



**People, Dreams &
Technologies Group Co., Ltd.**



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People, Dreams & Technologies Group

As an infrastructure service provider with "People, Dreams and Technologies" as our motto, we have always aimed to refine our technology in order to design infrastructure which enables people to pursue their dreams while enjoying the abundance of nature.

In the future, the development of a sustainable society will require even more diverse approaches, including regional revitalization, digital transformation (DX), and the creation of a carbon-free economy. National resilience has to be strengthened against increasingly frequent and severe natural disasters, and the issue of declining and aging populations in developed countries also needs to be addressed.

The People, Dreams & Technologies (PDT) Group Co., Ltd. was newly established as a holding company to further advance the technology we have developed so far, and allow us to quickly and flexibly respond to a wide variety of social needs by providing services related to all kinds of infrastructure.

Moving forward, we intend to build a diverse array of corporate alliances while further strengthening the governance of the PDT Group. In addition to our core businesses of disaster prevention and infrastructure development, our goal is to offer a broad range of services both in Japan and overseas. We remain fully committed to the creation of a safe and secure environment in which people all over the world have the freedom to pursue their dreams.

Representative Director and President

Yasuji NAGAYA

永谷泰司

Supporting social capital with reliable “Knowledge and Technology”

We believe that infrastructure including civil structures such as bridges, tunnels, roads and railways, utilities such as water supply and electricity, as well as harbors, rivers, schools and hospitals are the foundation on which people can build secure and affluent lives. The PDT Group has overcome various challenges at the forefront of developing this infrastructure, and this experience has enabled us to further enhance our technical capabilities and expand our business fields.

Renewable Energy

- Geothermal Power Generation
- Small-hydro Power Generation
- Biomass Power Generation
- Wind Power Generation
- Waste to Energy

Bridge

- Long-span Bridges
- Durability Improvement
- Maintenance Management, Inspection, Evaluation, Repair Design
- Wind and Earthquake-resistant Technologies
- Performance Design
- Steel Bridge Fatigue
- Compositional Structures
- New Technology/Construction Techniques
- New Materials (Wood, FRP, Highly Durable Materials, etc.)
- Design Standardization

Road

- Road Planning & Design (Highway, Rural Road)
- Intersection Planning & Design (Flyover, At-grade)
- Road Structure Planning & Design (Tunnel, Retaining Wall)
- Road Safety and Traffic Congestion Mitigation Plans
- Cycling or Footpath Planning & Design
- Road Maintenance (Inspection, Data Collection)

Port & River

- River Improvement Plans
- River, Coastal & Port Structure Design & Maintenance Plans
- Port Facility Service Life Extension Plans
- Disaster Prevention & Reduction Plans

Environment

- Environmental Survey, Forecasting, Evaluation & Conservation
- Environmental Impact Assessment
- Strategic Environmental Assessment
- Clean Development Mechanism
- Eco-products
- Eco-sanitation
- Construction Recycling
- Assessment & Design
- Soil Remediation
- Sludge Dewatering & Water Purification

Railway

- Planning Works
- Feasibility Study
- Civil Design & Engineering
- Architectural Design & Engineering
- Mechanical Facilities & Electrical Systems
- Construction Supervision
- Assistance in Operation and Maintenance

Urban & Regional Development

- Sanitary Solution
- Solid Waste / Medical Waste Management
- Water Supply & Waste Water Treatment
- Industrial Park Development

ICT

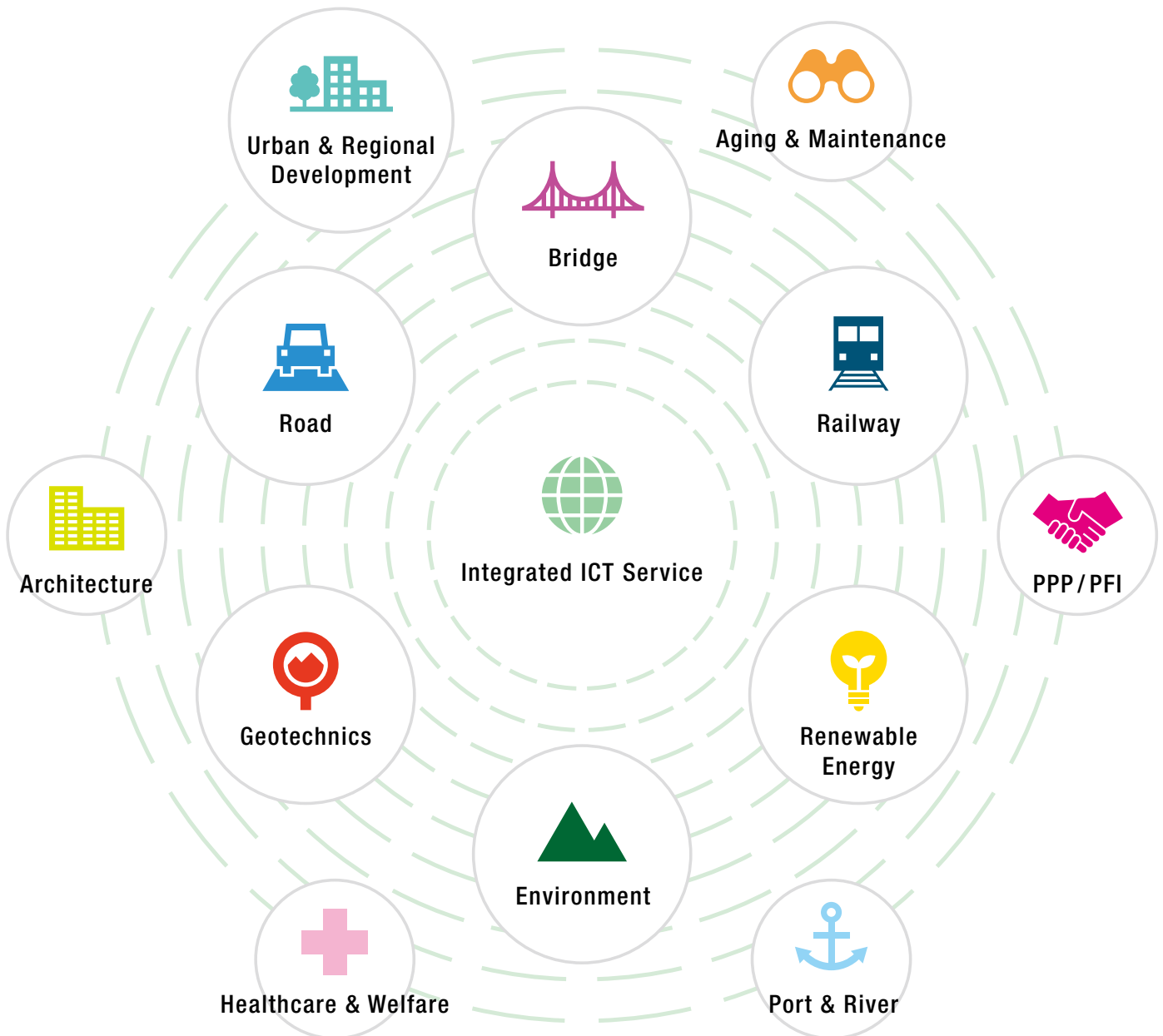
- Traffic Optimization using ICT Plan & Design, Evaluations
- M2M(Machine to Machine)System Design & Development
- Efficient Road Maintenance tools using ICT. Plan & Design
- Traffic control System Plan & Design, Development
- Various System Development & Operation
- Big Data Analysis

Geotechnics

- Geological & Geotechnical Survey
- Soil & Rock Laboratory Test
- Geotechnical Analysis & Design
- Instrumentation & Monitoring
- Geophysical Exploration & Development
- GIS (Geographic Information Systems)

Business Field

We are active in 13 business fields and have especially high technological expertise in the following 7 fields; Bridge, Road, Railway, Geotechnics, Renewable Energy, Environment and Urban & Regional Development. We use information technology related to these fields to create synergies between the mutual technologies.



From now on, we will continue using our accumulated technical capabilities and know-how to expand our business and contribute to improving the technology in developing countries while building good relationships with local engineers.

Introduction of PDT Group

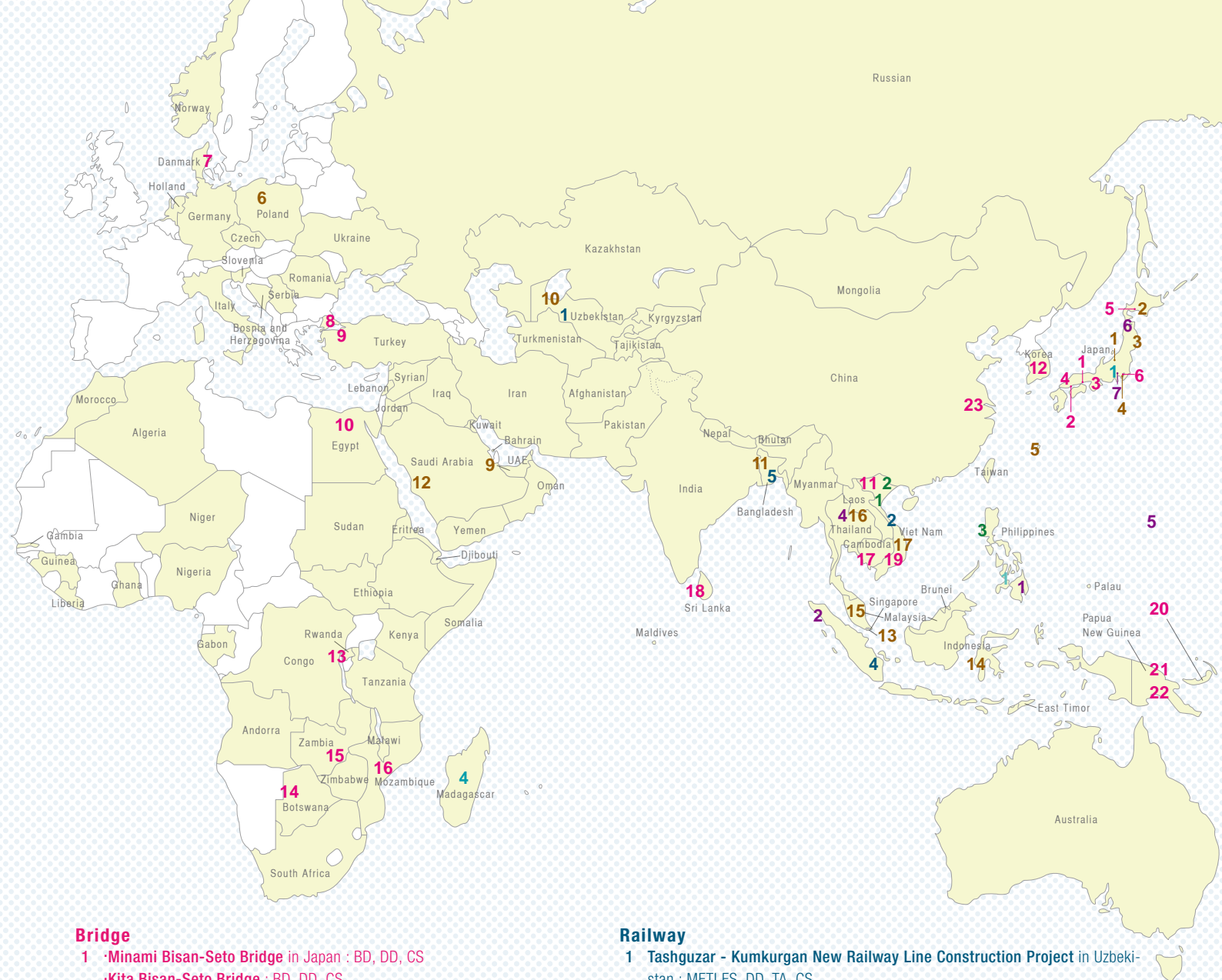
The following companies are the foundation of PDT Group, and are active in 13 fields. We aim to further expand to regions outside Asia, and continue contributing to the world.



The PDT Group was founded to optimize the synergies within the group in order to contribute to resolving all aspects relating to infrastructural issues.

PDT Group - Corporate Facts

Headquarters:	Tokyo, Japan
Representative:	Yasuji NAGAYA
Capital:	3,107,500,000 JPY
Establishment:	October 1, 2021
Remarks:	Listed on Tokyo Stock Exchange Prime Market (Code: 9248)



Bridge

- 1 **Minami Bisan-Seto Bridge** in Japan : BD, DD, CS
 ·**Kita Bisan-Seto Bridge** : BD, DD, CS
 ·**Shimotsui-Seto Bridge** : DD, CS
- 2 **Tatara Bridge** in Japan : BD, DD, CS
- 3 **Akashi Kaikyo Bridge** in Japan : DD, CS
- 4 **Kurushima Kaikyo First, Second, Third Bridge** in Japan : DD, CS
- 5 **Hakucho Bridge** in Japan : DD, CS
- 6 **Rainbow Bridge** in Japan : DD of the Cables, CS
- 7 **Great Belt Bridge** in Denmark : DD of the Cables, CS
- 8 **Yavuz Sultan Selim (the 3rd Bosphorus) Bridge** in Turkey : CS
- 9 **Osman Gazi (the Izmit Bay) Bridge** in Turkey : CS
- 10 **Suez Canal Bridge** in Egypt : DD, CS
- 11 **Nhat Tan Bridge** in Vietnam : BD, DD, CS
- 12 **Incheon Bridge** in Korea : BD, DD, CS
- 13 **Rusumo International Bridge and One Stop Border Post Facilities** in Rwanda and Tanzania : BD, DD, CS
- 14 **Kazungula Bridge** in Botswana and Zambia : CS
- 15 **Chirundu Bridge** in Zambia and Zimbabwe : DD, CS
- 16 **Construction of Bridges on The Road Between Ile and Cuamba** in Mozambique : BD, DD, CS
- 17 **Tsubasa Bridge** in Cambodia : BD, DD, CS
- 18 **Manmunai Bridge** in Sri Lanka : BD, DD, CS
- 19 **Can Tho (Cuu Long) Bridge** in Vietnam : Review of DD, CS
- 20 **Construction of Bridges on Bougainville Coastal Trunk Road** in Papua New Guinea : BD, DD, CS
- 21 **Reconstruction of Bridges on New Britain Highway** in Papua New Guinea : FS, DD, CS
- 22 **Bridge Replacement for Improved Rural Access Project** in Papua New Guinea : DD, CS
- 23 **Jiangying Changjiang Bridge** in China : CS

Railway

- 1 **Tashguzar - Kumkurgan New Railway Line Construction Project** in Uzbekistan : METI FS, DD, TA, CS
- 2 **Hanoi - Ho Chi Minh City Railway Bridges Rehabilitation Project (I)&(II)** in Viet Nam : FS Review, DD, TA, CS
 ·**Hanoi - Ho Chi Minh City Railway Line Bridges Safety Improvement Project** in Vietnam : SAPROF, DD, TA, CS
- 3 **Railway Rehabilitation of Eastern Line** in Bolivia : FS, DD, TA, CS
- 4 **Modification of Cirebon Station Track Layout on Java North Line** in Indonesia : DD, TA, CS
 ·**Double Tracking between Cikampek - Cirebon on Java North Line I, II** in Indonesia : DD, TA, CS
 ·**Double Tracking between Kroya - Yogyakarta on Java South Line** in Indonesia : DD, TA, CS
- 5 **Bangabandhu Railway Bridge Construction Project** in Bangladesh : FS, DD, TA, CS

Road

- 1 **Design for Roundabout** in Japan
- 2 **City traffic planning project** in Colombia : Master Plan Study
- 3 **Belem Metropolitan Trunk Bus System Project** in Brazil : DD, CS
- 4 **The Project for the Construction of Bypass Road on National Route No.7** in Madagascar : BD, DD, CS

Environment

- 1 **Introduction of Bio-Toilet in Vietnam Railways** in Vietnam : Delivery of Bio-Toilet
- 2 **Decentralized waste water treatment as Eco-Sanitation system Project** in Vietnam : FS

*FS:Feasibility Study, BD:Basic Design, DD:Detailed Design, TA:Tender Assistance, CS:Construction Supervision



The PDT Group has vast experience in Japan and all over the world

Geotechnics

- 1 Soil Investigation for Joetsu Oil-fired Power Plant in Japan
- 2 Soil Investigation and Liquefaction Resistance Study for Tomakomai Oil Complex in Japan
- 3 Kamaishi Port Post-quake Recovery Project in Japan
- 4 Undersea Soil Investigation and Liquefaction Resistance Study for the Tokyo Bay Undersea Tunnel in Japan
- 5 Soil Investigation for Naha Port in Japan
- 6 Soil Investigation and Demonstration Survey in Poland
- 7 Foundation Design for Chemical Plant in USA
- 8 Foundation Design for Fertilizer Plant in Republic of Trinidad and Tobago
- 9 Quake Resistance Study for LNG Plant in UAE
- 10 Foundation Design for Fertilizer Plant in Uzbekistan
- 11 Soil Investigation and Foundation Design for Coal-fired Power Plant in Bangladesh
- 12 Soil Investigation, Analysis and Foundation Design for Al-Mada Tower in Saudi Arabia
- 13 Soil Investigation for Marina Bay Sands in Singapore
- 14 Soil Investigation and Marine Survey for LNG Plant in Indonesia
- 15 Soil Investigation and Foundation Design for K.L. International Airport in Malaysia
- 16 Soil Investigation for Coal-fired Power Plant in Thailand
- 17 Soil Investigation for Refinery Plant in Vietnam

Renewable Energy

- 1 -Small-Hydro Power Projects in Philippines: FS, Construction Management, Investment
- P1 Biomass Power Project (Rice Husk): Pre-FS, Plant Engineering
- P1 Wind Power Project : Pre-FS, FS
- 2 Small-Hydro Power Projects in Indonesia: FS, Operation & Management
- 3 -Geothermal Power Project in Japan: FS
- 4 -Waste to Energy Project in Thailand: Equipment Supply
- 5 Waste to Energy Project in Saipan: FS
- 6 Geothermal Power Project & Wind Power Project in Japan: FS, Technical Assistance, Investment
- 7 Biomass Power Project in Japan: FS, Technical Assistance, Investment

Urban & Regional Development

- 1 -Water Supply Concession Project in Philippines: Investment, FS
- Industrial Park Development in Philippines: Investment, FS
- Agro and Aqua based Project in Philippines: Investment,
- Bulk Water Projects in Philippines: Investment
- The Project for Joint Development of Taguibo Agro Industrial Park in Philippines: Investment

Suspension Bridge



Akashi Kaikyo Bridge in Japan [Chodai]

Client	: Honshu-Shikoku Bridge Authority	Main Span	: 1,991m
Contract Period	: 1989-1999	Navigation Clearance	: 65m
Bridge Type	: 3-Span Suspension Bridge	Width	: 35m
Length	: 3,911m	Scope of Work	: Detailed Design/ Construction Supervision

The Akashi Kaikyo Bridge is currently the world's longest suspension bridge with a main span length of 1,991m. The bridge is a two-hinged 3-span stiffening-truss suspension bridge over the Akashi Kaikyo connecting the Island of Awaji with Honshu. The towers supporting the cables rise to 300m above sea level. Approximately, 200,000 tons of steel were used in the superstructure and approximately 1,420,000m³ of concrete were used for the substructure.

