

A unique construction method to avoid traffic congestion

— A proposal for construction innovation in Indonesian sewage pipe infrastructure



A tunnel boring machine painted with shark-themed illustration. (Photo: Iseki Poly-Tech, Inc.)

Indonesia is the world's fourth most populous country (approximately 247 million people), following China, India, and the United States. While the country has been developing rapidly, led by the capital city, Jakarta, where 9.6 million live, its systems of sewage, electric power, communications, and other infrastructure remain insufficient. Most under-developed among these is sewage, with just 2% of the entire population having access to sewage systems – the lowest level in Asia. Urban traffic jams are one of the main reasons why the construction of sewage infrastructure has been so slow. The number of car and motorcycle users is increasing every year. However, the construction of roads has not kept pace with the increase of users, leading to chronic traffic jams.

In order to avoid exacerbating traffic congestion, Indonesia has been calling for efficient underground construction methods that use less space on the road during the period of construction. ISEKI Poly-Tech, Inc. (headquartered in Akasaka, Tokyo), a tunnel-boring and peripheral equipment maker, responded to this call. The company has an extensive track record of serving overseas customers with its unique tunnel-boring machines and pipe jacking methods that can be used successfully for construction projects that entail long distance tunnels or curve digging.

"When digging for the installation of sewers and other pipelines, we usually use one of two methods – a cut and cover method or a pipe jacking method. The cut and cover method digs up a ditch spanning the length of the pipeline, and since that requires road traffic to be stopped for the construction period, it causes traffic jams. It also takes a lot of effort to put the soil back when the work is completed. On the other hand, with the pipe jacking method, we simply dig two holes in the ground using a tunneling machine. This method causes far less traffic congestion compared to the cut and cover method. This method can also be used for digging tunnels under rivers and railways, and construction can be completed without having to dig up a large amount of soil. That allows us to reduce the quantity of surplus soil from construction sites – which is treated as waste – and keep noise to a minimum. We commonly use this method in Japanese cities, and we thought it would also be useful for Jakarta, which suffers from heavy traffic jams. That is why we proposed the use



A Japanese engineer training the local operators in front of an operation panel. (Photo: Iseki Poly-Tech, Inc.)

of our machines and techniques," explained Mr. Tomoharu Wakita of ISEKI's Overseas Department.

This project was adopted as a JICA Pilot Survey¹ for Disseminating SME's Technologies to Developing Countries. It was started in September 2013 as the "Pilot Survey for Disseminating Small and Medium Enterprise's Technologies for Pipe Jacking for Sewage Works in Indonesia." The counterpart organizations in Indonesia are DKI Jakarta and PD. Pal Jaya. ISEKI undertook the construction of 300 meters of pipeline out of a total of 1,600 meters to demonstrate the pipe jacking method for local construction companies. "We applied for the project this time because we believe that in order to have this method be proactively adopted in Indonesian public work projects, we need to introduce and promote it by bringing our machines to actual construction sites and demonstrating the effects of the method first hand. A private company like us would never be able to work with a local government of a foreign country if not for projects like this supported by the Japanese government."

While the pipe jacking method itself exists in Jakarta, companies in the region have so far only been able to use it for short distance of around 100 meters per excavation, leading to problems such as prolonged construction. However, with ISEKI products and technologies, it is possible to dig through a long distance of 300 to 400 meters per excavation, making the work more efficient. That said, the actual work in Jakarta has taken much longer than expected, forcing the company to extend the initial project completion date from the end of June 2014 to the end of March 2015.

"Work does not always go how you think it would if this were Japan. For example, when we ask local construction companies to bring generators, they do not always bring them promptly, and even when they do, the generators are broken and so on. I realized how difficult it was to carry out construction work overseas."

For this project, JICA has purchased the machines from ISEKI and is lending them back to the company free of charge. For this reason, ISEKI has no concerns over the possible delay of payment from a counterpart country, which can be a big concern when working in developing countries. When the pilot project period ends, the ISEKI machines will be transferred from JICA to the local government, and they will be utilized for future construction projects.

If these construction method improvements can reduce traffic jams – even if only a little – in Jakarta, a place that has always been plagued with chronic traffic congestion, it will help improve people's quality of life as well as prevent great economic losses. In this way, Japan's advanced products and technologies are contributing to the construction of underground infrastructure in Indonesia, and helping to improve people's lives and promote the country's economic development.

*1 Projects that consider ways to promote products and technologies developed by Japan's Small and Medium Enterprises (SMEs) and other companies in developing countries through pilot and demonstration activities aimed at making the products and technologies more compatible to local conditions, based on proposals from such companies and other organizations. Projects are funded with up to a total of ¥100 million for a cooperation period of around one to three years.