B-DASH: Demonstration on the Comprehensive Gradual Sewer Diagnosis System Using ICT

(Research of FY 2018-2019)

1. Purpose

The appropriate management and continuous security of aging sewer facilities with limited human power and budget require asset management with preventive maintenance. "Gradual sewer diagnosis system" adopting deterioration prediction system by data analysis, data input/accumulation tool with ICT, and direct-view inspection camera enables efficient screening and close examinations.

This study aims to establish the "Gradual sewer diagnosis system" selected for the B-DASH project 2018 of the Ministry of Land, Infrastructure, Transportation, and Tourism (MLIT.) The joint research team of Clearwater OSAKA Corporation, JS, and Osaka City joined the demonstration as an entrusted research of National Institute for Land and Infrastructure Management (NILIM.)

2. Past Years' Progress

In FY 2018, the research team configured the "Comprehensive Gradual Sewer Diagnosis System" combined with desktop screening, ICT, and a direct-view inspection camera (figure 1) to verify its validity and efficiency. In FY 2019, the team demonstrated to solve issues found in the previous year.
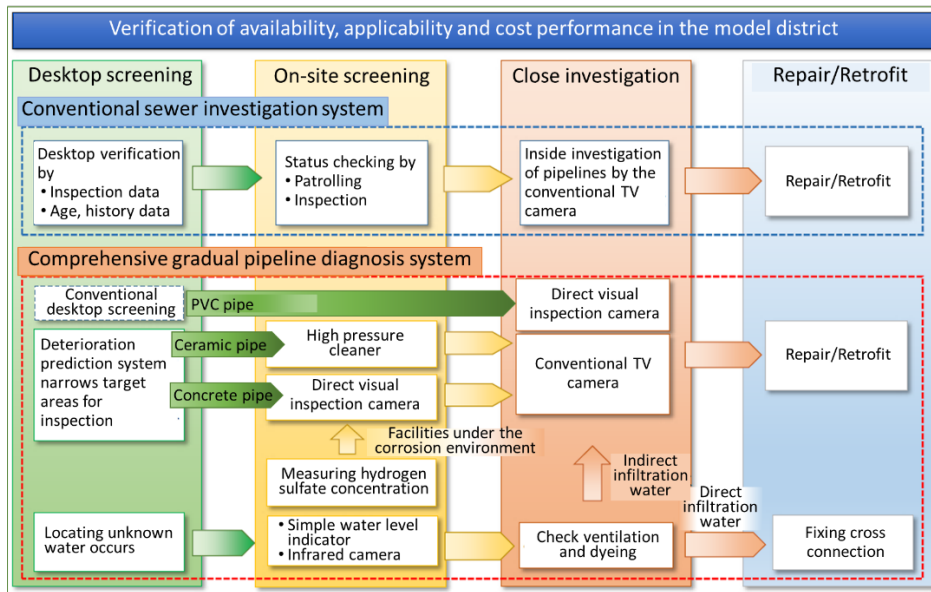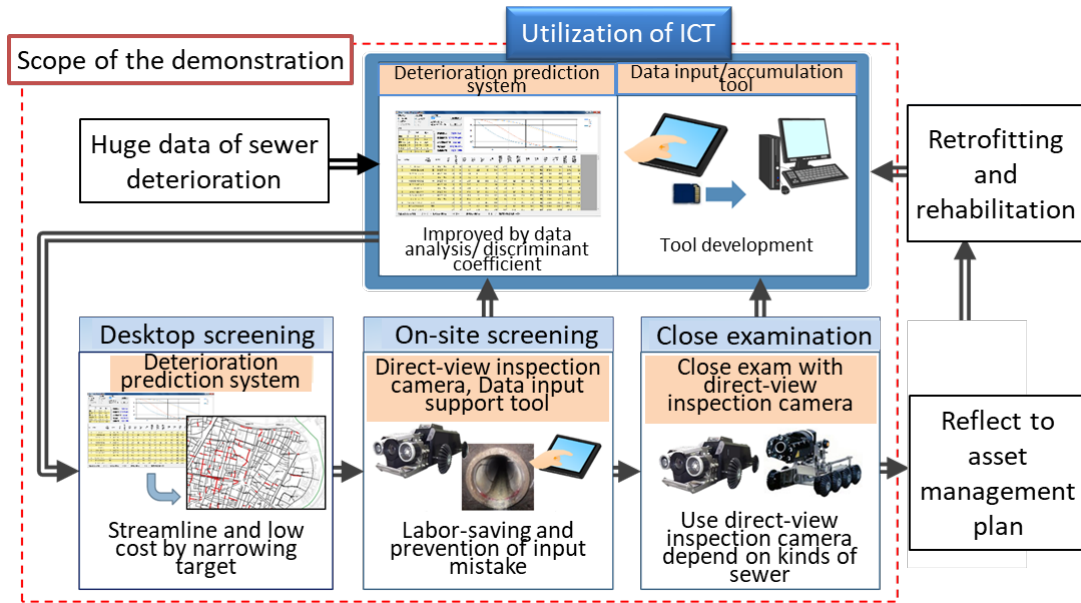
Figure 1. Overview of the demonstration

3. Outcomes of This Year

(1) The desktop screening

The segmented Weibull slope and predicted degradation using other municipal sewer pipeline data verified the applicability of the degradation prediction system to ceramic pipes was 70%.

(2) On-site screening

The research team improved the direct-view inspection camera to reduce the effects of sediments inside the sewer on the camera's driving performance. The improved camera achieved a 90% driving rate for pipelines with accumulated sediments and 90% emergency applicability for enlarged diameter (500-700mm) pipelines.

(3) Unknown water inspection

Simple water level indicators and dark vision cameras could narrow small blocks to closer blocks (2-5 ha) for unknown water.

(4) Corrosive environment investigation

The continuous measurement of hydrogen sulfide, TV camera survey, and visual inspection of manhole verified the relationship between hydrogen sulfide concentration and corrosive environment range. The investigation showed their constant correlation at the discharge destination of force mains and drainage pits.

4. Conclusion and Future Issues

- While some technologies could not achieve the goal, the whole system achieved 40% and more cost reduction, 30% and more period reduction compared to the existing system (by sewer pipeline inspection.)
- In the future, continuous data collection is required for further accuracy improvement.

Keywords: **Sewer asset management, Deterioration prediction, ICT, Screening**