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Editorial Board

Message from the Chairman

Dr. Osamu Kusakabe

The Press-in method has gained a wide acceptance in construction industry world-wide. The figure 1 shows the countries where the Press-in method has been adopted in construction projects so far, painted in green color, totaling 37 countries. The readers may be interested in to know how this method had started. I have picked up some episodes from the autobiography written by Mr. Akio Kitamura, the inventor of the Silent Piler. The below is a brief summary.

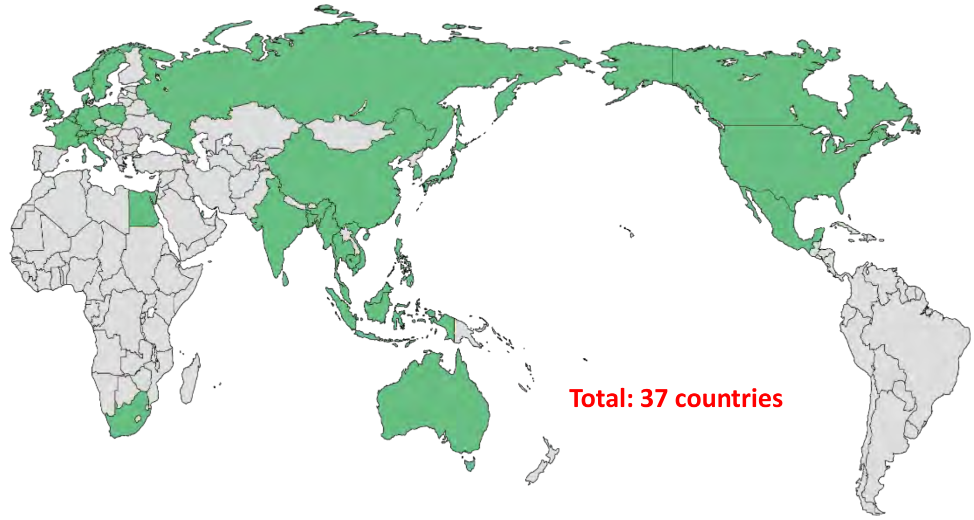

Figure 1 Expansion of Press-in Method

He, Mr. Kitamura, started his business in the construction industry in 1967 with the idea of its being an anti-pollution company. During the 1960s to the early 70s when Japan was enjoying high economic growth, Kitamura, who had ample experience of handling a variety of construction machinery, was running his business mainly with piling contracts for foundation works using construction machinery such as the vibratory hammer. One day, an incident occurred where an operator in his company was chased by local residents near the construction site due to complaints of noise and ground vibration caused by a vibratory hammer. He came to encounter the frequent occurrence of damage caused by pile driving works, such as roof tiles slipping down, doors unable to open, and walls cracking. He then realized that he himself had become a source of pollution in spite of his ambition to develop an anti-pollution company.

Looking around the world, he realized that there existed no piling machine capable of working without causing noise and ground vibration. There remained no alternative path for him to move forward without inventing such a piling machine himself. He made up his mind to devote himself to inventing and developing pollution-free piling machines.

When he started developing the idea, a scene recurred in his mind from when he was watching with keen interest an operation to extract an embedded steel H-pile used for retaining walls in a building project. Many workers on the construction site were trying hard to pull up the H-pile with a manual pulling system using timbers installed around the H-pile as the required reaction. The resistance of the H-pile was so strong that the pile could not easily be pulled out. While he was recapturing the past scene, an idea flashed in his mind. A pile could be statically jacked in without noise and ground vibration, if the piling machine were designed to firmly grip the tops of existing piles previously installed in the ground, utilizing the pullout resistances of these piles as a reaction force. A clear image of piles griping the Earth occurred to his mind.

Design of the first prototype commenced in 1973 (**Photo 1**) and after two years of development the first prototype was completed in 1975. The prototype machine had a capability of jacking a light-weight steel sheet pile into the ground using hydraulic pressures. The machine was named the “Silent Piler”, implying that the piling machine could install a pile in the ground quietly. The **photo 2** shows a view of the first prototype.

While Kitamura’s company, Giken, used its Silent Pilers for their own piling projects, a purchase order from another company arrived. Sales of the Silent Piler then started in 1977. The accumulated number of Silent Pilers sold reached 3,000 machines in 2014.

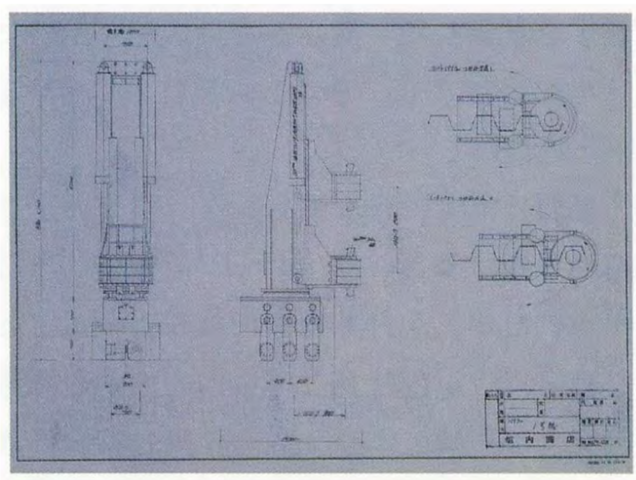

Photo 1 Design drawing of the first Silent Piler

Photo 2 First Silent Piler

Case History-1

Activities of Restoration and Reconstruction of Iwate Prefecture from the Grate East Japan Earthquake Tsunami

Mr. Ryuji Tanaka

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The outline of the jurisdiction area of Ofunato Civil Engineering Centre is shown in Figure 1. Iwate Prefecture has 1.5 thousand square meters area, which is the largest in Japan and as large as 80% of Shikoku Island. The National Athletic Meet is to be held in Iwate Prefecture in October this year. A lot of visitors including Imperial family will visit Iwate. Ofunato Civil Engineering Center lies in the south coastal area of Iwate Prefecture. It takes two hours from Ofunato City from the Prefectural capital, Morioka City. The Center manages Ofunato City, Rikuzentakata City and Sumida Town. A beautiful rias coastline can be found in the coastal area, which is designated as the national park. Before the disaster, 1 million visitors were visiting every year, but the disaster have changed the situation.

The huge earthquake with the magnitude of 9.0 on March 11, 2011 was a terrible disaster that was accompanied by the ground subsidence in a wide area and tsunami with significant height. In Iwate Prefecture, the number of casualties and missing people is 5800, and the number of damaged buildings was 2.6 thousand. In the jurisdiction area of our civil engineering center, the number of casualties and missing people is 4 hundred in Ofunato City and 1.8 thousand in Rikuzentakata City, which is the largest in the prefecture.

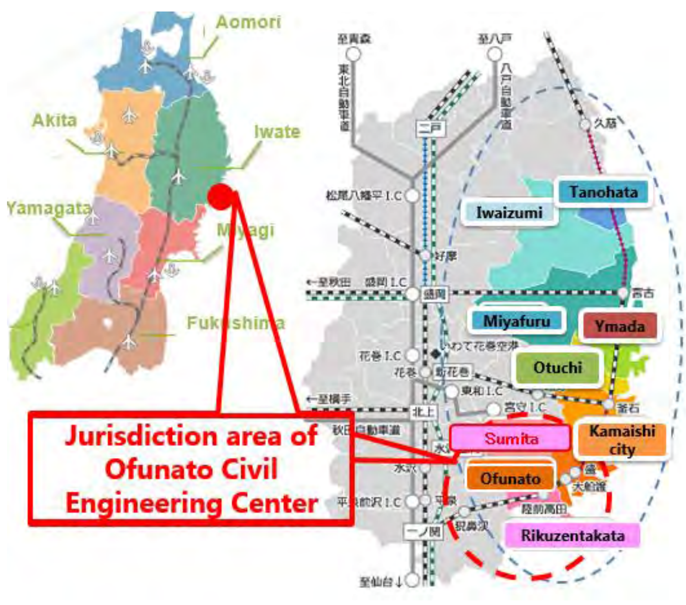


Figure 1

The situation of damage in Ofunato City was as follows. According to the city, the first tsunami arrived at 14:54 with the height of 0.2m. Then tsunami with the height of 8m arrived at 15:18, and the maximum height was recorded as 11.8m.

The situation of damage in Rikuzentakata City was as follows. The height of tsunami exceeded TP 15m and ran up Kesengawa River by 8km. This district was composed of beautiful sand beach and 70 thousand palm trees. It was designated as National Scenic Beauty in 1940 and was one of the most famous beaches in Tohoku District. Most of the beautiful beaches and palm trees disappeared due to tsunami. In the city center, the city office was completely destroyed.

Plan for Restoration of Iwate Prefecture is composed of 'Basic Plan for Restoration' and 'Execution Plan for Restoration'. At present we are in the second phase of 'Full-fledged restoration period', and this year is the final year of this period. By 'Multi-Protection Community Planning', we are planning to promote safe and reliable community planning based on the concept of 'disaster mitigation' to minimize the damage due to natural disasters such as tsunamis.

The planned height of the coastal levees was determined in the following way. The prefecture established a committee composed of academic experts on hydroengineering and other fields in April 2011. In the committee, the coastal area was classified into 24 zones and the height of the coastal levee was discussed in each zone. Here, L1 tsunami with relatively high frequency of occurrence of a few decades or couples of hundred years was considered, rather than L2 tsunami of low frequency of occurrence such as the one in the Great East Japan Earthquake.

The structure of the coastal levee was designed to be stable against L1 tsunami and to be tenacious against L2 tsunami, accepting the limitation of disaster prevention expecting excessively on the facilities: for examples, the inclination smaller than 20%, no steps in the back slope, erosion prevention at the foot of the slope.

Regarding the community planning and safety assurance, Land Readjustment Project is in process in 'Takata district' and 'Imaizumi district' in Rikuzentakata City. New communities are being constructed by raising the height of the land. In the estuary of Kesengawa river and the coastal area on Hirota Gulf, flood gate of Kesengawa river, coastal levee of Takata Coast, restoration of Kawara River, Restoration Memorial Park, restoration of sand beach and Matsubara, are undertaken by the prefecture and other organizations. In Takata district, there are two lines of levees. The first levee is for preventing erosion, which is the same as before the disaster. The second one is for tsunami protection and its height is TP 12.5m, which is increased from TP 5.5m before the disaster. In the second levee, approximately 26000 gravel compaction piles were constructed to try prevent liquefaction. On the other hand, in Ofunato Station district, as shown in Figure 2, the level of the ground surface in the yellow region will be raised by 2.5m. What assures the safety and relief in this district is the coastal levee along Ofunato port. The planned height is TP 7.5m.

