

Study on Operation and Maintenance of Network for Sewage Treatment Plants

Whole term

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(Purpose)

We examined the networking of several Sewage treatment plants as a means of meeting social demand for stable sewerage service management, CSO control and advanced wastewater treatment. This study was designed to present a method to calculate operation and maintenance costs for an economic comparison between a networking approach and an independent approach. Our aim was also to offer technical comments on operation/maintenance methods necessary for facilities (sanitary wastewater, sludge, information, etc.) networking and resultant accommodation and integration.

(Results)

(1) Method of calculating operation/maintenance costs when considering a network

Future operation and maintenance costs in two cases, that is, networked facilities and facilities working independently, were calculated to grasp how effective networking is. For this purpose, it was desirable to ensure that calculations were as accurate as possible by summing up future operation/maintenance costs by element, such as those for personnel, subcontracting, and electric power. This detailed summing-up method is rather complex and, therefore, not suitable for the rough estimates needed in the initial examination stage. Therefore, separate calculation methods must be used for each stage of the study.

This study presents the following two types of calculation methods for each stage in studying a network plan.

1) Calculation using an approximation equation expressing the relationship between the volume of influent sanitary wastewater and operation/maintenance costs (Calculation level 1)

The calculation work flow is shown in Fig. 1. In the initial examination stage, the future influent sanitary wastewater volume is used in the approximation equation obtained from statistical data on the volume of influent sanitary wastewater and operation/maintenance costs by component element in treatment facilities nationwide, so as to calculate the future cost for the case concerned.

2) Calculation method based on a network development plan (Calculation level 2)

The calculation work flow is shown in Fig. 2. As a project cost calculated when establishing a network plan, which, after all, will be used as data justifying the annual budget, the operation and maintenance cost is calculated by summing up costs for each of the component elements by taking into account the personnel allocation plan and the facilities and equipment to be introduced in the future.

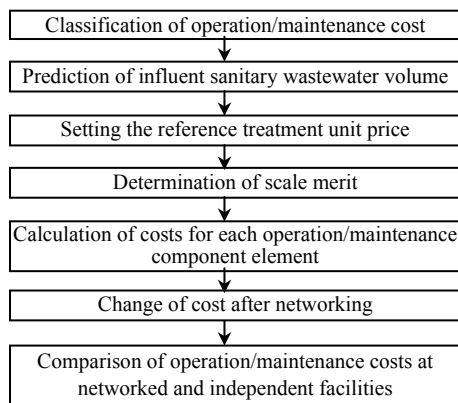


Fig.1: Operation/maintenance cost calculation for Calculation Level 1

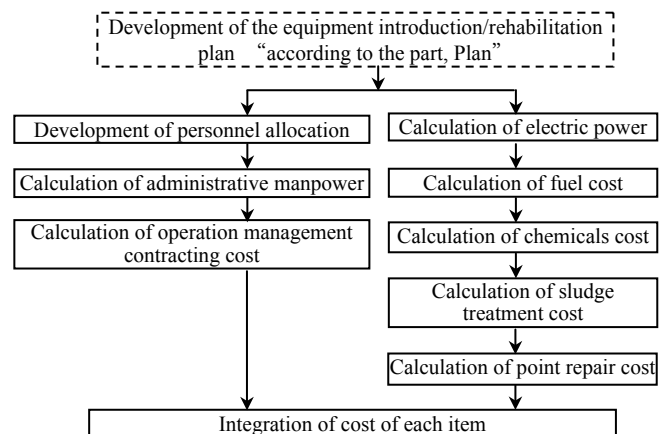


Fig.2: Operation/maintenance cost calculation for Calculation Level 2

(2) Operation/maintenance method by type of networked facilities

As the treatment facilities networking method varies according to the constraints of several treatment facilities and the objectives of networking, the operation/maintenance system must also be established according to the networking type.

This study presents the equipment composition needed to accommodate or integrate sanitary wastewater and sludge, considerations for operation/maintenance by networking type, and countermeasures in case of emergency. This paper also presents a method for establishing an information network according to facility size.

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key words

Network, method to calculate operation and maintenance costs, operation/maintenance methods necessary for facilities,