Management of Sewers

YOKOTA Toshihiro, Head
FUKATANI Wataru, Researcher
MIYAMOTO Toyohisa, Researcher
Wastewater System Division, Water Quality Control Department

(Key words) Sewers, stock management, Survival Ratio, LCA

1. Introduction

At the end of 2009, the sewerage coverage ratio reached about 73%, and the vast stock of pipes providing this coverage reached approximately 420,000km. It is predicted that sewerage facilities will deteriorate, pushing up the cost of their maintenance in the future, resulting in the need for systematic and efficient facility management to ensure that these facilities continuously provide their specified functions. One way to achieve this is stock management (SM).

To develop and implement the SM method, rational operation plans must be drawn up based on the prediction of the medium to long term quantity of work considering the soundness of the facilities. This will permit maintenance of good quality sewerage services under harsh financial restraints.

And a sewerage service contributes to improving the living environment and conserving water quality in public bodies of water. At the same time, the consumption of energy resources and emission of green house gases by the construction and operation of its facilities create a variety of environmental loads. Therefore, to operate a service, it is necessary to evaluate its environmental load from the medium to long term perspectives.

The NILIM is contributing to the promotion and development of the SM by carrying out research on a variety of basic technologies such as facility soundness (survival) evaluation and prediction, standardization of future works volume, and the evaluation of the impact of sewerage system operation on the global environment as Life Cycle Assessment (LCA).

2. Predicting Survival Ratio of sewers

To predict future works volume in the medium to long term, it is necessary to have a survival ratio prediction formula to predict change over years of the percentage of pipes which are reconstructed. Survival ratio is a value obtained by dividing total length at each deterioration rank by total surveyed length of pipes surveyed after any number of years of service. The survival ratio prediction formula indicates this with an approximate line.

The NILIM improves the precision of the survival ratio prediction formula by conducting a nationwide survey of pipe length by year of installation. And the NILIM updates the soundness prediction formula annually (Fig. 1).

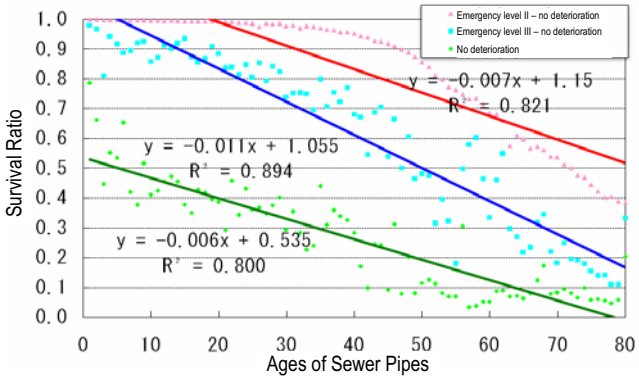

Figure 1.Survival ratio prediction formula

3. Application of LCA to sewers

To establish concepts to guide cases where LCA is applied to calculate the environmental load of sewers, we collected information about environmental load basic units by pipe material and by work method, etc. at each stage—pipe manufacture and installation, operation, and disposal—to prepare an environmental load calculation function (Fig. 2). This simplifies environmental load calculations, permitting its use as material to select work methods when installing new pipes or reconstructing existing pipes.

4. Conclusion

Initiatives to develop SM in the sewerage field have barely begun, and even local governments are at the trial and error stage. Under such circumstances, we hope that the SM method established by the NILIM will further promote the introduction of SM.

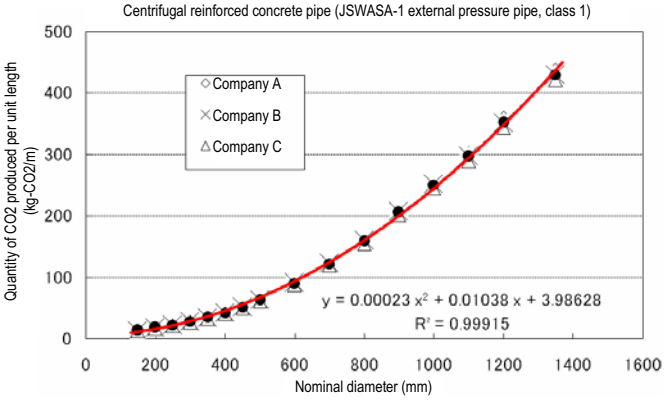

Figure 2. Environmental Load Calculation Function Graph (Example)