

Flood Control Coastal Protection **Geotech/Sediment** Dam/Gate Observation/EWS Water Pollution

PROJECT EXAMPLE

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PROJECT EXAMPLE IN INDIAN HYDROPOWER DAM

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STEEL SLIT DAM Debris Flow Countermeasure

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STEEL STRUCTURE DAM TYPES

Steel Structures can be classified into open & closed type by their functions & features.

- Open type
 - Debris flow section
 - Steel slit dam type B
 - Steel slit dam type T
 - Traction section
 - Steel slit dam type A
- Closed type
 - Debris flow section
 - SB wall construction method
 - Traction section
 - Flexible steel frame dam

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STEEL SLIT DAM

Normal condition: Down stream, Upper stream, Net interval of pillars, Net interval of beams, Let outwash flow down stream at normal condition.

At times of debris flow: Down stream, Upper stream, Net interval of pillars, Net interval of beams, Boulders at the frontline of debris flow interwine.

- Secures sedimentation space fill debris flow occurs
- Keeps the continuity of stream
- Prevents disaster by effectively capturing debris flow & driftwood

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CAPTURING AMOUNT COMPARISON

✓ Planned capturing amount of open type is 2~3 times higher than that of closed type

Closed type: Present slope of stream bed, Sand deposition slope at normal condition, Planned sand deposition slope.

Open type: Present slope of stream bed, Sand deposition slope at normal condition, Planned sand deposition slope, Planned capturing amount.

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TYPES OF STEEL SLIT DAM

	Type A	Type B	Type T
Function	Capturing driftwood	Capturing debris flow / driftwood	Capturing debris flow / driftwood
Steel height	2.0m~5.0m	2.0m~7.5m	2.0m~12.0m
Steel pipe diameter	Φ400~	Φ500~	Φ400~
Examples	Over 350 units	Over 850 units	Over 50 units

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CAPTURING EXAMPLE

Net interval of steel pipes: 1.40m
Steel height: 6.0m

Upper stream of dam
Even rocks, soil & sand are captured

Opening is blocked by boulders

Opening is blocked by boulders

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PROJECT EXAMPLE

- ✓ Type : Slit type A
- ✓ Location : Anilao river upper stream, Ormoc, Leyte island
- ✓ Construction period : 1998 to 2001
- ✓ Purpose: Flood disaster prevention (driftwood, debris flow)

Project site

Captured driftwood and sediment

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PROJECT EXAMPLE

- ✓ Type : Slit type B and its modified ver.
- ✓ Location : 中興大学 惠蓀林場内 蘭島溪
- ✓ Highlights: Effectively captured debris flow & driftwood in 2013

Project site

Right after construction

Captured driftwood and boulders

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EXECUTIVE SUMMARY

- STEEL is an indispensable basic & convenient materials and products for Infrastructure all over the world.
- In response to the increasing threat of Natural Disasters (both frequency & severity), it is urgently required to adopt Best-fit Infrastructure Solutions, especially in Rural Area.
- In Asia, more focus is put on Environment both in Urban Area as well as in Industrial Area.
- NIPPON STEEL & SUMITOMO METAL group is highly motivated to contribute to the Infrastructure Development in Indonesia.

For more details : <http://www.ns-kenzai.co.jp/english>

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TERIMA KASIH BANYAK!

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Hybrid Drilling Method and Survival Capsule

HI-TEC Inc.

December 6th, 2018



HI-TEC Inc. is a geological investigation company based in Osaka, provides a comprehensive range of services for engineering and infrastructure projects like dam, highway, and various geological and hydrological investigations. Our Geo-engineering professionals are trained to master all variety of techniques, so we could meet the needs of different subsurface conditions.

- HI-TEC consists of four units:
- Geological Investigation—our special technology: Hybrid drilling method
 - Hydrological Environment Survey
 - Maintenance Technology for Infrastructure
 - Environmental Conservation Technology

HI-TEC has a wide variety of solution for geological investigation and HI-TEC's major overseas experiences are shown below:
Malaysia: Engineering guidance of drilling and sampling
China, Dunhuang: Borehole camera observation, resistivity survey, field survey
Laos, Nam Ngiep: Drilling and sampling (hybrid drilling method), seismic survey, rock test
Australia: Engineering guidance of drilling and sampling
China, Shanghai: Engineering guidance of drilling and sampling
Turkey, Cappadocia: Field survey and rock test
Indonesia, Rajamandala: Drilling and sampling (hybrid drilling method) and rock test—clay shale
Myanmar, Daechebo: Drilling and sampling (hybrid drilling method)

Problems of Core Recovery in Indonesia

- Soft soil, peat & loose sand → core recovery small, <100%
- Jointed rock → hard to get sampling
- Deep drilling, depth >100m

Core loss >50%



◆ The reason of bad core recovery

Insufficient kinds of drilling tool, such as core tube and so on.
 Insufficient technique of operator for deep drilling.
 Insufficient technique of operator for various geotechnical and geological condition and so on

◆ Influences due to above circumstances

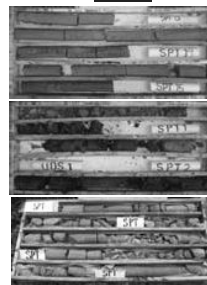
- Difficult to obtain sufficient sample for soil test ⇒ Inaccurate soil property
- Difficult to observe accurate geological condition ⇒ Difficult to specify slip surface, soft stratum

◆ Influences to development social infrastructure due to problems as mentioned above

- Inaccurate design of structure ⇒ the interruptions of construction work, the addition of countermeasures etc.

