Establishment of the Implementation Procedure for the Wastewater Treatment Performance Enhancement Technology

(Research of FY 2017-2021)

1. Purpose

Wastewater treatment facilities have to flexibly cope with inflow decrease because of population decline. This study deals with alternative technology or treatment performance enhancement technology for a primary settling tank, reaction tank, final settling tank, and sand filtration facilities. The study aims to promote the enhancement technology and establish its procedure for retrofitting through R&D, and post-survey at facilities that adopted the technology.

2. Outcomes of This Year

(1) Alternative or performance enhancement technology for a primary settling tank

Figure 1 describes the "High rate filtration system," with higher SS removal capability and a smaller filtration area than the conventional primary settling tank. This year, joint research with private companies has continued for the system. The study has investigated the impacts of the high rate filtration system on the following wastewater treatment functions. It has verified the system's applicability as an alternative or performance enhancement technology of a primary settling tank.

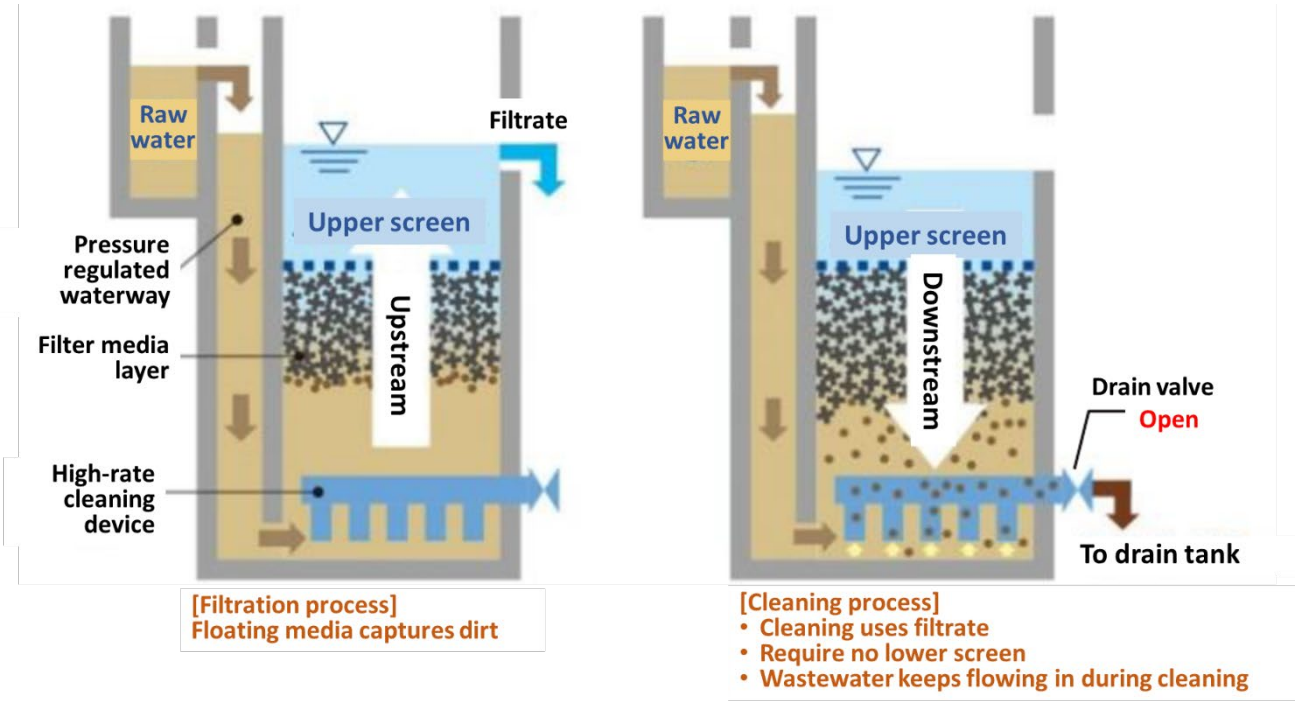

Figure 1. Structure and principle of high-rate filtration system

(2) The performance enhancement technology of a reaction tank

- The study investigated the operation status of the "Dual DO control system for OD process," targeting the facilities adopting the technology. Researchers collected the previous year's operation records of these facilities and set up the measurement equipment, including electric power monitors. The comparison and study for the treated water quality and power consumption between before and after the technology adoption and between adoption lines and the existing lines will start in 2021.
- The study also deals with treatment performance enhancement technology with better treatment capability than the CAS process. JS started a plant experiment for this technology which combines a fixed bed and floating bioreactors as joint research with private companies. The plant experiment at JS R&D center has verified the applicability of the technology to urban wastewater treatment systems.

(3) The alternative or performance enhancement technology for a final settling tank

The demonstration was implemented as continued research of "Treatment performance improvement technology for a final settling tank," adopted for the B-DASH project 2017, using its real scale demonstration facilities. The technology aims to improve its performance with additional filtration functions to a final settling tank. Researchers have verified the maintainability improvement, and the optimization of the filtration section's cleaning through a long operation.

(4) The sand filtration alternative technology

JS and private companies jointly research disk-configured cloth media filtration technology. The research group made a year-round operation using secondary treated water generated from the demonstration facilities set at the wastewater treatment plant. The research verifies the sand filtration alternative technology's treatment performance and adoption benefits.

3. Future Plan

- Joint research with private companies will verify the applicability of various treatment performance enhancement technologies and their practical applications.
- Researchers will conduct the operation status survey for the Dual DO control system for the OD process at facilities that have adopted it to verify and evaluate its adoption benefits. The survey will promote the improvement of the technology and make the documents for its standardization.

Keywords: **Treatment performance enhancement, High-rate filtration system. Dual DO control system, filtration**