Climate Change

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

》Information disclosure based on TCFD recommendations

We believe that responding to climate change issues is one of our most important management issues, and are strengthening our efforts to reduce greenhouse gas emissions both domestically and internationally. In addition to undertaking initiatives to reduce CO_2 emissions from our construction business activities, we will strive to achieve carbon neutrality by 2050 through our core business through promoting the construction of offshore wind power facilities and the conversion of buildings into ZEBs (net zero energy buildings).

1. Governance

The Carbon Neutral Promotion Committee chaired by the President and Representative Director and the CN Promotion Office play a central role for the further advancement of initiatives for reducing GHG emissions. The CN Promotion Committee operates under the CSR Committee (chaired by the President and Representative Director). The Committee plans and formulates basic policies and strategies for the Group's initiatives to tackle global climate change issues, and deliberates climate related matters based on the monitoring results of the progress of each measure. The Committee decisions are reported to and discussed at the CSR Committee. The Committee decisions on policies and strategies are incorporated into business plans of each Business Unit, the company-wide annual plans and Medium-Term Management Plans, and they then progress towards their implementation. The Board of Directors receives reports from the CSR Committee and supervises all sustainability-related issues including climate-change issues. The implementation of measures to address climate change issues will be continuously monitored by the CN Promotion Committee in order to review and improve our policies and strategies.

2. Strategy

In the construction industry, CO_2 emissions from construction activities are relatively small compared to other industries. However, the marine civil engineering work, which is one of our fortes, is characterized by higher CO_2 emissions than other construction work and civil engineering work performed on land, because of the use of work vessels. As part of our initiatives to tackle the issue, we have identified the risks and opportunities that climate change may pose to our group, and performed scenario analyses. As a result of the analyses, we expect to see an increase in capital investment in maintenance, renewal, and new construction of work vessels to achieve their carbon neutrality. We believe, however, that we will witness more business opportunities for our company that outweigh these drawbacks. The opportunities include the promotion of offshore wind power facility construction in the civil engineering field, and the promotion of ZEB technology application in the building construction field. As a company with distinctive strengths in marine civil engineering technology and as a front runner in offshore wind power construction, we will contribute to the expansion of renewable energy supply in Japan as well as to the development of a sustainable society.

3. Risk management

The Risk Management Committee established under the CSR Committee plays a key role in systematically categorizing risks assumed in our business activities, assigns a department in charge for each risk, and conducts overall risk management. The CN Promotion Office is the department in charge of climate change risks. They identify, evaluate risks and implement countermeasures against them from a long-term perspective. The results of deliberations of the CN Promotion Committee are reported to and discussed at the CSR Committee, and the activities of the CSR Committee are reported to the Board of Directors, which oversees the implementation of climate change risk management. In the event of the occurrence of climate change risk, it is promptly reported to the supervising department, determined according to the degree of impact on corporate management (major risks are reported to the Board of Directors). As described above, we have a system in place to respond to risks in a timely and appropriate manner.

》Roadmap to achieve carbon neutrality (CN) (Scope 1, 2)

Fuel efficiency improvement (Scope 1)
- Engine-idle reduction, energy saving education, and ensuring proper maintenance of major vessels and machinery
- Promotion of the on-site use of K-S1 and other **fuel efficiency improvement additives**

Improvement of construction efficiency (Scope 1)
- **Improving construction efficiency through the use of ICT technology** for land-based construction machinery and work vessels, and promoting more efficient energy use in work vessel equipment
- Tracking the market trend of electrified land-based construction machinery - Promoting their on-site use
- Conducting studies for the **electrification of cranes and winches on work vessels** and utilization of large rechargeable batteries and fuel cells

New energy (Scope 1)
- Tracking technological trends, such as engine development, for the introduction of new energy sources
- Review of contribution to the Carbon Neutral Port (CNP) as an import and storage hub for new energy sources

Energy conservation and energy creation (Scope 2)
- **Promotion of ZEB conversion of site offices, etc.**

