Cost and Labor Saving in Maintenance of Sewer Pipeline Facilities

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1. Introduction

Of the sewer pipeline laid across the country with a total length of about 460,000 km, aged pipeline that has passed 50 years after installation amounts to about 10,000 km in length, and is expected to increase to about 4 times in 10 years, and 12 times in 20 years. About 3,000 to 4,000 cases of road subsidence due to deteriorated sewage pipes, etc. occur every year, and concerns are arising according to progress in deterioration about increase in road subsidence and other accidents and financial burden for alteration / replacement of pipes, etc. There is also a concern about decrease in personnel engaging in the construction industry due to the decrease in labor force according to the aging population and declining birth rate, etc. In view of the situations described above, the National Institute for Land and Infrastructure Management (NILIM) has been studying both structural and non-structural measures from the viewpoint of saving cost and labor in maintenance of sewer pipeline facilities

2. Establishment of pipeline survey priority determination system (non-structural field)

For appropriate maintenance of sewer pipeline, it is essential to detect abnormal spots before road subsidence or other accident occurs. In addition, it is necessary to survey the inside of pipeline efficiently in order to address the expected rapid increase of deteriorated pipeline. Accordingly, it is effective to determine the priority of surveys by identifying the pipeline where abnormality is likely to occur, or that suffers serious damage in case of an accident, etc. based on the data on year of installation, pipe type, location, etc.

NILIM is establishing a system for enhancing the efficiency of surveys, including optimization of survey frequency, etc. and reduction of the risk of abnormality, by identifying the areas expected to deteriorate and determining priority of survey areas, etc. based on the ledge information collected from local governments. In this fiscal year, we plan to analyze the risk of abnormality with degradation effect factors such as corrosive environment and soil conditions and develop an approach to determine the priority of surveys. In next fiscal year, we study establishment / improvement of system (draft) and linkage with a large database.

3. Upgrading of pipeline survey technologies (structural field)

To prepare for the coming of times of full-scale maintenance, it is required to develop technologies and equipment that enable pipeline survey more quickly, cheaply, and accurately than existing survey technologies. NILIM conducted an empirical study in fiscal 2013 concerning a survey method using the screening survey technology, and developed guidelines based on results of the study. [1)]

In this fiscal year, we are promoting activities for further upgrade of technologies, the basic concept of which is provided in Figure 1. For example, since the conventional TV camera cannot climb over the level difference at manhole, the investigator has to enter the manhole each time to install TV camera equipment, which has been inhibiting the growth of daily progress (possible extension of per-day survey). In this research, we are organizing the specifications (traveling performance etc.) required for equipment in order to enable the survey equipment to climb on the level difference at manhole by improving traveling performance and to improve daily progress and reduce cost. In next fiscal year and thereafter, we plan to prepare a road map for commercialization of new technologies, and examine how development system should be, etc.

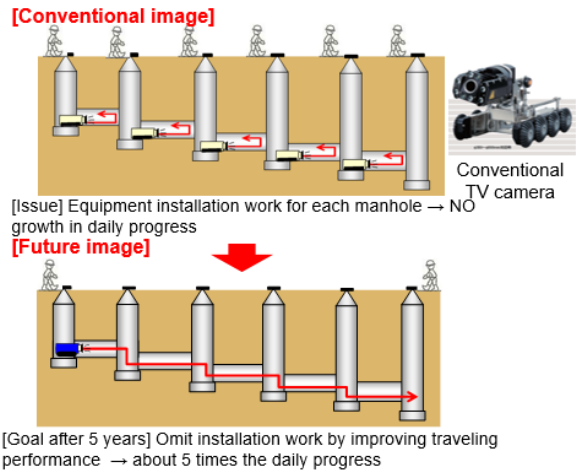

Figure 1. Image of Improvement in Pipeline Survey Equipment

[Reference]

1) http://www.nilim.go.jp/lab/ebg/b-dash.html