Study on the development of practical sewer BCP by damage estimation of large-scale earthquake

Year of Research	2013	Promotion of earthquake disaster prevention

(Purpose)

In this study, in order to recovery and maintain the sewer function as soon as possible, in Hamamatsu public sewer after the large-scale earthquake such as the Nankai Trough earthquake, we have examined the effective items that when you plan a practical sewer BCP (Business Continuity Plan) which is based and regional disaster prevention plan and damage estimation of sewerage facilities, it is known in advance.

(Results)

Summary of the study results are shown below.

1. Collection and analysis of basic information

The following data were analyzed and organized using GIS (Geographic Information System) for the creation of sewer BCP.

・Database of sewer ledger
・Regional disaster prevention plan
・Damage estimation data of Nankai Trough earthquake
・Database of other related Land

2. Damage estimation of sewerage facilities

The damage estimation of sewer pipe, damage rate in accordance with the pipe species, the design for earthquake, presence or absence of measures against earthquake, ground motion of the surrounding ground and PL values are set for each span, damage amount has been calculated damage and extension of sewer pipe of all.

As a result, the earthquake damage was assumed to be significant damage in the area of the old laying year, in the south of the city expected seismic intensity 7. Others, we assumed amount of damage on the basis of ground motion, PL values, and the performance for the earthquake To the pump station and treatment plant.

3. Setting the amount of sewage to be treated in post-disaster

The amount of sewage to be treated in post-disaster, which is the basic information for use in the calculation of risk, the amount of flooding due to the destruction of sewer pipe and setting of necessary capacity of the facility in accordance with the mitigation measures. It was assumed to increase with time due to the recovery in operating activities and restoration of lifeline.

4. Extraction of information related to disaster mitigation measures

In preparation for the case that the switchboard is flooded by the tsunami, trouble came to a stream of function, manhole pump envisioned tsunami damage has been extracted. Then, before a disaster occurs, the output and the number of engine generator and temporary submersible pump to be preparation has been considered by the agreement or arrangement.

5. Study of emergency discharge point

In the drainage path from each disaster-prevention facility, which is positioned as an important trunk line in Hamamatsu City sewer comprehensive earthquake preparedness plan, where the most likely to rupture has been extracted. Manhole with the lowest ground elevation upstream of the break point has been assumed to be the overflow point at the time of the break. Then, as a base point flooding point, public land as a candidate site for the simple precipitation treatment and near rivers that are candidates for emergency discharge destination is extracted.

Each route to consider emergency discharge was quantified the ease of breaking expands as based on various conditions such as damage rate. In addition, the amount of sewage overflowing from a manhole when you break has been set as the magnitude of the effects of damage occurs. It is assumed that the risk value obtained by multiplying these, used to determine the priority of investigation.

6. Study of a system that receives assistance

Quantity can be examined realistically has been estimated by the research team, which is currently planned by only sewer city officials and the resources (number of people) that are needed to investigate the target number of days in the sewer of all of Hamamatsu.

7.Summary

Large-scale earthquake, such as plate-linked differ from the direct type in that neighboring jurisdiction are reportedly affected at the same time. Therefore, time to get help as well late, resources will be greatly reduced. Before a disaster occurs, not only to ensure the system to receive help from other cities or private and reinforcements from sewer departments inside and outside of the city, it may have to be supported by only municipality affected by the disaster at first. To do this, information relating to the setting of the priority line of research is organized. And, based on the research priority is efficient. In addition, the risk and destruction part of the sewer is expected. And the information necessary to ensure the flow-down function of the minimum should be organized in advance. Then, it is reflected in the program is also effective.

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