UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE DISCHARGES CALCULATION OF FLOOD ROUTING IN AN OPEN CHANNEL

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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TABLE OF CONTENTS

ABSTRACT

Flood routing problem can be calculated by using Saint Venant's equations. This equation includes momentum and continuity equation. The derivation of momentum equation will transform to a partial differential equation which related to the discharge of the channel. Numerical method of an explicit finite difference can be used to calculate the discharge of the channel and the cross-sectional. Apart from numerical method, Slope-Area Method of stream also can be used to calculate the discharge. Velocity of flow in channels will compute by using Manning's formula. Then, the discharge calculated using this Manning's equation. The selection of Manning roughness coefficients, n is an important for this method according to the types of channel such as natural streams or artificial channels. The result of calculation discharge using Slope-Area Method will be plot in the graph of gage height versus discharge. This graph is represent the relationship between gage height with the discharge and it is show that, the increasing of the discharge are related with the gage height of the streams.

1 INTRODUCTION

Flood is one of the natural disasters that our country have to face. Mujumdar (2001) stated that, this phenomena occur frequently every year and involves the large section of population all over the world. There are a lot of problem arise from the flood which can cause some damage in rural, city, agricultural and others area along the rivers. Article written by Keskin & Ağiralioğlu (1997), said that some structures are design along many rivers to avoid flood damage and it is very important to estimate flood. This is because, we will know the effects of the stream channels on floods. According to Keskin (1998), flood routing can be defined as movement of a flood wave simulation technique through a river reach or reservoir. Next, Shakeel et al. (2015) stated that Saint Venant's equations are commonly used to approximate some of surface parameters such as velocity, depth, height or the flow rate. Furthermore, dynamic wave equation can be written in the form of continuity and a momentum equation that can obtain from the Saint Venant's equations. Referring to Barry & Bajracharya (1995), all flood routing models are using momentum equation and it can be distinguished by the number of terms considered in momentum equation. This momentum equation can be derived and solved by using different method of numerical such as explicit finite difference, implicit finite difference or finite volume method. Simplified dynamic model (SDM) are generated by the general dynamic equation that negligible the derivative of $\frac{\partial S_f}{\partial x}$ with respect to other terms of the equation. According to Keskin & Ağiralioğlu (1997), this simplified dynamic model(SDM) can be defined as a sequence of discrete channel segments in that dynamic wave equation.

Apart from numerical method to calculate discharge, Slope Area-Method of stream is the other method to calculate it. Stream gaging is the process of measuring water flow that collecting data on continuous stage and estimate the discharge measurement. This two data will apply to the stage-discharge relation to gain a continuous record of discharge. This is because the record will be useful apply to support the water management, hazard management, environment