

Study on Sewerage Network

Whole term

1997.4 ~ 1998.3

(Purpose)

In Kobe city, sewage system has been being developed since its inception in the FY1951, and now covers 97.3% of the total population. Throughout this period, land use has been highly diverse, catchment area of the sewage system has expanded, and also lifestyle has changed a lot. As a result, the amount of wastewater has increased and the capacity of the sewer system has become insufficient. The catastrophic earthquake on 1995 aggravated the whole situation. Redevelopment projects are now being carried out for emergency restoration of the city facilities. Most part of the sewer network now requires to be repaired or to be expanded.

For the future, the existing sewer network has to be restructured into a multiple network system in order to secure for alternative ways of wastewater drainage in cases of emergency. New methods ensuring complementary operation of the facilities have to be established. Smooth transitions of the existing wastewater treatment plants to the advanced ones have to be ensured as well.

This study investigated the necessity of sewer networks in Kobe-city. The required scale and corresponding effect of sewer network in regular period, reconstruction period, and at times of disaster were also assessed.

(Results)

The results of this study have been summarized below;

1. The network system appeared to be effective for mitigating the existing problems in Kobe-city which possesses a separate sewer system.
2. The network would be useful to accommodate wastewater by linking three wastewater treatment plants in Kobe with pipes of large diameter.
3. The whole sewer network would compose of sewers laid out in seaside, sewers in mountainside and connecting sewers in between those.
4. Usually excess wastewater would be converted by gravity flow to a treatment plant with enough capacity. In times of renovation and disaster, wastewater flow would be controlled by utilizing water head difference obtained by sluice gate operation.
5. The flow capacity of each sewer network against the total design wastewater flow was examined. The proposed network appeared to possess sufficient capacity.
6. The cost efficiency of the sewer network was evaluated by cost-benefit analyses. The estimated benefit-cost ratio (B/C) of 2.01 exceeded that of the existing system. Also the proposed system, as compared to the existing one, offered a surplus net benefit of 82 billion yen. The cost efficiency of the sewer network system was thus confirmed.
7. CVM (Contingent Valuation Method) was applied and a WTP (willingness to pay) survey for the civil administration advisors was conducted. This enabled compilation of data and information precious for the future developments.

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Keywords

sewer network, cost benefit analysis, opportunity cost analysis, CVM