Rainbow Bridge

in Japan [Chodai]

Client	: Metropolitan Expressway Company Limited
Contract Period	: 1990-1994
Bridge Type	: 3-span Suspension Bridge
Length	: 918m
Main Span	: 570m
Navigation Clearance	: 50m
Width	: 29m
Scope of Work	: Detailed Design/ Construction Supervision

The Rainbow Bridge is a suspension bridge with a 570m main span over the channel to the Port of Tokyo in the Tokyo metropolitan area. The bridge is a three-span, two-hinged stiffened steel truss, combined highway and railway suspension bridge. It carries four expressway lanes of traffic on the upper deck and two highway lanes and two rail tracks for a light rail system on the bottom deck within the truss structure. The bridge has relatively short side spans, and additional horizontal plates were provided between the two halves of strands in the tower saddles to increase friction forces.



Hakucho Bridge in Japan [Chodai]

Client	: Ministry of Land Infrastructure, Transport and Tourism (MLIT)
Contract Period	: 1988-1997
Bridge Type	: 3-span Suspension Bridge
Length	: 1,380m
Main Span	: 720m
Navigation Clearance	: 54.45m
Width	: 23m
Scope of Work	: Detailed Design/ Construction Supervision

The Hakucho Bridge was completed in 1998 at the mouth of Muroran Port in Hokkaido. It is a two-hinged three-span streamlined box girder highway suspension bridge, with a 720m main span carrying two roadway lanes in each direction. This bridge is the first application of a streamlined steel box girder for a major suspension bridge in Japan. An artificial island with cylindrical walls 37m in diameter and 103m in depth was constructed to facilitate the construction of the tower foundation.



Minami and Kita Bisan-Seto Bridge in Japan [Chodai]

Client	: Honshu-Shikoku Bridge Authority
Contract Period	: 1978-1988
Bridge Type	: 3-span Suspension Bridge
Length	: 1,723m (Minami), 1,611m (Kita)
Main Span	: 1,100m (Minami), 990m (Kita)
Navigation Clearance	: 65m
Width	: 30m
Scope of Work	: Basic Design/ Detailed Design/ Construction Supervision

The bridge is the southern part of the "twin" suspension bridges, which have a common anchorage between two bridges. The three-span continuous stiffened-steel truss girder consists of an upper deck (for highway) and the bottom deck (for railway).



Osman Gazi (Izmit Bay) Bridge in Turkey [Chodai]

Client	: General Directorate of Highways (KGM)
Contract Period	: 2013-2017
Bridge Type	: 3-span Suspension Bridge
Length	: 2,907m
Main Span	: 1,550m
Navigation Clearance	: 64m
Width	: 35.9m
Scope of Work	: Construction Supervision

Osman Gazi (the Izmit Bay) Bridge is the fourth longest suspension bridge in the world. The Bridge was opened to the traffic on June 30, 2016. After the bridge opening, it takes just six minutes to cross Izmit Bay over the bridge, which runs from the north to the south coast.



Cable-stayed Bridge

Tatara Bridge in Japan [Chodai]

Client	: Honshu-Shikoku Bridge Authority
Bridge Type	: Steel Box Girder Cable-Stayed Bridge
Main Span	: 890m
Width	: 30.6m
Contract Period	: 1980-1999
Length	: 1,480m
Pylon Height	: 222m
Scope of Work	: Basic Design/ Detailed Design/ Construction Supervision/ Review of Detailed Design

The Tatara Bridge is a cable-stayed bridge, with a main span of 890m as part of the Shimanami Motorway for the Honshu-Shikoku Bridge Project, with an overall length of 59.4km. A steel box girder cable-stayed bridge with a main span of 890m was selected to avoid the huge anchorage blocks, which would be required for a suspension bridge. The construction was started in April, 1992 and was completed and opened to traffic in April, 1999, as the world's longest cable-stayed bridge.



Incheon Bridge in Korea [Chodai]

Contract Period	: 2004-2008
Bridge Type	: Steel Box Girder Cable-Stayed Bridge
Length	: 1,480m
Main Span	: 800m
Pylon Height	: 238.8m
Deck Width	: 33.4m
Scope of Work	: Detailed Design

The Incheon Bridge is a cable-stayed bridge, which links the Incheon International Airport, on Yongjong Island, with Songdo New Town in the southern part of Incheon city, Korea. The total bridge length will be approximately 12.6km, including the cable-stayed bridge, approach bridges and viaducts. The inverted Y-shaped reinforced concrete towers rise up 238m high and are supported on drilled shaft piling foundations.



Nhat Tan Bridge in Viet Nam [Chodai] (Viet Nam-Japan Friendship Bridge)

Client	: Project Management Unit 85
Contract Period	: 2007-2015
Bridge Type	: 6-span Continuous Cable-Stayed Bridge
Length	: 1,500m (main bridge)
Main Span	: 300m
Pylon Height	: 110m
Width	: 35.6m
Scope of Work	: Basic Design/ Detailed Design/ Construction Supervision

The Nhat Tan Bridge is planned to mitigate further congestion on the already congested bridges over the Red River. Among three interchanges constructed in the Project, Vinh Ngoc Interchange connects Nhat Tan Road and National Highway No.5. The northern end of the project road is extended to Noi Bai Airport.



SOURCE : IHL





Yavuz Sultan Selim (3rd Bosphorus) Bridge

in Turkey [Chodai]

Client	: General Directorate of Highways (KGM)
Contract Period	: 2013-2018
Bridge Type	: Combined Suspension and Cable-stayed Bridge
Length	: 2,164m
Main Span	: 1,408m
Pylon Height	: 322m
Width	: 59m
Scope of Work	: Construction Supervision

Yavuz Sultan Selim (the 3rd Bosphorus) Bridge is the first bridge employing a combined cable-stayed and suspension cable system, The Bridge was opened to the traffic on August 26, 2016.

Iwagi Bridge in Japan [Chodai]

Client	: Ehime Prefecture
Contract Period	: 2011-2015
Bridge Type	: 5-span Continuous Steel-Concrete Hybrid Cable-stayed Bridge
Length	: 735m
Main Span	: 475m
Pylon Height	: 132.5m
Width	: 7.5m
Scope of Work	: Basic Design/ Detailed Design

Iwagi Bridge is a 5-span Continuous Steel-Concrete Hybrid Cable-stayed Bridge. The bridge is part of the "Kamijima Connecting Bridge Project" which connects Iwagi Island, Ikina Island, Sashima Island and Yuge Island. The construction of the bridge started in 2016 and was completed in March 2022. Due to its narrow width and long center span (475m), rational and economical wind-resistance measures were adopted by carefully considering the girder shape and bridge face structure after wind tunnel testing.



Tsubasa (Neak Loeung) Bridge in Cambodia [Chodai]

Client	: Ministry of Public Works and Transport
Contract Period	: 2009-2015
Bridge Type	: Pre-stressed Concrete Cable-Stayed Bridge
Length	: 640m (main bridge)
Main Span	: 330m
Pylon Height	: 105m
Width	: 13.5m
Scope of Work	: Basic Design/Detailed Design/ Construction Supervision

Tsubasa Bridge is to cross the Mekong River at Neak Loeung 50km east of Phnom Penh as a part of Route-1 of the Asian Highway in Cambodia. The total length of the crossing is approximately 5.3km, consisting of the main bridge 640m, approach bridges 1,620m in total and approach roads.



Arch Bridge | Girder Bridge | Pedestrian Bridge



Shin-Aso Ohashi Bridge in Japan [Chodai]

Client	: Kumamoto Prefecture
Contract Period	: 2016-2018
Bridge Type	: 3-span continuous steel girder, 1-span steel box girder, 3-span PC continuous rigid frame box girder
Length	: 525m
Main Span	: 165m
Width	: 10.5m
Scope of Work	: Basic Design/ Detailed Design

The Shin-Aso Bridge between Kumamoto city and Minamiaso village was constructed over the Kurokawa River, about 600m downstream from the old Aso Bridge. It was built as a replacement for the original bridge, which collapsed due to the Kumamoto Earthquake on April 16, 2016. The bridge crosses a deep valley and a presumed active earthquake fault. The bridge was designed with wide bridge piers to prevent the bridge girders from falling off in the event of strong tremors. Bridges near presumed active faults are designed with single girders and not continuous girders to minimize damage and speed up restoration work.



Kushima Bridge in Japan [Chodai]

Client	: Uwajima City
Contract Period	: 2008-2013
Bridge Type	: 3-span Continuous Steel Box Girder Bridge
Length	: 468m
Main Span	: 185m
Deck Width	: 7.25m
Scope of Work	: Basic Design/ Detailed Design

The Kushima Bridge is a three-span continuous steel box girder bridge with an orthotropic steel deck. The project included the construction of two pier foundations in the sea channel. Steel pipe piles as foundations were driven into the seabed after excavation in 30m deep water, while the lower parts of the reinforced concrete piers were being manufactured on land. The piers were then brought to the site to be installed on the piles. Footings were made by casting underwater non-segregate concrete on the seabed, and the upper parts of the piers, which are the deepest "bell-type submarine foundations" in Japan, were constructed in-situ.



Shin-Fujigawa Bridge in Japan [Chodai]

Client	: Japan Highway Public Corporation
Contract Period	: 1995-1998
Bridge Type	: Steel-Concrete Hybrid Arch Bridge
Length	: 381m
Main Span	: 265m
Deck Width	: 18.05m
Scope of Work	: Basic Design/ Detailed Design

The Shin-Fujigawa Bridge is a steel-concrete hybrid arch bridge crossing the Fuji River. This hybrid type bridge uses concrete in both the arch rib and vertical members which are mainly subject to axial force, and also applies steel to the stiffening girders which are mostly subject to bending moment. Particularly, the arch rib developed by high strength concrete was a cost-effective construction method which led to weight alleviation and cost savings.



Mishima Skywalk in Japan [Chodai]

Client	: Fujiko Co., Ltd.
Contract Period	: 2011 - 2012
Bridge Type	: Pedestrian Suspension Bridge
Main Span	: 400m
Height	: 70.6m
Tower Height	: 44m
Scope of Work	: Basic Design, Detailed Design

Mishima Skywalk is the longest pedestrian suspension bridge in Japan. Located in a steep valley with complex terrain, its construction required coming up with countermeasures against strong winds and overcoming various technical problems. The color of the bridge reflects a snow-covered Mt. Fuji. The shape of the cable anchorage allows it to be used as an observation deck. The bridge was awarded the Good Design Award in 2017.



On-going Project as of 2023



4th Cebu-Mactan Bridge

in Philippines [Chodai]

Client	: Japan International Cooperation Agency (JICA)
Contract Period	: 2018-2023
Bridge Type	: Steel Box Girder Bridge with Orthotropic Steel Deck
Length	: 525m
Main Span	: 215m
Width	: 26.75~33.75m
Scope of Work	: Basic Design/ Detailed Design

The 4th Cebu-Mactan Bridge is a steel box girder bridge with an orthotropic steel deck for the main spans and a composite slab deck for the approach spans. The project has a total length of about 8.2km and involves the construction of a fourth bridge with connecting coastal roads over the strait between Cebu Island and Mactan Island (where the airport is located) in the Philippines. The project is expected to contribute to the sound socioeconomic development of the Cebu metropolitan area by responding to the increasing traffic demand between Cebu and Mactan Island and alleviating traffic congestion. The project is targeted for completion in 2029.



Laguna Lakeshore Road Network Project (Phase I)

in Philippines [Chodai]

Client	: Department of Public Works and Highways (DPWH)
Contract Period	: 2021-2023
Bridge Type	: PC I Box Girder Bridge
Length	: 21,500m
Main Span	: 40m
Width	: 19.5-28.1m
Scope of Work	: Detailed Design

This project consists of the detailed design for a 37.4km road planned along the left bank of Laguna Lake, the largest lake in the Philippines located in the south of Metro Manila. Bridge sections make up about 21.5km and embankment sections about 15.9km of the total project length. The construction of this road is expected to contribute to economic development and reduction of CO2 emissions by alleviating the chronic traffic congestion in the Metro Manila area. The embankment sections of the project will also act as levees to mitigate the frequent flooding in the area. The project is targeted for completion in 2026.



Mumbai Trans Harbour Link Project (Package-2)

in India [Chodai]

Client	: JFE Engineering Corporation
Contract Period	: 2018-2020
Bridge Type	: Steel Box Girder Bridge
Length	: 3,460m
Main Span	: 180m
Width	: 14.84m (Each Direction)
Scope of Work	: Detailed Design

The Mumbai Trans Harbour Link (MTHL) was planned to facilitate decongestion of the island city by improving connectivity to the mainland (Navi Mumbai) and development of the Navi Mumbai Region. MTHL was planned as a bridge between Sewri on Mumbai Island and Nhava on the mainland in order to speed up traffic between Mumbai and Navi Mumbai and to facilitate traffic from Mumbai to Pune and Goa. The project comprises the construction of an approximately 21.8km long 6-lane carriageway bridge across Mumbai Bay. The length of Package 2 is 7.8km. The project is targeted for completion in 2024.

Design, Construction Supervision and Service Life Extension

We offer a wide variety of engineering services at the various stages of design and construction as detailed below.

Consulting Service

We have extensive know-how of understanding client needs, project finding, preliminary surveys, basic and detailed design, construction supervision, as well as operation and maintenance, and can provide comprehensive civil engineering services and technology at all project stages.

Consulting Service Stage



Project Finding



Environmental Survey



Site Investigation



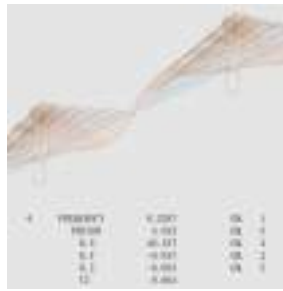
Design

For large-scale suspension bridges and similar structures with few precedents, models as similar to the real structure as possible are made of not only the girders and towers, but of the whole bridge. These models are then used to make highly accurate wind resistance studies and dynamic analyses, the results of which are reflected in the design.

Wind Tunnel Testing used to Study Aerodynamic Stability



Dynamic Analysis



Evaluation of Detailed Design using Study Models



For structurally complicated locations, study models are created for individual members in order to ensure they fit into the overall structure.

Building Information Modelling (BIM) and Aesthetic Design

BIM Designing



BIM has become a mainstream technology in infrastructure design and innovation. Comprehensive 3D models can be created for structures such as bridges, and additional information such as time, cost and materials can then easily be added and managed. BIM can be applied to all processes from structural design to construction and maintenance, and we have also applied the technology to aesthetic design.



Construction Supervision

Construction Supervision of Nhat Tan Bridge in Viet Nam




TENCATE
Geotube

Application in Incheon Bridge

For more cost effective and time efficient construction, we offer Geotube® technology for temporary platform to facilitate construction of the piers.

CHODAI was responsible for the management of Yeongjong Grand Bridge which was Japan's first real overseas construction management project. CHODAI has since been able to use the valuable experience gained from this project on other construction management and PPP projects. We can now provide overall project management services to promptly and smoothly implement projects as well as reduce construction costs and time through design reviews and construction schedule management.

As part of our overseas project management activities, we also support business promotion with an emphasis on financing schemes in order to implement privately funded BOT projects.

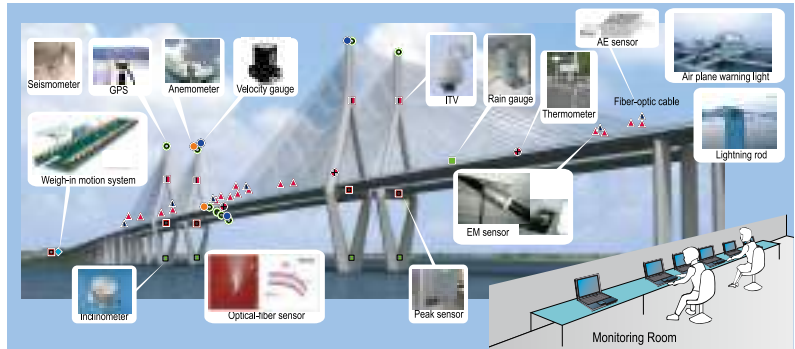


Service Life Extension

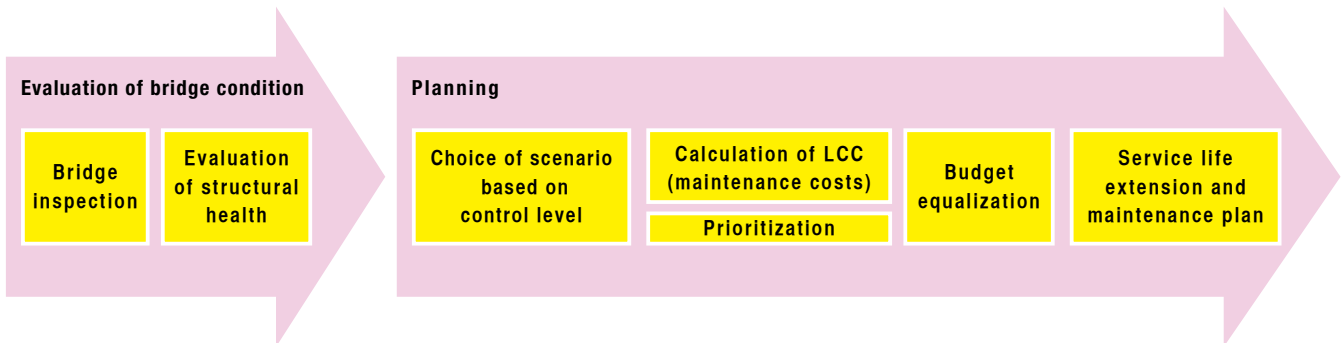
Inspection and Diagnosis



Structural Health Monitoring System



Flow chart showing our service life extension and maintenance planning



The goal is to employ a PDCA (Plan-Do-Check-Act) cycle for bridge maintenance consisting of the following parts: Plan (service life extension and maintenance plan), Do (repair and reinforcement measures), Check (bridge inspection and diagnosis), Act (policy improvement and revision). In order to improve the sophistication and efficiency of the individual parts of the PDCA system, we are implementing Structural Health Monitoring Systems (SHMS) for overseas long-span cable-stayed bridges, aims to create, share and use bridge databases as a management tool, and strives to develop support tools which can be used for simple inspections and by disaster patrols.

Railway Engineering Services

Our services cover all project phases from project formation, master planning, preliminary studies, feasibility studies, detailed design, cost estimates, bidding and contract documentation, bidding procedures including evaluation, construction supervision, material inspection, planning, training and guidance for operation and maintenance of projects.

Our engineering services cover the following fields.

Planning Works

Project formation, master plans, regional development planning, urban development planning, inter-urban transportation planning, etc.

