Training and Technical Development Center Bureau of Waterworks Tokyo Metropolitan Government

Collaboration

Management Policy

I HRD to support the waterworks management with a smaller number of staff
II R&D applied to work sites to meet changing needs
III Creation of synergy effect through collaboration between training and technical development

HRD

R&D

東京都水道局

Websites : http://www.waterworks.metro.tokyo.jp/

Background of Establishment

Tokyo Metropolitan Government Bureau of Waterworks consists of a wide variety of facilities including water source facilities, water purification plants and a network of distribution pipes with a total length of roughly 26,000 km. In order to stably supply safe and better tasting tap water, the facilities must be operated properly 24 hours a day 365 days a year and be maintained continuingly in good conditions.

For this reason, it is extremely important to possess specific know-how for waterworks management and techniques serving for field services, for instance, the adjustment of water purification operations to adapt to the changes in raw water qualities and the emergency responses to earthquakes or large-scale water leakage accidents.

In order for Tokyo Waterworks to stably supply safe and better tasting tap water to the customers, with combined efforts between training section and R&D section, Training and Technical Development Center is making an effort for passing down technical capabilities in the bureau, improving abilities of personnel staff, and promoting R&D that directly corresponds to our diversifying needs.

Characteristics

The largest facility for waterworks training in Japan

The center's facilities were constructed by utilizing part of Tamagawa Water Purification Plant (19,000 square meters), which ceased treatment of drinking water in 1965 due to deterioration of water quality in Tama river.

Air photograph of the water purification plant in white line and the Center in red line

Part of the filtration tank walls of the old purification plant utilized as brick walls

The facility features a training environment which imitates actual sites as much as possible. Various facilities such as a filed with equipment which can purposely generate water leakage, practice area for water pipe construction. Young trainees acquire techniques through physical practice with lectures by experienced staff. The development facilities are equipped with water treatment experiment facilities and a field with experimental pipeline in the same condition as actually used water pipes under ground throughout the city. At these facilities, research and development of new waterworks technology is carried out with the cooperation with the universities and the private enterprises.

The training field for water leakage control
Artificially water leakage can be generated at the service pipes laid underground

The development field with basic facilities for R&D such as loop pipes and pumps

The objectives, functions and design of the Center has been rated highly, and was recognized in the Administrative Building Division at the 13th Public Buildings Award (Minister's Prize, the Ministry of Land, Infrastructure, Transport and Tourism) held by the Public Buildings Association in October 2012.

Direction

Training is operated by an annual plan based on "Training Plan 2005 –Stage2-", which indicates training purposes and principles for training management.

The objectives of training

1. HRD for the era of business operation by smaller number of staff
2. Passing down and improvement of technique and know-how
3. Fostering personnels who take the lead in the waterworks field

Training arrange and policies

1 Long term vision for HRD

- Respective trainings to each position title with clear definition of "basic roles and abilities required in each position"
- Practical training with clear achievement goals
- Support for self-learning

2 PDCA cycle and effective HRD

- Development of training effect evaluation methods
- Development of framework for training instructors
- Compiling a data base of records of trainees and instructors

3 Enrichment of practical training and introduction of effective training methods

- Enrichment of practical training with hands-on practices and exercises
- Training for improving risk management skills with a simulation system
- Support to promote OJT at all sections in the bureau

