

Creation of a Sustainable and Rich Global Environment

Materiality

1. Responding to Climate Change Issues
2. Creation of a Rich Environment

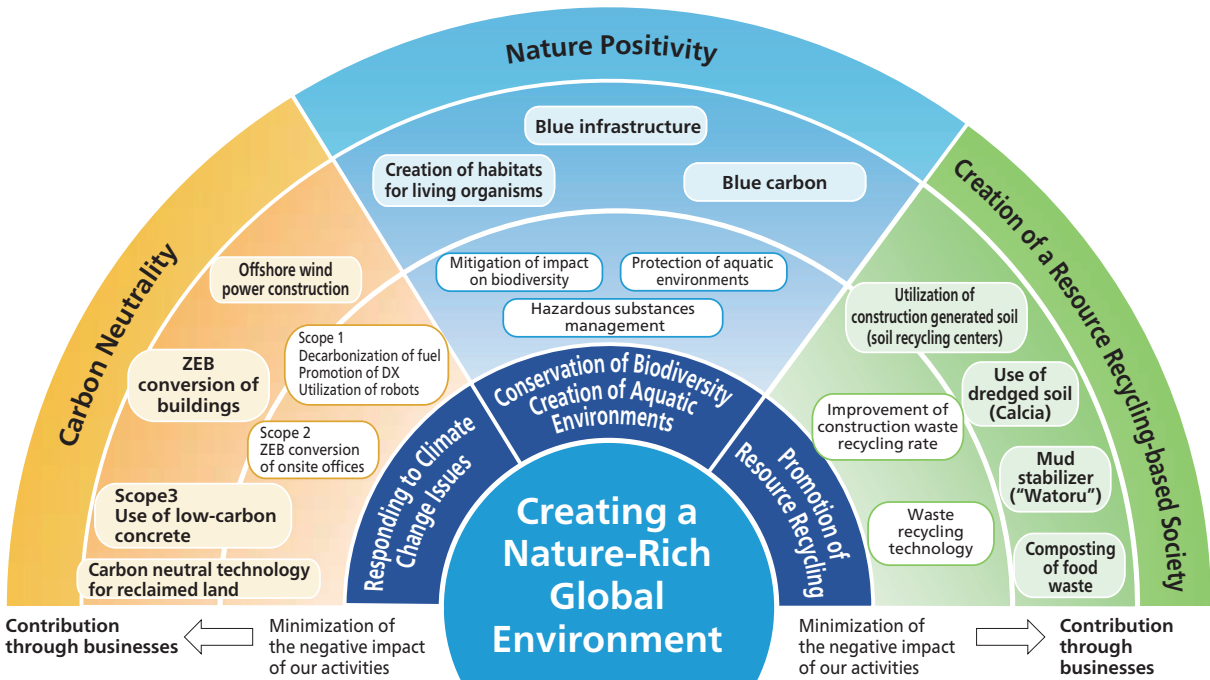
Penta-Ocean Construction Group strongly believes that passing on a nature-rich environment for future generations is fundamental to our business activities. Guided by this belief, we engage in manufacturing with consideration for the global environment.

In the Medium-term Management Plan announced in May 2023, we selected “Responding to Climate Change Issues” and “Creating a Nature-Rich Environment” as key issues (Materiality). For each of the above issues, we strive to contribute to society through our group business activities while minimizing their environmental impact.

In response to climate change issues, we are working to reduce CO₂ emissions from our construction business activities, while advancing businesses such as offshore wind construction, ZEB conversion of buildings, and the use of low-carbon concrete, aiming to achieve carbon neutrality.

In the fields of biodiversity conservation and creation of aquatic environments, we are developing technologies to reduce environmental footprint associated with construction and mitigate effects on marine organisms. These efforts include expanding the application of blue carbon, developing blue Infrastructure technologies, and creating habitats for living organisms, as part of our efforts toward commercialization.

In the field of resource recycling, we are enhancing the recycling rate of construction waste from our activities, and advancing recycling businesses for materials including contaminated soil treatment, construction-generated soil, construction sludge, dredged soil, paper ash, and food residues.



