Research on the utilization of a sewage treatment technology with effective land usage		
Whole term	1992. 10 ~ 1994. 3	

(Purpose)

In Nagoya city, several treatment plants are required to be renewed. Because all of these treatment plants are located in downtowns, the site areas are narrow.

In addition, it is difficult to acquire sites for the renewal of the treatment plants since urban circumstances change frequently.

Therefore, it is necessary to make use of the site effectively when renewal activities are carried out to increase the capacity of the treatment plant.

Hence, in this investigation, the performance of a pilot plant was demonstrated and the applicability to an actual plant was investigated using a combined process of a filter-type solid-liquid separating device and an aerobic filter, which specially is thought of being effective in the aspects of the economical area and are among the new sewage treatment technologies proposed in the "Research and development of a new wastewater treatment technology that utilizes biotechnology (So-called Biofocus WT): 1985~1989" of the Ministry of Construction.

(Results)

(1) Characteristics of the economical area

When the water flow velocity of the filter-type solid-liquid separating device and the aerobic filter were 140 m/d and 20 m/d, respectively and the magnification ratio was above 8.6/time, it could be expected approximately a 30% economical area in the water surface in comparison with the conventional method.

In addition, the aerobic filter had to be constructed in two units in the Tsuyuhashi sewage treatment plant (The daily maximum load was 70,000 m^3/day) in its renewal process, and a sand filter had to be installed in the latter part of the aerobic filter since its total water flow rate became 40 m/d as it was 20 m/d per one aerobic filter unit.

(2) Quality of the treated water

A stable treatment was carried out by the filter-type solid-liquid separating device even at the time of fluctuation of water quality of the sewage-influent, and its performance was similar to the results in the "Biofocus WT" and the likes.

Also, there was a high performance in SS removal under the condition of high filtering velocity. Therefore, it is regarded as an effective method of treatment for advancement of the simple treatments in combined sewer systems during the rainy weather.

When the rate of filtration of the aerobic filter was below 20 m/d, the targeted BOD concentration, 10 mg/L was achieved while the SS concentration exceeded the targeted value a bit. However, when the quantity of air fluctuated following the fluctuations in the flow, the targeted SS concentration, 5 mg/L was achieved. Also, under this condition, COD concentration of the treated water was 15 mg/L and the removal rate of NH_4-N was 90%.

When the sand filter was installed in the latter part of the aerobic filter, even though the filtration rate of the aerobic filter was 40 m/d, the targeted values of both BOD (10 mg/L) and SS (5 mg/L) were achieved, and COD concentration and the removal rate of NH_4-N were 20mg/L and 90%, respectively.

(3) Economical efficiency and maintenance

Construction cost of this process is almost the same as that of the standard method (two hierarchical sedimentation basins + deep aeration), however, when the aerobic filter is in two units, it becomes more expensive than the conventional method.

Because the aerobic filter is shallower than the facility for air diffusion in the conventional method (3.0 m), the consumption power of both the cases are the same even though the air magnifying-ratio

of the former is 8.6 and that of the latter is 5.

Also, the expenses for maintenance calculated using the consumption of electricity of this process is equal to that of the conventional method.

It is a special feature that this plant is easy to be managed since the sludge control inside the reactor can be done automatically.

In addition, it is necessary to investigate a piece of equipment for deodorizing based on the characteristics of the water quality of influent sewage and operational condition of the filter-type solid-liquid separating device.

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