TOKYO KYUEI

INTERNATIONAL PROJECT DIVISION
PERSON IN CHARGE: **HIROSHI TANAKA**
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SEAWATER INTAKE AND OUTFALL

-BUSINESS CONTENTS & EXPERIENCE-

TOKYO KYUEI CO., LTD.

COMPANY HQ;
2-4-2 IWAMOTOCHO,
CHIYODA-KU,
TOKYO,
JAPAN

TECHNICAL CENTER;
6906-10 SHIBA,
KAWAGUCHI CITY,
SAITAMA,
JAPAN

JAKARTA OFFICE;
JI.R.A KARTINI NO.37,
TB. SIMATUPANG, LEBAK BULUS,
CILANDAK,
JAKARTA SELATAN 12440
INDONESIA

COMPANY HP

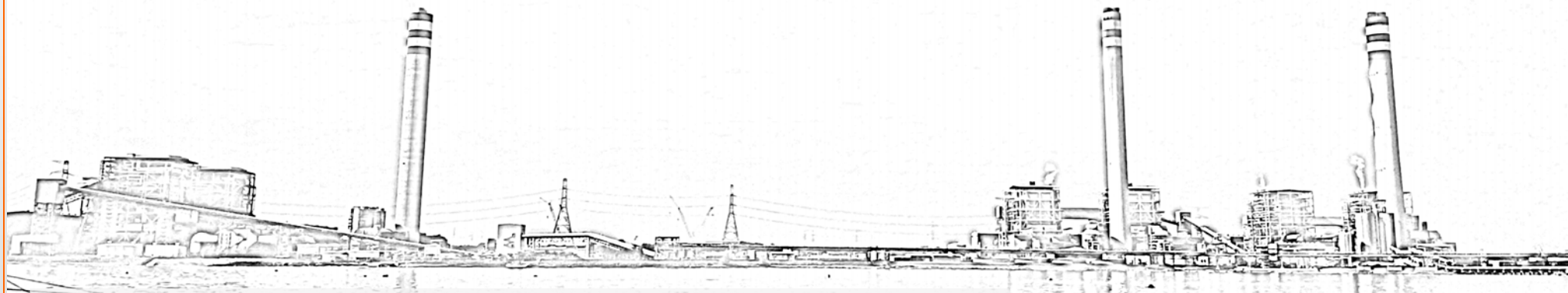
1. Business Contents

[Engineering] [Procurement] [Construction]
[Diving Work] [Diving Survey] [Facility Maintenance]

for Following Facilities and Structures:

- **Seawater Intake / Discharge Facility and Pipeline**

  (For Thermal / Nuclear power plants, Energy facilities, Various plant such as Desalination, Chemical, Vaporization of liquid, etc., Fishery facilities)

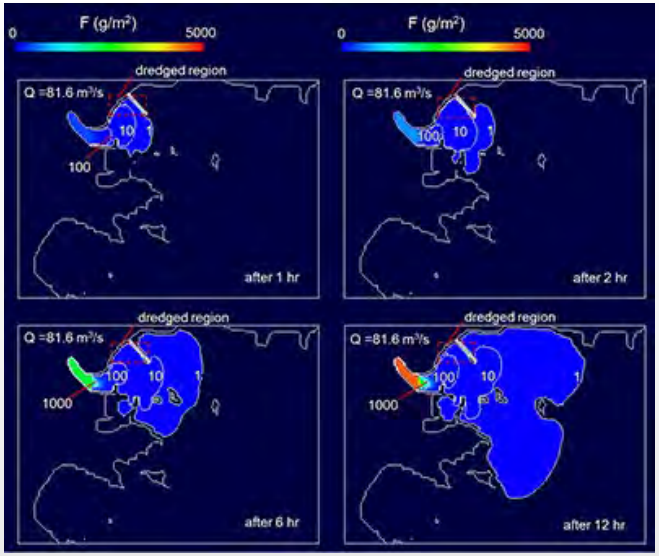


- **Marine / Coastal Facility / Structure**
- **Water Treatment and Waste Treatment Facility**
- **Water Quality Improvement Device**
- **Fishery-related Facility**
- **Aquarium, Marine Leisure Facility**

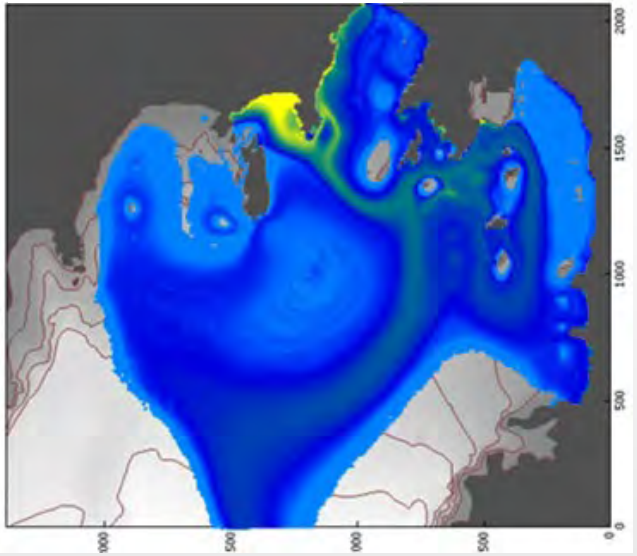
-Engineering dept.- [Numerical analysis] [Predict] [Experiment]

Through advanced numerical modeling utilizing computer simulations, we provide high-precision predictions of wave dynamics, ocean currents, and water quality distributions in marine environments. Backed by decades of experience, our models accurately reproduce complex oceanographic phenomena, enabling highly reliable and precise analyses.

