Training and Technical Development Center

Bureau of Waterworks, Tokyo Metropolitan Government

Management Policy

I Cultivation of human resources to support the waterworks management with limited number of staff

II Research and Development for coping with change in needs related to practical use

III Creation of synergy through cooperation with Training and 'Research and Development'

Please visit our website for more information and details:
http://www.waterprofessionals.metro.tokyo.jp/

東京都水道局

Background of the Training and Technical Development Center

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 allow the facilities to continue to operating properly 24 hours a day 365 days a year and to stably supply safe and better tasting tap water, the facilities must be maintained 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 the quality of raw water and the emergency responses to earthquakes and large-scale water leakage accidents. Such know-how and techniques have been accumulated through many years of field experiences. However, the number of opportunities to experience field work has been decreasing as more and more operations are being outsourced. In addition, considering the retirement of many experienced staff in the near future, how to smoothly transmit these advanced techniques to younger staff is increasingly becoming a concern.

Under such circumstances, the Training and Technical Development Center of the Bureau of Waterworks, along with facilities for field training, was established in 2005 in order to transmit know-how and techniques required for managing field services for stable water supply, which is achieved by intensive, practical training in addition to conventional on-the-job-training.

In order for Tokyo Waterworks to stably supply safe and better tasting tap water to the customer in the future, with combined efforts between training section and research and development section, Training and Technical Development Center is making an effort to improve the transmission of technical capabilities, the improvement of the ability for our personnel, and the research and development that directly corresponds to our diversifying needs.

Location and Feature of Facilities

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

The facility features a training environment which imitates an actual site as much as possible. The training facilities offer the opportunity for young trainees to acquire techniques through physical practice since it equips not only normal class rooms but also a training field which can artificially generate water leakage, facilities to practice water pipe construction, and experienced staff to give practical lectures. The development facilities are equipped with water treatment experiment facilities and a training field which has experimental pipeline in the same condition as actual water pipes in use throughout the city. At these facilities research and development of new waterworks technology is carried out with the cooperation between the university and the private enterprises.

＊ Aerial photograph of water treatment plant taken from the southwest of the plant.
・White line corresponds to the area of Tamagawa water treatment plant.
・Red corresponds to the range of the Center.

＊The training field. Distribution pipes, hydrants, drainage facilities and etc. are buried under the pavement. Water leakages can be artificially generated here.

＊The development field. Basic facilities for the necessity of research and development on waterworks such as loop pipes, pumping and etc are located.

Training

Aim of training

Training is operated by an annual plan based on "Training Plan 2005-Stage2-" as a basic guideline which indicates training purposes and a principle for training management.

The Objectives of Training

1. Cultivation of human resources to achieve work efficiency with limited number of staff
2. Transmission and improvement of know-how and techniques
3. Cultivation of human resources to take the lead in the field of waterworks

Direction of training management

1 Long-term vision for the development of human resources

- Rank-specific training based on clear definitions of 'basic roles and capabilities required for each work assignment.
- The practical training etc. that clarifies the ability level needed for work.

2 Establishment of PDCA items for training and effective human resources development

- Quantitative and objective evaluation for the results of the training, and reflection of those evaluations for training project.
- Construction of a database of training records, training instructors' qualifications, etc.

3 Improvement of hands-on training and introduction of effective training techniques

- Improvement of hands-on training courses adopting practical training and exercises.
- Implementation of training courses for the risk management through simulated experience using simulators etc.

4 Cultivating human resources with administrative organizations

- Enhancement of the system to accept staff members of administrative organizations into training.
- Implement cooperative training which satisfies both needs.

5 Promotion of mutual training and development of high-level capabilities

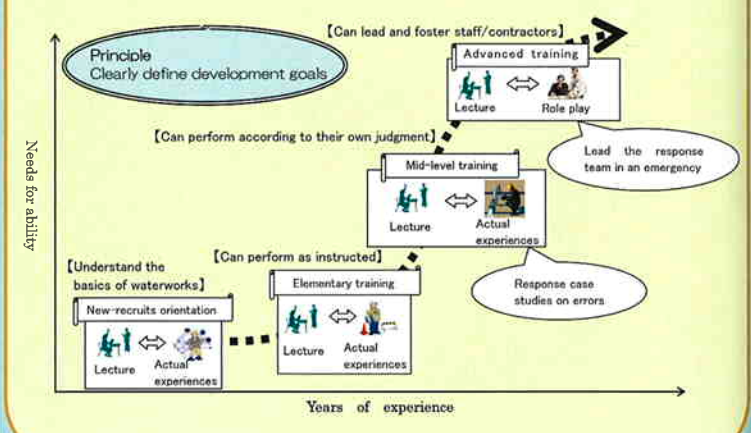
- Implementation of training courses in coordination with institution relates to waterworks and project partners.
- Implementation of training courses aiming to obtain waterworks-related qualifications etc.

Personnel Training System Diagram of Tokyo Waterworks

Personnel Training

- **Training out of workplace**
  - **Training in Tokyo Waterworks Bureau**
    - **Training course classified by duty level**
      This training aims at the acquisition of the knowledge requested commonly.
    - **Training course for practical jobs**
      This training offers the knowledge, technology, and skills required at each level of targets on trainings which have been set in advance and should be achieved.
    - **Training course classified by subjects**
      This training aims to deepen understanding and recognition of important Tokyo Metropolitan Government policies and issues concerning waterworks service and to motivate awareness of the issues.
    - **Training course for instructors**
      This training offers the necessary skills to carry out the high level specialty training as an instructor.
    - **Training course at private firms**
      This training aims to obtain required special knowledge and skills by dispatching trainees to private training firms etc.
  - **Consigned Training**
    - **To Central Training**
      Training consigned to Tokyo Metropolitan Government Personnel Training Institute.
    - **To other bureaus**
      Training consigned to other bureaus.
- **On the Job Training**
  This training is carried out by supervisors at general working places, using the actual tools, equipment, documents and/or materials.

