

# Research on Compact Attachment for Rainwater Outfall to Improve Confluence (Tokyo Metropolis)

Year of Research

2011 • 2012

Improvement of combined sewer system

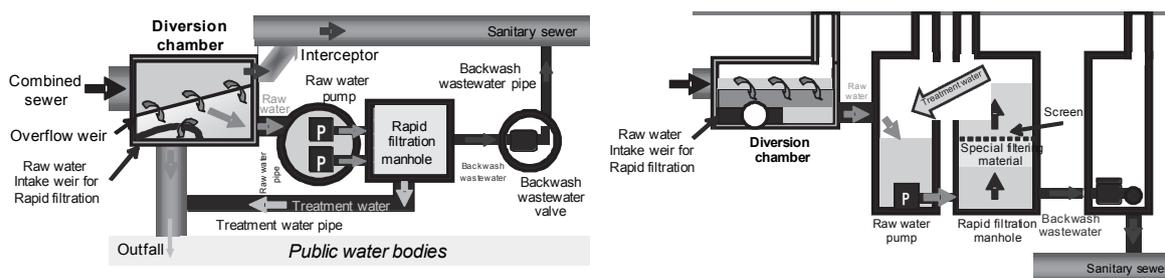
## (Purpose)

In Tokyo Metropolis, although the measure for the improve confluence is deeply committed, rainwater outfalls of a natural drainage division exist numerously in an urban area, since many parts where installation of retention facility is difficult are assumed from the constrained condition such as procuring of site and the existing underground installation, it has been a subject of business promotion.

This research is practical research aiming at developing a series of simple treatment systems which can install under a road etc. near natural outfall and have suitable removal performance of the contamination (BOD removal efficiency is 50% or more).

## (Outline of developmental technology)

The outline of this technology is shown in **Figure 1**. The reduction of the pollution load and to halve the number of times overflowed was accomplished by using the evaluation technology of SPIRIT21; “rapid filtration” and to run the simple treatment for some or all of overflowed water from rain water outfall. Although the target raw water of this technology is a raw sewage which overflowed from the rain water outfalls of a natural drainage basin, that was premised on after taking countermeasures against the outflow of the foreign substances.



**Figure 1** Conceptual diagram of the developmental technology (plane view and cross-sectional view)

## (Results)

The actual proof experiment plant was installed in the pump place which owned by Bureau of Sewerage Tokyo Metropolitan Government, and the treatment experiment was put in execution in case of rainy weather during the period from May 2012 to January 2013. As a result, the removal performance of BOD and SS in this technology was as follows.

### (1) Filter thickness : 800mm

When applied to rain water outfalls of a natural drainage basin and the condition of raw water satisfied the applicable condition of this technology, BOD and SS removal efficiency were based on the following estimated formula. BOD removal efficiency was 51.4% and SS removal efficiency was 66.6% by this estimation formula in case of the filtration rate which was 1000 m/day. Moreover, although the adoption of the removal efficiency calculation formula in SPIRIT21(Sewage Project, Integrated and Revolutionary Technology for 21st Century) "technical development about the improvement of a combined sewer system" is also enabled, as concerns raw water concentration, BOD dealt with as 36 mg/l and SS as 100 mg/l.

BOD removal efficiency (%) = $-0.0329 \times \text{filtration rate (m/day)} + 84.315$	filter thickness : 800mm filtration rate : 500~1000m/day
SS removal efficiency (%) = $-0.0320 \times \text{filtration rate (m/day)} + 98.615$	filter thickness : 800mm, filtration rate : 500~1000m/day

(2) Filter thickness : less than 800 mm (Lower limit : 400mm)

When the filter thickness is less than 800 mm, based on the experimental result in this research, the removal efficiency assumed as a constant value to show as follows regardless of the raw water concentration and the filtration rate. However, the filter thickness set a lower limit to 400mm and the scope of application of filtration rate was even 1000 m / day.

BOD removal efficiency 50%	filter thickness : 400mm or more, filtration rate : 1000m/day or less
SS removal efficiency 60%	filter thickness : 400mm or more, filtration rate : 1000m/day or less

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