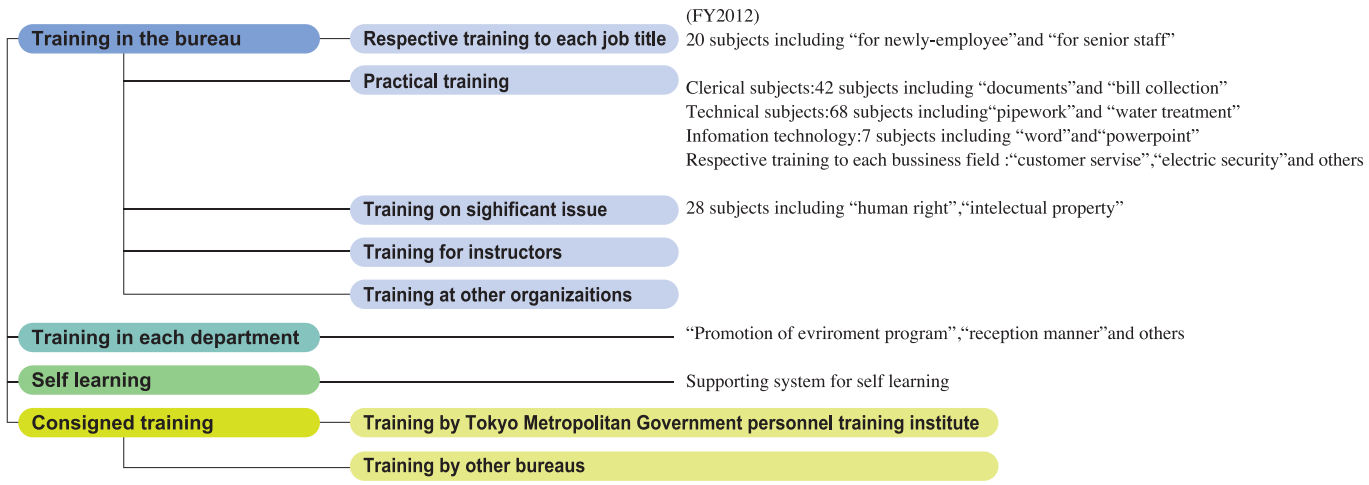
4 HRD under cooperation with administrative organizations

- Improvement of the framework for accepting staff members of administrative bodies into training
- Collaborative training to meet both sides' needs

5 HRD with the view of contribution to waterworks organizations at home and abroad

- HRD for employees to serve international affairs projects and activities
- Trainings to overseas waterworks organizations in accordance with each need
- Trainings in collaboration with other waterworks organizations at home and abroad

Training system



Training Scenes and Facilities

【Leakage prevention】

Skills of water leakage detection using electronic detectors and acoustic bars, fixing water leakage by exposed split ring and pipe freezing methods are acquired.

【Connecting distribution pipes】

Practice connecting large diameter pipes of 500 mm with seismic joints in a pit at a simulated construction site. Trainees learn necessary know-how of piping and the key points of security, which are required in supervising contractors.

Pipe laying, branch construction, connection to other pipes, construction with spot pipe removal etc with small diameter seismic pipes 100 mm and 150 mm are practiced. After the completion of works, passing water test is conducted.

【Electrical training 】

Electrical equipment identical with practical use in purification plants and water supply stations, and controller models are used in training. Trainees learn know-how of checking and wiring.

【Mechanical training 】

Assembling-disassembling pumps, making characteristic curves, various measurements using pipes, making practice using galvanized steel pipe and electric protection are part of this training course.

【Plant for water purification practices】

Practicing water analysis and water purification processes by operating the purification processing plant (chemical injection, coagulation-sedimentation and rapid filtration).

【Water analysis room】

Practicing by inspecting turbidity, chromaticity, pH, alkalinity and residual chlorine to learn the basics of water quality management at water purification plants.

Cooperation between Training Sector and Technical Development Sector ①

【Employee Education and Training System】&【Risk Management Training Course】

An “Employee Education and Training System” has been developed using simulated experience of incidents such as “pipeline accidents”, “water quality accidents”, “equipment accidents” and “earthquake response measures” on computer screens for the training of response by notifying information with a roll-playing system. Utilizing the system, a “Risk Management Training Course” has been conducted since FY2008.

These efforts were recognized with the East Asia Regional Honour Award at the International Water Association’s Project Innovation Award 2012.

