

Study on Narrowing Down Areas with Rainfall-derived Infiltration & Inflow by Using Dr. TCBM

Whole term

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(Purpose)

In the sanitary sewer pipes and treatment plants of sanitary sewer systems, a sudden increase in sewage inflow volume has frequently been observed in wet weather. The cause of increased sewage inflow in wet weather is infiltration & inflow (I&I) of stormwater through cracks in sanitary sewer pipes and pipe connections, or through cross connection of stormwater inlets. When sewage volume surpasses the capacity of the sanitary sewer pipes and treatment plants, numerous problems occur. To counter these problems, primary investigations and field investigations for I&I are carried out; however, if the area for investigation covers a wide area, there arises additional issues such as long-term investigations and high costs

This joint study focuses on Dr. TCBM, a technology utilizing sewage volume data recorded at the pump station together with meteorological data, or radar rainfall data obtained by the municipality, to narrow down areas affected by rainfall-derived infiltration & inflow (RDI&I) and provide characteristics of RDI&I. The applicability of Dr. TCBM in narrowing down areas with high levels of RDI&I, and the conditions for its application are investigated.

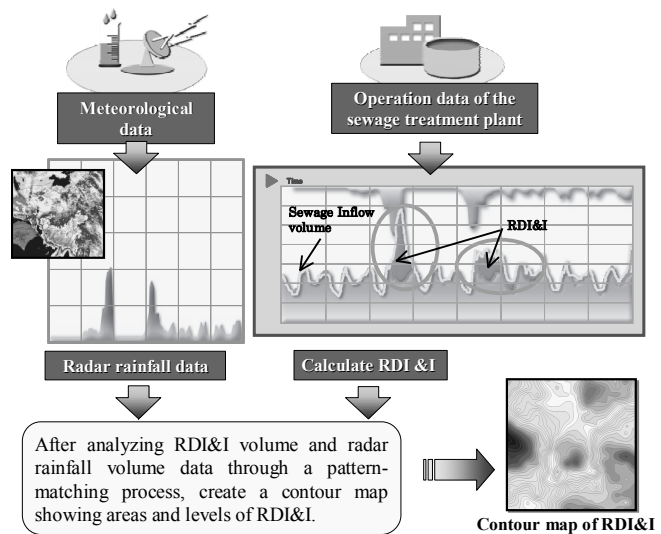


Fig.1 Outline of Dr. TCBM

(Characteristics and outline of the technology)

Dr. TCBM is a technology that narrows down areas estimated to have high levels of RDI&I by analyzing the operation data gathered at the treatment plant and radar rainfall data. (See Figure 1.)

The flow of analysis of RDI&I is shown in Figure 2.

The key points of this technology are steps 2, 6 and 7, which are described below:

2. Construct the estimation model of sewage inflow volume in dry weather
Construct the estimation model of sewage inflow volume in dry weather to the treatment plant by using historical data.
6. Pattern-matching analysis of RDI&I
Calculate RDI&I volume from the difference between actual sewage inflow volume in wet weather and estimated sewage inflow volume in dry weather. Analyze RDI&I volume and radar rainfall volume data through a pattern-matching process.
7. Create the contour map showing areas estimated to have RDI&I
After the pattern-matching analysis of RDI&I in the investigation area, create a contour map showing areas and levels of RDI&I, which is then overlaid with maps of sewer pipelines and streets based on GIS data.

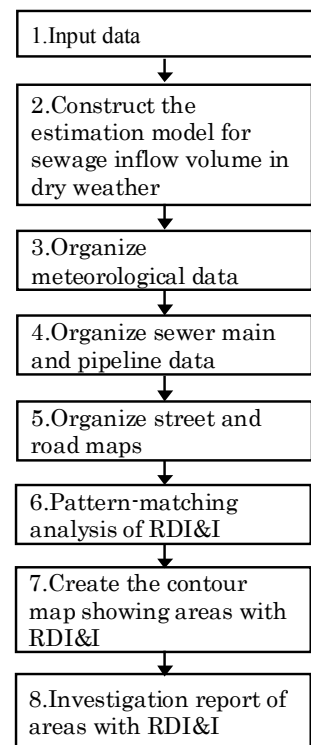


Fig. 2
Flow of investigation and analysis

(Study schedule)

Study results will be made into a technical manual and organized as follows:

- 1 . Foundation: Outline and theory of the technique, required data, target business
- 2 . Investigation: Required data and investigation method according to target business
- 3 . Analysis: Modeling, analysis method
- 4 . Application: Applicability and its conditions and case studies
- 5 . Materials: Standard specifications, proposal for field investigation.

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key words

Sanitary sewer systems, Rainfall-derived infiltration & inflow, Data analysis