Feasibility Studies

Socio-economic studies, traffic forecasts, transportation planning, engineering studies, cost estimates, economic/ financial analysis, etc.

Surveys

Topographical surveys, route surveys, geological/ soil surveys, environmental assessment, hydrological surveys, meteorological surveys, etc.

Civil Design & Engineering

Basic/ detailed design for track, railway bridges, viaducts, tunnels, subways, new transport systems, preparation of bills of quantities, specifications, cost estimates, etc.

Architectural Design & Engineering

Architectural design works for stations and other railway-related facilities, preparation of bills of quantities, specifications, cost estimates, etc.

Mechanical Facilities & Electrical Systems

Planning and design for depots, related machines, equipment and facilities for stations, railway mechanical & electrical systems, etc.

Bidding Documentation & Assistance

Preparation of bidding documents, contract documents, bidding evaluation, bidding assistance, etc.

Construction Supervision

Construction supervision, inspection of manufacturing and products, job training, advice on maintenance work, assistance in management & operation, etc.

New Railway Line Construction



Tashguzar-Kumkurgan New Railway Line Construction Project

in Uzbekistan [Chodai]

Client : Uzbekistan Railways
 Contract Period : 2005-2013
 Scope of Works : Feasibility Study/ Detailed Design/ Bidding Assistance/ Construction Supervision

The project was to construct a new railway line (222 km) between Tashguzar and Kumkurgan as well as rehabilitate the existing line (31 km).

The project scope covered 4 procurement packages; construction of 5 steel railway bridges, procurement of the heat-treated rail from Japan, installation of signal & telecommunication systems, and procurement of track material and maintenance machinery.

Railway Rehabilitation



Consulting Services for Hanoi - Ho Chi Minh City Railway Line Bridges Safety Improvement Project

in Viet Nam [Chodai]

Client : Railway Project Management Unit, Ministry of Transport
Contract Period : 2005-2016
Scope of Works : Feasibility Study/ Detailed Design/ Bidding Assistance/ Construction Supervision

The scope of the project includes replacement of bridges, construction of civil facilities, tracks, architecture buildings, installation of signal and telecommunication systems, and environmental assessment for improvement of Hanoi - Ho Chi Minh City Railway Line. The objective of the services was to perform the survey, detailed design for 44 bridges, bidding assistance and construction supervision services for northern 17 bridges among 44 bridges.

Railway Double Tracking



Consulting Engineering Services for Railway Double Tracking on Java South Line Project

in Indonesia [Chodai]

Client : Directorate General of Railways, Ministry of Transportation
Contract Period : 1998-2007
Scope of Works : Feasibility Study/ Detailed Design/ Bidding Assistance/ Construction Supervision

The project was to construct new track of approx. 64 km including roadbed, bridges, tracks, signal and telecom system installation, provision of a CTC center and rehabilitation of existing bridges and tracks. The objective of the project was to eliminate traffic congestion and increase the safety level between Yogyakarta and Kroya on Java South Line by double tracking.

Improvement of Railway Workshops



Consulting / Construction Advisory Services for Railway Passenger Transport Improvement Project in Uzbekistan [Chodai]

Client : Uzbekistan Railways
 Contract Period : 1996-2001
 Scope of Works : Feasibility Study/ Detailed Design/ Construction Supervision

The project involved the supply and delivery of 25 units of passenger coaches and spare parts for repair of existing passenger coaches, and the modernization of Tashkent Passenger Coach Depot No. 2, including supply, delivery, and installation works of necessary plant, machinery, workshop equipment and materials, electrical and utility facilities with construction and modification of buildings, civil structures, and tracks, etc. as well as the overseas training of Uzbekistan Railways' staff for management of a passenger coach repair workshop and repair work of passenger coaches.

Planning & Studies



Planning and feasibility studies for urban railway projects in various countries



Image of High Speed Railway Study in Indonesia

Our services in various engineering fields cover planning of urban railways and high speed railways including economic evaluation, regional and urban development, passenger and freight traffic analysis, route location and surveys, geological and soil surveys, ecological and environmental studies, earthwork, track, bridges, tunnels and other structures, workshops, signaling and telecommunications, electrification, buildings, rolling stock, train operation, etc.

On-going Project as of 2023



Consulting Services for Detailed Design, Bid Assistance and Construction Supervision of Bangabandhu Railway Bridge Construction Project [Chodai]

Client : Bangladesh Railway, Ministry of Railways
Contract Period : 2017-2024
Scope of Works : Feasibility Study / Detailed Design / Bid Assistance / Construction Supervision

The Project will construct a dedicated railway bridge (approximately 4.8 km long) with provision of dual gauge double track over the River Jamuna parallel to and approximately 300 m upstream of the existing Jamuna Multipurpose Bridge (Bangabandhu Bridge) and railway approach (approximately 6.2 km long) in order to meet increasing national and sub-regional traffic demand and to improve access between the cities of the eastern and western sides of Bangladesh. The Consulting Services will cover the survey / investigation, detailed design, procurement assistance, construction supervision and safeguard assistance including environmental and social considerations.



Consulting Services for of Basic Design, Bid Assistance and Construction Supervision of Jakarta Mass Rapid Transit System Project Phase 2 in Indonesia [Chodai]

Client : PT. Mass Rapid Transit Jakarta
Contract Period : 2018 - 2025
Scope of Works : Basic Design/ Bid Assistance/ Construction Supervision

The objective of the project is to expand passenger transport capacity by constructing a mass rapid transit system (MRT) (total length: 14.5 km) in the Jakarta metropolitan area, where traffic is seriously congested. Through the improvement of the traffic situation in this area, the project will help improve the investment climate in Java. The phase 1 section (between Lebak Bulus and Bunderan HI) was started operation in 2019. The phase 2 section (between Bunderan HI – Kampung Bandan: underground 7.3km, on ground 0.5km) is due to start operation in 2025. Preparation of the tender are currently under way. Chodai provides the consulting services for the basic design, bid assistance and Construction Supervision as a member of the consortium.



Preparatory Survey on Java North Line Upgrading Project [Chodai]

Client : Japan International Cooperation Agency
Contract Period : 2019-2023
Scope of Works : Feasibility Study

The objective of this project is to upgrade Java North Line with additional narrow-gauge track along the existing track, aiming at achieving a target travel time of less than 6 hours between Jakarta and Surabaya. This would increase the transportation capacity on Java Island, and significantly contribute to the improvement of the investment climate and economic development in the area. Chodai provides consulting services as the lead firm of a joint venture.

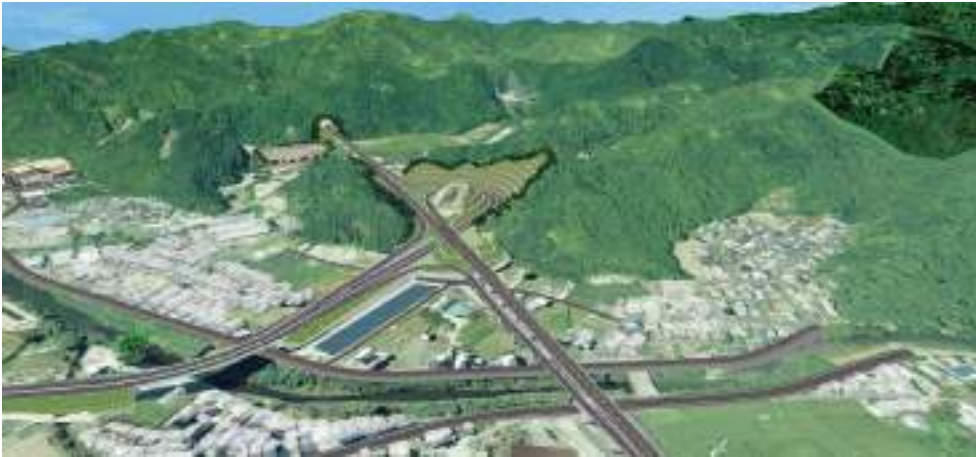
Expressway / High Grade Road

Roads are important networks which connect regions and promote logistics and local economic development. Construction of wide-reaching road networks such as expressways is indispensable for the economic growth of any country.



When constructing expressways, it is important to accurately select suitable road standards, geometry, and road structures such as bridges and tunnels to match the requirements of road users and regional needs. High-grade roads also play a major role for disaster prevention and management.

We strive to make the most of limited budgets when carrying out planning and design for road construction.



Interchanges connect wide-reaching and local road networks and are important facilities for regional development.

We have extensive experience of the selection of structures in consideration of traffic convenience and the regional environment.

Road Facilities / For All Road User

Road networks also require immigration facilities, rest facilities, and service areas which can be used to transmit information in case of accidents and disasters. It is also necessary to plan motorbike/ bicycle lanes and underground utilities in order to use the road space effectively in conjunction with road maintenance.



Example of customs/border and rest facilities at international highway.



Effective use of road space (utility duct)



Construction of dedicated bicycle lanes

Rural Road / Missing Link

Roads are essential for the life of local residents. It is therefore necessary to construct roads suitable for the local environment as well as alternate roads which can be used during disasters to enable roadside residents to live safely and comfortably.



In addition to enabling the movement of vehicles and people, roads also promote economic development and provide both surface and underground space for facilities such as utility poles, ducts, etc. An integrated approach is recommended for road planning and regional development.

We consider the landscape, environment, disaster prevention and traffic safety when carrying out road planning and design.

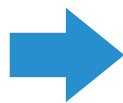
Reinforcement of Vulnerable networks



Improvement of Horizontal alignment and Vertical alignment, Structures and Pavement

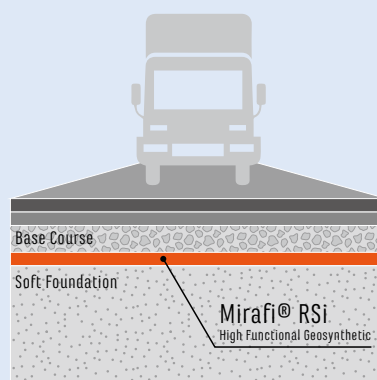
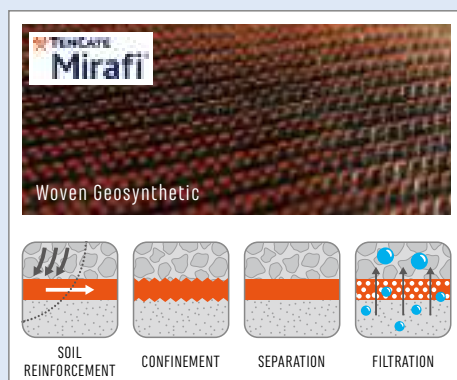


Elimination of Missing Links



Road construction and maintenance supports the stable movement of goods and people.

Roadway Reinforcement For Soft Foundation



TenCate Mirafi® RSi series — the “perfect” integrated geotextile

Cost effective solution for pavement base reinforcement and subgrade stabilization on soft foundations.

Being installed between base course and subgrade, RSi series provide all Separation, Tensile Strength, Water Penetration, and Filtration factors with its superior multi-layered conformation.

Traffic management / Road Safety

Congestion and accidents cause problems for urban roads and traffic, and lead to a deterioration of traffic conditions. It is therefore important to analyze the underlying reasons and develop accurate countermeasures. It is also vital to comprehensively consider the improvement of roads and intersections, the development of public transport, as well as the use of Intelligent Transportation Systems (ITS) and related software.



In order to mitigate traffic congestion caused by economic development, multi-modal solutions such as Bus Rapid Transit (BRT) systems are effective for traffic management.

Image of Bus Rapid Transit

Elimination of Traffic congestion



Simulation of Traffic Jam at the Intersection

We provide assistance and technical consulting to find solutions to problems in existing traffic networks.

Flow of traffic management and traffic congestion

1. Overview of current traffic volume, simulation, and factor analysis
2. Long- and short-term planning (road width extension and flyover construction at intersections / multi-modal transport solutions / traffic dispersion policy), prioritized schedule implementation
3. Consideration of detailed schemes, structure selection, design, and construction for the planned countermeasures

Intersection Improvements for smooth traffic flow



Study procedure

- Traffic survey
- Traffic demand forecasting
- Traffic capacity analysis
- Evaluating capacity
- Determine level of service and intersection type

Roundabout

Signalized intersection

Flyover



Source of Uda City

Signal-less roundabout (characterized by yield on entry)



Intersection with traffic signs and road surface markings for increased safety

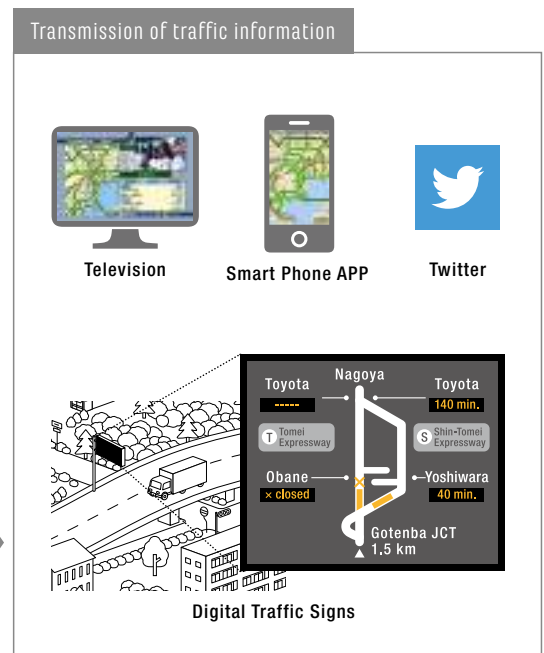
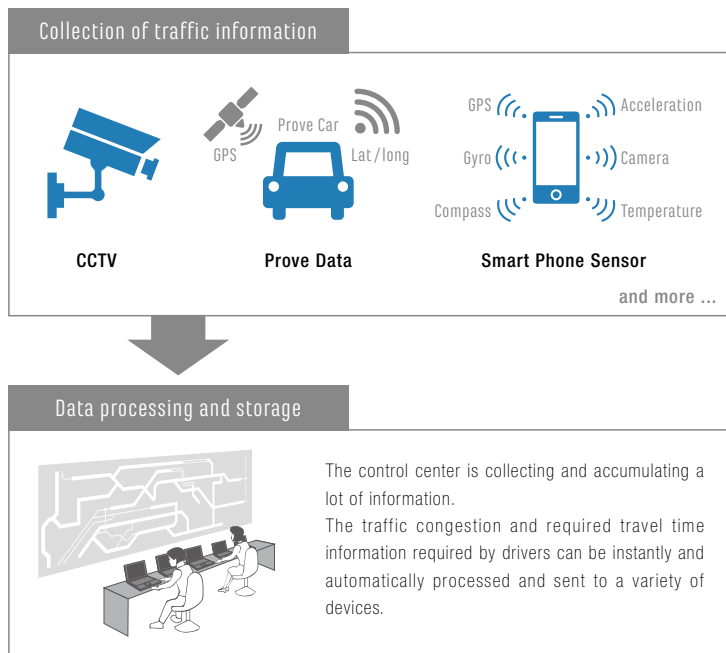
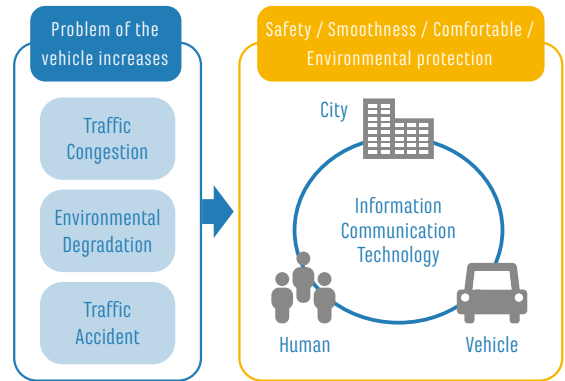


Flyover optimized for heavy traffic intersection

The use of ICT for Road & Traffic

When people's standard of living increases as a result of national economic growth, the rate of car ownership also becomes higher. Based on experiences from Japan, an increasing number of cars leads to congestion, deterioration of the traffic environment, and a loss of economic activity, resulting in a negative spiral. It is thus necessary to ensure an optimal traffic circulation so as not to lose opportunities for economic development and to enable the continued growth of the economy.

On the other hand, the communication infrastructure in developing countries has developed rapidly as they are not burdened by the history of ICT in Japan, and they already have an environment in which they can introduce more advanced technology. The PDT Group fully utilizes ICT technology cultivated in Japan, and is therefore able to propose comprehensive solutions for maintenance and traffic environment improvement to its client countries.



Road

Land Development

Roads are part of the main infrastructure and need to be prioritized and developed for urban and regional development projects such as industrial parks. It is important to plan and develop the road and traffic network to meet the objectives and needs of the development area as this has a significant impact on future convenience and value.



Our role as a consulting company involves supporting urban development by performing basic design for roads, bridges, soft soil improvement, utilities, and landscape design.



Maintenance / Life Extension

Road infrastructure improves the flow of people and things, makes our life more convenient in different ways, and significantly contributes to economic growth. The PDT Group is engaged in road maintenance projects which aim to keep this infrastructure sound over a long period of time. It is vital for road maintenance to comprehensively manage all the phases shown below: "Collect", "Evaluate / Manage", and "Provide".

