

インド水インフラセミナー配付資料

# “For a safe and reliable water environment” TOSHIBA’s Water Technology

Water & Environmental System Div.  
Toshiba Corporation  
January 30, 2014

© 2014 Toshiba Corporation



Toshiba Group contributes to  
the sustainable future of planet Earth.

## Contents

---

- 1. Company Profile**
- 2. Introduction**
- 3. SCADA System**
  - 3.1 Water distribution management system**
  - 3.2 Aeration rate control system**
  - 3.3 Optimum coagulant dose control system**
- 4. Ozone / UV Technology**

# 1. Company Profile

## Toshiba Corporation (Consolidated)

**World's 97<sup>th</sup> largest Corporation**  
(The Fortune Global 500, 2012)



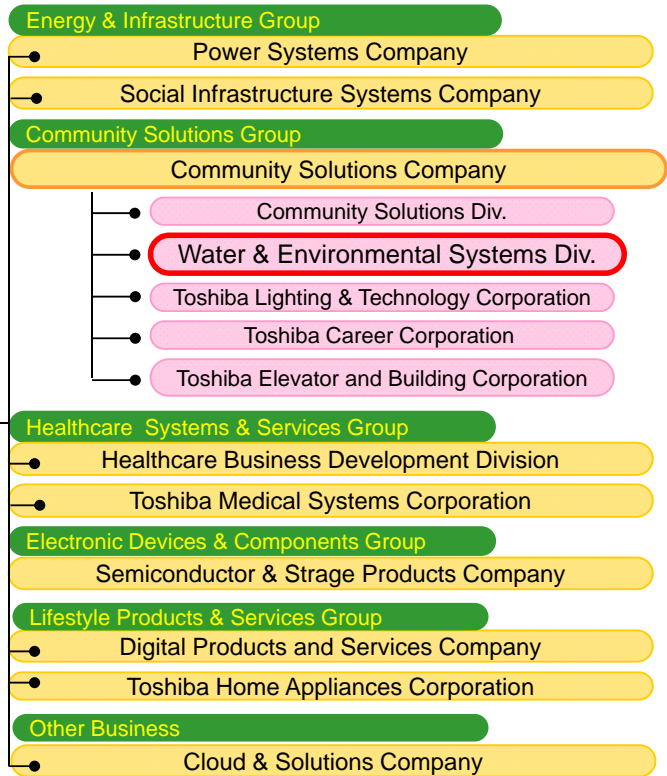
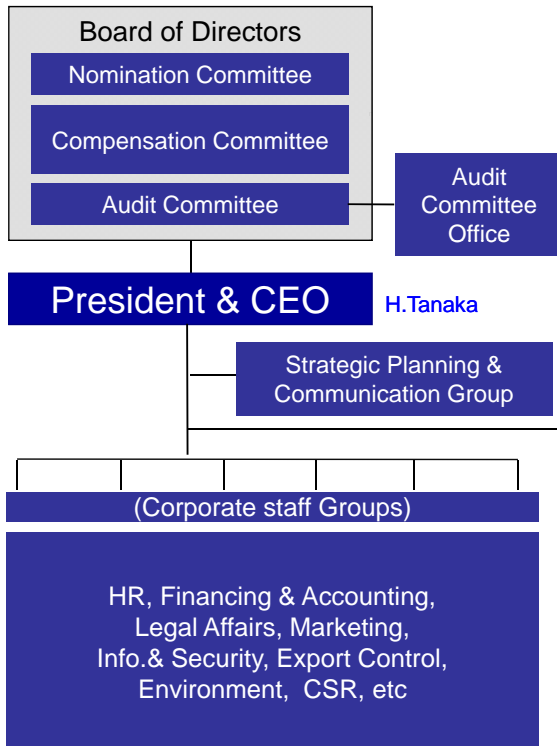
*Basic Commitment of  
Toshiba Group*

**Committed to People,  
Committed to the Future. TOSHIBA**

❖ Established:	July 1875
❖ President & CEO:	Hisao Tanaka
❖ Headquarters:	Minato-ku, Tokyo, Japan
❖ No. of Employees:	Approx 210,000 (as of June 2013)
❖ Total Assets:	US\$ 64,965 million (as of June 2013)
❖ Net Sales:	US\$ 61,705 million (as of June 2013)
❖ Subsidiaries:	590 companies (as of March 2013)
❖ Overseas Network (Outside Japan):	538 companies (as of March 2013) (Subsidiaries and Affiliates)

# Organisation

November 1, 2013



# Business Domains

## Energy & Infrastructure



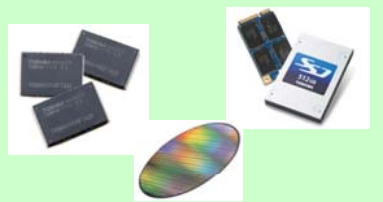
## Community Solutions



## Healthcare Systems & Services



## Electronic Devices & Components

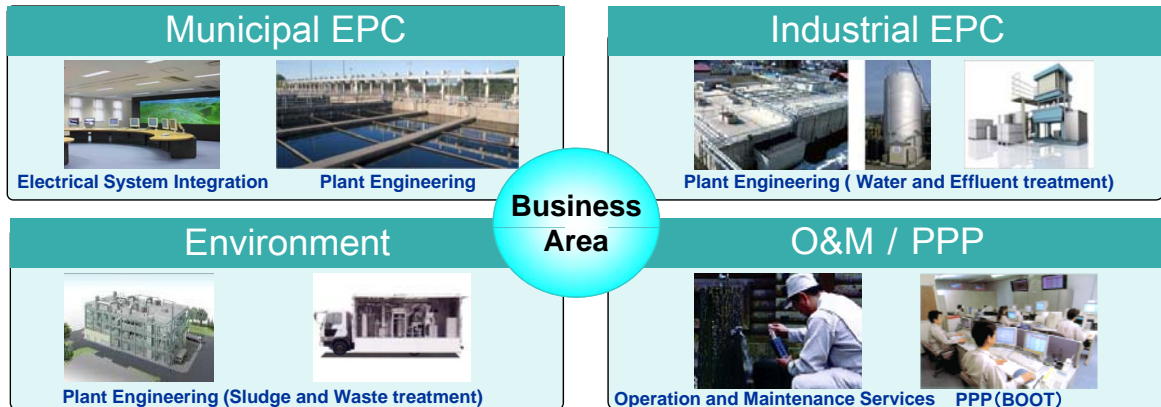


## Life style Products & Services



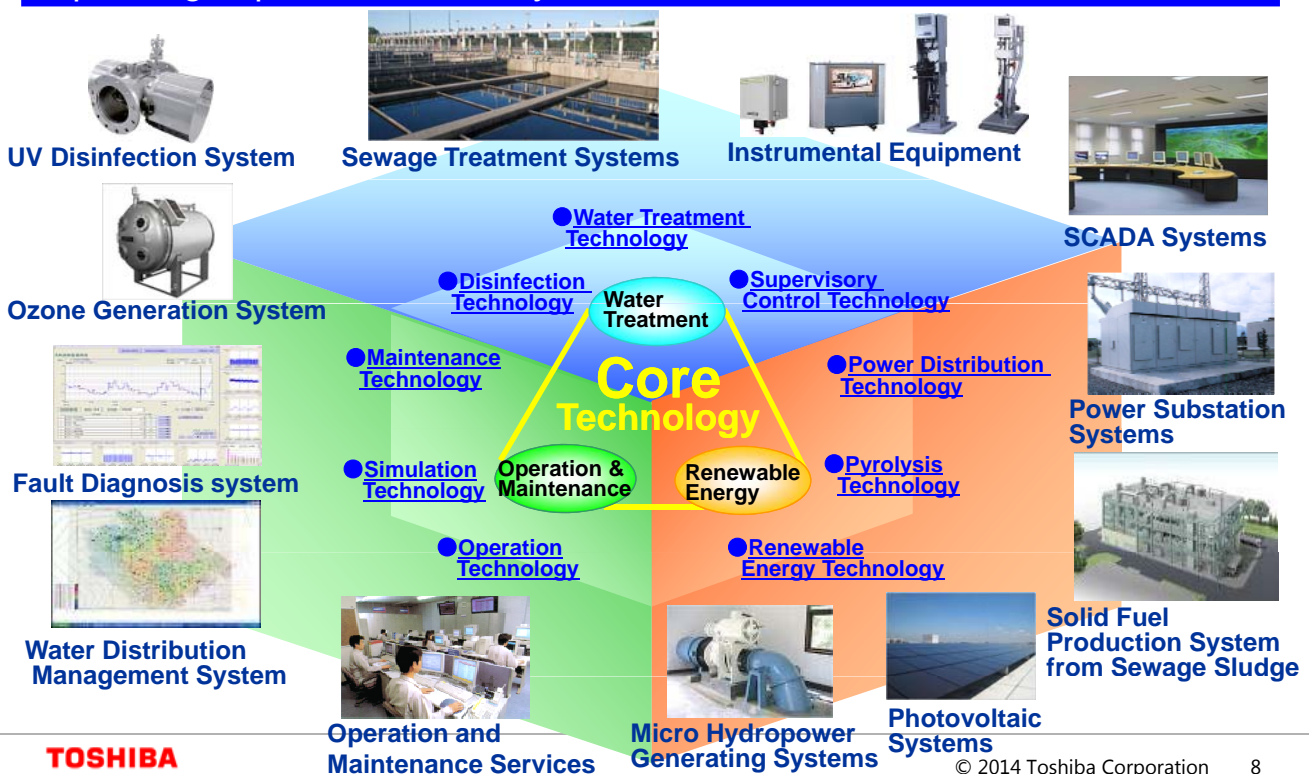
# Water & Environmental Systems Div.

❖ Established:	1972
❖ Division Head:	Naohiro Noro (Vice President)
❖ Head office:	Kawasaki, Kanagawa, Japan
❖ No. of Employees (Consolidated):	Approx 3000 (as of March 2012)
❖ Experiences (Consolidated):	Japan:800+ / Overseas:100+ (Municipal Water & Wastewater Treatment Plant) (Industrial Water Treatment Plant)
❖ Branches and Affiliates	Japan:27 / Overseas:3(China, Indonesia, Singapore)



# Water & Environmental Technologies

Toshiba water and wastewater plant engineering and technologies are expanding to provide various systems solutions.



