Practical Application of Inflow Reduction-adaptive Wastewater Treatment Technology

(Research of FY 2017-2021)

1. Purpose

The purpose of this study is the practical application of low-cost wastewater treatment technology which is flexibly adaptive to the inflow decreasing caused by such as population decline. In particular, the following two technologies are to be developed, and established as wastewater treatment technologies.

① **Downsizing wastewater treatment technology** that enables efficient downsizing of the existing conventional activated sludge (CAS) process(demonstrated in B-Dash Project 2016)

② **Small-scale low-cost wastewater treatment technology** that allows small-scale WWTPs with small capacity to secure the treatment performance during retrofit or flexibly deal with future inflow decline (new project)

2. Outcomes of this year

(1) Downsizing wastewater treatment technology

"Flow fluctuation tracking type wastewater treatment technology using DHS system" has been continued its independent demonstration using B-Dash facilities.

(2) Small-scale low-cost wastewater treatment technology

In 2017, a questionnaire survey was conducted against small-scale WWTPs of below 1,000 m^3/d capacity. This year, the collected practical data was analyzed in detail to quantify the fluctuation status of the amount and water quality of inflow at the small-scale WWTPs to consider the development conditions of new wastewater treatment technology.

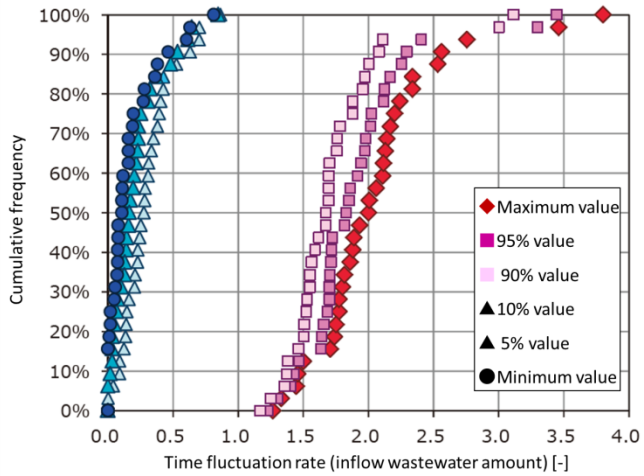

Figure 1: Cumulative frequency distribution of time fluctuation rate of inflow wastewater amount at small-scale WWTPs (≦1,000m^3/d)(n=33)

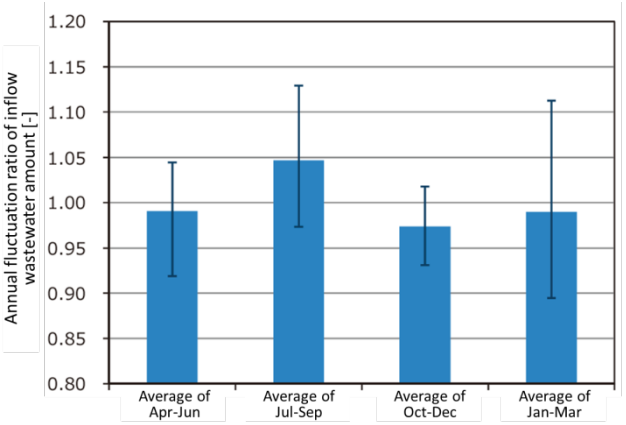

Figure 2: Seasonal average and 10-90% range for annual fluctuation rate of inflow wastewater amount at small-scale WWTPs (≦1,000m^3/d)(n=120)

- Time fluctuation of inflow wastewater amount: Figure 1 describes that peak ratio of time fluctuation (the maximum inflow amount per time ÷ the average inflow amount all times) is about 2 on average and most WWTPs have 3 or less. The peak ratio of time fluctuation shows no clear difference by day of week or seasons.
- Seasonal fluctuation of inflow wastewater amount: As figure 2 shows, the inflow amount of winter (January to March) on average is the same degree as the yearly average inflow amount.
- Seasonal fluctuation of inflow wastewater quality: inflow wastewater quality, the concentration of SS, BOD and COD, in winter tends to be higher than the yearly average wastewater quality. On average, its increasing rate is 10% or less.

3. Future plan

The demonstration will be continued for downsizing wastewater treatment technology to verify the long-term treatment performance, power consumption, etc.

Small-scale low-cost wastewater treatment technology will proceed to the demonstration stage for its practical application. Before the demonstration, development conditions will be defined based on the survey result in this paper.

Keywords: ***Decreasing of inflow wastewater amount, Downsizing, Small-scale wastewater treatment plant***