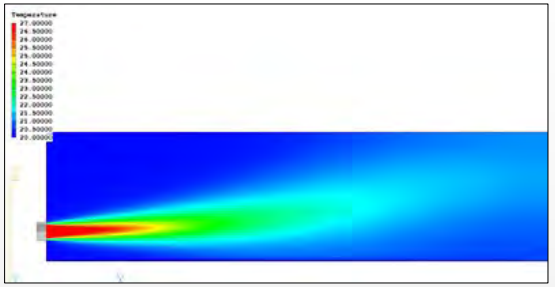
Coast Turbidity Predict



Turbidity Predict in the Bay

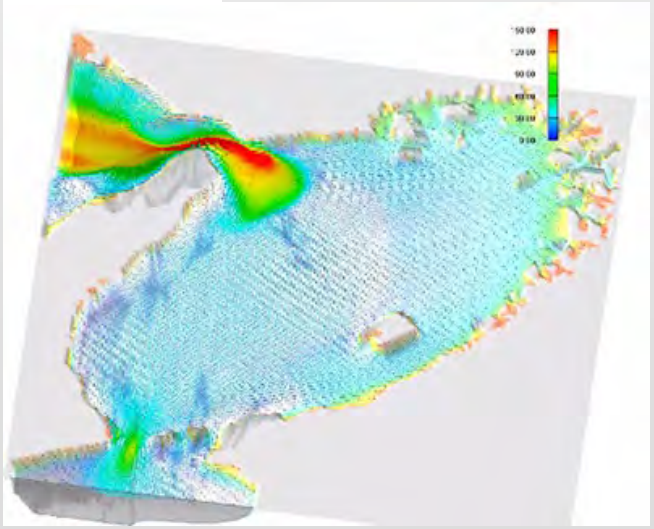


Hot Water Diffusion Analysis by CFD

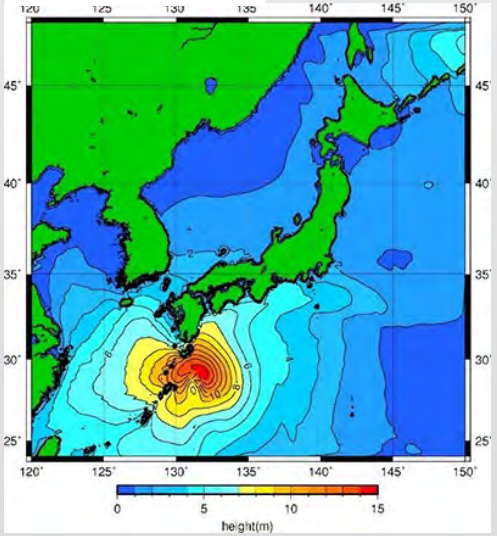


Hot Water Diffusion Analysis by Model test

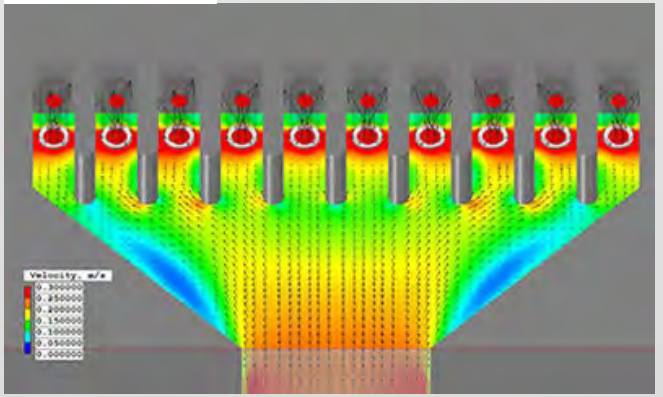
Flow Predict



Wave Forecast



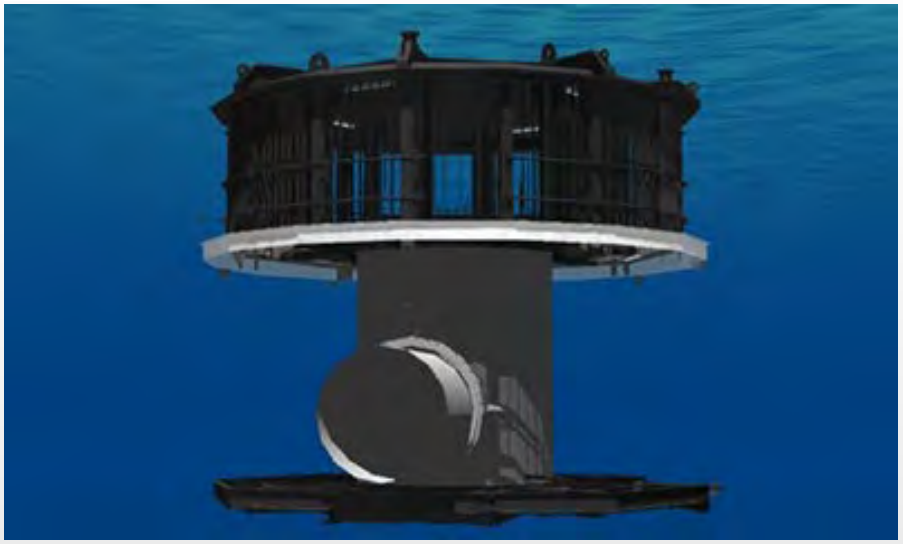
Fluid Analysis



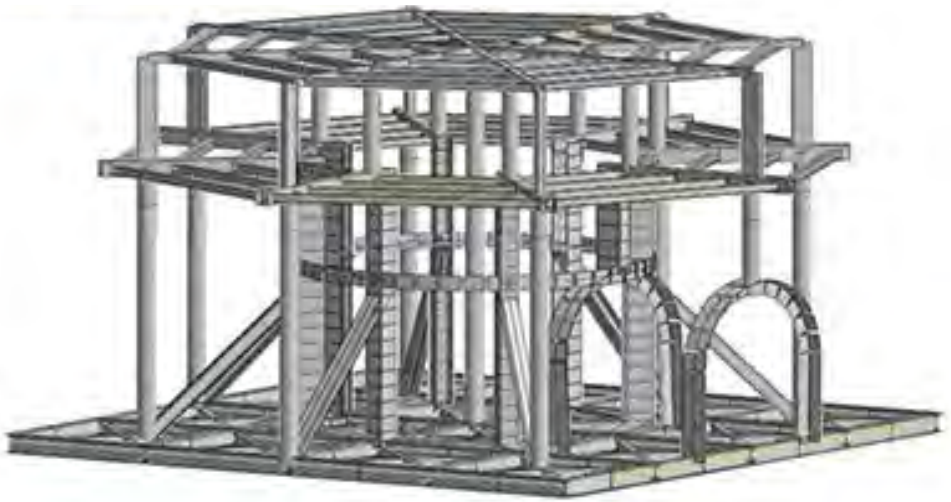
-Engineering dept.- [Design]

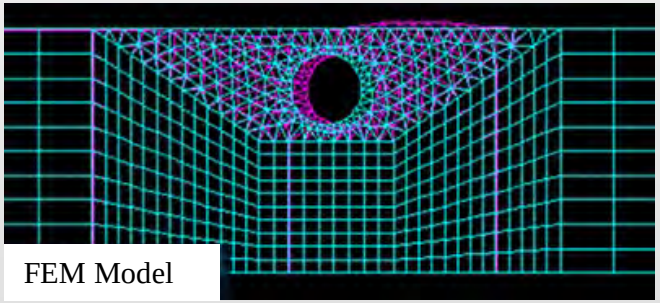
We propose facilities and systems designed with comprehensive consideration for the environment, surrounding communities, and operational continuity. The TK-type seawater intake system, comprising an intake head and intake pipe, ensures a stable supply of high-quality deep seawater, unaffected by coastal geography or oceanographic conditions.

