. Okabayashi: Giken Seko Co., Ltd. is being performed the Press-in piling which has been done by no one before under the stringent ground conditions and strict construction requirements. I believe that new technology will be innovated by challenging new projects, then the new technology enables the further difficult projects to be accomplished.

Mr. Morishita and Mr. Okabayashi were shy to answer the questions during the interview, but they tried their best to answer to all questions with their thoughts to me. When I joined the site tour in Hachioji city, the site was so quiet that I can hear the explanation of the site staff clearly. It was very impressed to me observing huge ϕ2000 mm tubular steel piles were rotating into the ground without noise, vibration and ground disturbance. Through this interview, I made myself sure that Press-in technology will be disseminated globally because of the further advancement of Press-in Technology and machines.

Photo 3: Interviewing with Mr. Morishita and Mr. Okabayashi

I would like to express my sincere appreciation toward Mr. Morishita, Mr. Obayashi and all who are concerned in this interview. Thank you so much.

Photo 4: Mr. Okabayashi is instructing co-workers to check a piling situation through a mobile wireless radio.

Photo 5: Mr. Morishita is checking the operation manual on site.

We welcome the on-site operators who are able to accept the interview. If you have any questions, please contact to IPA Secretariat address to Ms. Hongjuan He (ipa.ka@press-in.org). We are waiting for you!

Recent publications related to PRESS-IN Technology (2015-2016)

Model Test and Full-Scale Field Test on Vertical and Horizontal Resistance of Hatted Tubular Pile

Ishihara, Y., Ogawa, N., Okada, K., Inomata, K., Yamane, T. and Kitamura, A.

Proceedings of the Third International Conference Geotec Hanoi 2016 - Geotechnics for Sustainable Infrastructure Development, pp. 131-139, 2016.

Abstract: The hatted tubular pile consists of a tubular pile with a hat part rigidly connected to the pile at around the ground surface, and is expected to generate higher vertical and horizontal resistance. It can be constructed by the Press-in Method, where a static jacking force is used to install piles while the reaction force is obtained from the previously installed piles. This paper introduces the model test on the vertical resistance of the hatted tubular pile and the full-scale field test on the vertical and horizontal resistance of it. Based on the results of these tests, methods to estimate the vertical capacity and the horizontal resistance of the hatted tubular pile are investigated into.

Pull-out Resistance of A Large Diameter Steel Tubular Pile Installed by Rotary Cutting Press-in

Ishihara, Y., Okada, K., Yokotobi, T. and Kitamura, A.

Proceedings of the Third International Conference Geotec Hanoi 2016 - Geotechnics for Sustainable Infrastructure Development, pp. 141-147, 2016.

Abstract: The 'press-in' method is a piling technique that installs piles with a static jacking force. The applicable ground conditions of this method have been significantly expanded by 'rotary cutting press-in', where a vertical jacking force and a rotational torque are applied at the same time onto a pile with cutting teeth on its base. Recently, a new rotary cutting press-in machine was developed so that a pile with a diameter of as large as 2500mm can be dealt with. This paper introduced the result of the pull-out test of a steel tubular pile with the diameter of 2500mm, which was installed by rotary cutting press-in. In addition, the design method based on SPT was confirmed to provide a reasonable estimation for the pull-out resistance (shaft capacity) of this large diameter pile.

Experimental Study on Tsunami Mitigation Effect of Breakwater with Arrays of Steel Tubular Piles

Suzuki, N., Ishihara, Y. and Isobe, M.

Journal of Social Safety Science, No. 29, 2016.11, pp. 7-14, 2016.

Abstract: This paper presents experimental data to clarify Tsunami mitigation effect of the breakwater with arrays of steel tubular piles and the load of Tsunami. The model experiments were conducted to give a better understanding of the influence of the distance between the piles, the number of the row and the relative height of Tsunami. It turned out that the transmissivity of Tsunami is proportional to the distance between the piles. In particular, the greater number of the row reduced Tsunami load acting on each row of piles, with smaller load on the rows in the downstream side. Furthermore, in estimating the Tsunami load, the drag coefficient C_d was confirmed to be applied for multiple rows, whereas revised Tanimoto expression and reduction coefficient C_G was confirmed to be applied for a single row. (In Japanese)

Experimental Study on Influence of Porosity and Material of Pile-type Porous Tide Barrier on Its Tsunami Mitigation Effect

Suzuki, N., Ishihara, Y. and Isobe, M.