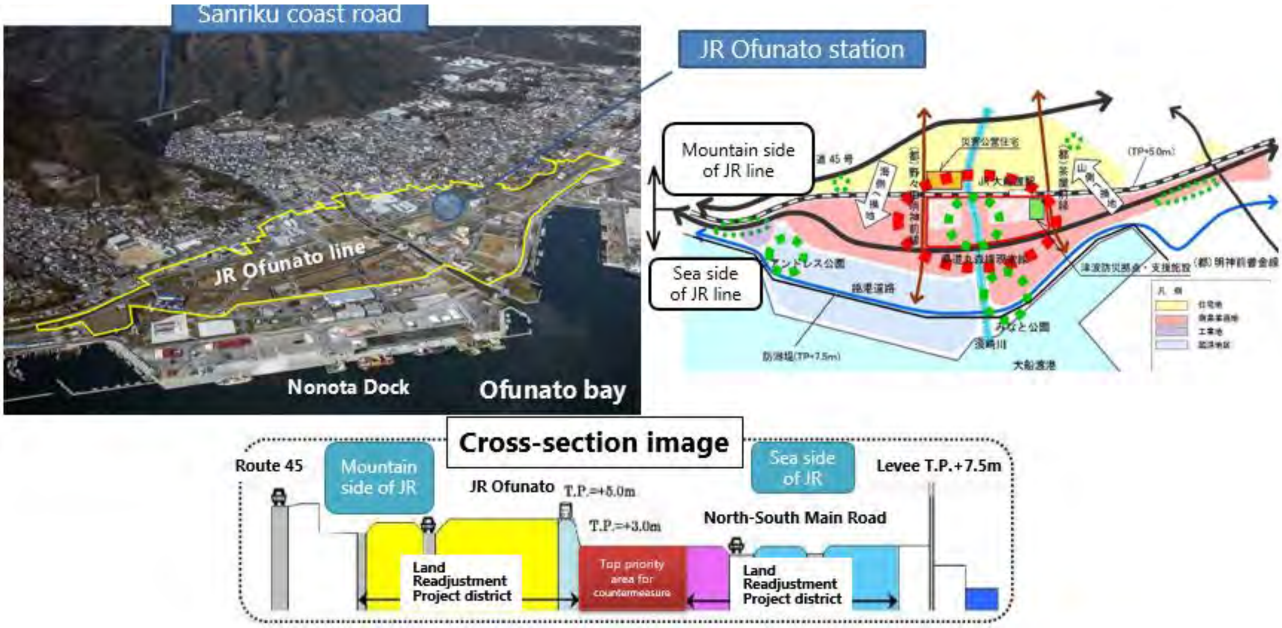


Figure 2

Out of 7 districts of the planned construction districts of the coastal levees in Ofunato Port, Gyropress method was or will be adopted in the four districts, as shown in red lines in Figure 3.

The first example is the levee in Nonoda district. The subsurface investigation revealed the existence of large gravels and concrete masses. Gyropress Method was adopted, as shown in Picture 1, because it was expected to be able to install tubular piles to the designated depth. The bearing stratum was confirmed by the variation of press-in time per 1m. This method requires the information of press-in time at the position near where the subsurface information was obtained.

The second example is the construction in Nagahama district, which is on the opposite side of Nonoda district. In this district, the new levee was planned to be constructed in front of the existing levee, considering the situation of the land behind the old coastal line. Therefore, the construction work had to be on the sea. As it was difficult to occupy the sea with the temporary works, Gyropress Method that can save the temporary works was adopted, as shown in Picture 2. The bearing stratum was confirmed by applying press-in force greater than the required capacity using Gyropiler. This method requires enough pull-out resistance of the completed piles.

The final examples are the constructions in Atohama district and Shimizu district. In both districts, the construction work has not been started yet but has already been ordered. The planned area is adjacent to the existing prefectural road with more than 10 thousand traffics and with many large cars running into and out of the factories. As the construction space was narrow, the Gyropress Method is going to be adopted.

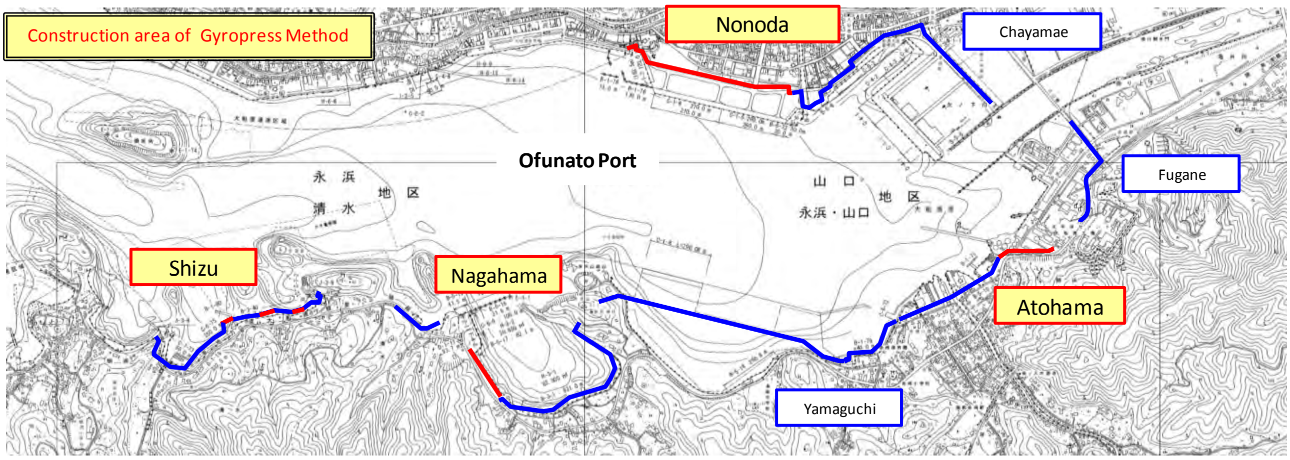


Figure 3

The advantages of the Gyropress Method are the high construction accuracy, its applicability to hard ground conditions, reduction of cost and labor by saving temporary works, its applicability to narrow area, and low noise. On the other hand, the remaining solution will be as follows. As the method of confirming the bearing stratum is not yet fixed, it is necessary to choose a method in each construction site. The method utilizes the completed piles as reaction piles. The base of the completed piles may be deformed while it is clumped by the Gyropiler. Some water is injected into the pile base to prevent plugging and frictional heat in the base teeth. This sometimes increases the cost of disposing the mud coming from inside the pile during the piling work.

Five years and four months have passed since the disaster. Last year and this year will be the busiest years for restoration and reconstruction projects. Although we are still on our way, the accomplishments so far is supported by a lot of people inside and outside of Japan. We appreciate all the supports so far and the continued supports in the future.

Picture 1

Picture 2

*This is an article that was lectured by Mr. R. Tanaka of Iwate Prefecture at the 9th IPA Press-in engineering seminar in Kochi on July 12, 2016, and translated into English by IPA Newsletter editorial committee.

Case History-2

Application of Special Press-in Piling Method for ERSS in Singapore

Dr. NG Tiong Guan

Principal,

Golder Associates (Singapore) Pte Ltd

In view of the urbanisation and scarcity of land, basement construction at close proximity to existing buildings is common in Singapore for residential and commercial developments. To facilitate the construction of the basement and sub-structures, sheet pile wall is often considered as an economical and efficient form of temporary earth retaining system. Sheet pile wall is designed with wall penetration into firm stratum to prevent toe kick, base instability and to achieve the desire serviceability wall deflection requirement.

Noise and vibration

Conventional sheet pile installation using vibro-hammer generate significant amount of noise and vibration that exceed the tolerable limits. In some cases the vibration may cause damages to adjacent buildings and services. The maximum permissible noise levels for construction work allowed by the National Environment Agency (NEA) are shown in Table 1 and Table 2. The noise generated by sheet piling install using vibratory hammer ranges between 70dBA and 90dBA, which exceed the general requirement set by NEA.

Types of affected buildings	7am - 7pm	7pm - 10pm	10pm - 7am
(a) Hospital, schools, institutions of higher learning, homes for aged sick, etc	60 dBA (Leq 12 hr)	50 dBA (Leq 12 hr)	
	75 dBA (Leq 5 min)	55 dBA (Leq 5 min)	
(b) Residential buildings located less than 150m from the construction site	75 dBA (Leq 12 hr)	65 dBA (Leq 1 hr)	55 dBA (Leq 1 hr)
	90 dBA (Leq 5 min)	70 dBA (Leq 5 min)	55 dBA (Leq 5 min)
(c) Buildings other than those in (a) and (b) above	75 dBA (Leq 12 hr)	65 dBA (Leq 12 hr)	
	90 dBA (Leq 5 min)	70 dBA (Leq 5 min)	

Table 1 maximum permissible noise levels for construction work on Monday to Saturday

Types of affected buildings	7am - 7pm	7pm - 10pm	10pm - 7am
(a) Hospital, schools, institutions of higher learning, homes for aged sick, etc	60 dBA (Leq 12 hr)	50 dBA (Leq 12 hr)	
	75 dBA (Leq 5 min)	55 dBA (Leq 5 min)	
(b) Residential buildings located less than 150m from the construction site	75 dBA (Leq 12 hr)	65 dBA (Leq 1 hr)	55 dBA (Leq 1 hr)
	90 dBA (Leq 5 min)	70 dBA (Leq 5 min)	55 dBA (Leq 5 min)
(c) Buildings other than those in (a) and (b) above	75 dBA (Leq 12 hr)	65 dBA (Leq 12 hr)	
	90 dBA (Leq 5 min)	70 dBA (Leq 5 min)	

Table 2 maximum permissible noise levels for construction work on Sunday and Public Holidays

In accordance with Eurocode 3, the maximum acceptable vibrations to avoid structural damage for various types of structure ranges between 2 mm/s to 25 mm/s. However, the maximum acceptable vibrations to human is much lower, i.e. below 5 mm/s, as shown in Figure 1. White & Deeks (2007) has demonstrates that press-in technology using silent piler is able to keep the vibration during installation work to below the human acceptable limits as shown in Figure 2.

Hard driving

Based on local experience, sheet pile installation by silent piler or vibro hammer will hit refusal in soil stratum with SPT N ranges between 25 and 35 blows/30cm. The problem of noise and vibration will be amplified when the sheet pile is driven forcefully into hard soil stratum. Hard driving may cause de-clutching of sheet piles which could result in even bigger problem on site such as inflow of soil into the excavation through gaps between sheet piles and sink hole behind the wall. Common methods available to overcome the installation of sheet pile in hard soil stratum include: Pre-bore using contiguous flight auger, press-in method assisted by water jetting, press-in method assisted by augering and change of type retaining wall system from sheet pile wall to pre-bored soldier pile wall or contiguous bored pile wall system. Care should be taken when pre-boring using contiguous flight auger is adopted. The soil loosen by the pre-boring or pre-augering will cause excessive wall deflection during the excavation.

