Water Supply in YOKOHAMA City

Manager for International Coordination
Takeo TANAKA

Yokohama Waterworks Bureau
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2. Water Supply in Yokohama
3. Challenges and Future Vision
Water Supply in JAPAN

Inclination pitch of Rivers

Rivers in Japan

- Jouganji River
- Abe River
- Tone River
- Chikugo River
- Yoshino River
- Sinano River
- Kitakami River
- Rhine R.
- Loire R.
- Colorado R.
- Seine R.
- Mekong R.
Water Supply in JAPAN

Water Resource for Supply

Annual intake
15.72 billion m³

As of 31.March, 2012
Water Supply in JAPAN

Administration

【National Government】
Ministries related to water in 11 ministries

**Water supply:** Ministry of Health, Labour and Welfare

**Water Environment:** Ministry of Environment

**River Control, Water Resource:** Ministry of Land, Infrastructure and Transport

**Industrial water:** Ministry of Economy, Trade and Industry

**Agricultural water:** Ministry of Agriculture, Forestry and Fishery

**Sewerage system:** Ministry of Land, Infrastructure and Transport

【Prefecture】 47 prefectures

【Cities, Towns and Villages】
- 1,727 communities（As of March 31, 2010）

Local Government
Ministries related to water in 11 ministries

**Water supply**: Ministry of Health, Labour and Welfare

*Waterworks Act (enacted in 1957)*
Ministerial Ordinance (technical standards etc.)
other decrees, regulations, orders

*Local Public Enterprise Act*: Ministry of Internal Affairs and Communications

【Prefecture】 47 prefectures

【Cities, Towns and Villages】
- 1,727 communities (As of March 31, 2010)
## History of these 130 years

**Urban area**

1887 Foundation of 1st modern water supply system in Yokohama

1945 World War II

<reconstruction>

Development of stimulated urban peripheral water supply systems

1957 Japan Finance Corporation for Municipal Enterprises was established to support to issue local bonds

### Rural area

1952 Nangkai Great Earthquake and **subsidy** for the area

1950's: Quality of Life Improvement Movement

Exemption of strict Accounting principal apply of self supporting

Launching many small scale public water supply systems
Water Supply in JAPAN

System & stakeholders

National Government

Ministry of Health, Labour & Welfare

Ministry of Internal Affairs & Communication

JWWA

Local Government

Local assembly

Subsidy

Approval of Tariff

Approval of bond

Water Utilities as PUBLIC ENTERPRISE
JWWA-1 Organization

General Assembly

President
7 Vice-President

7 Regional Branches

46 Prefectural Branches

1,355 Corporate Members
395 Individual Members
563 Associate Members

Executive Director

Board of Directors (13 directors)
Standing Executive Board

Audit Board (2 auditors)

Committee
Committee
Committee
Committee

Secretary General

General Affairs Dept.
Research Dept.
Training & International Dept.
Engineering Dept.
Inspection Dept.
Osaka Regional Office
Water Works Engineering General Institute
Quality Certification Center

As of Dec, 2016

Water Supply in JAPAN
Water Supply in JAPAN

JWWA-2 Activities【1】

Nation-wide collaboration on water supply issues
Annual conference and symposium, Approach to obtain government budget allocation, etc.

Research Activities on Water Supply Management/ technologies
Standardizations of water supply equipment and materials etc.

International Activities

Training
Water Supply in JAPAN

JWWA-2 Activities 【2】

The Inspection Service

The Certification Service

Publications

JWWA—GLP053
水道 GLP 認定
Water Supply in YOKOHAMA

Location of Yokohama

Tokyo Metropolitan

Tokyo Bay

Shizuoka Prefecture

Kanagawa Prefecture

Sagami Bay

Pacific Ocean

Japan

Tokyo

25km

30km

0km 1,000km

JICA
Water Supply in YOKOHAMA

Water Resource

A view from Doshi Village to Mt. Fuji

Mt. Fuji

Doshi

Yokohama
Water Supply in YOKOHAMA
Predawn of Modern Water Works

“THE FAR EAST,” 1. August, 1870

Water Vendor, (Supplying spring water from suburbs)

Wooden channel
Water supply area in 1887

Yokohama got 1.26 million gallons (5,720 m³) of water per day for 70,000 users.

As of the end of 1887

- Hydrant: 629
- Domestic tap: 1,068 households
- Common tap: 143 for 6,606 households

H. S. Palmer

Common Tap at that time
Yokohama became a city in 1889, and expanded into 75 times larger area municipality in 50 years.

<table>
<thead>
<tr>
<th>Area</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.40 km²</td>
<td>1889</td>
</tr>
<tr>
<td>24.80 km²</td>
<td>04.1, 1901</td>
</tr>
<tr>
<td>36.71 km²</td>
<td>04.1, 1911</td>
</tr>
<tr>
<td>133.88 km²</td>
<td>04.1, 1927</td>
</tr>
<tr>
<td>168.02 km²</td>
<td>10.1, 1936</td>
</tr>
<tr>
<td>173.18 km²</td>
<td>04.1, 1937</td>
</tr>
<tr>
<td>400.97 km²</td>
<td>04.1, 1939</td>
</tr>
</tbody>
</table>

Reclaimed
## Basic Information of YWWB

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of service</td>
<td>17/Oct/1887 (130Ys ago)</td>
</tr>
<tr>
<td>Served population</td>
<td>3,726,317 (F.Y.2015)</td>
</tr>
<tr>
<td>Connections</td>
<td>1,824,383 (F.Y.2015)</td>
</tr>
<tr>
<td>Service rate</td>
<td>100.00 % (Since 1988)</td>
</tr>
<tr>
<td>Pipelines length</td>
<td>9,250.6 km (F.Y.2015)</td>
</tr>
<tr>
<td>Fee collection rate</td>
<td>99.9 % (F.Y.2015)</td>
</tr>
<tr>
<td>Leakage (NRW) rate</td>
<td>5.6(8.2) % (F.Y.2016)</td>
</tr>
<tr>
<td>Daily supply (average)</td>
<td>1,127,804 m³ (F.Y.2015)</td>
</tr>
</tbody>
</table>
Water Supply in YOKOHAMA