Materiality (Specific Initiatives)

	Our Vision	Materiality	Examples of Initiatives
Environment	Creation of a Sustainable and Rich Environment	1. Responding to Climate Change Issues	- Reduction of greenhouse effect gases in construction business activities - Scope 1: Decarbonization of fuel (improved fuel efficiency), streamlining construction - Scope 2: ZEB conversion of site offices (energy saving, use of renewable energy) - Scope 3: Use of low-carbon concrete, ZEB conversion of constructed buildings, CO₂ fixation through blue carbon in coastal areas, etc. - Contributing to the promotion of ZEB conversion of buildings (energy saving, use of renewable energy) - Contributing to the expansion of renewable energy supply through offshore wind construction
		2. Creation of a Rich Environment	- Promotion of resource recycling - Recycling of construction-generated soil and construction sludge, using Calcia-modifying material (steel slag), and Watoru soil-modifying materials (paper sludge incineration ash) for improvement of dredged soil, and food recycling business (food waste composting) - CO₂ fixation through blue carbon in coastal areas and Calcia-modified soil - Creation and conservation of seaweed beds and tidal flats, utilization of Calcia-modified soil (dredged soil), etc.

Environmental Management

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Penta-Ocean Construction Group promotes construction practices that take into account environmental protection through an environmental management system that complies with ISO 14001 standards.

Principle of Environmental Activity

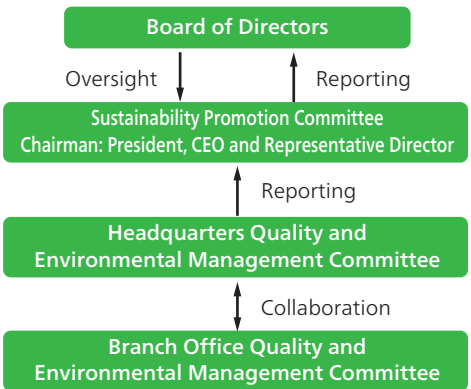
1. Reduce CO₂ emissions generated in construction business activities (reduction of CO₂ emissions from work vessels and construction equipment; productivity improvement through utilisation of ICT, electrification, automation and autonomy; use of low-carbon materials, etc.), and promote ZEB* (energy saving and energy creation) for project offices, thereby contributing to the realisation of carbon neutrality.
* ZEB: Net Zero Energy Building
2. Strive to achieve carbon neutrality, create a recycling-based society, and create, preserve, and restore the environment, through close communication with local communities, the development of environment-related technologies, and environmentally friendly design and construction.
3. Continuously educate the staff and business partners on the importance of environmental conservation activities, and strive to prevent environmental accidents and ensure zero violations of environmental laws and regulations.



Scan the QR code for Safety, Health, Quality and Environmental Policy

Promotion System / Environmental Management System

Our environmental management system conforms to ISO 14001 standards. We obtained ISO14001 certification as a company-wide environment management system in November 2002, and have been operating it as a means to promote continuous system improvement and efficient, effective operations. The environmental management system is overseen by the Quality and Environmental Management Committees of the Headquarters and each branch office, established under the Sustainability Promotion Committee chaired by the President, CEO and Representative Director. The system is applied to all of our business activities (construction production activities and office activities). 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.



Compliance with Environmental Laws and Regulations

In order to conduct business activities with due consideration for the environment in all aspects, such as preventing global warming and ensuring proper waste disposal, we regularly monitor compliance with environmental laws and regulations. We respond promptly to any revisions of these laws and regulations and strive to prevent legal violations related to the environment. There were zero major legal violations related to the environment in FY 3/25.

Environmental Patrols

We conduct environmental patrols at each branch’s construction sites to prevent air pollution, water contamination, soil contamination, noise, vibration, ground subsidence, foul odors, and other forms of environmental pollution, and to achieve zero legal violations related to the environment.

Education and Awareness

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. Specialized environmental training is held annually at each headquarters and branch office, in which our employees participate regularly (once every three years). The number of participants in specialized environment training in FY 3/25 was 677.

