

## Joint Research on Monitoring Systems Based on Risk Management

Year of research	2011~2012	Appropriate stock management
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**(Purpose)**

To ensure that a sewer system performs their functions, a huge group of facilities and equipment must be managed and operated properly. There are various risks sewer systems can face: external risks like earthquakes and localized heavy rains and internal risks such as, especially in recent years, aging facilities and insufficient passing on of expertise. It is important to anticipate and minimize those risks.

Operation of a sewer system requires a monitoring system that integrates processing of all the local data and visualizes them. Such monitoring systems are used effectively. This research, focusing on the roles of the monitoring system, has been conducted to examine additional functions that can serve as effective risk management tools for sewerage business in the light of latest technologies and to compile technical data. (See Figure 1.)

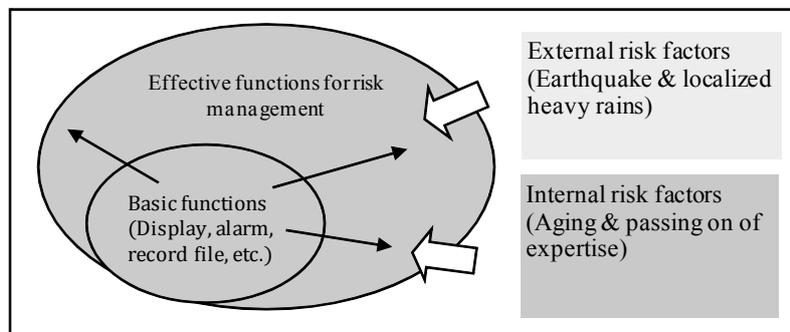


Figure 1 Monitoring system and additional functions (subject of the research)

**(Results)**

(1) Grasp of present situation of risks to sewer systems and identification of problems

Risks to sewer systems are diversified. We have identified and analyzed possible risks (Figure 2).

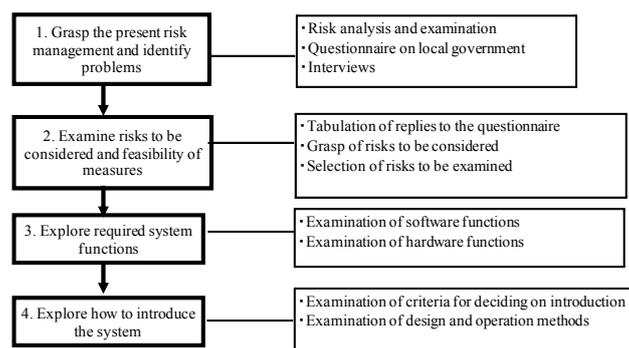


Figure 2 Flow of this research

To grasp the present situation and problems of sewer system management, we conducted a survey on local governments. The questionnaire is divided into three parts: planning, operation and maintenance of the system. We have sent the questionnaire to 300 governments that have sewage plants aged 15 or more years after their launch (Table 1). About half of them have replied to the questionnaire. The survey was conducted in January 2011; it does not reflect the effect of the Great East Japan Earthquake.

Table 1 Outline of the questionnaire

Questionnaire item	Type of work		
	Planning	Maintenance	System operation
1) Detail of work	<ul style="list-style-type: none"> <li>• Necessity of support systems</li> <li>• Impression on support systems</li> </ul>	<ul style="list-style-type: none"> <li>• Ledger management method</li> <li>• Usage of support systems</li> </ul>	<ul style="list-style-type: none"> <li>• Usage of automatic controls</li> <li>• Usage of support systems</li> </ul>
2) Risk	<ul style="list-style-type: none"> <li>• Major problems (Problems at present)</li> </ul>	<ul style="list-style-type: none"> <li>• Risks by facility (Actual occurrence)</li> </ul>	<ul style="list-style-type: none"> <li>• Risk by scene (Actual occurrence)</li> </ul>
3) System function	<ul style="list-style-type: none"> <li>• Needs for improvement in the existing system</li> </ul>	<ul style="list-style-type: none"> <li>• Needs for specific functions (for maintenance)</li> </ul>	<ul style="list-style-type: none"> <li>• Needs for specific functions (for operation)</li> </ul>

(2) Listing and examination of risks to be considered

From the survey result, we have listed risks to be considered, focusing on those that have occurred before and those of great concern. We have also selected risks to be examined. These are selected according to two basic conditions in the context of feasibility of preventive measures: 1) It is possible to reduce the effect by operation or maintenance of the system and 2) the existing monitoring system data can be utilized. Figure 3 shows examples of the risks to be examined.

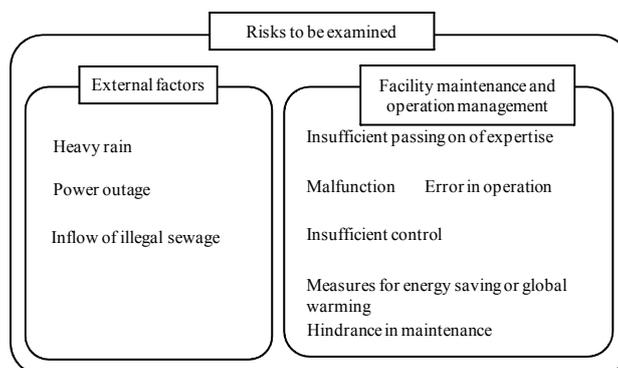


Figure 3 Example risks to be examined

**(Future plan)**

At the moment, we are carrying out technical examination, assuming actual systems, such as operation support systems and ledger management systems. We will finalize the list of risks to be examined, considering the result of scheduled interviews with local governments and the situation in the aftermath of the Great East Japan Earthquake.

After the list has been finalized, we will explore functions the monitoring system must have to perform sufficient risk management and discuss required monitoring items and software and other specifications. We will also explore how to introduce the monitoring system, mainly planning method, while clarifying criteria and things to be considered before the introduction is decided on. Specifically, we will examine estimation of the effect of system introduction, selection of functions, planning of the system, its designing, operation and maintenance. At the same time, we will compile technical data from these research results.

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Key words

Risk management, Monitoring system, Support system, Maintenance