# Water system Business Global Reach



## UEM India PVT. Limited

Established : 1973  
 Capital Participation : 2014 (26%)  
 Address : 2nd & 3rd Floor, Tower-B, A-1  
 Windsor IT Park, Sector-125,  
 Noida, UP - 201 301, INDIA  
 Tel : +91-120-3817000  
 Fax : +91-120-3817005



**Main Business**  
 • EPC and O&M Service for Municipal and Industrial Water Treatment System



## Guangzhou Toshiba Baiyun Control System Engineering Co., Ltd

Established : March 2004  
 Address : 18, Daling Nan Lu, Industrial  
 District Shenshan Town, Baiyun  
 District, Guangzhou, P.R. China  
 Tel : +86-20-2626-1282  
 Fax : +86-20-2626-1161



**Main Business**  
 • Manufacturing and Distribution of Electrical and Instrumental Equipment, and Supervisory Control System for Water Treatment System and Facility System  
 • EPC Service for Municipal and Industrial Water Treatment System



## PT. Envitech Perkasa

Established : October 1983  
 Capital Participation : 2011(67%)  
 Address : Wisma Pondok Indah 1  
 Suite 306-307 (3rd floor),  
 Jl. Sultan Iskandar Muda Kav.  
 V-TA Jakarta Selatan,  
 12310, Indonesia  
 Tel : +62-21-758-19050  
 Fax : +62-21-758-19040



**Main Business**  
 • EPC Service for Municipal and Industrial Water Treatment System



## Aqua Research Centre

Established : April 2012  
 Address : Water Hub, 82 Toh Guan  
 Road East, #02-08 Singapore  
 608576  
 Tel : +65-6305-5534  
 Fax : +65-6515-5389



**Main Business**  
 • Research and Development of Industrial Wastewater Treatment System

## UEM India Company profile

<b>Company Name</b>	UEM India Pvt. Limited
<b>Established</b>	1973 USA (1977 Trinidad Tobago / 1983 India)
<b>Registered office</b>	New Delhi (Engineering head office : NOIDA, UP)
<b>Overseas office</b>	USA (Florida) / Trinidad Tobago
<b>No. of Employees (Consolidated)</b>	Approx. 750
<b>Managing Director</b>	Krishan M Kshetry
<b>Share capital</b>	INR 70 million
<b>Share holders</b>	Toshiba 26% / India Value Fund 50.48% / Individuals (Promoters) 23.52%
<b>Business</b>	EPC and O&M service for Water treatment plant
<b>Sales (FY2013 consolidated)</b>	Approx. INR4,384million (Approx. JPY7,000million)
<b>References</b>	over 350 installations in over 30 countries / 1 PPP project (CETP in India)



### Technologies

- Physicochemical treatment
- Aerobic treatment (ASP, SBR)
- Anaerobic treatment (UASB)
- Desalination
- Membrane (UF, MF, RO, MBR)
- ZLD (HERO)

### Coverage

- Municipal projects
  - Drinking water t
  - Sewerage
- Industrial projects
  - Distillery
  - Oil & Gas
  - Chemical
  - Pharma
  - Food & Beverage
  - Power plant
  - Pulp & Paper
  - Textile & Dyeing

### References

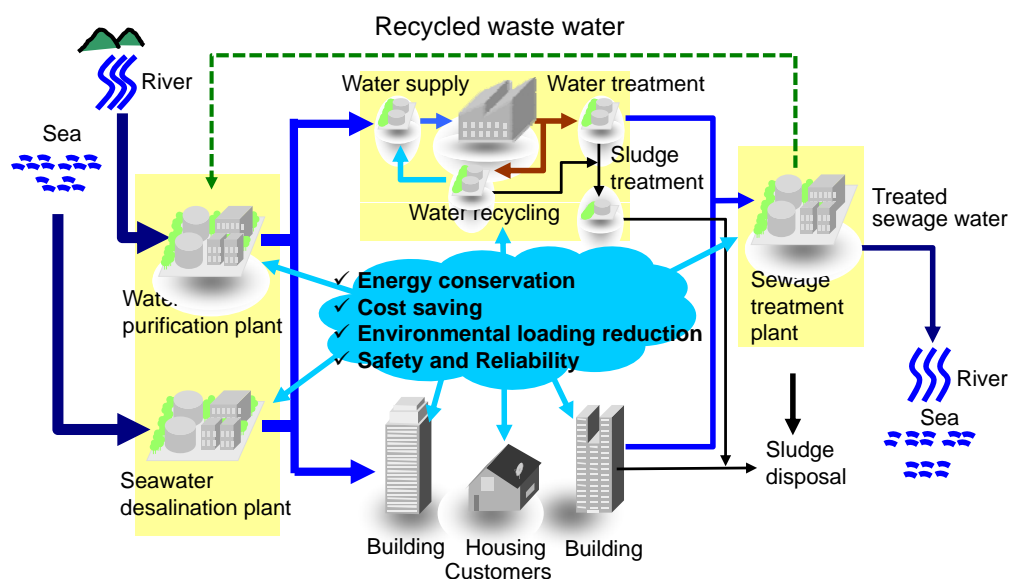
over 350 installations in over 30 countries



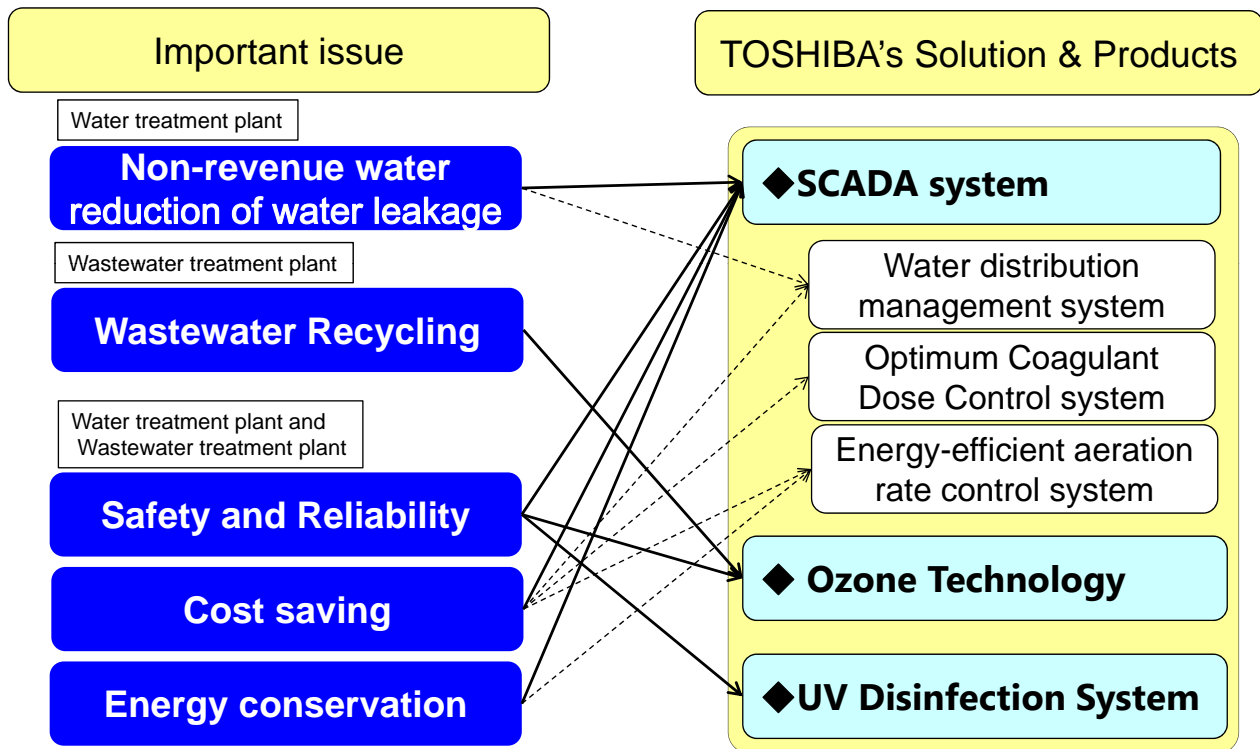
## 2. Introduction

## 2. Introduction

As your partner, We provides total solution for Water and Sewage systems. Our focus is on "Safety" and "Reliability". We contribute to realize "Sustainable water cycle" and "Environmentally-advanced community".



## 2. Introduction



## 3. SCADA System




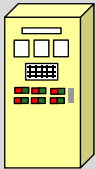

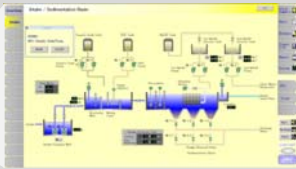
# 3. SCADA System

SCADA system can meet a wide range of needs regardless of the user's skill, point of use, and information volume.



# 3. SCADA System

## Benefits of SCADA System

Items	Local panel only	SCADA
Operating Area	Several local rooms	Central monitor room only
Data	State or process indicator only (No storage devices)	Supervise , accumulate and analyze
Control	Manual operation only	Just click button to operate Automatic process control Real-time continuous control
Result	Human Error Risks Depend on Operator's Skill Inefficient Plant Operation High Operation Cost	Safety Operation (Avoid Human Errors) Not Depend on Operator's skill Efficient Plant Operation Reduce Operation Cost Analyze Data and Improve Plant Management
Operating Device	 Local Operation Devices  Local Panel	 SCADA System 

**Recommend**

# 3. SCADA System

## Toshiba SCADA System Past Records

### ■ Japan

- Misato, Tokyo (Water Treatment Plant)  
1,100,000tons/day
- Ukima, Tokyo (Sewage Treatment Plant)  
1,120,000tons/day
- etc.



**More than 400 Projects**  
in Recent 10 Years

### ■ China

- Guangzhou, Jing Xi (MBR WWTP)  
100,000tons/day
- Liaoning, Jinzhou(A2O WWTP)  
300,000tons/day
- etc.



We meet the needs of customers  
with **High Quality, High Reliability**

# 3. SCADA System

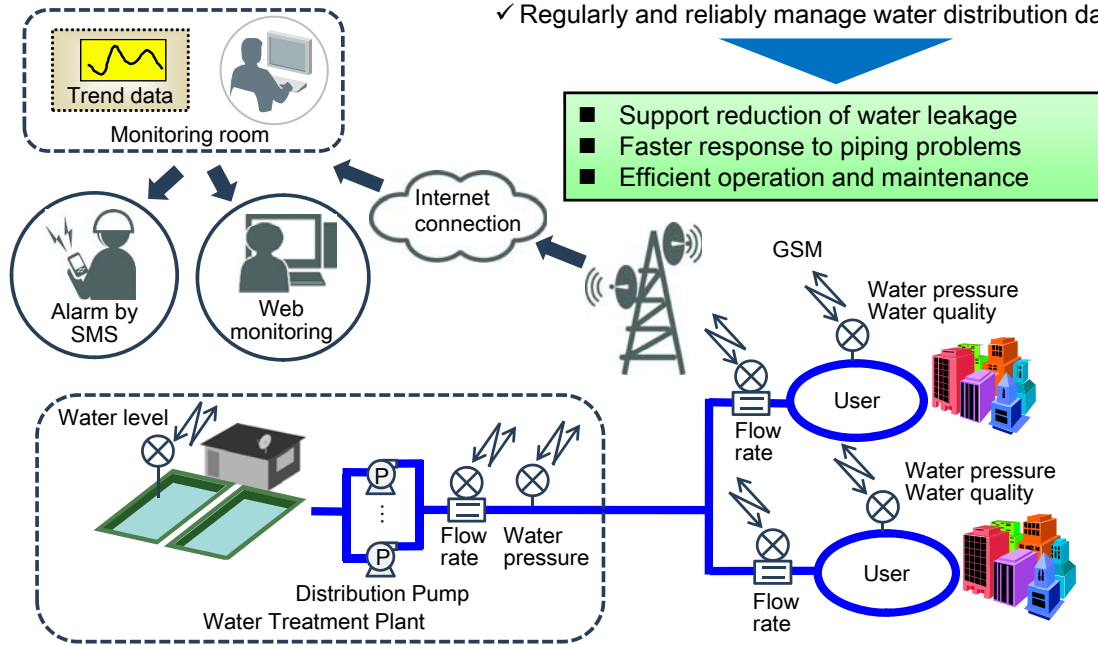
## 3.1 Related Solution (1)

### Water Distribution Management System

# 3.1 Water Distribution Management System

This system enables the efficient management of water distribution by collecting, accumulating, and monitoring the flow rate, pressure and distribution water quality data.