Environmental Study Session Before Construction Commencement

To confirm and enhance the environmental knowledge of site staff, the Safety, Quality and Environment Management Division conducts environmental study sessions prior to the start of construction. Through this training, we ensure thorough implementation of measures to prevent environmental contamination and to maintain compliance with laws and regulations. In FY 3/25, sessions were held at 141 sites.

Responding to Climate Change

Materiality 1. Responding to Climate Change Issues

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 CO₂ 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, CEO and Representative Director and the CN Promotion Office play a central role for the further advancement of initiatives for reducing GHG emissions. As a subordinate organization under the Sustainability Promotion Committee (Chairman: President, CEO and Representative Director), this committee is responsible for deliberating important matters such as the basic policy for responding to climate change issues for our group, planning and formulating strategies, and measures based on the results of monitoring the status of initiatives. The Committee decisions are reported to and discussed at the Sustainability Promotion 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 Plan, and they then progress towards their implementation. The Board of Directors receives reports from the Sustainability Promotion Committee and oversees all sustainability related issues including climate-change issues. The implementation of measures to address climate change issues will be continuously monitored by the Carbon Neutral Promotion Committee in order to review and improve our policies and strategies.

2. Strategies

In the construction industry, CO₂ 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 CO₂ 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 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 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 Sustainability Promotion Committee, plays a central role in systematically classifying risks assumed in business activities, assigning a department in charge for each risk, and implementing appropriate risk management. The CN Promotion Office is the department in charge of climate change risks. They identify, evaluate risks and implement countermeasures against these risks from a long-term perspective. The results of deliberations by the Carbon Neutral Promotion Committee are reported to and discussed at the Sustainability Promotion Committee. The activity status of the Sustainability Promotion Committee is reported to the Board of Directors, which oversees the implementation of risk management for climate change. 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.

Risks and Opportunities

Categories		Climate change	Impact on businesses	Scale of impact	
				1.5°C	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 CO₂ emissions from construction machinery and work vessels) • Increase of procurement costs for construction materials (cement and steel), which have high CO₂ emissions during manufacturing process • Further increase in climate change response costs and construction costs due to the introduction of a carbon tax	Large	Small
	Opportunities	Increased construction demand related to renewable energy and energy conservation	• Increase in costs due to tightening of Energy Efficiency Act and mandatory ZEB application • Increase in demand for the construction of offshore wind farms • Increase in demand for the construction of ZEB buildings/ZEB technology application	Medium	Small
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	Large
		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	Large
		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	Large
	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	Large	Large

Measures

Categories	Climate change	Measures
Transition risks and opportunities	Risks	• 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) (Long-term) Utilization of renewable electricity (including electricity supply from land and rechargeable batteries) (Long-term) Introduction of hydrogen, ammonia, and other next-generation energies
	Opportunities	• Reduction of CO ₂ emissions (Scope 2, 3) Promotion of the renewable electricity use at site 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)
Physical risks and opportunities	Risks	• Strengthening offshore wind 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
		• Establishment of BCP system and regular implementation of disaster drills (for BCP and tsunami)
	Opportunities	• Advanced weather and metocean forecasting systems • Improving productivity by saving labor on sites (contribution to CO ₂ reduction) Actively using precast concrete for concrete work and promoting DX (digital transformation) • Development and practical application of technologies that contribute to the national resilience plan

