

The study of social influences caused by earthquake damaged sewerage systems

Whole term

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(Purpose)

In densely populated large cities, sewerage systems have been damaged by a number of large earthquakes including 1995 the Southern Hyohgo prefecture earthquake. Damaged sewerage systems hit by an earthquake could make toilets unusable, public health deteriorated so that civic life and social and economic activities would largely be affected. Establishing assessing methods of those social influences, showing the magnitudes of the social influences quantitatively and grasping effectiveness of earthquake countermeasures quantitatively will be very important to promote effective countermeasures. And in this study, methods for quantitative evaluation of the social influences caused by damaged sewerage systems were investigated fundamentally. This report is a summary of some outcomes from the study.

(Results)

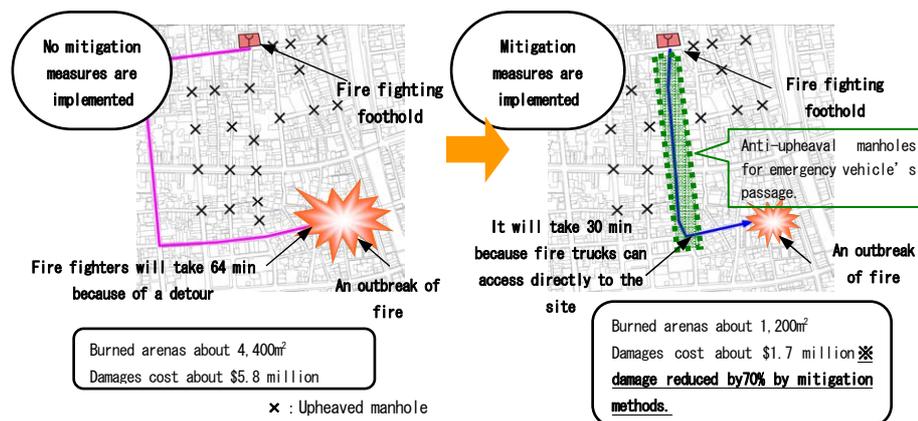
(1) Analysis of relationships between damaged sewerage systems and the social influences

By grasping characteristics of the social influences caused by earthquake damaged sewerage systems, and by examining relationships between risk inducing factors and those resulted in a series of risks, we seized and arranged useful relations to examine evaluation methods.

(2) Fundamental examination of quantitative evaluation methods of the social influences

From outcomes of (1), and considering 2004 the mid Niigata prefecture earthquake, we selected ①shortage of toilet after an earthquake, ②traffic impediment caused by upheaved manholes, and both social influence were estimated, and effectiveness of carrying out mitigation methods were simulated to do a basic examination. Following results were obtained; 1) the social influences and effectiveness of mitigation methods could be evaluated quantitatively, 2) Assessing effectiveness by simulating mitigation methods to where and what extent should be implemented, it is confirmed that efficient measure planning can be achieved to optimize mitigation methods.

■② Results of examination on traffic impediment caused by manhole upheavals, and effects of mitigation implementation measured by decreased burned areas and fire damages.
 ●Mitigation measure : giving priorities to carry out Anti-upheaval method to manholes for emergency vehicle' s passage.
 ●Effects : if one fire broke out as shown in the figures below, mitigation effects were examined using a simulation.
 ・Burned arenas and damages reduced by 70% by mitigation methods.



(Summary)

Social influences were arranged according to individual features, and framework of methodology of quantitative evaluation was achieved shown as described above, as 2007's results. We can expect more effective mitigation measure will be promoted using the results of this study, and we also expect farther research will be done.

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Key words

Earthquake countermeasure, mitigation, social influence, quantitative evaluation.