Development of the Distribution Pipes Investigation Robot

Bureau of Waterworks, Tokyo Metropolitan Government

Introduction
Tokyo Waterworks Bureau is carrying out reinforcement of transmission and distribution pipes and replacement of old pipes, for to prevent turbid water and leakage. However, we usually shut down distribution mains, because investigators need to get into the mains for the investigation. As a result, large quantity of drinking water is wasted for empty and water suspension can extend to long term and large area. Therefore we developed the equipment that is able to investigate internal pipe condition without suspension of water supply. The whole unit is composed of the Robot, an insertion device, a monitor, control unit, a picture record device, a cable, etc. The movement of Robot is made possible with 4 thrusters into 6 directions by a monitoring operator.

The Composition Of Investigation Equipment

The Robot

- Thrusters
- Side view camera
- Front view camera
- Laser pointer
- Side lights
- Front lights
- Main pipe (Dia.800mm ~)
- A sheath pipe (Dia.100mm ~)
- A Control stick
- Control unit
- Control sticks
- A Monitor
- A cable
- Division valve

Specifications of the Robot
- Length 760mm
- Diameter 80mm
- Diameter of application 800mm ~
- Weight 3.3kg
- Capacity 3.3L

Conclusion
We carried out a field examination to assess functions of the unit, such as mobility of the Robot and camera and measurement equipment. The examination was performed on Hongo line (a diameter of 1,100mm) in Bunkyo-ku and Dalichi-jonan line (a diameter of 1,500mm) in Shinagawa-ku (the 23 ward of Tokyo). As a result, the Robot has excellent mobility and camera and measurement equipment performance in the flowing water.