Indonesia

Japan (taka deposits)

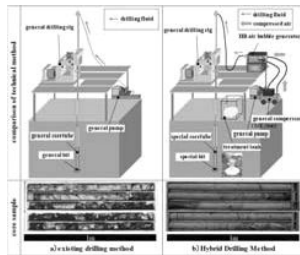


The comparison of core samples between Indonesia and Japan. We could understand the difference of technology very well through the photo. When the engineers conduct construction project, because constructor couldn't achieve the accurate geological information through drilling work, they had to use the conditions that was acquired through experience, or set a high safety factor.

Hybrid Drilling Method is different from the existing drilling method, it cleans the slime using foam as recycle drilling fluid that created by HB air bubble generator using the compressed air and surfactant polymer, instead of the common drilling fluid, such as water or water-based drilling mud.

Because of the soft foam fluid doesn't destroy the surrounding structure of core sample, therefore Hybrid Drilling Method can drill smoothly and avoid structural disorder by excessive water pressure, obtains the undisturbed sample for various rock mechanics testing. In addition, HB air bubble generator can supply bubble continuously and stably, enables sampling of previously inaccessible cores, especially under the groundwater and artesian groundwater.

Hybrid Drilling Method applies to both hard and soft rock, and also applies to surface drilling and exploratory tunnels. Regarding the drilling direction, this method applies to variety of angles, vertical, horizontal, or diagonal. But due to the viewpoint of cost problem, Hybrid Drilling Method is considered that it more applied in the important structures, where the high accuracy geological investigations are required, could be provide more value-added.



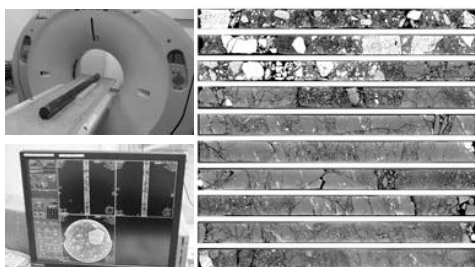
Indonesia Rajamandala (clay shale)



Core samples by local company

Core samples by hybrid drilling method

Indonesia Rajamandala (clay shale)



CT scan

Photos of core sample by CT scan

Survival Capsule



The Survival Capsule is a patent-pending, personal safety system (PSS) designed as a spherical ball to protect against tsunami events, tornados, hurricanes, earthquakes, and storm surges.



Using a PSS, as opposed to a municipal safety system like a safe house, allows individual groups and families to be more in control of their survival in an emergency situation. The capsule is also a variable disaster solution, which means it can vary position according to the water depth, so it will never be inundated by water levels rising too high. It also provides warmth, safety, and shelter during the initial post-disaster period before rescue crews and relief workers have arrived on the scene.





•We currently have five capsule models available or planned for manufacture and sale. Our model matrix defines the various models, including seating arrangements and other building specifications.

- SC2001 Capacity – 2 Adults
- SC3001 Capacity – 4 Adults
- SC6001 Capacity – 6 Adults
- SC8001 Capacity – 8 Adults
- SC10001 Capacity – 10 Adults



Standard Features

- Safety Seating with Four-Point Harness Straps
- Storage Space (sufficient for five day's supply per person)
- Multiple Counter Sunk Hoisting Points
- Water Storage (bladder or tank)
- Bass, Internal Light
- GPS (Global Positioning System)
- Air Ventilation Vents
- Capsule Storage Stand
- Bass, High-Visibility Unit Color
- Air Supply Tanks (one for each occupant)
- Hard Restraint Support
- Solid, Watertight Marine Door (opens from inside and outside)
- Marine Standard Window



- Designed by aircraft engineers
- Tested to extremes
- Different occupancy models to choose from
- Storage provided for supplies and water
- Dual hatch design
- Locator beacon
- Tethered option
- Multi-hook points on outer surface
- High strength, low weight
- Thermal protection
- Dry shelter for use post-disaster
- Affordable



Optional Features

- Surround Sound Music System
- Additional Storage
- Multiple Capsule Stacking System
- Dry Powder Seat Toilet
- Additional Internal Lighting
- Solar Panel Array
- Additional Internal Insulation (acoustic and thermal)
- Ground and Rooftop Tether System
- Color Options



YOSHIDA BORING MACHINE



Our Factory

**YBM Head Office
Karatsu Factory**

YBM Kishiyama Factory



YBM SERVICE
(Subsidiary Company)



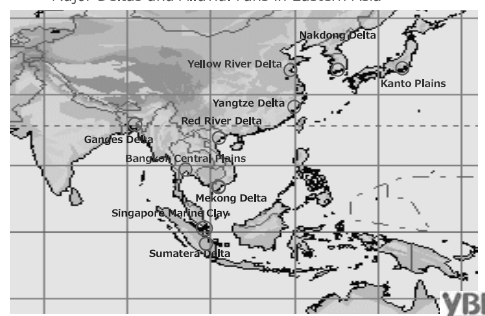
PRODUCTS LINE-UP

- Drilling machines
- High Pressure Grout pumps
- Ground Improvement machines
- Civil Construction machines
- Environmental Equipment



SOFT GROUNDS – Problems and Solutions

- Allocation of regions with weak soil -
Major Deltas and Alluvial Fans in Eastern Asia



Location in Japan

Since 1946



KANTOR PERWAKILAN DI LUAR NEGRI

INDONESIA REPRESENTATIVE OFFICE
GEDUNG PUSAT PERFILMAN H. USMAR ISMAIL
LANTAI-3 RUANG 343
JLN. HR. RASUNA SAID KAV.C-22 JAKARTA
SELATAN KODE POS 12940



Soil Mix Piling



YBM Co., Ltd. Japan

Service & Technology



SOFT GROUNDS – Problems and Solutions

Soil Liquefaction in Eastern Japan, Ibaraki Pref.



