

Analytical and investigative study concerning infiltrating water on rainy days (F City)

Year of Research

2013

Implementation of anti-inundation measures

(Purpose)

In the sewage pipe lines of separate sewer system, because of rapid increase of infiltrating water during rain, sometimes water inflow exceeds the remaining capacity of sewerage facilities, which may cause overflow from the sewerage pipes, shutdown or decline in the function of water treatment facilities. In order to deal with such problem, in the first place, it is necessary to identify the rain water infiltration points. However, detailed survey would require cost and time. Case examples based modeling technology statistically analyzes the relationship between unevenly distributed rainfall in the past and inflow in the treatment plant, and through computer-based study, it broadly refines the rainwater infiltration points that would allow selecting the places for conducting detailed survey.

In the present study, our objective is to narrow down the rain water infiltration points in W treatment section in F city using the case examples based modeling technology.

(Results)

(1) Analysis results

We collected the actual rainfall data for the last 3 years and 7 months, and based on the fact that rainfall is unevenly distributed in the survey area, we analyzed the impact in terms of heavy rainfall in which area increases inflow in the water treatment plant. We divided the evaluation of infiltrating water during rainfall in 5 ranks with the place having the highest impact as Rank 1. We further divided it into 3 ranks and created infiltration analysis map during rainfall by marking the sections in different colors. (Figure 1)

In the W treatment section, impact of mainly North-east part of the treatment section was high, while the impact of Southern part and Western part was low.

(2) Verification using representative unevenly distributed rainfall

Figure 2 shows the response of inflow in water treatment plan with respect to the representative unevenly distributed rainfall. Although there is no response of treatment plan for rainfall in southern and western parts, response can be seen for rainfall in the North-Eastern part. In this manner, we could confirm relevance and validity of analysis.

(3) Understanding the root cause of infiltration during rainfall

Figure 3 shows the topographical map around G7 block where impact was highest. G7 block is at the bottom of a ravine surrounded by a steep range of hills, and its topographical conditions make it easy for rain water to accumulate. Moreover, there were places where objects with holes in the manhole lid were used for field survey, and we presumed that rain water was infiltrating from these places.

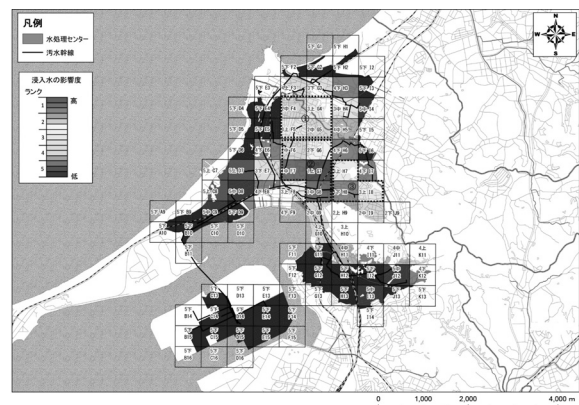


Figure 1. Infiltration analysis map during rainfall

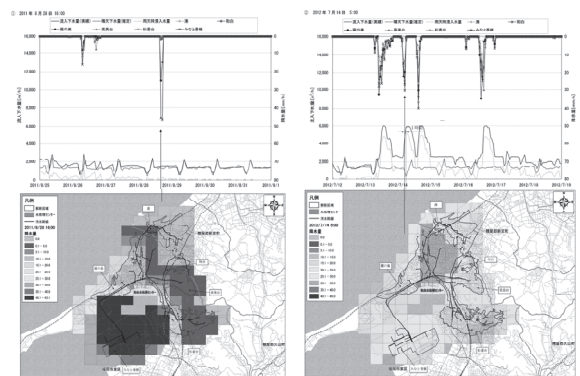


Figure 2. Verification diagram for representative rainfall



Figure 3. Topographical map around G7 block

(Summary)

Objective of the present study was to broadly track the potential places where infiltrating water occurs during rainfall, we could successfully identify the potential places.

Going forward, it is necessary to identify the exact places and under root causes through detailed survey, and take the necessary measures.

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Key words	Infiltrating water during rain, measures for infiltrating water, infiltrating water narrowing techniques, case examples based modeling technology
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