

Survey study on the measure for rapid water increase during storm events in the separate sewer system

Whole term

1999.4-2001.3

(Purpose)

There is a phenomenon in which the amount of inflow sewage increases in the sewage pipe of the separate sewer system during storm events due to the permeation of rain water into conduit lines. This phenomenon is recognized as the maintenance of the sewage pipe progressed.

Various problems occur when the amount of inflow sewage during storm events exceeds the margin of the capability of the present sewerage facilities. It has been considered that the measure for the problems such as rapid increased water during storm events is the maintenance of conduits and treatment facilities. Therefore, each sewer managers have individually made effort in respect to reduce the water permeation or the operation managed by various methods. However, the effective measures for this problem have not been established yet.

The purpose of this research is to summarize basic method of planning and proposal of measures, etc. on the countermeasure of rapid increase during storm events in the separate sewer system.

(Result)

1. Basic View of the Countermeasure of Rapid Increase during Storm Events

- ① Countermeasure of rapid increase on storm events should be decided in terms of risk management of sewage facilities, damage prevention of the area, and preservation of the quality of effluent with the emergency consideration.
- ② Countermeasure of rapid increase during storm events consists of the measure of permeation water reduction, operation and maintenance for utilizing the most of the existent facilities capability, and improvement of treatment capability.

2. Arrangement of Basic Condition

The following items are arranged in the countermeasure of rapid increase during storm events.

- ① Analysis of the condition of sewerage maintenance
- ② Analysis of present condition of flood damage and permeation water reduction measures, etc.
- ③ Analysis of the record of the amount of permeation water on storm events
- ④ Examination of correlation of the rainfall rate and the amount of permeation water during storm events
- ⑤ Examination of the influent quality

3. Permeation Water Reduction Measures

The project quantified the permeation water reduction effect for the model area (2.5ha, 100 houses) concerning the amount of permeation water and the course of permeation during storm events and carrying out repair work separately. As a result, the 55% of the amount of permeation water during storm events was caused in the public sewerage side, and the 45% was caused in the drainage facility side and 19% among 45% was depended on the mistake of junctions. Moreover, it revealed that the cost of repairing of the facilities for drainage in each houses is more effective than repairing in the side of public sewerage. However, it is considered that the enforcement of repairing of facilities for drainage takes much labors and time because of the personal property.

4. Examination of Proposed Measures

The project summarized the method of the goal setting to calculate measures amount and the assumption method of the amount of sewers during storm events in the target rain scale. It is necessary to decide upon the comprehensive and efficient proposed measures. An examination case in a certain treatment division was shown in this report.

(Future tasks)

In order to perform countermeasure of rapid increase during storm events efficiently, it is important not only to perform daily survey of conduit facilities, etc. and to enforce the instruction on the mistaken junction, etc., but also to carry out announcement and briefing session on permeation water during storm events for the identification of rapid increase during storm events in the separate sewer system.

The author would like to perform the decision of survey manual of quality and amount of permeation water during storm events and the examination of proposed measures, the cases collection of design of countermeasure of rapid increase during storm events, etc. in order to aim at the improvement to this issue.

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Key words

Separate sewer system, Regional sewerage system, Infiltration water at rain, Measures at rain