

Research on the new technology of vacuum sewerage collection system

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61P ~ 66P

(Purpose)

By present of the end of 2000, the saturation level of national sewerage has reached 62%, on the other hand, it just reach 27% for the municipality under 50000 population persons. As a primary factor, the cases that the life cycle cost is not efficient are rising, while construction period is needed to be more long by considering topography and geotechnical condition and pipe network extension, by adopting conventional improvement technique (the natural draining sewerage system) in the districts where the population density is comparatively low, etc.. Then, it is required that the pipe system is constructed with the different idea unlike the conventional, and it is necessary to introduce the approach of synthetic evaluation of the life cycle cost considering the construction cost and maintenance cost and repair cost, etc. in selection stage of the pipe system.

In this study, efficiency improvement of the system is attempted based on the examination of appropriate selection of the pipe system and operation control method, etc., when the examination is advanced on the extension of application range such as the correspondence to review of pipe lowest gradient and shallow layer buried work. In addition, considering the needs of customer, introduction of the newest technology and standardization of the design technique based on results are done, while the synthetic rationalization of verification and maintenance of the application is attempted, and the technical manual is revised on the basis of the results.

(Result)

New technologies verified in this study are shown in the following.

- (1) Review of the lowest pipe gradient (0.2%? 0.1%).
- (2) Caliber extension of vacuum valve and vacuum pipe (correspondence of large scale points charge).
- (3) Correspondence to the shallow-layer buried work (development of shallow-layer buried work and valve corresponding to shallow-layer buried work interval).
- (4) Proposal of **avoidance method of contour lift** in crossing division of waterway (standardization of original technology of each company).
- (5) Standardization of the pipe system with automatic suction system.

The technical manual was reorganized in the order of plan, design, construction and maintenance of utilities in order to be easily used for the designer of consultant and municipality, and was arranged by the work flow. The composition of the technical manual is as following.

- Chapter 1 General rules
- Chapter 2 General plan
- Chapter 3 General design
- Chapter 4 Pipe design
- Chapter 5 Design of vacuum valve unit
- Chapter 6 Design of relay pump station
- Chapter 7 Construction
- Chapter 8 Maintenance
- Chapter 9 Large-capacity transportation system
- Chapter 10 Life cycle cost

Collaborators : Japan institute of Wastewater Engineering Technology.

Corp., Ebara, Corp., INAX, Corp., Kubota, Sekisui Chemical Corp.,...

Corp., Torishima Pump Mfg., HITACHI gold odd lot style company, Hitachi Plant Engineering & Construction Corp.,...

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Key Words

Vacuum sewerage collection system vacuum valve, vacuum sewer pipe