

Investigation research on a nitrification advanced type aversion non-oxygen-aerobic method

Whole term

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(Purpose)

The water quality of the Hakata bay does not improve according to an eutrophication phenomenon. In Fukuoka city, from the Heisei 5 fiscal year, advanced processing institution maintenance of phosphorus removal was started, and maintenance was completed in the Heisei 11 fiscal year. On the other hand, since the environmental quality type of nitrogen and phosphorus was specified in June, Heisei 8 by Fukuoka Prefecture, it decided upon the "Hakata bay specification water area advanced processing master plan" in collaboration with Fukuoka Prefecture in June, Heisei 10, and the matter which is to the foundations of promotion of a future nitrogen and phosphorus simultaneous removal advanced processing enterprise was defined.

The pilot plant experiment of the aversion-non-oxygen-aerobic method using the hollow cylinder type joint carrier made from foaming polypropylene is conducted for the purpose of nitrogen and phosphorus removal, and the real scale actual proof experiment is conducted from this foundation and the Heisei 16 fiscal year to the Heisei 17 fiscal year using one series of an eastern part water processing center based on the result from the basis of such a background and the Heisei 9 fiscal year to the Heisei 12 fiscal year.

While this investigation conducts the real scale actual proof experiment which used the real institution and proving achievement of a processing target, the optimal institution design and the operation management method are examined, and this report summarizes achievement of a processing target for a center as an actual proof experiment result in the Heisei 16 fiscal year.

(Results)

1 . Nitrogen (processing target water quality less than 9 mg/ ℓ ; target value of the Hakata bay specification water area advanced processing master plan)

The water quality average value of outflow water the final settling tank, T-N is 8.3 mg/ ℓ , and processing target water quality was attained. However, in the nitrification reaction, NH₄-N remained in single shot, and it had not resulted in full nitrification. It turned out that this has happened when DO concentration is low, it is checked that nitrification speed falls, so that DO concentration is low, and DO concentration is influenced greatly. Moreover, the situation which has not seen and carried out perfect denitrification of the case where NO_x-N is detected in a denitrification reaction was checked. Here, it is CBOD (organic matter origin BOD). When arranged about the relation between -SS load and denitrification speed, the tendency for denitrification speed to become high was accepted, so that CBOD-SS load became high, without being influenced not much of water temperature. Therefore, in order to attain perfect denitrification, it was thought effective to make the amount of organic matter inflow loads increase by methanol addition, a first settling tank bypass, etc. if needed.

2 . Phosphorus (processing target water quality less than 0.4 mg/ ℓ ; target value of this master plan)

Although the water quality average value of final settling tank outflow water T-P is 0.38 mg/ ℓ and processing target water quality was attained, it was checked at a acclimation period or the time of an experiment start that the phosphorus removal which does not shine 4 to rain gets worse. Then, it was possible in stable operation which was satisfied with performing operation management of adding a condensation agent when an analysis value continues using the automatic analysis equipment of T-P and it becomes 0.2 or more mg/ ℓ , checking the PO₄-P hand analysis value of reaction tank end water being less than 0.1 mg/ ℓ in general, and stopping addition of a condensation agent of processing target water quality.

3 . COD_{Mn} (processing target water quality less than 10 mg/ℓ ; provisional target value of this master plan)

The water quality average value of final settling tank outflow water COD_{Mn} is 7.8 mg/ℓ , and processing target water quality was attained. Furthermore, when SS concentration carried out the increase in 1 mg/ℓ of the SS origin COD_{Mn} in COD_{Mn}, it turned out that it is in the tendency which carries out the increase in about 0.25 mg/ℓ .

4 . BOD (processing target water quality less than 10 mg/ℓ ; established processing water quality level)

The water quality average value of final settling tank outflow water BOD is 3.0 mg/ℓ , and processing target water quality was attained. Moreover, it was checked that change of BOD (N-BOD) of the nitrification origin originates greatly, and change of BOD was understood that stable achievement of full nitrification is very important in order to stabilize BOD removal.

5 . SS (processing target water quality less than 10 mg/ℓ ; established processing water quality level)

Although the water quality average value of final settling tank outflow water SS is 5.4 mg/ℓ and processing target water quality was attained, there was a case where it was over a processing target sporadically. The sludge to which visual observation is carried out and the winding-up phenomenon of the sludge in final settling tank was able to wind this up is the cause, and SS is considered to have exceeded processing target water quality.

(Study schedule)

In this report, it collected focusing on verification of processing target water quality achievement. The concentration of final settling tank outflow water has cleared processing target water quality in general in the actual proof experiment of abbreviation half a year of the Heisei 16 fiscal year. However, there was a case where rain could not attain a processing target.

In future investigation, it is important to accumulate much establishment of the operation management methods, such as acquisition of the further water quality data based on the dissolution of the carrier blockade problem to a screen and medicine pouring through every year, and more knowledge of the maintenance management method, and it is required to investigate as much as possible by investigation about the examination item which was not able to acquire knowledge in the Heisei 16 fiscal year in the Heisei 17 fiscal year, and to accumulate knowledge.

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key words

Advanced processing, A carrier, An aversion non-oxygen-aerobic method