- ✓ Easily gather the information to manage water distribution
- ✓ Regularly and reliably manage water distribution data



# 3.1 Water Distribution Management System

TOSHIBA has line-up of highly reliable Component and Systems best suited for Water Distribution Management System.

**Integrated Controller**

- ✓ Integrated functions
- ✓ Scalable
- ✓ Variety of networks
- ✓ Integrated engineering

**Supervision and Control System**

- ✓ **Many Years of Experience**
  - High Quality and High Reliability
  - Giving you Total Solution
- ✓ **Meet various needs**
  - Meet your Plant Scale
  - Meet your Budget
- ✓ **Many Benefits**
  - Avoid Human Errors
  - Reduce Operation Cost

**Battery Powered Electromagnetic Flowmeter**

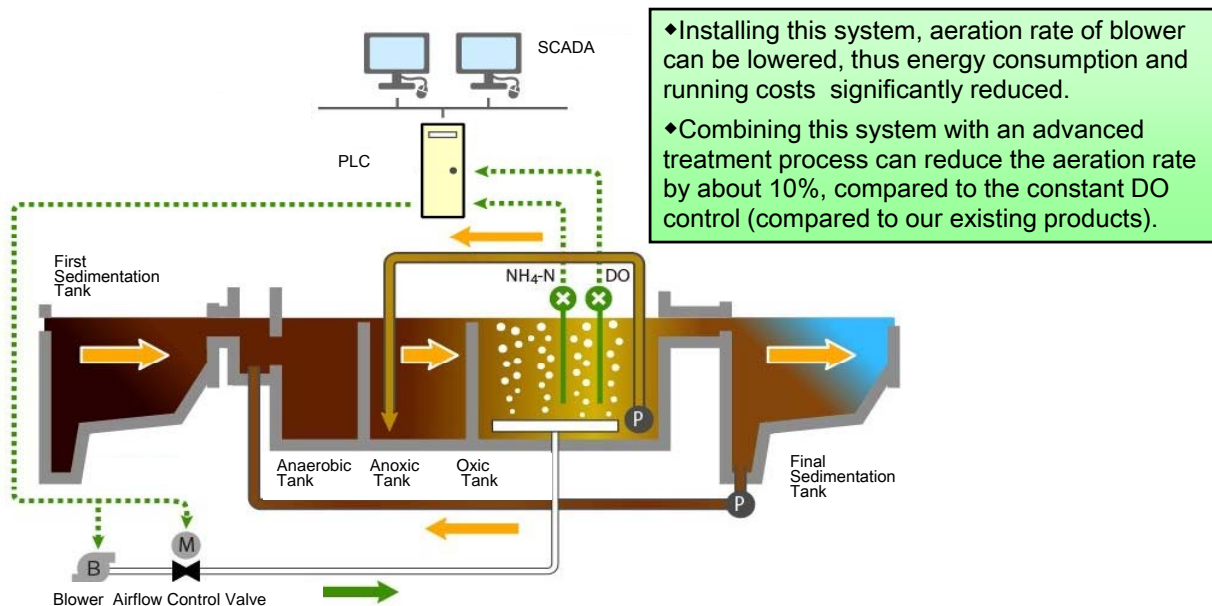
- ✓ High accuracy
- ✓ Easy operation
- ✓ Self-reliant power supply
- ✓ Battery life up to 6 years at 35 Deg. C

# 3. SCADA System

## 3.2 Related Solution (2) Aeration Rate Control System

### 3.2 Energy-efficient aeration rate control system for nitrogen removal

The electricity cost required for aeration process accounts for about 30 to 60% of the total electricity cost of a sewage treatment plant. This system effectively removes nitrogen at low energy consumption.



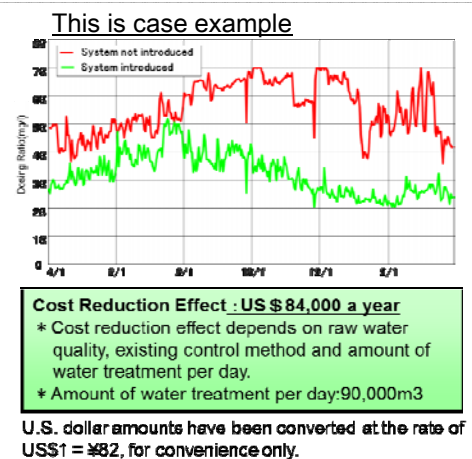
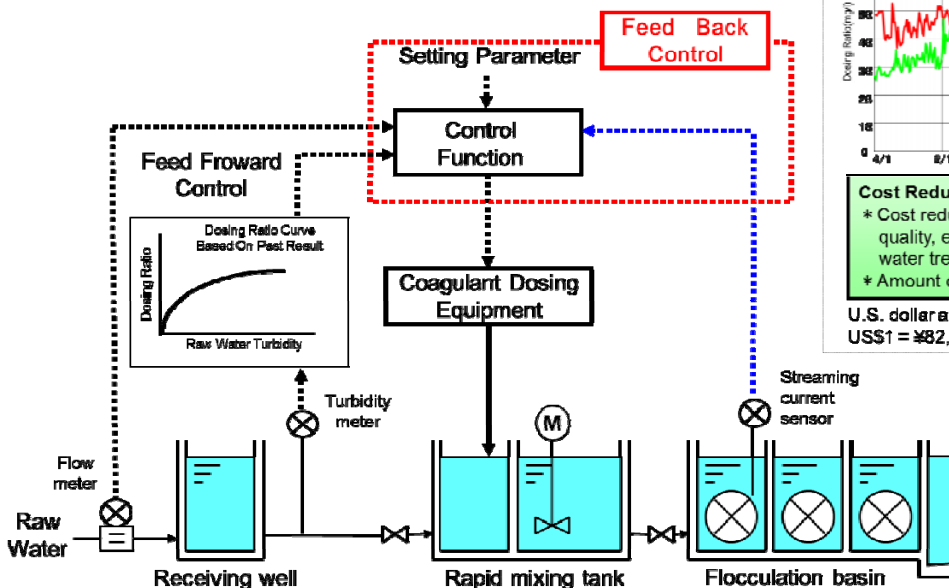
# 3. SCADA System

## 3.2 Related Solution (3) Optimum Coagulant Dose Control System

### 3.3 Optimum Coagulant Dose Control System

Adding feedback control to the conventional system, reduction of excess coagulant and operation cost can be achieved.

#### ■ Example of system configuration



# 4. Ozone / UV Technology

## 4. Ozone Technology

TOSHIBA's ozone generators have more than 100 installation references.



Sewage Treatment Plant  
(5.4kg-O<sub>3</sub>/h)



Medium-scale Waterworks  
(11 kg-O<sub>3</sub>/h)



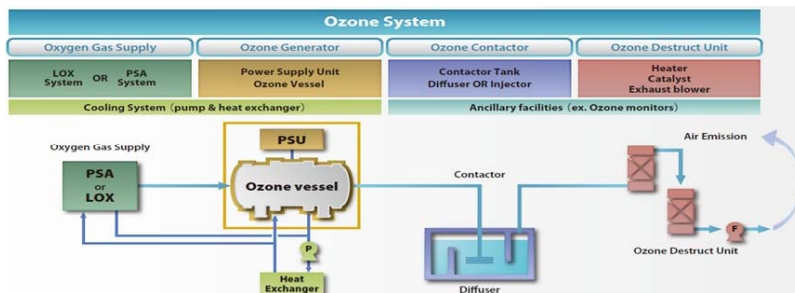
Large-scale Waterworks  
(31 kg-O<sub>3</sub>/h)

### FEATURES

- Rated Ozone Conc: 150g/m<sup>3</sup>
- High Performance: 6-8kW/kgO<sub>3</sub>
- High-flexibility: wide range of products
  - unit type available in package unit
  - custom construction with 1-30 kgO<sub>3</sub>/h\* capacity
- Low maintenance: long-life electrodes with stainless steel film
- Optimum control: adjust the ozone production based on dissolved and emitted ozone.

The system consists of an ozone generator with anti-corrosion stainless electrode, harmonic suppression type power supply, and fluorescent control technology to realize energy saving and bromic acid control.

Applicable to  
 >30,000 m<sup>3</sup>/d for Drinking Water Plant  
 >6,000 m<sup>3</sup>/d for Municipal Wastewater Plant  
 >3,000 m<sup>3</sup>/d for Industrial Wastewater Plant



\* (Products with capacity greater than 30 kgO<sub>3</sub>/h are available upon consultation)

Application	Effect	Treated Water	Ozone Injection Rate (mg/L)	Feed Water COD for Reference (mg/L)
Drinking Water	Decoloration, Decoloration	Odor <1B	f to B	<5
Swimming Pool	Disinfection, Decoloration	E. Coll 0	f to B	-
Wastewater Recycling	Decoloration, Decoloration Disinfection	E. Coll 0	B	<25

## 4. UV Disinfection System

UV disinfection is an effective technique for inactivating chlorine-tolerant pathogens found in water supply systems, such as *Cryptosporidium*.

### Features

#### Low cost

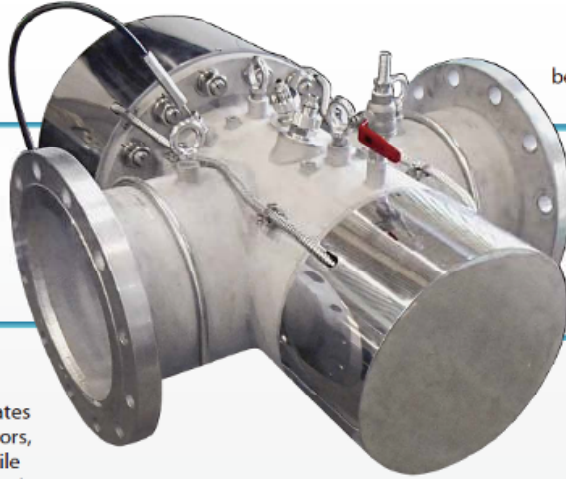
UV disinfection systems offer low-cost technologies for *Cryptosporidium* inactivation.

#### High efficiency

The system has high UV irradiation efficiency, made possible through simulation-based design.

#### Power control

The power control system operates without the need for UVT monitors, resulting in lower initial cost while maintaining low power consumption.



#### Easy maintenance

Fewer lamps are needed because medium-pressure lamps with high output are used.

#### Space saving

The design is suitable for direct installation in existing pipelines, taking up an optimal amount of space.

