

MARINE CIVIL ENGINEERING

Operations

Since its foundation in 1908, TOA has engaged in reclamation and marine construction works through various projects all over the world. Among them are reclamation works for industrial areas and offshore airports; port and harbor facilities, such as wharves and breakwaters; transportation facilities, such as coastal roads and bridges; and recreational facilities, such as marinas.

In order to complete those projects safely and successfully, TOA has developed various construction methods, working vessels, and equipment to overcome severe natural conditions on and under the sea. In addition, as lifecycle management of infrastructures, environmental sustainability, and protection from natural disasters are becoming of greater concern to society, TOA has developed new technologies for renewal and reinforcement of structures, environmental assessment and pollution control, sub-surface and sub-ground survey, disaster prevention, and so on.

With these work achievements, advanced technologies and accumulated expertise, TOA has earned a reputation for more than a century as a reliable contractor of maritime construction and engineering. TOA will make all possible efforts to improve technologies and cultivate human resources in order to respond to growing engineering requirements and emerging concerns, and strive for the prosperity of society and sustainability of the natural environment.

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

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 (2,500 m).

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 enabling 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 20 meters. The project was started in the 2007 fiscal year and is scheduled to be completed in the 2012 fiscal year. Work on

MC-3 was completed in the 2015 fiscal year. At present, work is being carried out on MC-4.



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Manzanillo LNG Receiving Jetty (Mexico)

In June 2011, Toa Corporation completed work (design and execution) on the construction of an LNG Receiving Jetty, which was part of a construction project to build LNG Receiving and Supply Facility in Manzanillo, in the state of Corima, Mexico.

The client that placed the order for the construction was Terminal KMS de GNL, a special purpose company that was established for the purpose of building, owning and operating this LNG project.

It comprises unloading platform of 30 meters in width, 45 meters in length and 15 meters in depth, four breasting dolphins and six mooring dolphins.

In addition to executing the work on its part of the project, Toa Corporation was also involved as an Engineering Procurement and Construction Contractor of the LNG Receiving Jetty.



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 were 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.

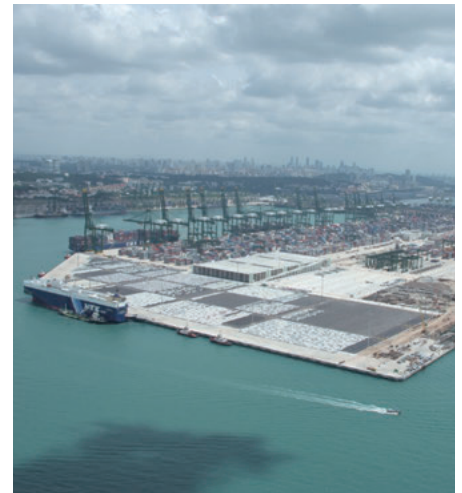
The work calls for the design and construction of container terminal including a 75-ha container yard behind the berth, building and MEP works.



Pasir Panjang Container Terminal, Phase II (Singapore)

The Port of Singapore, which is connected to 600 ports in 123 countries, is one of the largest container hub ports in the world. The Pasir Panjang Container Terminal, located in the southwest part of Singapore Island, will have a total of 26 berths at the completion of Phase I and II of the project. All container berths have been designed to have a depth of 15 meters and be equipped with gantry cranes capable of reaching out across 18 rows of containers, making it possible to accommodate Post-Panamax class container ships.

Since 2005, TOA Corporation has been awarded 6 separate contracts to construct 14 container berths with a total quay length of 4,330 meters and a carry ferry terminal. The last 4 berths, with a total quay length of 1,300 meters, were completed in October 2009.



Honiara Port Facilities (Solomon Islands)

Work has been completed on the Project for Improvement of Honiara Port Facilities in the Solomon Islands.

The international wharf facility for Honiara Port, which was originally established as a general cargo wharf, was unable to cope with the recent increase in the size of cargo containers and large vessels, and various problems, such as inefficiency in loading and unloading cargo and safety-related issues, were becoming more apparent. In order to realize the safe and effective operation of the facilities at Honiara Port, improvements were carried out on the facilities at International Wharf No. 2 and container yard. These improvements are expected to produce such positive results as eliminating the waiting times for berths.



■ Client

Ministry of Infrastructure Development,
Solomon Islands

■ Construction period

September 2014 to June 2016

■ Site of construction

Solomon Islands

■ Project outline

Steel pipe pile and sheet pile-type quay wall L=150m, north-side embankment L=122m, south-side embankment L=33m, concrete pavement A=12,648m², access road L=227m, lighting fixtures, water supply facilities

Runway Expansion at Naha Airport (Okinawa, Japan)

Construction work on GS Section Embankment Construction Work for Naha Airport Runway Expansion has been completed in Naha, Okinawa prefecture.

Naha Airport plays an important role not only as a first class airport that serves as the gateway to Okinawa, with connections to various domestic and international locations, but also as a hub airport connecting Okinawa's remote islands with the main island. It is anticipated that the construction of another runway will enable the airport to respond properly to demand in the future, as well as contribute to the sustainable growth and development of Okinawa prefecture, and serve as a key base for domestic and international airway network in the future.



■ Client

Okinawa General Bureau

■ Construction period

May 2014 to August 2016

■ Project outline

Underwater exploration, work on foundation, work on main body, coating & foot protection work, work on superstructure, auxiliary work, wave damping work, backfilling work and other miscellaneous work on landfill embankment at GS section, S section, E section of the Naha Airport Runway Expansion project