MARINE CIVIL ENGINEERING

Operations

Tokyo International Airport (Haneda Airport) (Tokyo, Japan)

Haneda Airport started in 1931 as a small nationally run airfield with a single 300-meter runway. Subsequent extensions were continuously carried out to keep pace with the continually increasing demand of the airport. To respond to this growth, Toa Corporation, too, moved forward with its state-of-the-art civil engineering technologies. A new artificial island was completed at the Haneda Airport site and put to use for the 4th runway (2,500m). The construction was carried out in cooperation with multiple construction companies under a variety of difficult conditions, including using a hybrid pier/reclamation construction, a structure rarely used anywhere in the world, short construction periods, and quick execution under restrictions by airlines.

Toa Corporation's technologies were applied to nearly every part of the construction of the artificial island, including improving the weak foundation soil and producing landfill material by hardening dredged soil. Furthermore, the company dedicated itself to ensuring quality by grasping the ever-changing movements of the foundation in real-time through meticulous management of work execution that was reflected in subsequent processes.

Minami-Honmoku Container Terminal (Yokohama, Japan)

The Minami-Honmoku Pier is located at the Port of Yokohama, which is one of the ports in Keihin Port, a designated strategic international container port. With the aim of strengthening its international competitiveness, work is currently underway to make improvements to the facilities at the Minami-Honmoku Pier to transform it into an international container terminal capable of large-scale container ships to come alongside the quay. Columns measuring 32 meters high with a diameter of 24.5 meters constructed of steel sheet structure cellular were employed in the work to construct the earthquake-resistant quay's foundation. The quay will, in the future, have a façade that is sunk to a depth of 18 meters. Toa Corporation was involved in the project and successfully completed MC-3 phase and MC-4 phase(2007-2019).

Chubu Centrair International Airport (Aichi, Japan)

Chubu Centrair International Airport, inaugurated on February 7, 2005, is a first class airport with a 3,500m runway. It is designed to be the main international gateway to the Chubu (central) region of Japan. In order to be 24-hour operational, the airport is located in Ise Bay, 1.1km offshore of Tokoname City, Aichi Prefecture, to prevent disturbing local communities with airplane noise.

Throughout the construction of the 470ha artificial island, which commenced in November 2001, "Plug Magic" and "COS-NET," two of TOA's advanced technologies, played critical roles in building the 12km-long enclosing seawalls and reclaiming 56,000,000m³ of soil and earth in an economical, timely, safe, and environmentally-friendly manner. "Plug Magic" recycled the soft clayey material coming from dredging operations of navigational channels in Ise Bay into construction material suitable for reclamation, and saved 8,630,000m³ of soil from having to be transported from on-land sources in the vicinity. "COS-NET" was adopted by contractors involved in the projects as a common system to monitor and control working vessels, and ensure their smooth and safe navigation around the working area.

TOA's "Plug Magic" dredging method was adopted in order to maximize the recycling of dredged soft materials

Great East Japan Earthquake Disaster Recovery

The Great East Japan Earthquake that struck on March 11, 2011, caused devastating damage to the area inland from the coast, although the coastal disaster prevention forest along the coast of Miyagi Prefecture was effective to a certain degree, achieving such results as reducing damage from the subsequent tsunami. With the aim of realizing the early regeneration of the coastal disaster prevention forest through restoration of the damaged seawall and the land where subsidence had occurred, TOA took part in construction work on the embankment foundation and the restoration of the seawall.

TOA is involved in disaster recovery construction work on a large number of projects related to not only the Great East Japan Earthquake, but also for earthquake damage, and wind and flood damage throughout the country.

Namibe Port Rehabilitation Project (Angola)

The Namibe Port Rehabilitation Project was completed in the Republic of Angola.
This project was carried out with the assistance of Grant Aid from the Japanese government, and involved repair and maintenance work on the port facilities at Namibe Bay, which had suffered substantial deterioration. The work included restoration work on the quays, paving the yard, and installation of water supply facilities.
The construction work improved the efficiency and safety of various types of work being carried out in the port, such as increasing the volume of cargo handled, shortening the container handling cycle (loading and unloading work), and reducing the number of accidents when vessels are berthing, enabling this project to contribute to the development of the entire country.