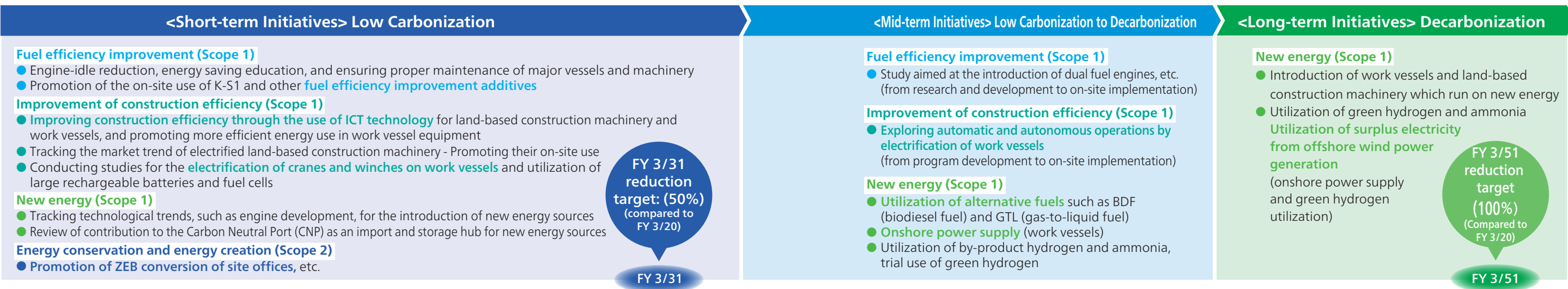
4. Metrics and Targets

With the aim of achieving carbon neutrality by 2050, we have set a CO₂ emissions reduction target with FY3/20 as the base year, including our overseas operations, which account for the majority of our CO₂ emissions. The reduction target for FY3/31 was certified at the "1.5°C level" by the SBTi (Science Based Targets initiative) in December 2022.

CO₂ Emissions Reduction Target (Unit: thousand t-CO₂)

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

Roadmap to Achieve Carbon Neutrality (CN) (Scope 1, 2)



Biodiversity, Aquatic Environment

Materiality 2. Creation of a Rich Environment

Penta-Ocean Construction Group, with creating a rich environment as one of our management philosophies, is engaged in activities for the conservation of biodiversity, creation of aquatic environments, and initiatives toward nature positivity. In the future, we plan to disclose information in accordance with TNFD recommendations.

Action Guidelines on Biodiversity

To conserve and enhance biodiversity while contributing to the sustainable development of society, Penta-Ocean Construction Group established the Action Guidelines on Biodiversity in August 2025 as the foundation of our environmentally responsible and sustainable construction business activities.



Scan the QR code for
Action Guidelines
on Biodiversity

Promotional Structure

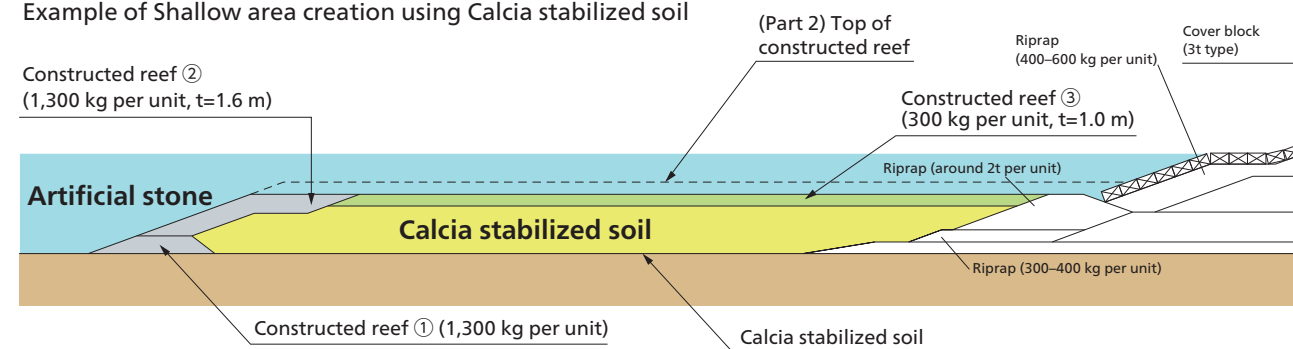
The Sustainability Promotion Committee, chaired by the President, CEO and Representative Director, formulates and promotes company-wide policies, strategies, and activity plans related to biodiversity.

