2-Dimensional Flood Inundation Analysis Considering Building Effects

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Recently, the flood damage is increasing because of the intensive rainfall due to abnormal climate phenomena such as global warming. The total casualties during Typhoon Morakot in 2009 was about 688 people in China and Taiwan. Korea had to cope with several major typhoons in 2007, 2003 and 2002. Therefore, it is necessary to establish the structural and nonstructural flood control to prevent of mitigate the flood damage. In this thesis, it is assumed that flow into the structures was not considered during flood and flood depth, stage and flow aspect was analyzed by virtual scenarios. In this thesis, geometry data was constructed using LiDAR data of interval 10 meters which is based on raw LiDAR data of interval 1 meter and structures data was constructed using scale maps. The final geometry was constructed by combination of LiDAR with structures data. River analysis was simulated using projects rainfall data in terms of 200 years at Taehwa river and virtual scenarios in terms of levee break was applied for flood inundation analysis. The coupling method of 1-dimensional river analysis and 2-dimensional inundation analysis was applied for flood analysis in the study area. Simulation with structures was assumed more accurate results than simulation without structures. As analysis of simulation results, agreement of flooded area with structures was below 90% compared with flooded area without structures. The flood depth and elevation was analyzed in this thesis. As results, flood depth of simulation with structures was lower than flood depth of simulation without structures. When flood inundation simulation is conducted using geometry data with structures, accuracy of inundation analysis can be more high than before. In this thesis, GIS Tool was used for construction of geometry effectively and this method can be considered to utilize systematic practice application. The results of accurate two dimensional inundation analysis can be usefully applied to flood insurance or a guide to structure Flood Maps. And the developed model will contribute to the establishment of the national integrated flood disaster prevention system and the high-accuracy flood analysis system.

References

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