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

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 (see page 12 for details), played critical roles in building the 12km-long enclosing seawalls and reclaiming 56,000,000m^3 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 8,630,000m^3 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 (see page 12 for details) was adopted in order to maximize the recycling of dredged soft materials

Kansai International Airport 2nd Stage

Kansai International Airport 2nd Stage was to reclaim a new artificial 545ha island in the sea 200m off the existing island. The island was to have an average thickness of 19.5m and have a 4,000m-long runway parallel to the existing one, access ways between the two islands, and other related facilities. Development of the second island required the construction of a 13km-long seawall, reclamation of 250,000,000m^3 of soil, and improvement of the 20m-26m thick alluvial clay layer under the seabed. Work commenced in August 1999 and was completed in October 2005.

TOA devoted its rich experience and advanced technologies to carry out this super-scale project in a timely, top-quality, environmentally-friendly manner. Among these technologies were the "Beluga Surveying System," for accurate and speedy survey of the seabed formation (see page 12 for details), and the all-terrain GPS-positioning surveying buggy, for surveying wide and bumpy landforms.

Second Expansion Project in Tokyo International Airport

This project, carried out from 2005 to 2010, comprised the consolidation of D runway, cargo terminal, and apron. The consolidation of the D runway is aimed at expanding the capacity for arrivals and departures from the present 296,000 to 407,000 times annually by constructing a fourth runway. Completion of this project will make it possible to resolve constraints on the capacity for arrivals and departures, as well as upgrade conveniences for passengers from various routes, and secure future expansion of operations of domestic and international routes.

D runway, designed to handle the latest type of large-body aircraft, is 2,500 meters in length, 60 meters in width, and 13 to 17 meters above sea level. It has a hybrid structure that employs a newly-developed pier constitution. TOA is engaged in the construction of Section IV of the seawall reclamation works and the section for the joint part of the seawall-pier.

MARINE CIVIL ENGINEERING
Operations

Sakhalin II LNG Project in the Russian Far East

Provided by Sakhalin Energy

The Russian Government invited foreign investments to develop the natural gas and oil fields offshore of Sakhalin Island in the Russian Far East in the Sea of Okhotsk. For the Sakhalin II project, TOA was awarded contracts in 2003 to construct a LNG loading facility for natural gas processing, a liquefying plant, the foundations for the oil export terminal, and to provide ready-mixed for the entire project.
TOA overcame various difficulties that hampered the smooth execution of the construction work, such as the severe weather conditions that prevented offshore work throughout the winter and oftentimes other seasons as well, the strict environmental regulations to protect fish, other marine creatures, and their habitats around the worksite, and completed the project in 2008 on schedule.

Cai Mep International Container Terminal in Southern Vietnam

In 2008, a joint venture in which TOA Corporation acted as the representative partner of TOYO Construction Co., Ltd. received a new order from the government of Vietnam to construct the Cai Mep International Container Terminal. This project is being funded by an aid-loan of Japan's ODA program. The new container terminal is located at the estuary of the Thi Vai Cai Mep River, approximately 50km south of Ho Chi Minh City. It will have a 600m-long, 14m-deep quay capable of accommodating two 80,000DWT-class container ships at a time, and a 38ha container yard with a handling capacity of 600,000TEU to 700,000TEU of containers per year.
In the tender process, TOA's work achievements and advanced technologies for soil improvement works were highly regarded because the terminal was to be constructed over thick layers of very soft alluvial clay.

Pasir Panjang Container Terminal in 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 n October 2009.

Newly Completed Project

Saigon Premier Container Terminal

The terminal, located in the longest harbor constructed in Ho Chi Minh City in the Socialist Republic of Vietnam, was completed in December 2009. The facility has a 500-meter wharf and 23-ha container yard with a capacity of 16,000TEU, enabling it to handle 930,000TEU of containers a year. TOA was engaged in dredging work of 985,000m^3, construction work for a 500-meter pier-seawall, and pavement work for a container yard covering 23ha. With regard to the construction, TOA applied its original technology for soil improvement, such as the CDM (Cement Deep Mixing) method and PVD (Plastic Vertical Drain) method, earning high praise from the client.

Minami-Honmoku Container Terminal

In order to become an international port capable of handling giant container ships, container terminals with a depth of 20 meters, the deepest in Japan, were constructed. During the year under review, TOA manufactured and installed the Steel Sheet Structure Cellular to construct the 20-meter deep quay wall that currently extends to 400 meters.

The Steel Sheet Structure Cellular is the world's largest, measuring 32 meters in height and 24.5 meters in diameter.

Project owner: The Ministry of Land, Infrastructure, and Transportation of Japan.