3D Drawing



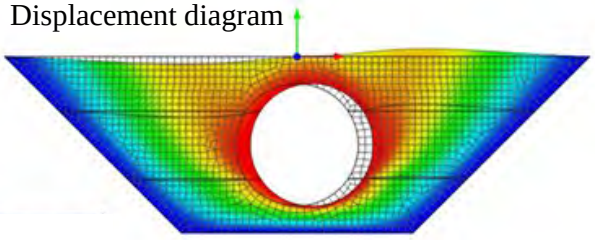
3D Analysis Model of Steel Structure

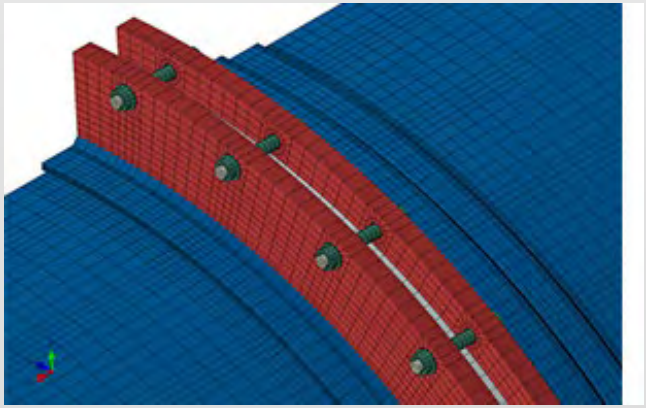




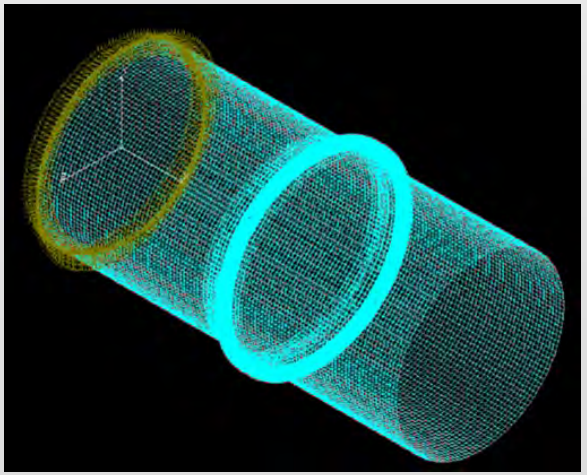
FEM Model

Displacement diagram





Analysis Model of Flange Joint



Analysis by response-displacement method

-Engineering dept.- [Procurement]

The TK-type seawater intake system, including the engineered intake head and intake pipe, is manufactured at fabrication facilities in Indonesia and other countries. Strict quality control is implemented to ensure compliance with the required shape, dimensions, and structural strength. Transportation of the products from the fabrication facility to the construction site for installation is carried out as part of our services.