# Cooperation of the Bureau of Waterworks, Tokyo Metropolitan Government to “The Assistance Related to Delhi Water Supply Improvement Project”



Tokyo Metropolitan Government  
The Bureau of Waterworks  
Manager of Kita Service Station

Koichiro Igari



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

## Outline of the Project

### Objective

DJB's capacity for the implementation of Delhi water supply improvement project is strengthened.

Period 2013.6 – 2015.5 (3 years)



Executing Agency JICA



Contractor TEC International Co.,Ltd  
Tokyo Suido Service Co.,Ltd



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved



# Output of the Project

## Output 1 Chandrawal Water Treatment Plant

DJB's capacity to manage data and information on water supply facilities in Chandrawal WTP command area is strengthened.

## Output 2 Water Distribution Management

DJB's capacity to monitor and control the water distribution for equitable distribution and non-revenue water management is upgraded.

## Output 3 GIS/RMS Application

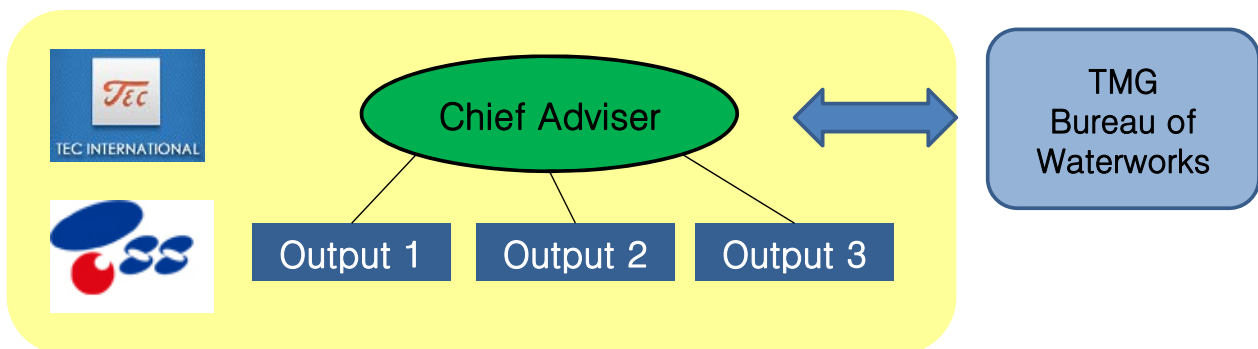
Draft of scenarios for stage wise development of GIS/RMS application in DJB is prepared.



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

# Role of Tokyo Waterworks



TSS is one of subsidiary companies of TMG, Bureau of Waterworks. And we cooperate with TSS for this project.

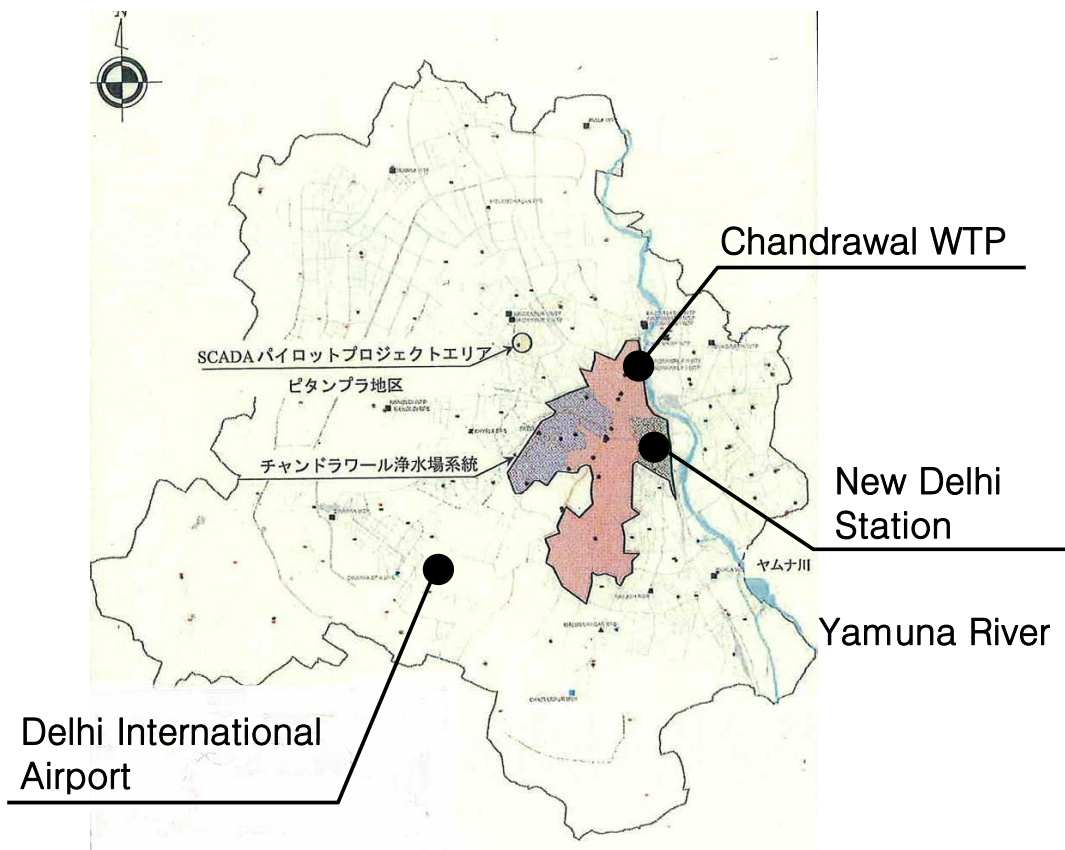
## To dispatch staff members and hold seminar

- Introduce our experiences and systems
- Review DJB's management policy, Business Plan, etc...



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved



Chandrawal WTP    Established    1937( I ), 1955( II )  
                                  Capacity        400,000m<sup>3</sup>/day



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

## About DJB (Delhi Jal Board)

Public corporation established by Delhi Government



Area	1,483km <sup>2</sup>
Population	1.7million
Connection	2million
Capacity	3.7million m <sup>3</sup> /d
Number of Staff	22,000
Established	1992



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

## Site visits in Delhi (last year August)

29 <sup>th</sup> August	Meeting with CEO, Addl CEO
30 <sup>th</sup>	Seminar
31 <sup>st</sup>	Site Visits (Chandrawal WTP, Wazirabad Intake etc...)
1 <sup>st</sup> September	To arrange Materials
2 <sup>nd</sup>	Meeting with Director Revenue, Site Visits
3 <sup>rd</sup>	Meeting with Addl CEO, Site Visits
4 <sup>th</sup>	Reporting to JICA India Office, Move to Goa
5 <sup>th</sup>	Goa Workshop(the 1 <sup>st</sup> day)
6 <sup>th</sup>	Goa Workshop(the 2 <sup>nd</sup> day)



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

## Issues of DJB

### Administrative

- ▶ Development of reliable accounting information
- ▶ Getting and updating customers information
- ▶ Activities to be covered by expenses from tax
- ▶ Proper staff assignment

### Technical

- ▶ Development of reliable facility information  
: Basic Information, Drawing, History of Maintenance etc...
- ▶ Water treatment and water quality management procedures



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

## Outline of 1<sup>st</sup> Seminar in Delhi



Date 30<sup>th</sup> August 2013

Place The Metropolitan Hotel

Participants 80persons (DJB 60, Japan 20)



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

## Outline of 1<sup>st</sup> Seminar in Delhi

### Administrative

Outline of Tokyo Waterworks and Approach for Sustainable Management

- ▶ Introduce our history and outline
- ▶ Purpose of waterworks and principle of waterworks management
- ▶ Our management policy and three basic elements

### Technical

Facility Improvement of Tokyo Waterworks

- ▶ Outline of facility improvement plan
- ▶ Maintenance of water treatment facilities and pipeline
- ▶ Asset management system



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

# Upcoming Seminar

Year		Administrative	Technical
1 <sup>st</sup>	1	(Performed)	(Performed)
	2	Focus on the part of “Management Improvement” <ul style="list-style-type: none"> <li>▶ Set up the finance plan</li> <li>▶ Public fund etc...</li> </ul>	Focus on the part of “Facility Improvement” <ul style="list-style-type: none"> <li>▶ Efficient operation and maintenance of facility</li> </ul>
2 <sup>nd</sup>	3	<ul style="list-style-type: none"> <li>▶ NRW, Charge calculation</li> <li>▶ Details of charge system</li> <li>▶ Reduction of staff</li> </ul>	<ul style="list-style-type: none"> <li>▶ Leakage prevention</li> <li>▶ Operation and monitoring</li> <li>▶ Water quality control</li> </ul>
	4		
3 <sup>rd</sup>	5		
	6	To summarize	



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

Thank you for your attention



Tokyo Metropolitan Government, Bureau of Waterworks

Copyright © 2014 Tokyo Metropolitan Government. All rights reserved

# **“Water level gauge” and “Water gate opening indicator”**

*for enhancement of dam and weir facilities management*



**TAKUWA CORPORATION**  
**Tokyo, Japan**  
1-4-15 Uchikanda, Chiyoda-ku, Tokyo 101-0047 JAPAN  
Tel: +81-3-3291-5873, Fax: +81-3-3291-5226

1

## **Contents**

Proposal for upgrading management of dam and weir facilities in India

- ◆ Water level gauges
- ◆ Water gate opening indicators
- ◆ Necessity of Maintenance

2

# About TAKUWA Corporation

We are pure-play company focused on sensors for prevent disaster.

Company Name	TAKUWA Corporation	
Headquarters Location	1-4-15 Uchikanda, Chiyoda-ku, Tokyo 101-0047, JAPAN	
TEL	+81-3-3291-5873	
FAX	+81-3-3291-5226	
E-mail	<a href="mailto:info@takuwa.co.jp">info@takuwa.co.jp</a>	
Founded	26 May 1965	
President	Makiko OKUDA	
Branch office	Sapporo, Sendai, Niigata, Tokyo, Nagoya, Osaka, Hiroshima, Takamatsu, Fukuoka	
Factory	Moriya city, Ibaraki pref	
Products	<ul style="list-style-type: none"> <li>▪ Water Level Gauges</li> <li>▪ Gate Opening Indicator</li> <li>▪ Sabo Disaster Sensors</li> <li>▪ Discharge Meter</li> <li>▪ Synchronous</li> <li>▪ Related equipments</li> </ul>	
Major Clients	<ul style="list-style-type: none"> <li>▪ Ministry of Land, Infrastructure, Transport and Tourism</li> <li>▪ Ministry of Agriculture, Forestry and Fisheries</li> <li>▪ Japan Water Agency</li> <li>▪ Japan Meteorological Agency</li> <li>▪ Electric Power Company (Tokyo, Kansai, Hokkaido etc.)</li> <li>▪ Local Governments</li> <li>▪ Japan Radio Co.,Ltd</li> <li>▪ Fujitsu Limited</li> <li>▪ Mitsubishi Electric Corporation</li> <li>▪ Ebara Corporation</li> <li>▪ Overseas (Philippines, Indonesia, South Korea, Taiwan etc.)</li> <li>▪ Toshiba Corporation</li> <li>▪ Panasonic Corporation</li> <li>▪ IHI Corporation</li> <li>▪ Meidensha Corporation</li> </ul>	

3

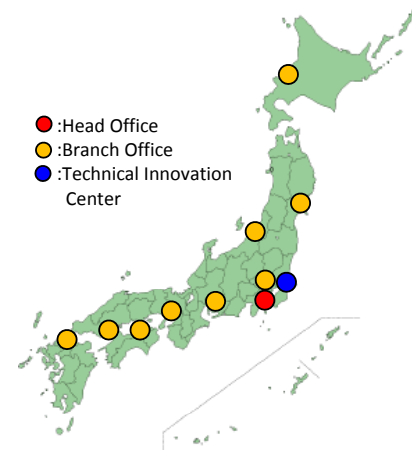
## Our offices in Japan



Tokyo Head Office



Technical Innovation Center



Office Map in Japan

*We provide prompt sales and technical support to all our customers*

4



## Our Shares in Japan

### Water level gauge

- MLIT and Local government have approx. **5000** FFWS station.
- We have **70%** share of them.

