Inspection and Research of Pipeline Deteriorations Using Quantitative Diagnosis Method		
Year of Research	2012	Appropriate stock management

(Purpose)

Currently, City A has a sewer pipeline network extending over approx. 360 kilometers, of which approx. 20 kilometers account for pipes installed 30 years ago or earlier. For the proper maintenance and stable operation of the sewage system continuously over the years ahead, the city needs to shift from "reactive management" to "preventive maintenance management," minimize the variations of renewal costs and maintenance costs, and develop a plan for extending the lives of sewers.

In this research, by using impact elastic wave inspection method as quantitative evaluation of pipe conditions, and imaging camera inspection (hereinafter referred to as visual inspection) were employeed to identify detereoration condition of Hume pipe.Investigation was carried out for building life extention plan by using inspection results. Added proposal was also conducted for dealing with unidentified water that was viewed as a problem by the city.

(Results)

(1) To grasp the deteriorations of pipes, the research addressed the following:
Total length of 5,029.08 meters of Hume pipe(RC pip of Class 1), with diameters 250/300 mm

(2) The examination using the imaging camera and the impact elastic wave inspection revealed that eleven of the 121 spans (all spans) were of urgency I or II. Most of the locations that require countermeasures were judged according to the result of with the inspection using the imaging camera, whereas fewer locations were found to have reduced strength by the impact elastic wave inspection.

(3) The concrete strengths of the eleven spans that require renewal were estimated based on the results of impact elastic wave inspection, and structural calculations were conducted as composite pipe. According to the calculations, composite pipe can be applied to all spans, and their costs (including inspection expenditures) can be reduced by approx. 7% as compared to self-support pipe as observed with visual inspection (**Figure 1**). From this result, using impact elastic wave inspection method is effective for considering the LCC as making pipeline life extention planning.

(4) Based the results of the inspection utilizing the impact elastic wave inspection, as derived from the inspection results for City A, selections of renewal method were built.

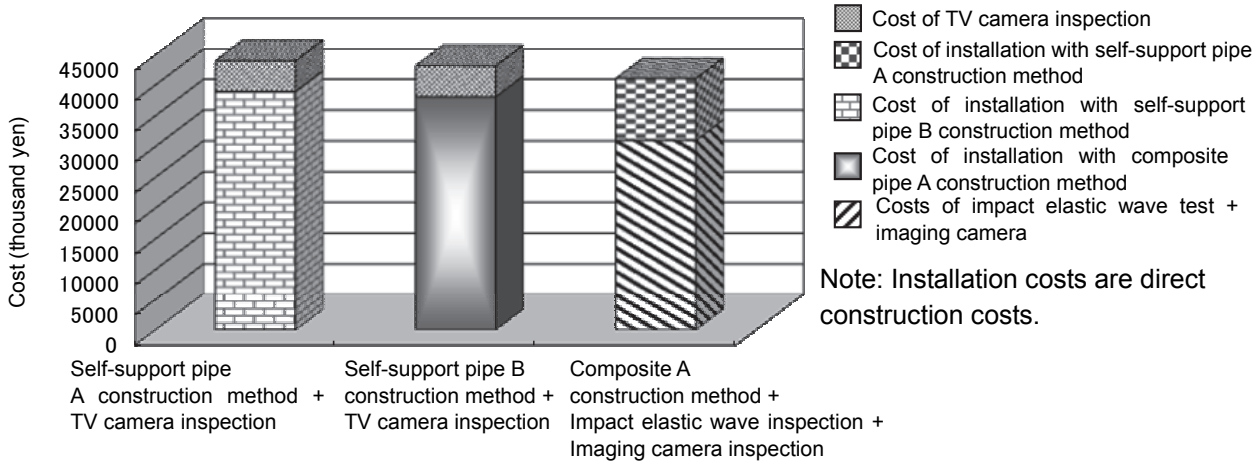

Figure 1 Comparison of rebuilding projects

(Conclusion)

The effectiveness of impact elastic wave inspection method for making pipeline life extension plan is summarized. More investigation is now planned for further study.

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Key words	Pipeline diagnosis, life extension plan, LCC reduction, impact elastic wave, inspection of sewers