

Research on the demand for labor-saving at small scale treatment plants and on the Evaluation Model of the Centralized Management System

Whole term

1992.10 ~ 1995.3

(Purpose)

Towns and villages where sewerage construction is going to begin are likely to face population decrease over the coming years, resulting in increasing maintenance cost per unit over the same period. On the other hand, it is difficult for these towns and villages to secure maintenance engineers, making it necessary to have a maintenance system which requires less manpower.

Accordingly, this research aims at achieving the following two points:

1. To automate the maintenance process, in order to reduce manpower as much as possible and at the same time to enable that engineers are not required to have advanced skill set.
2. To construct a centralized management system for remote monitoring and controlling of more than one treatment plant at the same time.

(Results)

The following three points were examined for basic research.

1. Questionnaire survey on the actual maintenance conditions and research on the demand for saving labor in municipalities

1) Maintenance system

The ratio of entrusted maintenance to direct management was higher, as the number of years in operation and the scale were smaller

2) Frequency of water quality measurement

For OD tanks, pH and DO were measured every day at almost all treatment plants. For treated water, pH (or BOD) and SS were measured every day at half of the treatment plants, while at the other half they were measured twice or thrice a month.

3) Operation time

There were not enough data available for operation time and only thirteen samples were collected. The annual operation was conducted for approximately 1,600 hours manually and 42 hours automatically at the treatment plants which were equipped with sludge dewatering machines.

4) Need for automation

Cleaning (mainly final settling troughs), removing screen scum, sludge dewatering and preparing daily and monthly reports were listed as troublesome work for maintenance. In addition, screen operation, MLSS control, flow equalization and remote monitoring and controlling were also desired to be automated.

2. Research on the establishment of O&M (operation and maintenance) methods for the OD process

The operation factors for the OD process were identified as aerator, return sludge pump and excess sludge drawing pump. The O&M methods were ranked according to the combinations of the factors and required sensors for each factor.

3. Research on the evaluation model for the centralized management system

Basic research was conducted for the development of the management system evaluation model to judge whether to manage every single treatment plant separately or to centralize more than one treatment plant.

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Keywords

OD method, automatization, labor-saving, centralized management system, evaluation model