R & D Policies

Overall coordination of R&D projects in the bureau	■ Affirmation of R&D commitments by Technical Development Review Committee ■ Comprehensive coordination of surveys, research and development
Accurately understanding the needs of work sites	■ Field examination and interviews with various sections ■ Advertising for technical problems and demands arising in day to day operations
Utilization of effective and efficient R&D methods	■ R&D implementation making most use of Development field's function ■ In addition to commission research, utilizing joint research with open submissions and other initiative, and a variety of R&D methods
Promotion of practical use of the R&D results	■ Evaluation of R&D projects by Technical Development Review Committee ■ Studies into utilization conditions of past development results and investigations into improvements
Integrating development functions and training functions	■ Development of Knowledge Bank System and Employee Education and Training System ■ Distribution of technical information through intranet

Approaches for R & D

Commissioned research: the technical capabilities of private companies are utilized, with R&D led by the Bureau.

Joint research: the ideas and techniques of private companies, and the think-tank functions of universities are utilized actively to conduct more effective and efficient R&D.

Directly-managed studies: conducting studies of existing technology, literature view of new technology and following up after development.

[Joint research with open submissions]

To conduct even more advanced, diversified research in a more efficient manner, "Technology that the Center Seeks" is uploaded to the Center homepage (see image on right) as part of a call for technology to resolve a wide range of issues.

Cooperation between Training Sector and Technical Development Sector ②

【Knowledge Bank System 】

By compiling knowledge and business know-how into a database of documents and videos, a knowledge bank system has been developed where staff can access required information at any time via the intranet. This system has been in operation from April 2007.

The knowledge bank system contains videos and descriptions made by using technology of technical experts of water supply (staff with a high level of technical experience certified by the bureau) as part of efforts to pass down technology.

Top page


Examples of updated movie

Major Development Results

【Various types of water meters】

The examples of developments are the dry digital water meters (DA meter) with high durability and small failure rate, the electronic water meter (EA meter) suitable for use in automatic meter reading system.

【Automatic meter-testing equipment】

Through the automation, the manual meter testing works with measurement tank, which required skill and time, became more efficient and easier to handle for every person.

【Internal pipe inspection robot】

This machine was invented to investigate inside of pipes 800 mm or more in diameter by remote-controlling, without causing water flow suspension. The condition of pipe inside can be clearly observed by camera attached to the robot. Also the distance between joints can be measured. It has been utilized in pipe maintenance and management works on site.

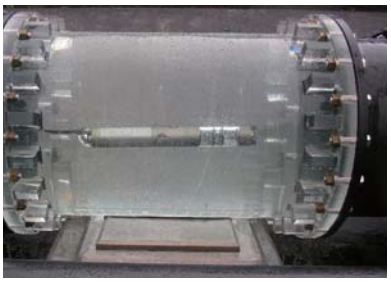
【Water treatment experiments 】

Research is conducted to improve water processing technology with the aim of supplying safe and tasty water. Research is currently being conducted into water purification technology with a focus on filter membranes capable of filtering low-molecular substances, and water treatment technology such as plant-based activated carbon that is environmentally-friendly.

Exhibition room

Easy-to-understand displays of past R&D products exhibit. Some products can actually be picked up and used.

Pipe facilities for experiment at development field



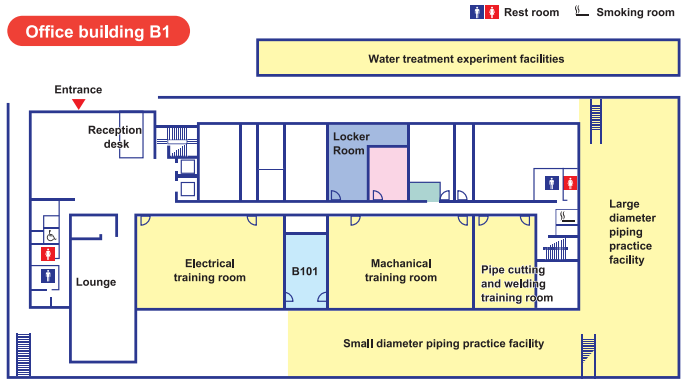
Clear acrylic pipe is used so that the interior of pipes can be observed during experiments (photo is of the Internal Pipe Inspection Robot).