Practical training (technical) with the focus on the level of experience (conceptual)



Practical Works

Practice for Water Leakage Prevention

Trainees acquire the skill of water leakage detection using electronic leak detectors and acoustic bars and fixing water leakage by exposed split ring and pipe freezing method.

Practice for Piping

Piping practice (large and small diameter pipes with seismic joints) in a pit at a simulated construction site. Trainees acquire necessary know-how and the safety measure of installation for supervising subcontractors.

Practice for Water Purification

Utilizing the raw water of Tama River and this plant, training course offers practice in analyzing water quality and water treatment.

Electrical Training Practice

Trainees practice wiring on a special distribution board and learn the structure, operation and maintenance methods of electric installations.

Mechanical Training Practice

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.

Classroom

Lectures, case studies and group discussions are held in 13 classrooms which can accommodate between 20 to 200 trainees.

Training to Foster Skills as a Lecturer

For improving the ability to give a lecture, experienced staff who are likely to become lecturers learn how to talk and how to make materials in this training course. At the end they receive acknowledgement to be a lecturer.

* Receiving acknowledgement of lecturer from the Director General

◆◆◆ Cooperation Between Training Sector and Technical Development Sector ① ◆◆◆

Risk Management Training and 【Staff Education and Training System】

We developed the Staff Education and Training System which enables trainees to get virtual experience of a "pipe accident", "water quality problems", and "equipment accidents" from the computer screen in addition to training in reporting information through a role-play method. This advanced Training System course in risk management launched in 2008.

Policies of Research and Development

Unification of research and development activities in the bureau

- Selection by the Technical Development Study Committee of subjects for research and development for the entire bureau
- Comprehensive adjustment of surveys, research and development activities in each department

Adjustment ⇔ Departments

Accurate grasp of the needs of the field

- Identification of needs through job site surveys and coordination among departments
- Establishment of a website (in TS-Park bulletin board page) to collect opinions from the job site

Cooperation ⇔ Departments, Workers

Active utilization of efficient and effective methods for development

- Implementation of efficient research and development in close coordination with the Development field
- Active use of effective development approaches including joint studies with colleges and private-sector firms

Cooperation ⇔ Colleges, Research, Private Enterprise

Promoting practical use of the results of research and development

- Evaluation by the Technical Development Study Committee after start of new research and development project
- Tryout of newly developed items to promote improved practicality and PR for them

Dispatch of information to different areas and collection of feedback ⇔ Departments, Water Supply, Private-secto

Building technical assistance functions

- Establishment of a Knowledge Bank system
- Dispatch of technical information through the TS-Net

Cooperation ⇔ Departments

◆◆◆ Cooperation Between Training Sector and Technical Development Sector ② ◆◆◆

Succession of Technology through 【Knowledge-Bank System】

We developed "Knowledge-Bank System", which makes database through transforming knowledge and business know-how into document or image and enable our staff to access necessary information through intranet by own PC at any time, and training sector operates this system from April 2007. The skill of waterworks technology and abundant experience acknowledged by Bureau of Waterworks Tokyo Metropolitan Government was recorded as animation with added comment and was registered into the Knowledge-Bank System, and this animation is useful for succession of technology to pass on the knowledge to the next generation.

Development

Development Results Examples

←Water Meters

We have developed several types of water meters. The dry digital water meter (DA meter) is highly durable. The electronic water meter (EA meter) is useful for the automatic meter reading system.

Automatic Meter-Testing Equipment→

By automating manual testing work of water meters, which requires skill and time for using measurement tank, the work becomes efficient and easy for everyone.

←Internal Pipe Investigation Robot

This machine was developed investigating of pipes whose diameter is more than 800mm by means of remote control without suspending water supply. Using a side camera, LED lighting and a laser pointer, we can clearly observe the inside of pipes and also measure the gap at a pipe joint etc.

Technology for effectively cleaning the inside of pipes →

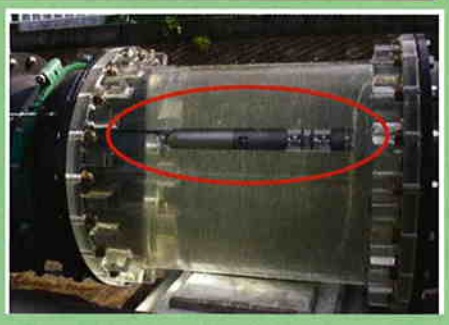
Due to aged deterioration, construction, and etc, impurities such as rust and sand may mix and remain in distribution pipes. This parachute expels them from the drain valves or hydrants by being inserted into large diameter pipes, blocking the cross-sectional area of flow partially, increasing the water flow velocity, and effectively transporting them.

Development Facilities

Exhibition room

Current research and development items are exhibited in this room.

Pipe facilities for experiment at the Development Field



A transparent acrylic pipes is partially used to observe the experiment under way in it.

Water Treatment Research Facilities

New water treatment technologies are being researched. (Photograph shows membrane filtration equipment.)