Joint Research Study for Performance Evaluation of Primary Processing Advanced Facility

Year of Research	2011・2012	Improvement of combined sewer system

(Purpose)

A City has constructed a Primary Processing Advanced Facility (rated water treatment volume: 168,000m^3/day, designed filtration speed: Maximum 1,000m/day), and test operation of the facility began in December 2011. As this was the first time for A City to operate the facility, the aim of this performance evaluation was to evaluate this first operation of the facility.

(Results)

The details and results of this research study are as follows.

(1) Target Rainfall

A study was implemented a total of 10 times throughout 2 years, in the winter of 2011 and from the spring to autumn seasons of 2012, during which time a wide variety of rainfall related processing data such as the preceding dry period, total rainfall and maximum 10-minute rainfall was obtained.

(2) BOD, SS Load Removal Rate

The average BOD and SS load removal rates in this study were BOD: 67.5%, SS: 76.4%.

A comparison of the BOD load removal rate with the measurement values obtained from the results of SPIRIT21 is as shown in **Figure 1** (line in the figure indicates the SPIRIT21 removal rate), and values that exceeded the SPIRIT21 removal rate were obtained in all but the 7th study.

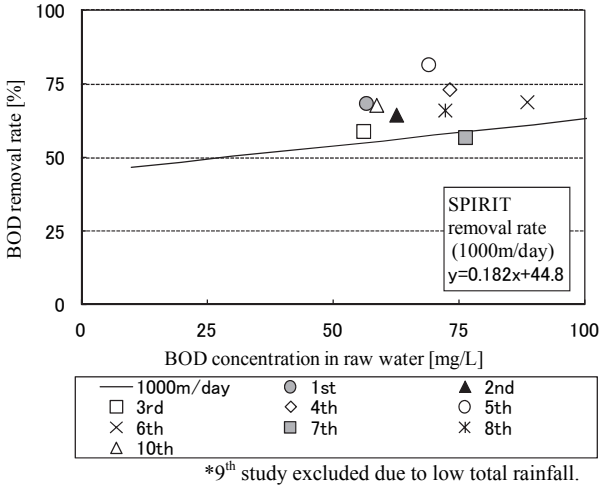
(3) Debris Removal Rate

The debris (2mm and above) removal rate was 100% in all studies, and the same results as SPIRIT were obtained.

The sediment removal rate by particle size of particles greater than 1μm (average values of the sediment removal rate by particle size) is shown in **Figure 2**. It was found that the removal rate increased in accordance with increased particle size, and that a removal rate of almost 100% was obtained for particles 425μm and larger.

(4) Other Removal Rates

The load removal rates of other items were, 39% average for total phosphorous, 95% for n-hexane extracts, 32% for total nitrogen, and 52% BOD for solubility.



*9th study excluded due to low total rainfall.

Figure1. Comparison of BOD removal rate and SPIRIT

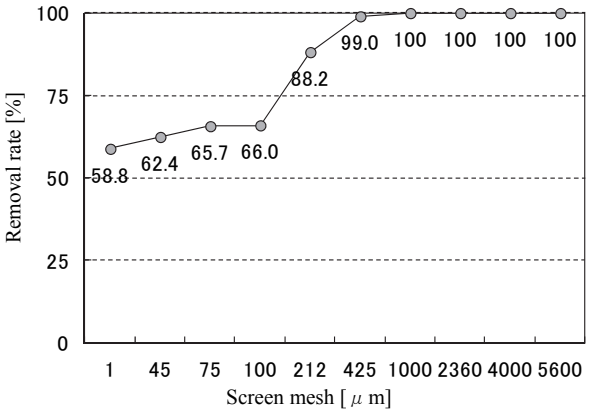


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Figure2. Sediment removal rate by particle size

(Conclusions)

The results of this research study indicated generally better results than those obtained in SPIRIT21. In future, the promotion of further improvements in combined sewer systems will be pursued through the application of these results.

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Key words	Improvement of combined sewer system, high-rate filtration