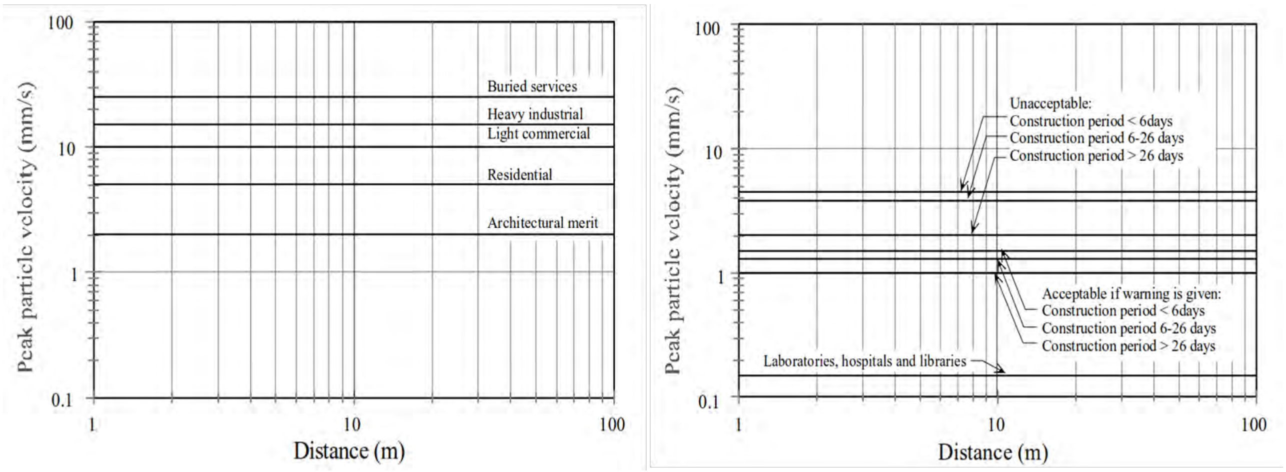


Figure 1 Maximum acceptable vibrations to avoid structural damage and to prevent human disturbance

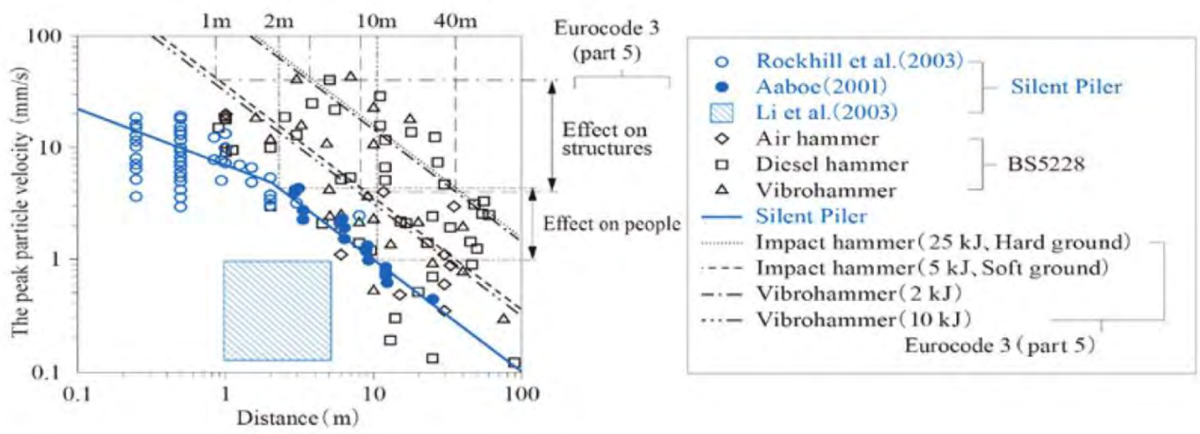


Figure 2 Comparison of vibration characteristics between driving and press-in (after White and Deeks, 2007)

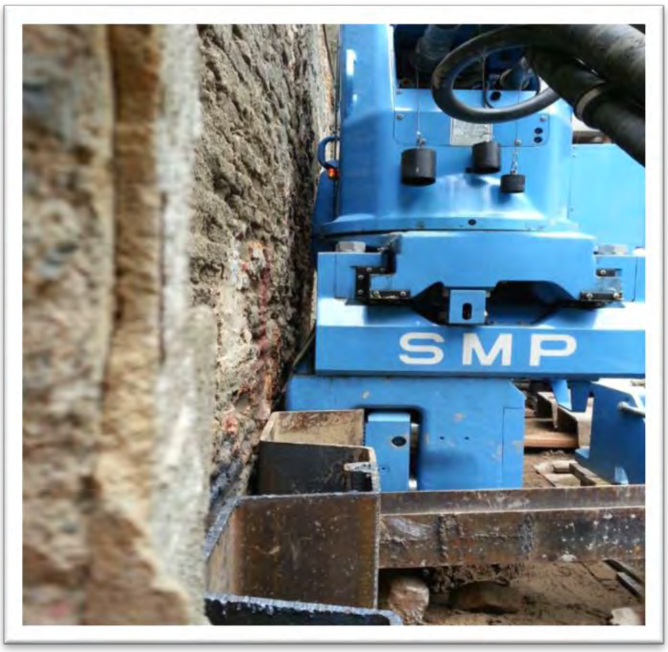


Figure 3 Zero clearance press-in method

■ Sheet pile construction next to existing structure

In land scarce Singapore, architect and developer has inclination to construct the building and substructure all the way to the land boundary. In development where the proposed sub-structure is to be built next to existing structures, conventional sheet piling method is sometime not feasible due to the lack of working space required for the machinery to install the sheet piles.

To overcome such site constraint, zero clearance press-in method or zero piler as shown in Figure 3 could be used.

Case Study #1: Press-in method assisted by augering

The proposed landed property is bounded by public road on the front and back of the development and two existing buildings on the other two sides. The ground level of the site is sloping from the back to the front of the house as shown in Figure 4. The maximum retained height for the basement is 3.3m from the existing ground level.

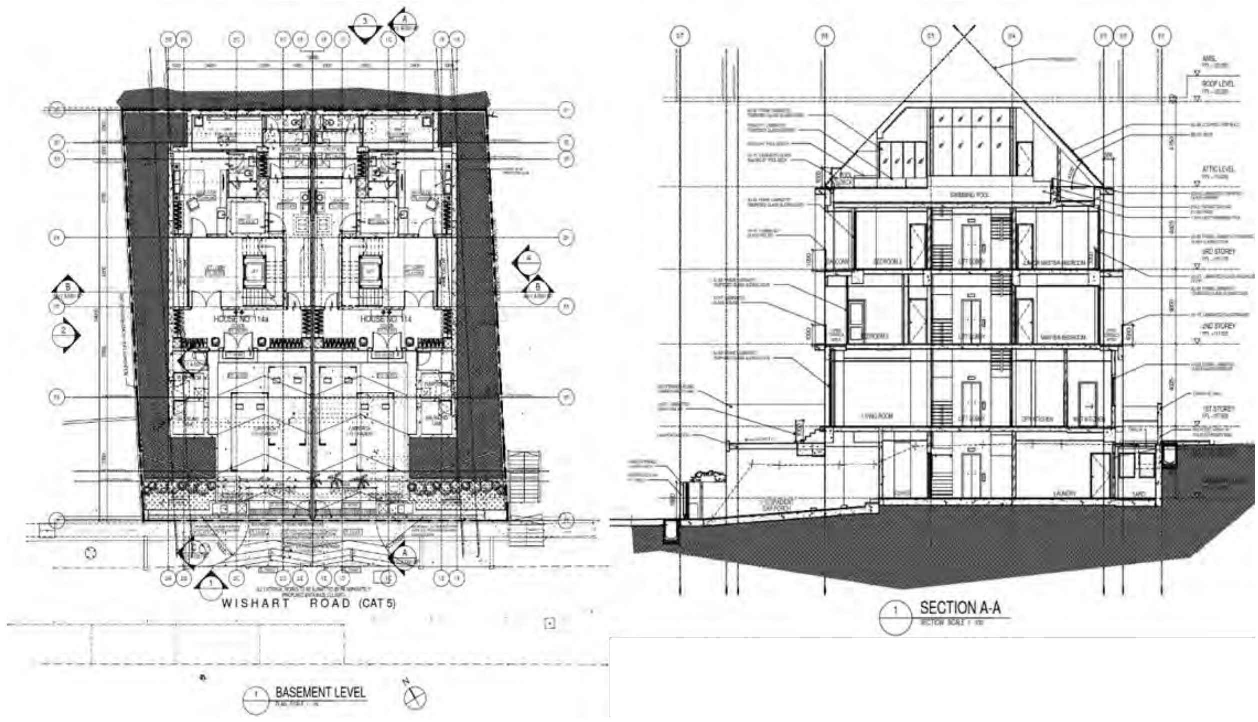
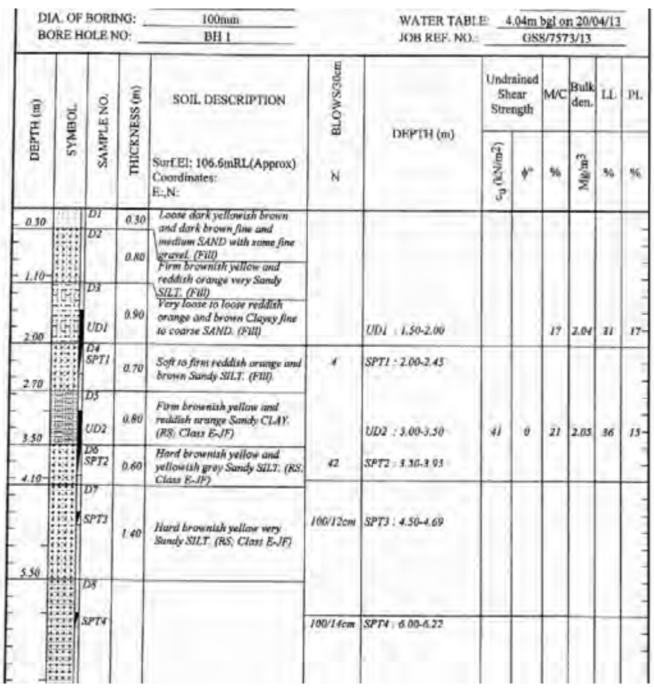


Figure 4 Basement plan and cross section for Case Study #1



DIA. OF BORING: 100mm
BORE HOLE NO: BH 1
WATER TABLE: 4.04m bgl on 20/04/13
JOB REF. NO.: GS8/7573/13

DEPTH (m)	SYMBOL	SAMPLE NO.	THICKNESS (m)	SOIL DESCRIPTION Surf.El: 106.6mRL(Approx) Coordinates: E.,N:	BLOWS/30cm N	DEPTH (m)	Undrained Shear Strength c_u (kN/m²)	$\phi°$	M/C %	Bulk den. Mg/m³	LL %	PL %
0.30		D1	0.30	Loose dark yellowish brown and dark brown fine and medium SAND with some fine gravel. (Fill)								
1.10		D2	0.80	Firm brownish yellow and reddish orange very Sandy SILT. (Fill)								
2.00		D3 UD1	0.90	Very loose to loose reddish orange and brown Clayey fine to coarse SAND. (Fill)		UD1 : 1.50-2.00			17	2.04	31	17
2.70		D4 SPT1	0.70	Soft to firm reddish orange and brown Sandy SILT. (Fill)	4	SPT1 : 2.00-2.45						
3.50		D5 UD2	0.80	Firm brownish yellow and reddish orange Sandy CLAY. (RS; Class E-JF)		UD2 : 3.00-3.50	41	0	21	2.05	36	15
4.10		D6 SPT2	0.60	Hard brownish yellow and yellowish grey Sandy SILT. (RS; Class E-JF)	42	SPT2 : 3.50-3.95						
5.50		D7 SPT3	1.40	Hard brownish yellow very Sandy SILT. (RS; Class E-JF)	100/12cm	SPT3 : 4.50-4.69						
		D8 SPT4			100/14cm	SPT4 : 6.00-6.22						

Figure 5 Borehole log for Case Study #1

Figure 5 shows the borehole log from the soil investigation. The typical ground condition comprises of 3.0m thick Fill layer comprises of clayey sand/sandy silt with SPT N < 10 overlying 1.0m thick residual soil with SPT N > 40. Beneath the residual soil is completely weathered Jurong Formation with SPT N > 100.