Road

Phase
01

COLLECT To know present situation

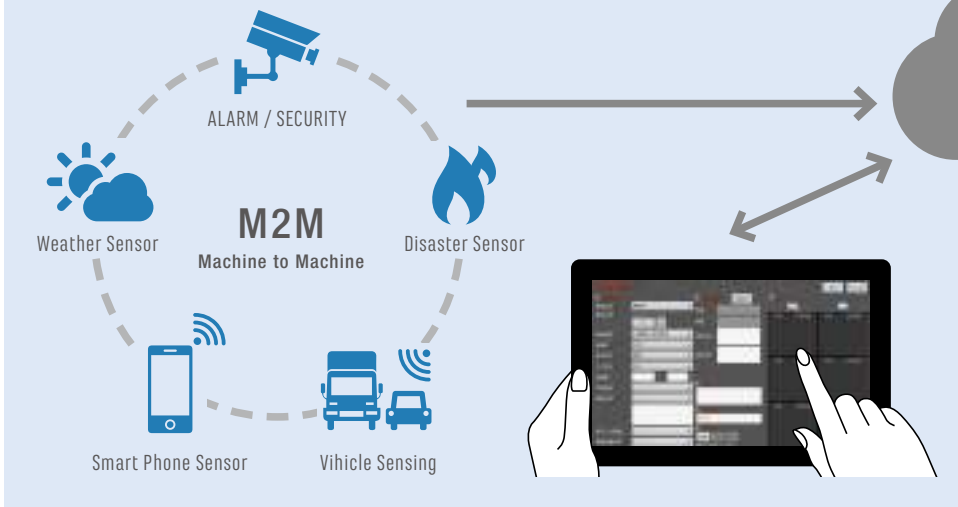


Inspection of cut slope

Data collection for pavement maintenance

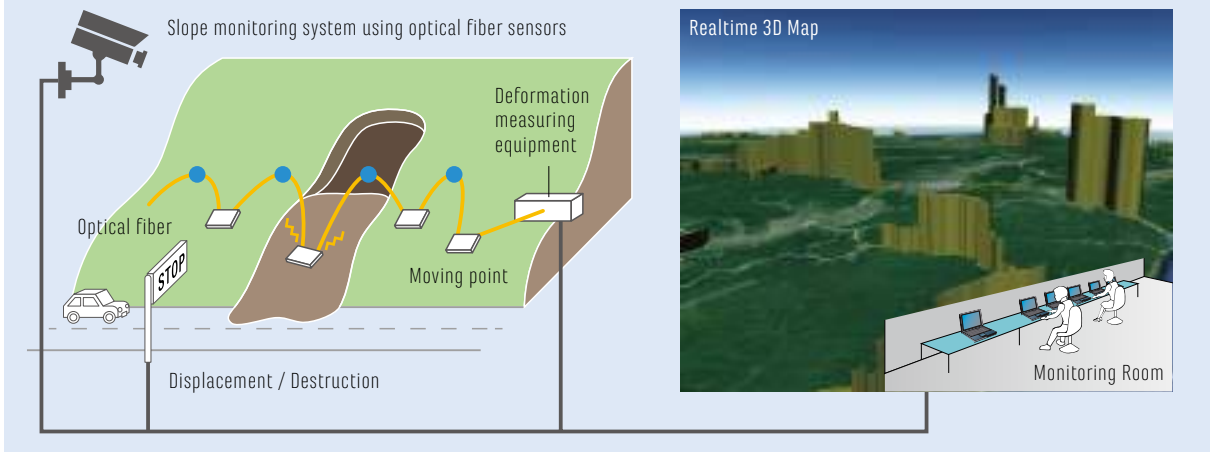
Phase
02

EVALUATE / MANAGE By collected data



Phase
03

PROVIDE To all road users



On-going Project as of 2023

Design of lagoon-crossing bridge with access roads in Tonga [Chodai]
 This ongoing project involves the construction of a new 700 m long bridge and bypass road in Tonga, a nation of about 170 islands in the South Pacific. The bridge will connect the north and south shores of the lagoon on Tonga's largest island Tongatapu. The Asian Development Bank provides funding for the project. The bridge has attracted nationwide attention in Tonga as the first on the island. The structure proposed by Chodai is resistant to natural disasters such as earthquakes and tsunamis and reduces the environmental burden on the water environment and mangrove forests in the lagoon. The bridge is expected to improve accessibility between the city center of the capital Nuku'alofa and the international airport, and to serve as an emergency evacuation route for residents in the event of a tsunami.



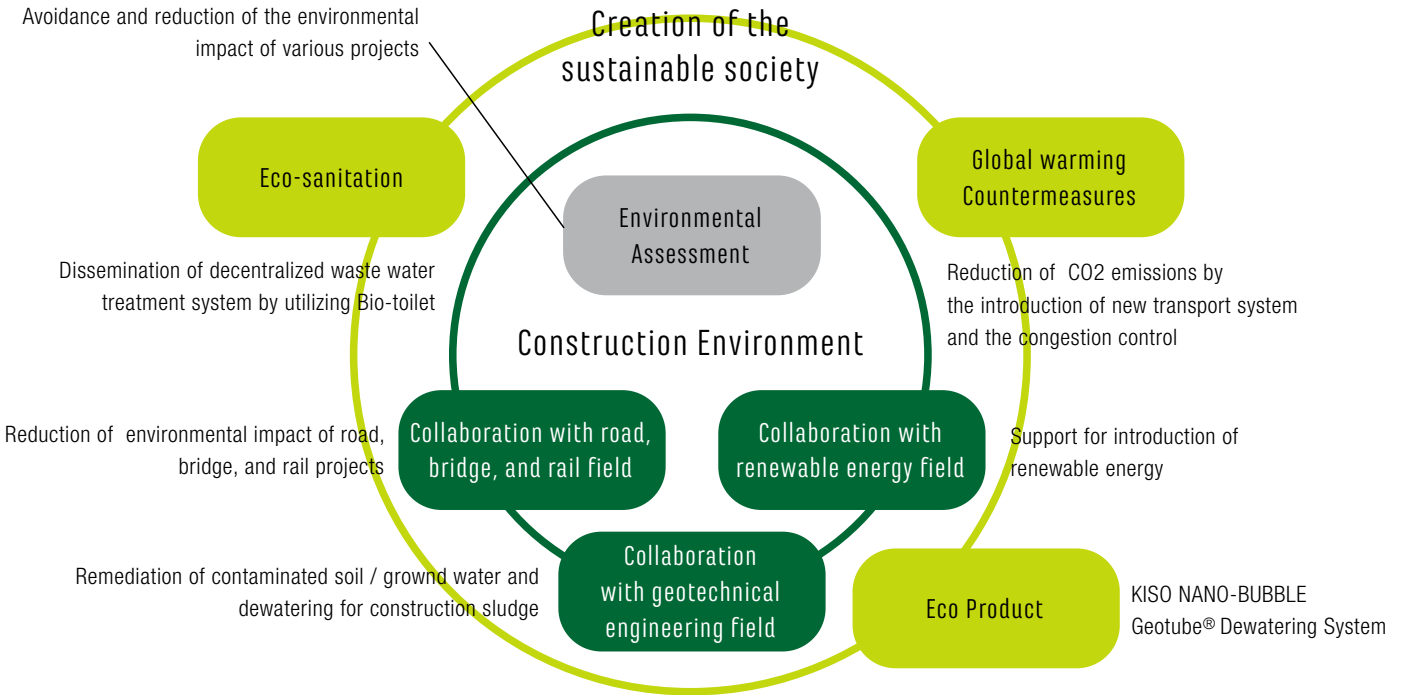
Road

Our Proposal

We provide high-quality infrastructure to help realize the future vision and support the continuous development of our partner countries. For this, we make full use of road, traffic, ICT, and management technology that we have accumulated for infrastructure construction projects in Japan.



PDT Group Contributes to The Creation of a Sustainable Society through The Environmental Technology



Environment

Environmental Assessment

Avoidance and reduction of the environmental impact of various projects
 -PDT Group has taken part in various project in Philippine and Vietnam-

Projects which aim to road, bridge, and rail development are affecting people and natural environment, and we support both domestic and overseas projects from various aspect by using the latest technology and intelligence.

Natural Environment Survey

Grasp condition of natural environment with various field surveys



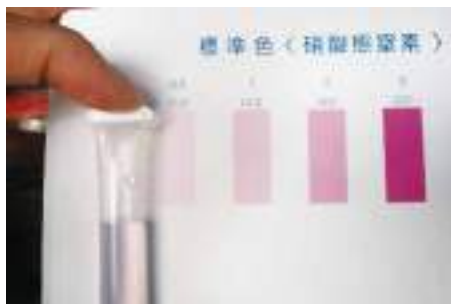
Telemetry survey



Drone survey

Social Environmental Survey

Grasp condition of air quality, water quality, vibration, and resettlement support with study corresponding to the local standard



Water quality survey



Stake holder meeting



Environmental Impact Assessment

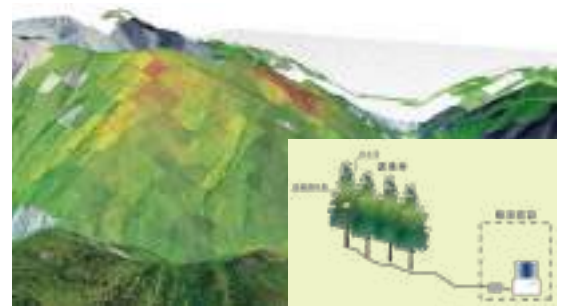
We propose environmental preservation plans with assessment of environmental impact from the projects based on the survey result



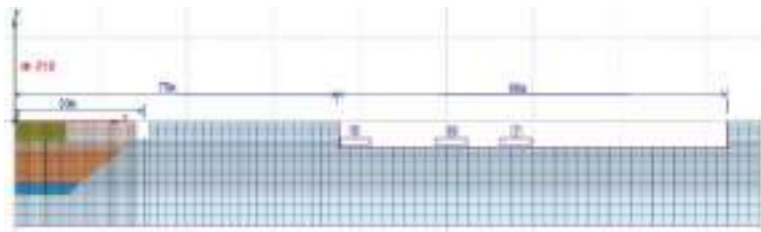
Noise simulation



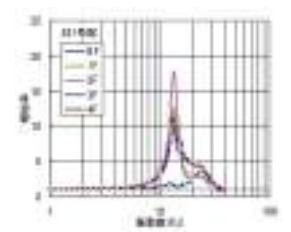
Development, plan, and design of noise barrier



Grasp of impact on rare raptors



3D numerical simulation of vibration effect

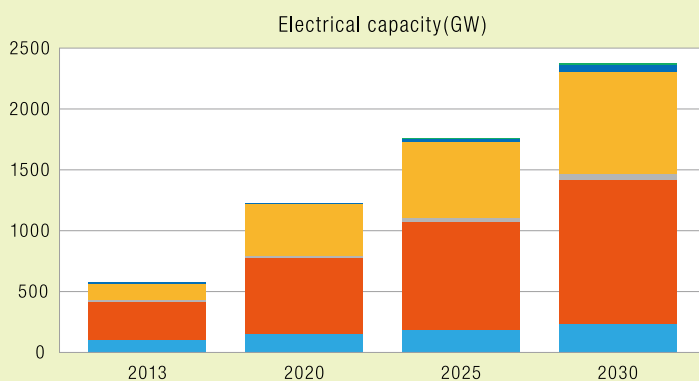


Landscape investigation with photomontage

Environment

Collaboration with renewable energy field

We support the introduction of renewable energy while giving consideration to the environment with agreement with the local interested party.



- Bioenergy
- Wind
- Geothermal
- Solar PV
- CSP
- Marine

Reference; WEO 2015 Special Report on Energy and Climate Change (IEA)

Global Warming Countermeasures

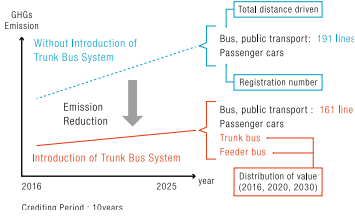
CO2 emission reduction by new transport system and congestion control
 -We have taken part in various projects in Brazil and Beijing-

Energy measures such as global warming or clean energy are about to enter a transitional period in all over the world.

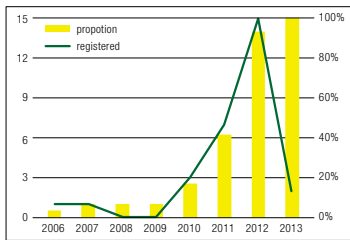
We are working on the construction of bussiness model such as reduction of greenhouse gases emission and creation of the new energy development schema to mitigate environmental problems.

As one of them, we calculate reduction amount of greenhouse gases of clean Development Mechanism (CDM) and consider the registability of CDM for the BRT system project.

Estimation of GHGs Emission Reduction

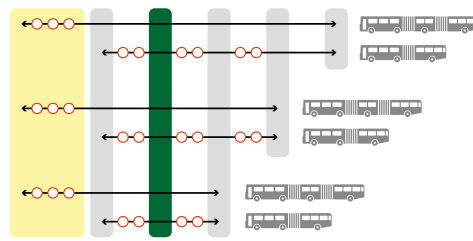


Study of calculation scheme for CO2 reduction

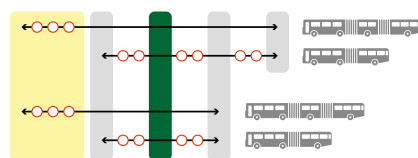


Global market survey

Pattern A



Pattern B



Study of bus lanes



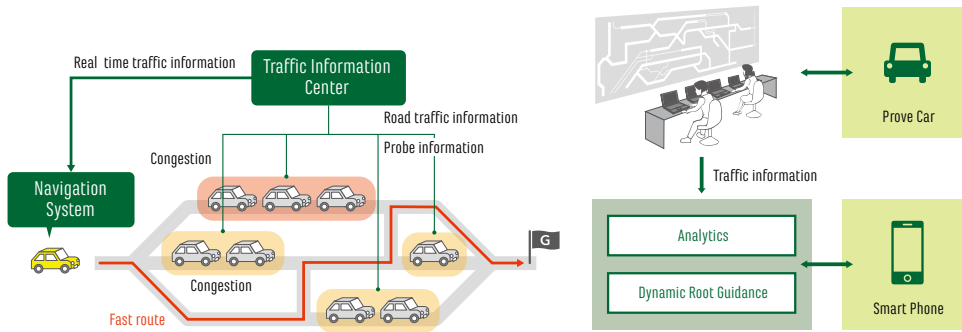
Conceptual drawing

PDT Group provides ICT technology to solve the various problems such as traffic congestion, energy, and environmental problems



Dynamic Route Guidance System (DRGS)

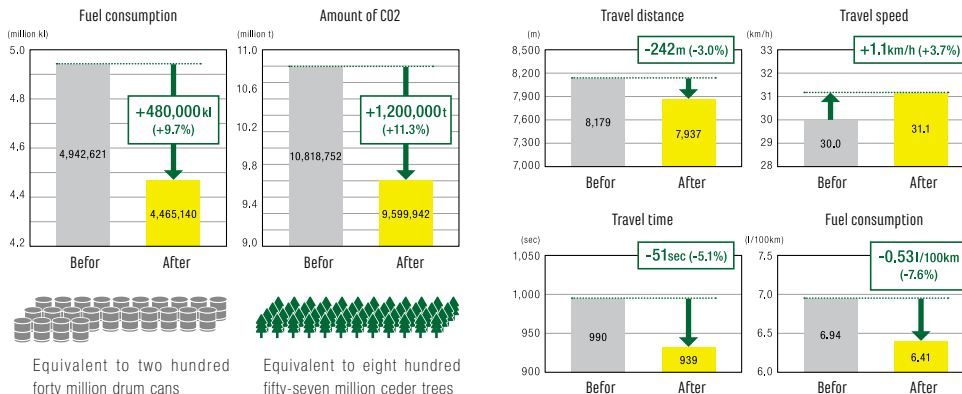
Guide a fast route by using probe data



Dynamic Root Guidance

Sending high-quality real time traffic information from the traffic information center to smart-phones via M2M. Smart-phone shows the fast route and guide to the destination.

Annual Energy Saving and CO2 Reduction Effect Estimation (Case: System is disseminated in all over Beijing City)



In the case this system is disseminated in 10% of Beijing city, the result shows 10% improvement in the average speed and 10% reduction in the fuel consumption and the emission amount.

We support project operation and propose traffic environment improvement with technology backed up from

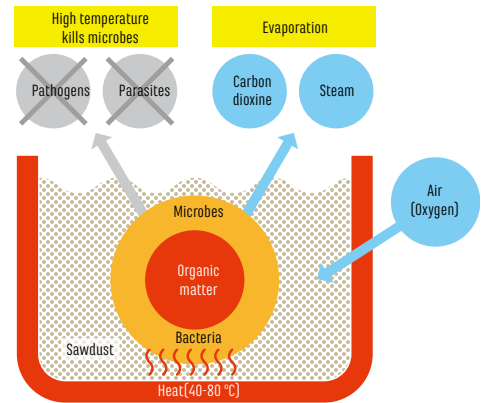
Solutions to the world's water shortage and environmental pollution problems

Currently, about 700 million people around the world suffer from water scarcity, and unsanitary water kills 4,900 children every day (about 1.8 million per year). (UN World Water Development Report, UN Human Development Report)

As demand for sustainable societies is increasing globally, we are working to improve the quality of life through environmental protection based on the idea that environmental conservation and technological innovation are indispensable for infrastructure development.

Promotion of bio-toilets in Vietnam

- The "Water Quality Improvement by Bio-Toilet Implementation" project in Vietnam was adopted as the Ministry of the Environment's "Model Project for Improvement of Water Environment in Asia" in 2011.
- In this project, Chodai introduced bio-toilets developed from Japanese manufacturing technology to Vietnam Railways through the installation of 199 environmentally friendly toilets in 127 train cars.
- Through the introduction of bio-toilets, we strive to improve the water environment along railway lines, as well as the living conditions and environment in mountainous areas, tourist spots, construction sites, etc.



[Bio-toilet technology]

Bio-toilets contain sawdust which allow them to independently process human waste.



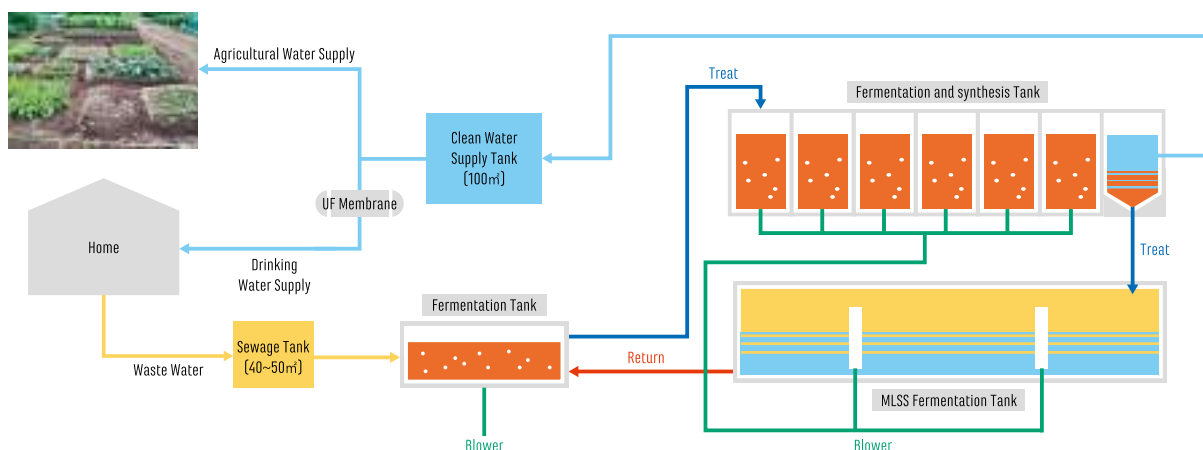
Bio-toilets



Sawdust

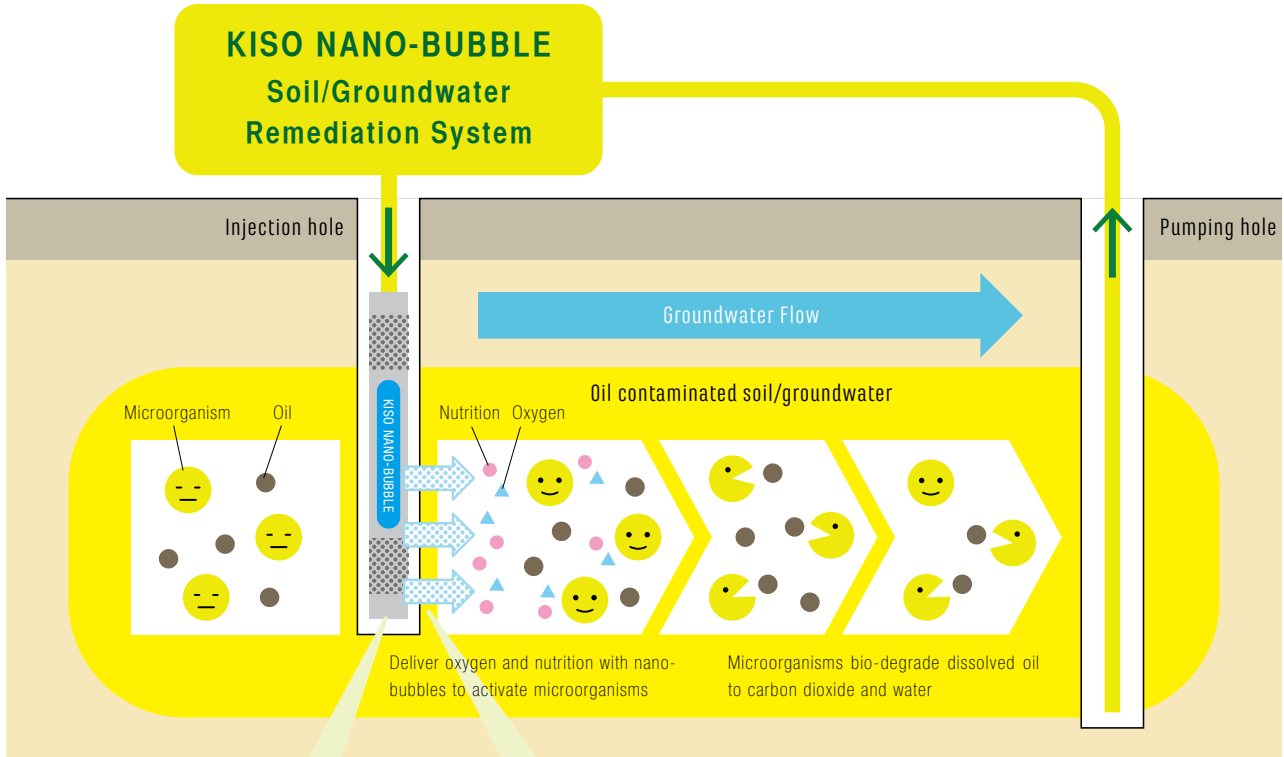
Introduction of a complete water circulation system in Laos that does not require water supply and sewage

- This system helps realize a non- infrastructure society (no need for water supply and sewage system). In Japan, there are cases of complete recycling of bath, laundry, and kitchen drainage water as well as toilet sewage and self-sufficiency have been achieved (the photo shows an overview of the water treatment facility and an aerated synthetic tank).
- This system is also planned to be used in the 35-hectare "Namtha Culture Park (NCP)" project being planned in Laos. We plan to spread liquid fertilizer and energy water in the fields and grow rice, vegetables, and fruits using no pesticide and chemical-free fertilizers.