Reduction target for FY 3/31 (50%) (compared to FY 3/20)

FY 3/31

<Short-term initiatives> Low carbonization

● Risks and Opportunities

Categories		Climate change	Impact on businesses	Scale of impact 1.5°C	Scale of impact 4°C
Transition risks and opportunities	Risks	Policy changes and regulation tightening on CO_2 emission reduction	• Increase of climate change response costs for construction and other business activities (in particular, costs to reduce CO_2 emissions from construction machinery and work vessels) • Increase of procurement costs for construction materials (cement and steel), which have high CO_2 emissions during manufacturing process • Further increase in climate change response costs and construction costs due to the introduction of a carbon tax	Major	Minor
			• Increase in costs due to tightening of Energy Efficiency Act and mandatory ZEB application	Medium	Minor
	Opportunities	Increased construction demand related to renewable energy and energy conservation	• Increase in demand for the construction of offshore wind farms • Increase in demand for the construction of ZEB buildings/ZEB technology application	Major	Minor
Physical risks and opportunities	Risks	More intense and frequent natural disasters (high waves, storm surges, and torrential rains caused by typhoons and low-pressure fronts)	• Extension of construction period and increase in construction costs due to damages by disasters made during construction • Supply constraints due to disruptions in the supply chain for construction materials and equipment	Medium	Major
		Decrease in construction productivity due to severer weathers/conditions caused by rising sea temperature	• Increased risk of process delays and higher construction costs due to lower utilization rates, especially in marine civil engineering work	Medium	Major
		Decrease in construction productivity during summer time caused by temperature rise	• Increased risk of workers' heat stroke on construction sites • Decreased productivity due to increased frequency of break times to prevent heat stroke	Medium	Major
	Opportunities	Increase of construction demand related to the national resilience plan	• Increase in construction demand for disaster prevention, disaster mitigation, and national resilience • Increase in demand for disaster recovery work	Major	Major

● Measures

Categories		Climate change	Measures
Transition risks and opportunities	Risks	Policy changes and regulation tightening on CO_2 emission reduction	• Reduction of CO_2 emissions from construction machinery and work vessels (Scope 1) Improvement of construction efficiency: Electrification, use of ICT, and promotion of automatic and autonomous construction Fuel decarbonization ⇒ from low-carbon to zero-carbon: (Short-term) Use of additives to improve fuel efficiency (Mid-term) Use of alternative fuels (BDF, GTL) Utilization of renewable electricity (including electricity supply from land and rechargeable batteries) (Long-term) Introduction of hydrogen, ammonia, and other next-generation energies
			• Reduction of CO_2 emissions (Scope 2, 3) Promotion of the renewable electricity use at onsite offices, etc. (Scope 2) Promotion of introduction of CO_2 adsorption materials and low-carbon concrete, etc. (Scope 3) CO_2 fixation by solidification of dredged sediments (Scope 3)
	Opportunities	Increased construction demand related to renewable energy and energy conservation	• Strengthening offshore wind power construction initiatives (e.g., capital investment in equipment for offshore installation vessels and other large work vessels) • Promotion of ZEB proposals, design, and construction of ZEB buildings • Trial use of hydrogen at company-owned facilities • Issuance of green bonds for capital investment
Physical risks and opportunities	Risks	More intense and frequent natural disasters	• Establishment of BCP system and regular implementation of disaster drills (for BCP and tsunami)
		Decrease in construction productivity due to severer weathers/conditions caused by rising sea temperature	• Advanced weather and metocean forecasting systems
		Decrease in construction productivity during summer time caused by temperature rise	• Improving productivity by saving labor on sites (contribution to CO_2 reduction) Actively using precast concrete for concrete work and promoting DX (digital transformation)
	Opportunities	Increase of construction demand related to the national resilience plan	• Development and practical application of technologies that contribute to the national resilience plan

4. Metrics and Targets

With the aim of achieving carbon neutrality by 2050, we have set a CO_2 emissions reduction target with FY 3/20 as the base year, including our overseas operations, which account for the majority of our CO_2 emissions. The reduction target for FY 3/31 was certified at the "1.5°C level" by the SBTi (Science Based Targets initiative) in December 2022.