Initiatives to Create and Maintain Aquatic Environments

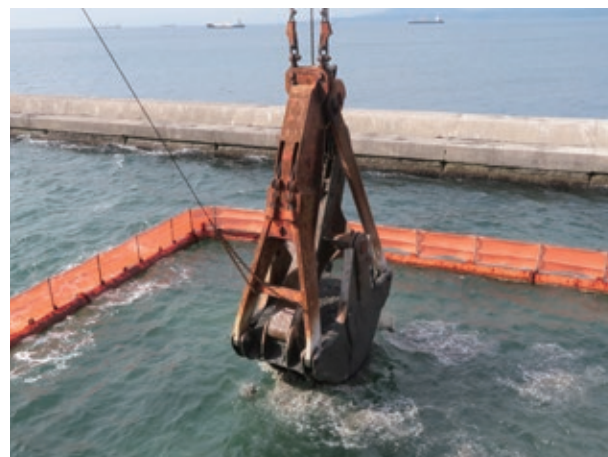
Application of Calcia Soil Stabilization Technology in the Creation of Shallow Areas, etc.

Shallow areas and tidal flats serve as habitats for many organisms. To conserve biodiversity, we are working on blue infrastructure development of shallow areas and tidal flats using dredged soil, Calcia stabilized soil, and Calcia artificial stone (artificial stone made by mixing dredged soil, steelmaking slag, blast furnace slag powder, etc.).

Example of Shallow area creation using Calcia stabilized soil



Mixing dredged soil and Calcia stabilized material with a backhoe



Placement of Calcia stabilized soil

Formation of Blue Carbon Ecosystems and Creation of Seaweed Beds

CO₂ Fixation through Blue Carbon and Other Means

In shallow areas formed with Calcia shallow soil and other materials, the growth of seaweed and seagrass capture atmospheric CO₂ as blue carbon, contributing to measures against global warming while also realizing a rich marine environment through blue carbon ecosystems. We conducted surveys on the growth status of seaweed and evaluated the amount of CO₂ fixed as blue carbon in the shallow area created in Aboshi District, Himeji City, Hyogo Prefecture, and carried out registration and sales as J Blue Credit®. Additionally, the results of catch surveys such as basket net fishing in shallow areas, revealed an increase in species such as rockfish and sea cucumbers.



Seaweed growth survey



Catch survey of basket net fishing

Development of Materials for Seaweed Growth

For seaweed to grow in shallow areas, it is necessary to provide stones or concrete blocks that seaweeds can cling and flourish. By installing Calcia artificial stone, a low-carbon material compared to concrete, in shallow areas or by capturing CO₂ in Calcia artificial stone, it is possible to reduce CO₂ emissions during construction. We are also developing Calcia artificial stone that enables better attachment and growth of seaweed compared to concrete.

Currently, we are developing a real-time seaweed growth monitoring system by attaching transmitters to seaweed to check growth status.



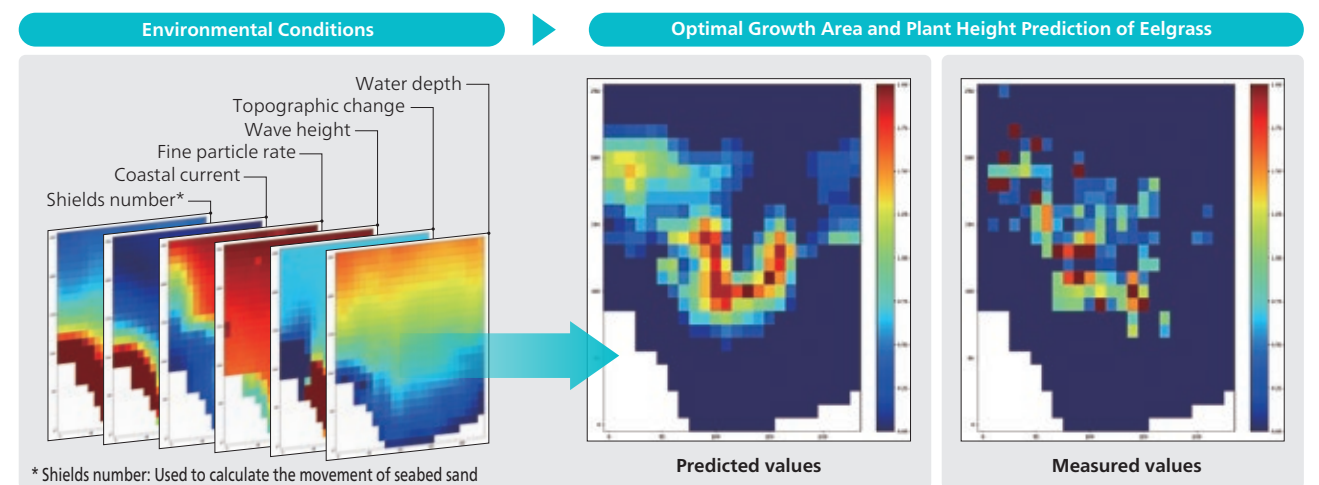
Development of material for seaweed growth