Facility Control Systems

- SCADA
- Mapping System
  - Forecast of water suspension
  - Pipeline network analysis

- WTP
- Reservoir
- Pumping Station
- Intake Office, etc
Water Supply in YOKOHAMA

Customer Administration System

- Public server (Web service)
- Credit Card Cooperation
- Convenience Store Cooperation
- Log management
- Disk array

- Internet
- Telephone Call Reception system
- Pricing System
- Meter Reading System
- Forms management

- Call Center
- YWWB’s Office
- Handy Terminal
- Print Center
- CMT
Water Supply in YOKOHAMA

History of Pipe Installation

DN75 & over

- 1887: Cast Iron Pipe (CIP)
- 1930: Asbestos Cement Pipe (ACP)
- 1952: Steel Pipe (SP / SUS)
- 1963: Ductile Iron Pipe (DIP)
- 1965: Polyethylene Pipe (PEP)
- 1970: Galvanized Steel Pipe (GP)
- 1971: Lead Pipe (LP)
- 1974: Vinyl Pipe (VP)
- 1974: Stainless Steel Pipe (SUS)
- 1984: Vinyl Lining Galvanized Steel Pipe (VLP)
- 1985: Epoxy Coated Galvanized Pipe (ECGP)
- 2004: New Polyethylene Pipe (PP)
- 2006: Polyethylene Lining Galvanized Pipe (PLGP)

DN50 & less

- 1887: Polyethylene Lining Galvanized Pipe (PLGP)
- 1971: Galvanized Steel Pipe (GP)
- 1984: Polyethylene Lining Galvanized Pipe (PLGP)
- 2004: Stainless Steel Pipe (SUS)

(Year)
Water Supply in YOKOHAMA

Organization Structure

<table>
<thead>
<tr>
<th>Director General</th>
<th>Technical Administrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,555</td>
<td>1,362</td>
</tr>
</tbody>
</table>

- Improve Efficiency of Business
- Outsourcing
- Reemployment of Retiree

1,332 staffs as of 31 Mar, 2017
Water Supply in YOKOHAMA

Production Cost

Total Cost 165 yen/m³

As of 31. March, 2017

Other cities (yen)
Tokyo: 197
Nagoya: 157
Kyoto: 146
Osaka: 137
Kobe: 184

Cost for Bulk Water Supply 40 yen (24%)
Depreciation Cost 52 yen (32%)
Operation & Maintenance Cost 32 yen (19%)
Personnel Cost 25 yen (15%)
Others 16 yen (10%)
Water Supply in YOKOHAMA

Human Resource Management

- Setting development goals by merit rating system
  Awareness of capability development level using goal sharing sheet

- Human Resource Development Spiral
  - evaluation
  - personnel reassignment
  - setting a bit challenging goal

- Reflection at merit rating
  Reflected in promotion, etc.

- Reflection at career shaping interview

- Capability development toward a goal
  OJT, Off-JT, Self-Development

- Capability realization through performing tasks
Water Supply in YOKOHAMA
Sustained Endless Effort
Challenges & Future Vision

Future Demand Forecast

(x 10,000 m³/day)

1992 1.33 mil. m³/day
Peak Demand

2014 1.14 mil. m³/day

2035 (Estimation)
0.97 mil. m³/day

Actual record ← → Estimation

Challenges & Future Vision

Revenue of these years

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (Trillion Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>550</td>
</tr>
<tr>
<td>1994</td>
<td>600</td>
</tr>
<tr>
<td>1999</td>
<td>650</td>
</tr>
<tr>
<td>2004</td>
<td>701</td>
</tr>
<tr>
<td>2009</td>
<td>789</td>
</tr>
<tr>
<td>2014</td>
<td>701</td>
</tr>
</tbody>
</table>
Now, we are facing the time limit to replace pipelines which are installed during this period.
Challenges & Future Vision


YWWB provides future vision for each 5 areas to help customers and stakeholders of those areas.
Challenges & Future Vision

Environmentally Friendly Water Supply

Environmental load shall be reduced in the process of treatment from water source to water tap, that needs a lot of electric power.

① Energy Efficient waterworks
- Extending gravity flow systems
- Promoting renewable energy application

② Maintenance of water sources and environmental protection by public and private partnership
- Public relation by using official bottled water “Hamakko-doshi The Water”
- Maintenance water source forest with citizens volunteer and so on.
Established by YWWB on July 1, 2010
- Capital: 100 million yen (wholly funded by YWWB)
- Making use of YWWB’s technology and know-how accumulated for 129 years
- Contribution to water supply and sewerage utilities in home and overseas
Public-Private Alliance Offering Solutions to Water-related Issues

Yokohama Water Business Association

Overseas Water & Sewage Utilities

Support

Solutions

164 Private Companies

Partnership

Government, JICA, Universities, etc.

City of Yokohama

City of Yokohama

Private Companies
- Cutting-edge technology
- Rich experiences in overseas business

+ City of Yokohama
- Know-how for planning, construction, O&M etc.
Challenges & Future Vision

Y-PORT Center
Yokohama Urban Smart Solution

Establishing a knowledge hub for smart city management
Challenges & Future Vision

We can share future vision of water

130th Anniversary 2017

Foundation 1887
Thank you for your attention