Japan Dredging and Reclamation Engineering Association

Purpose of JDREA

Japan Dredging and Reclamation Engineering Association (JDREA), a non-profit organization consists of 27 members, was founded in 1961 for the purpose of:

1. Improving the technologies related to construction of port and harbor facilities including coastal and offshore structures;
2. Promoting sustainable development of marine construction industry;
3. Improving the quality of life of the people and secure their safety.

In order to realize these, JDREA members have been continuously developing advanced technologies through acquired extensive and nurturing experiences in marine civil engineering field, such as port and harbor facilities and offshore airport structures.

JDREA also aims to create a prosperous society by promoting marine civil engineering projects through research and development of advance engineering and construction techniques, contractual approach, safe work, disaster prevention, environmental conservation and international cooperation for development.

In addition, JDREA takes part in activities as a member of Japan branch of The World Association for Waterborne Transport Infrastructure (IAPH) and The International Association of Ports and Harbors (PIANC).

International Cooperation

JDREA is firmly committed to contribute its technical advancements internationally and thus, aggressively focusing on the following activities:

1. Providing training courses for the engineers from recipient countries to introduce Japan’s port construction technologies under the sponsorship of Japan International Cooperation Agency (JICA);
2. Assisting the Ministry of Land, Infrastructure, Transport and Tourism in the introduction of “Design Standard for Port and Harbor Facilities in Japan” to recipient countries;
3. Transferring of technical know-how to the local engineers through overseas projects of the member companies.

Overseas Project Experience

This map shows the countries and areas where JDREA members undertook projects.

- Container Terminal at Pasir Panjang (Phase I)
  - Singapore
  - 1993 - 1998
- Thi Vai International General Cargo Terminal
  - Vietnam
  - 2008 - 2013
- Civil and Building Works for La Union Port Development Project
  - El Salvador
  - 2005 - 2008
- Constantza Port, South Container Terminal
  - Romania
  - 2001 - 2004
- Construction of Civil Works and Buildings under Mombasa Port Development Project
  - Kenya
  - 2012 - 2016
- International Cruise Terminal
  - Singapore
  - 2009 - 2011
- LNG Export Jetty Construction Project
  - Russia
  - 2003 - 2007
- Pohnpei International Airport Runway
  - FSM: Micronesia
  - 2008 - 2010
- Bali Beach Conservation Project Package II
  - Indonesia
  - 2001 – 2004

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- **During a Lecture of JICA Training Course Trainees of Construction Site Observation**
  - Kiribati
  - Marshall Islands
  - Solomon Islands
  - Tuvalu
  - Vanuatu
  - Samoa
  - Palau
  - Micronesia
  - Tonga
  - Fiji
  - Nauru
  - Oceania

- **Antigua and Barbuda**
- **Commonwealth of Dominica**
- **St. Christopher and Nevis**
- **St. Vincent and Grenadines**
- **Grenada**
- **Saint Lucia**

- **Carib**

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born from the Sea
grown with the Sea
live with the Sea
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- Fiji
- Nauru

Oceania

- Antigua and Barbuda
- Commonwealth of Dominica
- St. Christopher and Nevis
- St. Vincent and Grenadines
- Grenada
- Saint Lucia
- Saint Lucia

Carib
The artificial islands are reclaimed and constructed by filling soil into the area separated by revetment. In order to utilize the beneficial use of the reclaimed land, the construction of a large scale and rapid construction is essential. Therefore, the sophisticated techniques for construction and the sophisticated settlement controlling system to monitor and control the ground settlement and deformation were introduced in these artificial island projects. Therefore, these airports have been the best of the artificial islands in terms of scale and technology.

The improvement of quay depth at Tokyo Port, Yokohama Port and Kobe Port is necessary under minimized construction period to accommodate the increasing size of container ships. The adoption of technology such as dredging work with pollution-prevented curtain fencing around dredging area not to worsen surrounding environment with polluted water, sea-water disposal yard in Tokyo Bay has been progressing. As the construction work is progressed after waste is safely shut off with sea and land water, the sea-water disposal yards in our country are founded on weak ground, soil improvement is also an important theme. Dredging work is carried out with pollution-prevented curtain fencing around dredging area not to worsen surrounding environment with polluted water, sea-water disposal yard in Tokyo Bay. Since sea-water disposal yard is easily influenced by waves, construction work is progressed after waste is surely shut off with sea and land water. And since most of sea-water disposal yards in our country are founded on weak ground, soil improvement is also important theme.

Environmental Conservation Technology

Since sea-water disposal yard is easily influenced by waves, construction work is progressed after waste is safely shut off with sea and land water. Therefore, the adoption of technology such as pollution-prevented curtain fencing around dredging area not to worsen surrounding environment with polluted water, sea-water disposal yard in Tokyo Bay has been progressing. As the construction work is progressed after waste is surely shut off with sea and land water, the sea-water disposal yards in our country are founded on weak ground, soil improvement is also important theme. Dredging work is carried out with pollution-prevented curtain fencing around dredging area not to worsen surrounding environment with polluted water, sea-water disposal yard in Tokyo Bay.