Journal of Japan Society of Civil Engineers, Ser. B3 (Ocean Engineering), Vol. 72, No.2, pp. I-491-I-496, 2016.

Abstract: Since the Great East Japan Earthquake, tenacity has been required for structures against Tsunami. Especially for the tsunami with extraordinary power, it is more realistic to adopt the multifaceted protection rather than a single structure. In this context, pile-type porous vertical barrier is expected to be effective. In this paper, a simple theoretical

explanation on its tsunami mitigation effect was provided, and the model experiments were conducted to examine the influence of the porosity ratio and the material of the barrier. The results showed that the wave force on the barrier and the height of the tsunami behind the barrier in the trade-off relationship and are the functions of the loss coefficient, which is expressed by the friction factor and the porosity ratio. It was demonstrated that the effective barrier can be designed by choosing the adequate value of the loss coefficient. Finally, a case study of designing the barrier was introduced, by applying the experimental results to the full-scale case based on the Froude law. (In Japanese)

Influence of Surging and Jack-in Pile Installation Methods on Pile Performance Observed in Model Load Tests in Dry Sand Grounds

Moriyasu, S., Meguro, H., Matsumoto, T., Kobayashi, S. and Shimono, S.

Proceedings of 19 Southeast Asian Geotechnical Society (SEAGC), Kuala Lumpur, Malaysia, pp. 621-626, 2016.

Abstract: In this paper, an attempt was made to experimentally investigate the relationship between the pile installation method and bearing performance by comparing two different installation methods, jack-in and surging. The term "surging" stands for the cyclic push-in and pull-out movement of the pile during installation. The experiments were carried out using model ground of densely and loosely packed dry sand. It was found that the surging causes a reduction in the total penetration resistance (pile head load) of the pile due to a large decrease in shaft resistance, although the base resistance increases compared to installation by the jack-in method. It was demonstrated though experiments in different ground conditions that the degree of impact of the surging is strongly related to the relative density of the ground.

Estimating Base Resistance and N value in Rotary Press-in

Ishihara, Y., Haigh, S. K. and Bolton, M. D.

Soils and Foundations, Vol. 55, No. 4, pp. 788-797, 2015.

Abstract: In the Press-in Method, press-in machines use static jacking force to install prefabricated piles, while gaining a reaction force by grasping several of the previously installed piles. The emergence of this piling technique in 1975 solved problems in urban piling construction such as noise and vibration associated with the piling work, restricted construction conditions due to the existing structures, and so on. Among a variety of press-in methods, rotary press-in is a relatively new technique to install tubular piles into hard ground by applying axial and rotational jacking force at the same time. An additional feature of the Press-in Method is that it allows continuous measurement of penetration depth and jacking force during piling work. The concept of a PPT, Pile Penetration Test, has been developed to apply this feature to improving the efficiency of piling work and foundation design. This paper highlights the technique to estimate base resistance and N value from the data acquired during rotary press-in.

Measuring Horizontal Stresses during Jacked Pile Installation

Burali d'Arezzo, F., Haigh, S. K., Talesnick, M. and Ishihara, Y.

Proceedings of the Institution of Civil Engineers – Geotechnical Engineering, 168 (4), pp. 306-318, 2015.

Abstract: Jacking is an installation technique for displacement piles which is commonly used onshore in urban environments owing to its low noise and vibration. During pile jacking, stress changes occur in the soil which are substantial close to the pile, but also extend a significant radial distance. These stresses are difficult to measure accurately owing to arching around stress sensors. In the field, stress measurements are commonly made by means of an adjacent pile whose stiffness changes the stress field within the soil. Accurate measurements of stresses due to the installation of a single pile under laboratory conditions are needed in order to quantify this error. In this paper, null gauges that do not suffer from membrane deflection are used to measure horizontal stress changes during the jacked installation of a cylindrical pile in dry sand. Stresses are measured by means of both an adjacent pre-installed square pile and in-soil sensors. The paper also presents a comparison between the centrifuge results and the radial stress distribution estimated using conventional methods, such as Boussinesq's elastic analysis and elasto-plastic spherical cavity expansion.

