5 Measures against Earthquake

1 Reinforcing Resilience of Waterworks Systems

Japan is one of the earthquake-prone countries in the world. In March 2011, “the 2011 off the Pacific coast of Tohoku Earthquake” with a magnitude of 9.0 registered a maximum JMA (Japan Meteorological Agency) seismic intensity of “5 upper” in Tokyo, and other earthquakes that have caused extensive damage to water supply facilities have occurred throughout Japan. Furthermore, it is expected that an earthquake directly under the Tokyo metropolitan area is imminent. The Tokyo Disaster Management Council estimates that this earthquake could produce areas a maximum magnitude of 8.2, with a seismic intensity of 7, as well as a wide area a seismic intensity of 6 upper.

* JMA seismic intensity scale is an index used in Japan that indicates the strength of shaking and severity of damage caused by an earthquake. Please see the JMA website for the details: https://www.jma.go.jp/jma/en/Activities/inttable.html

Since Tokyo Waterworks Bureau takes a role to support the lives of 13.67 million of Tokyo citizens, urban activities and central functions of the capital, it is crucially important for us to secure the water supply in case of occurrence of serious earthquakes.

Taking these circumstances into consideration, we recognize the measures against earthquake to be one of the highest priority agendas, aiming to build an antiseismic water supply system suitable for the capital city, Tokyo, by promoting the reinforcement of earthquake-resistance of waterworks facilities and the enhancement of their backup functions.

5 震災対策

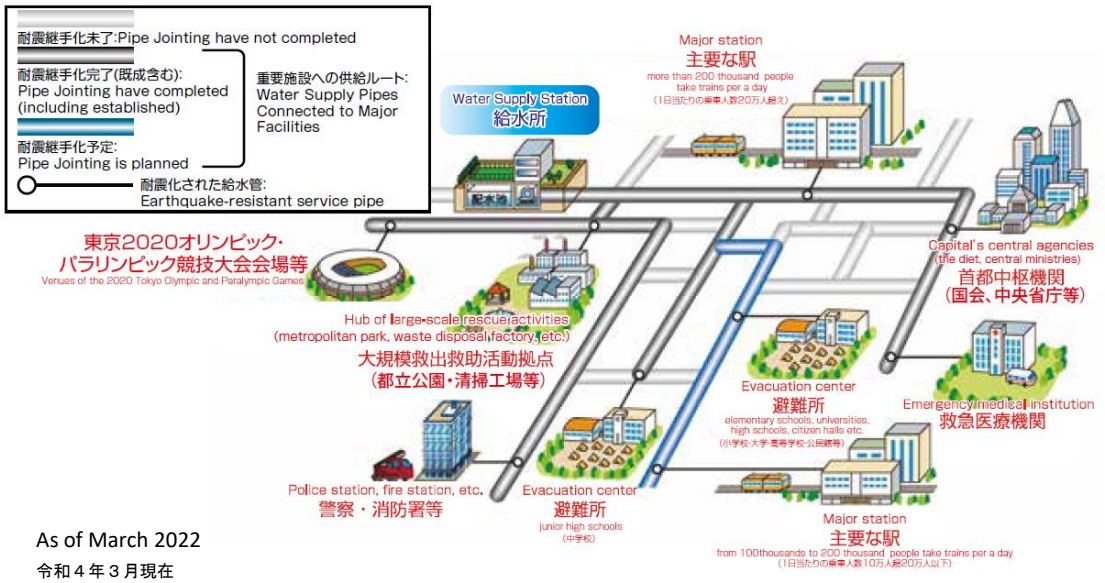
1 水道システムの強靭化

我が国は、世界有数の地震国である。東京においては、平成23年３月の東北地方太平洋沖地震により最大震度５強を観測しており、その他にも水道施設に大規模な被害を及ぼす地震が全国各地で発生している。また、首都直下地震の切迫性が指摘されており、東京都防災会議による被害想定では、最大震度７の地域が出るとともに、震度６強の地域が広範囲に及ぶと想定されている。

当局は、約1,367万人の都民生活、都市活動及び首都中枢機能を支える役割を担っており、震災時における給水の確保は、極めて重要である。

このような状況を踏まえ、当局では、震災対策を最重要課題の一つとして位置付け、水道施設の耐震化及びバックアップ機能の強化等を推進することで、首都東京にふさわしい、地震に強い水道の構築を目指している。

