From Yokohama Tsurumi to everywhere in Japan, to all the world, and to the future

Developing “Technologies with a Vision for the Future”

We believe that the mission of TOA CORPORATION is to respond to the needs of society, which change with the times, and contribute continuously and appropriately to society as a construction company. In order to promote contributions to society, TOA Research and Development Center truly shoulders the responsibility of being “the foundation of TOA’s technology.”

The demands made of a construction company will change due to dramatic shifts in the consciousness of the people and in society.

“Protect people’s livelihoods from natural disasters”
“Reduce the burden on the environment, and live in harmony with nature”
“Maintain and renew the facilities in service and utilize them for a long time”

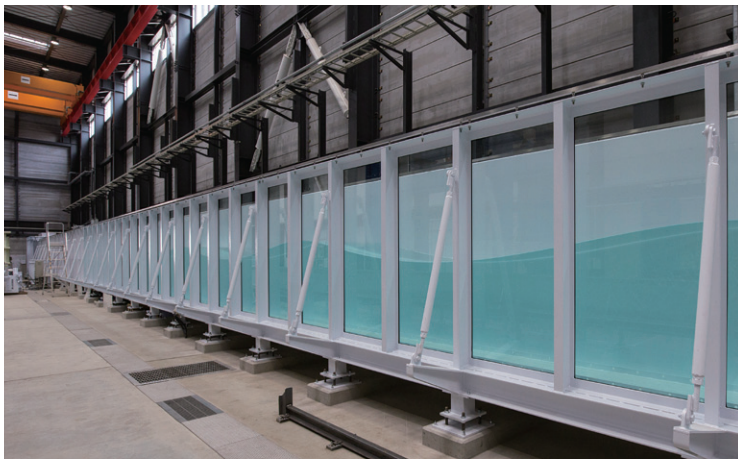
To create a sustainable society, it is essential to respond to a wide variety of needs, including coexisting in harmony with nature, and prevention and reduction of damage from natural disasters, as well as safety and security.
We are fully prepared to respond to those needs.

We will effectively activate the research and development capabilities, know-how, and skills we have accumulated from the past to today, and thoroughly grasp the ever-changing needs to determine the direction our research and development will take.

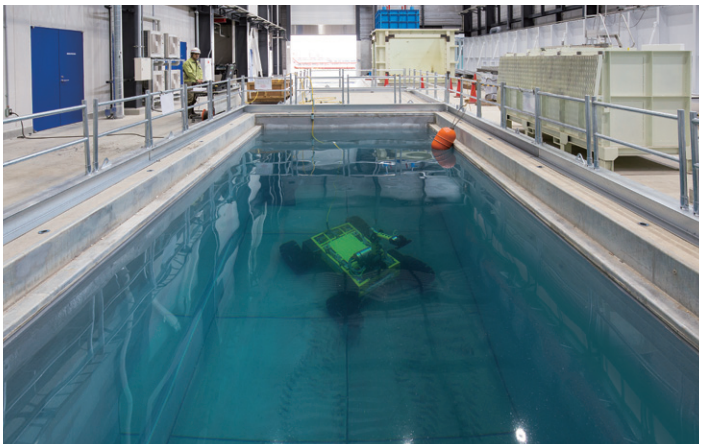
Going forward, in order to perfect “technologies with a vision for the future,” TOA Research and Development Center will continue its efforts in research and development of the technologies that will form the fundamentals of its those technologies.

Large-Scale Wave Flume, Small-Scale Wave Flume

The large-scale wave flume, equipped with a wave generator and current generator, is capable of generating various types of waves and flows. Furthermore, various types of tsunami having the desired wave profiles can be generated by using either the wave generator, the current generator, or a tsunami generator independently, as well as by coordinating the various systems together.
This large-scale wave flume makes it possible to carry out large-scale experiments in about 1/20 scale. It can be used in the development of technologies for port and harbor structures, marine and coastal structures, floating structures, ships, coastal erosion, tsunami disaster prevention works, and other structures.
The small-scale wave flume, which is set up at the same premises, is used to conduct basic experiments and preliminary experiments in about 1/100 scale. The system is very easy to use, making it possible to conduct experiments speedily.

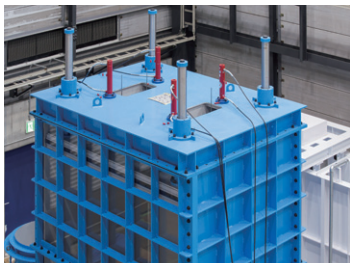


Tsunami generator



Deep Water Basin

This is a huge water basin, which is installed in the basement, with the capability of reproducing on a large scale various working conditions that are encountered underwater. In this water basin, it is possible to conduct various types of construction experiments underwater, and carry out work experiments using underwater construction robots or other equipment.
Together we can observe the condition of the experiment from the 1st floor, and also from underwater through an observation window provided in the basement.



Large-Scale Soil Container

The large soil container makes it possible to conduct large-scale experiments similar to in-situ tests, controlling the experimental condition on model ground accurately. We can apply a pile load test to observe bearing capacity and pile friction.
In addition, we can conduct pilot tests on soil improvement work by chemical grouting and cement mixing, etc.

