

## Study on real time control system for improvement of CSOs

Whole term

2003.6 ~ 2005.3

### ( Purpose )

From 2001 to 2002, JIWET developed “the Storage Gate in Sewer main” which is able to install in existing sewer pipes and to utilize as a storage facilities., The point about which this technology is excellent to the conventional technology (e.g. storm-water reservoir) is as follows.

- To use an existing pipe, the fee of the construction is inexpensive.
- At the urban area which can't secure necessary space, it can be applied.

However, it is required that the safety and reliability in the system should be secured in order to install this system in sewer main.

Therefore it is necessary to realize safe and reliable system. In this study, we defined that RTC is the system that control the Storage Gate by water level information of target points.

The purpose of this study are as follows.

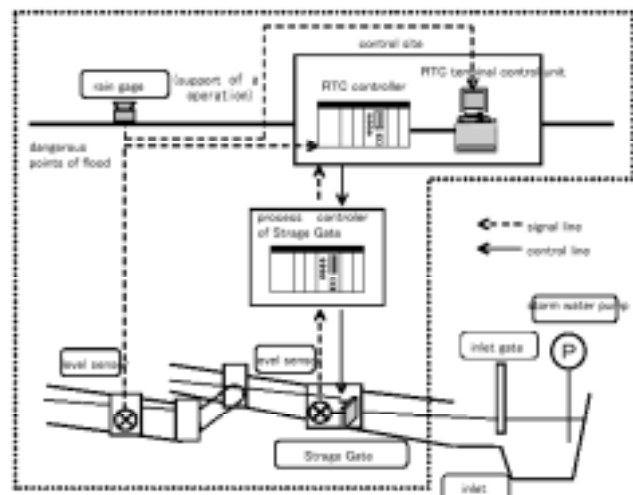
- The rational way of selecting in the installation site at the Storage Gate in Sewer main
- The rational way of selecting in the set points at the level sensors
- The RTC methods which will be applied

Then the results of this study will be compiled to the technical report.

### ( Technical outline )

In this technology, reduction of the amount of discharge of raw sewer is obtained by controlling the storage gate in pipe which stores mass to the maximum. The gate control is based on the water level at set points which will be observed in real-time.

The outline of this technology is shown in Fig.-1.



**Fig.1 Outline of RTC technology in this study**  
**Table-1 Overview of control strategy**

### ( Result )

The results are obtained such as relation between improvement of combined sewer system and risk of flooding, and economical efficiency, etc. by applying this system to a watershed area as a model case.

#### 1 . Gate Control Method

The control method of the gate was performed in three methods shown in Table -1.

#### 2 . Analysis Result

Compared with present condition, the amount of discharge loads (BOD) were reduced by 29t (13.6%) in control method Type A, and 36t (17.9%) in Type B and 40t (20.0%) in Type C, respectively. Moreover, according to simulation result, new flood area did not exist so far by installing this system.

Annual operation and maintenance cost was calculated for improved combined sewer facilities in consideration of economic life of civil, mechanical and electrical facilities.

	Control strategy		
	Type A	Type B	Type C
water level information for gate operation	top edge of the Gate and/or dangerous point of flood	dangerous point of flood	dangerous point of flood
judge elements	- water levels	- water level - rising velocity of water level (It computes from the maximum rainfall in the past.)	- water level - rising velocity of water level (It computes from the maximum rainfall in the past.) It calculates realtime.
requirements	Gate will be operate (It opens) when water level reaches at upper edge of gate.	Gate is opened when water level reaches at upper level of sewer pipe.	Gate is opened when water level reaches at upper level of sewer pipe.

It is confirmed this system should be economical compared with other methods for improvement.

**( Conclusion )**

- A RTC system, as one of the measures for combined sewer improvement, is excellence in economical efficiency and combined sewer improvement.
- Since the amount of load reduction per gate is fewer than that of other methods in combined sewer system, it is necessary to study RTC system should be combined with other methods or installed in two or more gates.

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key words

RTC system , improvement of combined sewer system , the storage gate in pipe