Pipe Jointing by Earthquake-resistant Joints in Water Supply Pipes Connected to Major Facilities (An Example of a Water Pipe Replaced by Earthquake-resistant Joints) (Image)
重要施設への供給ルート耐震継手化（水道管路の耐震継手化の事業例）（イメージ）



As of March 2022
令和４年３月現在

[Major measures]

Reinforcing earthquake-resistance of waterworks facilities
- Reinforcing earthquake-resistance of reservoirs, water intake/conveyance facilities
- Reinforcing earthquake-resistance of purification facilities
- Reinforcing earthquake-resistance of distribution reservoirs
- Reinforcing earthquake-resistance of distribution pipes
- Reinforcing earthquake-resistance of service pipes
- Building or enhancing independent power generation facilities

Enhancement of backup functions
- Duplexing and renewal of water conveyance facilities
- Networking and renewal of transmission pipes

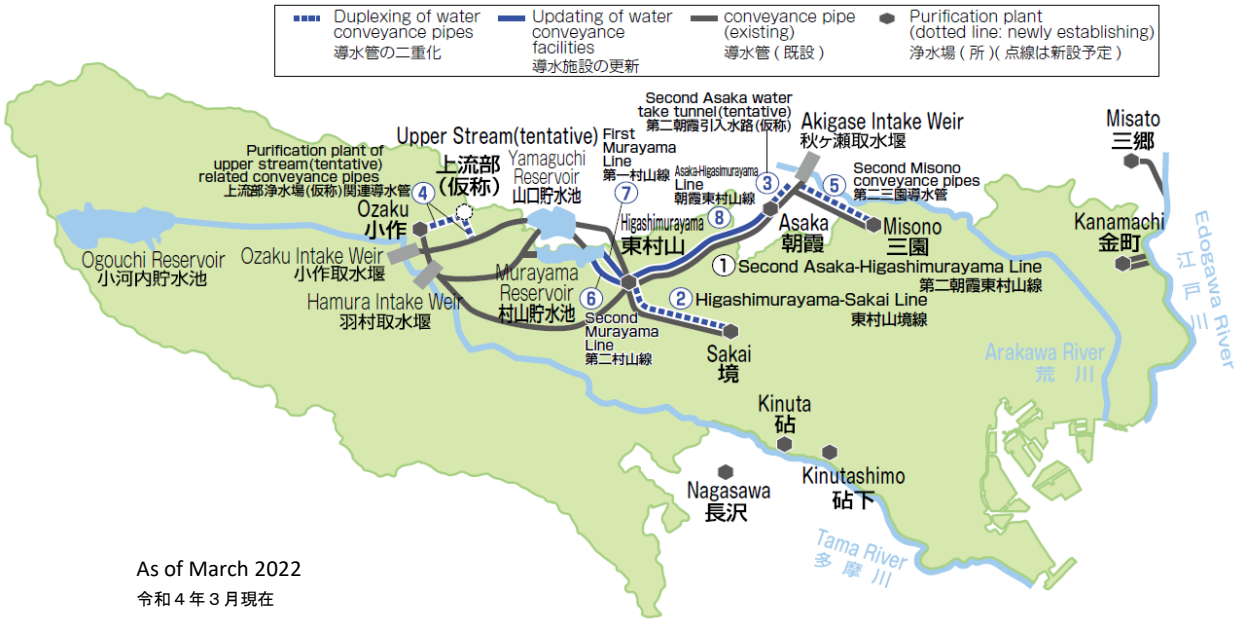
【主な施策】

水道施設の耐震化
- 貯水池及び取水・導水施設の耐震化
- 浄水施設の耐震化
- 配水池の耐震化
- 配水管の耐震化
- 給水管の耐震化
- 自家用発電設備の新設・増強

バックアップ機能の強化
- 導水施設の二重化・更新
- 送水管のネットワーク化・更新

Proposed Site for Installation of Water Conveyance Facilities (Image)