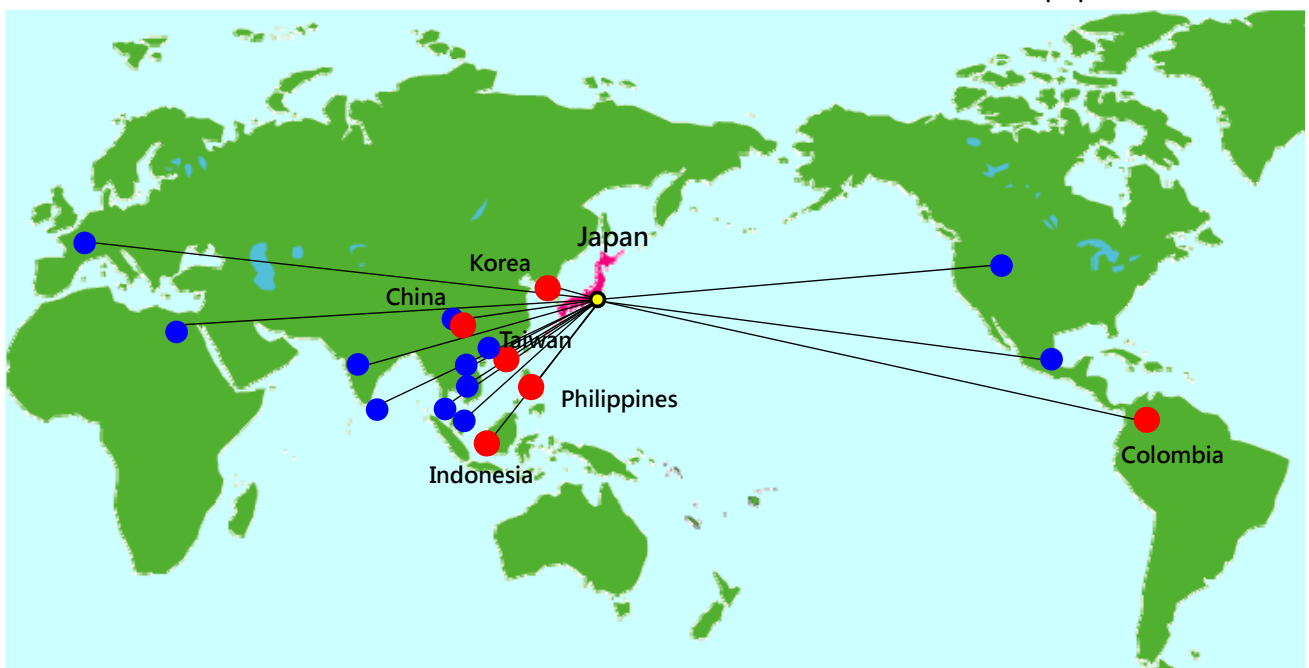
### Water Gate Indicator

- MLIT and Local government have approx. **1300** dams.
- We have **70%** share of them.

5

## Our Global Records

- : Water level gauge
- : Other equipment



6

## Water Level Monitoring (1)



7

## Water Level Monitoring (2)



# Our proposal to upgrade management of dam and weir facilities

## 【PRESENT】

Manual-reading staff gauge and telephone report

- Once per day
- Not real time
- May cause misread in bad weather and night
- Dangerous in bad weather



By using monitoring equipment....

(Water level gauge and Water gate indicator)

## 【FUTURE】

Automatic water monitoring

- 10 min interval
- Real time
- Remote
- Accuracy
- Safety



## 【EFFECTS】

- Appropriate water control
- Water-related disaster mitigation



9

## Water Level Monitoring for control of water facilities in Japan



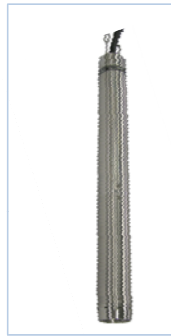
10

# Our Water Monitoring Equipments

- Water Level Gauges



Quartz Type



Optical cable Type



Microwave Type



Staff Gauge

- Water Gate Indicators



Stand type (Rotation input)



Shaft Direct type (Rotation input)



Wire-spring type<sup>11</sup>

## Staff Gauge



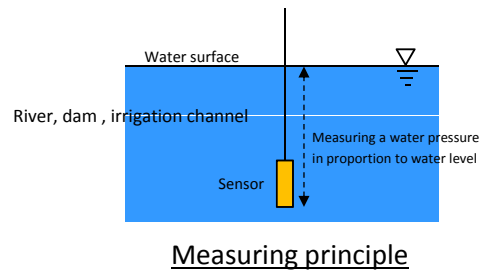
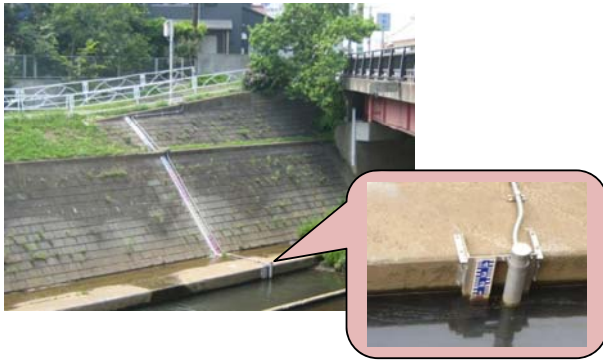
- Features

- Simple and Conspicuous
- Very Low Cost
- Easy to Replace in Case of Failure
- Various Types Suitable for Purpose and Field Condition

# Quartz Type Water Level Gauge

## Accurate Measuring by Water Pressure Sensor

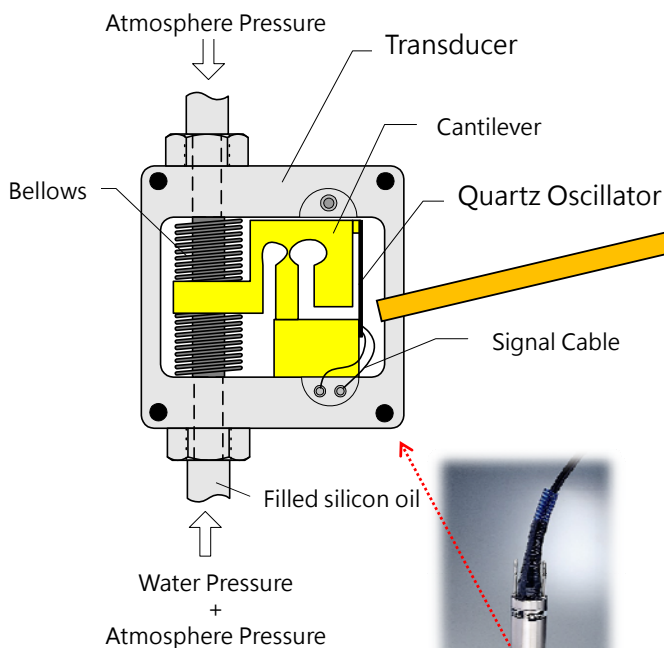
- **Very High Accuracy by Using a Quartz Oscillator**
  - Selectable 1mm or 5mm (at 10m range)
- **Wide Measurement Range**  
(0 to 10, 20, 30, 50, 70 m)
- High Temperature Character
- Built-in Arrester
- High Durability
- Easy Installation and Maintenance



