Study on the Comprehensive Management for Sewer Pipelines

(Study period: FY2018-)

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1. Introduction

Total extension of sewer pipelines in Japan is as large as about 470,000 km, and about 3,000 cases of road subsidence occur every year due to pipe deterioration, etc. Since the personnel and budget of local governments that take charge of sewer pipeline projects are limited, it is necessary to build a proper pipeline management cycle by further increase in efficiency of pipeline inspection survey and optimization of the pipeline management cost with utilization of accumulated maintenance information etc.

The purpose of this study is to develop a method for choosing inspection survey technologies according to laying conditions, pipe types, and other conditions and thereby promote efficient inspection survey, secure the continuous function of pipeline system, and optimize maintenance cost.

2. Survey on the occurrence tendency of pipeline clogging

In considering an inspection survey plan, it is effective to determine the priority and method of inspection survey considering the occurrence tendency of risk, such as road subsidence or pipeline clogging, according to pipeline conditions. Past studies organized the occurrence tendency of road subsidence, while there are few reports on the occurrence tendency of other risks, so that we conducted a questionnaire survey to local governments with focus on pipeline clogging and organized the occurrence tendency.

The questionnaire survey researched pipeline clogging that occurred during a period from FY2015 and FY2017 due to abnormalities in the pipelines (excluding backflow and inundation caused by insufficient discharge capacity in rainy weather and pipeline clogging due to the failure of manhole pump) and received about 9,000 responses from 111 organizations.

The number of cases of clogging according to pipe types was large in concrete pipe (HP pipe), PVC pipe (VU pipe), branch pipe, and public inlet in relation to main pipe, manhole, and main pipe at the joint of main pipe and manhole, and in ceramic pipe (CP pipe) and VU pipe in relation to branch pipe at the joint of branch pipe and public inlet. For the causes of clogging, oil adhesion accounted for the largest number of about 1,600 cases in terms of main pipe, while entry of tree roots accounted for the largest number of about 2,400 cases in terms of branch pipe. In order to prevent pipeline clogging caused by external factors, such as oil adhesion, in addition to maintenance such as regular inspection and cleaning, it would also be necessary to give notification widely on proper use of sewerage service to users. For the entry of tree roots, the ratio of occurrence is greater in HP and CP pipes than VU pipe both in main and branch pipes. As a reason for this, HP and CP pipes have an opening in the joint larger than VU pipe, which may allow tree roots to enter easily. It would be therefore effective to consider the priorities of inspection taking into account pipe types and the range of growth of tree roots.

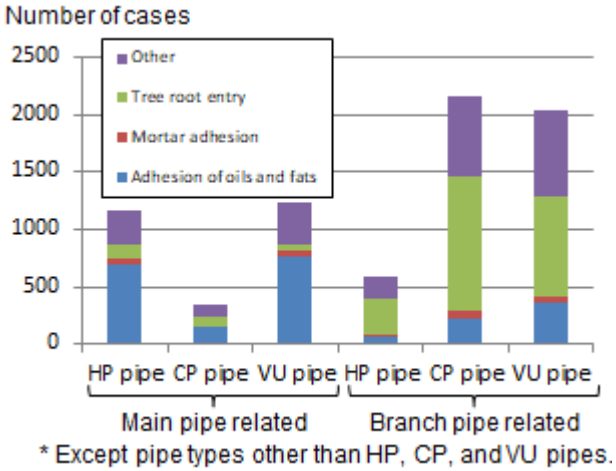

Fig. Number of cases of pipeline clogging by pipe type and cause of occurrence

3. Future activities

We intend to study the frequency and method of inspection survey according to the conditions of pipelines considering the technical development trend of inspection survey technologies that contribute to labor saving and cost reduction, as well as the knowledge so far obtained about the occurrence tendencies of abnormalities in the sewer pipelines and risk occurrence.