

資料 5

資料 5 ベトナム水インフラセミナー配付資料

VIETNAM WATER SUPPLY AND SEWERAGE DEVELOPMENT POLICIES AND INVESTMENT OPPORTUNITIES

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of Technical Infrastructure
Ministry of Construction



URBAN AREAS IN VIETNAM

- By Dec, 2012, there are **765 cities and towns** in Vietnam: 2 of special category, 12 of category 1, 10 of category 2, 52 of category 3, 58 of category 4 and 631 of category 5.
- Urbanization rate: **32%**
- Average economic growth in urban areas: 12-15%
- Forecast: by 2015, the number of cities and towns will reach **870**; urban population **35 million**; urbanization rate: **38%**;
- Forecast: by 2025, the number of cities and towns will reach **1000**; urban population **52 million**; urbanization rate: **50%**;
- Contribution to GDP: from **70 -75%**

Cities and towns have been playing the role of driving force for economic development and the core factor in transfer of economic structure and labour force in each province, region and the country as a whole.

URBAN WATER SUPPLY (1)

I. CURRENT STATUS OF URBAN WATER SUPPLY IN VIETNAM

- Total designed capacity: **6.6 - 6.65 million m³/day** (2012)
- Urban water supply coverage (through centralized system): **77,5 – 78%%**
- Average non-revenue water: **28 - 29%**
- Main investment capital source for urban water supply: ODA funding

URBAN WATER SUPPLY (2)



II. LEGAL DOCUMENTS ON WATER SUPPLY

- 1. Decree No. 117/2007 ND-CP(11/7/2007) and Circular No. 01/2008 TT-BXD:** Provide regulations on clean water production and consumption; benefits and responsibilities of service providers and consumers.
- 2. Decree No. 124/2011/ND-CP (28/12/2011):** Provide amendments to the Decree No. 117 on clean water production and consumption; more detailed incentives and preferences in land use: the water operator is exempted from land use fee or lease for the water supply facilities including: exploitation and treatment works, pipes and facilities in the network, supporting works for management and operation of water supply system (admin house, executive and managing house, workshops, materials and equipment warehouse).

URBAN WATER SUPPLY (3)



3. Decision No. 1929/QĐ-TTg (20/11/2009) on approval of the Orientation for Water Supply in Urban Areas and Industrial Zones in Vietnam to 2025 and Vision to 2050, which specifies:

Target to 2015:

1. Urban water supply coverage will reach 90% with the water supply standard of 120 liters/capita/day in cities of category III upwards ; 70% and 100 liters/capita/day in cities of category IV and 50% in cities of category V; clean water quality shall meet the standards.

2. Non-revenue water will be less than 25% in cities of category IV upwards and for new water supply system; less than 30% for cities of category V with existing water supply system;

Target to 2020:

1. Urban water supply coverage will reach 90% with the water supply standard of 120 liters/capita/day in cities of category IV upwards ; 70% and 100 liters/capita/day in cities of category V; clean water quality shall meet the standards.

2. Non-revenue water will be less than 18% in cities of category IV upwards; less than 25% for cities of category V; continuous water supply 24/24h for cities of category IV upwards;

URBAN WATER SUPPLY (4)

5. Decision No. 2147/QĐ-TTg (24/11/2010): on approval of the National Program on Non-revenue Water Reduction to 2025.

Target:

- By 2015: average non-revenue water will be **25%**.
- By 2020: average non-revenue water will be **18%**.
- By 2025: average non-revenue water will be **15%**.

Solutions:

- Awareness raising for the community
- Capacity building for local authorities
- Develop and improve policies and mechanism on non-revenue water reduction
- Leakage reduction activities (due to technical reasons)

6. Circular No. 08/2012/TT-BXD (21/ 11/2012) by the Minister of Construction: provide regulations on water safety plan



URBAN WATER SUPPLY (5)

6. Inter-ministerial Circular No. 75 /2012/TTLT-BTC-BXD-BNN (15/05/2012): provides guidelines to principles and methodology for pricing and jurisdiction to determine clean water consumption price in urban and rural areas as well as industrial zones.

7. Water supply planning in 4 key economic zones in accordance to the Decision No. 1251/QD-TTg dated 12/9/2008 and Decision No. 2065QD-TTg dated 11/12/2010: identifies locations and size of some inter-provincial water treatment plant, e.g. Duong River WTP (phase 1: 150.000 m³/day, phase 2: 300.000m³/day); Hau River WTP (phase 1: 500.000 m³/day: requested to be included in the list of PPP projects) .

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URBAN DRAINAGE, SEWAGE AND URBAN WASTEWATER TREATMENT (1)

I. CURRENT STATUS OF DRAINAGE, SEWERAGE AND WASTEWATER TREATMENT

- Combined sewerage system (for both storm water and wastewater) is common in almost all cities and towns of Vietnam.
- Aged drainage and sewerage system: mainly constructed through different periods, incomprehensive, degraded.
- Limitations in treatment technology and management
- Wastewater and sludge dredged from the sewerage system and the septic tanks are discharged into the environment without proper treatment.



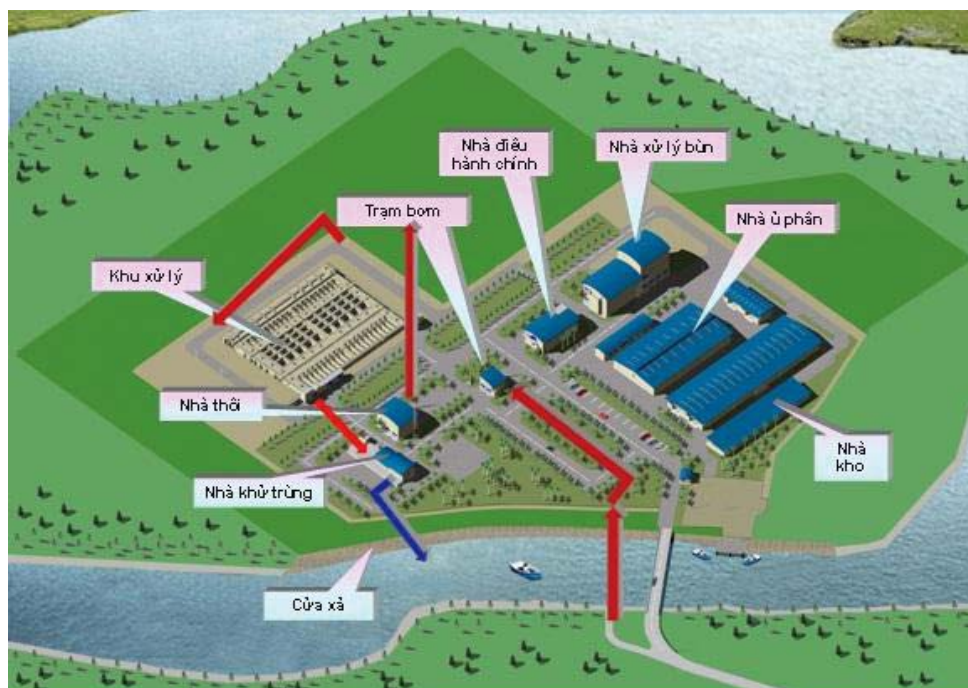
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URBAN DRAINAGE, SEWERAGE AND URBAN WASTEWATER TREATMENT(2)

I. CURRENT STATUS OF DRAINAGE, SEWERAGE AND WASTEWATER TREATMENT

- Total capacity of 20 centralized wastewater treatment plant in urban areas: > 600.000 m³/day (2012)
- Wastewater treatment services have not existed in most cities.
- Wastewater fee is collected at 10% of clean water tariffs through the water supply companies; Expenses for O & M are mainly covered by the state budget. Investment in drainage and sewerage is dependent on state budget. Many projects (expansion, rehabilitation of the network, construction of wastewater treatment plant) being developed or planned rely on ODA funding.

Binh Hung Wastewater Treatment Plant with capacity 141.000m³/d in Ho Chi Minh City support from Japan



URBAN DRAINAGE, SEWAGE AND URBAN WASTEWATER TREATMENT(3)

II. LEGAL DOCUMENTS ON DRAINAGE AND SEWERAGE

1. Decree No. 88/2007 ND-CP(28/5/2007) and Circular No.

09/2009 TT-BXD Provide regulations on drainage and sewerage in urban areas and industrial zones, wastewater fee, rights and responsibilities of relevant entities in Vietnam (being under revision)

2. Decision No. 1930/QDD-TTg (20/11/2009) on approval of Orientation for urban drainage and sewerage in urban areas and industrial zones

Target to 2015:

- Priority is given to drainage
- Construction of collection sewer system and residential wastewater treatment plant for cities of category III upwards and 40-50% of residential wastewater will be treated up to the standards.

Target to 2020:

- Put an end to flooding in cities of category IV upwards
- Cities of category III upwards will have collection system and centralized wastewater treatment plant; 60% of residential wastewater will be collected and treated up to the standards; for cities of category IV and V, the percentage will be 40%.

CHALLENGES

1. Water supply, sewerage and drainage works are characterized by its systematic and comprehensive manner (the key works plus the network).
2. Water supply, sewerage and drainage works are characterized by its regional and territorial feature. These works should be adaptable over a long period. Investment on development of the works should not meet the current but also future demand.
3. Development of water supply, drainage and sewerage facilities should be considered in the relations with other sectors and the economic and social conditions of the areas that are served.
4. Water supply, sewerage and drainage works provide services for public purposes including variety of users (households, institutions, enterprises...), therefore, most of them are constructed with high density in urban areas.

CHALLENGES

In addition, water supply, sewerage and drainage works have large size and can not be moved (high static manner).

- (1) They require big initial investment but have low cost recovery (especially drainage and sewerage works);
- (2) There are wastewater fee in place but it is difficult to collect;
- (3) Clean water tariffs are still low and insufficient for management, operation and accumulation for development or payment of loan; There are a lot of difficulties to realize the tariff adjustment roadmap;
- (4) Limited affordability to pay of the users;
- (5) Issues related to connection to water supply or drainage and sewerage system, operation and maintenance...

