

On-site Interview

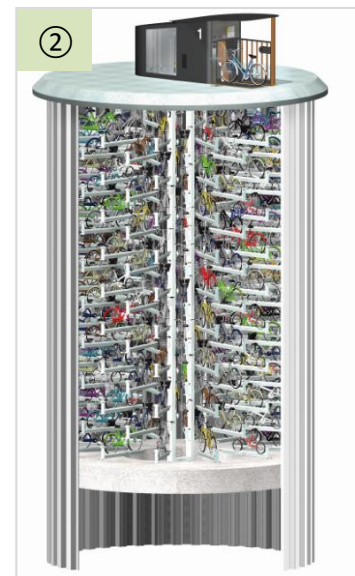
Construction of underground bicycle parking (Eco Cycle) in Sumida ward, Tokyo

Ms. Hongjuan He

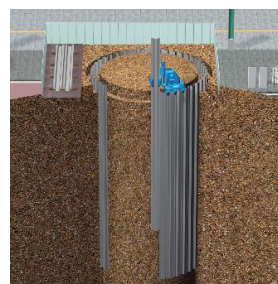
IPA Secretariat

I visited the construction site of the underground bicycle parking system at the vicinity of the JR Kinshicho Station on August 2, 2018. I met Messrs. Yohei Nakayama and Mizuho Yokoyama of GIKEN SEKO CO., LTD. there and interviewed them. I sincerely appreciated that they shared a very valuable information with me.

Illustration 1 - Illustration 4 are the images of completion



Construction Sequence



1. Installing piles to form the cylindrical wall



2. Excavation of soil from the cylinder



3. Installation of the Parking Machinery

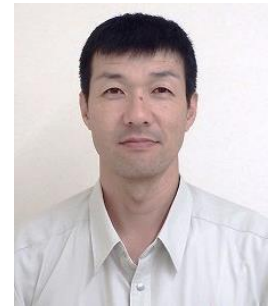


4. Fixing the entrance booth

Profile of Mr. Yohei Nakayama, Assistant Manager of GIKEN SEKO CO., LTD.

Mr. Nakayama Joined GIKEN Group in April 1996 and have worked on the Press-in construction projects including Hard Ground Press-in Method and Gyropress Method for 19 years. This is his 13th experience on the underground bicycle parking project and he is assigned as the operational manager.

Qualifications: The certified First-class Civil Engineering works Execution managing engineer and the Supervising Engineer in construction



Profile of Mr. Mizuho Yokoyama, Assistant Manager of GIKEN SEKO CO., LTD.

Mr. Yokoyama Joined GIKEN Group in April 1997 and has worked on the Press-in construction projects including Hard Ground Press-in Method and Gyropress Method for 19 years. This is his 12th experience on the underground bicycle parking project and he is assigned as the Chief Operator.

Qualifications: The certified Second-class Civil Engineering works Execution managing engineer and the First-class Press-in technician



Q1. Please explain me about the background and overview of this project.

Mr. Nakayama: Many illegal parking bicycles have found in the vicinity of JR Kinshicho station. Those are not only interfering pedestrians and emergency vehicles traffic but also causing social problems by impairing town's landscape. This area is congested with many commercial facilities and residential houses around the station so that it is difficult to build parking facilities above ground. These are main reasons why the underground mechanical bicycle parking system (ECO Cycle) was adopted. This underground bicycle parking system will accommodate 456 bicycles in two units. Construction period is scheduled in 8 months between June 2018 and February 2019. We hope this project will contribute to decrease the number of illegal parking bicycles substantially and a safe and comfortable walking space will be secured upon completion.

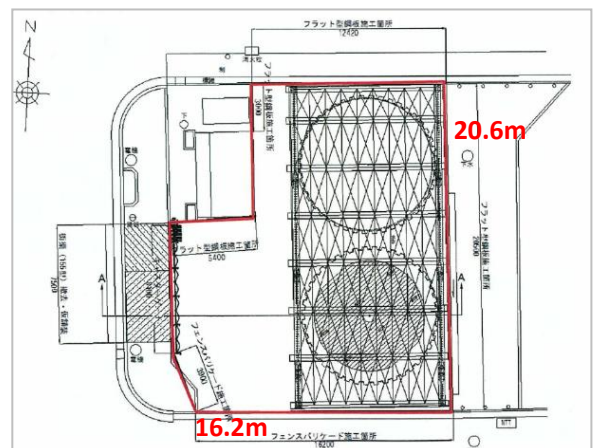


Figure 1: Site plan

Q2. What are the features on this project?