CO_2 emissions reduction target

(Unit: kt-CO_2)

	FY 3/20 result	FY 3/31	FY 3/51
Scope1+2	446	223 (50% reduction)	Carbon neutrality
Scope3	4,370	3,060 (30% reduction)	

Fuel efficiency improvement (Scope 1)
- Study aimed at the introduction of dual fuel engines, etc. (from research and development to on-site implementation)

Improvement of construction efficiency (Scope 1)
- **Exploring automatic and autonomous operations by electrification of work vessels** (from program development to on-site implementation)

New energy (Scope 1)
- **Utilization of alternative fuels** such as BDF (biodiesel fuel) and GTL (gas-to-liquid fuel)
- **Onshore power supply** (work vessels)
- Utilization of by-product hydrogen and ammonia, trial use of green hydrogen

New energy (Scope 1)
- Introduction of work vessels and land-based construction machinery which run on new energy
- Utilization of green hydrogen and ammonia

Utilization of surplus electricity from offshore wind power generation (onshore power supply and green hydrogen utilization)

Reduction target for FY 3/51 (100%) (compared to FY 3/20)

FY 3/51

<Mid-term initiatives> Low carbonization to decarbonization

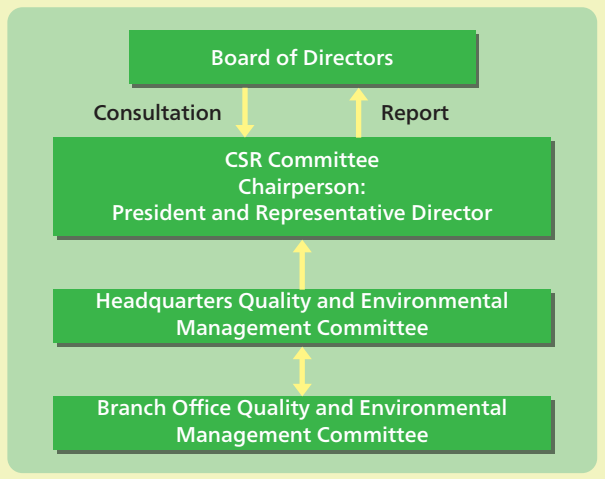
<Long-term initiatives> Decarbonization

Environmental Management

Penta-Ocean Construction Group's management philosophy is "Creating a nature-rich environment" and we promote construction practices that take into account environmental protection through an environmental management system that complies with ISO14001 standards.

》Environmental Management System

Our environmental management system conforms to ISO 14001 standards. The environmental management system is controlled by the Quality and Environmental Management Committee, established under the CSR Committee chaired by the President and Representative Director, and applies to all of POC's business activities (construction activities and business activities in our offices). We formulated the "Integrated Manual" that outlines the rules and procedures for corporate management in conformity with the certified environmental management system and quality management system, and implement it across the organization. In addition, we continuously provide training sessions to employees, including management system training for young employees, to inform and educate our employees.



》Environmental Patrols

We conduct environmental patrols at construction sites of domestic branch offices at an early stage after the construction start in order to prevent environmental accidents such as air pollution, water contamination, soil contamination, noise, vibration, ground subsidence and foul odors, and to eliminate the violation of environmental laws and regulations, as well as to prevent the occurrence of environmental complaints.

》Compliance with Environmental Laws and Regulations

Whenever we conduct business activities, it is necessary to consider environmental issues from various perspectives such as global warming prevention and waste management, and it is mandatory to ensure compliance with environmental laws and regulations. We strive to prevent violation of environmental laws and regulations by responding quickly to the latest revisions of environmental laws and regulations.