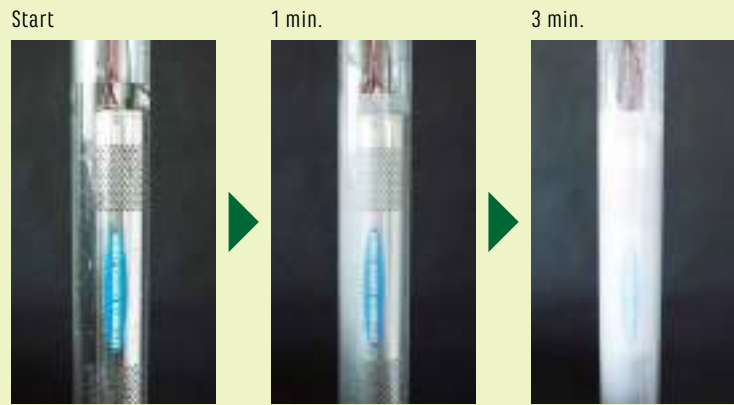


KISO NANO-BUBBLE is a remediation system for oil contaminated soil. The system aims to activate microorganisms in the soil to accelerate bio-degradation of the oil by delivering oxygen and nutrition with micro/nano-bubbles. The device can be installed in a borehole and take advantage of groundwater flow to spread the bubbles to the downstream area, which enables remediating a wide area without direct works.

KISO NANO-BUBBLE

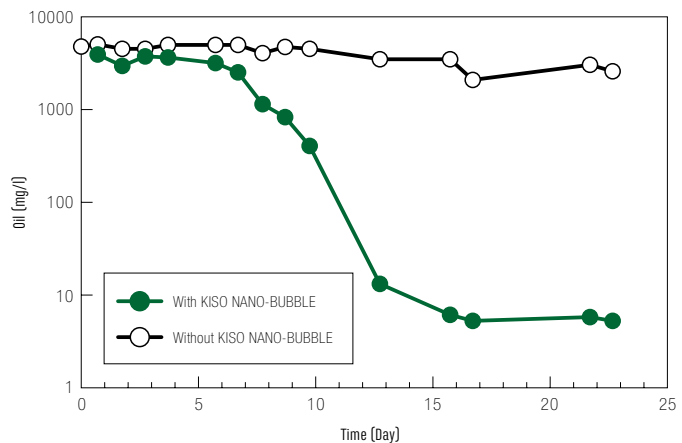


Micro/nano-bubble generator



Degradation of Dissolved Oil

With KISO NANO-BUBBLE remediation system, we have demonstrated a drastic reduction of dissolved oil in the contaminated soil. Positive results became apparent within 2 weeks.



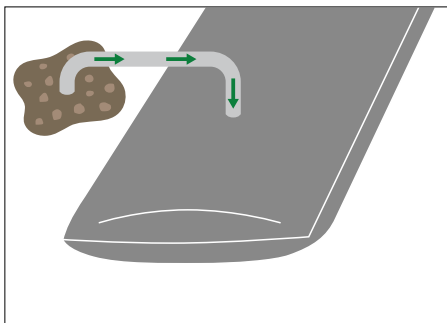
Geotube® Dewatering System



Geotube® is a low cost, high volume dewatering solution for projects large and small. Geotube® containers are available in a variety of sizes in accordance with sludge volume and space requirements. There are no belts or gears. It is one of the most simple and versatile dewatering system as well as one of the most effective.

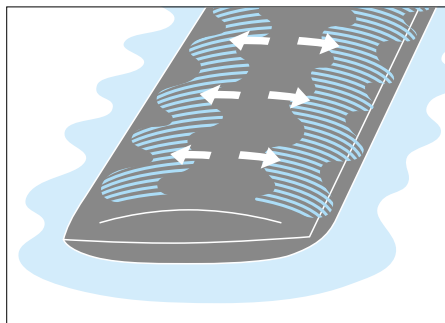


Geotube® GT5000



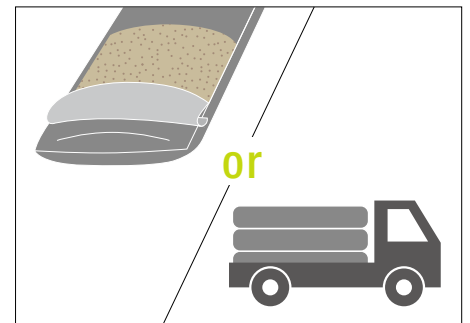
1. Filling

Sludge is pumped into the Geotube® container. Environmentally safe polymers are added to the sludge, which make the solids bind together and water separate.



2. Dewatering

Clear effluent water simply drains from the Geotube® container. Over 99% of solids are captured, and clear filtrate can be collected and recirculated through the system.



3. Consolidation

Solids remain in the bag. Volume reduction can be up to 90%. When full, the Geotube® container and contents can be deposited at a landfill.

Projects

- Chemical plant waste pond sludge removal
- Pharmaceutical plant waste pond sludge removal
- Pulp & paper plant waste pond sludge removal
- Power plant flyash pond sludge removal
- Tioxide plant production waste management
- Gold mine plant waste pond sludge dewatering for gold recovery
- Coal mine plant waste pond sludge removal
- Palm oil mill effluent pond sludge removal
- Municipal wastewater treatment plant sludge removal
- Aeration lagoon sludge removal



Food processing wastewater ➤ After coagulant added ➤ Followed by flocculant added ➤ Clear effluent



Representative Projects

KISO-JIBAN was established in 1953 and has contributed in a profound way to national social infrastructure developments through Japan's high-speed economic growth period.

Recognized for our considerable experience and reliable technology, We have participated in a multitude of big national projects and have been serving both public and private sectors.

Tokyo Bay Aqua Line in Japan [Kiso-Jiban]

Client : Public / Private
 Participation Period : 1969-1993
 Scope of Works : Soil Investigation, Soil Laboratory Test, Geotechnical Analysis

The Tokyo Bay Aqua Line is a bridge-tunnel combination across Tokyo Bay in Japan. With an overall length of 14 km, it includes a 4.4 km bridge and 9.6 km tunnel underneath the bay which is the fourth longest underwater tunnel in the world. KISO-JIBAN has provided geotechnical engineering service for both bridge and tunnel section.



Tokyo International Airport in Japan [Kiso-Jiban]

Client : Public / Private
 Participation Period : 1966-Present
 Scope of Works : Soil Investigation, Soil Laboratory Test, Geotechnical Analysis

Tokyo International Airport, commonly known as Haneda Airport, is one of the two primary airports that serve the Greater Tokyo Area. Haneda Airport has been expanded onto new landfill in Tokyo Bay from 1980's. Following Tokyo's winning bid for the 2020 Summer Olympics, further expansion plans has been released, and in which KISO-JIBAN continues to serve the needs.



Obara Dam in Japan [Kiso-Jiban]

Client : Public
 Participation Period : 1987-2006
 Scope of Works : Soil Investigation, Geological Survey, Soil and Rock Laboratory Test, Geotechnical Analysis

Obara Dam is a concrete gravity dam built in upstream part of the Hii river mainly for the purpose of flood control in the watershed area that has been suffered from water damage back through Edo era. Utilizing experiences in major dam projects, KISO-JIBAN now also partakes in Small-hydro power projects in Southeastern Asia such as Indonesia and Philippines.



Source: Ministry of Land, Infrastructure, Transport and Tourism

Since undertaking the soil investigation for Cagayan Railway Project in Philippines in 1959, We have proactively participated in overseas projects in spite of challenging situations and have deepened the relationship with global clients. In 1974, we opened the first overseas branch office in Singapore and now have expanded our overseas bases to Kuala Lumpur, Jakarta, Hanoi, and Manila.

Regional Geological Survey Program in Singapore [Kiso-Jiban]

Client : Public
 Participation Period : 2012-2018
 Scope of Works : Geological Survey, Soil and Rock
 Laboratory Test, Geotechnical Analysis

With a growing population in a limited land space, in order to underpin subsurface planning to support sustainable urban development, Singapore is currently directing a significant program of ground investigation on a nation-wide level. KISO-JIBAN is extensively involved in provision of geological survey and development of 3D geological map.



Marina Bay Sands in Singapore [Kiso-Jiban]

Client : Private
 Participation Period : 2006-2008
 Scope of Works : Soil Investigation, Soil Laboratory Test,
 Geotechnical Analysis

Marina Bay Sands is an integrated resort fronting Marina Bay in Singapore and is billed as the world's most expensive standalone casino property. The complex was built on a reclamation area where the underlying soft marine clay layers had the potential to cause geotechnical problems. KISO-JIBAN performed a constellation of investigations and tests that contributed to the safety of the design.



Donggi Senoro LNG Plant in Indonesia [Kiso-Jiban]

Client : Private
 Participation Period : 2007-2014
 Scope of Works : Soil Investigation, Soil Laboratory Test,
 Geotechnical Analysis

The Donggi Senoro LNG Plant is the first project in Indonesia developed for manufacturing Liquefied Natural Gas from feedstock gas as downstream business of the LNG production process. Besides from soil investigation, KISO-JIBAN also assisted Cavity Grouting for ground improvement of the weak foundation underneath the tank area.

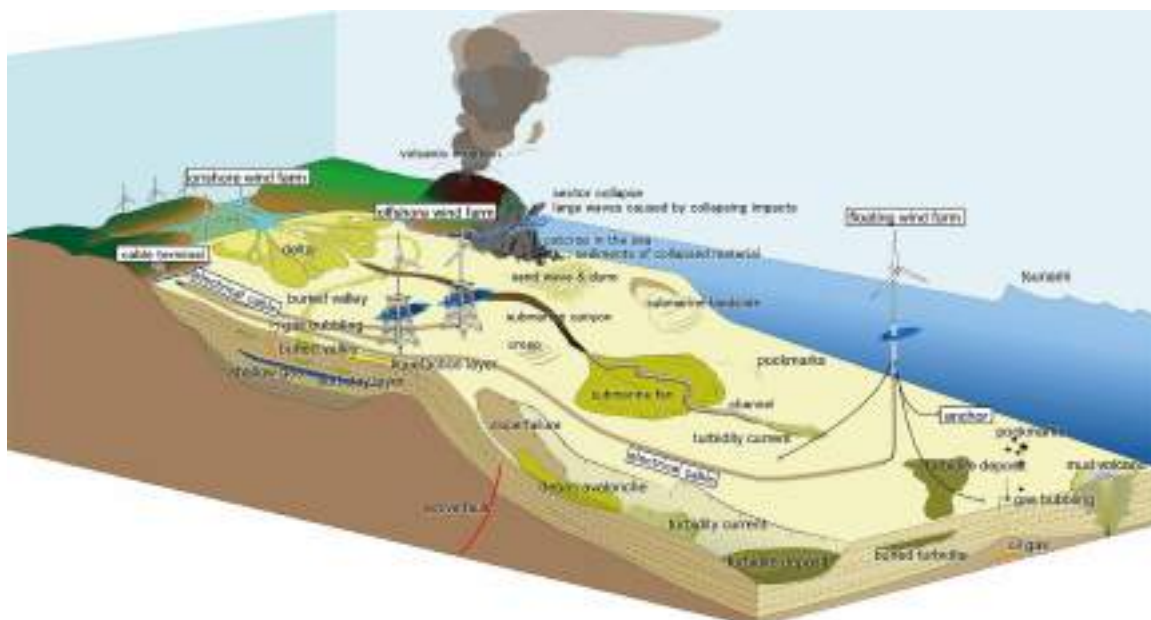
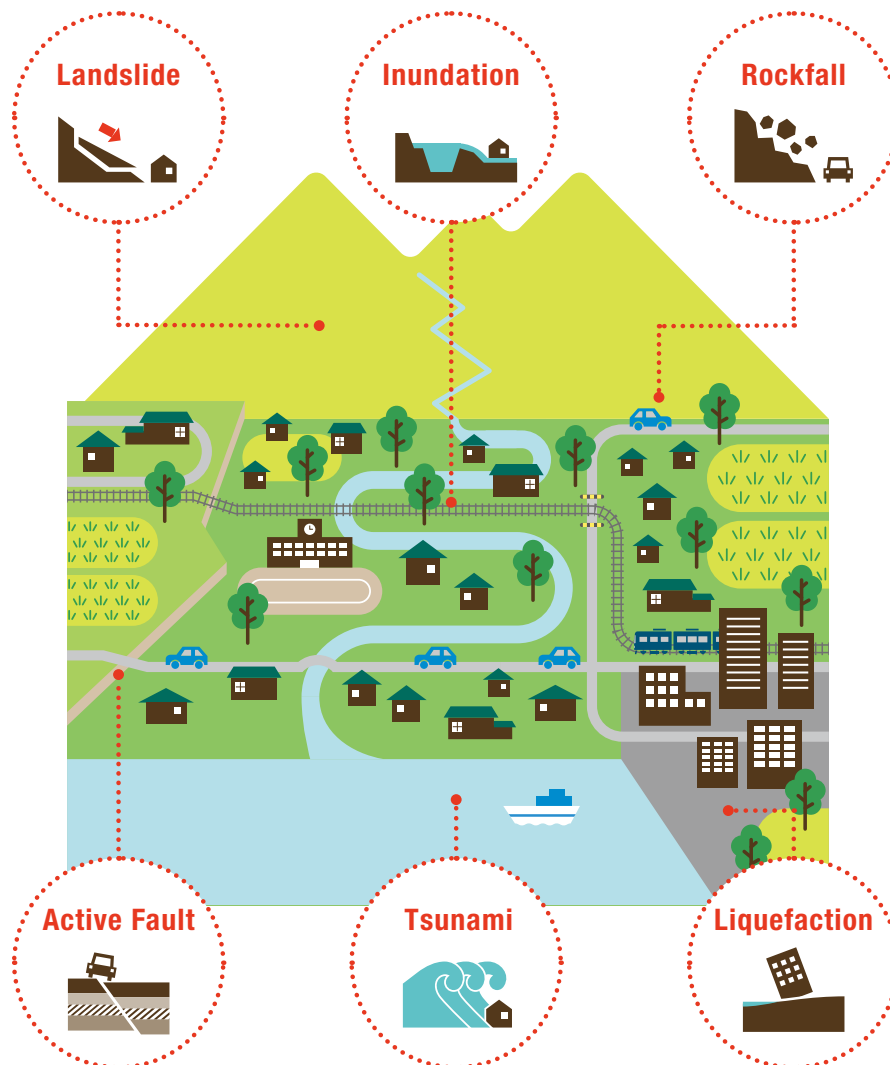


Geotechnical Risk

Geotechnical risk is the risk to onshore and offshore construction work created by the site ground conditions. It is a key and a very important element that needs to be considered in all construction.

Risk can be assessed, managed, and minimized. But to that end, unforeseen geological conditions and the associated geotechnical problems need to be correctly understood since geotechnical risks are as varied as the geological conditions. That is to say, appropriate investigation in the early stage of a project is crucial in reducing the risks.

KISO-JIBAN's comprehensive specialty in geotechnical engineering will set priorities for the use of limited resources and time, and provide the underpinnings for geotechnical risk management.



Earthquake Geotechnics

In an earthquake-ridden country as a leader of geotechnical engineering, KISO-JIBAN played a significant role in drawing up Japan's governmental guidelines regarding earthquake resistance and has long contributed in developing earthquake resistant technologies including seismic risk assessment, liquefaction analysis and countermeasure designing.

At the time of the Great East Japan Earthquake (March 11, 2011), on the very next day of the quake, we sent a special engineer team to the devastated area to assess the extent of the damage, investigate the cause of damage, and provide consultation on the design for reconstruction.

Reconstruction of Joban Expressway

2011.3/12



same site in 5days

2011.3/17



Source: East Nippon Expressway Company Limited

Soil Investigation

If the circumstances allow, the most ideal way to understand the unforeseen ground condition is to crack open the Earth in half. But when that's not possible, the best we can do is to collect information based on boring survey, sampling, laboratory test, and geophysical exploration.

Boring Survey

The better we know, the better measures we take. To know better, KISO-JIBAN is committed to innovating the technics in obtaining information of the ground as close to what it is.