Transplantation and Creation of Coral and Seaweed Beds Associated with Construction

Creating seaweed beds and coral growth areas requires understanding suitable environmental conditions, selecting appropriate sites, and transplantation techniques. We have been working on the creation of eelgrass beds for some time, and are improving the accuracy of site selection through calculations using genetic algorithms. In addition, in canal areas of Tokyo Bay and elsewhere, we are conducting growth tests in tanks and transplantation experiments in actual sea areas targeting the seagrass *Zostera japonica*, which can be utilized for blue carbon.



Zostera japonica growth test



* Shields number: Used to calculate the movement of seabed sand

Selection of suitable sites using simulations

Resource Recycling

Materiality 2. Creation of a Rich Environment

Penta-Ocean Construction Group utilizes construction-generated soil, dredged soil, waste, and other materials generated during construction as resources, commercializes their cyclical use and creation of added value, and contributes to the formation of a recycling-oriented society. At construction sites, we have been promoting zero-emission activities company-wide since fiscal 2006 to reduce final disposal volumes, and are implementing 3R (Reduce, Reuse, Recycle) promotion activities with full participation, based on the principle of suppressing generation.

Effective Use of Soft Dredged Soil

Calcia Reforming Technology

Calcia stabilizing technology is a technology that improves the physical and chemical properties of soft dredged soil generated in ports by mixing it with Calcia stabilizing material (a material made by controlling the composition and adjusting the particle size of converter steelmaking slag generated in the steelmaking process). The Calcia reformed soil made by the Calcia reforming technology can be widely applied in marine constructions such as landfill material, partition embankment material, revetment backfill material, and marine embankment material for repairing route burial. It is expected to shorten the construction period and reduce costs.

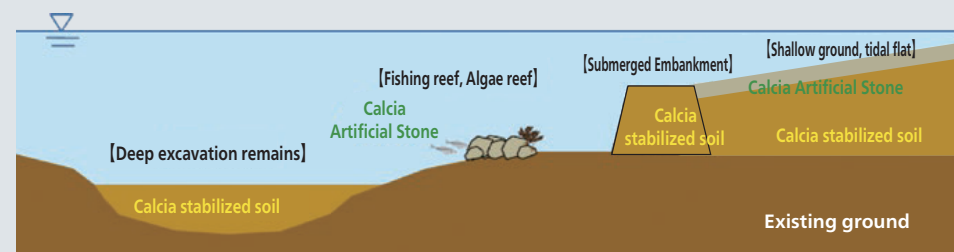
Our company has long focused on Calcia stabilizing technology as an effective method for utilizing dredged soil and by the end of fiscal 2024 used it to create over 2 million m³ of Calcia stabilized soil. We are also engaged in the development of large-scale construction technologies, the construction of Calcia stabilized soil drop mixing vessels, the development of efficient construction methods, and the creation of new materials such as advanced Calcia stabilization technologies incorporating short fibers and soil improvement agents.

Overview of the Calcia Reforming Technology



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

Utilization of Calcia stabilized soil



An image showing the different ways how Calcia stabilized soil can be used



Ocean 3 (Calcia stabilized soil drop mixing vessel)

Recycling Business

The recycling of construction-generated soil is an important issue for the construction industry. Our company is developing maritime hubs and building a wide-area network to promote the utilization of soil as a resource. In addition, we are collaborating with the steel industry to develop new environmentally conscious technologies (Calcia reforming technologies) for the use of dredged soil, and are working to expand the range of applications for dredged soil as construction material.

