

Study on the wastewater treatment plant network in Fukuoka city

Whole term

1996.10 ~ 1998.3

(Purpose)

The sewerage system in Fukuoka city came into application in 1930 with the aim of management of stormwater and municipal wastewater. Among the initially constructed treatment plants, under operation now are, Chubu treatment plant, Wajiro treatment plant, Tobu treatment plant, Seibu treatment plant and Nishi-tozaki treatment plant. Chubu treatment plant, the oldest one, due to long-term operation under severe conditions, has recently gone out of order despite the fact that it underwent repairing many times. This plant needs complete overhauling. Since Hakata-bay was designated with stringent water quality standards, immediate installation of the advanced sewage treatment system is required for wastewater treatment plants.

This study was aimed at outlining a renewed scheme for the sewage works with a view to the future requirements and establishment of a network among the wastewater treatment plants in the Fukuoka-city.

(Results)

The results of the study conducted in FY1997 have been listed below.

1. Details of renovation of Chubu wastewater treatment plant

Based on site-inspection and interview of the operating personnel, basic points for renovation of Chubu wastewater treatment plant were comprehended, and consequently the agenda for renovation were set. The facility layout plan following the reconstruction was also made. Treatment performance of Chubu treatment plant was estimated from the viewpoint of treatment water quality by using the biological treatment modeling tools.

2. Stormwater reservoir

Accommodating stormwater along with municipal wastewater appeared to be the greatest challenge for the Chubu wastewater treatment plant which was worn out due to prolonged operation under severe conditions.

In this study, basic features of the renovation plan of present combined sewer system were set and the present water quality of stormwater reservoir was comprehended. Also the effect of feeding water from stormwater reservoir to Chubu treatment plant on the treatment performance of the latter was evaluated by using biological treatment modeling tools. The outcome of this evaluation enabled assessment of the possibility of managing reservoir water with the present water treatment plants.

3. Uncertainties associated with the assumptions regarding basic conditions

(1) Calculation of the annual amount of untreated water

In case of each treatment plant the amount of water that cannot be treated was calculated providing margin for fluctuations and considering uncertainties associated with the renovation period and influent quantity.

(2) Details of network facilities

The optimal pattern of renovation was decided based on the estimated amount of untreated water. The distribution of stormwater to the plants and the corresponding required scale of the new plants as well as the order of installation of network facilities were set.

4. Scheme of the network among treatment plants and pumping stations

The probable lay-out of the sewers was decided. Also capacity of network facilities under usual condition was investigated.

5. Analysis of the stability of the network

In this study, the term 'network facility' stood for arrangement of pipes connecting different plants and different treatment districts. The effects of such installations were analyzed, and probable problems in times of disaster and corresponding countermeasures were also considered.

6. The implementation plan of the networking project

A stepwise construction plan was drawn up. The cost-benefit ratios in cases of individual renovation of each plant and renovation of all the plants under a combined network were compared to assess the advantage of the proposed project.

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Keywords

reconstruction/renovation, advanced sewage treatment, network, crisis management