

STUDY ON MAINTENANCE  
MANAGEMENT PRACTICE OF  
TELECOMMUNICATION TOWER THROUGH  
STRATEGIC PLANNING  
IN MALAYSIA

FARID IZAMER BIN AZIZAN

B. ENG(HONS.) CIVIL ENGINEERING

UNIVERSITI MALAYSIA PAHANG



## **SUPERVISOR'S DECLARATION**

I/We\* hereby declare that I/We\* have checked this thesis/project\* and in my/our\* opinion, this thesis/project\* is adequate in terms of scope and quality for the award of the Bachelor Degree of Civil Engineering

---

(Supervisor's Signature)

Full Name :

Position :

Date :

---

(Co-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 Universiti Malaysia Pahang or any other institutions.

---

(Student's Signature)

Full Name : FARID IZAMER BIN AZIZAN

ID Number : AA13095

Date : 19 JUNE 2017

STUDY ON MAINTENANCE MANAGEMENT PRACTICE OF  
TELECOMMUNICATION TOWER THROUGH STRATEGIC PLANNING IN  
MALAYSIA

FARID IZAMER BIN AZIZAN

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**

Firstly, I want to grateful to Allah S.W.T because with His permission and guided me to the path of success. I can finish my full thesis with full support by family, supervisor, lecturer and friends that encourage me to complete the course of studies.

I am grateful and would like to express my sincere gratitude to my supervisor Mr. Mohammad Syamsul Hairi bin Saad for his inspiring idea, invaluable guidance, continuous encouragement and constant support in making this research possible. He always impressed me with his outstanding professional conduct, and his belief that a Degree program is only a start of a life-long learning experience. I would not have been able to achieve this goal without the guidance that I received from my supervisors.

Lastly, I would like to thank the administration, faculty and the university's staff for their assistance directly or indirectly. My sincere thanks also to go to my entire course mate's friend for the knowledge and information sharing, their comment and suggestion during the completion of this research.

## TABLE OF CONTENT

<b>DECLARATION</b>	
<b>TITLE PAGE</b>	
<b>ACKNOWLEDGEMENTS</b>	<b>ii</b>
<b>ABSTRAK</b>	<b>iii</b>
<b>ABSTRACT</b>	<b>iv</b>
<b>TABLE OF CONTENT</b>	<b>v</b>
<b>LIST OF TABLES</b>	<b>viii</b>
<b>LIST OF FIGURES</b>	<b>ix</b>
<b>LIST OF ABBREVIATIONS</b>	<b>x</b>
<b>CHAPTER 1 INTRODUCTION</b>	<b>1</b>
1.1 Introduction	1
1.2 Problem Statement	2
1.3 Objectives of Study	3
1.4 Scope of Study	3
1.5 Rationale and Significance of The Study	4
<b>CHAPTER 2 LITERATURE REVIEW</b>	<b>6</b>
2.1 Introduction	6
2.2 Definition of Maintenance	7
2.3 Concept of Maintenance	7
2.4 Importance of Maintenance	7
2.5 Process of Maintenance Management	8

2.6	Strategic Planning	9
2.7	Strategic Planning Process	10
2.8	Maintenance Policy	12
2.9	Strategy of Maintenance Management	13
2.9.1	Preventive Maintenance	13
2.9.2	Corrective Maintenance	13
2.9.3	Condition-Based Maintenance (CBM)	14
2.9.4	Special Maintenance	14
2.10	Maintenance Management Program	16
2.10.1	Long-term Program	16
2.10.2	Medium-term Program	16
2.10.3	Short-term planning	17
2.11	Types of Telecommunication Tower	17
2.11.1	Self-Support Tower	17
2.11.2	Monopole Tower	19
2.11.3	Guyed Tower	20
2.12	Classification of Tower	20
2.13	Components of Telecommunication Tower	21
2.14	Failure of Structure	22
2.14.1	Causes of Failure	23
2.5	Summary	24
<b>CHAPTER 3 METHODOLOGY</b>		<b>25</b>
3.1	Introduction	25
3.2	Data Collection	25
3.2.1	Primary Data	27

3.2.2	Secondary Data	27
3.3	Data Analysis	27
3.3.1	Statistical Package for Social Science (SPSS)	28
3.3.2	Average Index	30
3.4	Conclusion	31
<b>CHAPTER 4 RESULTS AND DISCUSSION</b>		<b>32</b>
4.1	Introduction	32
4.2	Background of Respondents	33
4.3	Analysis of Identification of The Common Practice in Maintenance Management System	35
4.4	Analysis on Performance of Maintenance of Telecommunication Tower	40
4.5	Analysis of Improving Maintenance Management System in The Organization Through Strategic Planning	43
4.6	Conclusion	46
<b>CHAPTER 5 CONCLUSION</b>		<b>47</b>
5.1	Introduction	47
5.2	Objective 1: To study the way of implementation of the maintenance of telecommunication tower	47
5.3	Objective 2: To identified and design questionnaire framework related to maintenance management practice of the telecommunication tower	48
5.4	Objective 3: Analysis on efficiency of maintenance management practice through strategic planning	49
5.5	Recommendation	50
<b>REFERENCES</b>		<b>51</b>
<b>APPENDIX A SAMPLE APPENDIX 1</b>		<b>53</b>



## LIST OF TABLES

Table 1	Classification of tower	21
Table 2	Common practice in maintenance management system	36
Table 3	Factor influenced in maintenance work	39
Table 4	Factor of defect on telecommunication tower	42
Table 5	Improving maintenance management in organization through strategic planning	44

## LIST OF FIGURES

Figure 1	The process of maintenance strategic planning	11
Figure 2	Flow chart of types of maintenance	15
Figure 3	4-legs self-support tower	18
Figure 4	Another self-support tower	18
Figure 5	Monopole Tower	19
Figure 6	Guyed tower	20
Figure 7	Proposed methodology	26
Figure 8	The example of analysis data by using SPSS software	29
Figure 9	The example of result from SPSS software	29
Figure 10	Age of respondents	34
Figure 11	Graph for number of respondents on identify the common practice of maintenance management system	37
Figure 12	Preventive maintenance work flow chart by Telekom Malaysia Berhad	38
Figure 13	Types of telecommunication tower that always involve in maintenance works	40
Figure 14	Identifying the factor of defect on telecommunication tower	42
Figure 15	Improving maintenance management in organization through strategic planning	45

## **LIST OF ABBREVIATIONS**

SPSS	Statistical Package for Social Science
M&O	Maintenance and Operation
CBM	Condition Based Maintenance