》Environmental Education

Specialized Environmental Training

We provide specialized environmental training to keep all employees apprised of the necessary knowledge of overall environmental management at construction sites and the key points of legal revisions. The specialized environmental training is provided every year at the headquarters office and branch offices, and we ensure employees' participation on a regular basis (once every three years). In FY 3/24, 662 people took the specialized environmental training. In FY 3/24, as in the previous fiscal year, we conducted environmental training targeted for the employees in sales & marketing and design engineering divisions at the headquarters as well as those in sales & marketing and design engineering divisions at branches to enhance their knowledge level of compliance to environmental laws and regulations when dealing with clients, and 132 employees attended the training.

Specialized Environmental Expert Training

We conducted specialized environmental expert training for employees of the Environment, Health, Safety and Quality Divisions Group at branch offices to provide them with more far-reaching knowledge. Through this training, we aim to strengthen their perspective during the branch patrols and further enhance the training of construction staff.

Click here for the Basic Environmental Guidelines ▶

Biodiversity

We are working on the creation and maintenance of the marine environment as a measure to conserve biodiversity and tackle climate change by utilizing our extensive experience and knowledge gained from civil engineering work in coastal and marine areas.

》Calcia Stabilized Soil

Calcia stabilized soil improves the physical and chemical properties of dredged soil by mixing soft dredged soil generated in ports and harbors with Calcia stabilizing material (material made by controlling the composition and adjusting the particle size of converter steel slag generated in the process of steel making), etc. The Calcia stabilized soil, in addition to improving the strength of soft dredged soil and ensuring its long-term durability, has the feature of preventing and controlling the elution of harmful substances and the suppressing of turbidity. Taking advantage of these characteristics, it is used as a reclamation material, a backfill material for seawalls, and a submerged dike material to prevent the siltation in shipping routes.

Moreover, since organisms can settle more easily in Calcia stabilized soil than in concrete, it is also used as a fishing reef and algae reef.

Calcia Stabilized Soil Drop Mixing Vessel

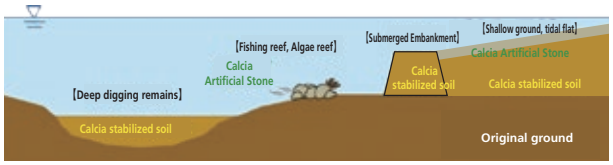
The drop-mixing method is a method of mixing dredged soil and Calcia stabilizing material to make Calcia stabilized soil by using a mixing action when material falls at the transfer section of the belt conveyor, suitable for large-scale construction of 3,000 m^3 or more per day.

To enable efficient construction, we have built a reclaimer vessel (a work vessel that unloads dredged soil to a reclaimed site by a belt conveyor) equipped with a supply hopper, a supply conveyor, and a conveyor for dropping and mixing the Calcia stabilizing material, and are used in actual construction work.

Overview of the Calcia Stabilizing Technology

The reformed soil can be used in a wide variety of applications including landfill material, levee widening material, embankment material, filling material, etc.

Applications of Calcia stabilized soil



Ocean 3 (Calcia stabilized soil drop mixing vessel)

》Initiatives to Create and Maintain Marine Environments

To conserve biodiversity in shallow areas and tidal flats, we are working on the development of shallow areas and tidal flats using Calcia stabilized soil, which is easier for organisms to settle than conventional materials. We recycle removed soil for backfilling tidal flats in an attempt to restore them to their pre-construction state, as well as to minimize the impact on tidal flat organisms.

In addition, as a measure against climate change, we carry out evaluation on the carbon fixation as blue carbon in the newly-created shallow areas, in order to contribute to carbon recycling through the creation and evaluation of shallow areas.

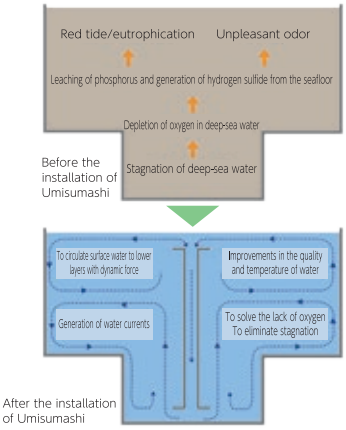
Shallow area and tidal flat development progress (injection of Calcia stabilized soil)

Shallow area and tidal flat development progress (eelgrass growth)

》Water Purification

By generating water currents with dynamic force, Umisumashi eliminates the stagnation of water flow near the seabed, restores dissolved oxygen, and reduces the elution of nutrients that cause eutrophication and sulfides that are harmful to benthic organisms. It is also effective in improving water temperature by stimulating heat transfer through mixing of surface water and bottom water.