On-shore Boring Survey

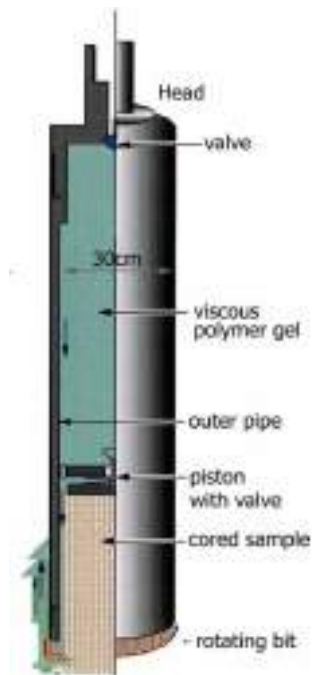


Off-shore Boring Survey on Jack-up Platform

Gel-Push Sampler

Gel-Push Sampler is specially designed to contain liquid polymer inside to reduce the friction between sample core and sampler tube in the course of sampling. With Gel-Push samplers, we overcame the difficulty in sampling undisturbed soil samples on fragile soft ground.

Geotechnics



Sample core covered in liquid polymer

Remove the polymer



Undisturbed sample core of dense sand (200mmø)



Sandy Gravel Sample (300mmø)



Laboratory Test

KISO-JIBAN has 3 soil/rock mechanics laboratories in Japan located in Tokyo, Nara, Hiroshima, and 2 overseas laboratories respectively in Singapore and Malaysia. Our laboratories are equipped with full or semi automated testing apparatus to cover various types of tests.

Soil Test

- Cyclic Triaxial Compression Test
- Constant Rate of Strain Consolidation Test
- Direct Shear Test
- Poisson's Ratio Measurement
- Permeability Test
- Dispersion Test

Rock Test

- Water Content Measurement
- Unit Weight Measurement
- Uniaxial Compression Test
- Point Load Test
- Ultrasonic Wave Velocity Measurement



Singapore Laboratory



Tokyo Laboratory

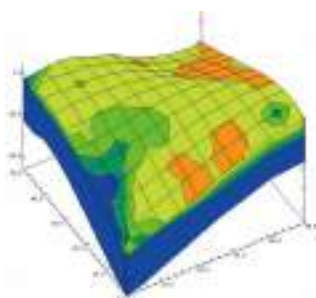


Geophysical Exploration and Remote Sensing

KISO-JIBAN has developed and innovated a number of geophysical exploration technics as well.

3D Seismic Refraction Survey

One of our notable geophysical survey method, 3D seismic refraction survey, enables the visualization of elastic wave velocity for underground structure.



In SAR (Interferometric SAR)

Our InSAR system allows accurate estimation of both extent and rate of landslide movements based on a comprehensive interpretation of satellite InSAR results from geotechnical and landslide engineering viewpoint.

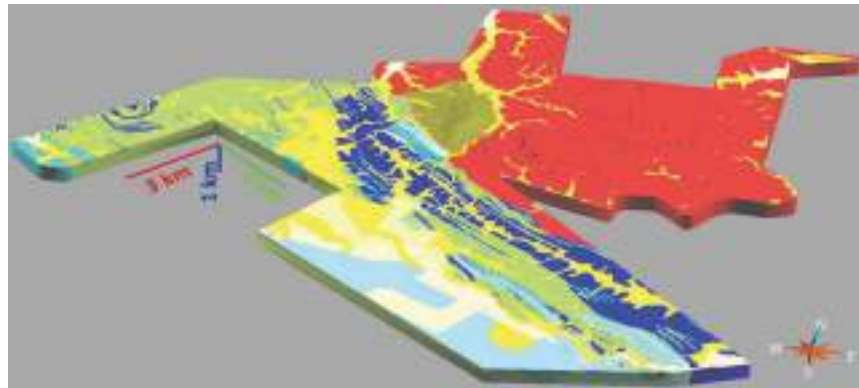
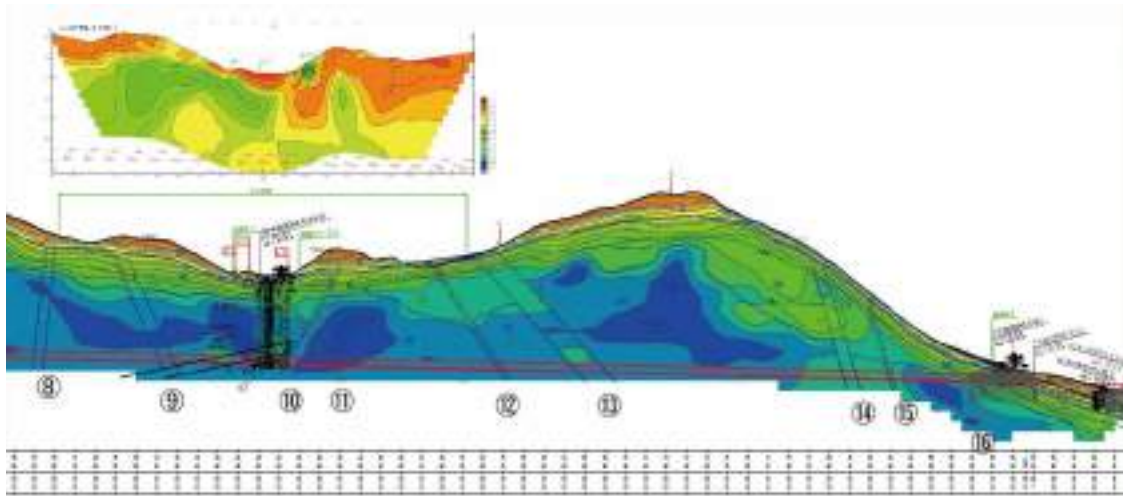


Analysis

KISO-JIBAN pieces together all the information and data obtained by soil investigation, laboratory test, and geophysical exploration, to develop comprehensive understanding of the surveyed area from geological and geotechnical perspective.

Geological Model

We leverage our technical expertise and our experience in choosing analyzing method and developing geological model.



T.Yasuda, K.T.Lu, L.C.Leh, K.Chiam and L.S.Ghiong(2019)
Development of 3D geological model of Singapore
Japanese Geotechnical Society Special Publication Volume 6 Issue 2, 67-72

Geotechnics

Design

As the compilation of putting things in perspective, KISO-JIBAN aims to engineer geotechnical design to secure the safety of the structure and to minimize the damage to the environment.

Port and Coastal Design

Designing isn't just about the design, it is also about the intention. We regardfully care for people and the environment as well as economical efficiency.



Geographic Information System (GIS)

While GIS is a broad term that can refer to a number of different technologies, methods, and businesses, KISO-JIBAN utilizes GIS to link geological and geotechnical information to mapping data base as well as the associated hazard map.

We have provided custom-built GIS for the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Tokyo Metropolitan Government, and many other municipalities and private companies.



National Geotechnical Information Service for MLIT



Liquefaction Potential Map for Tokyo Metropolitan Area

Disaster Prevention and Restoration

Together with intangible approach as providing hazard map, it goes without saying that KISO-JIBAN is committed to disaster prevention and restoration with tangible measures in designing and construction.



Damage from a Landslide



Restoration and Countermeasure against Landslide



Tsunami Barrier devastated by the Great East Japan Earthquake

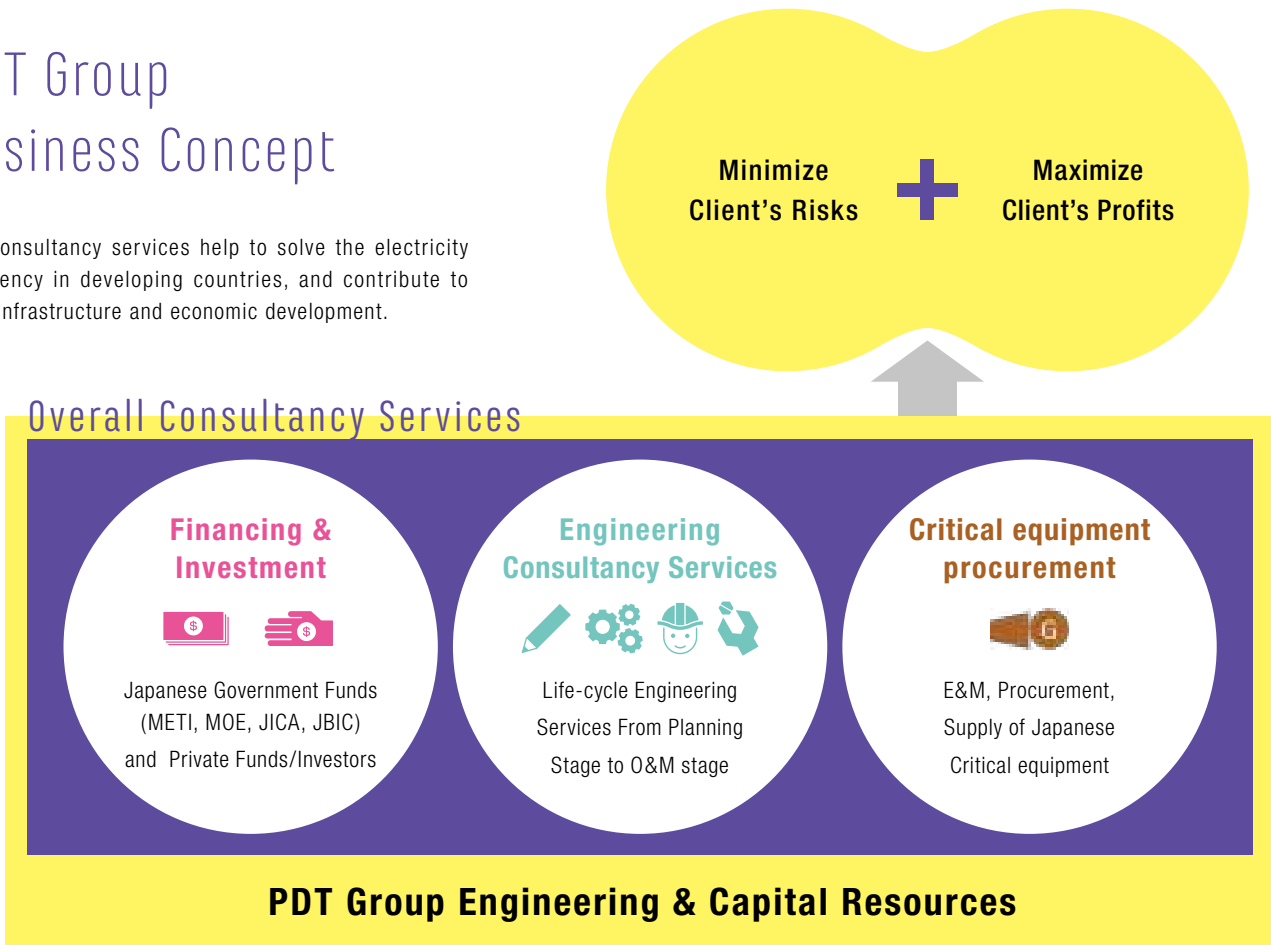


Restoration and Countermeasure Against Tsunami

PDT Group provides overall Consultancy services for efficiently utilizing renewable energy

PDT Group Business Concept

Our consultancy services help to solve the electricity deficiency in developing countries, and contribute to local infrastructure and economic development.



PDT Group Service Scopes and Business Structure

In consideration of the client profit, PDT Group performs enhanced technical consultancy services at every stage: Planning/Design, Project Execution and O&M. PDT Group also makes equity investment on SPC, and support for financing from different organizations such as JICA /JBIC and Japanese investors. In addition, PDT Group provides advice and support for the procurement of the reliable equipment.

PDT Group Engineering Consultancy Service Scopes

1. Planning /Design & Financing

- Planning/Design**
 - Field Survey
 - Business plan / Financial plan
 - Design (Outline/Basic/Detail)
 - Support for license acquisition
- Environment**
 - Environmental Assessment
- Partnership**
 - Building relationships with stakeholders
- Financing**
 - Acquire public support
 - Investment / Financing arrangements

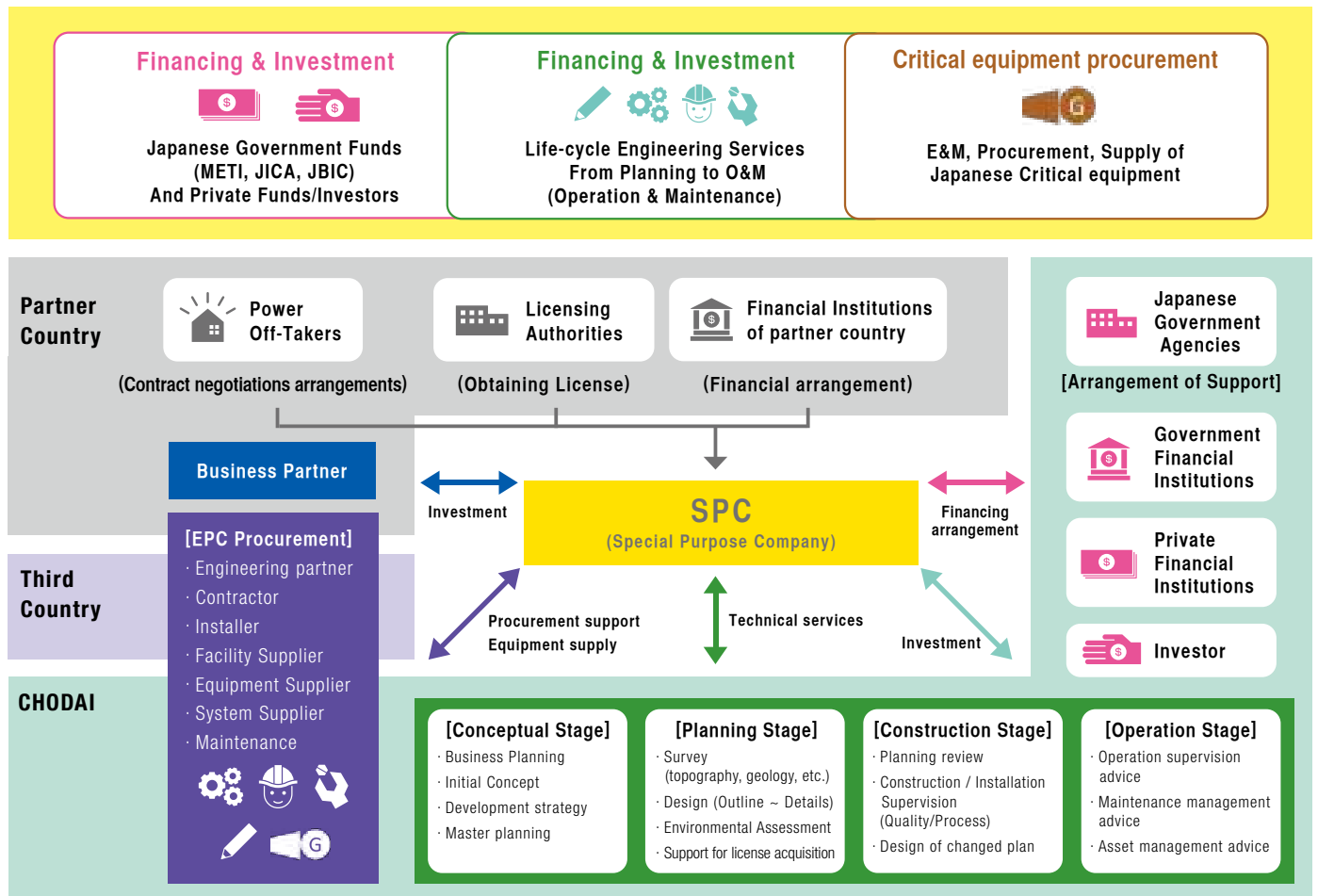
2. EPC Phase

- Engineering (E)**
 - Design Review / Factory Inspection (E&M)
- Procurement Support (E)**
 - Bidding Documents
 - Various equipment, construction
 - Bidding Evaluation & Contract
- Construction support (E)**
 - Supervision for Construction & Commissioning
- Equipment supply (P)**
 - E&M, Procurement, Supply

3. O&M

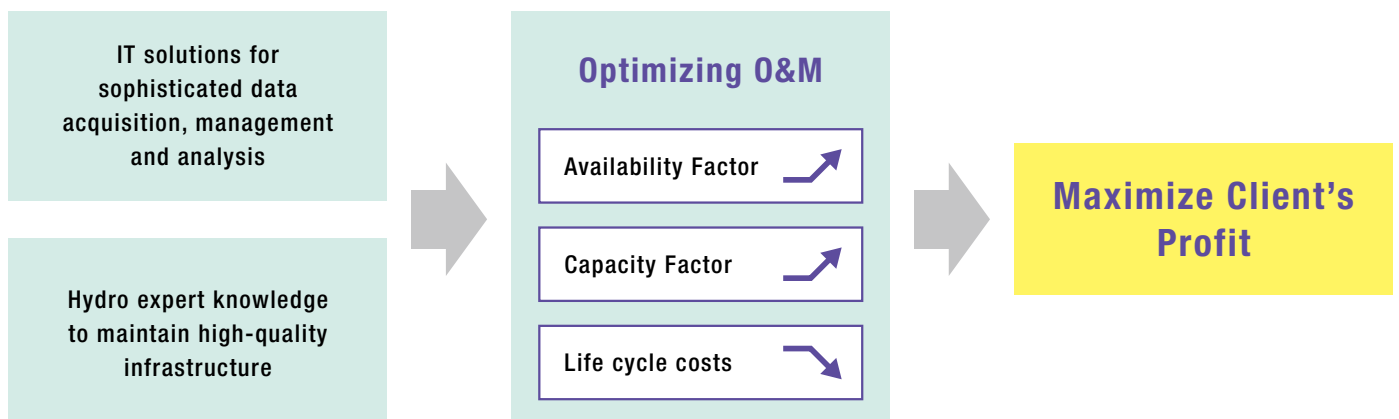
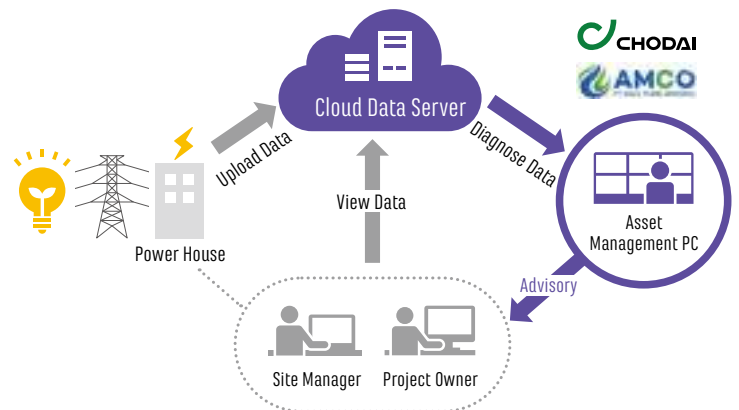
- Operation Management**
 - Plant Operation
 - Plant Monitoring
- Maintenance Management**
 - Maintenance support plan
 - Help desk
- Asset Management**
 - Asset book
 - Various contract management
 - Assets management related support

PDT Group Business Structure [ISP]



Remote Monitoring Service for Efficient Operation

Established in 2016, PT. AMCO Hydro Indonesia (AMCO) provides solutions to small hydro power plants to assist their operation and maintenance (O&M) activities, with the combination of its information technologies and the knowledge of hydro experts. AMCO's solutions will maximize clients' profits by optimizing O&M, increasing availability and capacity factors as well as reducing life cycle costs.