OPPORTUNITIES AND DEMAND

I. Inter-regional water supply projects:

- Hau River Water Treatment Plant I: Capacity in phase 1: 500,000 m³ /day; phase 2: 500.000 m³ /day in Can Tho City;
- Hau River Water Treatment Plant II: Capacity in phase 1: 1,000,000 m³ /day; phase 2: 2,000,000 m³ /day in Chau Thanh, An Giang;
- Hau River Water Treatment Plant III: Capacity in phase 1: 200,000 m³ /day; phase 2: 500,000 m³ /day in Chau Doc, An Giang;

2. Projects calling for investment

In the North of Vietnam

- Drainage, Sewerage and Wastewater Treatment Project in Ninh Binh City: Capacity: 10,000m³/day; total investment is about 40 million USD.
- Project on Rehabilitation and Upgrading Water Supply System in Mong Cai City: Capacity: 10.000m³/day; total investment is about 10 million USD.
- Project on Drainage, Sewerage and Wastewater Treatment in Mong Cai City: Capacity: 5,000 – 7,000 m³/day; total investment is about 15-17 million USD
- Project on Drainage, Sewerage and Wastewater Treatment in Nam Dinh City: Capacity: 50,000 m³/day; total investment is about 200 million USD

2. Projects calling for investment

In the center of Vietnam

- Project on Drainage, Sewerage and Wastewater Treatment in Kon Tum City: Capacity: 10,000 m³/day; total investment is about 40 million USD
- Project on Drainage, Sewerage and Wastewater Treatment in Ha Tinh City: Capacity: 20,000 m³/day; total investment is about 50 million USD
- Project on Drainage, Sewerage and Wastewater Treatment in Cua Tung District Town: Capacity: 5,000 m³/day; total investment is about 5 million USD
- Project on Drainage, Sewerage and Wastewater Treatment in Pleyku City, Gia Lai: Capacity: 10,000 m³/day; total investment is about 40 million USD

2. Projects calling for investment

In the South of Vietnam

1. Project on extracting water from Phuoc Hoa Lake – Thu Dau Mot, Binh Duong Province

- + Capacity: 1,300,000 m³/day
- + Total investment: 288 million USD

2. Project on Drainage, Sewerage and Wastewater Treatment in Di An Town, Binh Duong Province:

- + Capacity : 30.000m³/day
- + Total investment: 150 million USD

3. Project on flood proofing, wastewater collection and treatment for the wards in Rach Gia City, Kien Giang Province.

- + Capacity : 21,000 m³/day
- + Total investment : 34 million USD

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2. Projects calling for investment

4. Project on Drainage, Sewerage and Residential Wastewater Treatment in Tan An City, Long An Province:

- + Capacity : 8.000m³/day -10.000m³/day
- + Total investment: 50 million USD

5. Project on Drainage, Sewerage and Residential Wastewater Treatment in My Tho City, Tien Giang Province:

- + Capacity: 40,000m³/day; + Total investment: 100 million USD

6. Project on Drainage, Sewerage and Residential Wastewater Treatment in Go Cong Town

7. Project on Drainage, Sewerage and Wastewater Treatment in Tay Ninh Town:

- + Capacity: 15,000m³/day; + Total investment: 40 – 60 million USD

8. Water Supply Project in Ben Tre City: capacity: 25,000m³/day; Total investment: 15 million USD

9. Project on Drainage, Sewerage and Wastewater Treatment in Ben Tre: Capacity: 20,000m³/day; Total investment: 50 million USD

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2. Projects calling for investment

10. Water Supply Project – Kien Luong Water Treatment Plant, Kien Giang Province: capacity: 20.000m³/day; Total investment: 15 million USD
11. Project on increasing capacity for Binh Duc WTP, Long Xuyen, An Giang: additional capacity: 30.000m³/day; Total capacity: 17 million USD
12. Project on Thu Duc WTP; Capacity: 300,000m³
13. Project on raw water transmission pipe system from Dau Tieng Lake – Sai Gon; Kenh Dong WTP: capacity: 150,000m³/day; Total investment: 1,500 billion VND
14. Project on wastewater collection and treatment in Tham Luong – Ben Cat Basin: capacity: 150,000m³/day
15. Project on Wastewater Treatment Plant in Suoi Dum: capacity: 150,000m³/day; total capacity: 800 billion VND

3. Seek for cooperation and support in studies and researches

1. Support in implementation of the Non-revenue Water Reduction Program;
2. Study in implementation of PPP/PSIF models in water supply and wastewater treatment;
3. Study on clean water tariffs, wastewater fee;
4. Study on management and operation models for drainage and sewerage systems;
5. Development and implementation of water safety plan;
6. Study on climate change impacts to urban water supply (polluted source, salinity...)
7. Study on climate change impacts to urban drainage and sewerage (high tides, flooding...)

THANK YOU VERY MUCH FOR YOUR ATTENTION



Arigato Gozaimasu

Winter in Hanoi, 2012

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History of Swing Corporation

- 1912 Inokuchi Type Machinery Office founded by Issei Hatakeyama
- 1920 EBARA Corporation established
- 1956 EBARA-INFILCO established with INFILCO Inc(USA)
- 1994 EBARA-INFILCO was merged into EBARA Corporation
- 2009 All EBARA's water related business unit integrated to Ebara Engineering Service (EES)
- 2010 Mitsubishi and JGC joined EES
- 2011 EES has a new name Swing Corporation as of April 1

Organization Restructuring
for **21 Century**

Pump Manufacturing **One century(100years)**

Water Treatment **Half century(55years)**

Aiming at further expansion in the global water business market

Global Network,
Finance,
Business Management

Global procurement,
Project Management

State-of-the art
technologies for
water/wastewater
treatment and O&M works

 Mitsubishi Corporation



 EBARA

33.3%


33.3%

33.3%

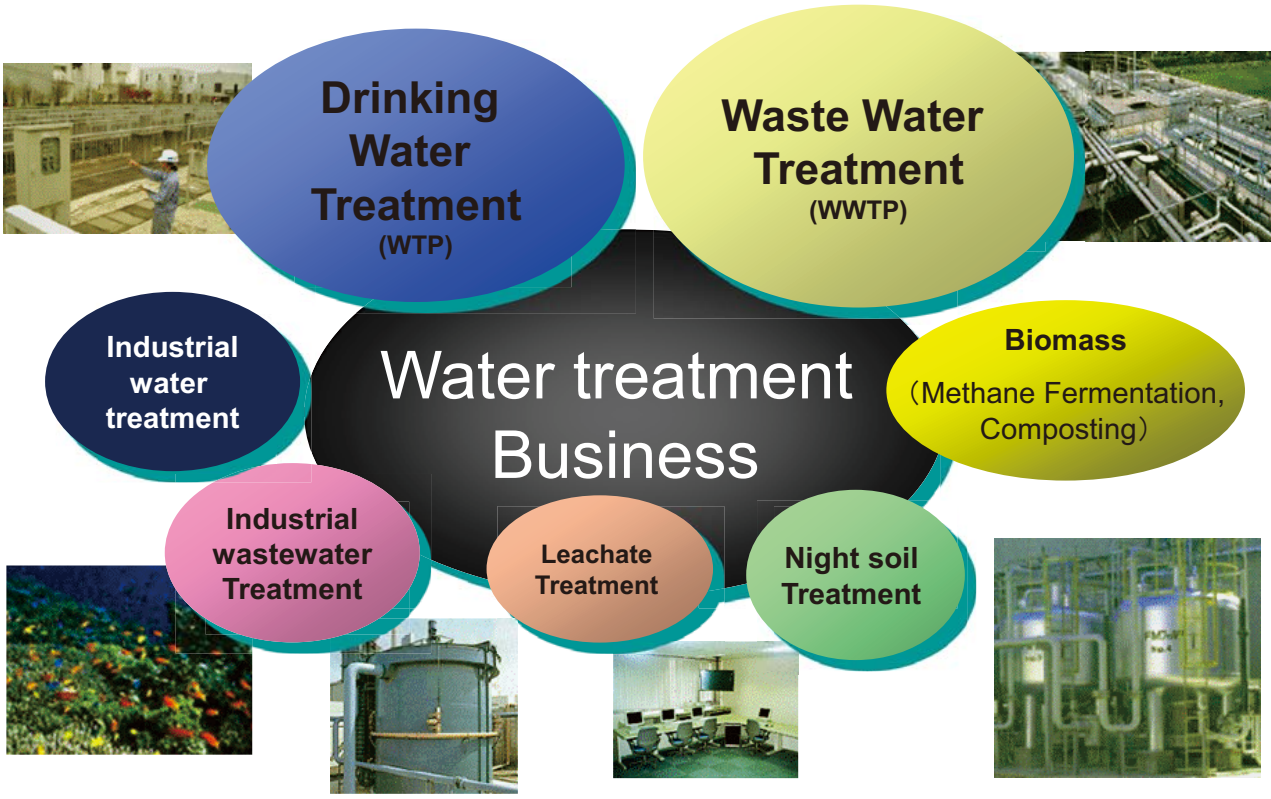
 EBARA ENGINEERING SERVICE CO., LTD.



