



This is the standard Tokyo manhole cover, colored for display in order to make it understood easily. The four small colored caps in the center convey location and other information about each individual manhole cover.

Visitors to Japan often remark how Japanese love to beautify things that are often overlooked overseas: a slick robotic toilet, for instance, or an ornate wooden cover for a Buddhist temple’s fire extinguisher. This tendency also applies to sewers. Manhole covers in some municipalities and sightseeing spots in Japan are adorned with colorful, eye-popping designs, and the same is true in Tokyo.

Specially designed manhole covers often feature local attractions or historic figures. In Tokyo, even run-of-the-mill, standard manhole covers feature a bold design. They depict flora and fauna that symbolize the capital: surrounding a large *somei yoshino* cherry petal are ginkgo biloba leaves and a ring of wavy lines representing black-headed gulls.

today manholes and sewer pipes play vital roles in Tokyo’s sanitation, rainwater drainage, and disaster mitigation. For instance, manhole covers with blue rubber caps indicate that the cover can be opened and an emergency toilet can be set up on top of the manhole in times of disaster. Meanwhile, modern manholes are fitted with unique seismic dampening technology to reduce the chance of ruptures in major quakes, as well as water-pressure equalization valves to mitigate damage from soil liquefaction.

Aging sewer pipes must be replaced to prevent sinkholes, but blocking off space for construction can be very difficult in a dense, crowded city like Tokyo. That is where another unique technology comes in: the sewage pipe renewal (SPR) method. With SPR, rigid polyvinyl material is unspooled into the existing sewer and formed into a large pipe while backfill material is inserted between the old and new pipes; the flow of sewage can continue during the installation. The SPR method allows the existing sewer to be reused while eliminating the need to dig it up in a large above-ground construction zone. As of 2017, some 1,200 kilometers of pipe renewed with the SPR method had been installed in Japan, as well as 138 kilometers in 17 foreign countries and regions.

Before central Tokyo’s sewage and rainwater are discharged into the sea, they are treated at the Shibaura Water Reclamation Center in Shinagawa Ward, which lies on Tokyo Bay. Established in 1931, the facility can treat up to 830,000 cubic meters of wastewater a day from an area of some 6,440 hectares. Recovered heat and recycled wastewater from the treatment plant are used for heating and as toilet water in the building; neighboring areas also use this recycled water for toilets. Part of the plant is covered by Shibaura Central Park, a public space full of greenery, while a commercial skyscraper, Shinagawa Season Terrace, sits atop a 76,000-cubic-meter combined sewerage overflow storage tank. Just as it has done with manhole covers, Tokyo has added a touch of beauty to a wastewater treatment plant. Tokyo’s sewerage system, full of unique advanced technologies, is a success born out of the challenge to keep a giant metropolis clean and safe. It represents know-how that is worth spreading to other cities around the world.



©1976, 2019 SANRIO CO., LTD. APPROVAL NO. G602272 Hello Kitty™ adorns manhole covers in Tama City in west Tokyo, home to the theme park Sanrio Puroland.

The Art and Science of Manholes

Tokyo’s manholes and sewers showcase both beauty and modern technology.

by **Tim Hornyak**



Manhole covers in Hachioji City in the west of Tokyo depict a Hachioji Kuruma Ningyo (wheeled puppet), a style of puppetry originating at the end of the Edo period.

Apart from their looks, Tokyo’s standard manhole covers are functional and informative. They are the only visible parts of the underground sewerage system, and are designed to reduce noise and vibration when vehicles travel over them. The “T-20” at the top of the manhole means it can support vehicles of up to 20 tonnes, while inscriptions at the bottom indicate whether the sewer is used for rainwater, sewage, or a combination of both. Four colored caps display the cover’s identification number and the year it was manufactured. They also precisely identify the location of each manhole cover, making maintenance more efficient and enabling prompt responses to residents’ concerns.

Construction of Tokyo’s sewerage system began in the 1880s and reached nearly 100 percent coverage in 1995. Over the past century, the system has evolved, and



Medaka, a type of killifish, swimming in a clear stream, with fireflies hovering above adorn the manhole covers of Setagaya Ward, a leafy green residential area in the inner southwest of Tokyo.