LOOSE BOUNDARY MODELING USING SFLOOD FOR SUNGAI JUNJUNG

By

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Report is submitted as
the requirement for the degree of
Bachelor Engineering (Hons) (Civil)

UNIVERSITI TEKNOLOGI MARA
NOVEMBER 2006

TABLE OF CONTENTS

ACKNOWLEDGEMENT

Bismillahirahmannirahim. In the name of Allah with merciful and grateful, without His help this report will not complete.

First I would like to thank my supervisor, Dr. Shanker Kumar Sinnakaudan, for his support and guidance in preparing this report. Without his cooperation, I would not to able to complete this study.

I would like to express my heartfelt appreciation to my parents and families for their patience, support and also for understanding the sacrifices required in completing this study.

I would like to acknowledge to my beloved friends and classmates for being supportive and for their contribution and understanding. Special thanks to Ms. Nuraida Sanin for making all this possible through her strong support given to me.

Lastly but not least, thank you to all that have contributed either directly or indirectly in making this study a success.

I have made every effort to identify the original sources of information stated but, if there have been any accidental errors of omissions, I apologies to those concerned.

ABSTRACT

The sediment transport capacity of a river determines the scour and deposition processes in a river reach. As such, it is quite important to correctly model the loose boundary channels in response to catchments changes either due to human interferences or natural processes. However, current engineering practice indicates that most modelling activities done by using rigid boundary models. This is due to lack of sediments transport characteristics information such as the sediments rating curve at Sungai Junjung. Site observation for hydraulic and sediments transport data including river cross section, velocity, water level, bed load, suspended load and bed material samples has been collected at downstream stations. A flow rating curve which contain the water level data as a function of water discharge (Q) were then established. Later, sediment rating curve which shows the relationship between sediments total load (Tj) and water discharge (Q) also been derived. By using the derived flow rating curve and sediments rating curve the historical water level and sediment discharge values for the ungauged catchment for Sungai Junjung can be derived at any time period from the historical water level records for the study site. The derived parameter then will be use to predict floods level using SFlood Model incorporating with the sediments transport. The simulation is considered in loose boundary condition and the rigid boundary condition. The simulation result show that loose boundary condition gave higher water level comparing to the rigid boundary condition. It's clear that loose boundary condition affected the river by erosion and deposition. Deposition of sediment cause the flow resistance is higher, thus the water level also increase.

CHAPTER 1

INTRODUCTION

1.1 Background

Floods are natural events that have always been an integral part of the geologic history of earth. Flood occurs along rivers, stream and lakes, in coastal areas, on alluvial fans, in ground failure areas such a subsidence, in areas influent by structural measures and in areas that flood due to surface runoff and locally inadequate drainage. Flooding is one of the major natural hazards affecting communities across Malaysia and has caused damaged worth million of dollar every year. (Sinnakaudan, 2003).Varies flood protection measure have been considered however, flood problems seem to getting worse every year. One of the major deficiencies evidence current rivers engineering practice is the design without considering the sediment transport phenomena. (Sinnakaudan, 2003). Sediment transport governs or influences the river morphology by erosion and sedimentation. Figure 1.1 and 1.2 show flooding at Simpang Ampat, Bukit Mertajam Pulau Pinang.

Sedimentation and erosion processes happen continuously in the loose boundary channels and has the significant influence the flood level. Heavy deposition of sediment reduces the conveyance capacity of the channel, and the erosion causes the river bank failure.