

# Study on Formulation of the Long-Term Maintenance and Rehabilitation Plan of Sewerage Systems

Whole term

2005.9~2007.3

## (Objectives)

The coverage of sewerage system has been increasing. On the other hand, many sewerage systems in urban areas have passed standard lifetime. Degraded sewerage system causes increase of damage/failure and O&M costs. Moreover, there is possibility for the disuse and it will cause crucial influence in daily life and social economic activities.

Although civil engineering structures such as wastewater treatment plant and pumping station are under the highly corrosive environment, the frequency of regular inspection for those structures is not enough compared to that for machineries. Also, because the criterion for quantitative evaluation is not clear, repair/reinforcement have been implemented under respective standards. Furthermore, it takes a long time and huge costs for detailed survey to determine the necessity of repair/reinforcement works.

This study proposes inspection and evaluation method that can examine the level of deterioration from simple survey. In addition, this study aims to introduce the example of the procedure for formulating long-term maintenance and rehabilitation plan of sewerage systems.

## (Results)

The contents and results of this study are as follows:

### (1) Survey on the deterioration of existing facilities

Survey for the deterioration of concretes is implemented to the facilities in Tokyo and ordinance-designated cities. Repair record and inspection record are also surveyed.

### (2) Study on the criterion of deterioration and deterioration prediction models

Based on the results of the deterioration survey, this study considers the index which can easily estimate the level of deterioration from observed information. Also, collected deterioration data from each facility are considered and deterioration prediction model adapting Markov chain model has developed as the method to predict future deterioration. (cf.Figure1)

### (3) Simulation at the model facilities

Provisions according to the degree of deterioration have introduced and life cycle costs of the model facilities are calculated. Also, long-term maintenance and rehabilitation plan has developed. These outcomes are incorporated in the draft guideline for long-term maintenance and rehabilitation planning by easy method.

## (Further Study)

This study is based on limited information and fixes the item of the deterioration prediction model which is necessary for long-term maintenance and rehabilitation planning of the sewerage facilities. For future issues, it is necessary to stock more data and to improve the accuracy of the deterioration prediction model.

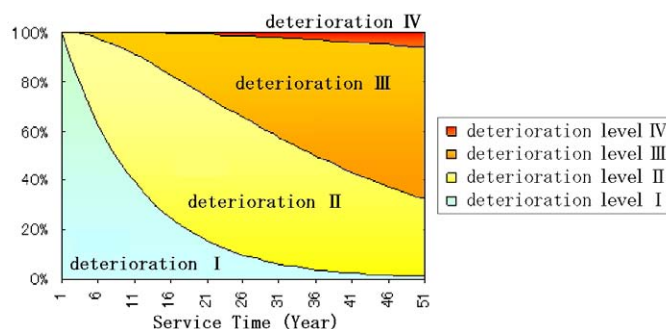


Figure 1 Example of the deterioration prediction model

Cooperative researcher : Liaison conference for sewerage technological development

Researchers : Osamu Fujiki, Yoshiyasu Onoda, Katsuya Kinoshita, Kenichi Fukushima, Hirokazu Kondo

Key words

Maintenance, Renewal, Deterioration Prediction, Life Cycle Cost, Long-Term Maintenance and Rehabilitation Planning