

Research for Developing a Plan for Sewerage Comprehensive Inundation Control Measures (Hiroshima City)

Year of Research

2007

(Purpose)

In regions of Hiroshima City where sewerage installation began early, stormwater runoff is increasing as urbanization continues. In these regions, existing pipes have insufficient drainage capacity, and inundation damage has occurred frequently. To cope with this, the installation of large stormwater trunks has been promoted as a radical inundation control measure. However, the installation of control facilities is expected to take a long time. Inundation damage arising from the localized heavy rain of recent years needs to be mitigated urgently and efficiently. To this end, tangible measures should be steadily promoted as a public service. At the same time, it is important to promote self-help among residents and thereby minimize the damage. Thus, as intangible measures to promote effective self-help, residents are actively provided with information about inside water inundation and evacuation. To raise residents' awareness of self-help and disaster prevention even in ordinary times, an Inside Water Hazard Map was created and published in March 2007. This research looked at the 570-ha Misasa-Fukushima-Kan'on region (Figure 1) as the area of interest because there was considerable inundation damage there on the Inside Water Hazard Map published in 2006. The aim of the research was to draw up an emergency plan for sewerage comprehensive inundation control measures. This research is based on the concept of the Sewerage Comprehensive Inundation Control Measures Planning Manual (draft). In addition to these tangible measures, a request was made to residents and utilities for their active participation and help. As such, resident cooperation and other intangible measures were included within the scope of the research for efficient and effective inundation control measures adapted to conditions unique to Hiroshima City.

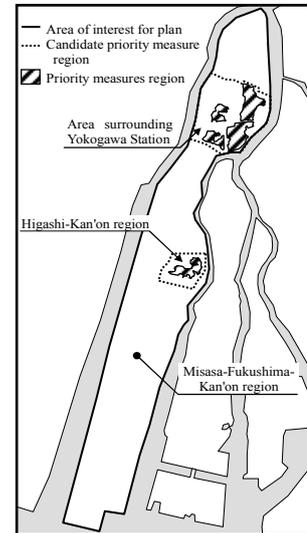


Figure 1 Regions of interest for plan

(Results)

This research was conducted according to the following procedure.

(1) Basic survey

In the area of interest, we ascertained the features and causes of past inundation damage, actual rainfall conditions, and regional characteristics, and organized the subjects.

(2) Set plan objective

For the purpose of individual property protection, we set the plan objective at an inundation depth of 45 cm, below which no above-floor inundation damage would occur. As the target rainfall of the plan, a 10-year probable rainfall of 56 mm per hour (or a 10-year probable rainfall of 53 mm per hour or more) was taken for the term of this plan (5 years). However, the past maximum rainfall of 81 mm per hour was targeted for when the radical measure of installing stormwater trunks will have been completed.

(3) Set priority measure regions

To select priority measure regions, a survey was made of the existing facilities in the drainage area that included candidate priority measure regions. Inundation simulation was performed assuming the available drainage capacity of those facilities and the target rainfall. Through this simulation and others, we succeeded in defining the expected inundated area and expected inundation damage. Based on these results, the Higashi-Kan'on region and the Yokogawa Station surrounding region were identified as candidate priority measure regions.

(4) Examine measures and evaluate optimum plan and prioritization

As shown in Table 1, tangible and intangible measures by public services and self-help were used in a comprehensive way in the drainage area that included a priority measure region. Through this process, we examined and planned measures to mitigate the inundation damage in the priority measure region. Considering the actual conditions and plans for the future of the region, we evaluated the priority of the measures. Further, B/C was calculated to confirm the effects of the measures.

Table 1 Menu of inundation control measures

Public service	Tangible	Sewerage	Installation of retention pipe, enhancement pipe, and regulating reservoir Installation of manhole pump
		Others	Installation of regulating reservoir Installation of infiltration inlet and permeable pavement
	Intangible	Sewerage	Creation and publication of Inside Water Hazard Map, on-site lectures
		Others	Creation and publication of Outside Water Hazard Map
Self-help	Tangible	Installation of water bars and sand bags and installation of infiltration facility in each dwelling	
	Intangible	Voluntary evacuation drills, cleaning of side ditches	

As shown in Figure 2, above-floor inundation damage by a 10-year probable rainfall was resolved during the term of this plan (5 years). It was verified that no above-floor inundation damage would occur in the future, even in the event of the past maximum rainfall. (This is also the case with the area surrounding Yokogawa Station.)

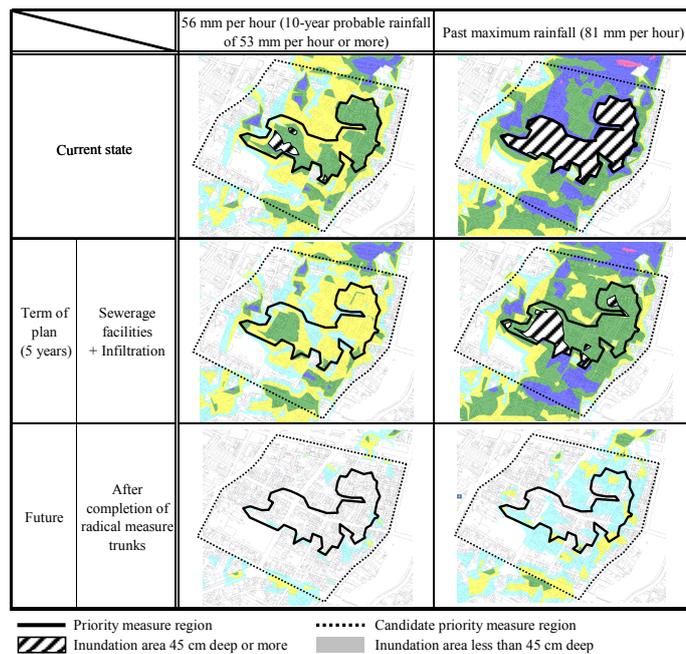


Figure 2 Verification of effects of measures (Higashi-Kan'on region)

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Key words

Emergency plan for sewerage comprehensive inundation control measures, inundation simulation