※ Full paper in a pdf form is available upon request to IPA members. Those who wish to have a copy of the full paper, please contact the secretariat.

Announcement

Three technical committees are launched

IPA Research Committees

IPA Research Committee, chaired by Prof. Tatsunori Matsumoto at Kanazawa University, is preparing three technical committees to be launched in December 2016 or in January 2017 as below.

TC-1: Technical committee on behavior of retaining wall using large diameter steel pipe piles socketed into a stiff layer and its design method

Chaired by Assoc. Prof. Jiro Takemura at Tokyo Institute of Technology, this committee will investigate into the behavior of retaining structure with large-diameter pipe piles socketed into a stiff layer through physical modelling and numerical analysis, and develop an economical yet rational design method. The first meeting was held at International Press-in Center (IPC) in Tokyo on 12th December, as shown in Picture 1.

Picture 1

TC-2: Technical committee on the use of data obtained in press-in piling to estimate subsurface information

Organized by several specialists, this committee will summarize the method to estimate the subsurface information (SPT N value) from data obtained in press-in piling and publish a technical material in March 2017.

TC-3: Technical committee on reappraisal of Partially Floating Sheet Pile (PFS) Method and extension to seismic design

Chaired by Prof. Jun Otani at Kumamoto University, this committee will reappraise the effectiveness of PFS method based on the results of field measurements at the sites, including those experienced during Kumamoto Earthquake in 2016 to investigate its dynamic performance. The results of physical modellings such as model test and numerical analysis will also be discussed to quantify this method.

The activities of these technical committees will be updated in the future newsletters.

Announcement

Announcement of 10th Press-in Seminar in Kochi 2017

IPA Secretariat

International Press-in Association (IPA) will hold the 10th IPA Press-in Seminar from **20th to 21th July, 2017** in Kochi City, Japan. The Seminar is the 10th anniversary of IPA since it has been established in 2007. From the seminar, you can experience the state-of-the art Press-in technology, communicate with kinds of people from various fields and getting hints for your researches and projects so on. The seminar will have various programs, as follows.

Planned programs;

- IPA Board Meeting
- Joint Technical Committee between IPA and JPA (Japan Press-in Association)
- Lectures (cases introduction for Press-in for overseas and Japanese)
- Site Visit of the latest Press-in piling
- Workshop (among young and senior engineers, researches from various countries and IPA members)

Note: Details are announced shortly on http://www.press-in.org/events/calendar/en.

Kochi City is the birthplace of Press-in technology which is located on the island of Shikoku in Japan. We are sure that you will have a memorable and productive seminar. We are looking forward to you attending the seminar. If you have any questions, please contact us to tokyo@press-in.org.

Announcement

IPA Seminar on Press-in Technology in Singapore

IPA Local Organizing Committees

The Publication Committee of International Press-in Association (IPA) is currently editing the "**Press-in Retaining Structures: A Handbook (First Edition 2016)**" in English and it will be published shortly. IPA is now pleased to organize a seminar to disseminate the press-in technology to commemorate the release of upcoming handbook at National University of Singapore as follows:

