

## Collaborative investigation about study of advanced wastewater treatment plan in Yokosuka City

Year of Research

2011・2012

Water quality improvement  
by advanced sewage treatment

**(Purpose)**

Yokosuka City has approximately 400,000 administrative population with 4 sewage treatment areas of single public wastewater. Among these, Shitamachi, Oppama, and Uwamachi sewage treatment plants(STP) which are discharged to Tokyo Bay which is a close nature water area should adopt advanced wastewater treatment in the future. By joint research in 2011 year, after unifying Shitamachi and Uwamachi STP, advanced wastewater treatment was introduced into Shitamachi and Oppama STP, and the Nishi STP became conventional activated sludge process. In this research, to advanced wastewater treatment system of the conventional type which became advantageous by joint research in 2011 year, introductory examination of new technology, such as simultaneous nitrification denitrification process (following, NADH system) and Membrane Bioreactor (following, MBR), is performed, and it aims at finding out the optimal proposal of advanced wastewater treatment. Moreover, removal of the phosphorus of recycle flow was considered.

**(Result)**

- (1) The track record of a domestic actual proof experiment of a NADH system is shallow type bioreactor. Therefore, an introductory possibility was investigated for Shitamachi STP system of deep type structure. As a result, since uniform DO distribution was checked, it was judged that NADH system could be introduced. anaerobic-anoxic-oxic process compared to flocculant combination type, anaerobic-anoxic-oxic process was expensive for construction costs, and administrative and maintenance expense resulted in a flocculant combined use type becoming high.
- (2) We performed introduction examination of circulation-type nitrification denitrification model MBR (flocculant combination type) and anaerobic-anoxic-oxic process type MBR. We could find 40,000m<sup>3</sup>/day in circulation type nitrification denitrification model MBR as a result that a capacity calculation of MBR and placement examined Shitamachi STP III system as a representative and knew that we could find processing capacity of 31,200m<sup>3</sup>/day in anaerobic-anoxic-oxic type MBR. anaerobic-anoxic-oxic process was expensive for construction costs, and administrative and maintenance expense resulted in a flocculant combined use type becoming high.
- (3) As a result of having compared the life cycle cost in consideration of a business schedule, in Shitamachi STP, in circulation-type nitrification denitrification model MBR (40,000m<sup>3</sup>/day) and flocculant combination type NADH system (98,100m<sup>3</sup>/day), Oppama STP, anaerobic-anoxic-oxic type MBR and a combination to do got the most economical result.
- (4) After plural most suitable plans of the handling of recycle flow calculating the phosphorus income and expenditure than a calculation and the phosphorus elution rate of the solid body income and expenditure of the case, and having calculated the rough estimate business expense based on this, We compared the economy and picked it. We did the examination case with a method to send a method to carry out sludge which We spin-dried according to the present conditions about an export method of the grime of Oppama STP and sludge which We mixed. In addition, We set four cases (treatment by II - III system, treatment by II - IV system, treatment facilities for exclusive use of one of recycle flow, treatment by the facilities which phosphorus collects and II - IV system) about recycle flow treatment plant of Shitamachi STP to work to gather sewage sludge of Yokosuka city in each case. As a result, as for the export method of sludge of the Oppama STP, a method to carry out sludge which We spin-dried became favored, and a method to add flocculant in II - IV system became advantageous to the treatment of recycle flow.

**List-1 The most suitable plan of the sewer system**

sewage - treatment plant	system	advanced wastewater treatment process		recycle flow treatment (phosphorus)
		process	capacity	
Shitamachi	II	Disuse	—	treatment by the facilities which phosphorus collects and II - IV system
	III	Flocculant combination type and Circulation-style nitrification denitrification model Membrane Bioreactor	40,000m <sup>3</sup> /day	
	IV	Flocculant combination type and simultaneous nitrification denitrification process	98,100m <sup>3</sup> /day	
	total	—	138,100m <sup>3</sup> /day	
Oppama		Anaerobic-anoxic-oxic type Membrane Bioreactor	18,000m <sup>3</sup> /day	—
Uwamachi		Disuse	—	Disuse
Nishi		Conventional activated sludge process	28,300m <sup>3</sup> /day	—

**(future subject)**

When I introduce flocculant combination type NADH system into Shitamachi STP IV system, the processing capacity is 98,100m<sup>3</sup>/day, and it is necessary to examine confirmation and the countermeasure of the structure of facilities and hydraulics-like problems. In addition, the IV system is a bioreactor of a deep type, and it is necessary to investigate it thoroughly about a sensor position and equalization measures in the direction of the depth to vary in DO distribution.

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Key words

advanced wastewater treatment, simultaneous anoxic-oxic process, Membrane Bioreactor