Main Category	Water Treatment and Water Quality Management
Sub Category	Water Distribution Management

Water supply coverage is over 97% in Japan and it is common for people to drink directly from the tap. This requires Japanese water utilities to provide safe and reliable water supply at all times, and it is important to carry out appropriate water distribution management, such as water volume and pressure adjustment and monitoring of distribution status.

1. Water distribution management

In Japan, water volume and pressure are adjusted to ensure equal and appropriate pressure in the service area. If the pressure or volume is insufficient due to the capacity of the distribution pipes, it is necessary to set them according to the location and topography of the water source(s) and water treatment plant(s) as well as the water demand. In addition to equalizing the water pressure and quality in the service area, the distribution system has been divided into appropriate-size distribution blocks in terms of both land area and elevation in order to make the water volume and pressure control easier.

(1) How to set up water distribution blocks

In general, there are two types of distribution blocks: "distribution main blocks" that consist of distribution reservoirs and distribution mains, and "distribution submain blocks" that consist of distribution submains branching out from distribution mains. For small water supply systems without a complicated distribution network, it may be more rational to set up zones according to land elevation or to partially increase or decrease pressure according to the zones, rather than dividing the system into distribution submain blocks. The following is a basic way to set up distribution submain blocks.

① When water distribution mains are used for mutual water accommodation, they should be used as normal distribution pipes as much as possible during non-emergency to avoid water stagnation inside the pipeline.

② The size of distribution submain blocks should be determined based on the area's population, existing distribution submains, and the shape of roads. The number of injection points from the distribution mains to the distribution submains should be two to three, considering the block size and emergency response for injection points, so as to ensure and facilitate the management of water volume, pressure, and quality.
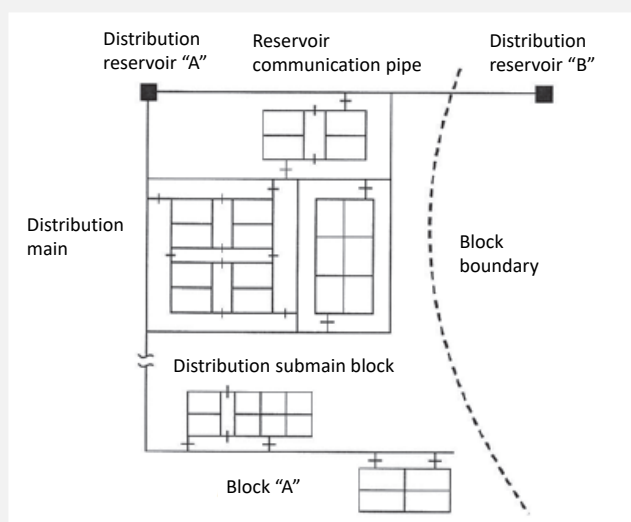
Figure | Relationship between a distribution main and distribution submain block

Furthermore, to provide safer and better-quality tap water, there is a need to strengthen the total water quality management from source to tap. To do this, water utilities are using automatic water quality monitors (for color, turbidity, residual chlorine, pH, electrical conductivity, water temperature, pressure, etc.) and ultra-compact automatic water quality measuring devices to monitor the water distribution status. Also, they consider downsizing the pipeline capacity when it is likely to cause water stagnation inside it, which can deteriorate drinking water quality.

2. Case studies
(1) Efforts to prevent turbid water (Yokohama City Waterworks Bureau)
　　The City of Yokohama has provided guidance on wastewater discharge to each of its business site to prevent water pollution in public waters based on the Water Pollution Control Law and the Yokohama City Ordinance on the Preservation of Living Environment.

(2) Water pressure control using the distribution block system
　　To be published together with relevant case studies in future (publication date TBD)

(3) Strengthening water quality monitoring at the customer tap (use of automatic water quality monitors)
　　To be published together with relevant case studies in future (publication date TBD)

References