Mr. Yokoyama: There are two remarkable features. Firstly, the construction is carried out in a tight space with 20.6 m by 16.2 m surrounded by commercial facilities, residentials and roads (Figure 1 and Photo 1). 640mm width of Hat-shaped steel sheet piles in 18.2m long are installed in the project. The length of the steel sheet piles is almost equivalent to the width of the construction site, therefore placement of construction materials and equipment have to be properly arranged on the site with the progress of the project. Secondly, the sheet pile installation is carried out in a circular shape by utilizing a special made press-in machine. This special made press-in machine is the only one our company owns and the angles of the clamp and the chuck are adjusted along the arc of the circular installation, and the piling is carried out in a clockwise direction (Photo 2).



Photo 1 A view of Construction

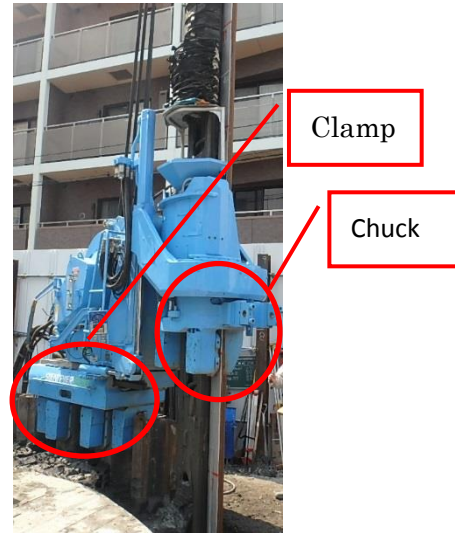


Photo 2 Silent Piler for Eco Cycle

Q3. Looking at the soil boring log, the site does not seem a stiff ground. Why is the augering system adopted?

Mr. Nakayama: There are two reasons. Firstly, the steel sheet piles in 18.2 m length are used in the project. With the repeated up-and-down stroke motions in the press-in operation, the longer sheet pile toe has tendency to be distorted during installation. Generally, there is the difficulty to manage the pile toe in a right position by dealing with the longer pile. The distortion of sheet piles is suppressed when the Pressing-in operation is assisted with the simultaneous augering, so that the position of the pile toe can be well controlled accurately (Photo 3). Secondly, we encountered underground obstacles which are not reflected in the SPT N-value in the soil boring log. Those obstacles have been left over in the ground due to the Great Kanto Earthquake in 1923. To protect pile materials from being damaged and to ensure accuracy in piling, the Press-in Method assisted with augering was adopted.



Photo 3 Checking distortion and verticality

Q4. What kind of measures did you take to prevent groundwater seepage from the interlocking of the steel sheet piles?

Mr. Nakayama: Expansive rubber water cut-off seal is securely mounted on the interlocking joint of the sheet pile at the factory in advance (Photo 4). To prevent water cut-off seal absorbing water like rain water prior to installation, the sheet piles are properly wrapped with waterproof materials and transported to the site. The rubber water cut-off seal expands by absorbing groundwater after the installation, then it prevents groundwater seepage thereafter. This measure is a unique application steel sheet pile to interlockings developed by our group company, GIKEN LTD.



Photo 4 rubber water cut-off seal

Q5. What was the most difficult problem in this project? How did you solve it?

Mr. Yokoyama: The most difficult thing was to control the curved sheet piles alignment. Forty-four (44) sheet piles are

installed as a unit of bicycle parking system. All of the 44 sheet piles are installed with different angles due to a circular shape. Further, the actual products are not accurately uniformed with 640 mm width as the catalogue data because of the product dimensional error. To make a circular enclosed coffer dam with 44 sheet piles, it is necessary to decide the placement of each sheet pile one by one for a resultant radius of the circle. In other words, angle and position of each 44 sheet pile are determined by the measured width, then the radius and circumference of a circle shall be determined accurately. At the site, a pile laser and a steel wire with a length of the radius are set up on the control platform located at the center of the circle, and the laser is radiated on the point measured by the steel wire. The forward angle and location of each sheet pile are determined with this way, and the press-in operation is carried out, putting emphasis on the construction accuracy (Photos 5 & 6). Placement of materials and equipment are also decided from the planning stage, while a construction plan is made, including how the piles used should be stuck up.