導水施設整備予定（イメージ）

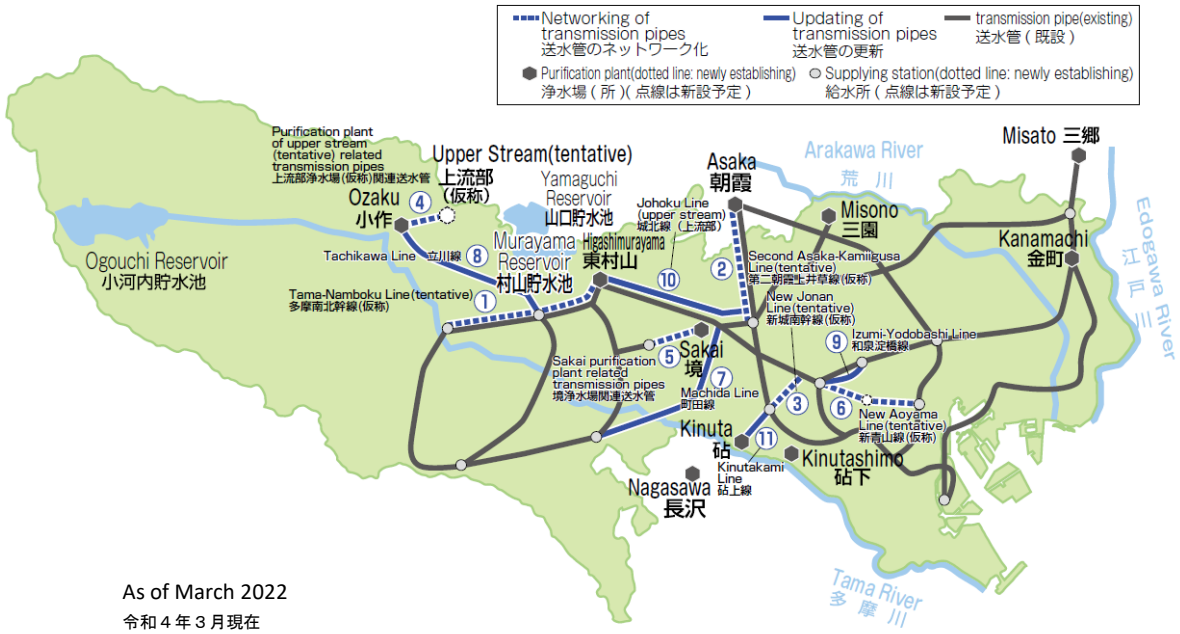


As of March 2022

令和４年３月現在

Proposed Site for Installation of Water Transmission Pipes (Image)

送水管整備予定（イメージ）



As of March 2022

令和４年３月現在

2 Establishment of Emergency Measures

Tokyo Waterworks Bureau has established emergency measures by estimating the damage to facilities from an earthquake, preparing the Tokyo Waterworks Bureau Earthquake Disaster Emergency Plan for recovery; conducting training in information communication on regular basis; securing staff, materials, and vehicles for recovery; and improving the information collection and communication systems.

When water suspension or other accidents occur in an earthquake disaster, we set up “Emergency Water Supply Stations” at the following places in order to offer emergency water supply.

(1) Emergency water supply tanks

We open one facility within an approximate 2 km radius from residences. These facilities that store water under parks and metropolitan schools are referred to as emergency water supply tanks.

In total, there are 213 waterworks facilities and emergency water supply tanks in Tokyo overall, holding approximately 1.05 million m^3 of water, equivalent to 2,100 swimming pools 25 meters in length.

Emergency water supply tanks cycle water between water distribution pipes, so they are always supplied with fresh water.

(2) Evacuation sites, etc.

To supplement emergency water supply from emergency water supply tanks, evacuation sites will be opened by municipal governments using emergency water faucets and pre-designated fire hydrants near evacuation sites. There are also temporary water tanks installed by municipal governments, which are supplied with water using water supply trucks.

We set up those stations to provide emergency water supply when it is particularly necessary, depending on the situation in the water stoppage areas and the restoration of water supply facilities.