SOFT GROUND – Problems and Solutions

Crack of asphalt and road subsidence caused by soft ground - Sumatera



SOFT GROUND – Problems and Solutions

Liquefaction in Solo, Sulawesi



SOFT GROUND – Problems and Solutions

Liquefaction in Solo, Sulawesi

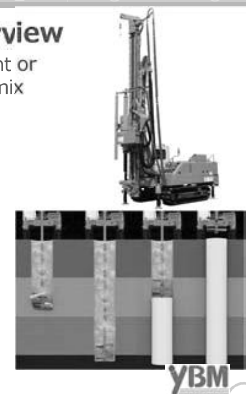


Soil Mixing Overview

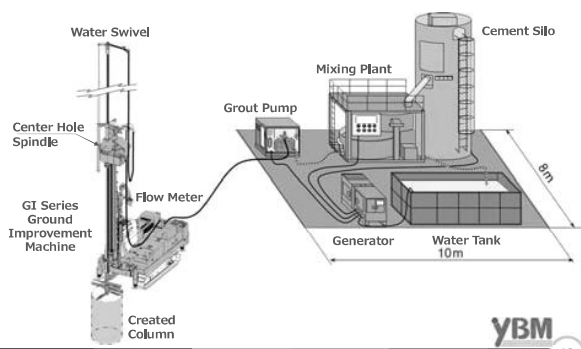
· Soil is mixed in-situ with cement or other hardeners to create soil mix concrete columns.

Characteristics

- Column Strength Easy Adjustment
- High-Strength Concrete Columns
- Can be blended into Bearing / Bedrock Layer
- Efficient and Effective method to mix large volume of soil
- Wing Bit Size : $\phi 0.6\text{m}\sim 1.6\text{m}$



GI Series - Soil Mixing Basic Layout



Soil Mixing Method

Mechanical mixing tools, wing bit is to shear the soil in-situ and mix it with pumped cement slurry to create soil mix concrete columns.

Column Diameter : $\phi 0.6\sim 1.6\text{m}$



Soil Mixing Method



Ground Improvement – Soil Mixing

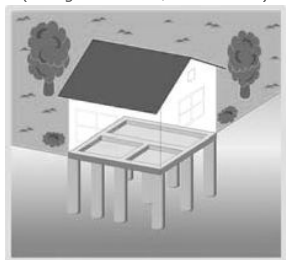


Soil Mix Piling / Soil Mixing

Land Subsidence Protection · Earthquake Proof

(Wing Bit size : ϕ 0.6~1.2m)

- Deep Foundation for Low-Rise Building
- Soft Soil layer(s) is deeper than 2m



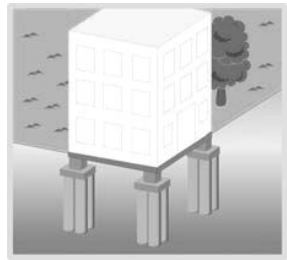
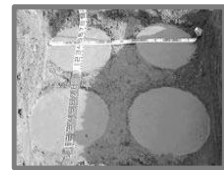
※ Maximum Length of Soil Mix Piles should not exceed more than 20 times of its column diameter size. Column diameter should be changed depends of the depth.

Soil Mixing Applications and Benefits

Ground Sinkage Protection · Earthquake Proof

(Wing Bit size : ϕ 0.8~1.2m)

- Deep Foundation for Medium-Rise Building
- Soil Liquefaction Protection

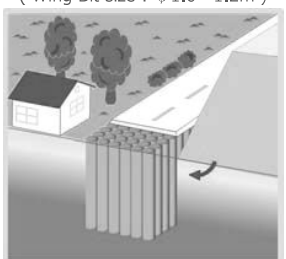
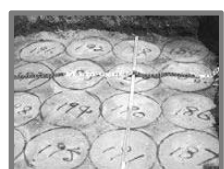


Soil Mixing Applications and Benefits

Land Subsidence & Land Slide Protection

(Wing Bit size : ϕ 1.0~1.2m)

- Nearby Building & Structure Protection
- Embankment / Land Slide Protection

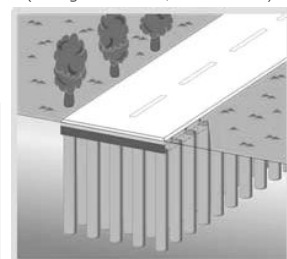


Soil Mixing Applications and Benefits

Land Subsidence Protection · Earthquake Proof

(Wing Bit size : ϕ 0.8~1.2m)

- Roadway / Embankment Sinkage Protection
- Soil Liquefaction Protection

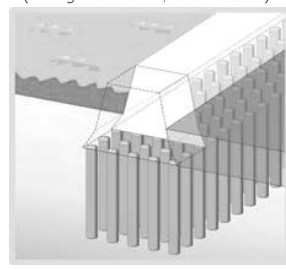


Soil Mixing Applications and Benefits

Retaining Walls · Slide Protection

(Wing Bit size : ϕ 0.8~1.6m)

- River bank/Seawall Foundation
- Retaining Wall
- Seepage Cut-Off

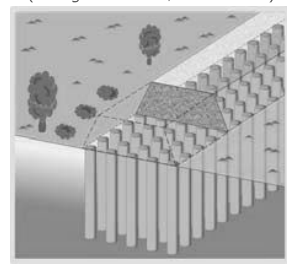


Soil Mixing Applications and Benefits

Embankment Sinkage Protection

(Wing Bit size : ϕ 1.0~1.2m)

