



**UNIVERSITI TEKNOLOGI MARA**

**EFFECT OF DESIGN FAILURE ON  
MAINTENANCE OF SCHOOL**

**AMYRUL HANIF BIN MISRUN**

Dissertation submitted in partial fulfillment  
of the requirement for the degree of  
**Bachelor of Building Surveying**

**Faculty of Architecture, Planning and Surveying**

**July 2021**

## **ABSTRACT**

Malaysia is one of the nations that is quickly developing in the economy and building sector, and this has a significant influence on the country. But the problem of building defects still occurs directly or indirectly whether in commercial, residential, or educational buildings. Most of problems are related to poor maintenance management and failures in design. The issues that related are from the building negligence, discomfort and hazardous to the building users and building defects arise cause high maintenance. The aim of this study is to evaluate the impression of building design failures to the schools building that involving the maintenance management perceptions and gain the deeply knowledge in building design failures towards maintenance management. The methodology adopted for this research is through literature review, observation, and semi structured interview for collecting the data. A survey was conducted to collect the required data were adopted in this study. This study reveals the important factors that leading to defects in the design stage. According to the study the main defects that contributed to the failures of design are the unqualified supervision, insufficient reinforcement concrete cover, deficient structural design such as foundation, not complying with specification, painting under inappropriate conditions or on an inappropriate surface, insufficient site supervision and do not define suitable materials. Because of these main defects, it is giving an effect toward the maintenance of the school and the main factors are increases the maintenance expense, on maintenance work, increasing on maintenance workforce and on increasing maintenance frequency. The study recommends several actions to improve maintenance performance of the selected schools in Perak state which is Tenby, WestLake and Fairview International school. The designer must advise to take into account maintenance issues by using durable materials that are appropriate for harsh weather conditions. Every part of departments or team member should be cooperating with each other in working to ensure the quality of work can be improved and the maintenance of the building will be more orderly.

## **ACKNOWLEDGEMENT**

Foremost, I would like to express my sincere gratitude to my supervisor Sr Ts Mohd Khazli Aswad Bin Khalid for the continuous support of my degree study and research, for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my degree study. Besides that, also I thank my friends for being helping me with this research.

Besides that, I would like to express my warm appreciation and sense gratitude to everyone who has directly and indirectly help me in this academic mission and without whom this study would not have been accomplished.

Lastly, this thesis is dedicated to the loving memory of my very dear father and mother for the vision and determination to educate me. This piece is dedicated to both of you. Alhamdulillah. Thank you, a lot, of you.

## TABLE OF CONTENTS

Author's Declaration.....	i
Confirmation By Panel of Examiners.....	ii
Abstract.....	iii
Acknowledgement .....	iv
Table of Contents .....	v
List of Figures .....	vii
List of Tables .....	viii
List of Charts.....	ix
<b>CHAPTER 1: INTRODUCTION.....</b>	<b>1</b>
1.1 Research Background .....	1
1.2 Problem Statement.....	2
1.3 Research Aim and Objectives.....	4
1.4 Scope and Limitation of Research .....	5
1.5 Research Methodology .....	6
1.6 Significance of Research.....	7
1.7 Chapters Outline .....	8
<b>CHAPTER 2: LITERATURE REVIEW.....</b>	<b>10</b>
2.1 Introduction.....	10
2.2 Concept of Building Maintenance .....	10
2.3 Building Maintenance.....	10
2.4 Types of Maintenance.....	11
2.5 Importance of Building Maintenance .....	13
2.6 Building Defects .....	13
2.7 Factors of Building Design That Related Building Maintenance.....	15
2.8 Defects in Building Design.....	18
2.9 Effect of Faulty Design.....	35
2.10 Summary .....	37
<b>CHAPTER 3: RESEARCH METHODOLOGY .....</b>	<b>38</b>
3.1 Introduction.....	38
3.2 Research Method .....	38
3.3 Research Population, Sampling and Case Study .....	42

## **CHAPTER 1: INTRODUCTION**

### **1.1 Research Background**

Building design has a great impression on the performance and the durability of the building. Building defects can be caused by design failures and this is often the case in our country where buildings have many defects due to design failures. Therefore, Maintenance activities are critical to a building's overall performance throughout its life cycle. Design and maintenance are two tasks that have a direct impression on the construction quality and effectiveness. Based on (Lam, 2000), the Statement stated that 40% were related to design, 30% were related to construction or installation problems, and 30 per cent were related to maintenance management problems as a result of a building survey conducted in Hong Kong.

Currently, reporting in the media and the resulting problem of government building defects continues. There are problems relating to building defects, maintenance and management, which are discussed at parliamentary level. In addition, the government continues to increase the national budget maintenance allowance every year. The design has a major impression on building conditions after it is completed, particularly in maintenance projects, since it affects building efficiency, physical properties, and durability.

Schools in our country Malaysia have a similar problem. According to (Baker, 1963), the challenge would be greater if we maintain the school facilities because the school occupancy consists of young persons, and in addition to any anticipated weather and obsolescence more wear and tear will be brought about. Furthermore, the school director and guardian are collectively responsible for the treatment and service that hundreds of school children and teachers have indirectly experienced in their own lives.