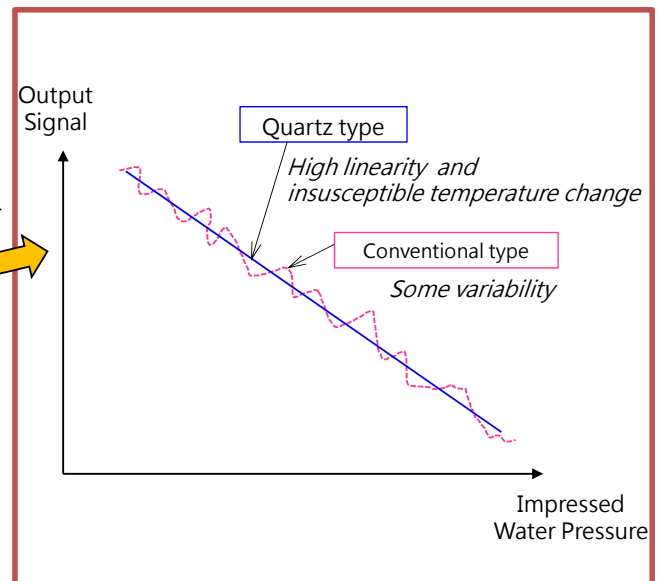
13

## Measuring principle of Quartz type

### Detail of Sensor



### Oscillation characteristic



High accuracy by high linearity of quartz oscillator

14

# Lineup of Quartz type

Quartz type has three types which are selectable depending on the site condition

1. Normal type  
(Traditional)

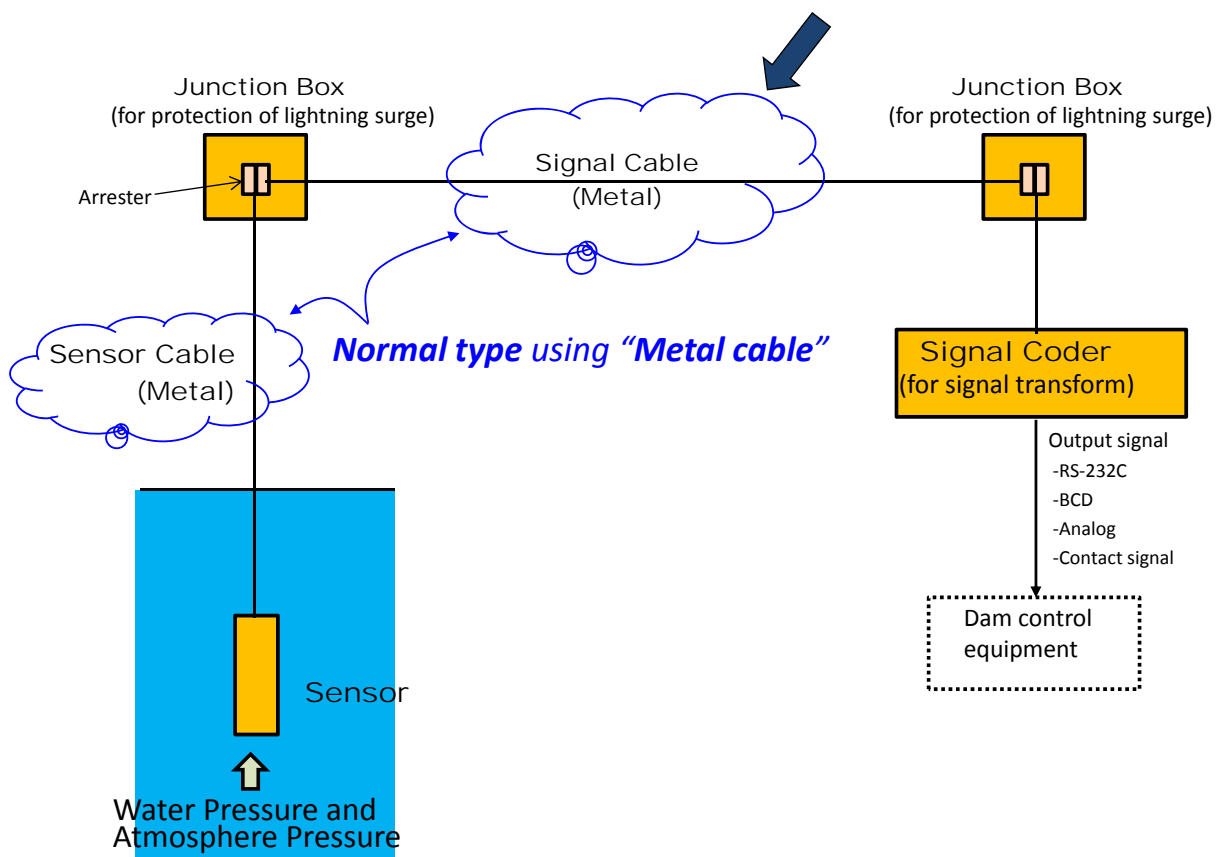
2. Optical fiber transmission type  
(New technology !)

