

Abstract of Doctoral Thesis

Title : STUDY ON NONSTRUCTURAL COUNTERMEASURES FOR FLOOD DISASTER MITIGATION IN ASSUMED INUNDATION AREA

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The objectives of this study are to clarify the problem of nonstructural measures, then to propose the solution concerning with a risk management, in order to reduce flood damages.

In the first half of this study, the problems of nonstructural flood measures to reduce flood damages are discussed. For the concrete field area, which includes the cities of Nagahama, Maibara, and Takashima in Shiga Prefecture, the judgment criteria for evacuation that the administration and residents should put into practice is discussed through a flood analysis. There have been social problems because administrators could not announce evacuation advisories or instructions to residents, for such case, the methodology of evacuation judgment criteria are also discussed. On the other hand, it is necessary to gain the agreement of residents in a district area, due to the actualization of nonstructural flood measures. Risk communication with residents has been advanced through a creative argument in a converging direction by entering various opinions. The residents accepted and recognized their inundation risk by disclosing local information of flood flows. This background shows the importance of applying the cycle in risk management. Therefore, the methods about the considering of the risk communication with residents were proposed.

In the latter half of this study, it is showed that the precision of the flood forecasting models for the River Yoshii, the River Muko and the River Yodo can be improved by applying a particle filter as the method of data assimilation, based on a non-linear filtering technique. Several of the sub-systems that comprise the flood forecasting system were designed to be frequently applicable to other basins. Moreover, the architectural and structural issues in the real-time flood flow forecasting system, which was developed to support evacuation judgments and actions, flood fighting, and flood prevention activities during flood events are also described.

Finally the results of this study are described along with the theme of future research activities.