- Roadway / Embankment Sinkage Protection
- Soil Liquefaction Protection

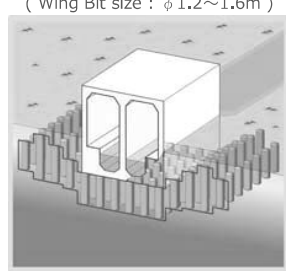


Soil Mixing Applications and Benefits

Land Subsidence Protection · Earthquake Proof

(Wing Bit size : ϕ 1.2~1.6m)

- Structure Slide and Sinkage Protection
- Retaining Walls

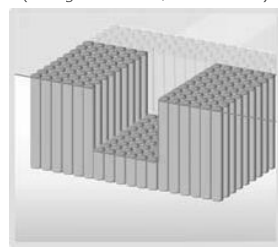


Soil Mixing Applications and Benefits

Shield Tunneling Startup/End Protection

(Wing Bit size : ϕ 1.0~1.2m)

- Caving Protection
- Impermeable Barrier
- Retaining Wall



Soil Mixing Machines

GI series - Ground Improvement

Compact, Lightweight, Efficient



GI-80C

GI-130C

GI-220C



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Soil Mixing Equipment

Fully Automatic & Continuous Mixing Plants

MIXEL		CMA Series			YMP-25 II
		04A	06A	08A	
Mixer Capacity	m ³ /h	4	6	8	26
Mixer Mixing Volume	L	200	300	400	1,320
Agitator Mixing Volume	L	400	600	900	2,100
Cement Water Ratio	%	60 ~ 100 %			
Weight	kg	1,260	1,800	2,200	3,900



CMA-04A · 06A · 08A



YMP-25 II



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Soil Mxig Equipment Grout Pmp

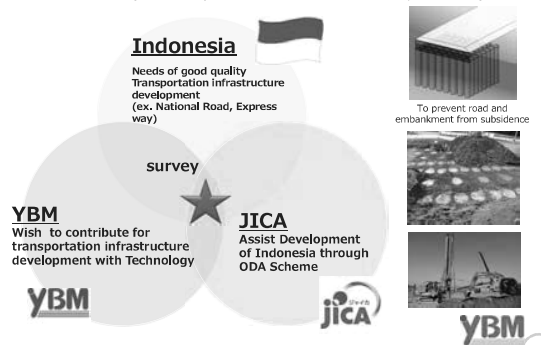


SG-30SV



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Verification Survey for the support of development for transportation infrastructure through soil improvement with the interlayer Mixing Method



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TERIMA KASIH
ATAS
PERHATIANNYA



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Precast concrete products for flood countermeasures

2018.12.6



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<http://www.yamau.co.jp/>

Precast concrete is concrete that is continuously manufactured under required quality control in the factory where concrete production facilities have been established. Generally called concrete products and secondary products.



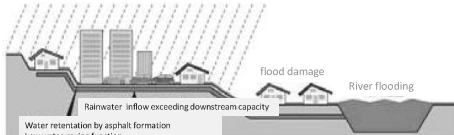
General advantages of precast concrete

- We can save labor for processes such as formwork, reinforcement work, support work, concrete placing and curing at the construction site
- Reduction of assembling of reinforcing bar, installation of formwork and supporting work at construction site and dismantling work → reduction of dangerous work
- In fact that construction work can be easily mechanized, it is possible to greatly shorten the construction term
- Products with stable quality

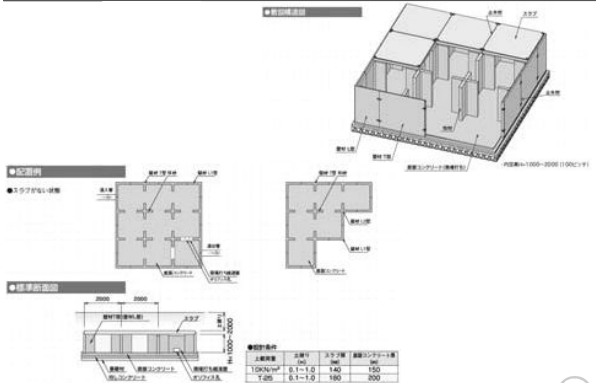
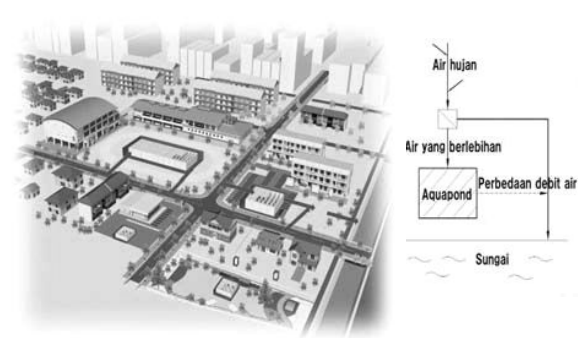


Concrete Precast Technology "AQUAPOND"

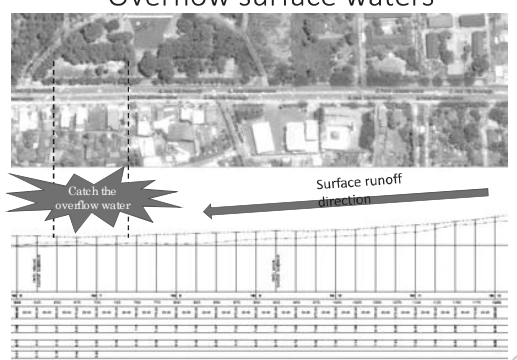
Image of flood damage caused by urbanization