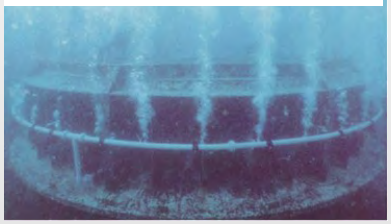
Intake Head

Intake Pipe

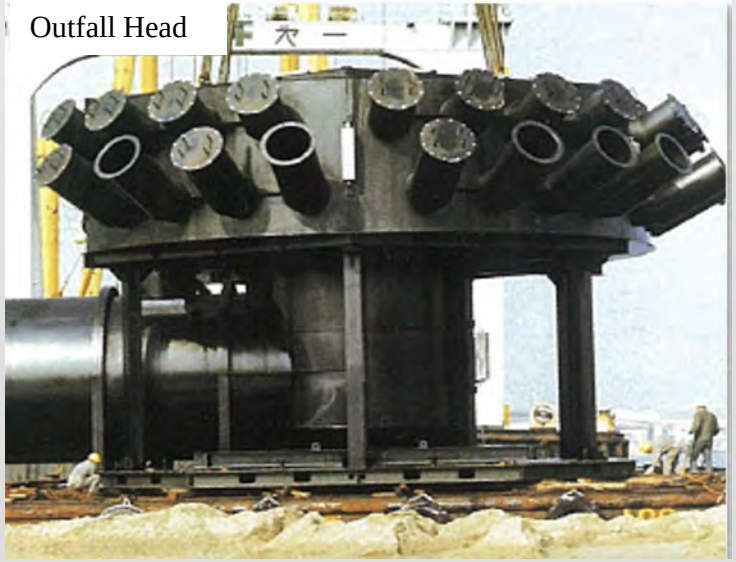
Flexible Joint

Intake Pipe Protected by Concrete

Chlorine Injection Pipeline



Outfall Head



Sea Transportation

Land Transportation

-Engineering dept.- [Procurement (Control of Fabrication Work)]

At fabrication facilities in Indonesia and other countries, quality control of the TK-type seawater intake system is carried out at each stage based on defined inspection items and specified tolerance limits. In addition to quality control, process control, transportation management, and safety management are also conducted by our staff.

Cutting

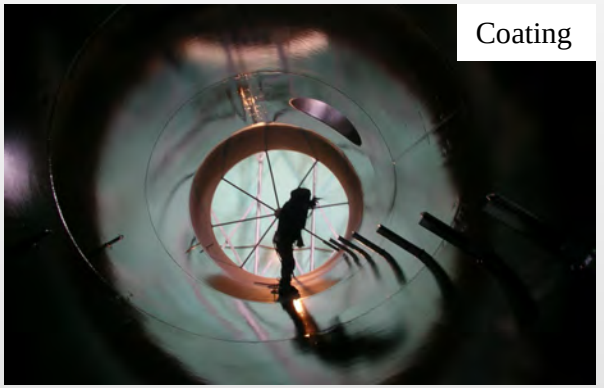
Bending

Welding

Flange Setting

Blasting

Coating



Intake Head assembly

Intake Head

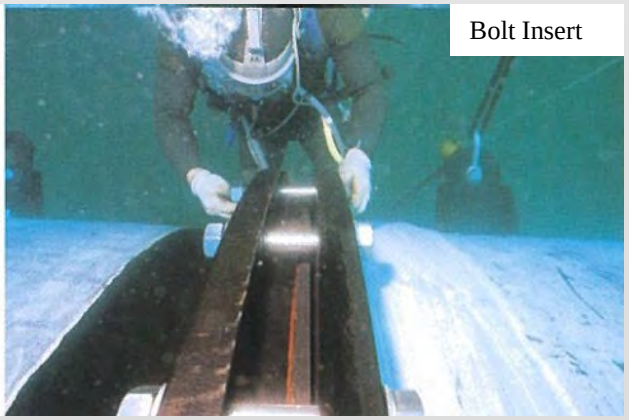
Accessory Setting

-Engineering dept.- [Construction]

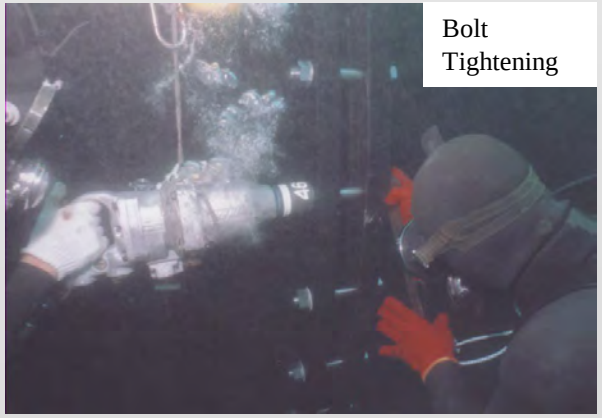
The TK-type seawater intake system, including the intake head and intake pipe fabricated at the manufacturing facility, is installed under the supervision of our own personnel.

The shape and dimensions of the special flange joints for pipe connection are managed by us, ensuring excellent workability and safety for the installation divers..

The underwater flange joint connection work is quality-controlled by our certified in-house divers.



Bolt Insert



Bolt Tightening

Underwater Welding

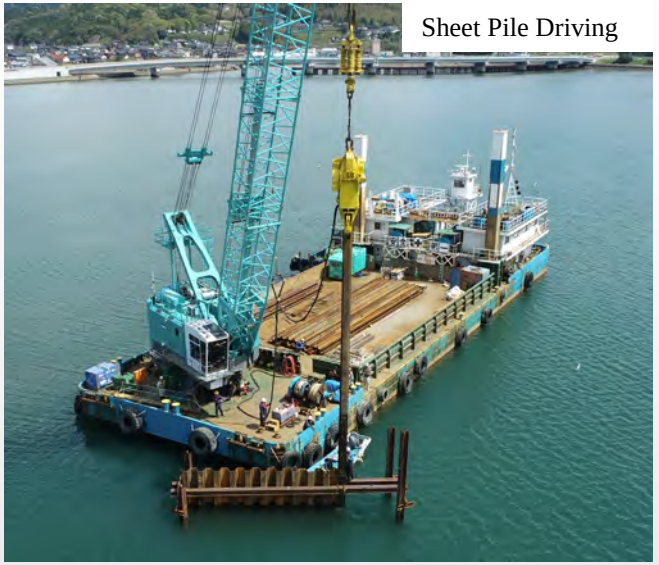
-Engineering dept.- [Construction]

Our services also include civil engineering works and site investigations at onshore area and offshore area associated with the installation of the TK-type seawater intake system.

