

INDUSTRIAL TRAINING REPORT
AT
PETRONAS
REFINERY & PETROCHEMICAL CORPORATION
KUALA LUMPUR
BY
NURAZIEMAH BINTI MOHAMAD ASLI
(2011224374)

REPORT
SUBMITTED TO
FACULTY OF COMPUTER AND MATHEMATICAL SCIENCES
UNIVERSITI TEKNOLOGI MARA

AS PART OF REQUIREMENT
FOR
BACHELOR OF SCIENCE (HONS.) STATISTICS

JANUARY 2015

ACKNOWLEDGEMENT

In this given opportunity, I would like to give my highest appreciation to Allah Almighty that blessed me the power and guts to complete this project in successful way. There are times of obstacles that depressed me to deliver the final product but I have managed in the end.

A special gratitude I give to my academic supervisor, Ms. Nur Dalila binti Norshahidi, and to my company supervisor who also the Head of Enterprise Risk Management, PETRONAS Refinery and Petrochemical Corporation, Mrs. Marzita binti Kamarudin whose contribution in stimulating suggestions and encouragement, aspiring guidance, constructive criticism, friendly advice and helping me to coordinate my project through various stages especially in writing this report.

In addition, I am grateful to the Public Service Department of Malaysia and Universiti Teknologi MARA, for funding my study. I am also very much grateful to the management of PETRONAS Twin Towers, Vista Tower, and G Tower that grant me permission to conduct this research in their buildings.

Hope to continue cooperation with all of you in the future. Thank you.

Nuraziemah binti Mohamad Asli

January 19, 2015

Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA Malaysia

ABSTRACT

There are many approaches to model an elevator routing system. In this study, some literature is shortly described, wherein different traffic categories and elevator policy types are presented. In the simulation approach, zoning is often used to model the elevator routing system. Zoning means that the floors are split into a number of zones, each consisting of a group of floors. Different zones are served by different elevators. Dynamic zoning can reduce passenger waiting times in high-rise buildings. Therefore, three types of elevator policies are chosen. In the presented model, the elevators of three policies are considered that are carrying passengers from the ground floor to higher floors in PETRONAS Twin Towers, Vista Tower, and G Tower. Four different elevator traffic (up-peak, normal, inter-floor, and down-peak), with three different elevator policies (zoning odd/even, zoning low/high, and no zoning) are compared on their performance (waiting times). Analysing the results tends to the conclusion that using zoning policies in such high-rise buildings is preferable above a policy without zoning. Furthermore, the conclusion that can be made from the results obtained is instead of the other traffic categories, the normal traffic performs the best.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	vii
CHAPTER 1 ORGANIZATION BACKGROUND	
1.1 Background of Industrial Training.....	1
1.2 Objectives of Industrial Training	1
1.3 Industrial Training Attachment	2
1.3.1 Background of Organization	2
1.3.2 Logo of Organization	4
1.3.3 Background of Department	4
1.3.4 Vision of Organization	5
1.3.5 Mission of Organization	5
1.3.6 Organizational Background	6
CHAPTER 2 RESEARCH PROJECT	
2.1 Introduction	7
2.2 Problem Statement	9
2.3 Research Objectives	10
2.4 Research Questions	10
2.5 Research Hypotheses	11
2.6 The Definition of Terms	11
2.7 The Significance of the Study	12
2.8 Scope and Limitation of the Study.....	12
CHAPTER 3 LITERATURE REVIEW	
3.1 Introduction	13
3.2 The Elevator Routing Scheme	13
3.3 The Elevator Zoning Techniques.....	14
3.4 Automated Destination Control Elevator System	16
3.5 Conventional Elevator System.....	18

3.6	Destination Control System versus Conventional System.....	18
3.7	The Elevator Policies	19
3.8	The Traffic Components	21
3.9	The Definition of Waiting Time	22
3.10	Vertical Transportation in PETRONAS Twin Towers	24
3.11	Vertical Transportation in Vista Tower	24
3.12	Factorial Experiment.....	25
3.13	The Model Assumptions	26
3.14	Two-way Analysis of Variance (ANOVA).....	28
3.15	Tukey’s Post Hoc Test	29
CHAPTER 4	RESERCH METHODOLOGY	
4.1	Choice of Factors and Levels	31
4.2	The Selection of Response Variable	32
4.3	The Treatment Combination	32
4.4	Choice of Experimental Design	33
4.5	Procedure of Designing the Experiment	35
4.6	Experimental Materials	37
4.7	Procedure of Performing the Experiment	37
CHAPTER 5	FINDINGS AND DATA ANALYSIS	
5.1	The Model Adequacy Checking	41
5.1.1	Test for Normality Assumption	41
5.1.2	Test for Independence Assumption	42
5.1.3	Test for Homoscedasticity Assumption	42
5.2	Test of Interaction Effect and Main Effect on Response Variable.....	43
5.2.1	Test of Interaction Effect between Traffic Categories and Elevator Policy Types on Waiting Time	43
5.3	Test of Mean Difference of Treatment Factor	44
5.3.1	Test for Mean Difference of Traffic Categories	44
5.3.2	Test for Mean Difference of Elevator Policy Types ..	45
CHAPTER 6	CONCLUSION AND RECOMMENDATION	
6.1	Conclusions	46
6.2	Recommendations	48
REFERENCES		
APPENDICES		