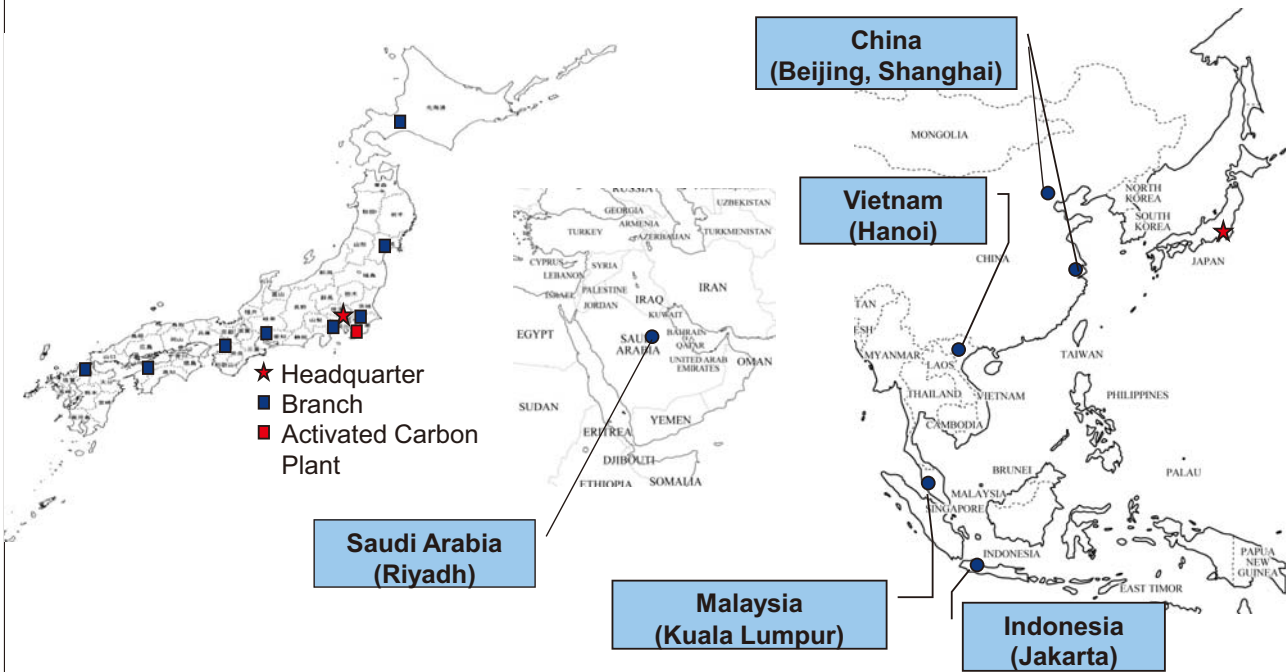
As of April 1, 2011

 **Watering** Swing Corporation

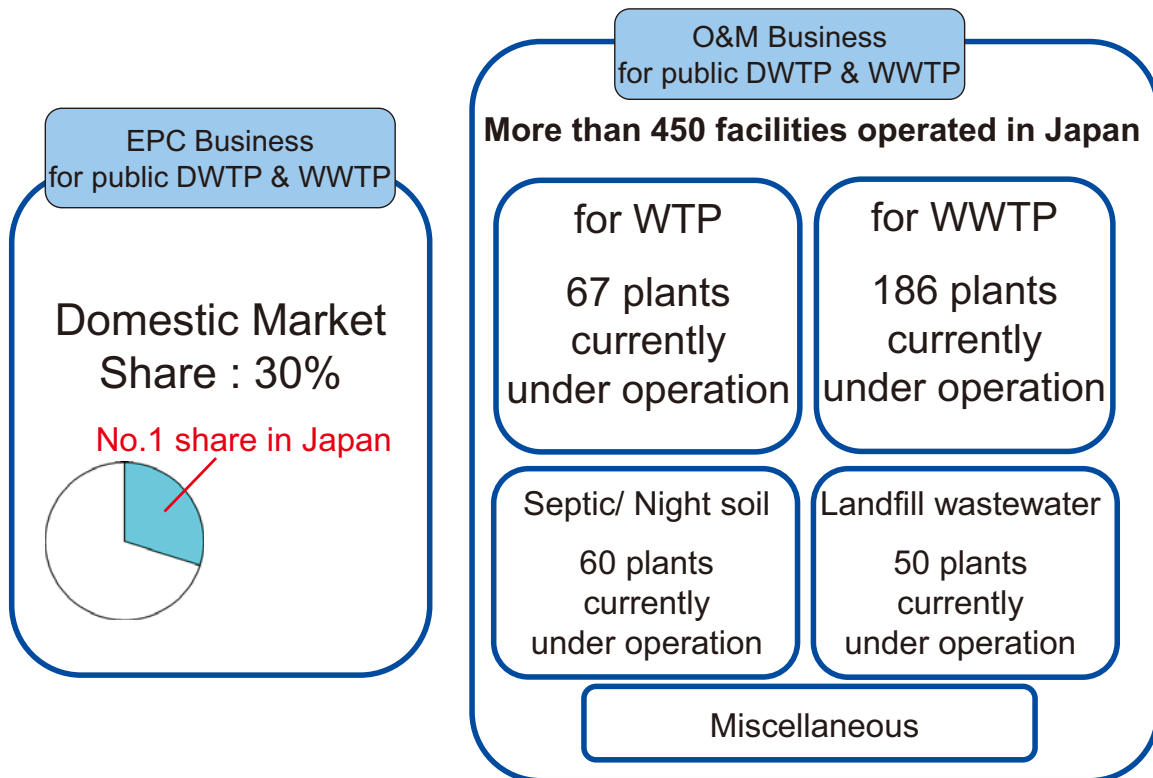
Abundant experience and accumulated technologies for Water treatment business



Swing has 9 branches in Japan and 6 strategic subsidiaries in Asia and Middle East



水ing has abundant experience both in EPC and O&M works in Domestic



Domestic Experience

Sewage Treatment Plant



Ariake sewage treatment plant
(Tokyo, 300,000 m³/day, 1994)

Advanced treatment :
Biofilm filtration (BIOPAC) and ozone



Morigasaki sewage treatment plant
(Tokyo, 1,5400,000 m³/day, 1966)

Domestic Experience

Leachate Treatment Plant



Landfill Leachate treatment
(Tokyo, Total 20,500 m³/d, 1979, 1986, 2000)

Process:

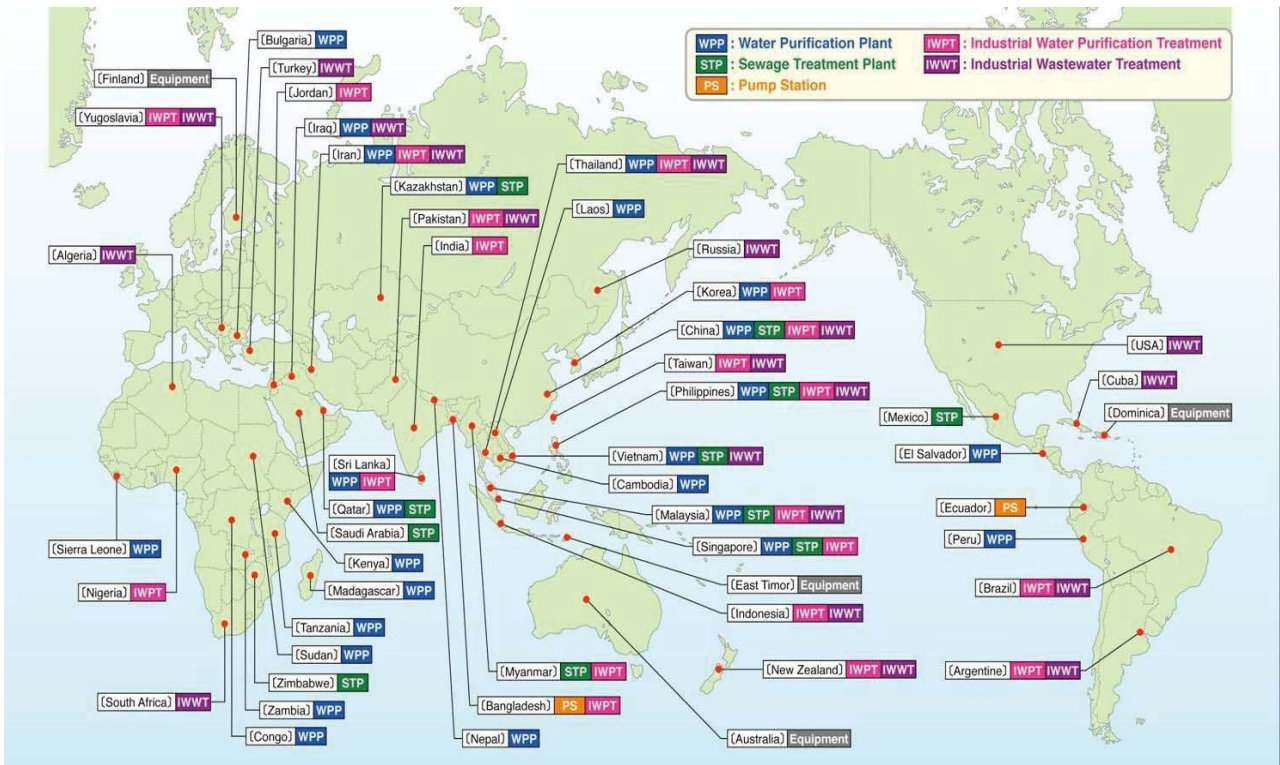
Nitrification/Denitrification (BIOERG)

Fenton Reaction

Adverse moving bed activated carbon tower



水ing accomplished EPC works all over the world and enjoys appreciations from our clients



水ing experience in Asia



WTP & WWTP in Kazakhstan (100,000 m³/d & 135,000 m³/d)



WWTP in China (260,000 m³/d)



WWTP in Singapore 75,000 m³/d



WWTP in Malaysia (59,000 m³/d)



WTP in Vietnam (50,000 m³/d)



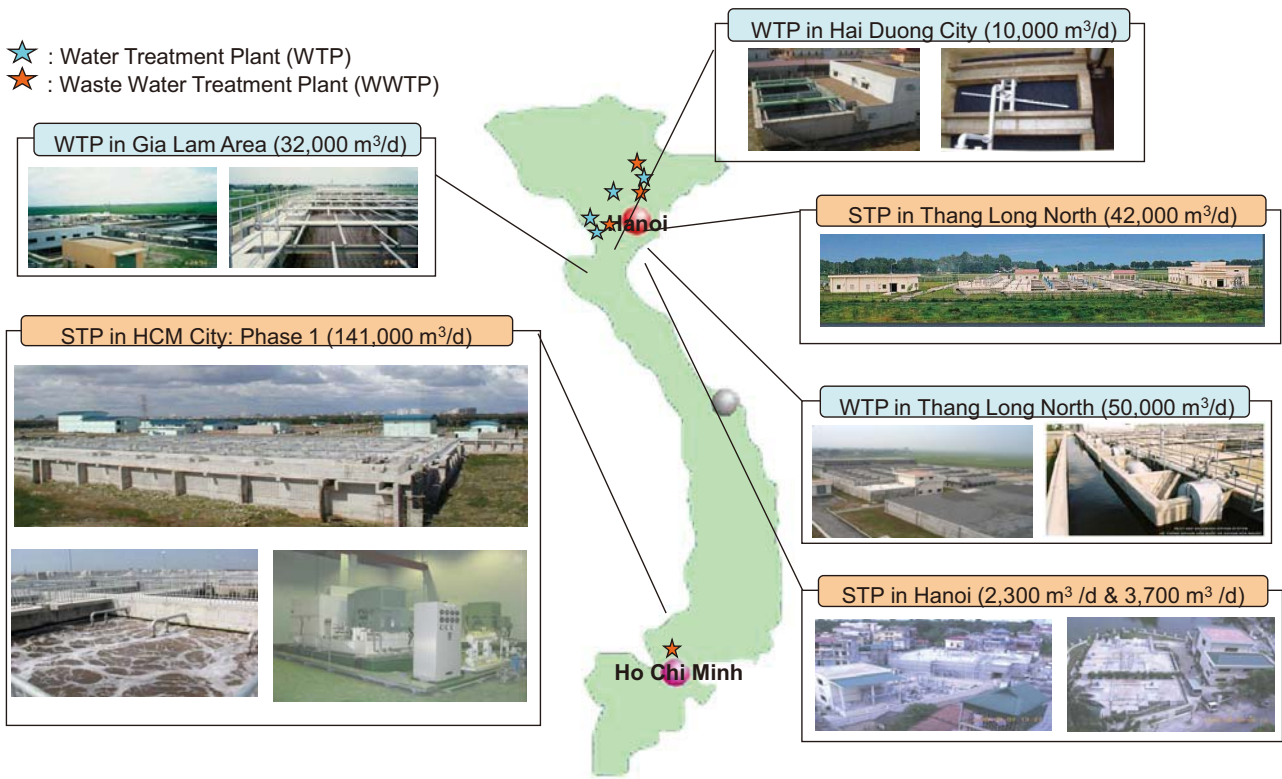
WTP in Sri Lanka (5,000 m³/d)



WWTP in Vietnam (141,000 m³/d)

Experience in Viet Nam

- ★ : Water Treatment Plant (WTP)
- ★ : Waste Water Treatment Plant (WWTP)