Bathymetric Survey

Dredging

Sheet Pile Driving



Concrete Casting

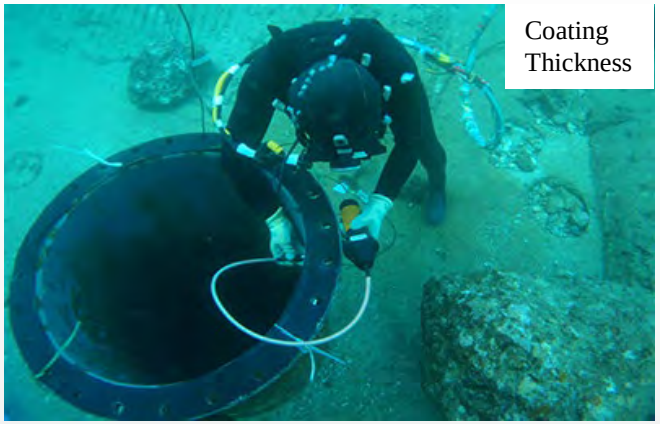
Revetment Construction

Sheet Pile Driving

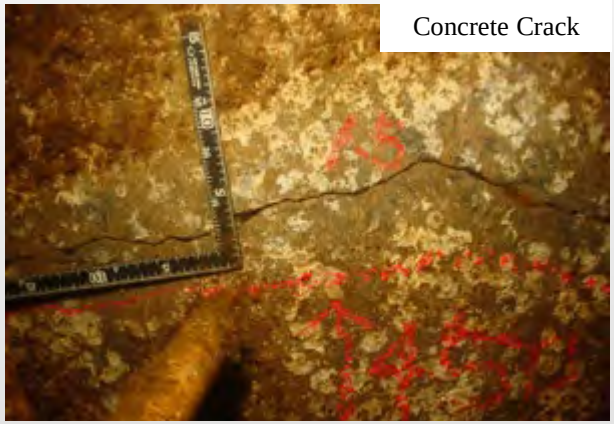
-Engineering dept.- [Diving survey]

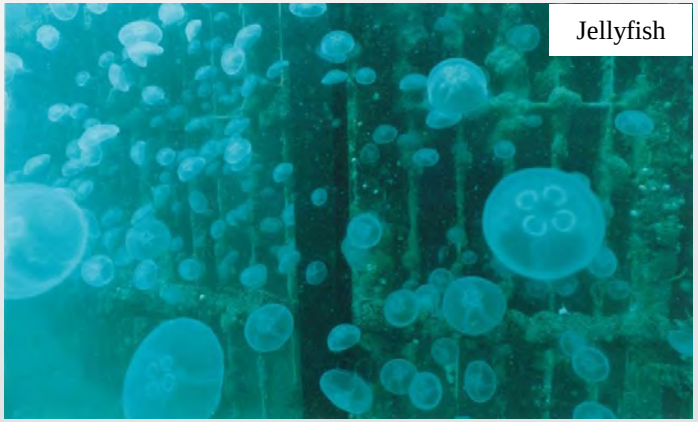
We provide underwater inspection services by professional divers. The inspection items include visual inspection, dimensional measurement, ultrasonic testing of steel thickness and coating, as well as photo and video documentation. Target structures include steel structures, concrete structures, pipelines, and water channels.