In view of the relatively shallow retained height and tight construction space, temporary sheet pile wall is considered to be the most economical solution. The close proximity of the proposed construction to surrounding buildings call for more environment friendly press-in method. To overcome the hard soil stratum from the depth of 4m below the existing ground level, press-in method assisted by augering was adopted.

The proposed sheet pile wall and strutting layout is shown in Figure 6. The sheet pile is supported by diagonal strut and raker struts. Figure 7 shows the typical finite element model used to analyze and design the temporary earth retaining system. During the progress of the excavation, the performance of the sheet pile wall was monitored by inclinometers. It was noted that the maximum sheet pile wall deflection exceeded the predicted value before the installation of the struts.

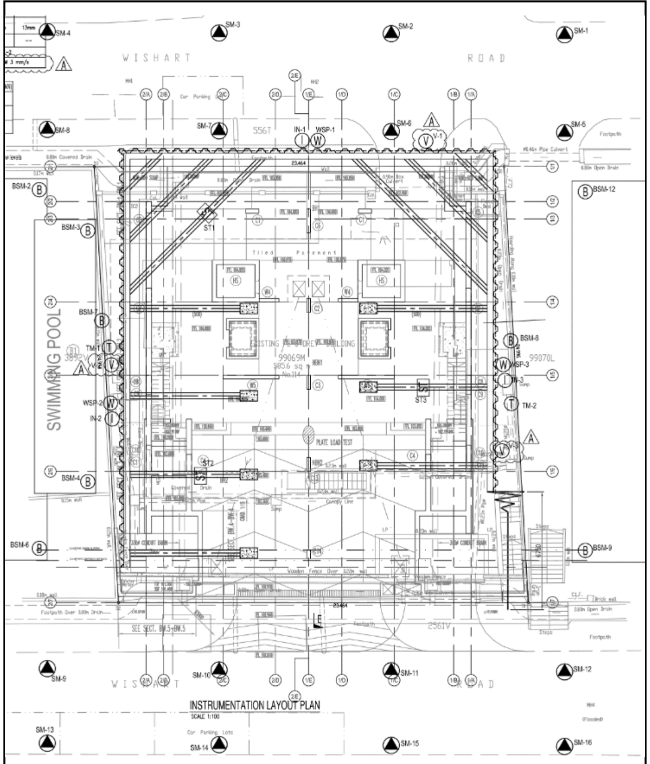


Figure 6 Sheet pile wall and strutting layout plan

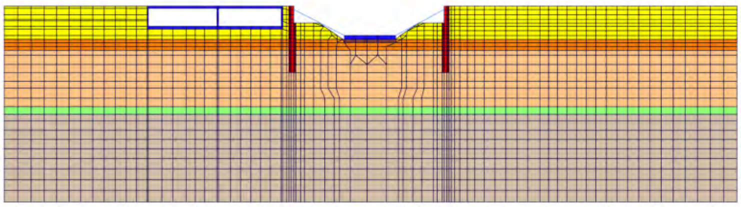


Figure 7 Finite element model

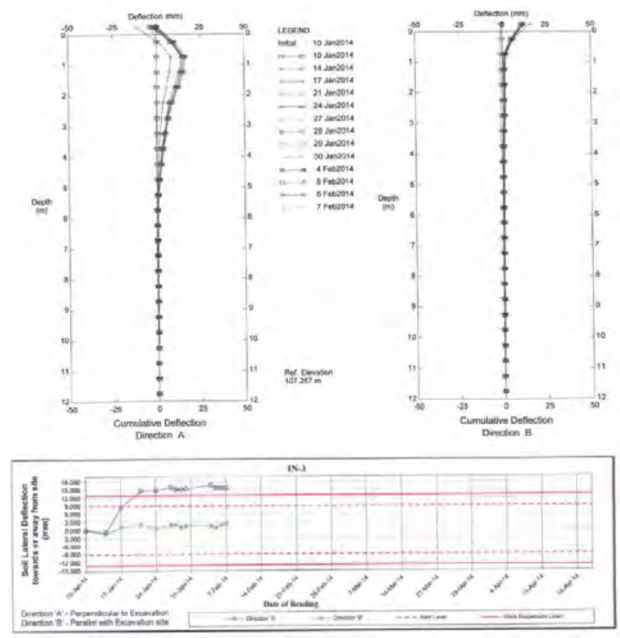


Figure 8 Sheet pile wall deflection due to excavation

Results of inclinometer is presented in Figure 8. Soil loosening around the sheet pile, due to the pre-augering, was identified on site. Back-analysis was then carried out by simulating a localized zone of loose soil around the sheet pile wall. The revised numerical prediction was able to reproduce the measured wall deflection quite well. This shows that the soil loosening effect by pre-augering is likely to be the cause for the additional 'unexpected' lateral deflection measured by the inclinometer.

Hence, in the design of press-in assisted by augering, the loosening effect around the sheet pile wall shall be taken into consideration. The adverse effect is most critical when the sheet pile wall is acting in cantilever mode.

■ Case Study #2: zero clearance press-in method

The Case Study #2 is a hotel development sandwiched between two existing buildings. One of the existing building is supported on raft foundation while the other is supported on piles. The architect and developer has decided to construct the new hotel fully to the legal boundary, abutting the existing building. The plan and typical section of the proposed excavation is shown in Figure 9.

The maximum depth of excavation required to construct the pile caps and deep perimeter ground beams is 3.75m. The boundary wall of the existing building is literally abutting the new structure and there is little space left for installation of any form of temporary earth retaining system. Hence, zero clearance press-in method was adopted. 9m length cantilever sheet pile wall was proposed for retained height more than 3m while 6m length cantilever sheet pile wall was proposed for retained height less than 3m.

Zero clearance press-in method uses a special type of sheet pile, named zero sheet pile NS-SP-J. The zero sheet pile is 600mm wide each and has interlock joint on the outer elements of the section. This is different from conventional U-shaped sheet pile where the interlocks are located on the neutral axis. Because of its unique design, the flexural stiffness (EI) of individual zero sheet pile is equivalent to Type SP-V_L U-shaped sheet pile even though the thickness of zero sheet pile is relatively much thinner as compared to the latter.

However, for plane strain finite element analysis, the EI per metre length of wall is more relevant, and not the EI for a single sheet pile. In term of EI per metre of wall, the EI of zero sheet pile is 12,090 cm^4/m as oppose to 16,800 cm^4/m for Type SP-III and 38,600 cm^4/m for Type SP-IV sheet pile, respectively. The designer adopting zero clearance press-in method should beware that the stiffness of zero sheet pile is merely 72% of sheet pile SP-III and 31% of sheet pile type SP-IV, even though a single zero sheet pile can be as strong as sheet pile type SP-V_L.

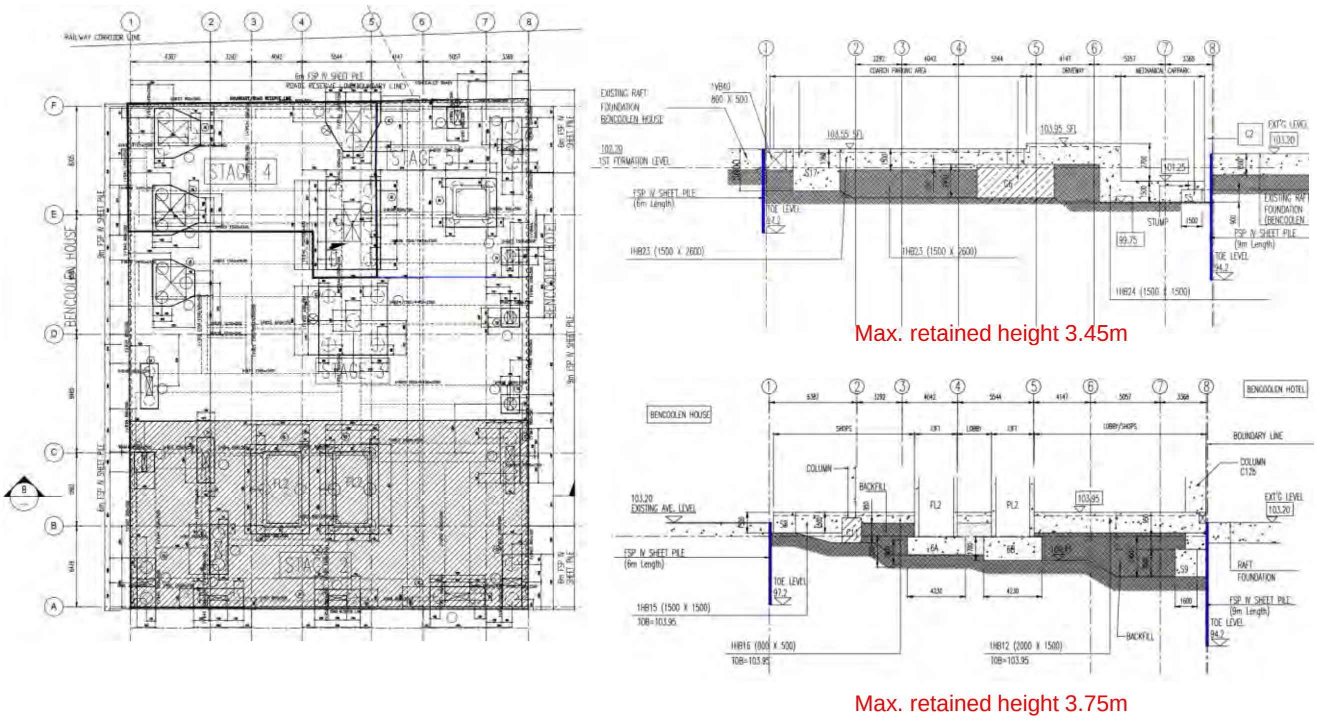


Figure 9 Plan and section of substructure for Case Study #2

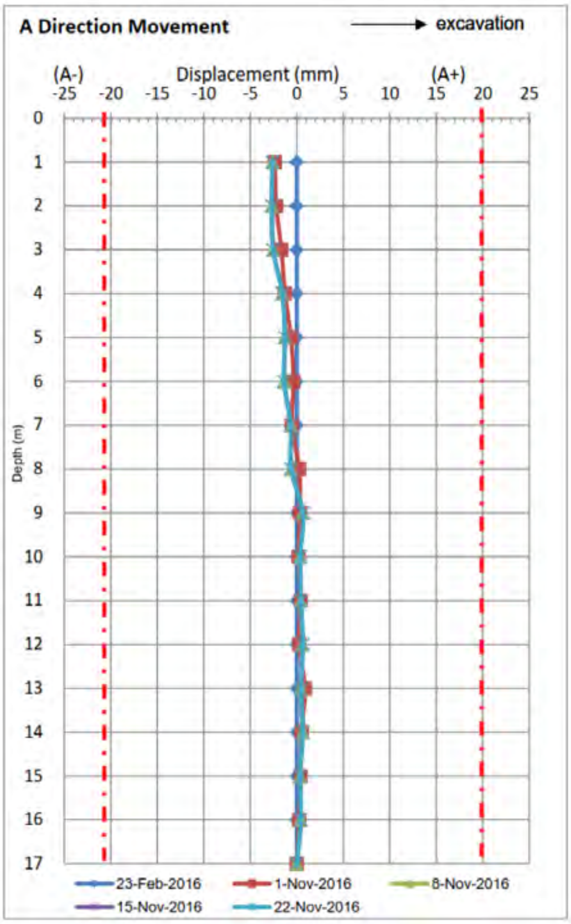


Figure 10 Sheet pile wall deflection due to excavation

A comprehensive instrumentation and monitoring scheme has been devised to ensure that the temporary earth retaining system is performing as per the design prediction and does not induce excessive lateral ground movement or settlement beyond the acceptable limits.