Water Environment Improvement & Issue

1. Protection of Raw Water Sources
2. Water Environment Improvement in Greater Area
→ Sewerage Treatment Plant Increase

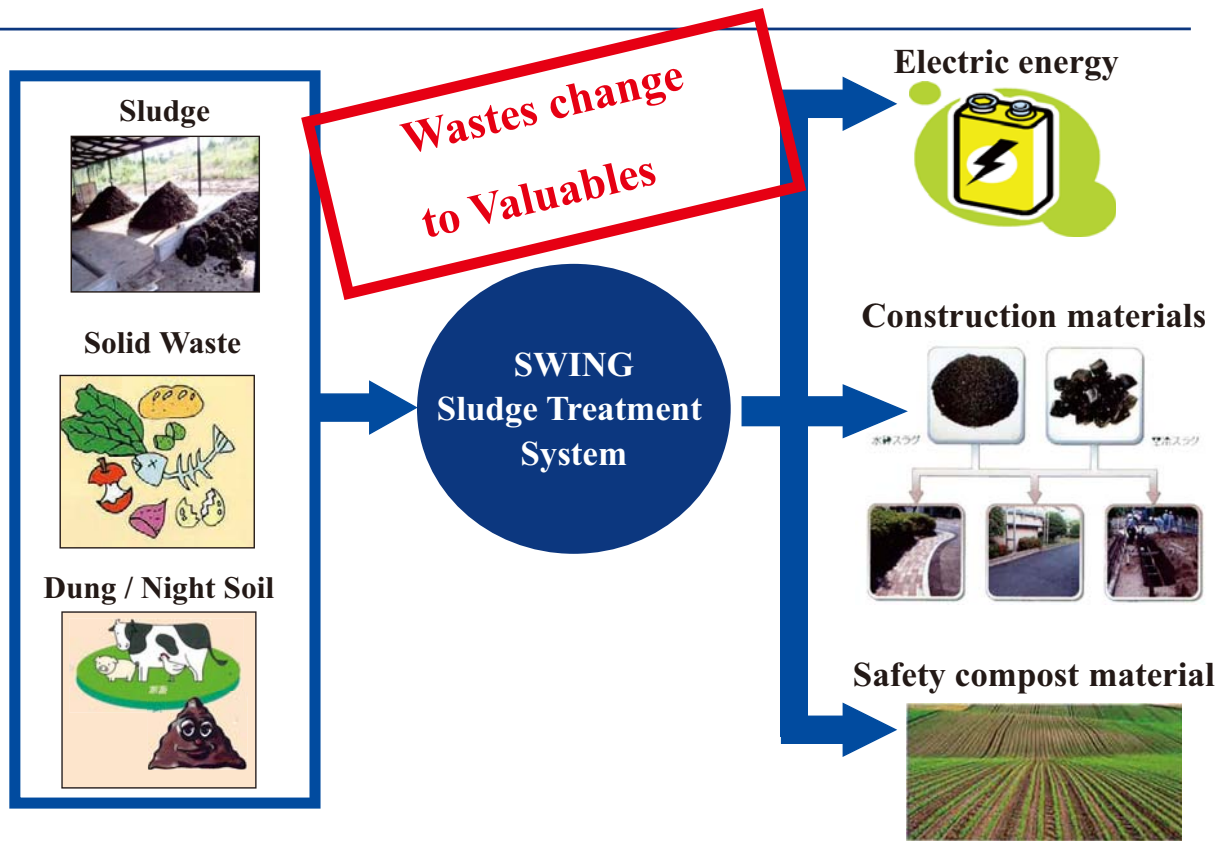
➔ **Sludge Volume Increase**

What is Issue ?

- Wide Area for Landfill → Land Acquisition
- Provision for Environment
 - ◆ Landfill Leachate treatment Plant
 - ◆ Odor Protect & Control at Landfill Area



Expensive for Environmental Protection



Methane Fermentation System

Multiple Recycling System of Sewage Sludge and Industrial Organic Waste in KUROBE CITY



Delivered in 2011
[80m³/day]

1-1. Advantages

+ Local Government

- Sludge Discharge Reduced by 60%
⇒ Effective Utilization (Alternative Coal, Fertilizer)
- Fuel for Sludge Drying Unnecessary
- Supplements Electricity Supply for WWTP by 10%

+ Regional Contribution

- Foot Bath Facility (Several Hundreds of Visitors per Month)