Umisumashi



Resource Recycling

We utilize construction-generated soil, dredged soil, waste, and other materials generated during construction work as resources, and contribute to the creation of a recycling-oriented society through commercializing the recycling of such resources and the creation of added value.

》Construction-generated Soil and Sludge Recycling Business

Ichikawa, Yokohama, and Nagoya Soil Recycling Centers

Overview of the business

This business operates Soil Recycling Centers (in Ichikawa, Yokohama, and Nagoya) that perform accumulation, intermediate treatment, and shipment of generated soil in order to reuse construction-generated soil, contaminated soil, and construction sludge generated in the Kanto and Chubu regions over a wide area.

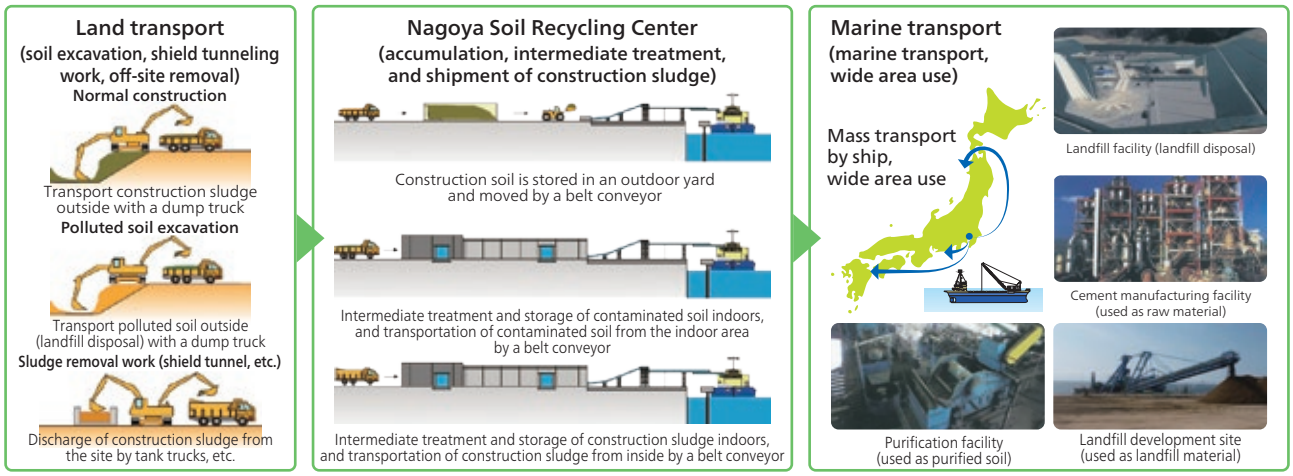
Characteristics

- Reduces the transport distance of trucks by making the most of the positional superiority in the Kanto and Chubu regions
- Accepts sediment 24 hours a day
- Mass transport of earth and sand using a quay that can accommodate a large ship

➡High cost competitiveness for transporting large volumes of generated soil in urban areas

Nationwide Recycling Operations Network

Image of the wide area use of construction-generated soil



Ichikawa Soil Recycling Center

Yokohama Soil Recycling Center

Nagoya Soil Recycling Center

* This business is conducted by Sand Techno Co., Ltd. (our wholly owned consolidated subsidiary)

Sendai Ecoland

Overview of the business

This business improves (by granulation and solidification) inorganic sludge* generated from construction and excavation work and recycles it as construction material "Simarussa" (reconditioned sand).