Rainwater outflow suppression image by underground storage facility



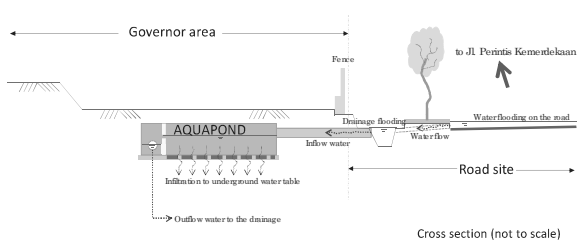
Overflow surface waters



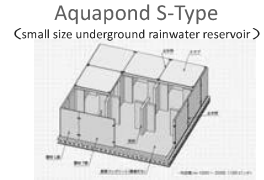
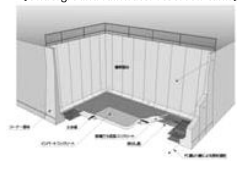
An Idea using "Aquapond"



Illustration of aquapond system



Tameloop & Open Adjustment Pond

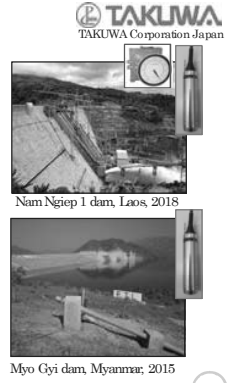




Takuwa Corporation

Recent Delivery Records in Asian Countries

- [Myanmar]**
- Myo Gyi dam
 - Myittha dam
 - Kyeon Kyeewa dam
 - Mobyel dam
- [Laos]**
- Nam Ngum 1 HPP
 - Nam Theun 2 HPP
 - Nam Ngiep 1 HPP
- [Vietnam]**
- Ham Thuan HPP
 - Dai Ninh dam
 - Thac Mo dam
 - Tuyen Quang dam
 - Ke Go dam (Pilot)

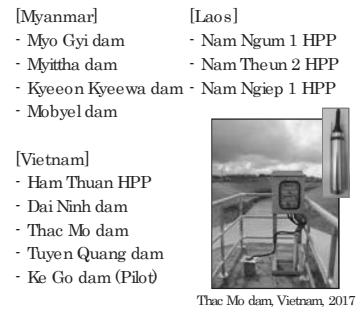


Delivery Records in Indonesia

- Water Level Gauge (WLG)**
- Kail Sunabaya dam
 - Tangga dam
 - Cinata dam
 - Solo river
 - Senguruh dam
 - West Banjil Canal, Jakarta
 - Brantas river
 - Sutami dam
 - Asahan HPP (Sigumgura, Tangga)
 - Bili Bili dam
 - Natural dam in Wai Ela, Ambon
 - Mampang river, Jakarta
- Gate Opening Indicator (GOI)**
- Wlingi dam
 - Tangga dam
 - Batujai
 - Garung hydroelectric
 - Cinata dam
 - Mamak irrigation
 - Kotapanjang dam
 - Asahan HPP (Sigumgura, Tangga)
 - Bili Bili dam
 - Solo river
 - Jabung gate

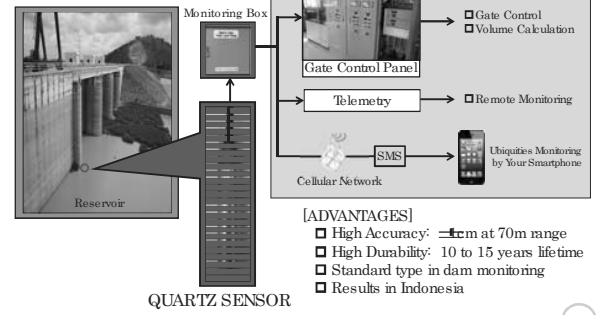


Quartz-type Water Level Gauge



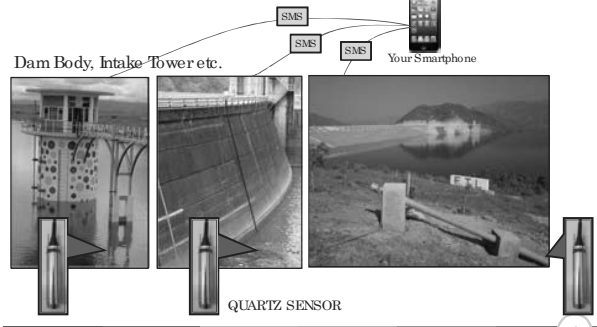
- [ADVANTAGES]**
- High Accuracy: ±1cm at 70m range
 - High Durability: 10 to 15 years lifetime
 - Standard type in dam monitoring
 - Results in Indonesia

Gate Opening Indicator

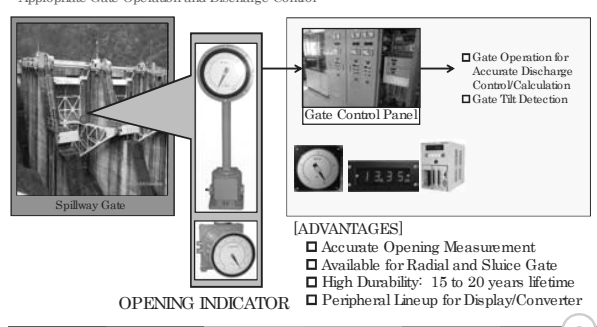


- [ADVANTAGES]**
- Accurate Opening Measurement
 - Available for Radial and Sluice Gate
 - High Durability: 15 to 20 years lifetime
 - Peripheral Lineup for Display/Converter