+ Private Factory

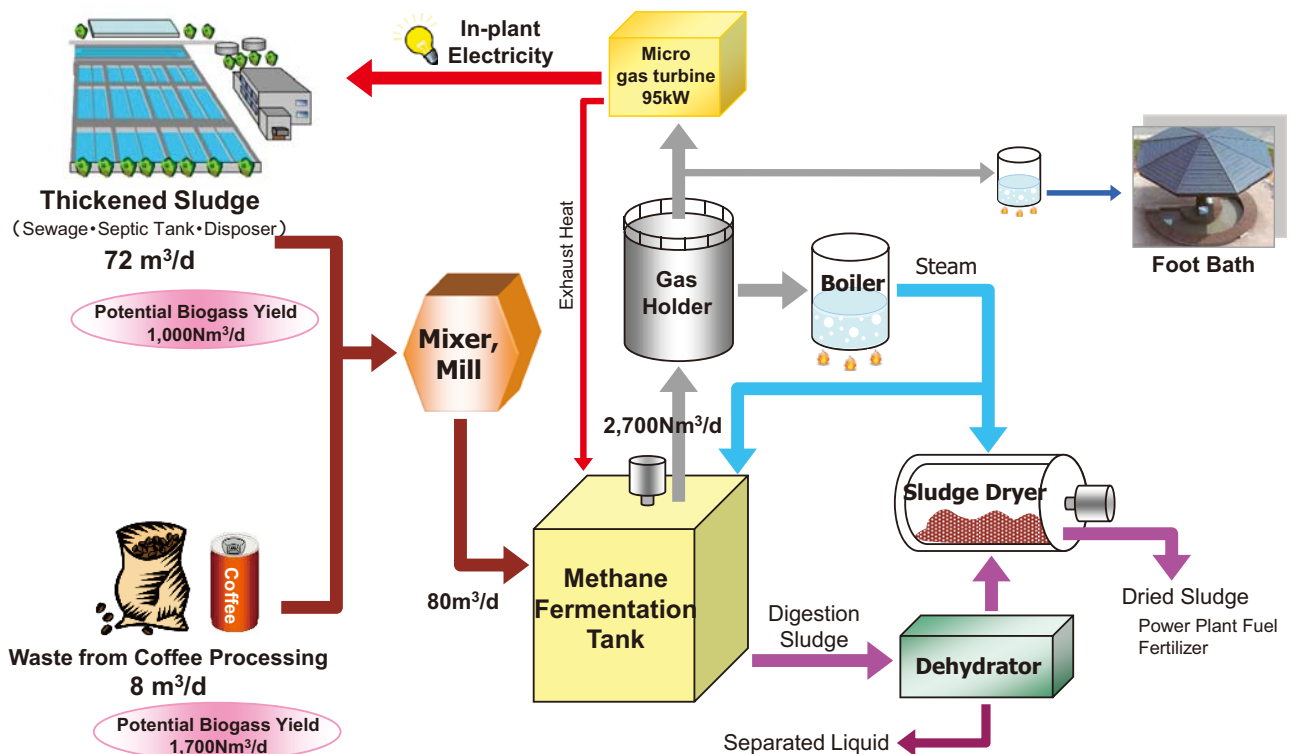
- Reduced Disposal Cost

+ Biomass Power Plant

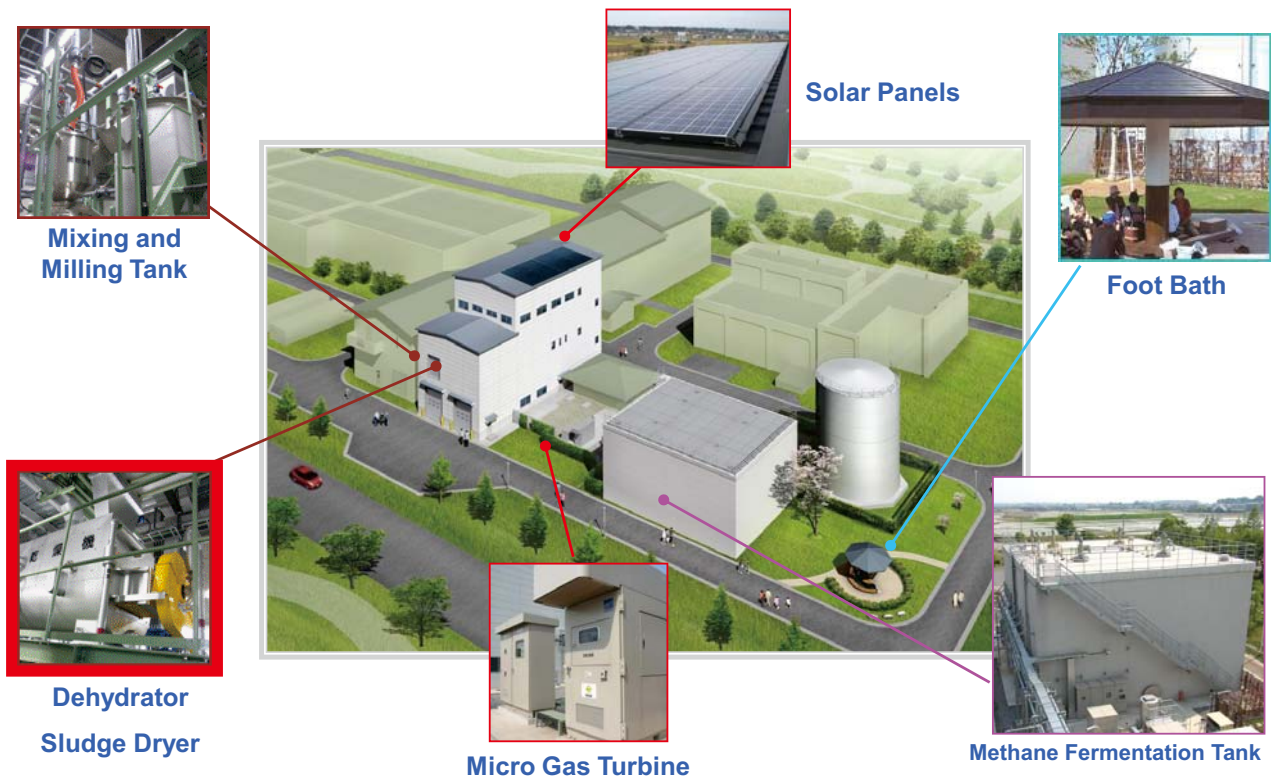
- Available Alternative Fuel



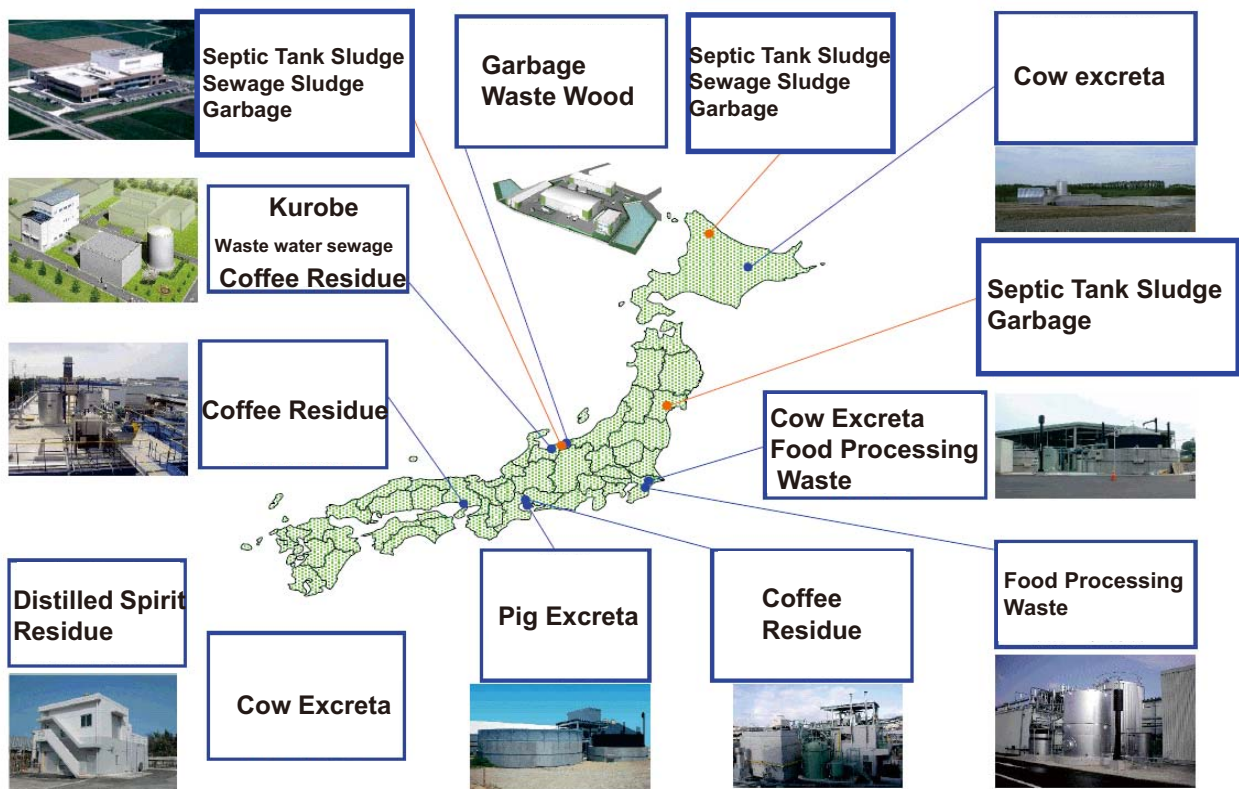
1-2. System Configuration



1-3. Plant Overview



Track Record for Biomass recycling plant



Slide Shaft Screw Press Dehydrator



2008

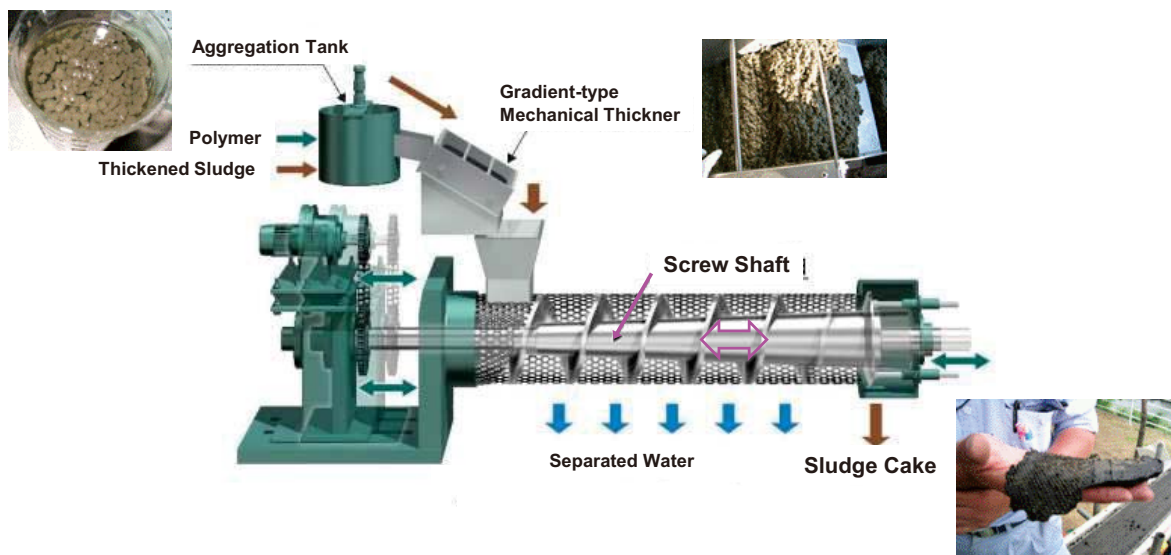
- Chairman's Prize of the Japan Machinery Federation
- Chief's Prize of Industrial Science and Technology Policy and Environment Bureau of the METI

Advantages

Low Water Content of Sludge (Mixed Raw Sludge 71~75%, Digested 76~77%, OD 82~83%)

⇒ Cost Reduction for Disposal or Treatment for Drying and Incineration

- Stable Performance by Shaft Sliding Mechanism ⇒ Easy Operation
- Small Footprint, Low Maintenance Cost

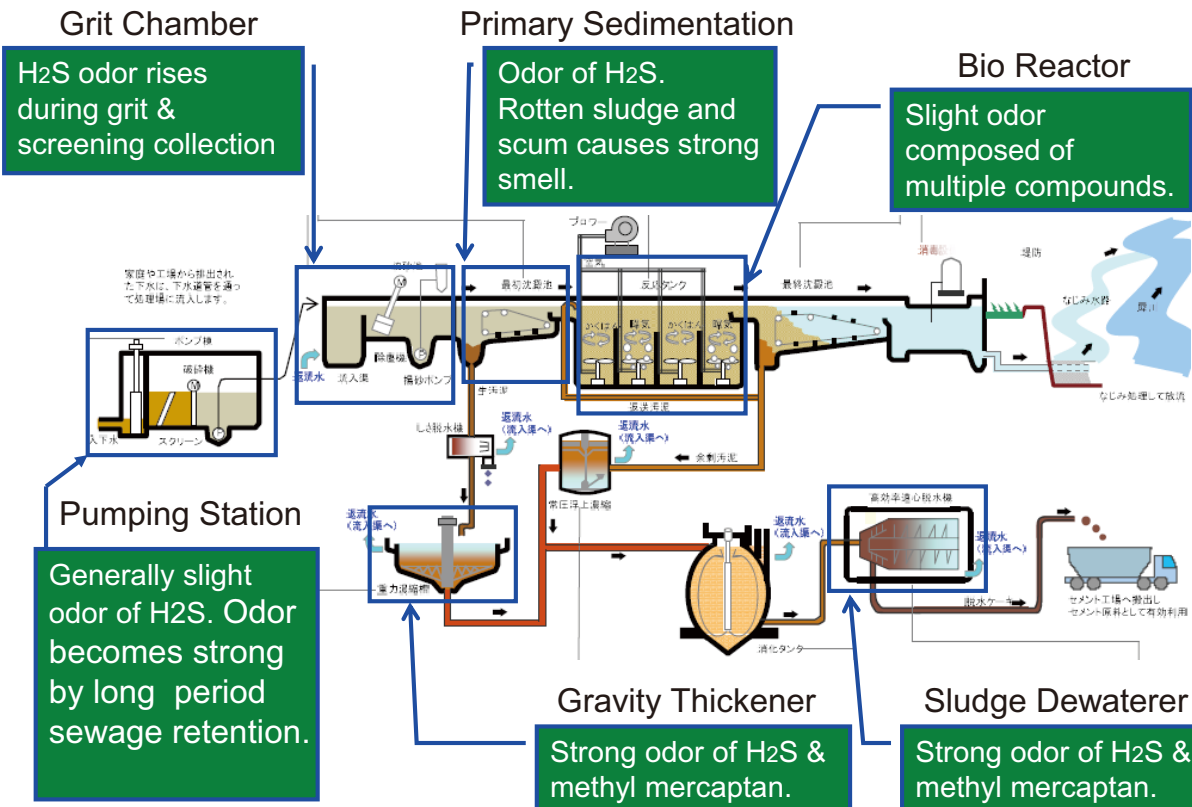


Swing Odor Control System

- Prevent for odor pollution -



Features of Odor in Sewage Treatment Plant



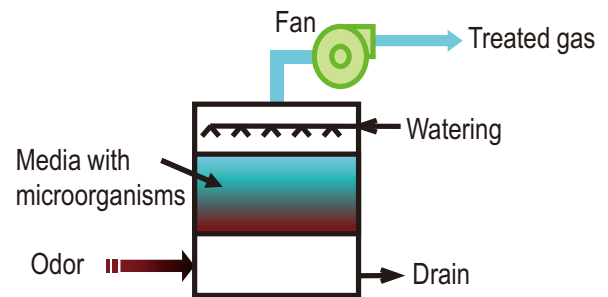
Bio-Deodorization Filter Bio-sweeper

Description

- Biological-deodorization filter
- Odor is decomposed by microorganisms that are fixed on filter media. Media is watered in order to maintain the microorganisms

Advantages

- Operational with only electricity and watering (chemicals and fuel is unnecessary)
- Simple structure, easy to operate
- Required maintenance for fan and watering device only



Bio-sweeper: Bio-deodorization Filter

Activated Carbon Filter

Description

- Activated Carbon Deodorization
- Odor is adsorbed by Specialized Activated Carbon

Advantages

1. Safety system due to no use of chemical
2. High stability for fluctuation of inflow odor level
3. Easy maintenance



Activated Carbon Filter System



Activated Carbon Module

**Thank you very much for your
attention!
Xin cam on!**

**Swing, a total solutions provider for water
and the environment.**

MICROTUNNELLING

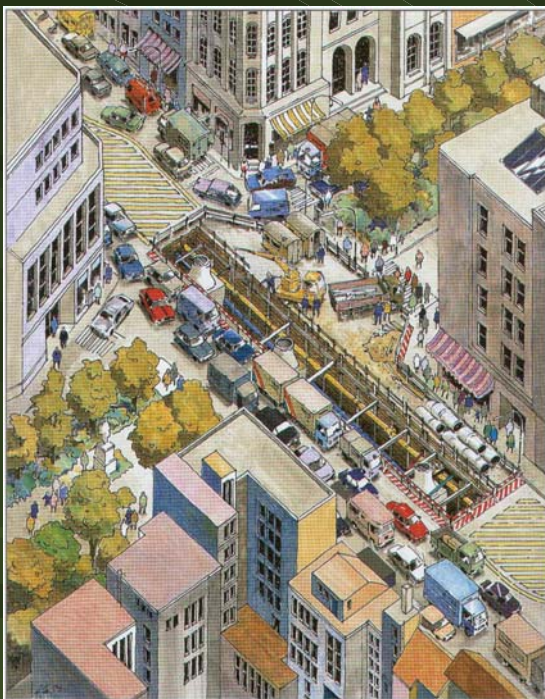
(Pipe Jacking Method)

COMPENDIUM

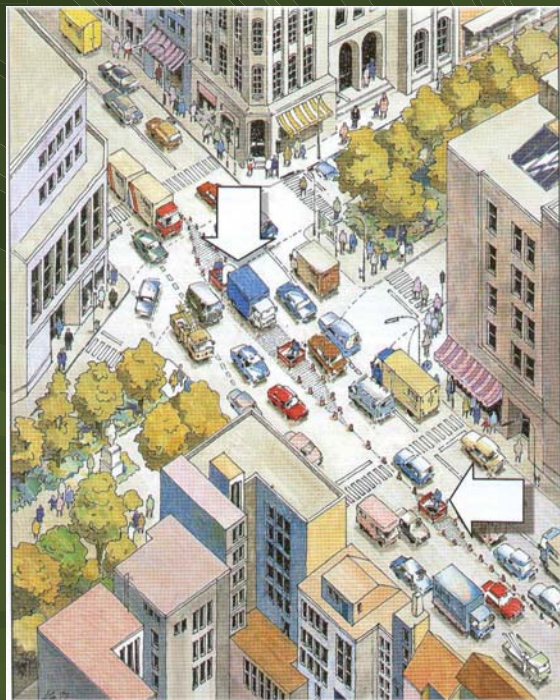
1

Open-cut vs Microtunnelling

(Pipe Jacking Method)