3. Water temperature correction type  
(New technology !)



15

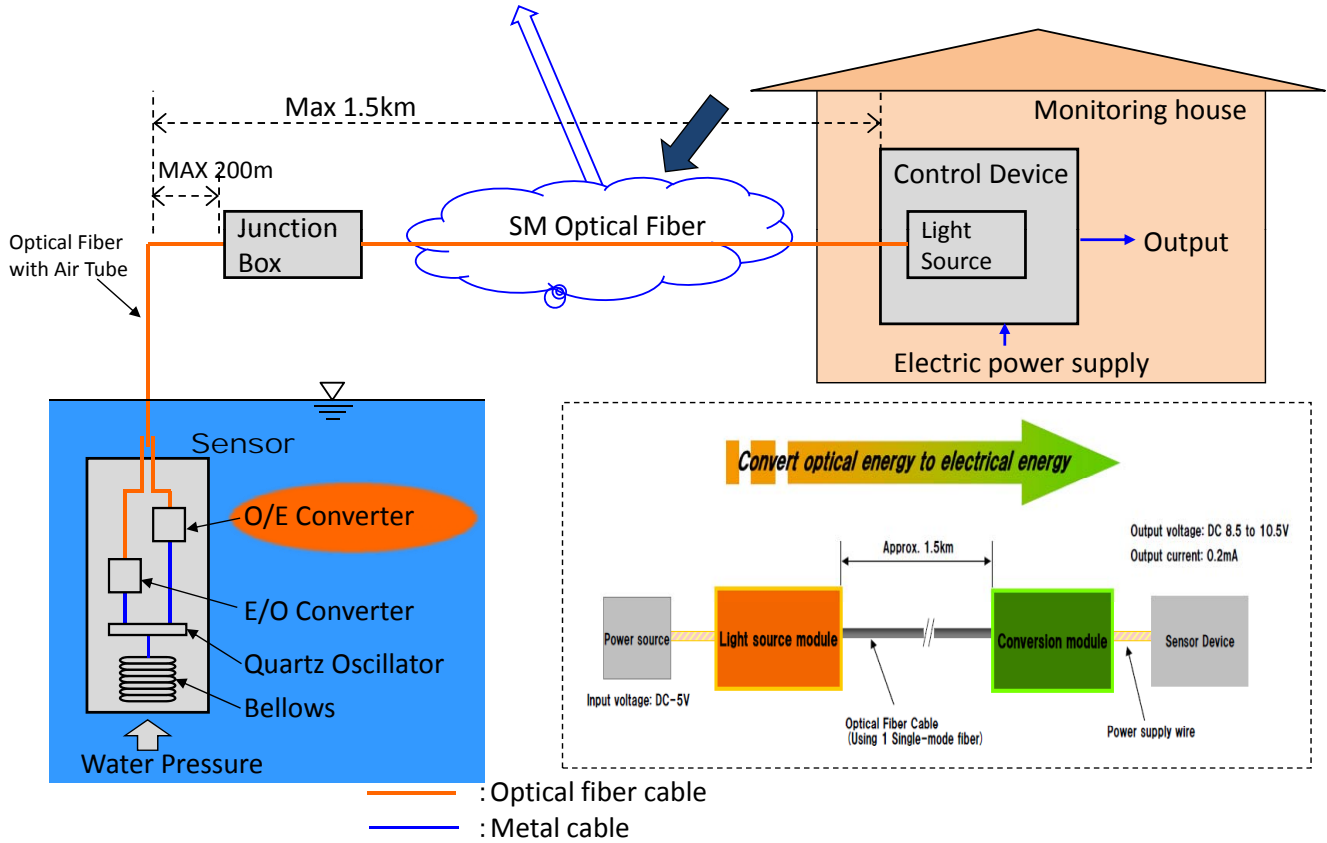
## 1. Normal type



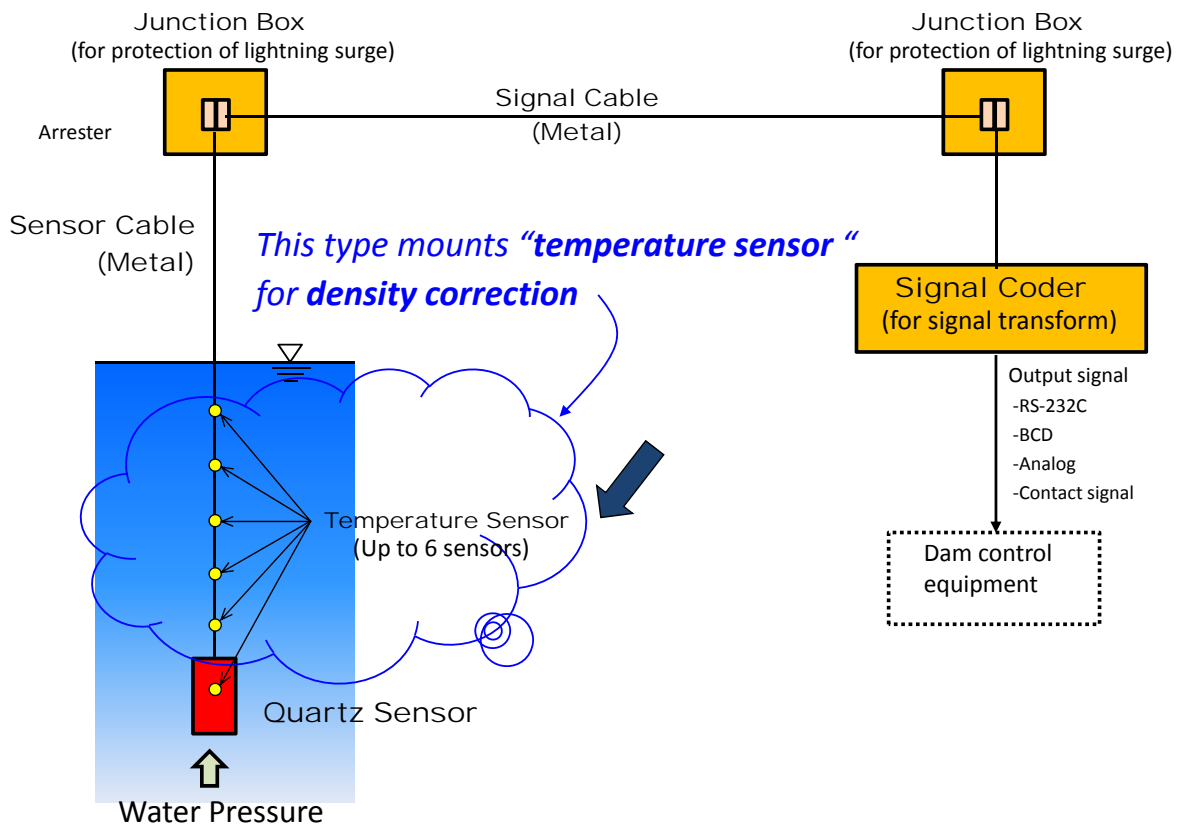
16

## 2. Optical fiber type

*Unaffected lightning surge by using optical fiber*

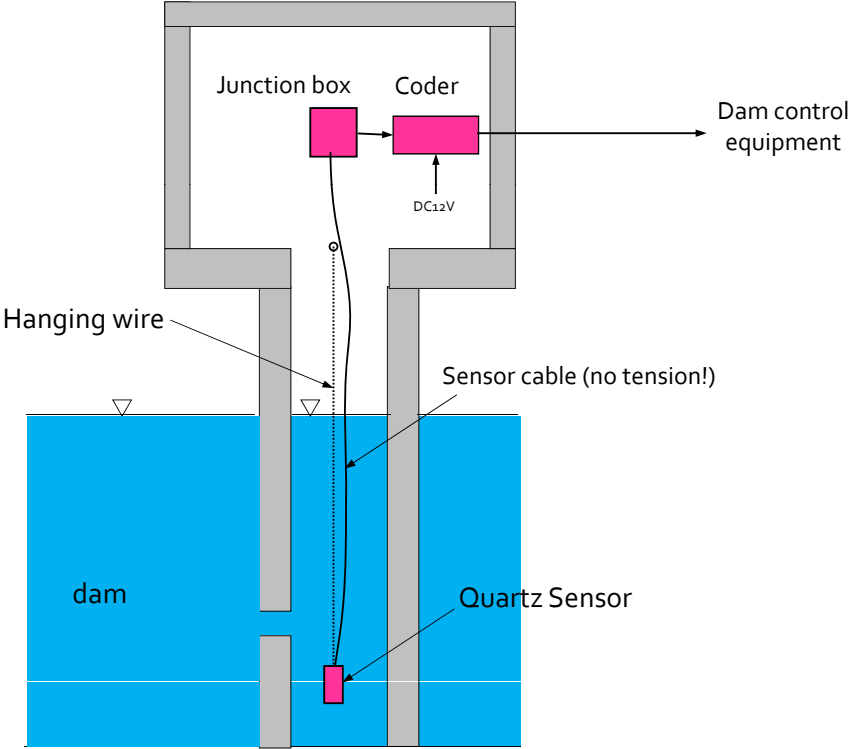


## 3. Water temperature correction type



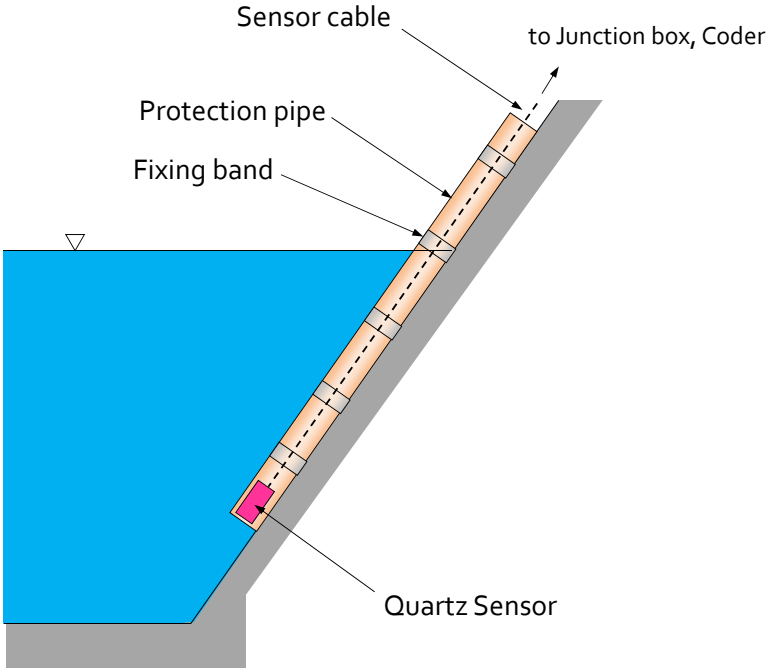
# Installation way of Quartz type

## 1. Observation well



# Installation way of Quartz type

## 2. Incline of dam side

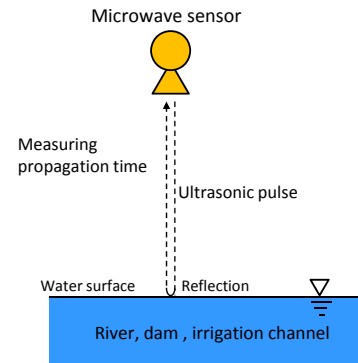




# Microwave Type

Non-contact water level measuring by microwave pulse

- Features
  - **Non-Contact-Flow Measurement**
  - Measurement range: up to 10-15m
  - Accuracy:  $\pm 1\text{cm}$
  - Easy Installation and Maintenance