2　応急態勢の確立

水道局では地震による施設の被害を想定するとともに、復旧に向け、東京都水道局震災応急対策計画を策定し、日頃から情報連絡等の訓練を行ったり、復旧要員、材料及び車両の確保、情報の収集、連絡態勢の強化等を図ったりするなど、応急態勢の確立に努めている。

さらに、震災時に断水等が発生した場合には、次の場所に「災害時給水ステーション」を開設し、応急給水を行う。

(1) 応急給水槽

お住まいからおおむね半径２Kmの距離内に１か所開設する。公園や都立学校の校庭の下などに水を貯めておく施設を応急給水槽という。

水道施設と応急給水槽合わせて、東京都全体で213か所整備されており、25mプールで約2,100杯に相当する約105万㎥の水が確保されている。

応急給水槽の水は、配水管との間を循環する仕組みになっているので、常に新鮮な水が供給される。

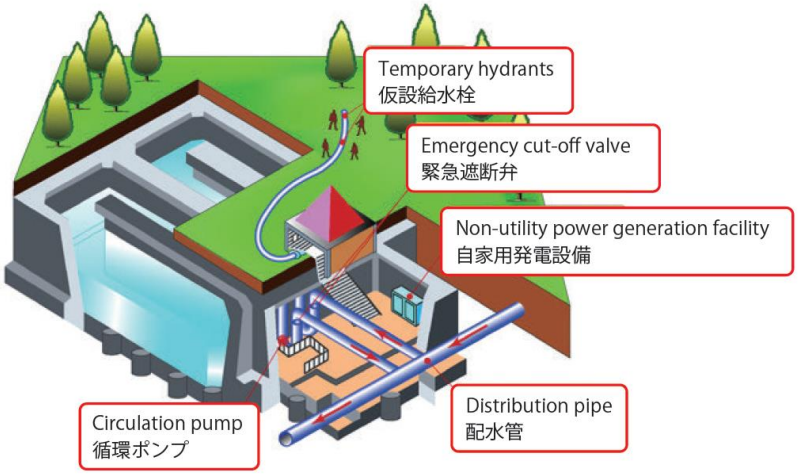
(2) 避難所等

応急給水槽等での応急給水を補完するために、避難所応急給水栓や、避難所付近のあらかじめ指定した消火栓を用いて、区市町が開設する。また、区市町が設置する仮設水槽に、給水車等の車両を使用して水を補給する形態のものもある。

断水地域の状況、水道施設の復旧状況に応じて、特に必要があると認められる場合に開設し、応急給水を行う。

Structure of Emergency Water Supply Tank (1,500 m^3)

応急給水槽の構造（1,500 ㎥）



3 Waterworks Emergency Services Unit

Tokyo Waterworks Bureau has an emergency services unit that operates 24 hours a day 365 days a year to secure the water for central agencies of the capital in the event of an earthquake and to conduct initial activities quickly in the case of a sudden accident.

The unit consists of the captain, five sub teams (12 members for each), an engineering team (7 members), and a planner (1 member), with a total of 7 teams and 69 members (including the captain).

The unit is equipped with two special emergency vehicles, two emergency loudspeaker vehicles, ten water trucks, two gate valve open/close vehicles, ten earthquake survey motorbikes, and an operation equipment truck in preparation for an emergency.

The unit secures the supply route to the central agencies of the capital within three days in an earthquake and conducts initial activities, such as support for water suspension support for emergency recovery activities of distribution pipes, emergency publicity, emergency water supply, security measures at the accident site, and information exchange in an unexpected accident.

The unit's daily operations include the investigation of the water supply routes for the central agencies of the capital, technical supports related to leakage prevention, inspection of water supply equipment and trainings for severing main distribution pipes. It also conducts comprehensive disaster drills in cooperation with the local municipalities in Tokyo every year.

3　水道緊急隊

水道局では、震災時の首都中枢機関等への水の確保や突発事故時の初期活動に迅速に対応するため、365日、24時間体制で活動する水道緊急隊を設置している。

隊は、隊長以下、５つの副隊（各副隊12名）、工務担当（７名）及び企画担当（１名）の計７担当69名（隊長含む。）で組織されている。

水道緊急隊には、特別緊急車２台、緊急広報車２台、給水車10台、制水弁開閉車２台、震災時調査用バイク10台、作業機材運搬車などを配置し、緊急時の対応に備えている。

震災時は、首都中枢機関等への水道水供給ルートを発災から３日以内に確保、突発事故時は断水作業支援や配水管等の応急復旧支援、緊急広報、応急給水、事故現場の保安処置、情報連絡活動等の初期対応を行う。

経常業務として首都中枢機関等供給ルート調査、漏水防止関係の技術支援、給水装置検査、配水本管切断等の訓練などを行っている。また、毎年都内の各自治体と協同し、総合防災訓練を行っている。

Information Delivery Drill Using Special Emergency Car and In-vehicle PCs
特別緊急車と車載パソコンを用いた情報連絡訓練の様子

Image of Tablet Devices Loaded with Maps of Supply Routes to Central Agencies of the Capital and Drill to Secure These Supply Routes Using the Devices
首都中枢機関等水道水供給ルート図を搭載したタブレット端末と端末を使用した当該供給ルートの確保訓練の様子

4 Dispatch of Support Teams

Tokyo Waterworks Bureau has provided support to other entities suffered from large-scale disasters such as the Great East Japan Earthquake and the Kumamoto Earthquake.