Recycling of Construction Generated Soil and Construction Sludge

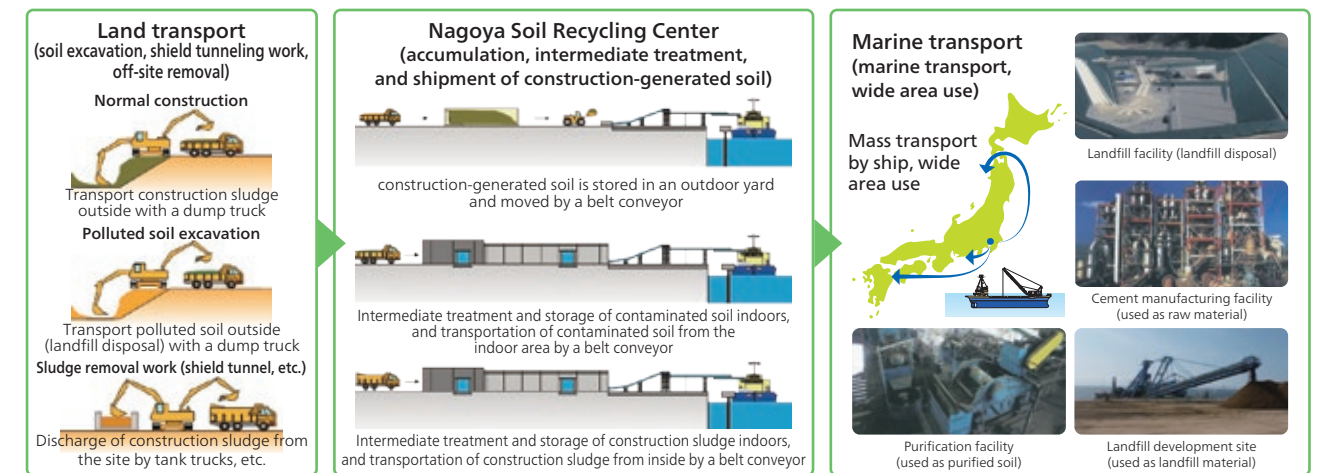
In 2014, we expanded our Ichikawa office in Chiba Prefecture, which undertook marine transportation of construction soil for utilization as a reclamation material, and opened the Ichikawa Soil Recycling Center as a facility to receive construction generated soil and contaminated soil. The received contaminated soil is properly treated and then used cyclically, for example, as raw material for cement. We opened a soil recycling center in Yokohama in 2017 (until 2024) and another center in Nagoya in 2018. In 2021, we began accepting construction sludge in Nagoya, and in 2022, we launched the production and sale of slurry fill in Ichikawa as part of our construction sludge recycling initiative. Through these efforts, we are advancing comprehensive initiatives for the proper treatment and wide-area recycling of excavated soil, with operational bases in both the Kanto and Chukyo regions.



Ichikawa and Nagoya Soil Recycling Centers

We operate Soil Recycling Centers (in Ichikawa and Nagoya) that are involved in the accumulation, intermediate treatment, and shipment of construction-generated soil in order to properly process and widely reuse construction-generated soil, contaminated soil, and construction sludge generated in the Kanto and Chubu regions.

Wide area use of construction-generated soil



Sendai Ecoland

We improve (granulate and solidify) inorganic sludge* generated from construction and excavation work, and recycle it as construction material "Simarussa" (recycled 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.



Paper Sludge Incineration Ash Recycling Business Water-absorbing mud stabilization material "Watoru"

Sodegaura Ecoland

The water-absorbing mud stabilization material "Watoru" is a hydration-treated product made by mixing a special chemical with incinerated paper ash (PS ash) from paper manufacturing sludge generated by paper factories. 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). The material received the Excellent Award in the Infrastructure Technology Development Award in 2021 and is highly recognized as an effective recycling material.



Food Recycling Business

Miki Composting Center

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