The Port Vila Lapetasi International Multi-Purpose Wharf Development Project (Vanuatu)

Construction work has been completed on the Port Vila Lapetasi International Multi-Purpose Wharf Development Project on Efate Island, where the capital city of the South Pacific nation of the Republic of Vanuatu is located. This nation is made up of an archipelago of more than 80 islands stretching north to south. Many of the islands are experiencing a growing number of tourists who come to enjoy natural surroundings untouched by humans, which contributes to the nation's economic growth.

In order to handle the recent rapid increase in the volume of cargo that has resulted from this growth, a development project to improve the facility to be an international multi-purpose wharf was carried out. In this project, a new quay, with a length of 200 meters and made to a depth of 12.3 meters below sea level to handle mainly container ships, was constructed at a location 500 meters east of the current harbor, which had been shared by both cargo ships and cruise ships.

Jebel Ali Container Terminal in Design and Construction (United Arab Emirates)

A new container terminal has been completed in Dubai of United Arab Emirates in March 2015. For this construction project, an existing general cargo berth was redesigned and renovated as a state-of-the-art container terminal.
Jebel Ali Port is the largest marine terminal in the Middle East and also has the largest man-made harbor in the world. With the completion of the new container terminal, Port Jebel Ali has become able to handle 19 million TEU containers a year.
This project involves renovating the existing 1,860-meter berth at the Jebel Ali Free Zone Area (JAFZA), which is located in the United Arab Emirates and operated by DP World. Improvements was made to the existing berth (the quay has a depth of 11 meters) by constructing a container berth (1,860 meters) with a depth of 18 meters.
The work calls for the design and construction of container terminal including a 75-ha container yard behind the berth, building and Mechanical, Electrical and Plumbing (MEP) works.

Construction Work on Phase III of Container Terminal at Pasir Panjang Terminal (Singapore)

Singapore is one of the largest container handlers in the world. And the volume is increasing day by day. In order to alleviate congestion at the terminal in Singapore, and as part of an effort to increase the volume of containers to be handled, fifteen new berths were built at Pasir Panjang Container Terminal, without disrupting the operation of the terminal. Toa Corporation built 12 of the 15 berths that were built, as well as a container yard having an area of approximately 160 ha. On the west side of this terminal, TOA has also built 14 berths and a container yard covering an area of 140 ha, all of which are currently in operation.

Newly Completed Project

Construction Work on the Foundations of Offshore Stanchions as a Part of the Construction of the Yokohama Ropeway

Construction work has been completed on the foundations of offshore stanchions as a part of the construction of the Yokohama Ropeway.
Toa Corporation carried out the construction of three offshore stanchions for the YOKOHAMA AIR CABIN, the first urban-type circular ropeway in Japan, which began operations on April 22, 2021, connecting Sakuragicho Station with Unga Park in the city of Yokohama.
In addition to the requirement that the offshore stanchions had to stand at a maximum height of approximately 40 meters, it was necessary for the stanchions to be designed to be earthquake resistant and withstand a major earthquake in order to ensure the safety of nearby main roads and other structures.

■ **Client** Senyo Kogyo Co., Ltd.
■ **Construction period** October 2019 to December 2020
■ **Project outline** Driving of steel pipe piles: 12 piles
Frame construction work: 3 units
Electric anticorrosion work: 1 set
■ **Site of construction** Yokohama City, Kanagawa Prefecture

Lach Huyen Port Infrastructure Construction Project

■**Client** Ministry of Transport (Maritime Project Management Unit), Socialist Republic of Vietnam
■**Construction period** July 2015 to October 2019
■**Project outline** Breakwater(Outer Revetment B)
Construction work on sand control dyke, light beacons along sand control dyke
■**Site of construction** Hai Phong City, Cat Hai Province, Vietnam

The objective of the Lach Huyen Port Infrastructure Construction Project is to provide additional cargo capacity in the northern part of Vietnam. The construction work under Package 10 of the Project involved building Outer Revetment B, a sand control dyke, the installation of light beacons, and other ancillary works.
Outer Revetment B, which has a total length of 2,480 meters, was constructed to serve as a seawall to protect the reclamation area against the effects of extremely powerful waves by providing concrete block protection. Along the same alignment of Outer Revetment B, a sand control dyke with a total length of 7,600 meter was constructed to prevent or reduce possible shoaling or sedimentation of sand in the water area that provides access to the channel. In addition, the installation of six (6) light beacons provides navigational aids for marine transportation.