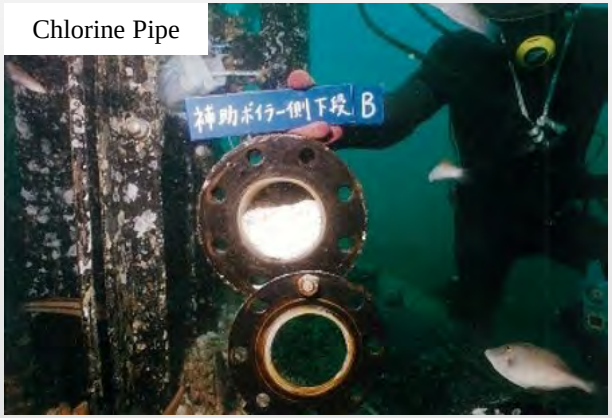

Steel Thickness


Coating Thickness


Anode


Concrete Crack

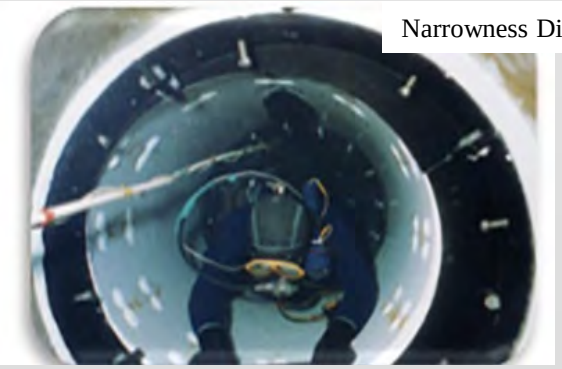

Jellyfish



Chlorine Pipe

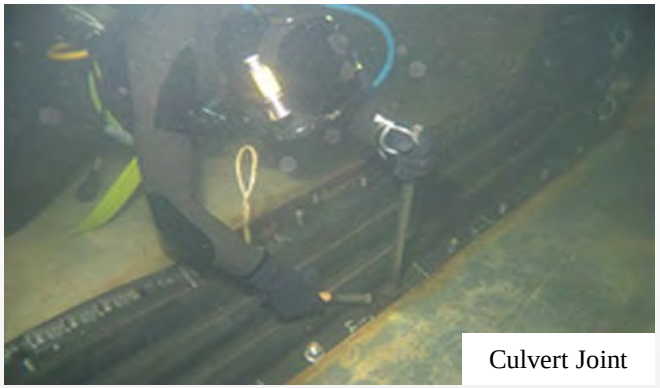

Steel Surface


Shellfish


Narrowness Diving

-Engineering dept.- [Facility maintenance underwater]

We provide underwater maintenance services performed by professional divers. Maintenance activities include part replacement, welding, joint sealing, and painting, as well as sediment removal and surface cleaning. Maintenance targets include steel structures, concrete structures, pipelines, and water channels.

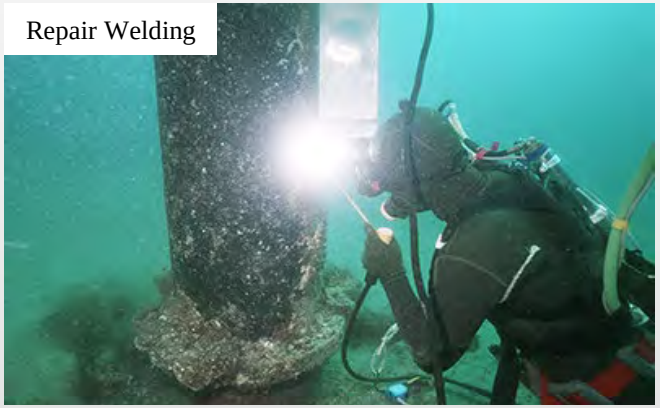


Culvert Joint

Epoxy Filling

Scraping Shellfish

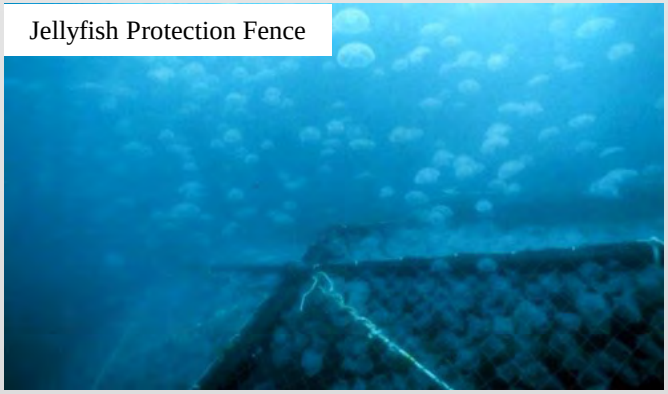
Repair Welding



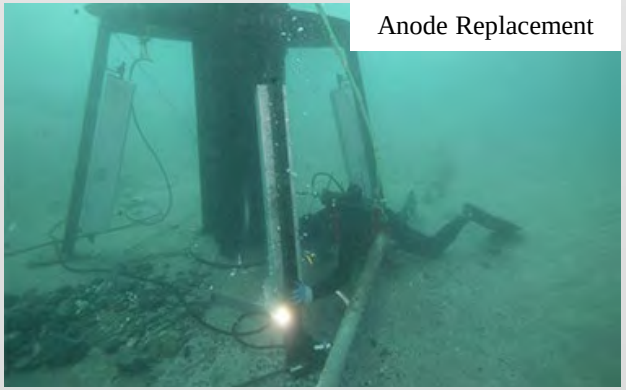
Surface Cleaning

Painting

Jellyfish Protection Fence



Anode Replacement

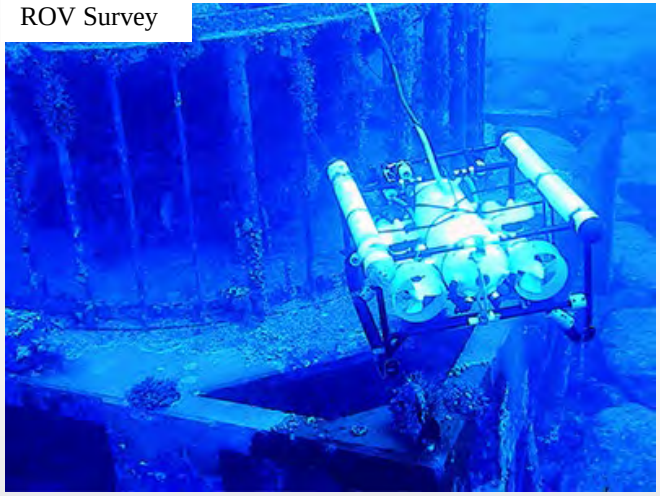


Removal Sediment

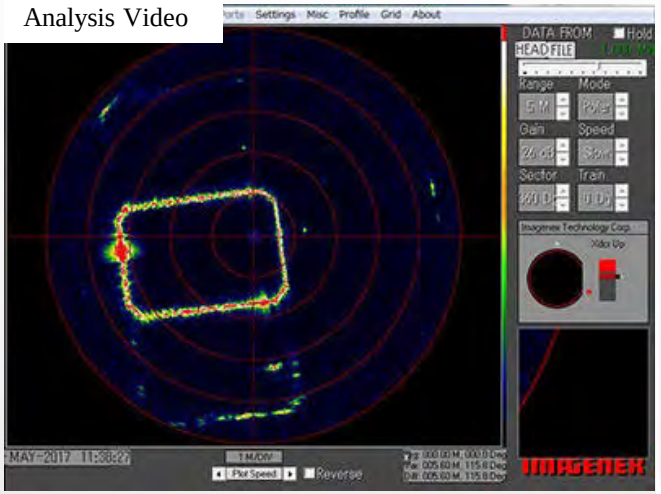
-Engineering dept.- [Underwater survey by equipment]

