

Collaborative research for the multipurpose use of precast underground storm water storage facility

Whole term

1998.4-1999.3

(Purpose)

Precast underground storm water storage facilities have been increasing used for control of storm water runoff in urban areas. It requires short period for installing and has less impact against ambient environment (e.g. noise or oscillations). It also has high earth quake resistance. However, when storage facility is usually constructed under parks and schoolyards, these spaces can not be used during construction period. Therefore, the precast type facility has some advantage against cast-in-place type facility because it takes shorter period to be installed. It means that precast one has less impact to space utilization by children and citizen. In this study, multipurpose use of underground storm water storage facility system is proposed. This facility can provide utilization of stored rainwater versatily.

(Result)

1. Needs of multipurpose underground storm water storage facility

We conducted surveys in different municipalities and found that there were needs of installing multipurpose underground storm water storage facility and versatile use of storm water. The storm water is used as i) sprinkling water, ii) stock water in times of disaster, iii) for fire control water, and iv) landscape water. However, some issues, such as the storm water quality and amount, the way to collect storm water, and the water quality and amount requirement for each use, were pointed out for discussion. According to results of these surveys, we established the quality and quantity for each use regarding the storage water in the multipurpose underground storm water storage facility. We also examined the collection and storage ways for rainwater.

2. Confirmation of the water quality criterion for each use

Water quality criteria for use of reclaimed wastewater were summarized by way of compensation, because there was no criterion for multipurpose storm water use.

3. Setting the water amount for each use

The specific amount of water use, the amount of actual water use, and the municipal regulation for each water use were decided.

4. Examination of the ways to collect and store rainwater for each use

The way to collect and storage rainwater depends on specific water situation. Here are the points to be considered in collecting and storing.

5. Suggestions for the construction of multipurpose facilities

After the amount and quality for each use are decided, it becomes clear that the better quality of stored rainwater could be obtained by proper way to collect, such as eliminating the first flush runoff and selecting the collection points. Here, three kinds of multipurpose storm water storage facility, namely, basic filtration storage of roof runoff water, precipitation storage of runoff water collected with separate sewer system, and basic filtration storage of storm water collected with separate sewer system, are suggested according to the different ways of collection.

6. Future tasks of precast multipurpose underground storm water storage facility

1) The challenge to expand the use

The treatment for disinfection and purification should be discussed prior to applying to other uses which require high water quality.

2) The challenge for the construction of storage facility

The efficient and economical construction of the storage facility should be discussed according to the storage scale, space, and required treatment facilities. The design of the collection part of the facility should be examined carefully for preventing the accumulation of pollutant.

3) The problems in maintenance

Based on the survey results, it turned out to be important, from the viewpoint of maintenance, not to collect polluted water, because the pollutants can diffuse inside of the whole storage facility. Besides, the ways to prevent diffusion of the pollutant should also be examined.

4) The problems in the relationship with public sewerage

When the multipurpose storm water storage facility collects water only from roof runoff water, its use can be limited. It should be evaluated whether the highly treated wastewater from sewage treatment system can be utilized as alternative water source for the storage system.

Collaborators: Japan Institute of Wastewater Engineering Technology

Japan association of precast underground storm water storage facility

Researchers : Yasuhiro Shinoda, Morihisa Saeki, Yasuhiro Nakanisi , Yoshiteru Kubo

Keywords

Precast, Storm water storage, Multipurpose