AN APPRAISAL OF CROSS SECTION GEOMETRY RESOLUTION ON PREDICTED FLOOD LEVEL USING SFLOOD MODEL

By

NOR ASHIDAH BINTI ISHAK

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ABSTRACT

This report describes a study that conducted to determine the suitable cross section resolution for flood level prediction using SFlood Model (modified version of HEC-6 model). The flood risk model was test using the hydraulic and hydrological data from a study reach approximately 3km long at Pari River catchment area. Various cross section geometry resolutions such as 5m, 10m, 20m, 40m, 60m, 80m, and 100m intervals are derive by using interpolation and extrapolation techniques. Flood levels were predicted using the SFlood Model with different cross section resolutions as stated above. The predicted water levels then compared with 1997 Flood observed water level. It is evident that, the usage of high-resolution cross section geometry data yields water levels greater than the observed values. Water levels predicted with cross section geometry configuration with 20m to 60m intervals relatively agree to observe water levels. Beside that, there are fluctuations in water levels when SFlood Model is simulate as loose boundary and rigid boundary where the former always yields higher values in water levels. Design floods with ARI 50 and ARI 100 with rainfall duration 120 minutes also simulated to yield flood conditions for future land use conditions. The predicted results transformed into a flood risk map by using GIS to demonstrate the differences in flood extend when various geometry resolutions are applied.

CHAPTER 1
INTRODUCTION

1.1 Background

Computer models play an important role in flood inundation analysis. Various models have been developed to model and predict water levels, which later used to derive flood inundation zones. Some of the possible application of hydraulic models namely HEC-6 can be found in researches conducted by Sinnakaudan (2002) and HEC-RAS by Tate (2002).

In recent years, efforts have been made to integrate hydraulic models and GIS to facilitate the modeling activities and ease the manipulation of modeling results. Three possible ways of system integration may be identified as (i) loose coupling, (ii) tight coupling and (iii) fully integrated (McDonnell, 1996; Pullar and Springer, 2000). Loose coupling, which integrates GIS systems and hydraulic models with common file exchange usually in ASCII format, has been a very popular approach among hydrology or hydraulic engineers. However, tight coupling shows a more prominent trend in system design, input and output control. It can be defined as a system that provides a graphic user interface (GUI) for viewing and controlling the application which may also link to different sub-routines or component programs (Pullar and Springer, 2000). Recent modeling trends move towards the fully integrated approach, which requires a model to be programmed and act as a component of the GIS core program using resident