<u>NRW Reduction</u> In Tokyo

≪GIS & SCADA≫



Hajime Horiguchi

Tokyo Suido Services Co., Ltd.



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1. Introduction

1.1 Tokyo Now

1.2 Tokyo's Experience



1.1 Tokyo Now

Since the start of modern water supply in 1898, Bureau of Waterworks, Tokyo Metropolitan Government has been supporting the urban prosperity of Tokyo, one of the biggest cities in the world.



Start of Service	December 1, 1898
Service Area	1,223km ²
Population Served	12.8 million
Non Revenue Water Rate (Leakage Rate)	4.2 % (2.8 %)
Total Pipe Length	26,348 km
Water Supply Capacity	6.9 million m ³ /day
Average Daily Supply	4.3 million m ³ /day
Water Availability	24/7

Note: AS of 2012



1.2 Tokyo's Experience

Water Crisis and Water Demand & Supply Capacity Expansion





2. Establishment of Water Saving City



Five policies

2.1 Water saving tariff

2.2 Promotion of water recycling

2.3 Development/extensive use of water saving devices

2.4 Water saving campaign

2.5 Acceleration of leak prevention



2.1 Water saving tariff system

Increasing with diameter

Increasing with consumption

			Volume Charges								
		Fixed	1	6	11	21	31	51	101	201	1,001
Charge brackets		Charges	~	~	~	~	~	~	~	~	~
			5	10	20	30	50	100	200	1,000	
		(Yen)	m ³								
			(Yen/m3)								
Household & industries	φ 13mm	860									
	φ 20mm	1,170	0	22	128	163	202	213	298	372	404
	φ 25mm	1,460									
	φ 30 mm	3,435						212	200	270	404
	φ 40mm	6,865						213	290	512	404
	φ 50 mm	20,720								270	404
	φ 7 5mm	45,623								312	404
	φ 100 mm	94,568									•
	φ 150mm	159,094									
	φ 200mm	349,434									404
	φ 250mm	480,135									
	φ 300mm~	816,145									
Public bath			0	22							100
	▶		0	22							109
¥ 6,865 for diameters of 40mm or more											

* Water bill includes charge and consumption tax:

Billed amount = (Fixed charge + Volume charge \times Volume) \times 1.05



2.2 Promotion of water recycling



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2.1.3 Development/extensive use of water saving devices





2.4 Water saving campaign



Water Campaign Caravan for elementary school pupils



Brochure



"Water Day" event



Directly drinking from taps



Poster



2.5 Acceleration of leak prevention **(1)**Replacement with anti-seismic joint pipes



Replacement (3)Leak detection



(4)Leak repair





Earthquake-proof joint pipe



(new type)

2Replacement with stainless steel service

Stainless Steel Pipe (self-bendable corrugated)

> 980~ **Stainless Stee**

> > Pipe

Elbow(Flexible Joint)

1979

₁₉₉₈ pipes

2.6 Total consumption/person/day

Distribution (10⁵m³) Population served (10³people)

Consumption (liters/person/day)





3. GIS and Map Management System

3.1 GIS3.2 Map management system



3.1 GIS

3.1.1 Composition and main functions



Main functions

- **1** Retrieving diagrams
- **2** Displaying distribution stop and cloudy water areas
- **3** Retrieving and displaying detailed diagram information
- 4 Retrieving and displaying construction work information
- **5** Retrieving and displaying emergency information



3.1 GIS

3.1.2 Displaying distribution stop span and cloudy water areas The area of cloudy water resulting from a distribution stop over a span of a pipeline can be estimated and displayed.





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3.1 GIS





3.2.2 Pipeline inspection for proper management

Air valve inspection

Pipe offset measurement



Gate valve inspection







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3.2.4 Water Suspension Management Diagram





: Valve

3.2.5 Offset diagram





4.1 History of Water Supply operation Center
4.2 Purification Plants and Supply Stations
4.3 Data collection and monitoring
4.4 Pipe Trouble Detection
4.5 Water Distribution during Soccer Game
4.6 Pressure and leakage rate



4.1 History of Water Supply Operation Center

1964: Telemetry systems began to be installed.
1979: Water Supply Operation Center was established.
Number of distribution Pipe telemeters: 215

Kinds of collecting data: 1,400



2012: Number of distribution pipe telemeters: 310

Kinds of collecting data: 20,000

Number of monitoring facilities: 54

•The center monitors 24/7.

• Supply stations and purification plants are operated according to the raw water intake plan, transmission /distribution main operation plan, distribution pump operation plan, and service reservoir operation plan prepared by the center.





4.3 Data collection and monitoring

Collecting data on pressure and flow rate from water sources to distribution networks





If the upper or lower limit is exceeded, an alarm will sound and the conditions will be displayed on the multi-screen.



4.5 Water Distribution during a Soccer Game of Japan vs Denmark in FIFA



4.6 Pressure and Leakage rate

Mpa : Water Pressuer

%: Leakage rate



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5.Conclusion

Our "efforts toward 3% leakage rate" won the Global Honour Awards.



The IWA 2012 World Project Innovation Awards



Atsushi Masuko Director General, Bureau of Waterworks, Tokyo Metropolitan Gvmt.



Provide safe and secure water to the world