Figure 10 shows the results of inclinometer measured during the excavation. The measured sheet pile deflection is fairly small and well within the prediction. This shows that even though the stiffness of zero sheet pile may be relatively low, if use appropriately, its performance is satisfactorily.

Conclusions

- Conventional sheet pile installation using vibro hammer generates excessive noise and ground vibration that exceed the limit tolerable by human
- Stringent control has been imposed by NEA for construction near to residential and sensitive structures
- Press-in piling method could be used to mitigate the problem of noise and vibration
- Press-in method with simultaneous augering system could be adopted to overcome pile penetration in hard soil / weak rock
- Design should take into consideration the soil loosening effect around the sheet pile due to the pre-augering
- Zero clearance press-in method could be adopted in site with very tight space constraint.
- Proper sheet pile properties shall be adopted in the analysis and design if zero sheet pile is used

IPA News Letter Volume 2, Issue 1 March 2017

Case History-3

Control Measures for Installation and Removal of Temporary Earth Retaining Walls

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The process of wall installation and removal may cause excessive ground movements if not properly controlled. Proper control measures should be implemented to minimise the effect of wall installation and removal, hence avoiding unnecessary damage to the adjacent structures. This paper highlights some control measures for wall installation and removal to minimise the impact of wall installation and removal. Case histories of wall installation and removal are also presented to demonstrate the important of implementing control measures during wall installation or removal.

■ Close proximity to existing buildings

Picture 1

As the city developed, buildings get closer. Due to high land prices in the city, developer may need to optimise the land use. This often resulted in basement constructed next to adjacent buildings. Such situation poses great challenges to the construction team. Installation of retaining wall in close proximity to existing buildings requires proper selection of machinery and tools and proper control and supervision of the piling works. In addition, designer should also need to allow adequate set-back distance for the safe installation of the retaining walls. Damage to the neighbouring building may cause unnecessary repair cost and also delay in construction program. Figure 1 shows an example of installation of retaining wall in close proximity to existing building. Figure 2 shows a typical basement construction in close proximity to existing building where various control measures can be adopted to minimise potential damage to adjacent buildings.

■ Case study of installation of soldier pile wall by vibro-hammer

Figure 3 shows a plan layout for a housing development with a basement. In the original design, 3 site investigation boreholes were drilled. Results of these 3 site investigation boreholes showed that the ground consisted of residual soils and weathered rocks of the Bukit Timah Granite. In view of the favorable ground conditions shown in all 3 boreholes and no concern of lowering of ground water level, the designer has adopted a soldier pile wall with structural lagging in between the soldier pile as the retaining wall system. During installation of soldier piles using vibro-hammer, a few neighbouring houses was reported damage. Work was stopped for 3 months for further investigation. As part of the investigation, 2 additional site investigation boreholes along an existing drain was conducted. Results of these two new site investigation boreholes showed the presence of very soft clay and very loose sand with SPT N value of 0. The designer has concluded that the damage to adjacent houses was caused by the installation effect of soldier piles using vibro-hammer in very soft soils.

In view of presence of very soft soils, the designer has enhanced the retaining wall system with additional sheet pile wall to provide an effective water cut-off wall during basement excavation. Standard Pressed-in method was adopted to install the additional sheet pile wall. No damage was reported during the sheet pile wall installation. Such example suggested that standard pressed-in method may be adopted as a control measure to minimise the impact of installation of sheet piles wall for site located in difficult ground conditions and in close proximity to existing buildings.

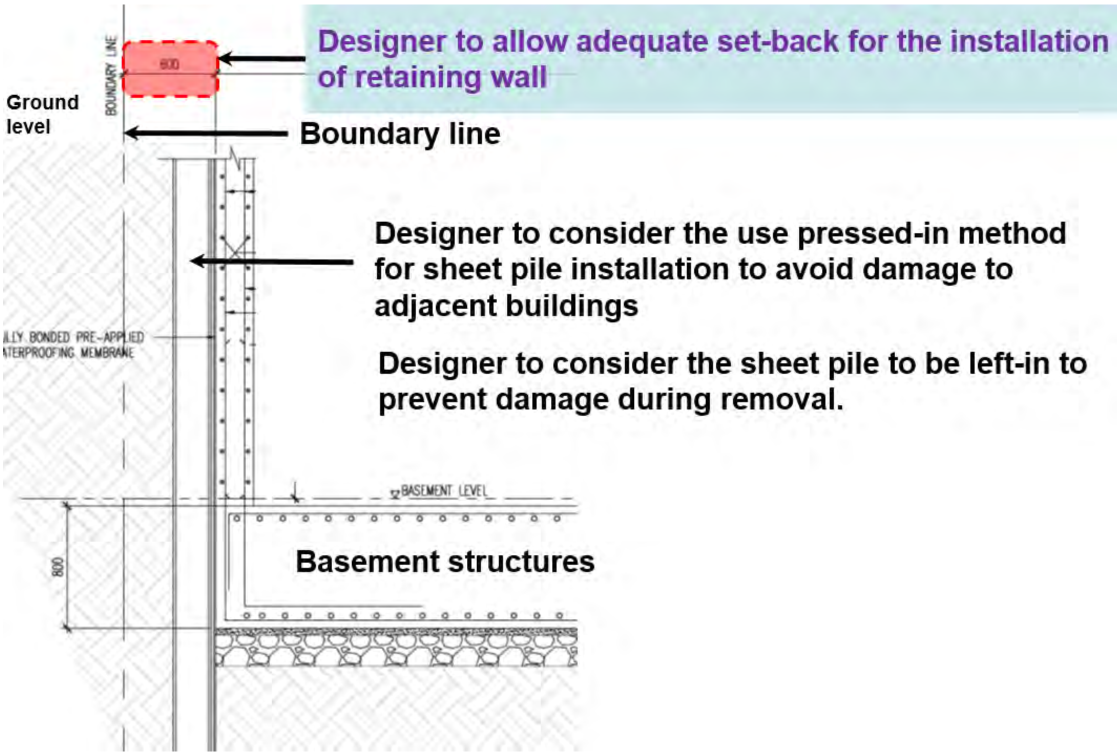


Figure 2

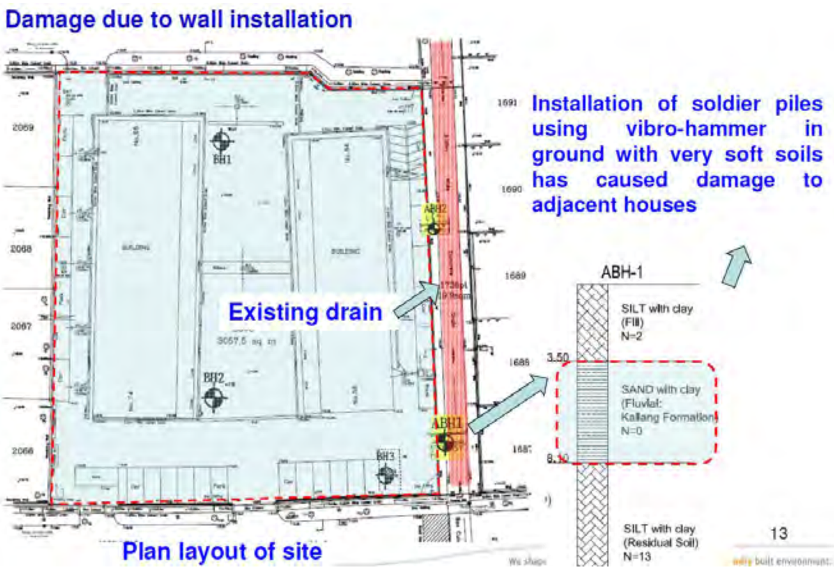


Figure 3

■ Case study of wall removal by vibro-hammer

Figure 4 shows a plan layout for a high-rise private residential development with 2-level of basement. Figure 5 shows the section of the retaining wall system. The ground conditions consisted of Fill layer overlying a thick layer of soft marine clay. Sheet pile wall and compressive ring slabs (where part of the permanent basement slab was used as compressive ring to support the basement excavation) was adopted as retaining system. Such retaining wall system is getting popular among designer in Singapore as it is a robust retaining system that able to provide effective support to restrict ground movement, and hence minimizing potential damage to the adjacent buildings. Ground movements at the end of basement construction was within its design limit as shown in Figure 6. The builder decided to remove two sections of the temporary sheet pile wall next to open car park. Vibro-hammer was used for the sheet pile extraction. Excessive ground movement was observed after the sheet pile extraction and the open car park and the adjacent road was damaged. This case study show that it is necessary to implement control measure such as proper equipment and method statement during sheet pile removal to avoid potential damage to adjacent properties.

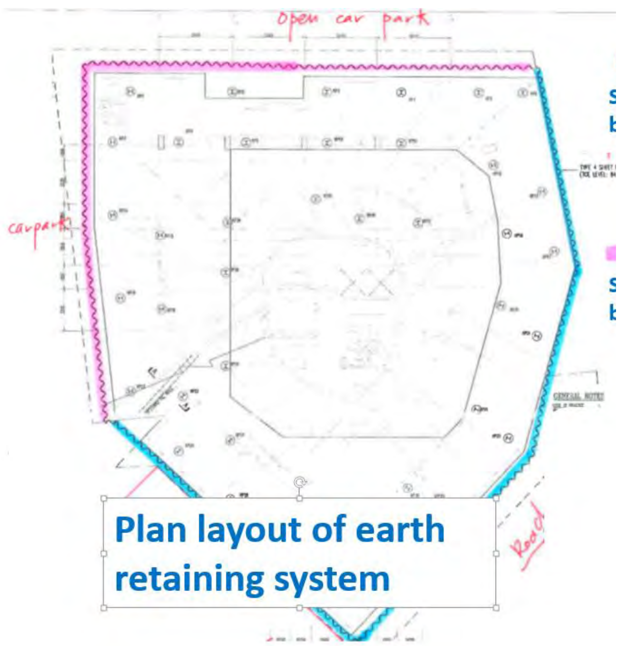


Figure 4

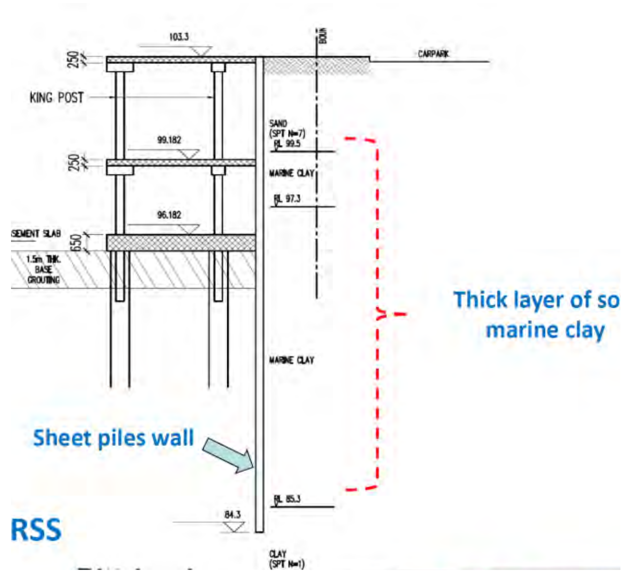


Figure 5

Feb 2013

After completion of basement works

- **Ground settlement at alert level**

Building settlement/monitoring			
Instrument Ref.	Current reading	Alert level	Work Suspension level
WP1	-2.8m	-1.4m	-2.0m
WP5	-1.6m	-1.4m	-2.0m
GS9	-26mm	25mm	35mm

Jun 2013

During removal of sheet pile wall

- **Excessive ground settlement way beyond work suspension level.**

Building settlement/monitoring			
Instrument Ref.	Current reading	Alert level	Work Suspension level
GS1A	-172mm	25mm	35mm
GS2B	-131mm	25mm	35mm
GS3A	-155mm	25mm	35mm
GS4A	-101mm	25mm	35mm

Figure 6

■ Control measures for wall removal

Figure 7 shows a summary of control measures may be adopted by the project parties to minimise the impact of removal of the temporary earth retaining wall. Proper implementation of such measures may help to minimise the risk of damage to the adjacent structures.