Measuring principle

21

Installation case of Microwave type



Debris flow detection in torrent



Irrigation dam control



Overflow levee in retarding basin

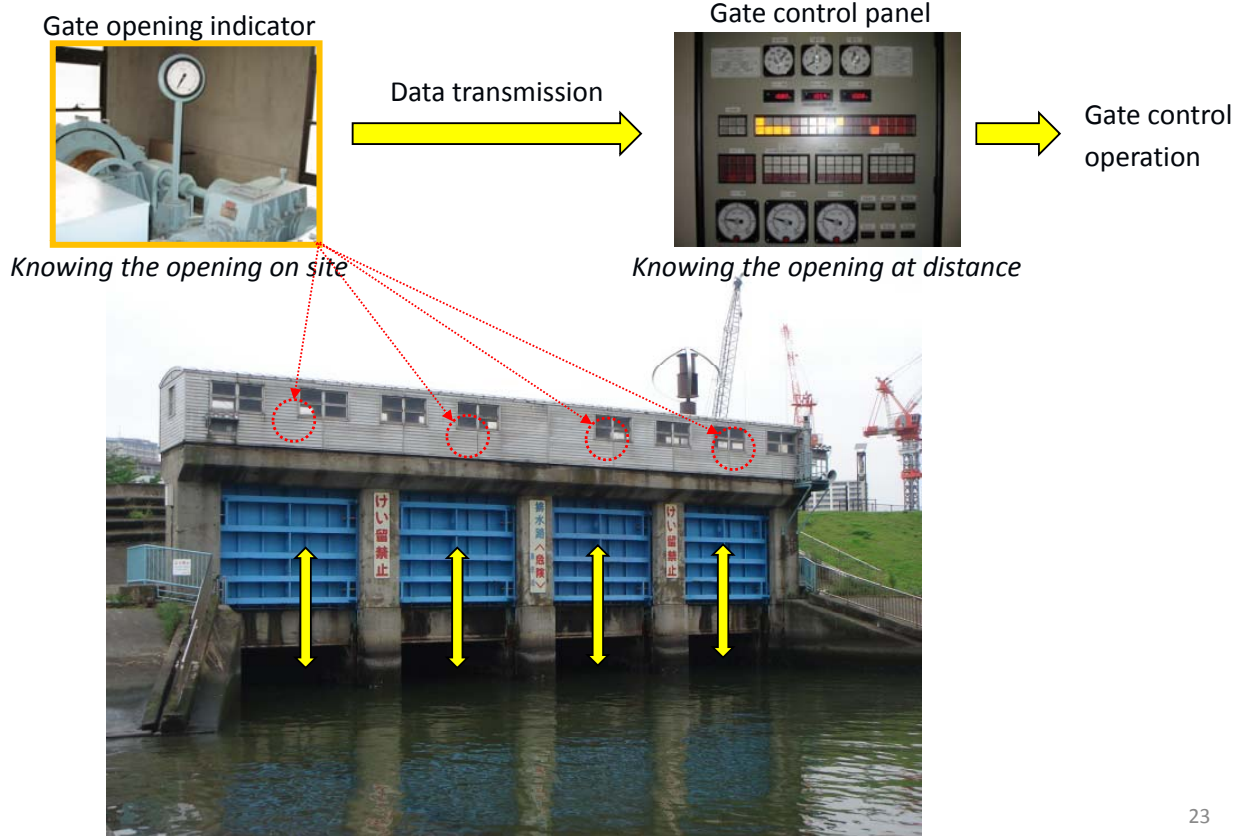


Reservoir Pond in retarding basin

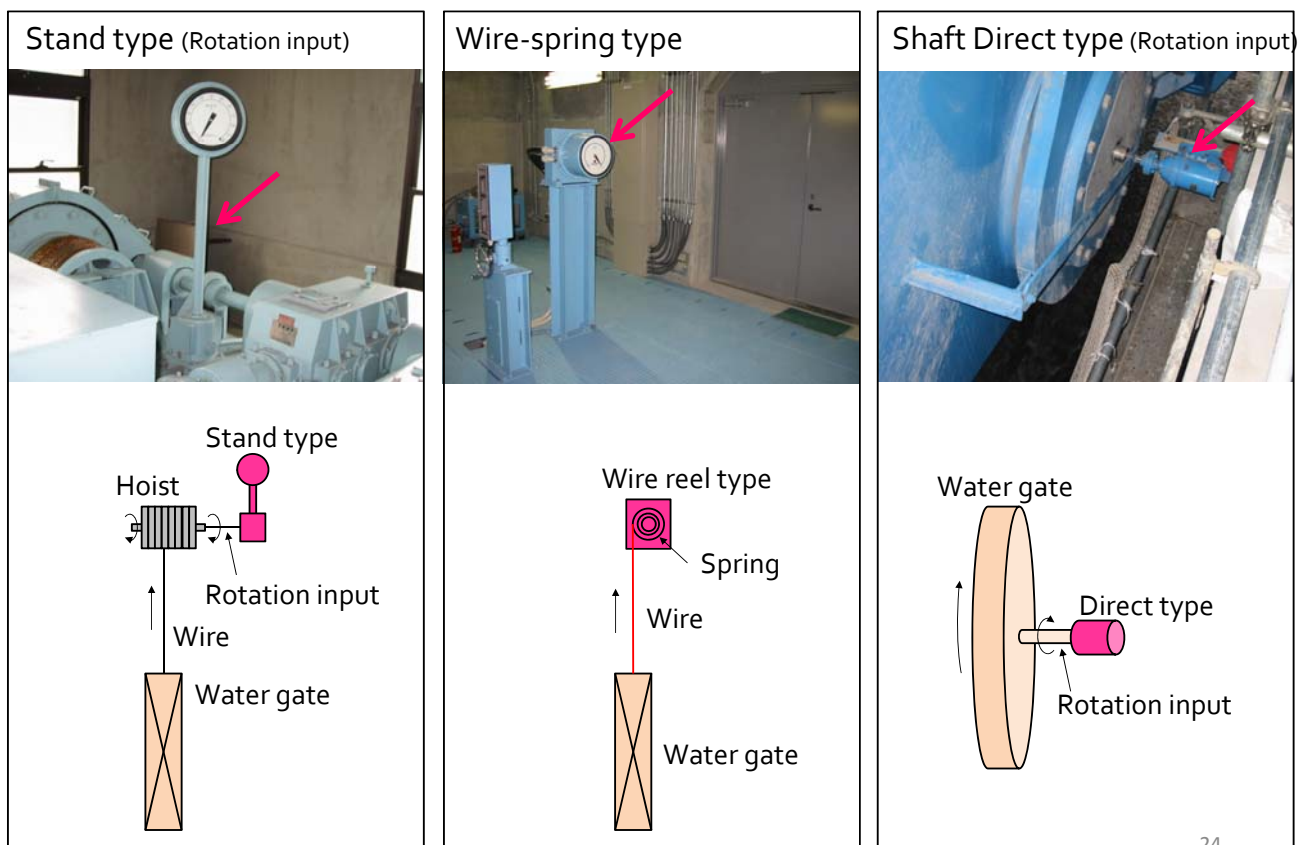
22

# Water Gate Opening Indicator

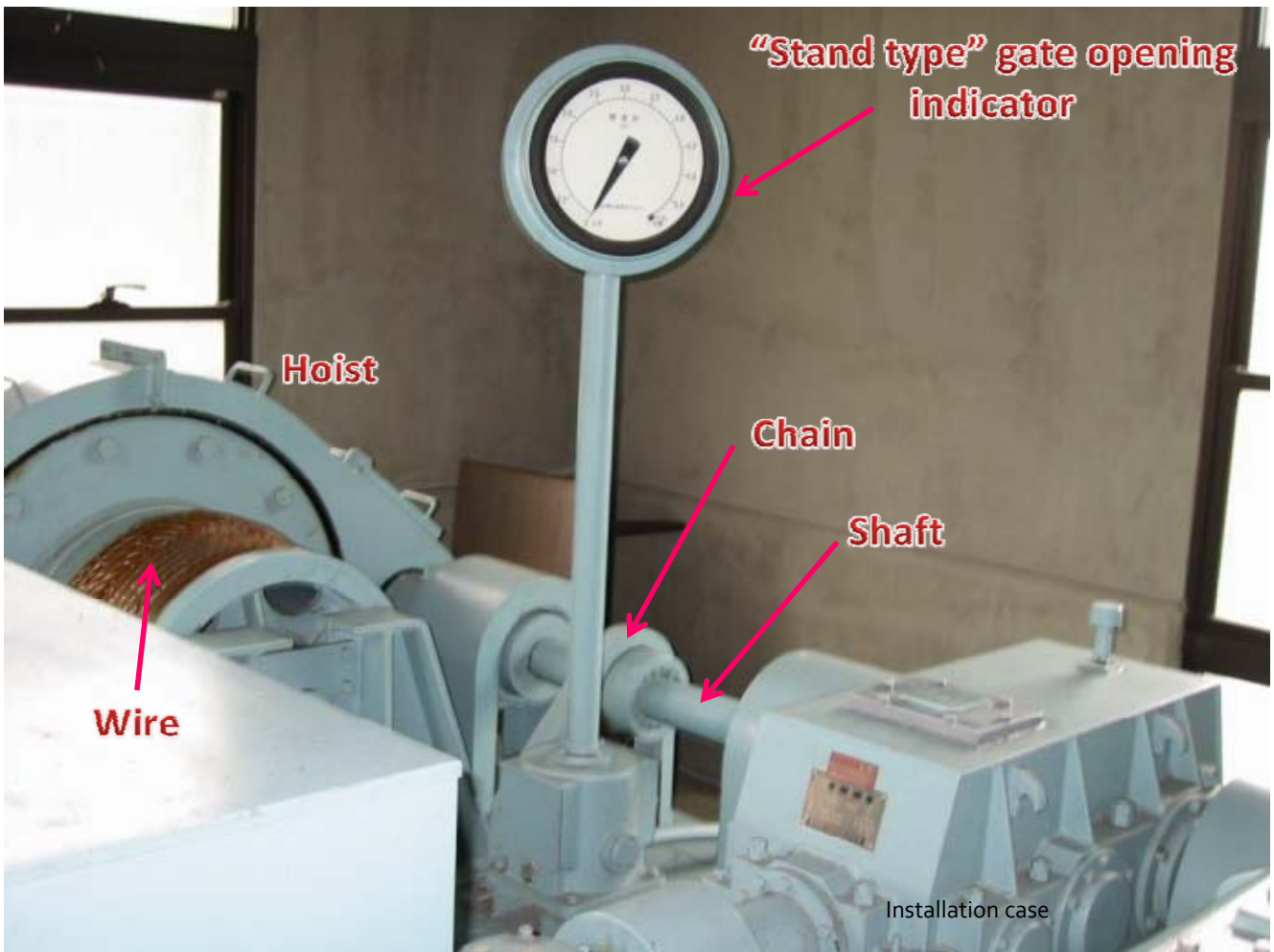
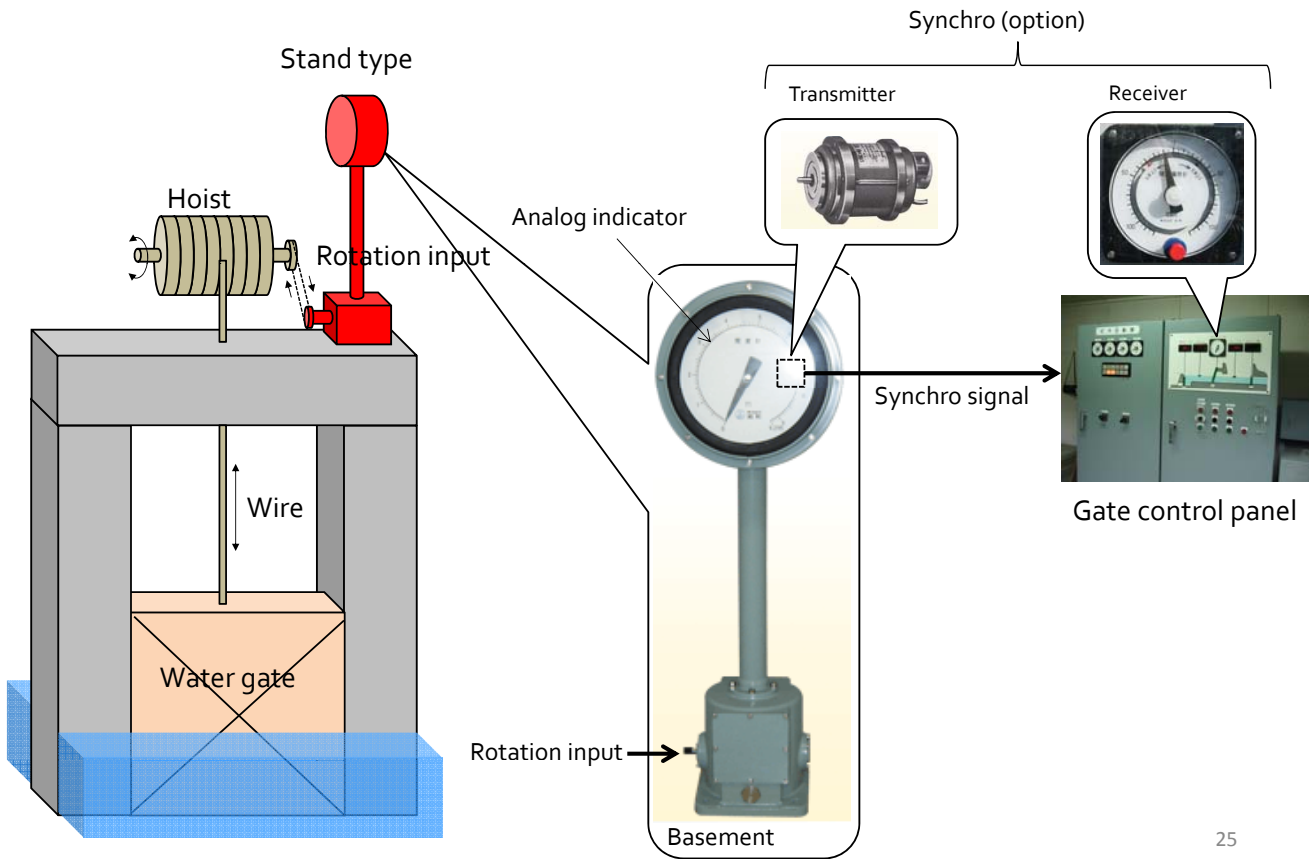
Water gate opening indicator is using for appreciate control of water gate.



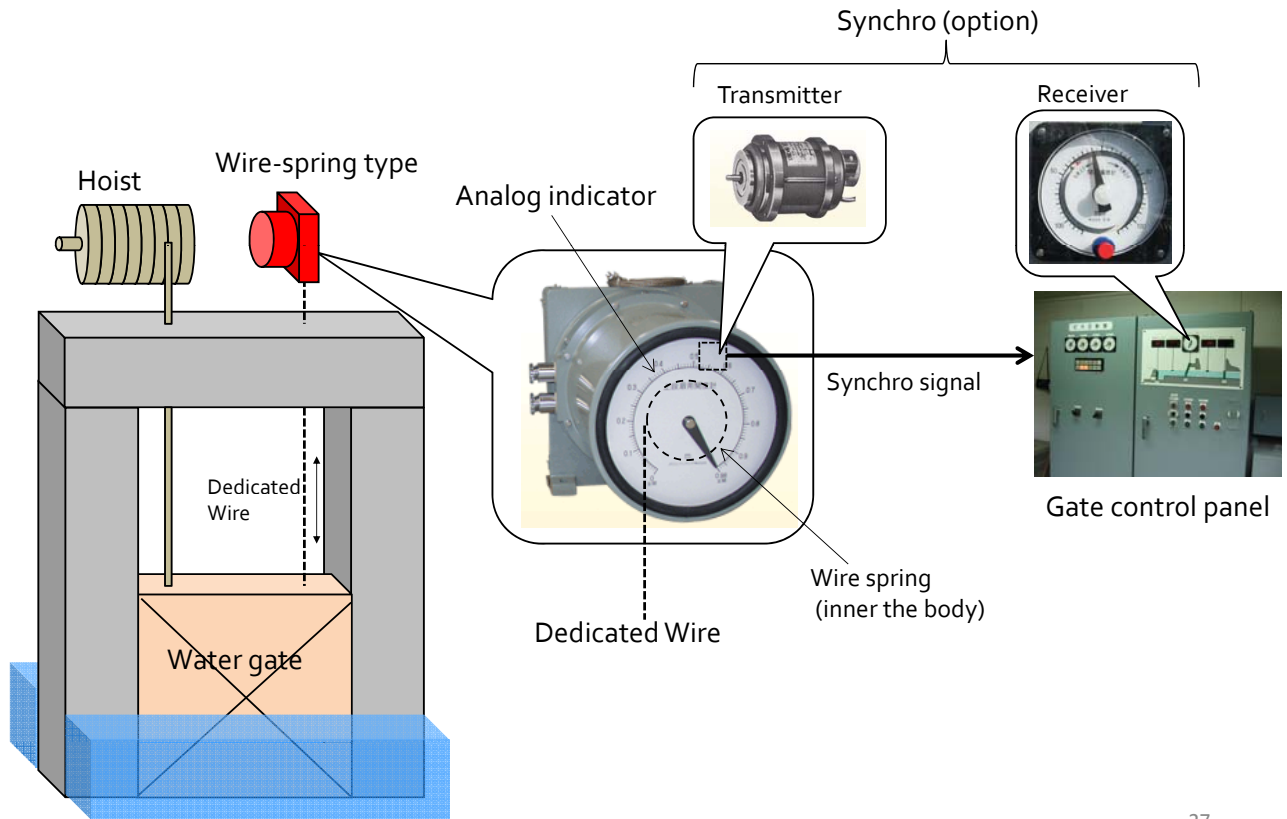
## Lineup of Water Gate Opening Indicator



# "Stand type" gate opening indicator



# “Wire-spring type” gate opening indicator



## Maintenance to Keep the Stable Observation

### Environmental Changes to Affect the Observation



Buried by sediment



Attacked by driftwoods

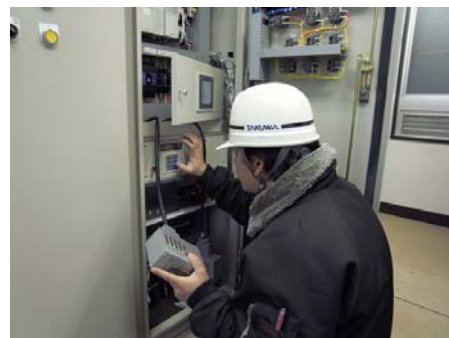


Drying up by river flow changes

### Periodical Maintenance Works



Cleaning Up



Signal Check

## Conclusion

- ◆ It is very important to measure the water condition appropriately by using equipment which has high accuracy and high durability.
- ◆ Appropriate equipment will contribute to the water-related facilities management and preventing disasters.
- ◆ Water-related problems are intensifying by development and climate change, and importance of measuring is also increasing.
- ◆ Maintenance works and data quality check are very important to keep the stable observation.
- ◆ We have various sensors suitable for the purposes and the field conditions.
- ◆ Their reliabilities are verified through long time usage in Japan.

We would like to provide our sensors and experiences to your country for enhancement the ability of water-related management.

29

Thank you very much for your attention

30