

RAINFALL RUNOFF MODELLING BY USING HEC-HMS

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ABSTRACT

A study was conducted at Upper Langat Basin to simulate the correlation of rainfall and runoff. On the other hand, runoff of the study area due to future development has been predicted as well.

The study area of Upper Langat basin was divided into 3 subbasins. One existing Rainfall station for each subbasin was selected and namely the TNB Pangsoon Ulu Langat, Kg Sawah Sg Lui and Kajang. Meanwhile, streamflow station at outlet of the study area is the Kajang station. Physical characteristics of the subbasin, channel and junction were simulated by the programme, HEC-HMS. Then, various models which represent each components of rainfall runoff process were chosen. The models simulate the rainfall losses, transformation of rainfall runoff, baseflow and routing. In this study, losses of rainfall represent by the model of SCS Curve Number, transformation of rainfall to runoff point by Snyder's UH model, simulating baseflow by Recession model and routing by Muskingam-Cunge model. Specified Hyetograph was selected for input data of rainfall event. Parameters adopted in the models were determined either from existing information or from the several calibration processes in the programme.

The calibration result showed that peak discharge of simulated hydrograph is about 1.77% lower than the observed one. Due to urbanization, the runoff of future condition is predicted about two times greater than present one. The main benefit from this study is the prediction of runoff response of an area to a given amount of rainfall over a defined period of time.

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CHAPTER 1

INTRODUCTION

1.1 General

The use of numerical model in the decision making process of water resources planning has become increasingly indispensable. Numerical model plays an important role to understand hydrological condition of river basins and predicting their behavior over time. Models are used in the design and operation of hydraulic structures, for discharge forecasting and for evaluating possible changes taken place over the catchments due to urbanization. On the other hand, accurate process for prediction runoff volumes is used in flood warning, navigation, water quality management and many water resources applications.

A model relates something unknown (the output) to something known (the input). In the case of rainfall-runoff modeling, the known input is rainfall while the unknown output is runoff. Since there are a lot of flood and flash flood cases in our country, therefore it's efficient for us to simulate the runoff for the aim of flood-damage reduction. By conducting simulation, the future urbanization impact can also be evaluated. Thus, the effective flood control has to be considered due to the future urbanization. The effective flood controls due to urbanization are such as having proper design and suitable size of storage and detention reservoir, flood embankments and channel.

The urbanization of the basin will change the land use of the natural watershed by altering the terrain, modifying the vegetation and also the soils