Control measures for wall removal

Designer assessment

- Designer to assess the potential impact of wall removal on adjacent structures.
- Designer to specify on plan whether the retaining wall to be removed or to be left-in.

Detailed method statement of wall removal

- If wall removal is allowed (for example for site located in green field area), designer to specify on plan type of equipment to be used and detailed method statement that should include necessary precautionary / mitigation measure to prevent ground loss during wall removal.

Proper supervision of wall removal

- Supervising qualified person or its qualified site supervisors to supervise wall removal in accordance with the approved plan and method statement.

Figure 7

*This case history is based on the presentation at “IPA Seminar on Pressed-in Technology in Singapore”, which was held on 2 March 2017.

■ A Brief CV of Dr. Ng Tiong Guan

Dr Ng Tiong Guan is the immediate past president of the Geotechnical Society of Singapore. He graduated from the University of Technology Malaysia with Bachelor in Civil Engineering 1st Class Hons. Degree in 1992 and obtained his PhD degree from the National University of Singapore in 1999. He co-founded a specialist geotechnical consulting firm GeoEng Consultants in Feb 2002, which became part of Golder Associates in Nov 2011. Dr Ng is currently the Principal of Golder Associates and Executive Director of Golder in Singapore. Dr Ng specialises in analysis, design and supervision of earth retaining system, deep foundation and ground improvement works.

■ A Brief CV of Dr. Poh Teoh Yaw

Dr. Poh is a Deputy Director with Building and Construction Authority which oversees and administers the regulatory framework on building structure safety in Singapore. He is a geotechnical specialist with over 18 years of practical experience. He has authored over 18 publications in geotechnical design and construction including those published in international peer-review journals and conferences.

Current Practice

Feasibility study on using sheet pile as mitigation measure for road failure alongside of canal in Thailand

Dr. Ittichai Boonsiri*, Dr. Pastsakorn Kittiyodom**

*Geotechnical Engineer, Construction Design & Planning Group.

**Executive Director, Geotechnical & Foundation Engineering Co., Ltd.

Central part of Thailand is located in a river deposit soil which consists of a thick soft to very soft clay layer on the top deposit, namely Bangkok clay, underlain by stiff clay and sand layer. These types of soft soils are very sensitive to deformations and have low shear strength. Many parts of the central part area are utilized as agricultural zone. A road alongside of irrigation canal has been used for transportation of agricultural products from plantation to a market. However, some of irrigation canals are exploited as flood drainage. These misuse and low bearing capacity of soil were caused many failure of the road as shown in **Photo 1**. In addition, one of the main reason for road failure comes from water level inside a canal. During drought season, soil under canals show large settlement due to lowering of groundwater levels. In addition, slope of canal tends to increase due to water erosion. As a result, canal is vulnerable to collapse when water level is decreasing.

At present, mitigation measure that is employed to prevent the problems is construction of retaining wall between road pavement and canal as displayed in **Figure 1**. Combination of concrete pile with concrete sheet wall has been chosen for protecting of road slope failure (**Figure 2**). The length of concrete retaining wall is approximately 16 km and specification is shown in **Table 1**. However, some retaining walls were collapse during drought season due to slope failure of soil under canal. It can be said that an interlock force between concrete pile and concrete sheet pile is not enough to prevent a slope failure.

Steel sheet pile wall could be one of possible solution for permanently solving the problems. Use of steel sheet pile become popular because it is reusable. Furthermore, price of steel material tends to reduce in Thailand because there is more import from China and increasing number of manufacturers. The major advantage of this type of wall is it provides resistance during installation stresses. The sheets must be driven into the ground and they contain high resistance to the force of being driven down. The pile length is easily adaptable and can be welded or connected for suitable work.

Photo 1 Road settlement alongside of irrigation area canal

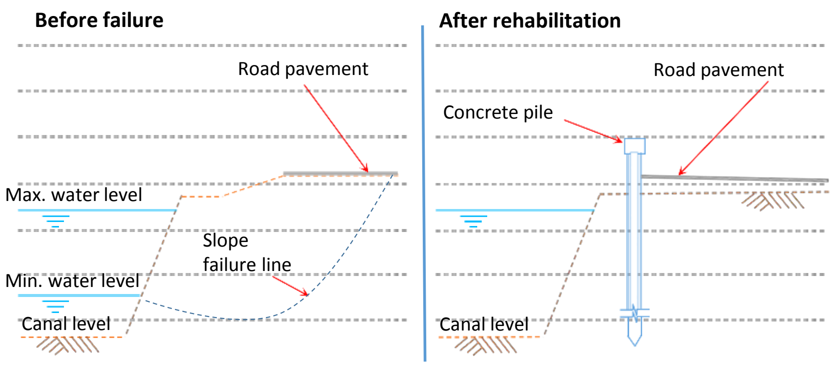


Figure 1 Typical section of roadway along a canal

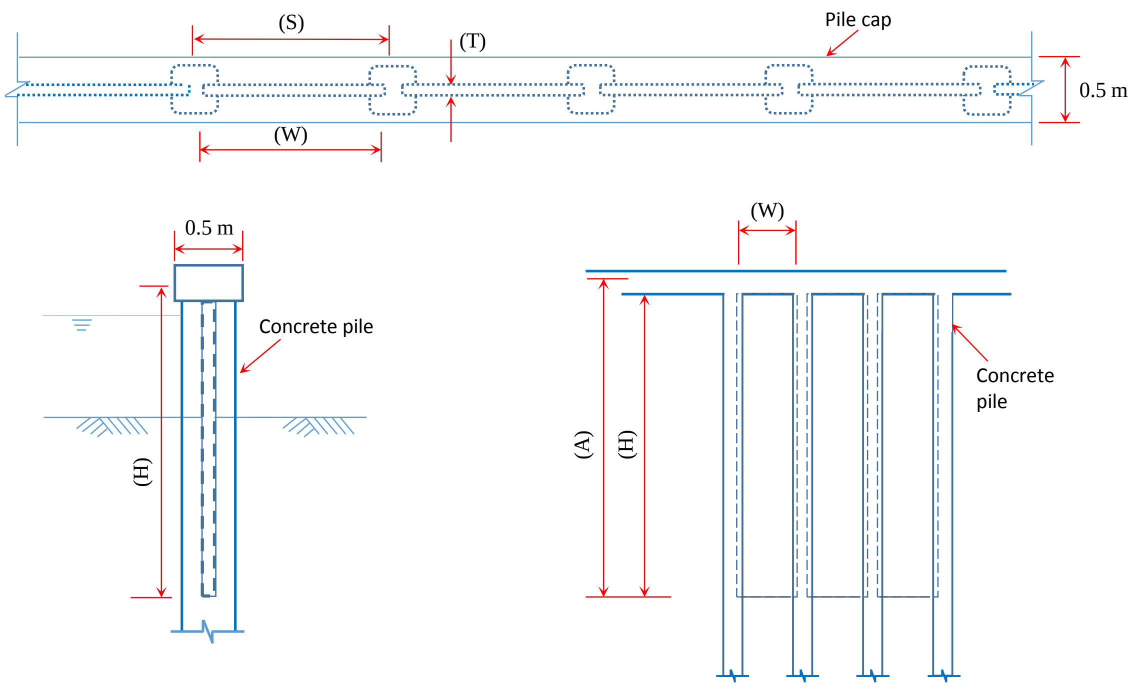


Figure 2 Detail of concrete retaining wall

Conventional methods for installation of steel sheet pile are percussion and vibratory. These methods produce noise and vibration to nearby existing structures or roadways. The vibration can cause fatigue or resonant frequency to structures and disturbance to the soil slope. As a result, it leads cracks to those structures or it will trigger a reduction of soil stability. In addition, these conventional methods require large working area for a machine and temporary platform. Occasionally, a nearby transportation system need to be shut down or rerouted for installation of retaining wall. Non-staging method or GRB system (Giken Reaction Base) proposed by Giken may be used to tackle these problems. This technique could construct retaining wall directly without any temporary platform.

Therefore, feasibility study has been performed. U steel sheet pile with 400mm width (typical size in Thailand) is selected to design for proposed retaining wall. Typical drawing of U sheet pile retaining wall is described in **Figure 3**. Long U sheet pile (L=15m) and short U sheet pile (L=6m) are connected alternatively. Long sheet pile is designed as structural element for resisting main lateral load and short sheet pile is designed as non-structural element for preventing water penetration.