Installation of the Sensor

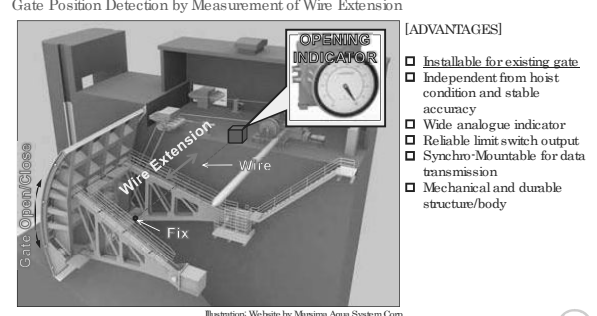


Gate Opening Indicator - Wire-Spring type



- [ADVANTAGES]**
- Installable for existing gate
 - Independent from hoist condition and stable accuracy
 - Wide analogue indicator
 - Reliable limit switch output
 - Synchro-Mountable for data transmission
 - Mechanical and durable structure/body

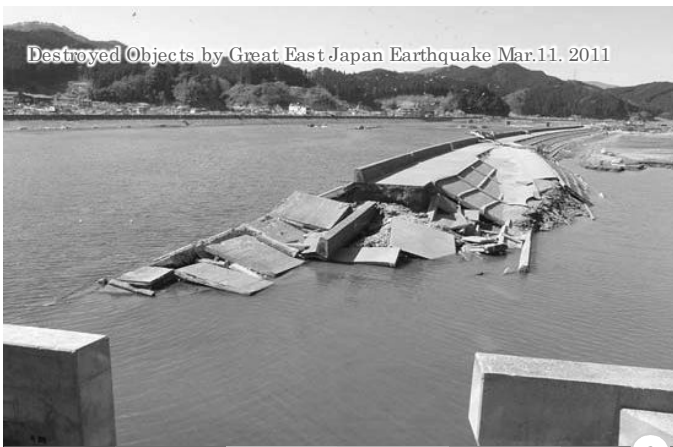
Gate Opening Indicator - Wire-Spring type



Implant Structure For Disaster Risk Reduction

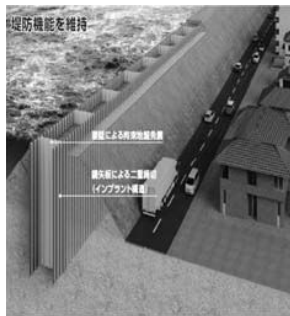
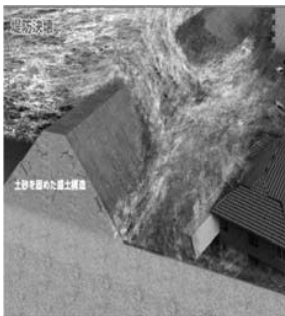
GIKEN Ltd
H. Yaegashi

6 December 2018

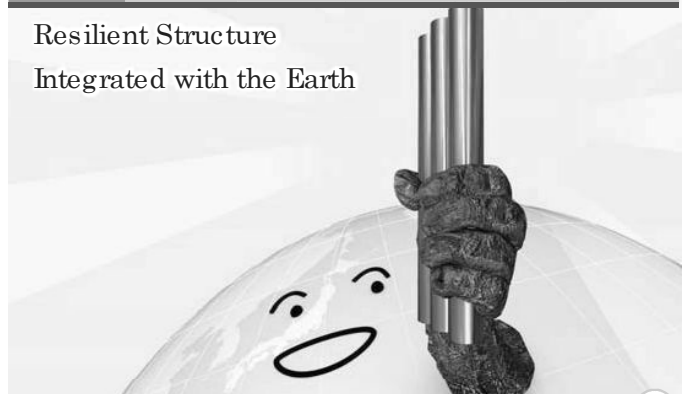


Footing Structure

IMPLANTSTRUCTURE



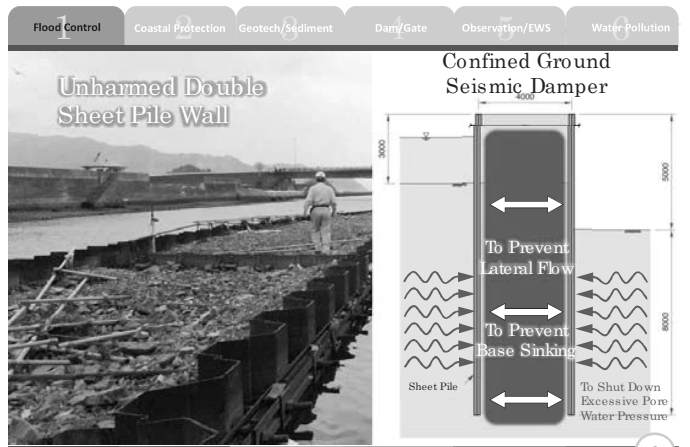
Resilient Structure Integrated with the Earth



Implant Levee against Earthquake and Tsunami

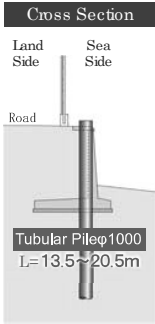


GRB System + GYRO Press (Kitakyushu)



Without Disturbing Traffic, Renovate Levee

Reinforce Levee, While Keeping It



Kamakura, Japan



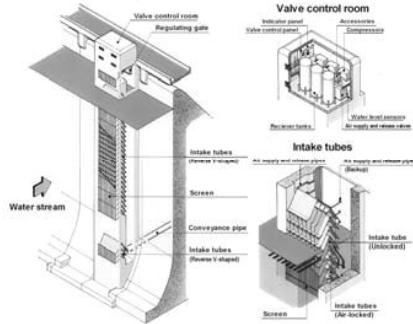


Yachiyo Engineering Co., Ltd.