Date	**: 2nd March 2017, Thursday [09:00 – 16:30]**	
Venue	**: NUSS Kent Ridge Guild House [Guild Hall] at National University of Singapore**	
Address	: 9 Kent Ridge Drive, Singapore 119241	
Capacity	: 100-120	
Program	: 08:30～	Reception
	09:00～13:00	Seminar
	13:00～14:00	Lunch (Buffet)
	14:00～16:00	Site visit (subject to availability of jobsite)
	16:30	Closing
Registration fee	: SGD 88.00 (inclusive of 7% GST) per person [buffet lunch to be provided]	
Registration	: The registration form to be downloaded from http://www.press-in.org/events/calendar/en	
Payment method	: Cheque payment or Bank Transfer (Account details to be advised upon confirmation of attendance.)	
Note	: A Handbook shall be distributed to every participant in an USB form during the IPA Seminar	
Speakers	: Dr. Ng Tiong Guan/ Golder Associates (Singapore) Pte Ltd, Executive Director, Principal	
	Er. Dr Poh Teoh Yaw/ Building and Construction Authority, Deputy Director	
	Prof. Yoshiaki Kikuchi/ Tokyo University of Science	
	Mr. Tsunenobu Nozaki/ GIKEN LTD., Department Leader of International Business Department	
Organizer	: IPA Local Organizing Committee (LOC)	
LOC Chair	: Prof. C F Leung, National University of Singapore / IPA Director	
Supporters	○ Geotechnical Society of Singapore (GeoSS)	○ National University of Singapore (NUS)
	○ Singapore Institute of Technology (SIT)	○ Universiti Tun Hussein Onn Malaysia (UTHM)
	○ Giken Ltd. ○ Giken Seisakusho Asia Pte.,Ltd.	○ Others

Event Diary

IPA Events

http://www.press-in.org/events/calendar/ja

IPA Singapore Seminar
March 02, 2017/ Singapore,
The National University of Singapore (NUS)

IPA Board Meeting
July 20, 2017/ Japan, Kochi

IPA Kochi Seminar
July 20-21, 2017/ Japan, Kochi

International Society for Soil Mechanics and Geotechnical Engineering

http://www.issmge.org/events

9th International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground, IS - São Paulo 2017
April 04-05, 2017/ Brazil, São Paulo

Third Bolivian International Conference on Deep Foundations
April 27-28, 2017/ Bolivia, Santa Cruz de La Sierra

Transportation Geotechnics and Geoecology
May 17-19, 2017/ Russia, St.Petersburg

BCRRA 2017 - Tenth International Conference on the Bearing Capacity of Roads, Railways and Airfields
June 28-30, 2017/ Greece, ATHENS

GeoMEast 2017
July 15-19, 2017/ Egypt, Sharm El-Sheikh

PBD-III Vancouver 2017 - The 3rd International Conference on Performance Based Design in Earthquake Geotechnical Engineering
July 16-19, 2017/ Canada, Vancouver

Second International Symposium on Coupled Phenomena in Environmental Geotechnics (CPEG2)
September 6-7, 2017/ United Kingdom, Leeds

ICSMGE 2017 - 19th International Conference on Soil Mechanics and Geotechnical Engineering, Seoul
September 17-22, 2017/ Korea, Seoul

4th International Symposium on Cone Penetration Testing (CPT'18)
June 21-22, 2018/ Netherlands, Delft

The 7th International Conference on Unsaturated Soils (UNSAT2018)
August 3-5, 2018/ Hong Kong S.A.R.

7 ICEGE 2019 - International Conference on Earthquake Geotechnical Engineering
June 16, 2019/ Italy, Rome

ISDCG 2019 – 7th International Symposium on Deformation Characteristics of Geomaterials
June 26, 2019/ United Kingdom, Glasgow

ECSMGE 2019 – XVII European Conference on Soil Mechanics and Geotechnical Engineering
September 1, 2019/ Iceland, Reykjavik

Deep Foundations Institute

http://www.dfi.org/dfievents.asp

SuperPile 2017
June 14-16, 2017/ Coronado Bay, CA

42nd Annual Conference on Deep Foundations
October 24-27, 2017/ New Orleans, LA

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Editorial Remarks

The Editorial Board of IPA Newsletter is pleased to publish Vol.1, No.2 on schedule. This issue contains messages from Chairman and a vice Chairman, a case history, and several reports from various parts of the world, including the report of the establishment of three technical committees. A new corner was also created for the serial 'On-site interview'. We plan to include the list of papers published in a respective year in December issues. This issue provided a list of recent publications (2015-2016) on press-in technology.

Contributions from IPA members are very much welcome, in particular, in the categories of 'Case History' and 'Report'. Any comments and suggestions to improve the Newsletter are also very much welcome.

Please feel free to contact the Editorial board members below with email address or IPA Secretariat (tokyo@press-in.org) for your clarifications and/or suggestions.

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