Specification	Unit (m)		
	Type I	Type II	Type III
Size of concrete pile	40 x 40 cm	30 x 30 cm	40 x 40 cm
Length of concrete pile	9-15	9	9-15
Spacing of concrete pile (S)	1.00	1.00	1.00
Spacing for concrete (A)	5.30	5.30	5.30
Width of concrete sheet (W)	0.75	0.85	0.75
Height of concrete sheet (H)	5.00	5.00	5.00
Thickness of concrete sheet (T)	0.10	0.10	0.10

Table 1 Specification of typical concrete retaining wall

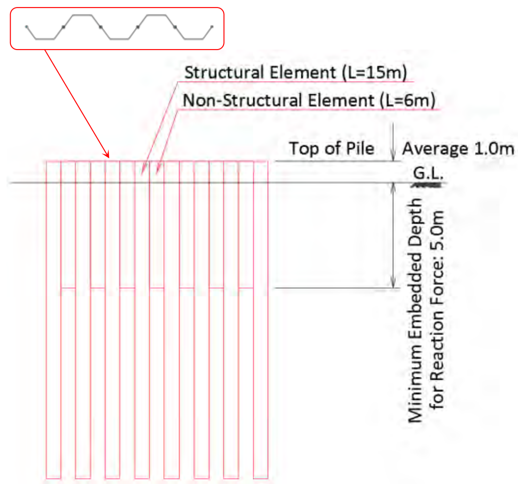
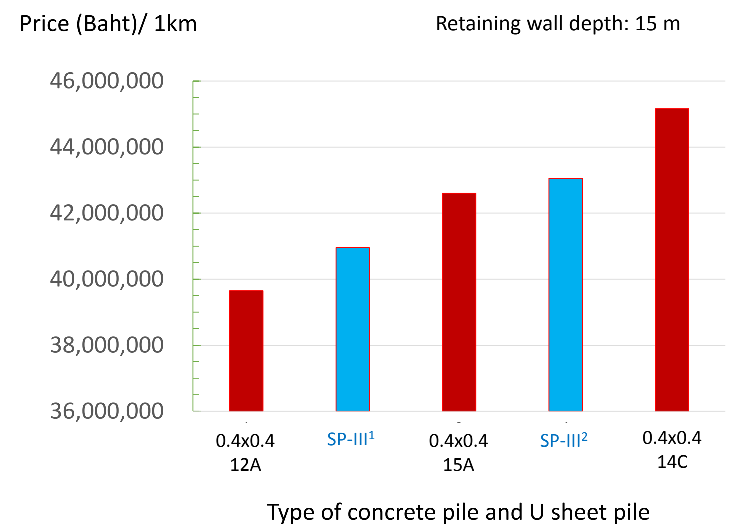


Figure 3 Drawing of U steel sheet pile wall (SP-III A)

	Description	Spacing (m)	Section Modulus Z (cm^3)	Section Modulus Z (cm^3/m)	Moment of inertia I		Elastic Modulus E x 10^8 (kN/m^2)	EI (kNm^2/m)
					(cm^4)	(cm^4/m)		
Concrete Retaining wall	0.40x0.40m	1,000	11,447	4,579	228,933	91,573	0.25	22,893
Steel sheet pile wall	SP-III A	400	-	760	-	11,400	2.10	23,940

Table 2 A comparison between concrete retaining wall and steel sheet pile wall

From **Table 2**, it could be seen that steel sheet pile wall can be used as substitute for concrete retaining wall because EI value of proposed steel sheet pile wall is higher than existing concrete retaining wall. Typical price of concrete retaining wall and steel sheet pile wall including material, workforce and instruments are summarized in **Figure 4**. Type of concrete pile retaining structure are divided by size of the pile, length of pile and quantity of reinforcement of pile cap. A price difference between SP-III[1] and SP-III[2] come from an approximately range of installation price by Silent Piler in Thailand. A comparison price shows that price of Steel sheet pile wall is between the highest and the lowest price of concrete retaining wall. Therefore, steel sheet pile wall could be considered as alternative solution to solve a collapse of concrete retaining wall during drought season. In addition, a restoration process of road failure due to wall collapse need to clear a slide pavement as shown in **Photo 2**. As the less requirement of temporary platform area for the Press-in Method, the installation of new retaining wall and remove of debris pavement during the restoration process can be conducted simultaneously which is the great benefit to the rehabilitation time. Finally, It is inevitable that an adverse effects caused by vibration and noise become more and more serious due to limited space, sloped working area and environmental concern. Silent technology is a promising solution that can handle these difficulties. As a result, there is an opportunity for Silent technology in the Thailand market.



Note: SP-III[1] for installation price = 400 baht/m²
SP-III[2] for installation price = 600 baht/m²

Figure 4 Comparison price between concrete retaining wall and steel sheet pile all

Photo 2 Restoration process of road settlement

Announcement

A Handbook published by IPA

IPA Editorial Committee

IPA editorial committee published the "**Press-in retaining structures: a handbook (First edition 2016)**" in December, 2016. The handbook brings together essential and useful information related to the design and construction practices of retaining structures by the Press-in Method. The Handbook also includes ample application examples of retaining structure construction project in various parts of the world, including UK, USA, Mexico, Singapore, Sri Lanka, Canada, France as well as Japan. Although much of the background materials for this edition of the Handbook refers to the Design and Construction Manual of the Press-in Methods (in Japanese) published in 2015, based on Japanese experiences over forty years, the contents of the Handbook were extensively revised and supplemented with the consideration that design code and practice varies from place to place.

The Press-in Method using a family of Silent Piler has been developed in Japan and has spread over various countries. Silent Piler is a piling machine which grips and presses a pile/sheet pile into the ground statically while gripping the top of the previously installed piles/sheet piles as a source of reaction force. The machine also has a function of self-walking. These unique features of the Silent Piler offer key features of the Press-in Method, which includes the following.

- Environmentally friendly construction, with low noise, low ground vibration, and environmental impacts
- Small construction yard and space required without temporary structures, reduction in construction period and cost
- Safe and sure construction with high precision
- Versatile to a variety of ground conditions, applicable to hard ground, can penetrate through existing structures
- Applicable to a variety of piles/sheet piles
- high-quality construction method, construction of high-quality piles/sheet pile structures

The method also has superior features to automatically gather the monitoring data during piling operation, including machine performances and penetration resistance with depth. Accumulated these data together with further development of Silent Piler functions would lead the Handbook to be revised to catch up the state-of the art technology.

We anticipate that this Handbook will be of particular interest to civil and geotechnical engineers with little or no experience of the Press-in Method. The target readers for this handbook also include piling engineers, design consultants and contactors. We hope more and more people to use the handbook to their projects.

- To those who would like to purchase the Handbook, please contact IPA secretariat (tokyo@press-in.org).
- Price: USB form (10,000 Yen + postage),
  Printed form (541p) in a hard binder (on demand) + postage
- IPA Members can purchase it with 10% reduced price.

Event Report

IPA Seminar on Press-in Technology in Singapore

Prof. Leung Chun Fai
Local Organizing Committees Chair
Department of Civil Engineering, National University of Singapore

The IPA seminar held at the National University of Singapore Kent Ride Guild House on 2 March 2017 was co-organized by IPA and Geotechnical Society of Singapore (GeoSS). The Seminar was supported by the National University of Singapore, Singapore Institute of Technology and University Tun Hussein Onn Malaysia and sponsored by Giken, Nippon Steel and Sumitomo Metal Corporation and JFE Steel Corporation. About 100 participants from Singapore and Malaysia attended the seminar.

During his introductory remarks, IPA chairman Prof. Osamu Kusakabe iterated that the aim of the seminar is to update the latest development in press-in technology and to highlight the important issues regarding the design and construction of press-in piling in the newly published IPA Press-in Piling Handbook English Edition. The first presentation was made by GeoSS Immediate Past President Dr. Tiong-Guan Ng who elaborated on the design aspects of press-in piling and practical considerations drawn from previous projects in Singapore. This is followed by the presentation of Professor Yoshiaki Kikuchi who represents the IPA. Prof Kikuchi summarized the first several chapters of the Handbook on the adoption and use of press-in piling and pointed out the important issues in the Handbook that the participants can look for when designing retaining and other structures using the press-in technique.

Photo 1 Opening address by IPA chairman Prof. Osamu Kusakabe

After the tea break, GeoSS Committee Member Dr. Teoh-Yaw Poh presented the risks involved in installing and extracting sheet piles with structures nearby. He also highlighted some good practices to mitigate the risks. Mr. Tsunenobu Nozaki representing IPA gave the final presentation by referring to the key points in the Handbook on the construction issues related to press-in piling. A video prepared by Giken Seisakusho Asia Pte Ltd was shown to the audience on the many press-in technique projects carried out in Singapore and other parts of the world.

A discussion forum chaired by Dr. Teik-Lim Goh of Singapore and Dr. Nor Azizi Yusof of Malaysia with the 4 speakers as the panelist was held as the last part of the seminar. During the Forum, many questions were raised by the audience with Mr. Nozaki being the busiest panelist as many questions are related to the construction and cost aspects of press-in technique. The panelists pointed out that press-in piling is the only technique feasible when installing sheet piles right next to existing buildings and the lowest headroom achievable for sheet pile installation using press-in technique is about 1 m and this is far superior to other available techniques. During the closing remarks, the Seminar Chairman Prof Chun-Fai Leung highlighted that although press-in installation of sheet pile walls is generally more expensive than conventional sheet pile installation involving vibration, engineers should evaluate the entire scenario including safety, time and other aspects. Professor Kusakabe then announced that the next IPA Seminar will be held in Kuala Lumpur, Malaysia tentatively in October 2017.

Photo 2 Moderators and panel members during forum discussion

Photo 3 Question raised by a participant during discussion forum

Serial report (Part 1)

Terminologies in press-in engineering

IPA Editorial Committee

The **"Press-in retaining structures: a handbook (First edition, 2016)"** has been issued in December 2016 and the first seminar to utilize this handbook was held on 2nd March 2017 in Singapore. The Editorial Committee has sort out over 500 of terminologies and picked up 64 of key terminologies in conjunction with the handbook. IPA Editorial Committee introduce those as the Serial reports for your reference.

The first report introduces basic terms of "the Press-in Method" and related 12 terminologies as follows:

Terminologies	Definitions
jacking	generic term for pile installation techniques by means of static load, where the reaction force can be ensured either by heavy weight or extraction resistance of adjacent piles Note; "pressing" can be used as an equivalent term
pressing	generic term for pile installation techniques by means of static load, where the reaction force can be ensured either by heavy weight or extraction resistance of adjacent piles Note; "jacking" can be used as an equivalent term
jacking/pressing machine	general term of jacking/pressing machine that presses piles/sheet piles into the ground by a static load such as hydraulic pressure
the Press-in Method (pressing method by Silent Piler)	piling method to install piles/sheet piles with static load by Silent Piler, using extraction resistance of the previously installed piles/sheet piles as reaction force
Silent Piler	the jacking/pressing machine to install piles/sheet piles into the ground with a static load (hydraulic pressure), and also with a feature to use extraction resistance of previously installed piles/sheet piles by clamping them. This is a collective term for a variety of pressing machines such as Tubular Piler, Clear Piler and Zero Piler etc.
standard Press-in	pile installation by Silent Piler without driving assistance such as water jetting or augering
driving assistance	techniques to reduce the penetration resistance during pile installation by Press-in Method, such as water jetting, augering, augering, and rotary cutting for difficult ground conditions
water jetting	the driving assistance for the Press-in Method by in injecting high pressure water into the ground from the nozzle attached to the lower part of the pile/sheet pile to reduce pile toe resistance and shaft friction
augering	the driving assistance for the Press-in method by augering, used in hard ground
air system	system to inject air at the pile toe, used with a water lubrication system to reduce rotational resistance when the Gyro Piler is used
non-staging system	a press-in system that enables all the piling machineries necessary for the press-in operation to moves by itself (self-walking) on the previously installed piles/sheet piles
basic configuration of Press-in machines	basic configuration of the machine that is comprised of a power unit, a reaction stand, a radio controller and a pile laser for Silent Piler to carry out pile(s)/sheet pile(s) installation

(To be continued on the next issue)

Report

Press-in Technology - Agenda of Odessa National Maritime University

Prof., Dr. Michael Doubrovsky

Head of department "Sea, River Ports and Waterways"
Odessa National Maritime University

During several latest years Press-in technology has been in the focus of teaching and studies in Odessa National Maritime University (ONMU) – the only Ukrainian university training in the sphere of maritime and coastal construction. Press-in advanced construction approach is proposed for learning at the School of Water-transport and Offshore Structures (Department "Sea, River Ports and Waterways"). Ukrainian students – future civil, port and coastal engineers - acquaint with theoretical basis of press-in method as well as with Five Construction Principles (see poster made by students of the University).

