Survey study on the decision of rainwater infiltration plan

Whole term	2000.4 - 2001.3	

(Purpose)

The conventional measures for the rain water in urban areas have been mainly the measures to a flood which discharges the rain water rapidly, and the maintenance of flow-type conduits, pump facilities, etc. have specifically been carried out. In recent years, since urban-type flood is increasing by expansion of the impervious area because of rapid urbanization, the rain water outflow is controlled by infiltration attracts attention. As such a situation, the project of rain water infiltration has been undertaken in various places with the expectation of effects of rain water outflow control in a river, improvement of environment such as the recharge of ground water, cost reduction, etc. Although these effects are obvious, since neither the calculation method of the amount of rainwater infiltration nor the quantitative evaluation technique of the effect is established, the rainwater infiltration facilities are not positioned clearly on a rainwater elimination program at this time.

This study aimed at establishing "the calculation method of designed infiltration rate" and "the evaluation method of the infiltration effect", positioning the effect of rainwater infiltration facilities clearly on a rainwater elimination program, and spreading rainwater infiltration facilities further in this research.

(Contents)

When introducing rainwater infiltration facilities intentionally, it is necessary to decide the maintenance purpose for the whole objected zone or each area, and to clarify the effect expected from them. The examination of effects in three steps, "examination of introduction", "examination of enforcement", and "designing" were performed. Furthermore the calculation technique of the designed infiltration rate and the evaluation technique of the infiltration effect in each stage were analyzed. Moreover, the way of positioning of rainwater infiltration on the rainwater elimination program was also investigated.

(1) Calculation Method of Designed Infiltration Rate

Conventionally, detailed examinations united with local situations, for example, the calculation of the final infiltration rate by field infiltration experiment, and the assumption of decreasing of infiltration rate or installation density, were required for calculation of designed infiltration rate. The simple calculation technique of the designed infiltration rate at this time was established by proposing the standard value of the installation density which was derived from the track record data of each city and the standard value of the final infiltration rate of each soil characteristics, etc. Especially in the early stage like "the examination of introduction", the judgment whether the rainwater infiltration facilities should be introduced or not became comparatively accessible by using the basic calculating method.

(2) Evaluation Technique of Infiltration Effect

There are the rainwater outflow control effect and the groundwater recharge effect in rainwater infiltration. The fixed-quantity evaluation of the rainwater outflow control effect was analyzed at this time. The technique in which the rainwater outflow control effect was classified into "influence on the coefficient of discharge etc.", "amount of outflow reduction effect", and "improvement effect of the combined sewer" was proposed, and evaluated by the simple evaluation method and the runoff-analysis model. The analysis of introduction of the infiltration facilities became accessible by using a simple evaluation method.

(3) Positioning on Rainwater Elimination Program

There were two ways to position on rainwater elimination program and one of them was chosen when the introduction of infiltration facilities was planned.

- When scale of the sewerage facilities which are maintained in future is reduced at the beginning of plan for the expectation of the effect of rainwater infiltration
- When the sewerage facilities are constructed continuously with no change of present sewerage maintenance plan with regarding rainwater infiltration for fulfilling a future maintenance level in advance

(Outcome)

The author will publish "the manual of rainwater infiltration technique on sewerage", "the recommendation of introduction of rainwater infiltration facilities on sewerage", and "the collection of questions and answers about the sewerage facilities" as the outcome of this research.

Independent research
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Key words	Rainwater infiltration, Rainwater elimination program, Designed infiltration rate, Evaluation of infiltration effect