INVESTIGATION OF SALT INTRUSION IN THE KUANTAN ESTUARY DURING HIGH TIDE CONDITION ADOPTING 1-D ANALYTICAL SOLUTION

WONG JIA ENG

B. ENG (HONS.) CIVIL ENGINEERING

UNIVERSITI MALAYSIA PAHANG

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree in Bachelor of Civil Engineering.

_____

(Supervisor's Signature)

Full Name :

Position :

Date :

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at University Malaysia Pahang or any other institutions.

_____

(Student's Signature)

Full Name : WONG JIA ENG

ID Number : AA13073

Date : 15 JUNE 2017

INVESTIGATION OF SALT INTRUSION IN THE KUANTAN ESTUARY DURING HIGH TIDE CONDITION ADOPTING 1-D ANALYTICAL SOLUTION

WONG JIA ENG

Thesis submitted in fulfillment of the requirements
for the award of the
Bachelor Degree in Civil Engineering

Faculty of Civil Engineering and Earth Resources

UNIVERSITI MALAYSIA PAHANG

JUNE 2017

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Dr. Jacqueline Isabella Anak Gisen for her guidance and encouragement throughout this study. Moreover, greatest thanks to the staffs of Faculty of Civil Engineering and Earth Resources (FKASA) who involve directly and indirectly for all their help and support in this study especially during the fieldwork at Kuantan estuary.

Fieldwork experience made me more understand about the salt intrusion in the Kuantan Estuary. During fieldwork, moving boat technique was used to collect the salinity level of the estuary. The data for salinity level was collected during high water slack (HWS) condition. High water slack is where the tidal velocity is near to zero just before the tidal current changes to seaward direction during a tidal cycle. It is difficult to notice the slack moment for a newbie like me. With the help of the local people and staffs, I able to collect the salinity level easily and correctly.

Last but not least, great deals appreciated going to the contribution of my faculty, the Faculty of Civil Engineering and Earth Resources (FKASA). I also would like to thank the Coordinator of Final Year Project, Dr. Nurul Nadrah Aqilah Binti Tukimat and all the staff in the Department of Academic and International Affairs that patiently helped us to register and complete the project.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

a	Cross-sectional convergence length [L]
A	Cross-sectional area [L^2]
A_0	Cross-sectional area at estuary mouth [L^2]
b	Width convergence length [L]
B	Estuary width [L]
B_0	Width at estuary mouth [L]
D	Longitudinal dispersion [L^2/T]
D_0	Longitudinal dispersion at estuary mouth [L^2 /T]
D_i	Dispersion coefficient at HWS, TA and LWS [L^2 /T]
E	Tidal excursion [L]
h	Estuary depth [L]
h_0	Estuary depth at the mouth [L]
L	Salt intrusion length [L]
Q_f	The freshet or fresh water flushing [L^3 /T]
s	Salinity [M/L^3]
S	Steady state salinity [M/L^3]
S_0	Steady state salinity at estuary mouth [M/L^3]
S_i	Steady state salinity at HWS, TA and LWS [M/L^3]
S_f	Fresh water salinity [M/L^3]
t	Time [T]
x	Distance [L]
α_0	Mixing number at estuary mouth [L^{-1}]
β_0	Dispersion reduction rate at estuary mouth [-]

LIST OF ABBREVIATIONS

HWS	High Water Slack
LWS	Low Water Slack
NSE	Nash- Sutcliffe Efficiency
RMSE	Root Mean Square Error