Open Cut



Microtunnelling

Courtesy: GSTT

2

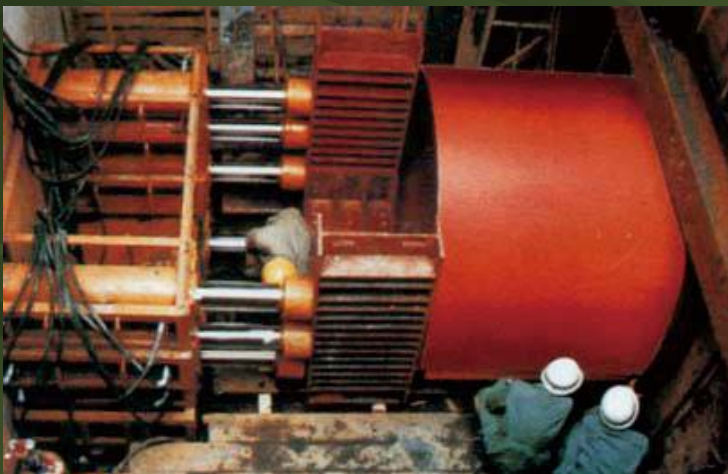
Problems with Cut-and-Cover

- Underground space in public right-of-way is heavily used
- Traffic congestion growing
- Street pavement damage
- Cost of surface restoration
- Direct and indirect business loss
- Great deal of spoil

3

MICROTUNNELLING (Pipe Jacking Method)

A system of directly installing pipes behind a Shield Machine by hydraulic jacking from a Drive Shaft such that the pipes form a continuous string in the ground

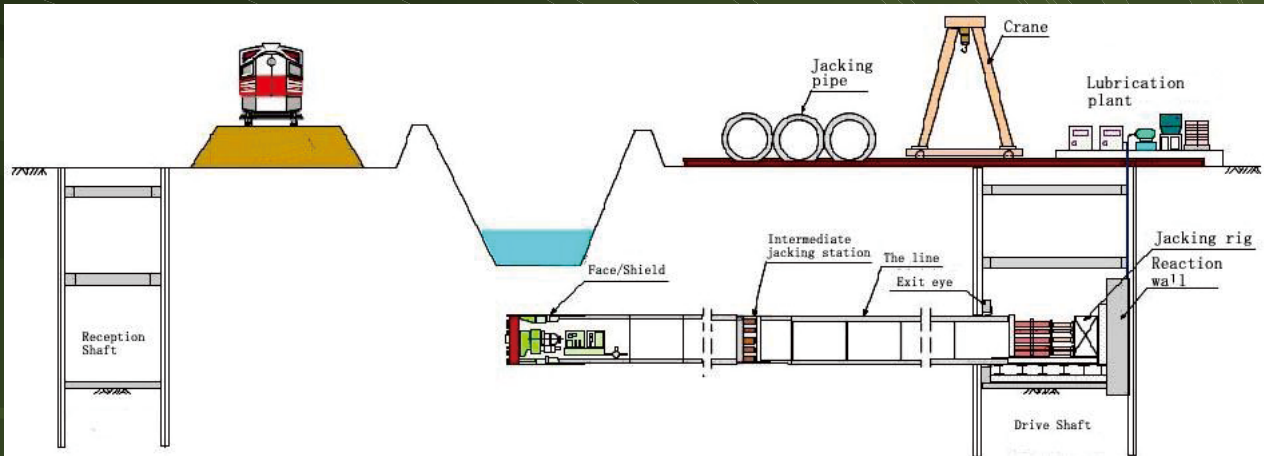


Used for places where;

1. Heavy traffic roads.
2. Utility pipes buried underground are congested and difficult to dig from the surface of the ground.
3. Crossing road and rivers, which means impossible to dig from above ground.
4. The level of the installation is deep and microtunnelling would be cost-effective.

4

Basic elements for microtunnelling



5

Shaft for Microtunnelling (Pipe Jacking Method)

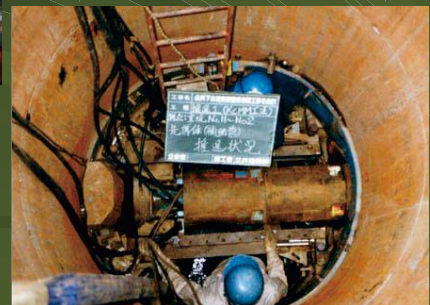
Sheet pile



Liner plate sheeting



Steel casing



6

MICROTUNNELLING

(Pipe Jacking Method)

Procedure

Earth-Pressure-Balance (EPB) type
for 3.0m Concrete pipe

7

Microtunnelling (Pipe Jacking Method)

Facilities installation (Drive shaft)



Exit eye

Reaction wall



Microtunnelling (Pipe Jacking Method) Facilities installation (Drive shaft)



support rails

Jacking rig



Microtunnelling (Pipe Jacking Method) Facilities installation (Drive shaft surface)



Lubrication & Backfill grouting
Plant

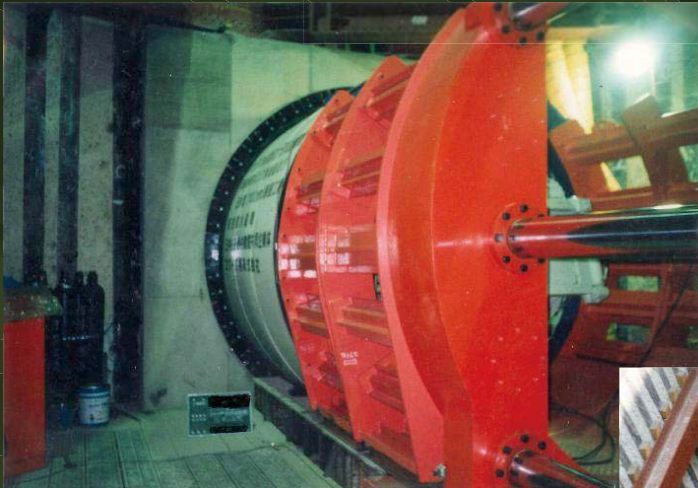
Muck pit



Installation of Shield machine



Start pipe jacking

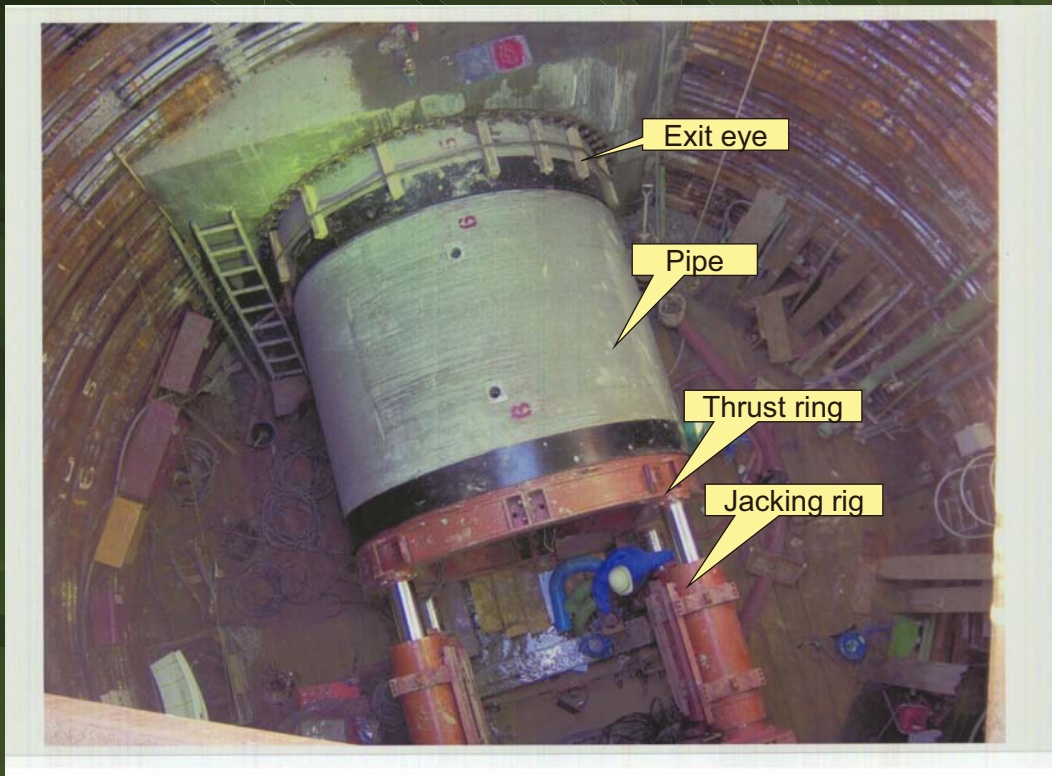


Jacking pipe is dropped into the shaft and placed on the support rails.

Launch of microtunnelling



Pipe Jacking



13

Measurement

Confirm the line and level by measurement. Make sure the installation is within close limits of the target.



14

Muck transportation and discharge



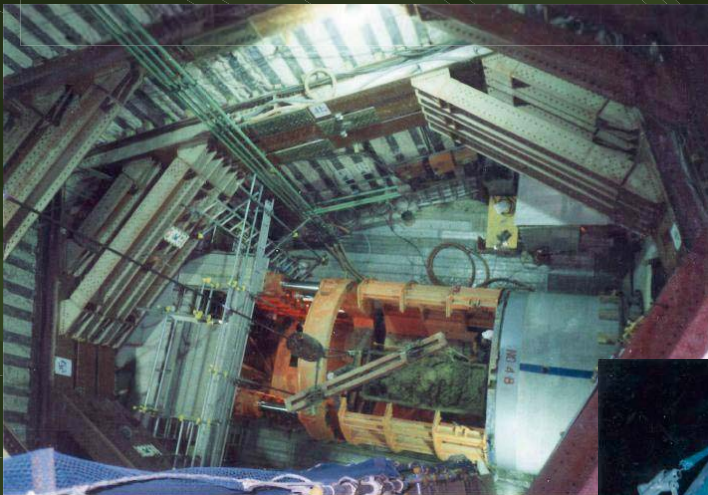
Muck discharge
(behind the shield)

Muck transportation
(by muck wagon)



