

Improvement of Water Environment

- Sewerage System in Yokohama -

Past Condition in Yokohama



Wastewater Treatment Plant

Diffusion Rate of Sewerage Service increased from 17% to 90% in less than 20 years



Source of Photos: Environmental Planning Bureau, City of Yokohama

Project Summary

The development of the sewerage system in Yokohama City was extremely delayed due to the destruction wrought by World War II. In addition, the rapid population growth in the sixties was accompanied by such problems as night soil disposal and pollution of major rivers. To address these issues, Yokohama City took a multipronged approach to ensure an effective and speedy development of the city's sewerage system.

In Past Years

Deterioration of Water Environment

- ✓ Water pollution
- ✓ Insanitation
- ✓ Flood/Inundation

Delay in Sewerage System Development

- Lack of Budget and Human Resources
- Shortage of Skills and Experience

Rapid Progress of

- ✓ Population Increase
- ✓ Urbanization
- ✓ Industrialization

Yokohama's Approaches

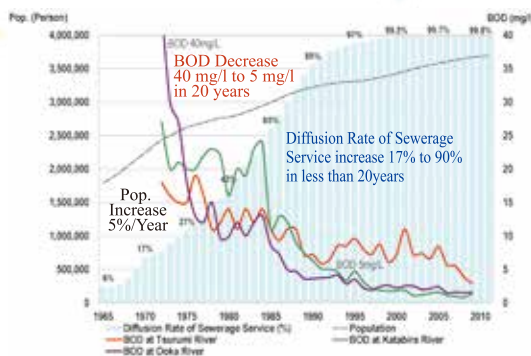
- ◆ Strategic planning and phased construction
- ◆ Adoption of advanced technologies
- ◆ Cooperation with the private sector
- ◆ Sound financial management
- ◆ Strengthening of public relations
- ◆ Comprehensive flood control system

Present



Source: Environmental Planning Bureau, City of Yokohama

Yokohama City has achieved a diffusion rate of sewerage service of 100% within a short period of time and nowadays works on sewage reuse for a sustainable future. Sewage sludge is now 100% incinerated and 100% reused.



Lower BOD levels in Yokohama's rivers (reduction of river pollution)

Source: Environmental Planning Bureau, City of Yokohama

Key Approaches for Effective Development of Yokohama's Sewerage Systems

■ Strategic Planning and Phased Construction

Based on a long-term plan, the city's sewerage system was built in phases, regulations and guidelines were developed, and certain areas were prioritized.

■ Adoption of Advanced Technologies

The city's sewerage system consists of separate and combined systems both for efficient and speedy development. In urban areas, pipe jacking and shield tunneling methods, which have a small impact on traffic, were adopted to install sewer pipes.



Shield tunneling machine

■ Cooperation with the Private Sector

The private sector played a key role in facility development. While private developers used their capital to install sewerage facilities, such projects had to comply with relevant government regulations. PFI schemes* have also been adopted in utilizing modern technologies and harnessing the experiences of the private sector.

*PFI projects include those in power generation from anaerobic digestion and soil improvement using incinerated sludge ash. The private sector is responsible for the rehabilitation, operation, and management of plants.

■ Sound Financial Management

Sewerage projects are managed using municipal budget, national government subsidy, and user charges. Sewerage works are managed financially by an accounting system that is based on corporate accounting methods.

■ Strengthening of Public Relations

To raise public awareness and understanding, many activities were implemented such as site visits of sewerage facilities, education of students, and conduct of public forums.



Site Visit for WTP

■ Comprehensive Flood Control System

Flood and inundation problems are managed by comprehensive flood control which includes not only construction of drainage channels and pumping stations but also regulation of land development, preparation of hazard map for flooding, and installation of run-off control facilities such as storage and infiltration systems.

Outline of Sewerage System in Yokohama City

Item	Value (2012)
City Area	435 km ²
City Population	3.70 million
Diffusion Rate of Sewerage Service	99.8 %
Wastewater Treatment Plant	11 places
Sludge Treatment Plant	2 places
Total Sewer Pipe length	11,700 km

Source: Environmental Planning Bureau, City of Yokohama



Dai-chan, mascot for Environmental Planning Bureau

Sewerage System Map



● Wastewater Treatment Plant (WTP)
● Sludge Treatment Center
● Pumping Station

Source: Environmental Planning Bureau, City of Yokohama

Note: Color-coded areas show coverage of treatment districts.

Use of Sewerage Resources and Assets: Global Implications

Yokohama City is continuing the recycling and use of sewerage resources and assets to create an eco-friendly society. Sewage sludge is now incinerated and reused 100%.

■ Effective Use of Treated Wastewater

Treated wastewater is used for cleaning/cooling of machinery, toilet flush water and landscaping in public utilities.



As toilet flush water in public facilities



As water flow in small streams

■ Effective Use of Digestion Gas

Digestion gas is used for gas engine to generate power and for fuel of incinerators in the sludge treatment plant.



To generate power using digestion gas



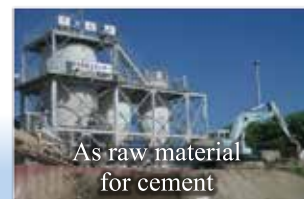
As auxiliary fuel for incinerators

■ Effective Use of Incinerated Sludge Ash

Incinerated sludge ash is used for improved soil and cement raw material in construction works.



To improve soil for backfill



As raw material for cement

Source of Photos: Environmental Planning Bureau, City of Yokohama