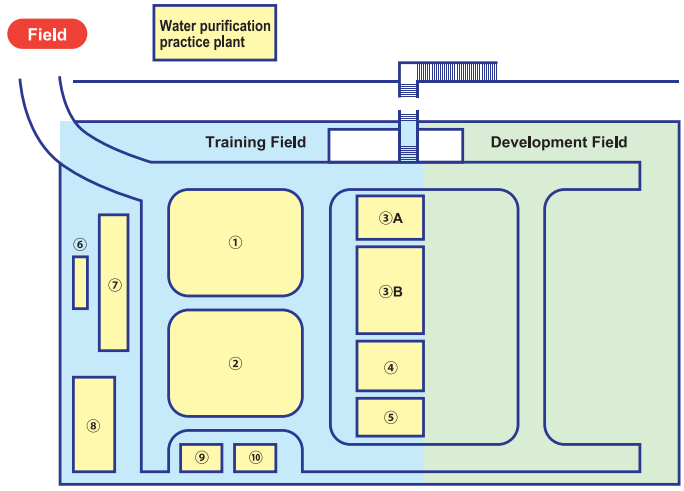
R & D debriefing session

An R&D debriefing session is held once a year to actively present information on R&D results inside and outside the bureau.

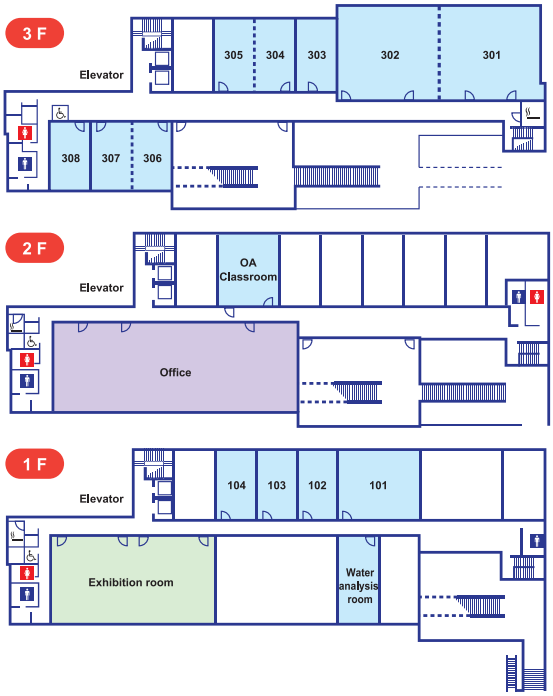
Floor Map

Office building B1 (Entrance) / Field





Office building 1F – 3F



Watch-and-learn facilities

⑥Model concrete retaining wall

⑦Model sheeting, lining and suspension type protection

⑧Cutaway model of different pavement types

Class room	Capacity(people)	
301	100	200 ※1
302	100	
303	24	
304	24	48 ※1
305	24	
306	24	48 ※1
307	24	
308	24	
OA	25	
101	—	
102	24	
103	24	
104	24	
B101	20	

*1 Without partition

Training Facility		Examples of Training Menu
Electrical training room		Sequence wiring, Instrumentation theory, Measurement and testing of substations
Mechanical training room		Pump performance test, Dismantling and assembling
Pipe cutting and welding training room		Cutting of small diameter pipes
Large diameter piping practice facility		Pipe joint (500Φ,700Φ)
Small diameter piping practice facility		Pipe joint (150Φ,100Φ)
Training Field	① Leakage prevention training area	Repair of leakage on distribution pipes, Minimum flow measurement, Leakage detection, Detection of buried pipes
	② Leakage detection practice area	Leakage detection in different kind of pavements, Minimum flow measurement, Detection of buried pipes
	③A Mock Leakage area	Leakage detection on different kind of pipes, Meter exchange, Pipe freezing method
	③B Valve practice area	Operation skills, Mechanism of valves, Dismantlement /Assembling /Repair
	④ Piping training area	Digging, Supply pipe piping, Connections in different kind of pipes
	⑤ Meter replacing practice area	Meter replacement, Leakage repair
	⑨ Pressure reducing valve training area	Mechanism of pressure reducing valves, Operation skills
	⑩ Plug accidents training area	Unplugging accident simulation, Accident prevention techniques
Water Purification Practice Plant		Chemical injection, Coagulation, Sedimentation, Trouble Simulation