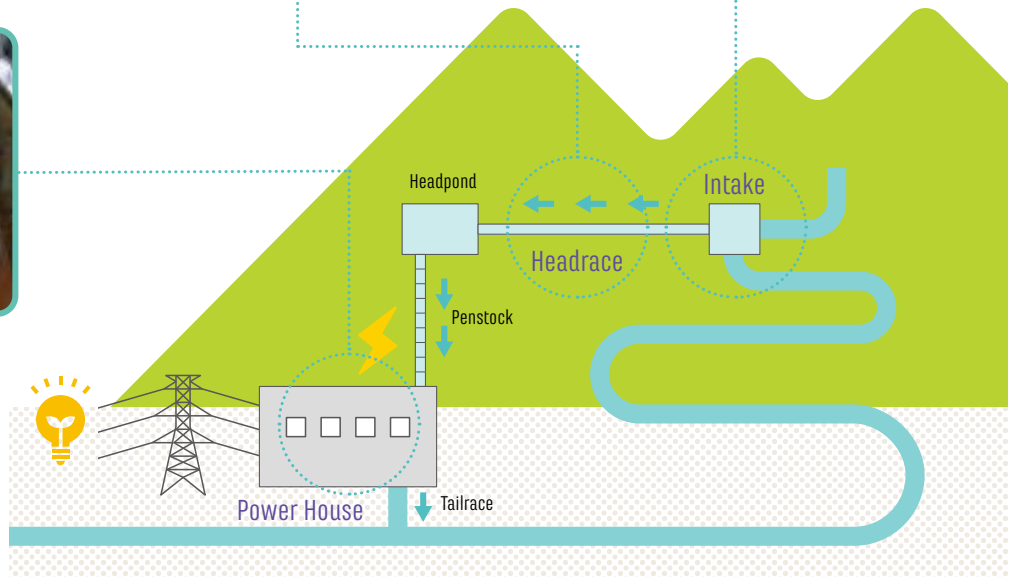


PDT Group Power Technology

PDT Group expands its business fields by utilizing experience and expertise acquired from domestic and international projects, and actively participates in the new business field: renewable energy, integrating the civil, electrical and mechanical technologies with ICT.

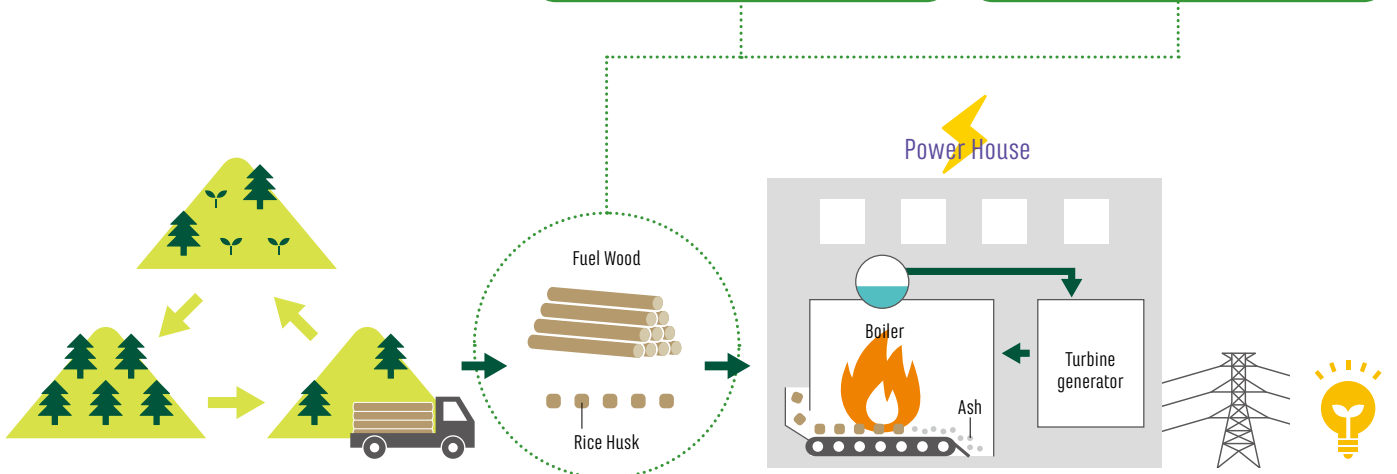
Small-hydro Power

- Run-of-river type without reservoir
- Efficient and reliable energy source
- Cost-competitive
- Low operation cost
- Long-life service



Biomass Power

- Recyclable power-generation project
- Contribute to local economy by forest management: employment, infrastructure, improve Quality of Life
- Carbon neutral
- Supply stable and reliable electric power
- Infinite energy sources

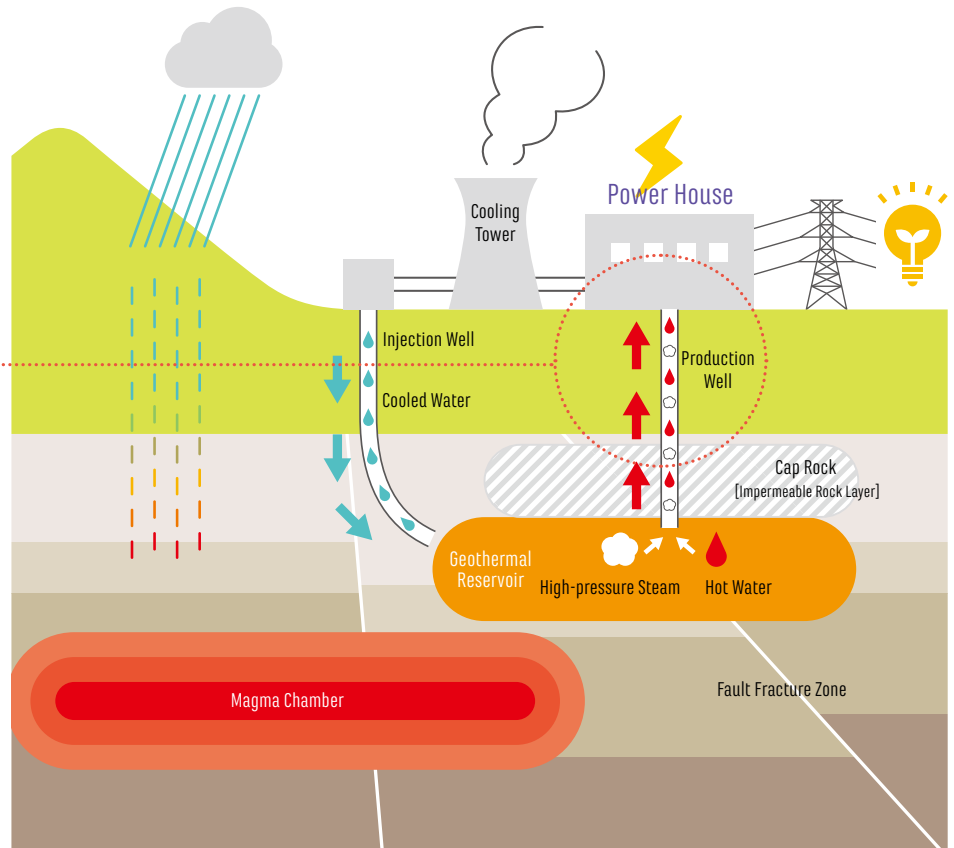


Renewable Energy

Geothermal Power

Convert Thermal Energy into Electric Energy

- Sustainable resource
- Reliable and efficient energy
- Cascadable heat energy
- Not subject to weather conditions
- Little CO2 emission
- Low operation cost



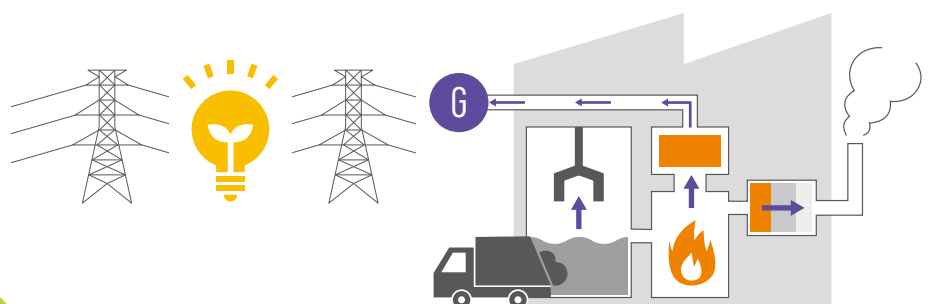
Wind Power

- Sustainable source of energy
- Zero carbon emissions
- Low running cost
- Low maintenance cost
- Space efficient (small land footprint)



Waste to Energy

- Efficient waste management
- Zero methane emissions
- Provides better control over foul odors
- The produced by-products from the combustion of waste can be utilized
- Not subjects to weather conditions





The Concept

We have been conducting several regional development projects under a private company-led PPP in the fast-growing Southeast Asian countries, particularly in the Philippines, Vietnam, Indonesia, Laos, Thailand and so on. These long-term projects cover the development of basic infrastructures such as power generation, water supply facilities and waste treatment to road maintenance and port expansions, to develop local industries and generate jobs.



Our PPP Projects Sites

■ Implemented Projects and On-going projects

Vietnam, Philippines, Indonesia

■ Partially on-going projects

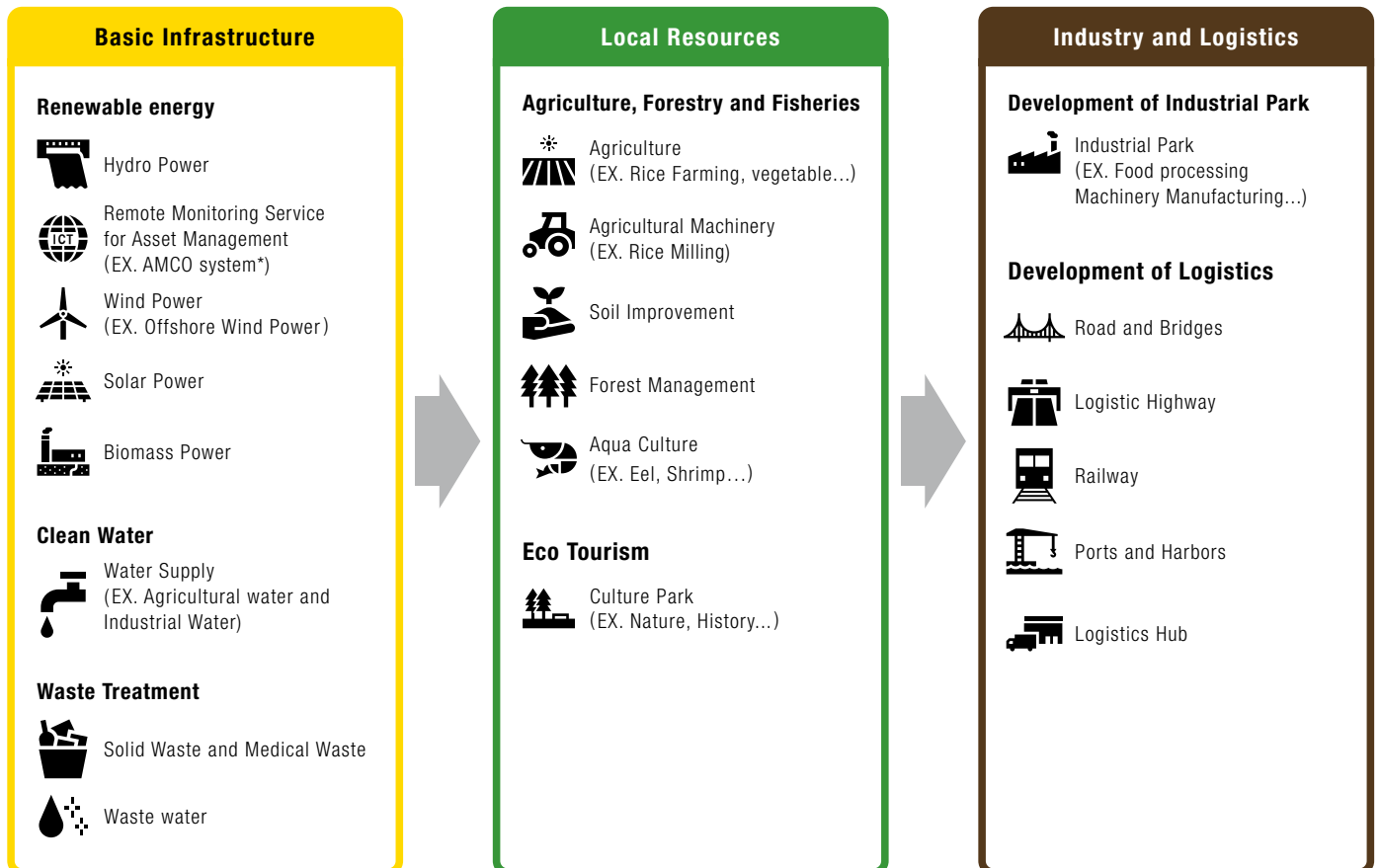
Laos, Thailand, Saipan, Taiwan

■ Projects in the planning stage

India

Value Chain of Economic Infrastructure

Urban and Regional development requires the effective use of local resources. For example, Eco-tourism projects are envisioned in a country where nature and historical heritage are abundant. We are working hard in various regions in developing new businesses that will make the best use of local resources while simultaneously expanding their basic infrastructure needs. These three categories are closely related and all of them have an essential role in making the value chain function.

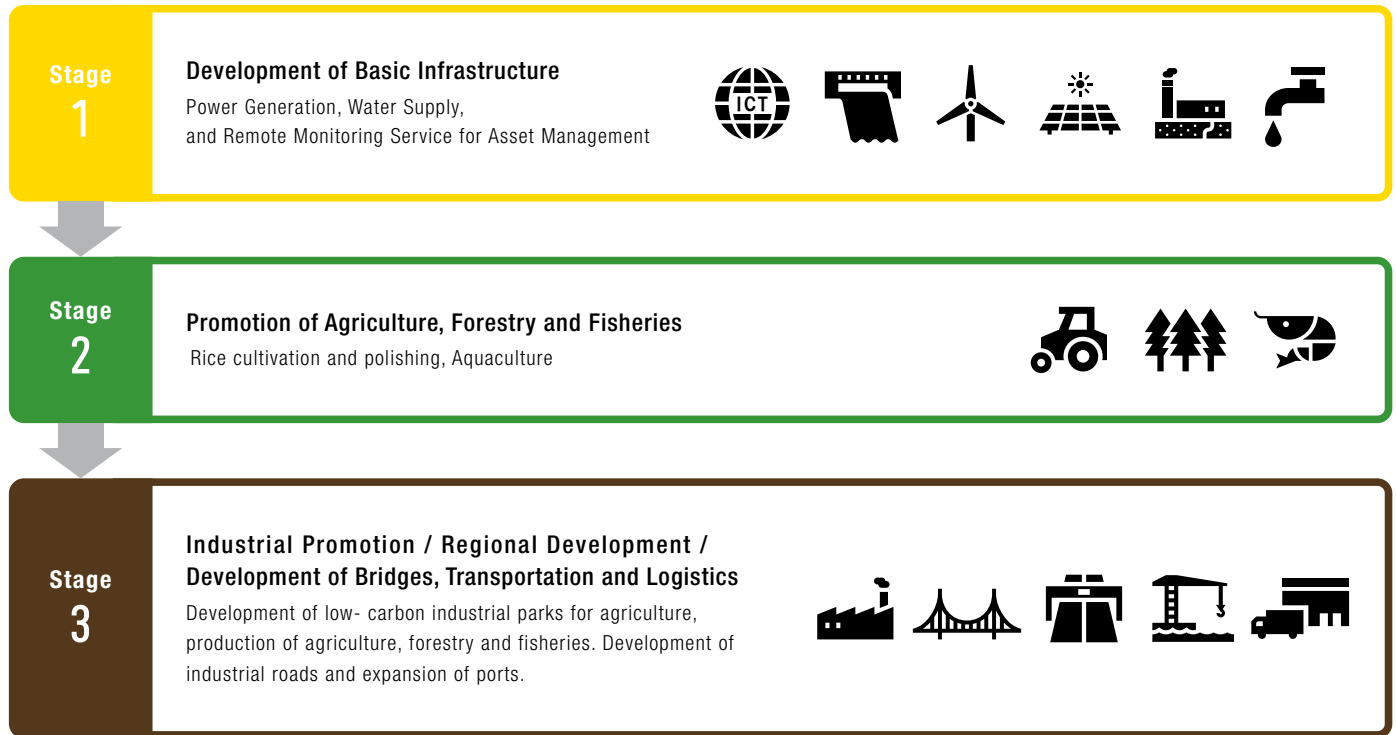


*There is an explanation on page P41.



Our Achievements in the Philippines

We have been actively involved in several regional development projects in line with the SDGs of the UN to address environmental, economic, and social challenges in Mindanao Island. Our projects contribute to the local community through the following three stages.



Won as the honorable 2nd winner in the World in the "Building Back Better" infrastructure awards 2021 at the 5th international PPP forum

We incorporate all the 17 SDGs into the scope of our business and strives to achieve those goals and contribute to the creation of a sustainable world.

At the 5th International PPP Forum hosted by the United Nations Economic Commission for Europe (UNECE), CHODAI through the submission of their project entitled "Regional Development Programme in Caraga, Mindanao, Republic of the Philippines" which started in 2011, was selected the "Building Back Better" infrastructure awards. At the forum, CHODAI made a presentation about the project and won the honorable 2nd award in the world.