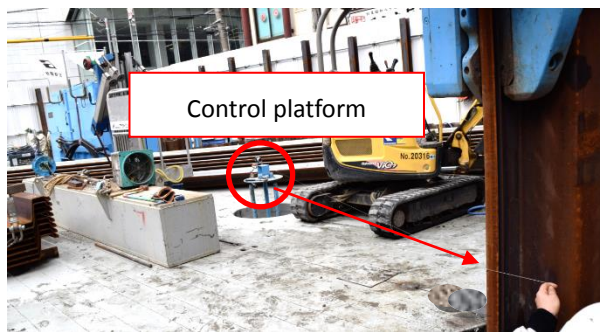


Photo 5 Control platform



Photo 6 Checking sheet pile position with the Piler laser

Q6. What was the most difficult and challenging site for you through your career?

Mr. Yokoyama: One-third of the Miyako-city in Iwate prefecture experienced serious disaster, due to the gigantic tsunamis occurred by the Great East Japan Earthquake in 2011. I was assigned to the site in Miyako-city in 2013 and took charge of a foundation construction of the disaster restoration work to build the 165 m wide flood control gate at the mouth of a river. The existing bedrock was found in shallower depth than expected during construction, and piles with a prescribed length had to be penetrated in to the bedrock. This seriously affected the progress of the construction duration. I was an under the extreme pressure to penetrate piles into stiff rock with very tight construction schedule. The issue has been studied and the prime contractor finally confirmed that “As long as enough bearing capacity is ensured, it is not necessary to embed the piles into ground with planned length.” As the conclusion, we ceased piling by ensuring an appropriate embedded length after the piles reached the bedrock. We have learned that the making a right decision in a timely manner is very essential as well as the improvement of construction understandings and skills for a disaster restoration work in particular.

Mr. Nakayama: I worked on the underground bicycle parking system like this project in front of the JR Chiba station in 2008. It was my first experience to conduct duties on site management. Since our company was the prime contractor for the project, I was in a position to assist the construction management. I could get to learn how to manage construction site little by little through valuable advices from experienced seniors parallel to daily work. There was the restaurant belowground next to the construction site. The restaurant owner filed complaints with respect to noise and vibration during the construction. I negotiated with him as the site administrative manager and took some measures including adjustment of construction time schedule to minimize the effect to restaurant’s business. I strongly felt, as the site administrative manager that it was very important to have a good site management programme to carry out a safe and smooth construction together with a good technical skill required in construction.

Q7. What is your view on how the young engineers and technicians should be trained?

Mr. Yokoyama: I feel some gap between young engineers and my generation now a days. However, I think it is important to train people for their needs, in a way goes with the times. We always tell them that the most important thing on site is safety, and we should carry out a risk prediction activity every day prior to the start of the daily work. We instruct them to predict risks in advance and carry out construction activities safely. It is important to train them in the technical parts, but the first priority is always safety.

Q8. What is your view on the future of the press-in technology?

Mr. Nakayama: As Japan heads for an aging society, the number of workers is gradually decreasing. I think the complete automation of the construction machinery could solve the problem of manpower shortage. In particular, the construction of ECO Cycle in which a high construction accuracy is required has high potential to be automated. To obtain accuracy required for coffer dams built in a circular shape, construction accuracy with high precision of positioning is required. I think automated operation of machinery will surely be helpful.

Mr. Yokoyama: Japan is a country with lots of natural disasters such as earthquakes and tsunamis. Very dangerous in sites after a disaster, since it is unknown when the secondary disaster will take place. Safe construction is considered possible, with remotely-controlled operations in a place away from the disaster area. I am hoping that if remote-control operation becomes possible, we can secure safety of the operators in the positive applications of press-in technology in disaster restoration works.

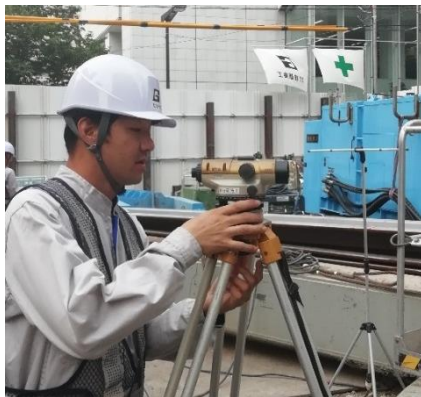


Photo 8 Mr. Nakayama is checking alignment with laser.



Photo 9 Mr. Yokoyama is operating the Piler.

★ Editorial notes :

Prior to the interview, we had paid attention to the function and convenience of the underground mechanical bicycle parking system from the users' point of view. But we found out through the interview that a high accurate planning and execution were required on actual construction sites.

We would like to thank the two persons we interviewed and other staff members for their cooperation.