Large-Scale Loading Test Equipment

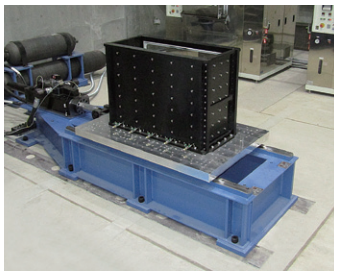
This is the equipment for performing loading tests of full-scale structural members such as columns, slabs, beams, as well as the joints of beam-columns, etc.
By utilizing a vertical jack in combination with a horizontal jack and/or a reaction frame, biaxial loading tests in the vertical and the horizontal directions can be performed.

Severe Environment Reproducing Chamber

This is the chamber for reproducing various environments with extremely high or low temperatures, extremely high or low humidity.
It is possible to mix concrete and conduct various quality of tests of concrete, as well as to produce test specimens in the reproduced harsh environments, because of the spacious work area in the chamber. In addition, the durability test can be performed by exposing test specimens in harsh environments for an extended period.
Therefore it is possible to conduct advanced researches and developments of materials and construction methods taking into consideration the local and harsh environment of the construction site such as freezing warehouses or foreign countries' climate.

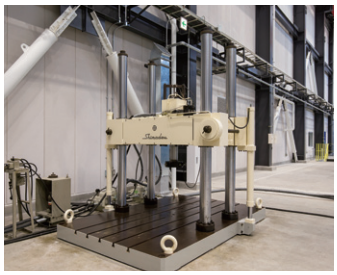
RESEARCH & DEVELOPMENT

Operations



One-Dimensional Shaking Table Test Equipment

With this equipment, it is possible to conduct basic experiments in a gravitational field (1G gravitational field) related to liquefaction and deformation of foundation material and soil structure caused by seismic vibration. This equipment can be applied to the development of ground improvement methods and foundation materials.
The specifications of this equipment give it the capability to reproduce the maximum acceleration (approx. 1.8G) similar to the acceleration in the harbor area during the 2011 off the Pacific coast of Tohoku Earthquake. One to its small size, a large number of experiments can be conducted in a short period of time.



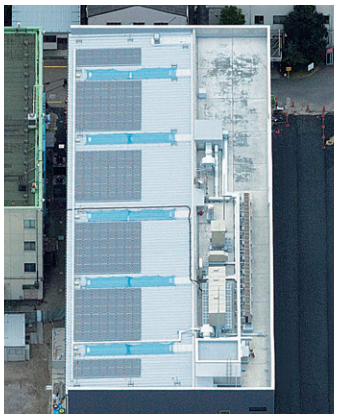
Fatigue Testing Machine

This testing machine is equipped with vertically-oriented high-speed actuators.
This is the machine for performing bending test and fatigue test of structural members under static or dynamic load condition. By setting a hydraulic jack separately in the horizontal direction, biaxial loading can be performed.

Environmental and energy-saving technologies implemented in the Research and Development Center

Energy-saving facilities

Solar power generation

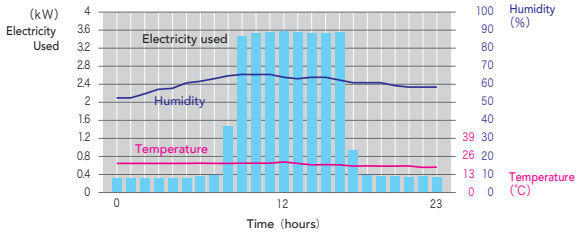


- Solar panels are installed on the spacious rooftop. Its capacity is 49.28kW.
- Its daily output can be monitored at the entrance lobby.

Rooftop solar panels

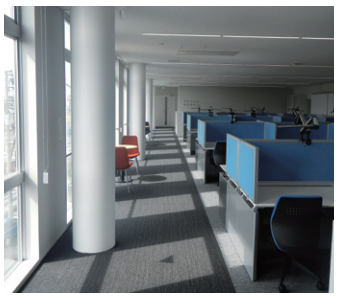
Visualization of the amount of electric power (with introduction of BEMS)

- Building Energy Management System (or BEMS) are computer-based systems that help to manage, control and monitor building technical services (HVAC, lighting etc.) and the energy consumption of devices used in the building. They provide the information and the tools that we need both to understand the energy usage of our facility and to control and improve its energy performance.



Example of conversion graph indicating amount of electricity consumption

Daylight sensor, Task-ambient lighting and LED lighting



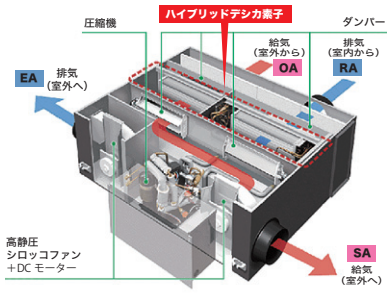
- Daylight sensor works to help using daylight energy effectively.
- Task-ambient lighting* contributes higher energy saving when compared with most general lighting strategies, because higher light levels are provided for the task areas only.

Office that actively brings in natural light

*Task ambient lighting
This is a system where the interior of a room as a whole is illuminated with a low level of lighting provided by ambient light, but a specific area where work is being performed is provided with a higher level of light by means of task (work) lighting.

A heat pump desiccant for humidity and outside air control unit without water piping

- "A heat pump desiccant humidity control outside air unit without water piping" permits individual integrated control of humidity and temperature, leading to increases in both comfort and energy saving.



Configuration and Structure of DESICA (manufactured by Daikin Industries,Ltd.)