Certificate of Award



Video: Introduction of Chodai's Mindanao Regional Development Projects

Video url: <https://www.youtube.com/watch?v=i3uxQFI1jTI>



Small Hydro Plant



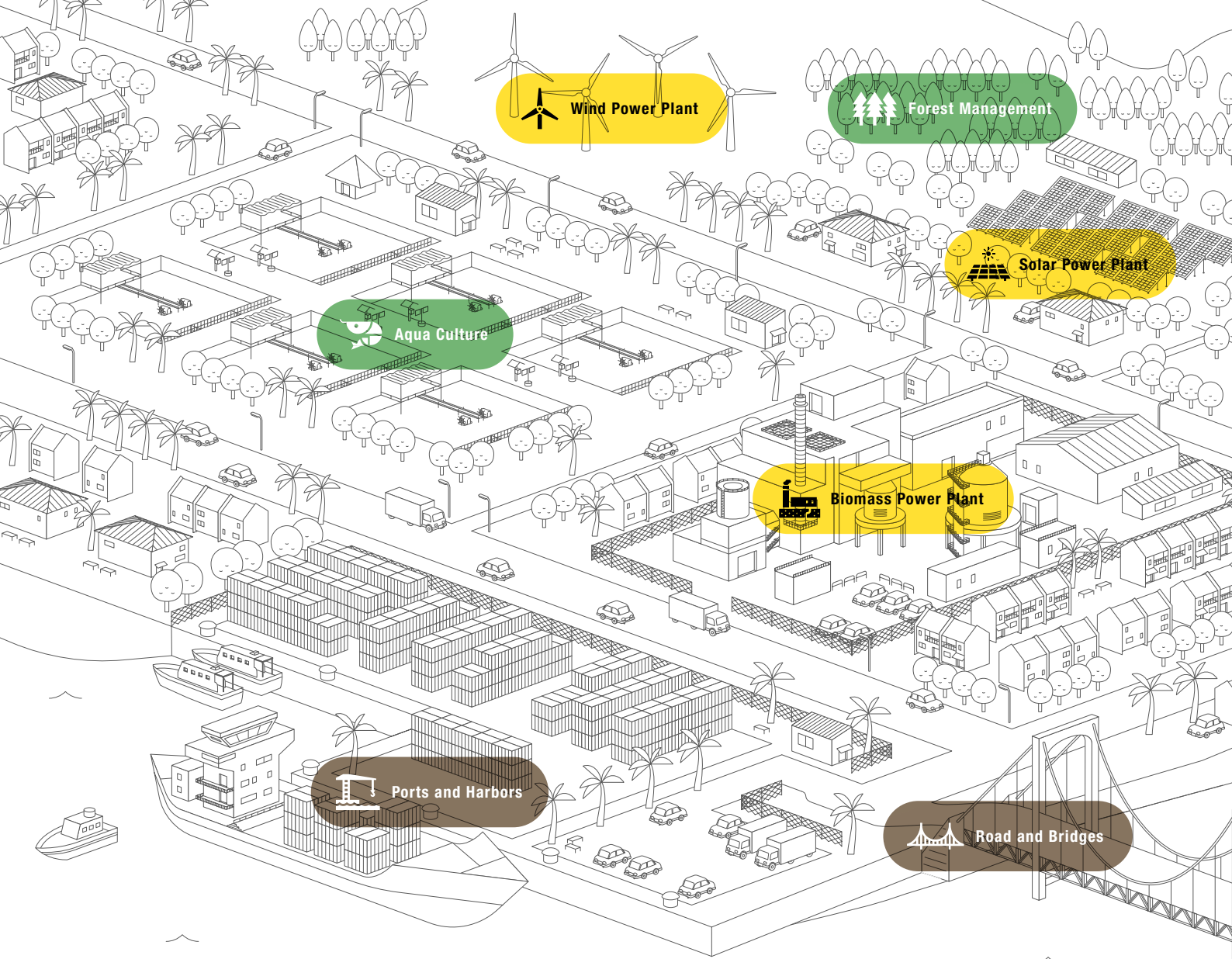
Water Supply (Potable)



Aqua Culture




Rice Milling Machinery




 Wind Power Plant

 Forest Management

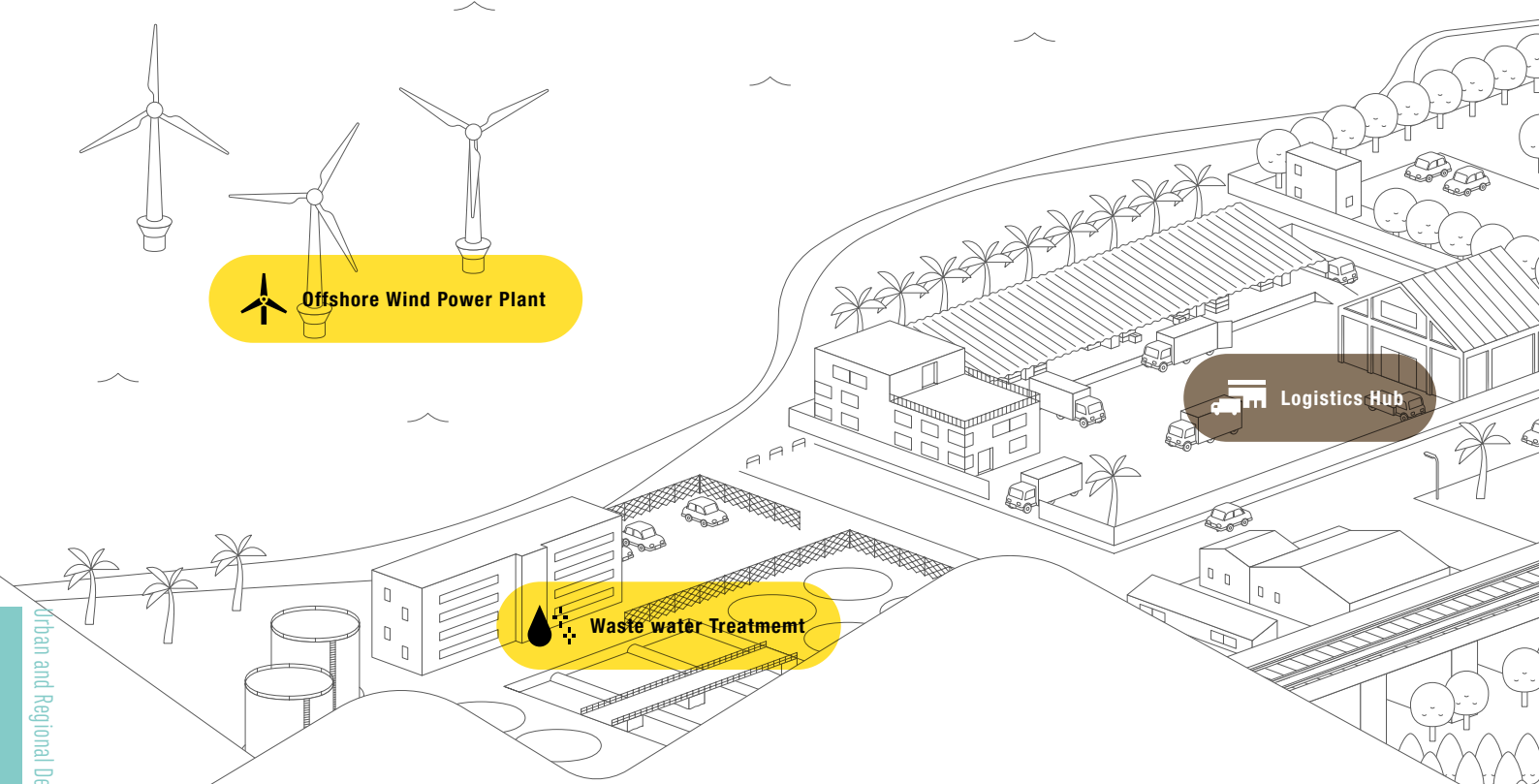
 Solar Power Plant

 Aqua Culture

 Biomass Power Plant

 Ports and Harbors

 Road and Bridges



 Offshore Wind Power Plant

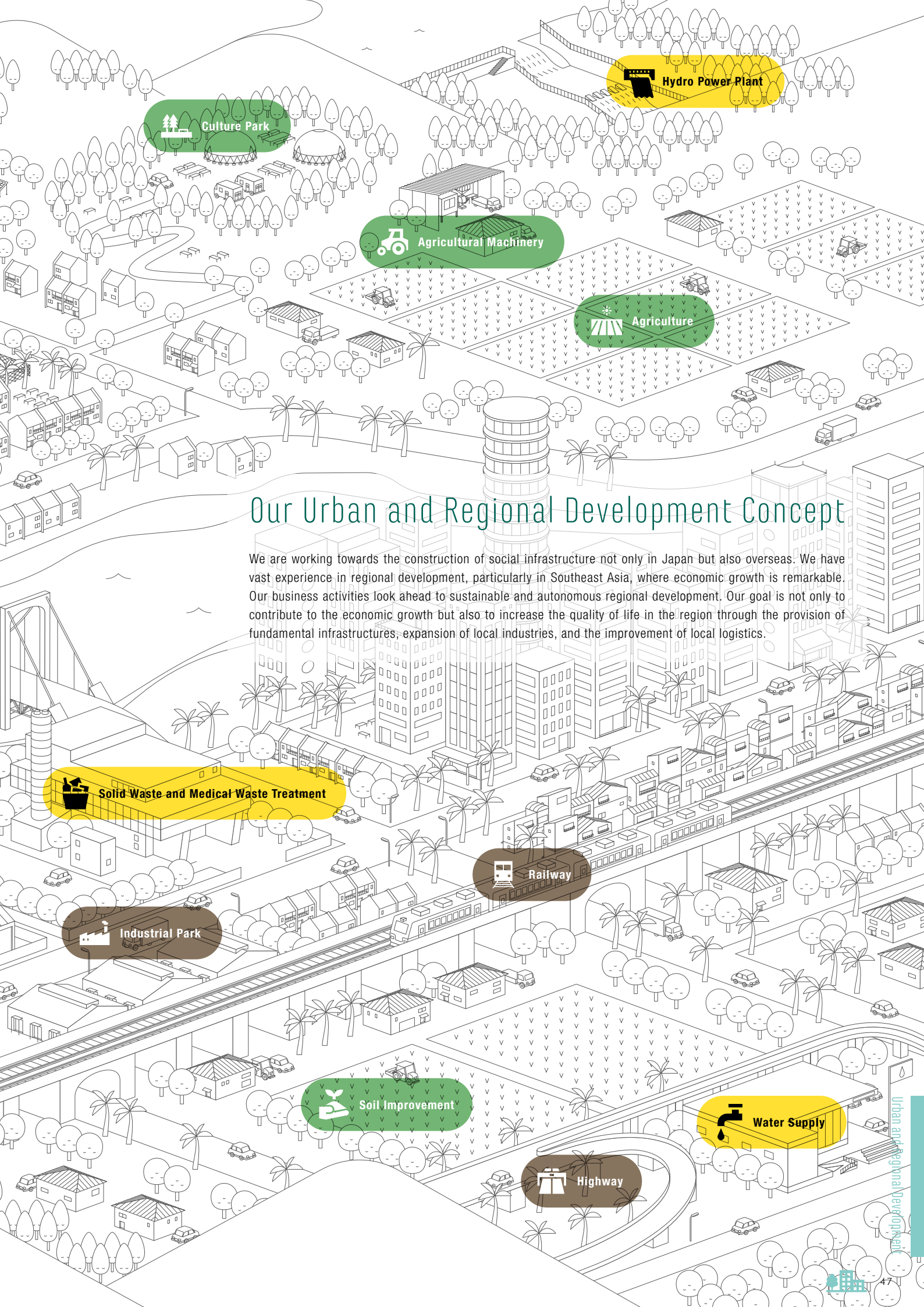
 Logistics Hub

 Waste water Treatment

 Basic Infrastructure

 Local Resources

 Industry and Logistics



Our Urban and Regional Development Concept

We are working towards the construction of social infrastructure not only in Japan but also overseas. We have vast experience in regional development, particularly in Southeast Asia, where economic growth is remarkable. Our business activities look ahead to sustainable and autonomous regional development. Our goal is not only to contribute to the economic growth but also to increase the quality of life in the region through the provision of fundamental infrastructures, expansion of local industries, and the improvement of local logistics.

PDT Group Global Network

The PDT Group currently has representative offices and subsidiaries mainly in Asia, and we are now creating a global network which will enable us to contribute to society.



● **JAPAN (Tokyo)**

CHODAI Co., Ltd. Headquarters
 Kiso-Jiban Consultants Co., Ltd. Headquarters
 Pc Railway Consultant Co.,Ltd. Headquarters

● **SINGAPORE (Singapore)**

Kiso-Jiban Consultants Co., Ltd. Singapore Branch
 Kiso-Jiban Singapore Pte Ltd

● **VIETNAM (Hanoi)**

Chodai Hanoi Representative Office
 Kiso-Jiban Hanoi Representative Office
 CHODAI & Kiso-Jiban Vietnam Co., Ltd.
 PC Railway International Co.,LTD

● **KOREA (Seoul)**

CHODAI Korea Co., Ltd.

● **TAIWAN (Taipei)**

Chodai Taiwan Inc.

● **MADAGASCAR (Antananarivo)**

CHODAI MADAGASCAR S.A.R.L.U

● **INDONESIA (Jakarta)**

Chodai Jakarta Representative Office
 PT Wiratman & CHODAI Indonesia
 PT. AMCO Hydro Indonesia
 PT Pondasi Kisocon Raya

● **PHILIPPINES (Manila)**

Chodai Manila Representative Office
 Chodai Philippines Corporation

● **PAPUA NEW GUINEA (Port Moresby)**

Chodai Papua New Guinea Office

● **MALAYSIA (Kuala Lumpur)**

Kiso-Jiban (Malaysia) Sdn. Bhd.

● **TURKEY (Istanbul)**

Chodai Istanbul Office

PDT Group Mainstay Corporate Profiles

CHODAI Co., Ltd.

CHODAI Co., Ltd. is a consulting firm headquartered in Tokyo, Japan, and the largest company of the PDT group. CHODAI was established by 13 bridge engineers in 1968 with the aim of forming a group specialized in long-span bridge design. CHODAI has since expanded its business and developed into an overall construction consulting company, and we are today involved in projects ranging from project planning to operation and create new projects by providing high-quality services to society.

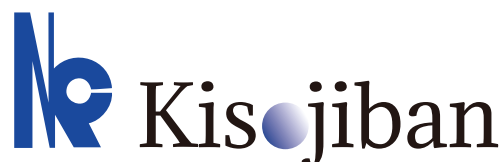


Corporate Profile (as of Jan. 1, 2023)

-Corporate Name	Chodai Co., Ltd.	-International	
-Headquarters	20-4, 1-chome, Nihonbashi- Kakigaracho, Chuo-Ku, Tokyo 103-0014, JAPAN	Representative Offices	Vietnam (Hanoi), Philippines (Manila), Indonesia (Jakarta), Turkey (Istanbul), Papua New Guinea (Port Moresby)
-President	Masahiro NOMOTO	Subsidiaries	Chodai Korea Co., Ltd. (Seoul), Chodai & Kiso-Jiban Vietnam Co.,Ltd. (Hanoi), PT. Wiratman Chodai Indonesia (Jakarta), PT. AMCO Hydro Indonesia (Jakarta), Chodai Philippines Corporation (Manila),Chodai Taiwan Inc. (Taipei), Chodai Madagascar S.A.R.L.U (Antananarivo)
-Established	Feb. 21, 1968		
-Capital	1,000 Million Yen		
-Certification	ISO9001, ISO14001, ISO55001		
-Employees	902 <Qualified : Dr.16, P.E.344>		
-Domestic			
Branches and Sales Offices	49		

Kiso-Jiban Consultants Co., Ltd.

Kiso-Jiban Consultants Co., Ltd. is the second largest company in the PDT Group and a pioneer in geotechnical engineering established in 1958. Kiso-Jiban is currently aiming to become an overall construction consultant with geotechnical projects as its core business and has played an important role in the PDT Group since becoming a member in 2011.



Corporate Profile (as of Sep.30, 2022)

-Corporate Name	Kiso-Jiban Consultants Co., Ltd.	-International	
-Headquarters	12 Floor, Kinshicho Prime Tower, 1-5-7 Kameido, Koto-ku, Tokyo 136-8577, JAPAN	Branch	Singapore (Singapore)
-President	Yoshiyuki YAGIURA	Subsidiaries	Chodai & Kiso-Jiban Vietnam Co., Ltd. (Hanoi), Kiso-Jiban Singapore Pte. Ltd. (Singapore), Kiso-Jiban (Malaysia) Sdn. Bhd. (Kuala Lumpur)
-Established	Aug. 28, 1953	Associate	PT Pondasi Kisocon Raya (Jakarta)
-Capital	100 Million Yen	-Domestic	
-Certification	ISO9001, ISO14001	Laboratories, Branches and Sales Offices	62
-Employees	625 < Qualified : Dr. 15, P.E.234 >		

PDT Group Global Network Address



**People, Dreams &
Technologies Group Co.,Ltd.**

CHODAI CO., LTD.

- HEADQUARTERS

1-20-4 Nihonbashi- Kakigaracho, Chuo-Ku, Tokyo 103-0014, JAPAN
T. +81-3-3639-3321 **F.** +81-3-3639-6805 **E.** info-int@chodai.co.jp

- INTERNATIONAL ENGINEERING DEPARTMENT

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- JAKARTA REPRESENTATIVE OFFICE

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- Istanbul OFFICE

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- Papua New Guinea OFFICE

Allotment 25 Section 20 Bialla, West New Britain, PNG
T.+675-7005-2720

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C-1017, 161-8, Magokjungang-ro, Gangseo-gu, Seoul, 07788, Korea
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No. 39B, Lane 130 Doc Ngu, Vinh Phuc Ward, Ba Dinh District, Hanoi, Vietnam **T.** +84-3644-07959 **F.**+84-4-3232-1641

CHODAI TAIWAN INC.

6F.-1, No.128, Xinhu 2nd Rd., Neihu Dist. Taipei City 114, Taiwan(R.O.C)

CHODAI MADAGASCAR S.A.R.L.U

Lot 23, Entre Ciel et Terre Ambohimalala, Manazary Ilafy ,Analamanga, 103 Antananarivo Avaradrano, Madagascar
T. +261-34-34-802-60

PT WIRATMAN & CHODAI INDONESIA

Graha Simatupang Tower II Blok A & D, Jl Letjen TB Simatupang Kav. 38 Jakarta 12540, INDONESIA **T.** +6221-781-7777 **F.** +6221-782-9370

CHODAI PHILIPPINES CORPORATION

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PT AMCO HYDRO INDONESIA

Jakarta, Indonesia

KISO-JIBAN CONSULTANTS CO., LTD.

- HEADQUARTERS

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- HANOI REPRESENTATIVE OFFICE

7th Floor, A Chau Building, No.24 Linh Lang Street, Cong Vi Ward, Ba Dinh District, Hanoi, VIETNAM **T.** +84-4-3232-1034 **F.** +84-4-3232-1641

KISO-JIBAN SINGAPORE PTE LTD.

60, Kallang Pudding Road #02-00, Tan Jin Chwee Ind. Bldg., Singapore 349320, SINGAPORE **T.** +65-67473233 **F.** +65-67474411

KISO-JIBAN (MALAYSIA) SDN. BHD.

No.3, Jalan Keneri 17/D, Bandar Puchong Jaya, 47100 Puchong, Selangor Darul Ehsan, MALAYSIA **T.** +603-80761377 **F.** +603-80761376

PT PONDASI KISOCON RAYA

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Pc Railway Consultant Co.,Ltd.

- HEADQUARTERS

3-18-13, Imaizumi, Utsunomiya-shi, Tochigi 321-0954, JAPAN
T. +81-28-639-0353 **F.** +81-28-639-7500

PC Railway International Co.,LTD

No. 39B, Lane 130 Doc Ngu, Vinh Phuc Ward, Ba Dinh District, Hanoi, Vietnam



People, Dreams & Technologies Group

To contact us, please access the following URL.

URL <https://www.pdt-g.co.jp/english/>