International and Domestic Contribution in the Waterworks Field

International contribution

● Acceptance of overseas trainees

Overseas trainees and visitors are gladly accepted through projects of JICA and other international organizations. In FY2011, 143 foreign guests visited the center.

Recent years, trainings in longer period have been conducted as the 2 week training course of water leakage control for specialists from MWA, the Kingdom of Thailand in FY2012.

Trainees from the Kingdom of Thailand (MWA)

Number of foreign visitors and trainees (FY2011)

Country/Region	People
Kingdom of Thailand	27
Malaysia	21
Republic of the Philippines	17
India	17
Republic of Korea	15
Other Asian countries	20
Republic of South Africa	9
Other African countries	10
Latin America	6
Europe	1

Trainees from the Republic of South Africa

Visiting by ambassadors in Tokyo

●The Asian Waterworks Utilities Network of Human Resources Development (A1-HRD)

Under the proposal by Bureau of Waterworks, Tokyo Metropolitan Government, the network was established with the aim of contributing to leveling up the waterworks throughout the Asia.

Through annual meeting and daily interactions, know-hows of HRD are exchanged.

The 5th meeting of A-1 HRD in Kaohsiung,Taiwan held in October 2012

Renting training facilities to governmental authorities

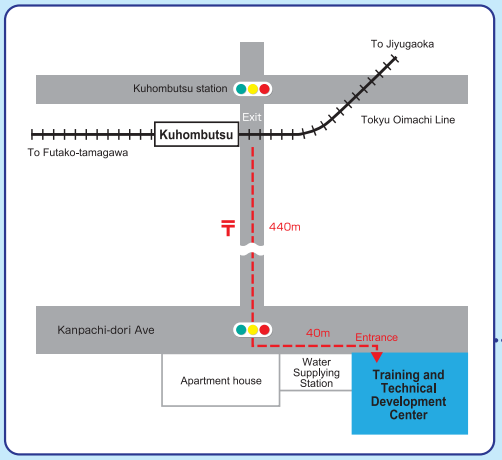
Our facilities are open to other waterworks utilities to support enhancing their technical skills.

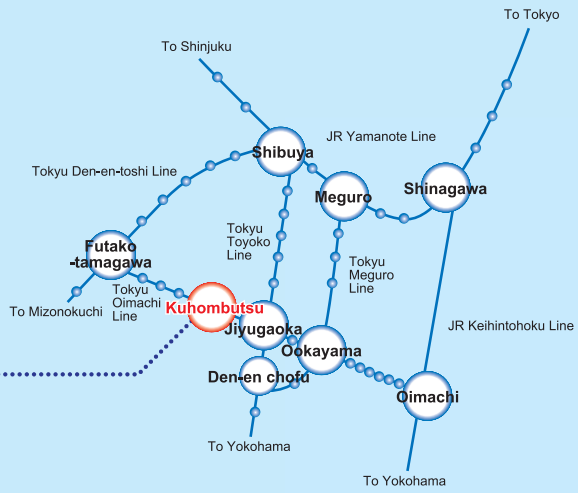
Cooperation with Japan Water Works Association

Under the cooperation with JWWA, training sessions on technical affairs have been organized for other waterworks utilities and private companies.

Access

【8 minutes on foot from Kuhombutsu station, Tokyu Oi-machi Line】





Training and Technical Development Center
Bureau of Waterworks
Tokyo Metropolitan Government
Phone/ +81-3-5483-3507
F a x/ +81-3-5483-2639
1−19−1 Tamagawa-den'enchofu
Setagaya-ku Tokyo JAPAN 158-0085

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