

Report

From IPA Singapore Regional Office

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Introduction

The Asian IPA regional office is Giken Seisakusho Asia Pte., Ltd., which is a subsidiary of GIKEN LTD. It has been promoting the Press-in Method in Asia, with the exception of China. In 2021, a representative office in Thailand was established to promote the Press-in Method proactively in countries such as Thailand, Cambodia, and Vietnam, in and around the Mekong River basin. This report discusses the current climate of the Press-in Method in Asia, collaboration with the IPA, a recent case study in Singapore and future prospects of the Press-in Method in Asia.

The Press-in Method in Asia

The utilization of the Press-in Method is increasing in Asia, particularly in major cities such as Singapore and Bangkok, owing to the Press-in machine's low noise, low vibration and compact size. Until now in Singapore, the U-shaped steel sheet pile type 4 has been commonly used for temporary structures; however, the number of projects utilizing Hat-type sheet piles (900mm wide) for temporary structures has been increasing since 2018. This can be attributed to Singapore's implementation of Eurocodes, as its building codes in 2013. With Eurocodes, U-shaped sheet piles require that "Reduction Factors" be considered (as the interlocking position is located on the center line of the wall), reducing the U-shaped sheet pile properties. In contrast, Hat-type sheet piles do not require the consideration of "Reduction Factors" as the interlocking position is not located on the center line of the sheet pile wall. Therefore, with Hat-type sheet piles, it is possible to reduce the total weight of a sheet pile wall, as well as to reduce the number of struts, which is a significant advantage. Hence, Hat-type sheet piles are being increasingly utilized/adopted in Singapore. Currently, we are also targeting Thailand to promote the Press-in Method with Hat-type sheet piles. The Press-in Method has been specified on the Pasak River project, which has been ongoing since May 2022, and we are working on specifying it on other large river projects.

Collaboration with IPA Directors

In association with the IPA President, Professor Chun Fai Leung and Auditor Dr. Goh Teik Lim, we are in the process of planning the third International Conference on Press-in Engineering (ICPE 2024). It will be held in Singapore in 2024, and this will be the first ICPE to be held outside of Japan. In Thailand, regular meetings are held with Director Dr. Pastsakorn Kitiyodom to discuss project information and exchange opinions about the potentials of the Press-in Method (Fig. 1). He also cooperated in the writing of "Press-in Retaining Structures: A Handbook Second Edition, 2021 (Thai Version)" (Fig. 2). In Malaysia, Vice President Dr. Nor Azizi Bin Yusoff has held several Press-in Method webinars during the pandemic. In addition, his team is trying to specify the Press-in Method on a retaining structure project. Unfortunately, owing to the pandemic, there were few opportunities to work with him on promotional activities. Despite that, promotional activities in Malaysia will resume shortly.



Fig. 1. Meeting with Dr. Kitiyodom (Thailand)

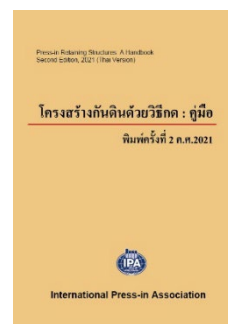


Fig. 2. Handbook (Thai version)

Recent Case Study in Singapore (Deep Tunnel Sewerage System Phase 2 T10 TS/SS site, Singapore)

In Singapore’s Deep Tunnel Sewerage System (DTSS) Phase 2 T10 TS/SS site, the Press-in Method with auguring was used for the first time in Singapore, to the installation of Hat-type sheet piles. The DTSS is a system used for water collection and transportation through a deep sewerage tunnel that transports domestically used water to water reclamation plants. It is then purified into ultra-clean water (NEWater). Hat-type sheet piles were installed to form a series of cofferdams which are used as TBM tunnel shafts.

The TS site is located in the vicinity of schools, roads, MRT railway, and residential areas. Therefore, minimizing vibration and noise was essential, making the Press-in Method well suited for the task. Moreover, there was no risk of the press-in machine overturning as it securely grips the previously installed sheet piles. Furthermore, the compact size of the press-in machine allowed it to function in an extremely narrow working space. Finally, as the maximum SPT N value was over 400, press-in with auguring was adopted as the best method.

As shown in Fig. 3, the excavation depth was over 20m. The U-shaped sheet pile type 4 did not meet the required bending stiffness; therefore, a soldier pile wall was considered. A soldier pile wall is a combined wall, using U-shaped sheet piles and H piles. To meet the required bending stiffness of the retaining wall, it would have been necessary to use large H piles in the soldier pile wall. For this reason, Hat-type sheet piles 50H (sheet pile length of 26.0m) were utilized instead of U shaped-sheet piles and soldier piles. Fig. 4 shows the overview of the construction site and Fig. 5 is the photo of the construction in progress.

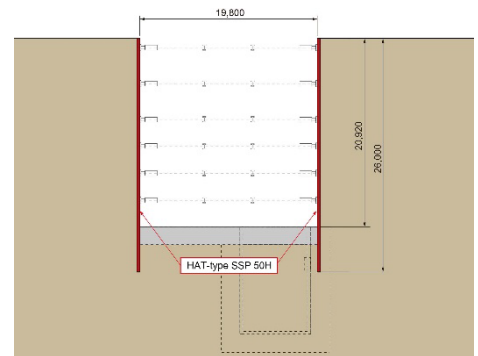


Fig. 3. Cross section (TS site)



Fig. 4. Overview of the construction site (TS site)



Fig. 5. Piling in progress (TS site)

Future Prospects for the Press-in Method in Asia

One of the IPA research activities is the TC5, which is to research the influence of the operator’s skill and experience on the performance of press-in piling. The paper, which was successfully published, concluded that the operator’s experience and skill play an important role in effective press-in piling with minimum risk of machine damage. In Singapore, the Giken Total Support System (GTOSS) ASIA was launched in October 2021. One of the purposes of GTOSS ASIA is to improve the press-in machine operator’s skill. Therefore, we dispatched a skilled instructor to sheet piling companies in Singapore as skillful operators are one of the key factors in promoting the Press-in Method. GTOSS ASIA will be launched not only in Singapore but also in Thailand and Taiwan in the near future, as there are several projects utilizing the Press-in Method. As we move forward, we continue to provide the best possible proposals to our stakeholders regarding the adoption of the Gyropress Method (Rotary Cutting Press-in Piling Method for steel tubular piles). Finally, the pandemic completely changed the world; however, our goal remains the same. We will continue to cooperate with IPA offices in Japan and other countries to promote the Press-in Method in both Asia and around the world.