We provide underwater inspection services using mechanical equipment. These include photo and video capture using ROVs (Remotely Operated Vehicles) and underwater drones, as well as seabed surveying using multi-beam sonar systems.

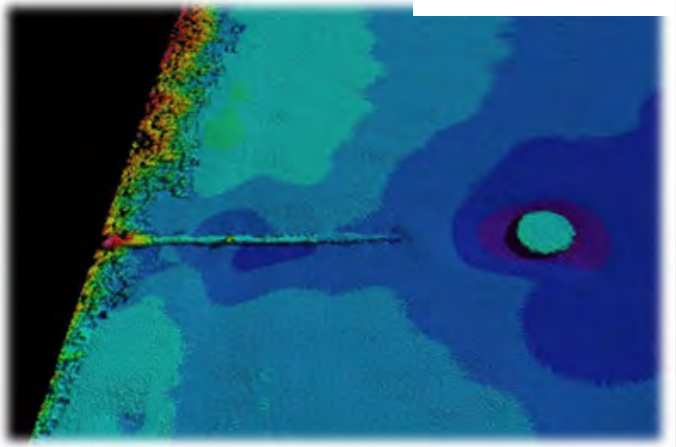
ROV Survey



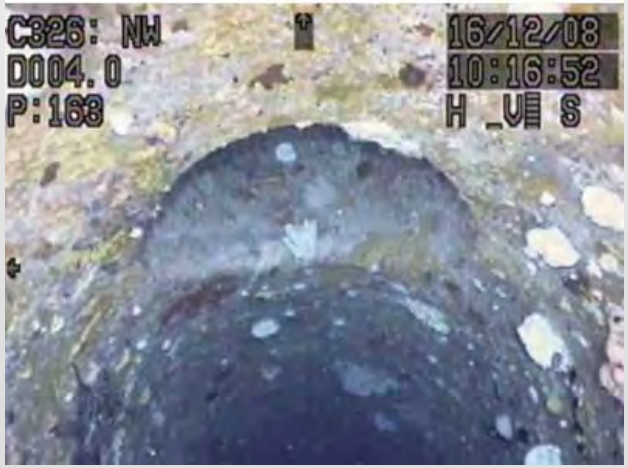
Analysis Video



Multi-beam Sonar



Video Pipe Inside



Biological Survey

Underwater Drone

M2 PRO MAX
Size; 608x294x196mm , Weight; 8.0kg , Max. Depth; 200m

2. Experience

OVERSEAS PROJECT RECORD (Procurement / Construction)-1/2

№	Clients	Description of work	Site	Date
1	Taiwan Salt Works	Seawater Intake facilities	Tongsiao, TAIWAN	Jan - '73
2	Petroperu	Seawater Intake facilities	Talara, PERU	Sep - '73
3	IJPC／Toa Corporation	Seawater Intake facilities	Bandashapool, IRAN	Dec - '76
4	Mitsubishi Heavy Industries, Ltd.	Seawater Discharge facilities	Dubai, UAE	Mar - '77
5	Taiwan Power Company	Tongsiao Power Plant / Seawater Intake facilities	Tongsiao, TAIWAN	Dec - '79
6	Japan Industrial Land Development Co., Ltd.	Seawater Intake facilities (Phase1 extension)	Misurata, LIBYA	Dec - '81
7	Kobe Steel, Ltd.	Seawater Intake facilities	BAHRAIN	May - '83
8	Sasakura Engineering Co., Ltd.	Supply of Seawater Discharge facilities for RO system	BAHRAIN	Feb - '84
9	Kajima Corporation	Supply of Seawater Intake equipment for Neritic Aquafirming Center	CHILE	Mar - '85
10	Kubota Construction Corporation	Construction of Aquaculture Research Center	SOUTH YEMEN	Apr - '87
11	Taiwan Power Company	Tongsiao Power Plant / Rehabilitation of Seawater Intake facilities	Tongsiao, TAIWAN	May - '87
12	Taiwan Power Company	Tongsiao Power Plant / Removal of Seawater Intake Pipe	Tongsiao, TAIWAN	Jul - '88
13	Taiwan Power Company	Tongsiao Power Plant (No4&5) / Seawater Intake & Discharge facilities	Tongsiao, TAIWAN	Nov - '89
14	Kawasaki Heavy Industries, Ltd.	Limay Combined Cycle Power Plant (Block-A) / Seawater Intake & Discharge facilities	Limay, PHILIPPINES	Nov - '92
15	Kawasaki Heavy Industries, Ltd.	Limay Combined Cycle Power Plant (Block-B) / Seawater Intake & Discharge facilities	Limay, PHILIPPINES	May - '93
16	Chiyoda Corporation	PT AMOCO MITSUI PTA INDONESIA / Seawater Intake facilities	Merak, INDONESIA	Dec - '96
17	Mitsui Engineering & Shipbuilding Co., Ltd.	Tanjung Jati "B" Coal-fired Power Plant / Seawater Intake facilities (1st term)	Jepara, INDONESIA	Oct - '99
18	Eimin･Kajima･Daihou JV	Ryumon Atomic Power Plant / Fabrication of Seawater Discharge Head (Supervising)	Ryumon, TAIWAN	Sep - '03
19	Kawasaki Heavy Industries, Ltd.	Mindanao Coal-fired Power Plant / Seawater Intake & Discharge facilities	Mindanao, PHILIPPINES	Jun - '04
20	Takenaka Civil Engineering & Construction Co., Ltd.	Tarahan Coal-fired Power Plant / Seawater Intake facilities	Tarahan, INDONESIA	Jun - '04
21	Mitsubishi Heavy Industries,Ltd.	Tuxpan V Power Plant / Seawater Intake facilities	Tuxpan, MEXICO	Sep - '04

