

# Surveying Pipeline Facilities Etc. and Survey Research of Reconstruction and Renewal Methods

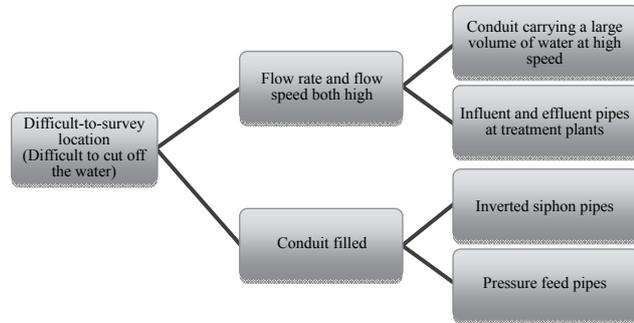
Year of Research

2011 • 2012

Appropriate stock management

**(Purposes)**

In medium and large diameter pipes for which submerged visual inspection is the standard pipeline surveying and inspection method, a large quantity of water flows very rapidly at all times, so it is difficult to visually survey such pipes and they have not been adequately surveyed, resulting in little progress in their deterioration diagnosis, reconstruction and renewal. This research, which is intended to organize various survey methods used to survey difficult-to-survey parts of medium and large diameter pipes, was a survey and a corroborative survey of effective survey technologies etc., and a two-year (2011 to 2012) study of the applicability and an evaluation of each survey method and an organization of challenges.



**Figure 1. Categorization of Difficult-to-Survey Locations**

(1) Contents and results of the study in FY2011

The difficult-to-survey locations to be studied by this research were classified as four types according to the reasons for the difficulty and structure by performing a questionnaire survey (Fig. 1). A survey of technologies which can be applied to difficult-to-survey locations in fields other than sewerage systems and overseas was conducted, abstracting multiple promising technologies.

(2) Contents of studies in FY2012

In response to the above challenges, the following corroborative survey policies were set for the multiple promising technologies extracted.

**Policy 1:** Expanding the difficult-to-survey location survey method choices

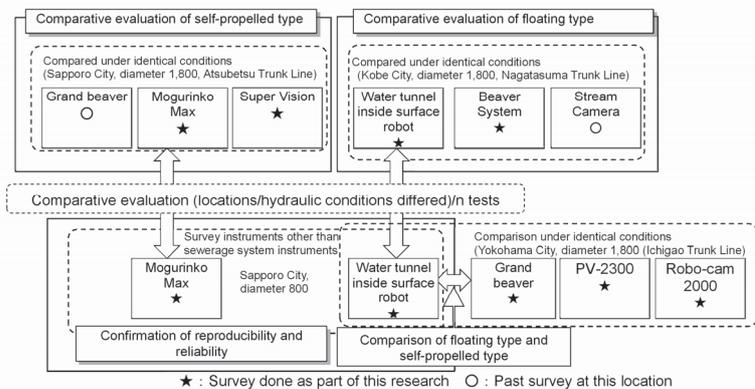
This research has abstracted less expensive survey technologies thought to be applicable to difficult-to-survey locations. Corroborative surveys of one self-propelled and one floating technology are done to expand the number of survey technologies which can be selected.

**Policy 2:** Clarifying conditions under the surface of the water (especially pipes which are in filled condition)

Having judged that there is a great need for underwater survey technologies, we carried out a questionnaire survey of sonar based survey technologies capable of clarifying conditions underwater and surveyed their past use overseas, to study the possibility of their future development in Japan.

(3) Corroborative survey

The objects of the evaluation were 8 types of machines: 3 floating type technologies (including 1 evaluated based only on a survey of past achievements) and 3 self-propelled technologies, which were developed in Japan, and 2 self-propelled technologies developed outside of Japan. The results covered most of the survey technologies now used in Japan for medium to large diameter pipes, and applicability as survey methods for locations which, for reasons such as, “high flow rate or high flow speed”, are difficult to survey using conventional methods or are still not surveyed despite the existence of survey methods, were organized. And **Figure 2** shows combinations of corroborative survey locations and survey locations.



**Figure 2. Concepts of the Corroborative Surveys**

(4) Preparing an application table

An application table of survey machinery according to survey purpose was prepared by weighting evaluation items according to the purpose of the survey by each regional government (reconstruction, renewal, maintenance, emergency response) obtained from the results of the questionnaire survey and by scoring survey instruments based on the results of the corroborative survey.

And ultimately, based on the results of the corroborative survey and on the performances which should be prioritized by survey goal set optionally by each local public body (the weight), applicability of survey technologies can be organized by pipeline condition.

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Key words

Pipeline survey, medium and large diameter pipelines, TV-camera survey, underwater survey, pipe rehabilitation work method