Besides lecturing for undergraduate (bachelor and master) students some original studies are proposed also for PhD students (tutor – Prof. M.Doubrovsky). Some aspects and peculiarities related to press-in installation of sheet piles and steel tubular piles are studied by both theoretical (numerical modeling) and experimental (physical testing in-situ and in laboratory conditions) ways.

So it could be considered as reasonable further development of such ONMU activity in particular using cooperation with IPA and Giken Ltd. As one of prospective direction of such cooperation we may consider contribution to translation of Press-in hand book for 15 countries of former Soviet Union (Russian version); we have gained positive experience in similar activity providing recent successful utilization of Russian and Ukrainian versions of "Implant Structure" brochure.

Figure – Poster in Odessa National Maritime University briefly describing some aspects of Press-in technology and IPA activity.

Report

Activity plans of three technical committees

■ Establishment of three technical committees

Research Committee

IPA Research Committee, chaired by Prof. Tatsunori Matsumoto of Kanazawa University, has established three technical committees (TC1-3). The activities of the TCs are commonly meant to attain three things: 1) experiments and analyses can be carried out adequately, 2) research results can be reflected to the real society smoothly, and 3) young engineers and researchers can have good opportunities to improve themselves. The activity plans are now being arranged by the chairpersons and key members of each committee, as introduced below.

■ Activity plans of TC1

Dr. Jiro Takemura,

Tokyo Institute of Technology

◆**Title** : Technical Committee on Application of Self-retaining Tubular Pile Wall to Stiff Ground (tentative)

◆**Period** : From April 2017 to March 2019 (3 years)

◆**Background** : Self-standing tubular pile walls have increasingly been adopted as a part of retaining structures on roads or a part of revetments in coastal areas. However, especially when the wall is embedded into a stiff ground, such as soft rock, an adequate design method has not been developed. If the wall is designed based on the existing methods, there is a possibility that the embedment depth is required unnecessarily large, leading to the increased construction cost and period, which hinders the wide application of this type of wall.

◆**Objectives** : To grasp the static and dynamic behavior of the self-retaining tubular pile wall embedded into a stiff ground, and propose a practical design method in order to determine the rational wall embedment depth.

◆**Methodologies** : Literature review, centrifuge test, numerical analysis and design calculation.

◆ **Current situations** :Preparatory meetings were held on December 12, 2016 and February 23, 2017 at IPC (International Press-in Center, Tokyo) and on January 19, 2017 at TIT (Tokyo Institute of Technology, Tokyo). Existing design codes as well as past researches (Figure 1 shows a preliminary test result obtained from a centrifuge model) on this kind of structure, including socketed piles, are now being reviewed, and the plan for the centrifuge test on tubular pile in stiff ground is being discussed.

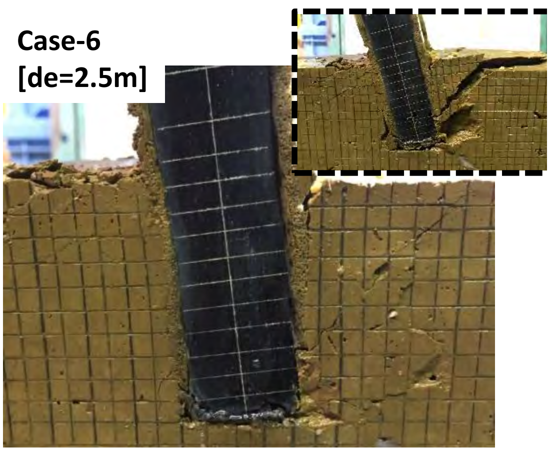


Figure 1 Preliminary centrifuge model test result: observed failure pattern of self-standing wall embedded in soft rock with depth.

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Activity plans of TC2

Dr. Osamu Kusakabe,

International Press-in Association

◆**Title** : Technical Committee on Estimation of Subsurface Information using Press-in Data

◆**Period** : From November 2016 to March 2017 (5 months)

◆**Background** : In general, the subsurface information provided to the designers or contractors of structures with piles are interpolated from the results of site investigations that are conducted separately from each other, sometimes with the interval of as far as 100 meters. On the other hand, the ground in reality often contains local variations. This difference between the existing information and the reality related to the ground is one of the factors that make a difficulty for the validation of the design and the construction itself of structures with piles. In the Press-in Method, it is possible to obtain data such as jacking force and penetration depth during the processes of press-in piling of every single pile. By taking advantage of this feature as a technology of informative construction and ICT, it is expected that the design and the construction of the structures with piles can be more rationally carried out. In addition, this feature is also expected to provide adequate responses to Japanese MLIT Notice No. 468 issued in March, 2016 (compulsory submission of documents of the evidence of proper construction control).

◆**Objectives** : In order to promote the use of press-in data, this TC has objectives: (1) to summarize the estimation methodology and (2) to present estimation results and (3) to validate the applicability of the technique of estimating the subsurface information from the press-in data. And subsequently (4) publish a technical material.

◆**Methodologies** : Summary of past researches, collection of press-in data, editing/discussion/revise of the technical material

◆ **Current situations** : A draft of the technical material, as shown in Figure 2, was completed and had been reviewed by February 20, 2017. The revise is being undertaken, and a meeting will be held in the beginning of April. Then the final version will be completed and will be published in April, 2017.

Figure 2

Activity plans of TC3

Dr. Jun Otani

Kumamoto University

◆Title : Technical Committee on Expansion of Applicability and Assessment of Dynamic Behavior of PFS Method (tentative)

◆Period : From April 2017 to March 2019 (3 years)

◆Background : Although the Sheet Pile Method has long been used as temporary works, it has recently been used as permanent structures, including coastal structures and others. Settlement countermeasure work in a soft ground is one of them. PFS Method (Partial Floating Sheet-pile Method) is a construction method where sheet piles are installed near the foot of slope of the embankment to prevent the settlement of the embankment on the soft ground, with some of the sheet piles floating in the soft layer, as shown in Figure 3, to provide the efficiency in economy and construction process. Since the research society on PFS Method published a technical material in 2005, this method has been adopted widely in Japan, especially in Kyushu District. In addition, the effectiveness of the Sheet Pile Method against the earthquake has been reported after the recent earthquake events such as the 2011 off the Pacific coast of Tohoku Earthquake and the 2016 Kumamoto Earthquake. On the other hand, the effectiveness of PFS Method on the lateral flow or the earthquake has not been understood.

◆Objectives : Regarding the PFS Method, grasp the stability against the lateral flow and the behavior during the earthquake, and propose a practical design method, attempting to develop a sheet pile method that is helpful in protecting the society by being efficient in economic point of view and at the same time being effective against the earthquake. In addition, enhance the presence of Japanese construction world in abroad, by internationally informing of this method.

◆Methodologies : Literature reviews, collection of site data, centrifuge test, numerical analysis, design calculation

◆Current situations : A preparatory meeting was held on January 29, 2017, as shown in Figure 4. Since then, the literature review has been carried out and the information of completed sites have been collected. Based on these information, detailed plans including the conditions of numerical analyses and centrifuge tests will be arranged in the coming several months.

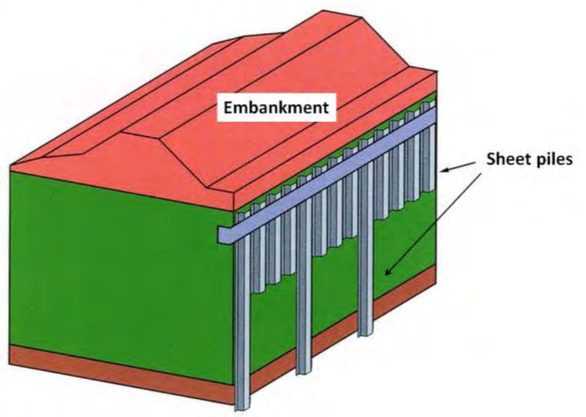

Figure 3

Figure 4

Event Diary

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

IPA Board Meeting
July 20, 2017/ Tokyo, Japan

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

International Conference on Press-in Engineering (ICPE) 2018, Kochi
September 19-21, 2018/ Kochi, Japan

■ International Society for Soil Mechanics and Geotechnical Engineering
http://www.issmge.org/events

First JTC1 Workshop on Advances in Landslide Understanding
May24-26, 2017/ Barcelona, Spain

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

9th INTERNATIONAL CONFERENCE Physical Modelling in Geotechnics 2018 (ICPMG 2018)
July 17-20, 2018/ London, United Kingdom

5th GeoChina International Conference-Civil Infrastructures Confronting Severe Weathers and Climate Changes: From Failure to Sustainability
July 23-25, 2018/ Hangzhou, China

■ Deep Foundations Institute
http://www.dfi.org/dfievents.asp

Piled Foundations & Ground Improvement Technology For the Modern Building and Infrastructure Sector
March 21-22, 2017/ Melbourne, Australia

DFI-India 2017: 7th Conference on Deep Foundation Technologies for Infrastructure Development in India
October 5-7, 2017/ Chennai, India

IFCEE 2018
March 5-10, 2018/ Florida, Buena Vista

DFI-EFFC International Conference on Deep Foundations and Ground Improvement
June 6-8, 2018/ Rome, Italy

■ Construction Machinery Events

CONEXPO-CON/AGG 2017
March 7-11, 2017/ Las Vegas, NV, United States
http://www.conexpoconagg.com/

Contech Vietnam 2017
April 25-28, 2017/ Hanoi, Vietnam
http://contechvietnam.com/en/

Intermasz 2017
May 23-25, 2017/ Poznan, Poland
http://www.intermasz.pl/en/

Construction Equipment and Technologies (CTT) 2017
May 30-June 3, 2017/ Moscow, Russia
http://www.ctt-expo.ru/en/

14th Beijing International Construction Machinery Exhibition & Seminar (BICES) 2017
September 20-23, 2017/ Beijing, China
http://www.e-bices.org/engdefault.aspx

■ Others

Pile 2017
"International Conference on "Advancement of Pile Technologies and Case Histories"
September 25-27, 2017/ Bali, Idonesia
https://www.pile2017.com/

2017 Global Platform for Disaster Risk Reduction
May 22-26, 2017/Cancun, Mexico
http://www.unisdr.org/conferences/2017/globalplatform/en

International Tsunami Symposium (ITS) 2017
August 21-25, 2017/ Bali, Indonesia
http://itsbali2017.com/meetingsite

International Disaster and Risk Conference (IDRC) 2017
November 25-27, 2017/Sendai. Japan
https://idrc.info/2017/

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Editorial Remarks

The Editorial Board is pleased to publish Volume 2, Issue 1 on schedule. This issue highlights the report on the IPA Seminar on Press-in Technology held in Singapore in March 2, 2017. This issue also includes an interesting contribution on 'Current Practice in Thailand', and more to read. Please notice that the corner of 'Corporate Members' indicates the 10 new members in a larger Fonts. Welcome to IPA.

IPA Newsletter has been distributed to over 2,200 readers. The Editorial Board is pleased to receive contributions from the members.

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.