Study on the fiber filtration technology for CSO control

Year of Research	2006・2007	

(Purpose)

In areas where combined sewerage is installed, untreated sewage is discharged to public water areas on rainy days. Thus, there has been concern in recent years about the impact on the ecosystem of public water areas and the quality of public health. Therefore, many cities that employ combined sewerage are working on sewerage improvement. As a means of improving combined sewerage, stormwater retention basins and settling basins have been constructed and the installation of a screen in the stormwater outfall has been promoted. In recent years in particular, there has been a demand for technology that provides greater pollutant removal performance, requires a smaller installation area, and incurs lower construction and maintenance costs than stormwater settling basin technology. This research deals with influent water to the primary settling basin of a treatment plant and untreated sewage discharged from a pump station. For the simple fiber filtration facility (Figure 1), which is a facility to reduce the discharge pollution load, a demonstration test was conducted for practical implementation and the obtained treatment performance data was examined. The aim was to establish design techniques, operation methods, and maintenance techniques.

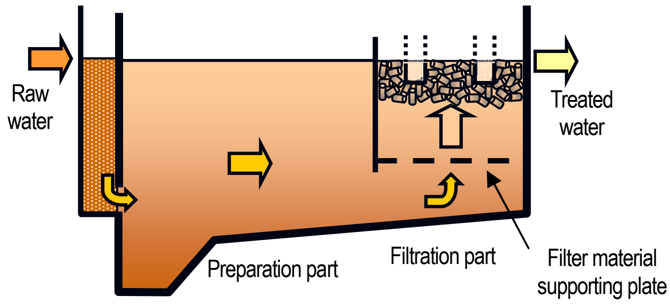

Figure 1 Outline of simple fiber filtration

(Results)

(1) SS, BOD, and debris removal ratio

Figure 2 shows the SS removal ratio versus the laboratory filtration rate. The lowest SS removal ratio was 67.2% (at a filtration rate of 500 m per day). This result fully satisfied the development target of 60% or more. For BOD removal ratio and debris removal ratio as well, the obtained results satisfied the respective development targets of 60% or more and 99% or more.

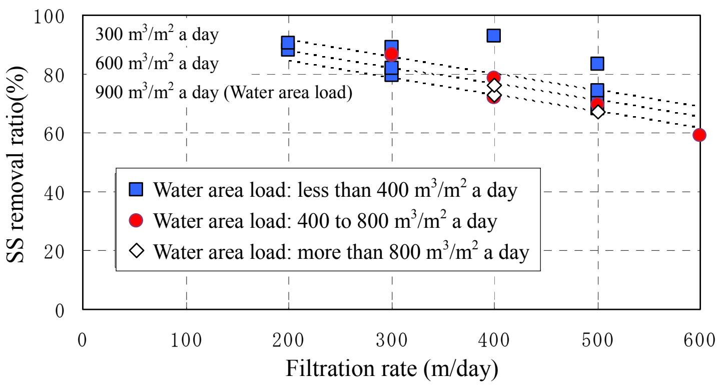

Figure 2 SS removal ratio versus filtration rate

(2) Filter head loss

For operation at a filtration rate of 500 m per day or less and a water area load of the pretreatment section of between 340 and 590 m^3/m^2 a day, it was verified that operation without cleaning was possible with a loss head of 5 kPa or less even when filtering for 6 hours. For a series of operations at a filtration rate of 400 m per day or less, it was verified that operation was possible for 5 hours or more, although the water area load of the pretreatment section was different; that is, it was taken at 240 to 830 m^3/m^2 a day. At a filtration rate of 200 m per day, operation was possible at 3 kPa or less for 10 hours or more.

(3) Odor generation and filter media duration

As a feature of this technology, one can cite the possibility that, after rainfall, the tank is washed with the water in the tank and then dried to reduce odor. To verify the effect, a test was conducted on odor generation from filtration media and other parts. The tank was dried after about three months had passed from the start of the demonstration test, and the odor was measured two days later. For both hydrogen sulfide and methyl mercaptan, which both have a putrid odor, the concentration was lower than the detection limit. After 7 days had passed, hydrogen sulfide was detected at a concentration of 0.003 ppm; however, this concentration is low. After 14 days, the concentration of hydrogen sulfide fell below the detection limit. The odor index was 17 in the highest case after 7 days had passed since drying, and this was about the same as an order intensity of 2.5 (10 to 15 if converted into an odor index), which is the regulation value on the site boundary.

These results were compiled in the document "Technical Data of Simplified Fiber Filtration Facilities for CSO control."

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