Atchara Komsai 2012: Formulation of Flood Routing Model Using Finite Element Method with Application to the Upper Ping River Basin. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Winai Liengcharernsit, D.Eng. 142 pages

This study is aimed at formulating the flood routing in the Upper Ping river basin, Northern Thailand. Several models are developed including overland flow model, kinematic stream flow model, detention basin model, and hydraulic model. The finite element method is used in model development. These models are applied to various parts of the Upper Ping river basin, depending on the hydrologic features of the stream/water body. The model simulation was conducted by computing flood hydrograph in July – September 2010, during which rainfall with high intensity occurred in the upstream sub-basins. Water levels and stream flow rates in various sections of the main streams in the study area at various times were computed. The observed data from 11 runoff stations between P.75 and P.73 stations along the Ping river and its tributaries were used to calibrate with the results from the developed flood forecast models. The values of correlation coefficient r, efficiency index (EI), and root-mean-square-error (RMSE) were computed to determine the accuracy of the developed models. It was found that most of the results obtained from the models were in the acceptable level, though the results at some river sections were rather different from the observed data. This might be due to errors in rainfall data and values of roughness coefficient.

/ /

Student's signature

Thesis Advisor's signature

Copyright by Kasetsart University All rights reserved