* Sludge that cannot be used as it is, such as construction sludge mixed with cement or bentonite or with a high water content ratio

Characteristics of the business

- Granulation and solidification of construction sludge with high moisture ratio in a few minutes
- No need for pre-treatment such as dewatering and drying when granulating and solidifying construction sludge
- No water pollution, no noise, no vibration, no dust, etc.
- Simarussa (reconditioned sand) exhibits strong property to be used as a civil engineering material

* This business is conducted by JAIWAT Co., Ltd. (our wholly owned consolidated subsidiary)

》Paper Sludge Incineration Ash Recycling Business

Sodegaura Ecoland

Overview of the business

This business manufactures a water-absorbing mud stabilization material "Watoru" made from paper sludge incineration ash discharged from papermaking companies, and supplies it for construction work.

The water-absorbing mud stabilization material "Watoru" is a hydration-treated product made by mixing a special chemical with incinerated ash from paper manufacturing sludge generated by papermaking companies. In addition to having physical reforming through water-absorption (with an instantaneous reforming effect), it demonstrates chemical reforming ability as time advances (with gradual strength development).

It is highly effective not only for processing dredged soil in harbors, rivers, and lakes, but also for processing mud and sludge generated by excavation on land.

Because this material absorbs (in Japanese, taking, or "toru") water from mud, we have named the product "Watoru" ("water taking").

Technical evaluation/patent

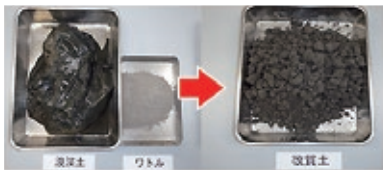
Ministry of Land, Infrastructure, Transport and Tourism, New Technology Information System (NETIS) Registration Technology (Registration No. TH-160010-A)
Received National Land Technology Development Award (Excellence Award) for the year 2021

Features of "Watoru"

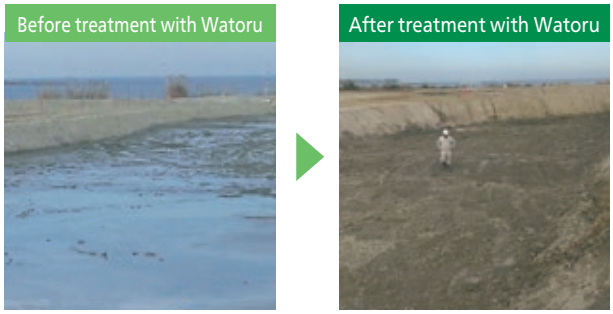
- High water absorbency: Has an immediate effect, reforming sludge into soil in a few days
- Deodorant effect: Quickly deodorizes bad odors such as hydrogen sulfide odor of dredged soil
- Neutralizing and solidifying material: The reformed soil is slightly alkaline and becomes more neutral over time
- Safety: Non-hazardous due to chemical treatment with special agents

Panoramic view of the facility

Water-absorbing mud stabilization material "Watoru"



Instantly reforms mud



* This business is conducted by JAIWAT Co., Ltd. (our wholly owned consolidated subsidiary)

》Food Waste Recycling Business

Miki Composting Center

Overview of the business

This business processes and sells compost materials made from organic waste discharged from food-related companies, etc.

Characteristics of the business

- With the automatic agitator (scoop-type) and the forced air circulation (aeration), collected food waste is subject to primary fermentation for about one month, and then further fermentation and maturation for about three months to produce complete compost
- Located near the Hanshin district with concentration of many food-related companies and easily accessible from interchanges of the expressway, the Miki Composting Center contributes to the reduction of waste transport costs

Use of recycled product (compost "Minami-No-Hikari")

- Because it is made from food waste, it is a safe and nature-friendly organic compost
- Fully meets the quality standards of the NPO Japan Bark Compost Association, surpassing common composts. It can be used in various situations from full-scale agriculture to landscaping/greening projects and kitchen gardens
- The performance of our recycled products has been evaluated, and our product delivery record is improving

* This business is conducted by Miki Biotech Co., Ltd. (our wholly owned consolidated subsidiary)