Our Field

- HIGHWAYS & BRIDGES
- TRAFFIC, TRANSPORTATION PLANNING & PUBLIC TRANSPORTATION
- WATER SUPPLY & WATER RESOURCES DEVELOPMENT
- ENVIRONMENTAL & SOLID WASTE MANAGEMENT
- ELECTRIC POWER
- RIVER, FLOOD CONTROL & NATURAL DISASTER PREVENTION
- ARCHITECTURE
- URBAN & REGIONAL DEVELOPMENT
- INFORMATION TECHNOLOGY

Air Lock W/ LSelectable Intake



Air Lock W/ LSelectable Intake

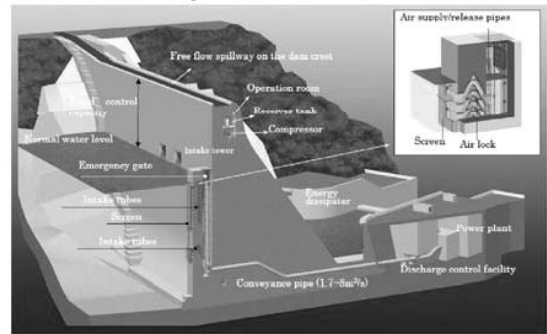
- **Low construction cost**
 - The amount of steel material can be reduced because no members are subjected to big hydraulic load.
- **Easy maintenance**
 - No water tight rubbers and no sliding parts which needs to be maintained.
- **No water leak**
 - Air-lock succeeds in perfect water tight
- **Less constraint of the control room**
 - Compressed air can be supplied into an intake tube through the air supply pipe.

Yachiyo Engineering Co., Ltd.

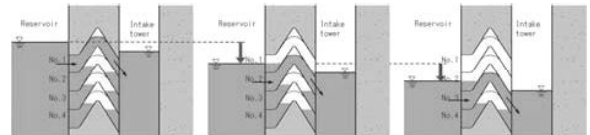


Establishment
January 29, 1963
Paid-up Capital
450 million yen
(USD 5.6 millions)
Number of Professional Staff
1,082 (As at Oct., 2018)

Air Lock W/ LSelectable Intake



Air Lock W/ LSelectable Intake



Sewerage and Urban Drainage

IP-550 Denpasar Sewerage Development Project II
Project Location: Bali

House Connection (Toilet - House Inlet - Sewer Pipe)



Sewer Pipe Construction (Open Cut Method)



Sewerage and Urban Drainage

Project for Urgent Reconstruction of East Pump Station of Pluit
Project Location: North Jakarta



Disaster Reduction

IP-524 Urgent Disaster Reduction Project for Mt. Merapi, Progo River Basin
Project Location: Yogyakarta



Flood Control

IP-551 Urban Flood Control System Improvement in Selected Cities
Project Location: Padang, Palembang, Surabaya, Gorontalo, Manado



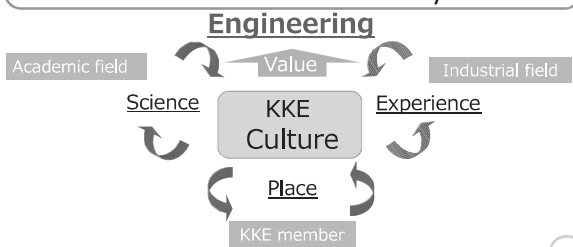
On-going Programs

- Engineering Service for Sewerage System Development in DKI Jakarta
 - JICA Loan Project
 - September 2017 – January 2020
- The Project for Promoting Countermeasures against Land Subsidence in Jakarta
 - JICA Technical Cooperation Project
 - May 2018 – March 2021
- Central Sulawesi Reconstruction Planning under Data Collection Survey on Disaster Risk Reduction
 - JICA Study
 - October – December 2018

構造計画研究所 KOZO KEIKAKU ENGINEERING Inc.

Corporate Philosophy

"To be an outstanding firm that bridges the academic and the industrial fields for the betterment of the society"



About us

“Structure” “Planning” “Laboratory”

