Emergency Water Supply at the Time of Disaster
—Based on the Cooperation among Local Governments and Residents—

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INTRODUCTION

Japan is one of the most earthquake-prone countries in the world. Waterworks service is a core essential utility. Water supply is absolutely necessary to protect Tokyo residents' lives and health at the time of disaster.

In order to supply water as much as possible in times of disaster, the Tokyo Metropolitan Waterworks Bureau(TMWB) is reinforcing the earthquake-resistance waterworks facilities and introduction of earthquake-resistant joint pipes along supply routes to important facilities.

Even still, it is not possible to completely prevent water suspension or contamination in the event of a large-scale earthquake. For this reason, TMWB has joined with local municipal governments to divide roles in building effective, efficient emergency water-supply systems that draw on local communities and other elements.

In the event of a major earthquake disaster, public assistance by local governments, self-help by local residents and mutual assistance are very important. In particular if prolonged water suspensions occur, it will be difficult for governments alone to supply water. Therefore, TMWB expects that the local residents who manage evacuation centers will be responsible for emergency water-supply activities themselves.

Here, we will introduce an emergency water-supply system resulting from collaboration between TMWB and local governments and residents.

Water suspension rates for an M7.3 directly underneath Tokyo (estimation)	
Northern Tokyo Bay Earthquake	34.50%
Suburban Tama Earthquake	36.90%

Table 1: Water supply system suspension rates (estimation)

	Scale	Number of households experiencing water suspension immediately post-earthquake	Number of days until restoration
Great Hanshin earthquake (1995)	M7.3	Approx. 1.27 million	91 days
Great East Japan Earthquake (2011)	M9.0	Approx. 1.80 million	40 days
Kumamoto Earthquakes (2017)	M7.3	Approx. 450,000	38 days

Table 2: Days until water supply system restoration after earthquake

Emergency water supply stations

TMWB provides emergency water supply services via "emergency water supply stations" in the event of water suspensions caused by a major earthquake or other disaster. Below are descriptions of the three types of emergency water supply stations .

1. Water supply points

Supplying water from water stored in waterworks facilities including purification plants, water supply stations, and emergency water tanks.
(Installed at 212 locations in Tokyo as of 2018)

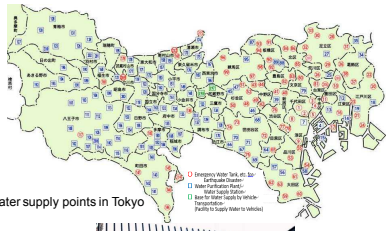

Fig. 1: Water supply points in Tokyo

2. Vehicle transportation

Supplying water using water transported via water trucks and water supply tanks to evacuation centers located at least 2 km away from water supply points, medical facilities, and welfare facilities.

Fig. 2: Water supplied via water truck

3. Fire hydrants, etc.

Supplying water by local governments and residents using emergency water supply materials and equipment plus fire hydrants and drain valves located near evacuation centers.

Fig. 3: Emergency water supply from a fire hydrant

Fig. 4: Emergency water supply station sign

TMWB is responsible for emergency water supply station facility construction and mechanism creation, while local governments are primarily responsible for emergency water-supply activities at emergency water supply stations.

TMWB works to improve awareness of emergency water supply stations through active PR among local residents via articles in local PR brochures and local disaster trainings.

Local community becomes responsible for emergency water supplies

Based on estimated water suspension rates for an earthquake directly underneath Tokyo and experiences with the Great East Japan Earthquake and Kumamoto earthquakes, it would be extremely difficult for TMWB and local government personnel alone to provide finely-tuned emergency water supply service to over 13 million Tokyo residents.

Therefore, in addition to emergency water-supply activities by local governments, TMWB pursues initiatives to have other parties be responsible for emergency water supplies. These groups include town councils, local governments, and other local community groups, as well as the young senior high school students who will lead future generations.

1. Emergency water-supply training in cooperation with local governments and residents

・TMWB lends approximately 2,600 sets of emergency water supply materials and equipment to local municipalities to enable local residents to provide an emergency supply of water from fire hydrants and similar facilities. This makes it possible for local municipalities and residents to rapidly provide emergency water supplies and other services after disasters.

・TMWB collaborates with the Tokyo Fire Department to provide support for residents' disaster trainings conducted by local municipalities .This support includes demonstrations of assembly and operation of materials and equipment, helps for trainings to operate materials / equipment, etc.

・Provides strong "tangible" and "intangible" support for emergency water-supply trainings for both local municipalities and residents, such that local residents can strongly take responsibility for emergency water supplies during emergencies.

Fig. 5: Demonstration of assembly and operation by TMWB

Fig. 6: Assembly training by residents

2. Installation of emergency water taps on evacuation center properties

・TMWB signed memorandum with local governments to begin installing emergency water taps on evacuation center properties in 2017.

・This enables local residents to take the lead to promptly supply emergency water even if the service pipe in the property is damaged.

・TMWB is aiming to complete installation at all 2,600 evacuation centers in Tokyo by March 2020.

Fig. 7: Installation Image of an Emergency Water Tap in an Evacuation Center

3. Senior high school students become responsible for emergency water supplies

・TMWB has performed water-supply trainings at Tokyo metropolitan senior high schools. Students practice assembling emergency water-supply equipment and transporting water in water bags. (In FY 2017, over 4,000 students participated from 18 schools.)

・High school students become an important asset in local disaster preparedness. By collaborating with local communities, the community's disaster response capabilities are improved.

Fig. 8: Water supply training by high school students

In preparation for a large-scale disaster…

There is estimated to be a roughly 70% probability of an M7-class earthquake hitting the southern Kanto region, which includes Tokyo, in the next 30 years. If a water suspension were to result from a large-scale disaster, complete restoration would take around one month to achieve. To that end, it is extremely important to establish an effective, efficient emergency water-supply system centered around local communities.

TMWB will continue to strongly support emergency water-supply initiatives that local governments and residents are responsible for putting into practice. TMWB will also broadly communicate to Tokyo residents the importance of cooperative and self-helping emergency water-supply activities, and furthermore work to improve the disaster response capabilities of local communities.

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