Research on Diversion Characteristics in Connection Manhole of the Storage Tunnel (Kyoto city)

Year of Research	2012	Implementation of anti-inundation measures

(Purpose)

In Kyoto Higashiyama district, as a means to achieve the goal of "improvement of combined sewer system" and " anti-inundation ", and has in place a storage tunnel. It is intended to be stored to the storage tunnel make diversion just before the discharge is started from spitting rainwater.Therefore, it is by making a storage efficient operation, thereby improvement of combined sewer and improvement flooding measures have become important. However diversion by the side weir in connection manhole and swallow from the steep slope pipe, it can not ensure a proper water diversion quantity is concerned. The present study was designed to set up in practice the deflector to diversion manhole of main storage, to be asked about the characteristics of the steep slope pipe and its practical use.

(Results)

(1) Survey contents

In addition to investigate the diversion characteristics for real rainfall of deflector installation before and after, it was confirmed the presence or absence of the problems of maintenance, such as blocking of floatables. Flow rate of the local flow regime and the water level was continuously measured by a measuring device that is installed as shown in **Figure 1**, Flow regime was observed in steep slope pipe and overflow situation. **Table 1** shows the rainfall situation and subject of investigation.

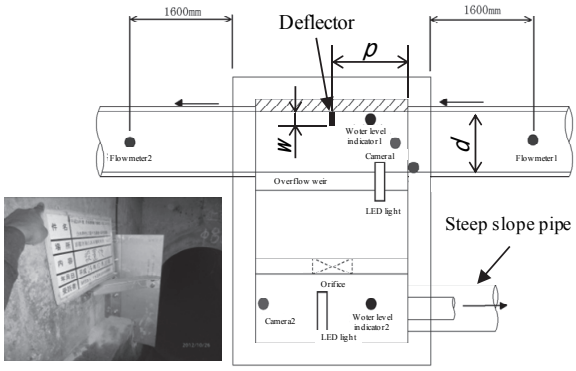

Figure 1 Observation status

Pipe	Inlet pipe diameter d=800mm Steep slope pipe diameter = 300mm
Deflector	location p : 780mm($\fallingdotseq d$) width w : 133mm(=1/6d) 400mm(=1/2d)※ ※Deflector of 400mm is installed for evaluation of maintenance.
Rainfall	The rainfall was observed in the study period 9/4 to 11/19 in, 0.5mm/10min or more was 30 times. Rain 10～30mm/hr occurred five times total.

Table 1 The rainfall situation and subject of investigation

(2) Flow regime

From flow regime captured image, how is promoting the watershed upon deflector flows was confirmed after installation of deflector. In addition, it can be determined that there is no problem of maintenance over by the deflector disposed Since there was no entanglement of floatables. Note that in rainfall 10mm ~ 30mm/hr this, that can flow into the reservoir through a pipe steep slope pipe without a large level variation is confirmed.

(3) Diversion characteristics

As a result of having arranged an inflow and relations of the quantity of diverted water based on flow quantity observation data, and is shown in **Figure -2**. There was less quantity of diverted water than a expected value before the deflector setting, but quantity of diverted water increased to appropriate quantity after the setting, and diverted water as scheduled confirmed what was performed.

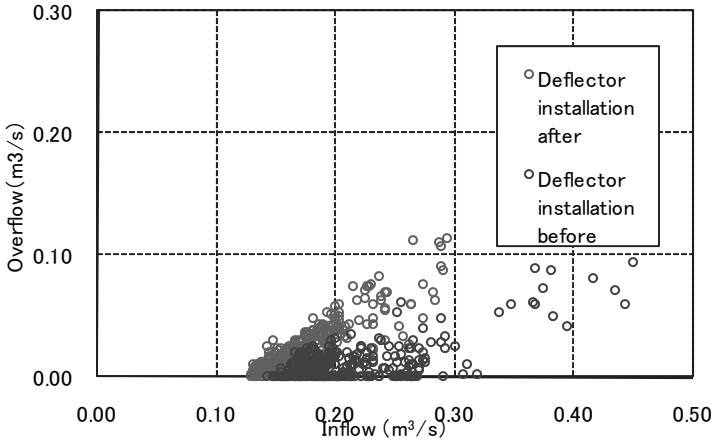

Figure 2 Effect of deflector installation

(Conclusion)

The field study, The effect installation as well as quantitative evaluation of the diversion characteristics of the deflector was tested. The use of the verification results, it is possible to achieve the diversion that was planned, It can be proposed that a storage tunnel operational efficient way. It should be noted that, as future work, behavior check in rainfall flooded scale measures on flow properties of the steep slope pipe.

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Key words	Implementation of anti-inundation measures, Improvement of combined sewer system, Deflector, Steep slope pipe