15

Muck transportation and discharge



Muck wagon being lifted
and discharged into the
muck pit



16

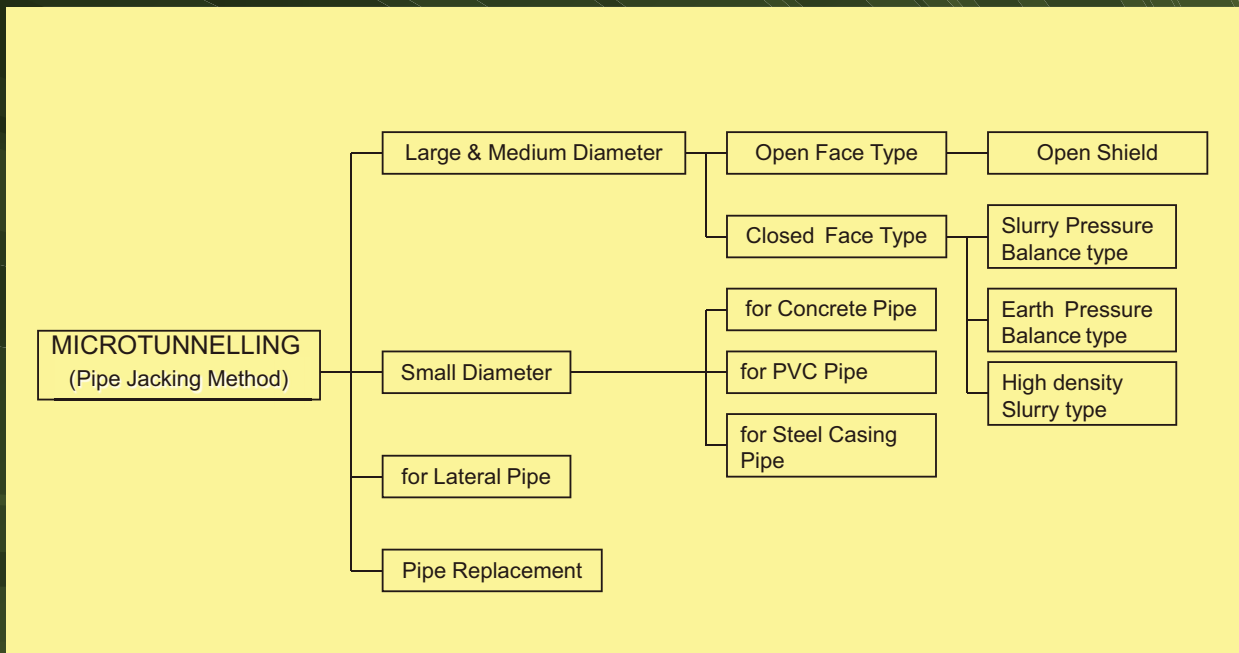
Reception of microtunnelling



After reception, backfill grouting is carried out



CLASSIFICATION OF MICROTUNNELLING (Pipe Jacking Method)



Super large diameter Pipe Jacking

(3500mm~5000mm)

Shield Machine



Segmented type Jacking Pipe



19

Microtunnelling (Pipe Jacking Method) for Large & Medium Diameter (Slurry Pressure Balance type)



20

Microtunnelling (Pipe Jacking Method) for Large & Medium Diameter (Earth Pressure Balance type)



21

Microtunnelling (Pipe Jacking Method) for Large & Medium Diameter (High density slurry type)



22

Small diameter Microtunnelling

(150mm~700mm)



for Concrete Pipe



for PVC Pipe



for Steel Casing Pipe



23

Microtunnelling (Pipe Jacking Method) for Small Diameter (Slurry Pressure Balance type)

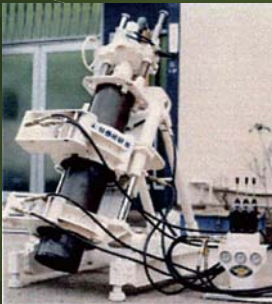


24

Microtunnelling for Lateral Pipe

(100mm~300mm)

Shield Machine

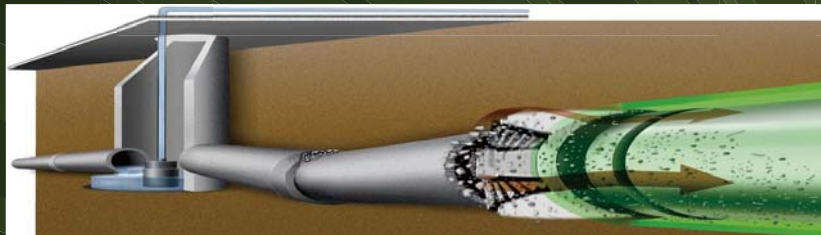


Steel casing pipe



25

Pipe Replacement



Shield Machine



Jacking rig



26

Thank you

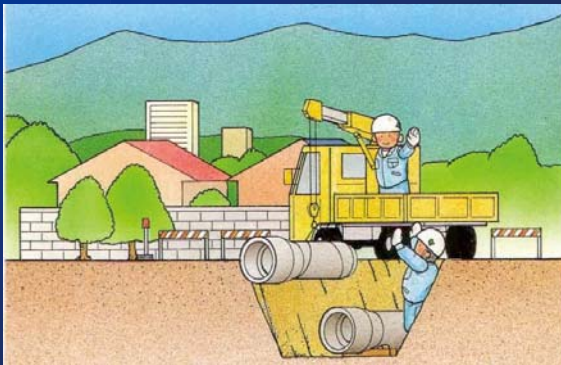
Japan Microtunnelling Association

[http : //www.suisinkyo.or.jp/](http://www.suisinkyo.or.jp/)

Concrete Jacking Pipe for Use in Curve Jacking

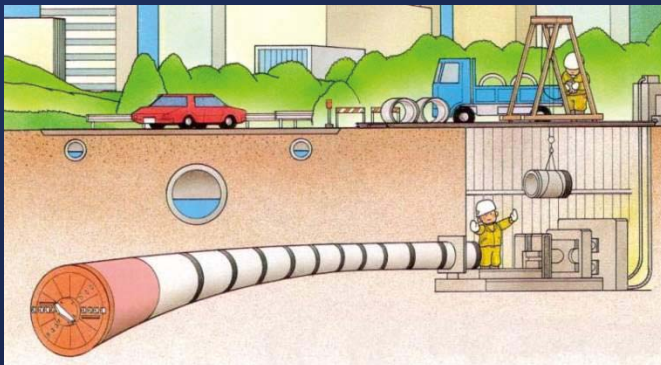
Nakagawa Hume Pipe Industry Co., Ltd.

Jacking vs. Open-Cut



Open Cut Method

- Interferes with road traffic
- Not suitable for built-up areas
- Low cost



Jacking Method

- Does not interfere with traffic.
- Allows installation of large pipelines in urban areas.
- More costly than the cut-and-cover method

Performance Required for Curve Jacking

1. Control of the jacking direction
2. Control of the jacking force
3. High-performance pipe joints
4. Dissipation of the jacking force

Features of SR Jacking Pipe (1)

A jacking pipe that **can bend**

The pipe has **flexible sections**.
The flexible section bends in a similar manner to a joint.



Sharp curve jacking can be carried out **without the use of** short pipes such as 1/2 or 1/3-length pipes.

Features of SR Jacking Pipe (2)

A specially designed cushion is placed in the joints and flexible sections to dissipate axial stress.

The number of flexible sections and the thickness of the cushion are designed to match the road alignment.

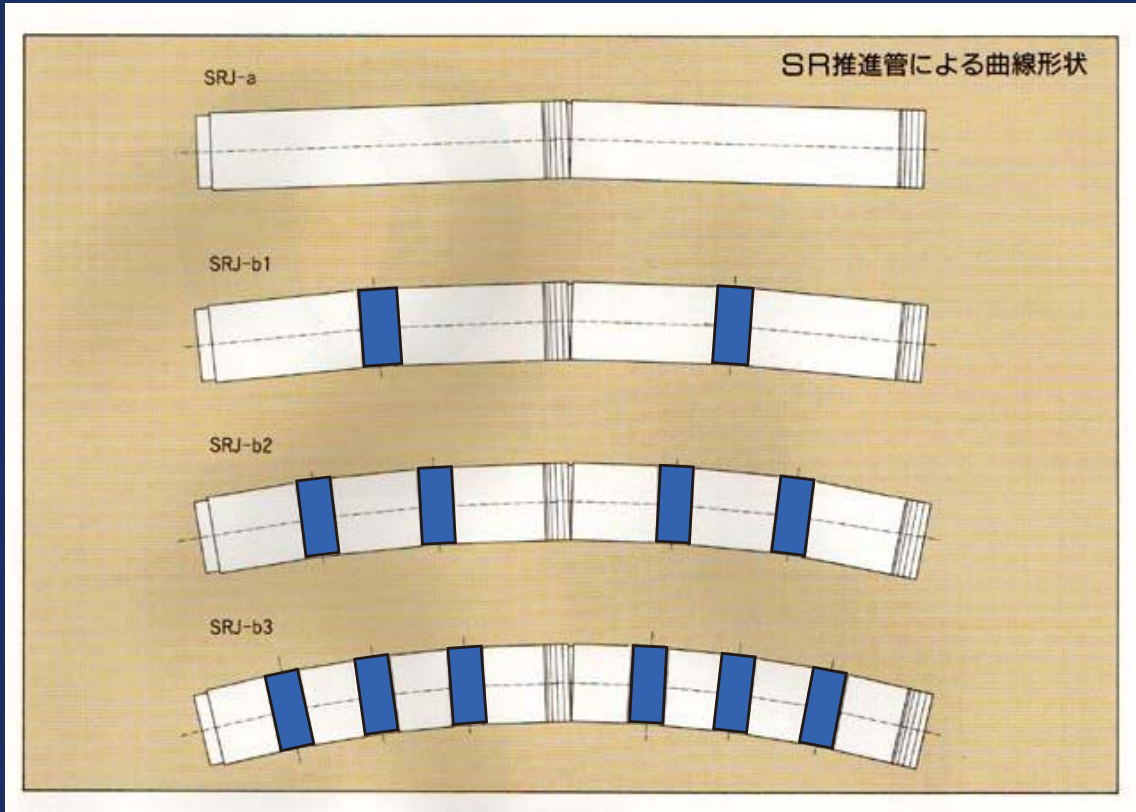


Stress concentration in the pipe ends at sharp curves can be dissipated, making the pipe less susceptible to breakage.