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The artificial islands are reclaimed and constructed by filling soil into the area separated by revetment. In order to utilize the site in offshore with efficient containment and environmental friendliness, sites. Therefore, effective utilization of surplus soils for reclamation work is useful because it provides alternative disposal methods. Inland disposal of surplus soils from construction sites is becoming difficult due to environmental issue and limited dumping sites. Therefore, dumping inside the construction site in offshore is an alternative alternative and is considered cost-effective compared to other methods.

The improvement of quay depth at Tokyo Port, Yokohama Port and Kobe Port is necessary under minimized construction period to accommodate the increasing size of container ships. The adoption of technology such as "Sand compaction pile method", "vibrating compaction method" and "dynamic consolidation method" for the construction of airport islands in Japan to overcome such strict conditions as deep water, soft seabed and large scale rapid construction. Sand compaction method, vibrating compaction method and dynamic consolidation method were used for the construction of airport islands in Japan to overcome such strict conditions as deep water, soft seabed and large scale rapid construction. Sand compaction method, vibrating compaction method and dynamic consolidation method were adopted by JDREA contractors. Furthermore, the sophisticated settlement controlling system to measure the ground settlement and deformation were introduced in these artificial island projects. Therefore, these airports have been the best of the artificial islands in terms of scale and technology.

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Dredging, Reclamation & Ground Improvement Technologies

The artificial islands are constructed by a process of filling soil and rock to create a land area, followed by stabilization and development. In Japan, these techniques have been applied to create artificial islands, such as the Kansai International Airport and Chubu International Airport, which have been the best of the artificial islands in terms of scale and technology. Ground settlement and deformation monitoring systems were introduced in these artificial island projects, allowing for precise control and mitigation of settlement.

Consolidation methods such as sand compaction pile, vibrating compaction, and dynamic compaction were used for the construction of airport islands in Japan to overcome strict conditions such as deep water, soft soil, and large scale rapid construction. Soil compaction methods are a key to shortening the project duration and providing a sustainable and environmentally friendly solution.

Dredging & Reclamation

The improvement of quay depth at Tokyo Port, Yokohama Port, and Kobe Port is necessary under minimized environmental impact. The adoption of technology such as deep-sea treatment barges, sand compaction ships, and steel cell and steel jacket structures has enabled the improvement of quay depth, installation of steel cell and steel jacket, and has contributed to the effective utilization of surplus soils for reclamation work.

Inland disposal of surplus soils from construction sites is becoming difficult due to environmental issues and limited dumping sites. Therefore, effective utilization of surplus soils for reclamation work is useful because it provides alternative disposal methods and reduces environmental impact.

Environmental Conservation Technologies

For port construction facing the Pacific Ocean, Japanese latest technologies of that time for dredging, breakwater, and so on have been used. Currently, the port is still expanding.

There are “Sand compaction pile method” and “Deep mixed disposal method” for soil improvement which are carried out to ensure safety and security. In the field of coastal engineering, the adoption of techniques such as revetment and shutting water off is important. Since sea-water disposal yards are founded on weak ground, soil improvement is also important to ensure safety and environmental conservation.

Dredging work is carried out with pollution-prevented curtain fencing around dredging area not to worsen surrounding environment with polluted water.

And since most of sea-water disposal yards in our country are founded on weak ground, soil improvement is also important theme. Problems of safety & environmental preservation are cleared.

Since sea-water disposal yard is easily influenced by waves, construction work (scraping) after water is safely shut off with sea and land is a key. Dredging work (scraping) is conducted by efficient treatment plan for the surrounding environment.}

Environmental Conservation Technologies

Dredging Vessels with Enclosed-type Grab

Drum Float and Features of Dredged and Recycling System

Vessels for Sand Compaction Pile Method

Execution of Steel Sheet Cellular Structure

Three-dimensional Perspective View of Cell-type Sandwich Structure

Steel cell

Backfill stone

Filled sand

Diagonal brace

Jacket

Pile

Kashima Port & Industrial Zone

This zone is one of the 22 area developed under principle of the integrated development and has been proceeding to construction period to accommodate the increasing size of container ships. The adoption of technology such as Deep-sea treatment barge Sand compaction ship, and installation of steel cell and steel jacket was completely a construction time saving that extremely shorten the construction period.

Kashima Port

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Dredging, Reclamation & Ground Improvement Technologies

The artificial islands are created by the combination of a sea bottom digging and the area surrounded by concrete to reinforce the island. The island is first built near its designed shape and then its material is changed to be a true island. In Japan, these techniques have been used to construct Kansai International Airport and Chubu International Airport, which are the best artificial islands in terms of scale and technology. Ground measurement and deformation were introduced in these artificial island projects. Therefore, these airports have been able to avoid consolidation method etc. were adopted by JDREA contractors. Furthermore, the sophisticated settlement controlling system to overcome such strict conditions as deep water, soft seabed and so on has been used.

Dredging, Reclamation & Ground Improvement Technologies

Work Flow and Features of Dredged-soil Recycling System

The construction of new port at Tokyo Port, Yokohama Port and Kobe Port necessitated a need for reclamation of deep sea bottom. In order to achieve this goal, the authors introduced the concept of reclamation using dredging. The reclamation work is carried out using various techniques such as beach nourishment, sand compaction and installation of piles, etc. The reclamation work has been completed using these techniques, and the result shows that the construction time can be significantly reduced.

Deeper Wharf & Rapid Construction Technologies

Integrated Development of Port & Industrial Zone

Deeper Wharf

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