Measure dispatch examples of the support teams are as follows.

4　救援隊の派遣

これまで当局は、東日本大震災や熊本地震の際など、大規模な災害により被災した他事業体に対して支援を行ってきた。

主な救援隊の派遣実績は、以下のとおり。

Dispatch Examples of Disaster Supports by Tokyo Waterworks Bureau (Including Contractors)
当局の災害救援派遣実績（工事業者等含む）

Year 発生年	Disaster name 災害名	Activity content 活動内容	The number of personnel dispatched 派遣人員数（名）
1995 平成7年	The Great Hanshin/Awaji Earthquake 阪神・淡路大震災	Emergency water supply Emergency restoration Emergency restoration of industrial water supply 応急給水 応急復旧 工業用水道応急復旧	1,256
2000 平成12年	Eruption of Miyakejima Volcano 三宅島火山活動の活性化	Emergency water supply Emergency restoration On-site damage survey, etc. 応急給水 応急復旧 現地被害調査　等	103
2004 平成16年	The Niigata Prefecture Chuetsu Earthquake 新潟県中越地震	Emergency water supply Emergency restoration 応急給水 応急復旧	105
2007 平成19年	The Niigata Prefecture Offshore Earthquake 新潟県中越沖地震	Emergency restoration 応急復旧	76
2011 平成23年	The Great East Japan Earthquake 東日本大震災	Emergency water supply Emergency restoration 応急給水 応急復旧	165
2013 平成25年	Sediment disaster on Izu-Oshima Island 伊豆大島土砂災害	Emergency water supply Emergency restoration support 応急給水 応急復旧支援	21
2015 平成27年	Heavy rainfall disaster in Kanto and Tohoku regions 関東・東北豪雨	Support by providing water supply bags Emergency restoration Water quality survey 給水袋支援 応急復旧 水質調査	25
2016 平成28年	The Kumamoto Earthquake 熊本地震	Support by providing water supply bags Emergency restoration 給水袋支援 応急復旧	111
2018 平成30年	Western Japan Floods 西日本豪雨	Water examination support 水質検査支援	8
2019 令和元年	Typhoon Faxai 令和元年房総半島台風	Emergency water supply 応急給水	46
	Typhoon Hagibis 令和元年度　東日本台風	Emergency water supply Water examination 応急給水 水質試験	7
2022 令和4年	Typhoon Talas 令和4年台風第15号	Emergency water supply 応急給水	18

Emergency Water Supply from Water Supply Car
(The Great East Japan Earthquake)
給水車からの応急給水（東日本大震災）

Survey on Water Leakage
(The Kumamoto Earthquake)
漏水調査（熊本地震）

5 Tokyo Water Rescue Team

Based on lessons learned in previous support dispatch, we established the Tokyo Water Rescue Team in February 2017 so that support teams can be dispatched promptly and smoothly, with the requests for support by suffered entities no matter when or where a disaster occurs. We conducted emergency water supply activities in Chiba and Kanagawa prefectures in FY2019, and in Shizuoka city in FY2022.

5　東京ウォーターレスキュー

これまでの救援派遣の教訓を踏まえ、いつ、どこで発災しても、被災事業体からの救援要請に基づき、迅速かつ円滑に救援隊を派遣できるよう、平成29年２月に東京ウォーターレスキューを創設した。令和元年度には千葉県や神奈川県で、令和４年度には静岡市で応急給水活動を行った。

Emergency Water Supply Activities
In Futtsu City, Chiba Prefecture
応急給水活動の様子（千葉県富津市）

Water Supply Work for Hospital Water Tank
in Kiyokawa Village, Aiko District, Kanagawa Prefecture
病院の受水槽への給水作業（神奈川県愛甲郡清川村）