OVERSEAS PROJECT RECORD (Procurement / Construction)-2/2

№	Clients	Description of work	Site	Date
22	Mitsubishi Heavy Industries, Ltd.	Tuxpan V Power Plant / Seawater Discharge facilities	Tuxpan, MEXICO	Sep - '04
23	Mitsui Engineering & Shipbuilding Co., Ltd.	Tanjung Jati "B" Coal-fired Power Plant / Seawater Intake facilities (2nd term)	Jepara, INDONESIA	Dec - '04
24	Toa Corporation	O-Mon Thermal Power Plant / Seawater Intake facilities	O-mon, VIETNAM	Dec - '07
25	Technip consortium	Dung Quat Refinery / Seawater Intake facilities	Dung Quat, VIETNAM	Mar - '08
26	Technip consortium	Dung Quat Refinery / Seawater Discharge facilities	Dung Quat, VIETNAM	Mar - '08
27	Mexico Carbon Manufacturing S.A. de C.V.	MEXICO ALTAMIRA CARBON BLACK / Seawater Intake facilities	Altamira, MEXICO	Mar - '08
28	Mexico Carbon Manufacturing S.A. de C.V.	Mexico Altamira Carbon Black / Seawater Discharge facilities	Altamira, MEXICO	Mar - '08
29	Mexico Carbon Manufacturing S.A. de C.V.	Mexico Altamira Carbon Black / Circulation pipeline	Altamira, MEXICO	Mar - '08
30	Mexico Carbon Manufacturing S.A. de C.V.	Mexico Altamira Carbon Black / Discharge pipeline	Altamira, MEXICO	Mar - '08
31	Mitsui Engineering & Shipbuilding Co., Ltd.	Tanjung Jati "B-Ex" Coal-fired Power Plant / Seawater Intake facilities	Jepara, INDONESIA	Sep - '10
32	Toshiba Plant Systems and Services Corporation	CEL II-1 × 135MW Sihanoukville Coal-fired power plant/ Intake head	Sihanoukville, CAMBODIA	Jul - '18
33	Mitsui E&S Engineering Co., Ltd.	Central Java Coal-fired Power Plant/ Seawater Intake and Outfall head	Batang, INDONESIA	Jul - '18
34	Mitsui E&S Engineering Co., Ltd.	Tanjung Jati "B-Ex" Coal-fired power plant (5&6)/ Seawater Intake head	Jepara, INDONESIA	Aug - '18
35	Mitsui E&S Engineering Co., Ltd.	Tanjung Jati "B-Ex" Coal-fired power plant (5&6)/ Seawater Circulation Pipe	Jepara, INDONESIA	Apr - '19
36	Mitsubishi Power Corporation	Muara Karang Extension Combined Cycle power Plant/ Seawater Intake head	Jakarta, INDONESIA	Jan - '20
37	Mitsui E&S Engineering Co., Ltd.	Tanjung Jati "B-Ex" Coal-fired power plant (5&6)/ Temporary seawater Intake head	Jepara, INDONESIA	Jan - '21
38	Marubeni Corporation	Tambak Lorok Combined Cycle power Plant Block 3/ Seawater Intake head	Semarang, INDONESIA	Jun - '22
39	CCT Constructors Corporation	Pagbilao unit 3 Coal-fired power plant/ Fabrication of Replaced Intake head	Pagbilao, PHILIPPINES	Jan - '23
40	PT. Chiyoda International Indonesia	Manyar Smelter/ Fabrication of Brine discharge spool with diffuser	Gresik, INDONESIA	Sep - '23
41	PT. Guna Teguh Abadi	Manyar Smelter/ Installation of Brine diffuser pipe and removal of blind flange and wrapping	Gresik, INDONESIA	Feb - '24
42	PT. TJB Power Services/PT. SWI Jetty Nusantara	Tanjung Jati "B" Coal-fired power plant (U2)/ Replacing pipe	Jepara, INDONESIA	Dec - '24

3. Recent Project in Indonesia

☐Batang (Central Java) Coal Fired Power Plant 2 x 1000 MW

☐Tanjung Jati B Coal Fired Steam Power Plant 2 x 1000 MW

☐Muara Karang Combined Cycle Power Plant 400-500 MW


Fab. & Transportation Intake Head


Installation Intake Head: 65 ton

☐Tambak Lorok Combined Cycle Power Plant 600-850 MW


Pile Driving


Installation of Bar Screen
for Intake Head

☐Manyar Smelter Copper Smelting Plant

☐Tanjung Jati B Coal Fired Power Station Units 1&2 2 x 662 MW

Terima Kasih!

TOKYO KYUEI CO., LTD.