

Establishment of Implementation Procedures for Wastewater Treatment Performance Enhancement Technology

(Research of FY 2017-2021)

1. Purpose

Wastewater treatment facilities must 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 it.

2. Outcomes of This Year

(1) Demonstration of the performance-enhancing or alternative technologies

Demonstrations through the B-DASH project (independent research) or joint research continued.

- First settling tank: High-rate filtration system (completed in 2020)
- Aerobic tank: performance-enhancing wastewater treatment system
- First settling tank and aerobic tank: Energy-saving wastewater treatment technology using high-efficiency solid-liquid separation and dual DO control
- Final settling tank: treatment performance improvement technology
- Filtration of secondary effluent: Filtration technology by disk-shaped filament filter cloth

(2) Post-project survey of the Dual DO control system in the OD process

The post-survey, including regular and 24-hour water quality tests and operation control data analysis, was conducted at one facility adopting the Dual DO control system. The survey compared demonstration trains with the existing trains for their treated water quality and power consumption. The result showed the demonstration line reduced power consumption per treated water quantity by a monthly average of 30%.

(3) Verification of cost reduction effects by treatment performance-enhancing technology

Dual DO control system in the OD process, and Carrier Added Activated Sludge Process (LINPOR Process) are treatment performance-enhancing technologies.

The verification dealt with these two technologies registered in JS New Tech Implementation Program. Under the condition of increasing treatment performance by 1.5, the costs of case (a) of new technology adoption and case (b) of simple retrofit and expansion were compared by treatment capacities.

Figure 1 shows the verification results of the Dual DO control system in the OD process in case of increasing treatment performance by 1.5. Verification targeted three treatment facilities with a capacity of 2,000, 4,000, and 6,000 m³/day, having two OD tanks each.

Case (a) assumes adopting new technologies for two tanks, and case (b) assumes retrofitting two tanks with the same facilities while expanding a new tank with the same capacity as the existing tank.

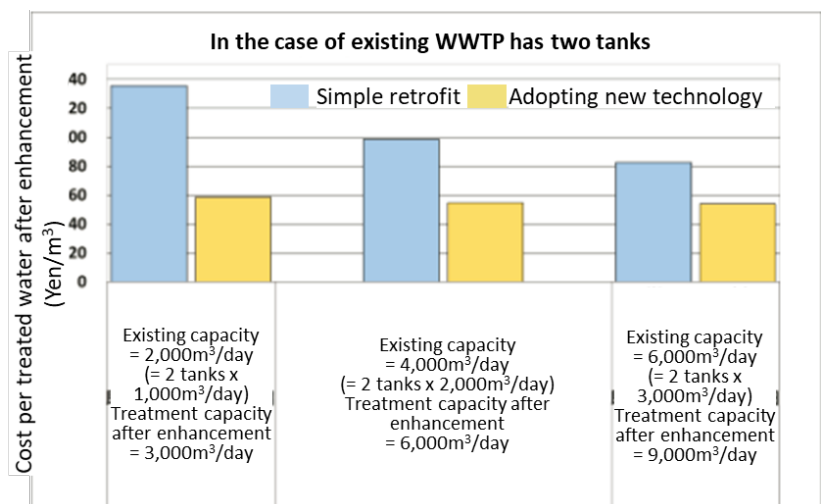


Figure 1 Cost comparison for the dual DO control system

The Figure shows each case's unit load, the total construction (retrofit) costs per year, and annual O&M costs divided back by the treatment capacity after enhancement.

In each scale facility, new technology adoption costs less than simple retrofit and expansion, and this tendency is more evident for the smaller facility. The reason is new technology' cost depends on inflow quantity more than others, and it means smaller scale facility has relatively more cost reduction benefits by new technology adoption.

3. Future Plan

- Demonstration by joint research will continue studying wastewater treatment performance-enhancing technology's adaptability and practical applicability.
- The post-project survey for the dual DO control system for the OD process will continue verifying and evaluating adoption benefits in its installed facilities to study its improvement and standardization.
- Using various new technologies, the treatment performance-enhancing scheme for the existing facilities will be organized as a universal study procedure.

Keywords: **Treatment performance-enhancing technology, Dual DO control system,**