Company name “KKE”
=Kozo Keikaku Engineering

570 Employee number

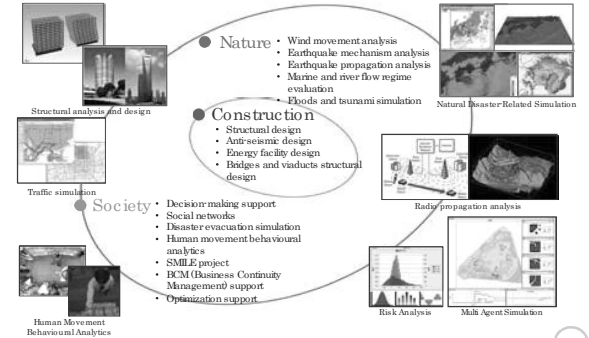
¥11,500 mil Sales

1959 Foundation

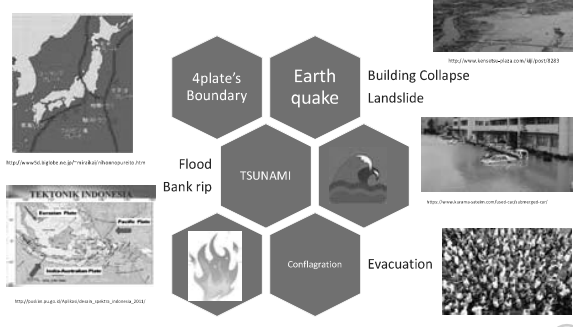
JASDAQ 4748

NO KEIRETSU company

Our Business Domains



Natural Disaster in Japan

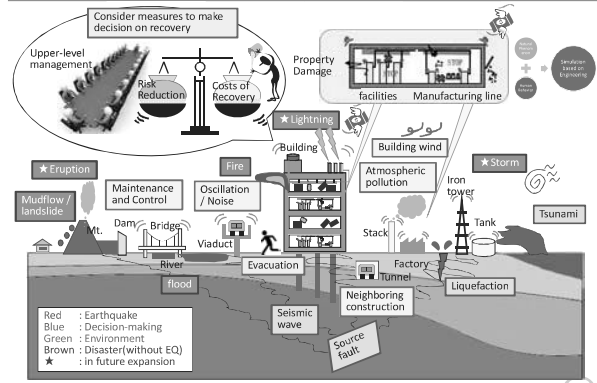
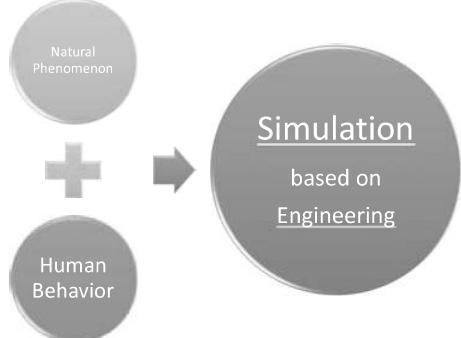


The Great East Japan Earthquake ~2011 Tōhoku Earthquake and Tsunami

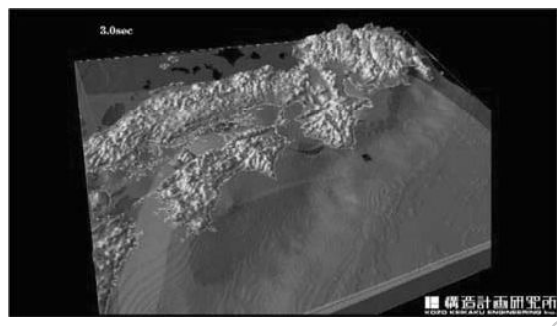
- Mw 9.0, Mega Earthquake occurred on 11 March 2011
- Tsunami, Fukushima Daiichi nuclear disaster
- Casualties: 15,893 deaths, 6,152 injured (as of 10 September 2015)
- Over 154,000 evacuees due to the nuclear disaster (as of 2013)



KKE Concept for countermeasure

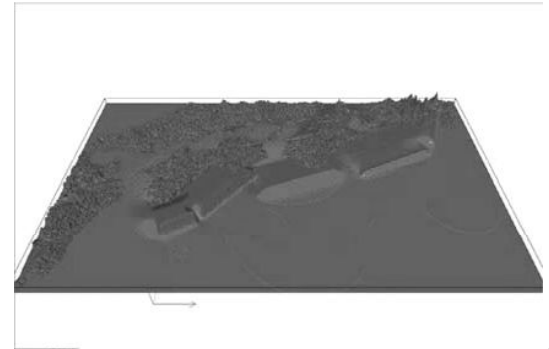


Earthquake Simulations



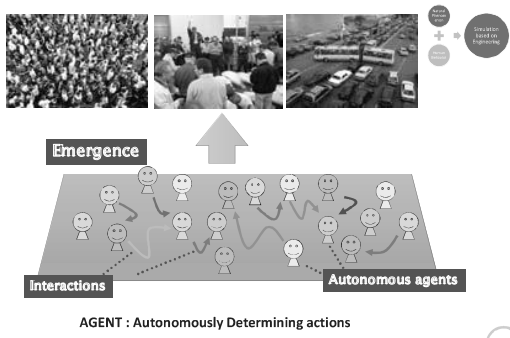
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Tsunami Simulations



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What is Agent-Based Modeling & Simulation (ABM)



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The issues in evacuation simulation

- Evacuation Simulation = Efficiency as examination or verification tool in disaster prevention plan
- Remarks on application
 - Evacuation time differs effect factor depending on the disaster as below

Disaster	Area	Time	Means	Effect factor
Fire in city	District, City	Short	Walk	Explosion point, fire spread direction, action confusion
Tsunami	Prefecture, City	Short	Walk, Car	Slope gradient, evacuation station, snarl
Nuclear Accident	Over prefecture	Long	Car	Snarl, Back evacuation, (autonomy evacuation)
Fire in building	building	Long	Walk	Footstep's wide, derivation, smoke

※Typhoon(flood) and heavy snow can be predicted. So there will be more time for escaping. (Time for evacuation timing. The capacity of the station and cargo shipment plan are the issues.)
 ※Case study in different case natural phenomenon: Explosion point, fire spread direction, etc human action: panic, chain of moves, offense against a rule, etc.

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KKE's Evacuation Planning Solution's point

Discussion on evacuation only:
 → Interaction between the progress on disaster and evacuation behavior can't grasp



- Ex 1 : Emergency evacuation route obstructed in earthquake
- Ex 2 : Evacuation speed down by flood
- Ex 3 : Derivation by fire or smoke etc.

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KKE's Evacuation Planning Solution's point

Process on time series
 Nature disaster (=Physical)Model
 +
 Evacuation (=Human behavior) Model
 Reflect in simulation at the same time

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River Flooding Simulation

<Nature disaster (=Physical)Model>



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Example for evacuation simulation

<Evacuation (=Human behavior) Model>



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