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 14 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 14 for details) was adopted in order to maximize the recycling of dredged soft materials

Tokyo International Airport (Haneda Airport) (Tokyo)

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

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. At present, work is being carried out on MC-3, with plans calling for work to continue on MC-4.

MARINE CIVIL ENGINEERING

Operations

Sakhalin II LNG Project in the Russian Far East

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.

Saigon Premier Container Terminal

The Saigon Premier Container Terminal, located in the south part of Ho Chi Minh City, was constructed in the largest port in the city. This facility has a 500-meter wharf and a 23-ha container yard with a storage capacity of 16,000 TEU (20-foot equivalent container units), giving it the capability of handling containers totalling 930,000 TEU a year.

Making use of its many years of experience in construction work in the Mekong Delta region in southern Vietnam, TOA took part in the construction of this facility by undertaking measures to reinforce the soft ground in the delta region. TOA employed the cement deep mixing (CDM) method, a technology for ground improvement developed by TOA, earning high praise from the client.

The construction of such port and harbor facilities is seen as being a part of the port and harbor development projects promoted by the government of Vietnam. It is anticipated that this facility will make it possible to increase the volume of containers handled in the southern part of Vietnam.

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 in October 2009.

Newly Completed Project

Cai Mep International Container Terminal in Socialist Republic of Vietnam

Construction has been completed on this international container terminal, which was built adjacent to the Cai Mep and Thi Vai Rivers in Ba Ria-Vung Tau Province in the Socialist Republic of Vietnam.

The Vietnam Government plans to make the Cai Mep-Thi Vai area an industrial zone. The container terminal was constructed as a part of this plan through yen loans provided under Japan's STEP (Special Terms for Economic Partnerships), which can be utilized for such purposes as making use of Japanese soft ground stabilization technology for the construction of port facilities.

The construction site was located in mangrove wetlands, so prior to the start of construction work, landfill work and stabilization (through compaction) of the soft ground clay layer were carried out.

■ Client
Ministry of Transport in the Socialist Republic of Vietnam

■ Construction period
October 2008 to October 2013

■ Project outline
- Container Wharf (Length:600m, Depth:14m)
- Two Approach Trestle (each 20m wide, Length:85m)
- One Approach Trestle (40m wide, Length:85m)
- Mooring and Turning basin (Diameter:600m Depth:14m)
- Soil Improvement Work (PVD and Surcharge)
- Container Terminal Yard (40ha)
- Buildings (Container Freight Station, Office etc.;Total of 9 buildings)
- Utilities Works (Drainage, Sewerage and Fire Fighting)
- Electrical Works

Main Body of the Breakwater (offshore) (Disaster recovery construction work) in the Honko Area, Port of Soma in Fukushima Prefecture

Two years have passed since the Great East Japan Earthquake, and recovery work is being steadily undertaken at the Port of Soma in Fukushima Prefecture as well, where a tsunami measuring approximately ten meters in height had caused devastating damage.

Toa Corporation was responsible for constructing nine caissons, utilizing the floating docks at Onahama Port in Fukushima Prefecture, and then transporting the caissons to the Port of Soma and carrying out the work for their temporary placement.

■ Client
Tohoku Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism

■ Construction period
June 2012 to March 2013

■ Project outline
Work to repair damage from the Great East Japan Earthquake
Work to construct 9 caissons, and 1 set of miscellaneous works