Practical Application of Wastewater Treatment Technology Adaptable to Inflow Reduction

(Research of FY 2017-2021)

1. Purpose

Municipal WWTPs expect they have less inflow because of population decline in the future. The purpose of this study is a practical application of the low-cost wastewater treatment technology adapting to the reduction of inflow volume. Researchers develop and establish the following two technologies as wastewater treatment technology.

① **Downsizing wastewater treatment technology** targeting conventional activated sludge (CAS) process aims to enable efficient downsizing of treatment process with utilizing existing facilities. The demonstration was adopted B-DASH 2016.

② **Low-cost, compact wastewater treatment technology** (new development) aims to maintain the treatment performance at retrofitting and enable flexibility to the inflow decreasing.

2. Achievement of This Year

① Downsizing wastewater treatment technology: The demonstration on "Flow fluctuation tracking wastewater treatment technology using DHS system" as B-DASH project has been completed.

② Low-cost, compact wastewater treatment technology: The researchers made a field study targeting small-scale WWTPs with a capacity of 1000m^3 per day, based on the statistical data and hearing survey. The purpose of

the field study is to consider the requirements for the new development of wastewater treatment technology.

- Based on the statistical data including "Sewerage Statistics 2014," conditions such as planning factors, wastewater/sludge treatment method, operation/treatment performance, and power consumption were organized. The data showed that 481 WWTPs with a capacity of 1,000m^3/d or less were in operation and about 73% of them adopted the OD process. 73% WWTPs with only one reactor will have problems to maintain their treatment performance at retrofitting in the future.
- Based on the above data, the researchers extracted 202 small-scale WWTPs of 117 municipalities for a questionnaire survey. The questionnaire included items which are hard to obtain by statistics, such as inflow fluctuation by time-slot, O&M condition, and costs. The investigation got 121 valid responses. Figure 1 describes the peak flow rate (peak hourly flow divided by average daily flow) by time fluctuation in each season. The figure represents small-scale WWTPs have approximately

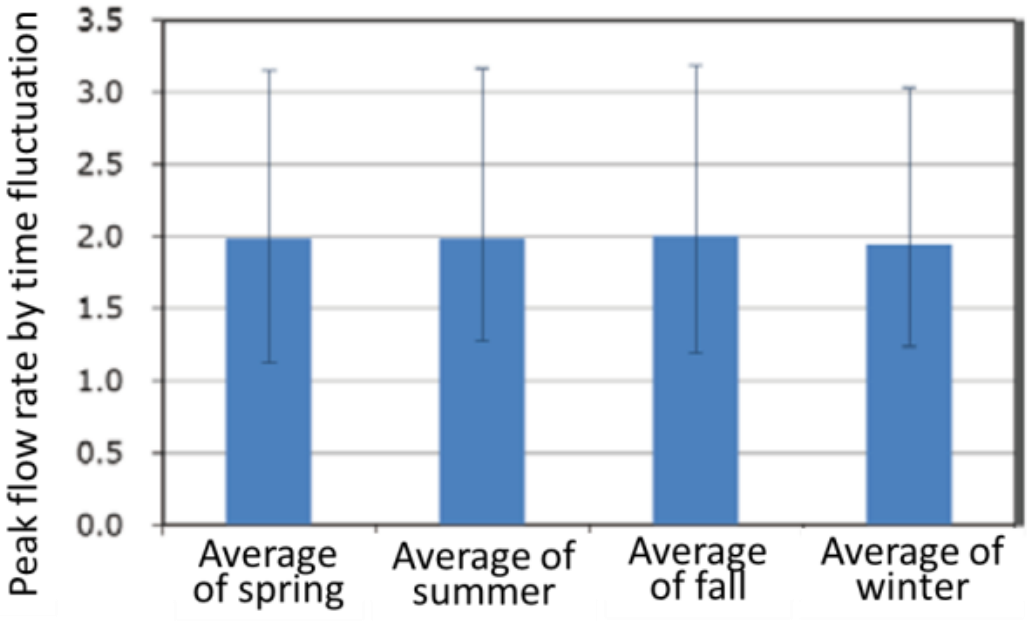

Figure 1: Peak flow rate in the small-scale WWTP(≦1,000m^3/d)
* The average of 36-38 WWTPs × 7days and range of 5-95 percentile

stable peak flow rate by time fluctuation through the year. The result defines that small facilities require wastewater treatment performance which is adaptable to the peak flow rate of average 2.0 or maximum 3.0-3.5.

3. Future issues

The demonstration for downsizing wastewater treatment technology will continue next year. The further research for its treatment performance including treated water quality and sludge generation, and tracking ability of power consumption per inflow will optimize and establish the technology.

Low-cost, compact wastewater treatment technology will proceed to the stage of demonstration for practical application through defining the requirements of the development based on the result of the field study of this year.

Keywords: Inflow reduction, Downsizing, Small-scale WWTP