Feature 1

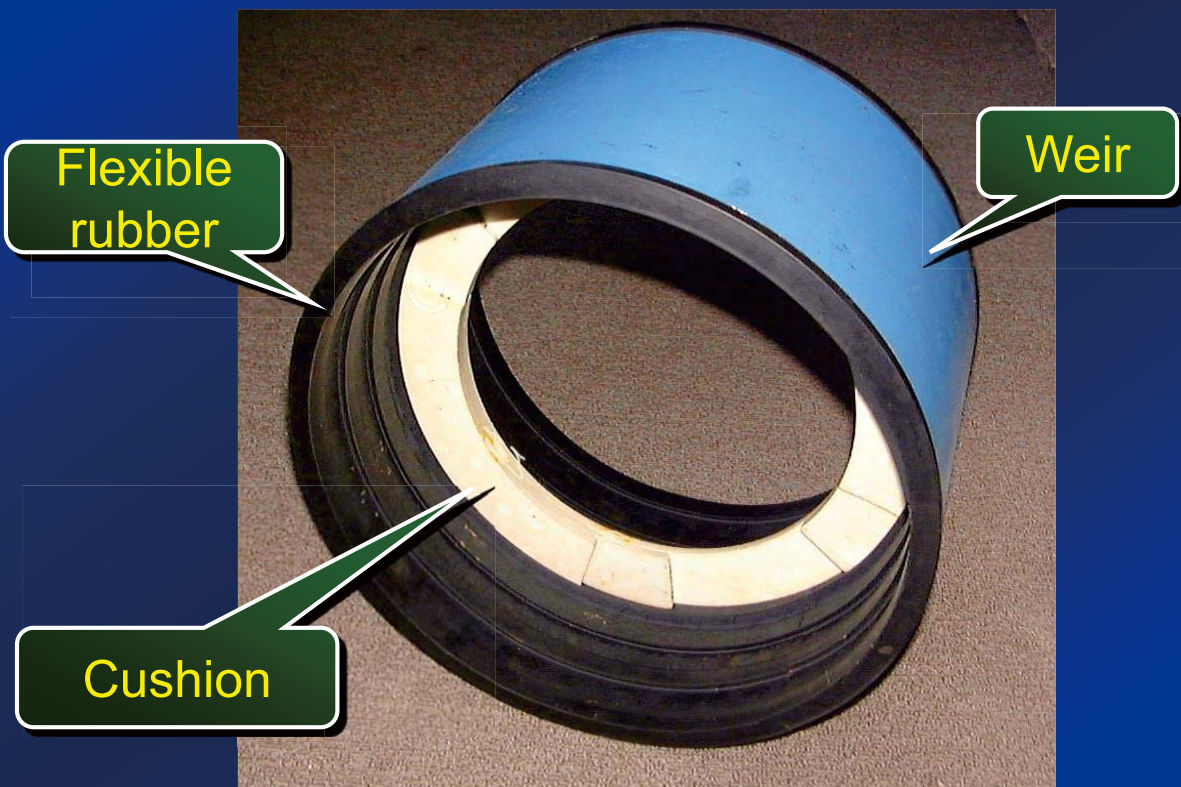
The pipe itself can bend.

Curved Profile Achieved by SR Jacking Pipe



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Flexible Section

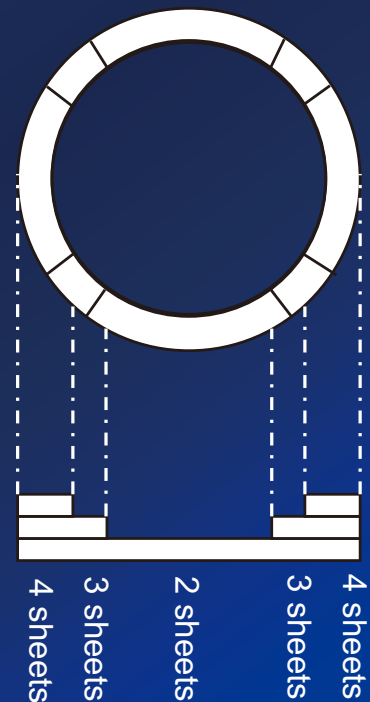


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Feature 2

A specially designed cushion is used.

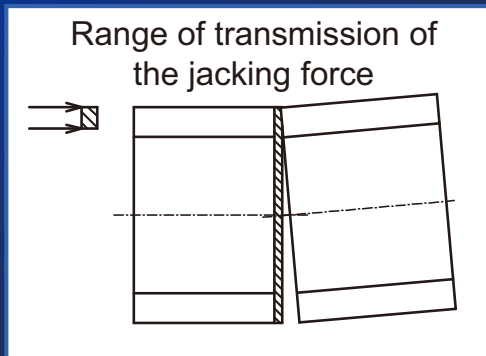
Cushion for SR Jacking Pipes



Example

Bending of Conventional vs. SR Jacking Pipes

Conventional Pipe

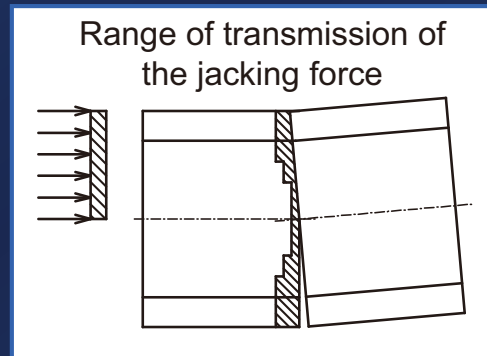


Due to the small contact area, all the force is focused on the contact point.



The pipe is susceptible to breakage in curved sections.

SR Jacking Pipe



Due to the large contact area, the force is dissipated over a large area.



The pipe is less susceptible to breakage in curved sections.

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Types of SR Jacking Pipes

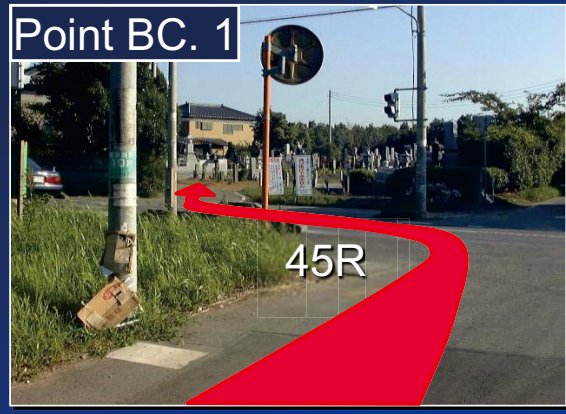
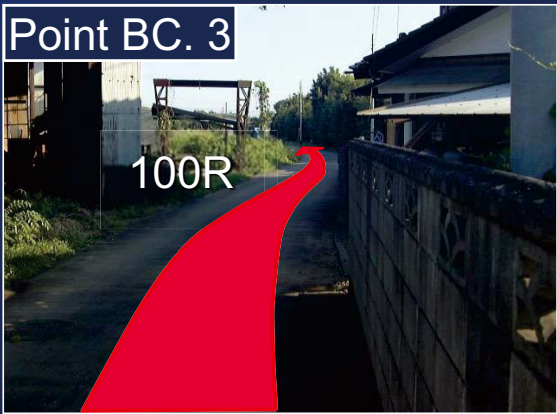
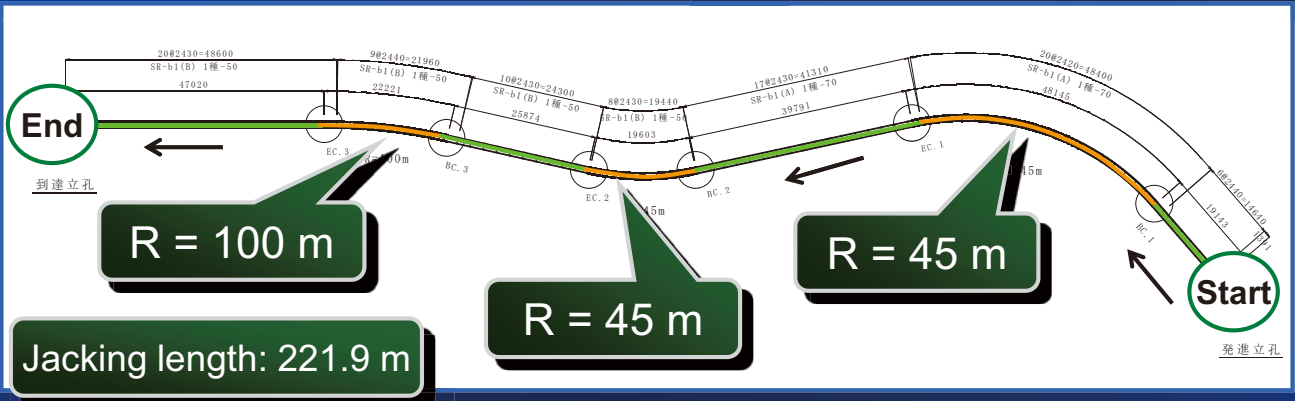


Inner diameter: 250 to 3000

Flexible sections: Up to 4

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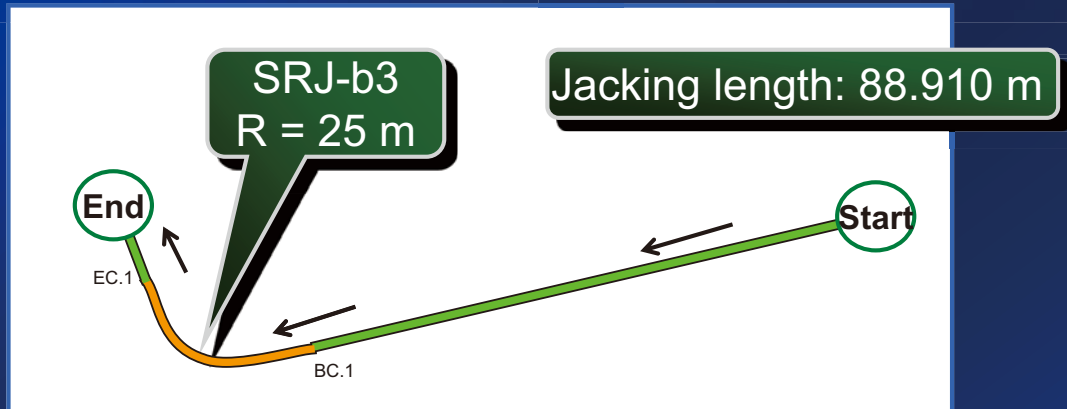
Example 1: Jacking a 1000-mm SR Jacking Pipe



Curvature after Installation (Size = 1000-b1, R = 45 m)



Example 2: Jacking a 1800-mm SR Jacking Pipe



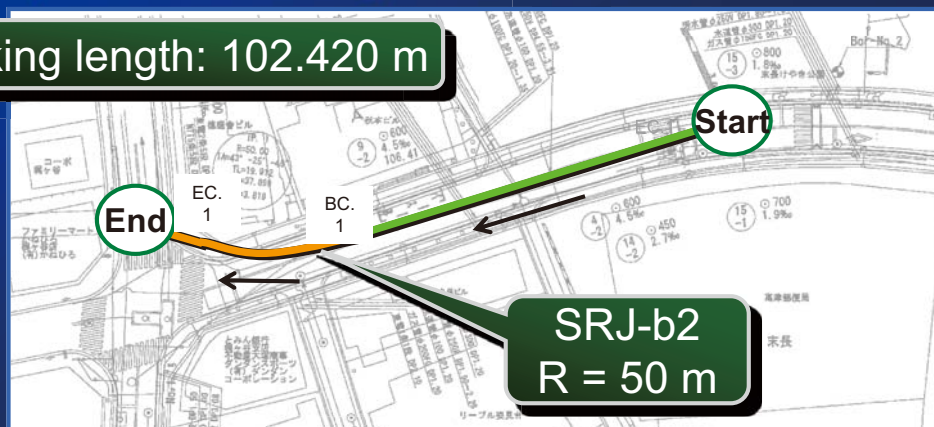
BC.1 R = 25m



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Example 3: Jacking a 600-mm SR Jacking Pipe

Jacking length: 102.420 m



BC.1 R = 50 m



Vertical shaft area at start point



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Thank you for
your attention.

Nakagawa Hume Pipe
Industry Co., Ltd.