

Research on city region flood analysis model use guideline

Whole term

2003.12 ~ 2004.3

(Purpose)

The present study clarifies the matters to be noted and problems in performing flood analysis when an anticipated urban inundation area map is prepared for a drainage basin of a river designated as a specified urban river based on the Specified Urban River Inundation Damage Control Law, and compares and verifies the features, applicability, etc. of various flood analysis models. Further, discussion meetings attended by learned people and committee members of the national government and local governments were held to verify the flood analyses performed for urban areas, and to compile the problems that surfaced as a result of the analyses.

The purpose of the present study is to compile standard technical matters relating to the use/utilization of flood analysis models considered to be necessary for preparing anticipated urban inundation area maps and to formula “Proposed Guidelines for Utilization of Urban Flood Analysis Models.”

(Result)

The “Proposed Guidelines for Utilization of Urban Flood Analysis Models” was formulated mainly at three discussion meetings attended by learned people and committee members of the national government and local governments.

JIWET was in charge of preparing, operating and recording the discussion meetings, and prepared reference materials as the base of the “Proposed Guidelines for Utilization of Urban Flood Analysis Models” and also prepared “Guidelines for Utilization of Urban Flood Analysis Models (draft).”

The requirements of the flood analysis made for an urban area are that sewers and ground surface flood phenomena can be analyzed simultaneously and integrally, that the detailed storm sewage discharge phenomena reflecting land use and topographical features can be expressed and that diverse inundation states can be expressed. A disclosed software product (NILIM/New Comprehensive Flood Analysis Model) and commercially available software products (InfoWorksCS, MOUSE, XP-SWMM, etc.) were examined as flood analysis software products satisfying these requirements.

The disclosed software product is a simultaneous and integral flood analysis software product in which the flood analysis using a two-dimensional unsteady flow model of the ground surface and the hydraulic analysis of sewers are connected with each other. However, since numerical values are always entered as inputs and delivered as outputs, the software is yet to be improved in view of visual expressions and operation convenience. The commercially available software products can adequately express the hydraulic phenomena in sewers and the spouting near manhole sites, but cannot basically express the phenomena in which spill flows down and diffuses on the ground surface. So, for performing flood analysis, for example, it is necessary to devise any idea such as a model including pairs respectively consisting of a sewer and a virtual open channel (road) on the ground surface.

For examination, a virtual drainage basin was established, and spill amounts were calculated and inundation states were simulated using each flood analysis software product. The spill amounts of the respective software products were compared. As a result, it was confirmed that the respective flood analysis software products showed almost similar results in time series spill amounts, maximum spill amount and total spill amount. Further, also in the simulation results of inundation states, it was confirmed that the analysis results used as the base of the anticipated inundation area map were almost similar though the disclosed software product is different from the commercially available software products in expression method (the disclosed software product expresses the flood area as inundation depths of respective meshes, and the commercially available software products express the flood area as the inundation depths at manhole positions).

(Summary)

The “Guidelines for Utilization of Urban Flood Analysis Models (provisional title)” is planned to be disclosed by National Institute for Land and Infrastructure Management, Ministry of Land, Infrastructure and Transport.

1. General

(1) Purpose and relative function of the guidelines; (2) Definitions of terms; (3) Scope of the guidelines

2. Basic matters

(1) Requirements of flood analysis; (2) Software products used for flood analysis

3. Use/utilization of flood analysis models

(1) Collection of analysis data; (2) Investigation by measurement; (3) Modeling the drainage basin concerned; (4) Calibration; (5) Simulation and output of results; (6) Matters to be noted for preparing an anticipated urban inundation area map; (7) Utilization of the constructed flood analysis models in future

Research funded by Ministry of Land Infrastructure and Transport National Institute for Land and Infrastructure Management

Person in charge of study: Takahashi Ryuichi, Kirihara Takashi, Tsuchiya Gen, Kamata Kozo, Masuoka Shuichi,

Keywords

Flood analysis model, Specific city river flood damage policy act, City flood assumption district chart