

CAUSATIVE FACTORS OF CONSTRUCTION WASTE GENERATION IN MALAYSIA

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Abstract: This is a research book based on a study conducted to identify the significant causative factors to construction waste generation in Malaysia construction industry. This book describes the research process which includes data analysis in a systematic manner and is organised in four chapters as follows: Chapter 1: Concern of waste generation in construction industry. It covers the classification of the wastes, causes and effects of the generated wastes and also the disposal issues. Chapter 2: Identification on causative factors of construction wastes generation. These factors are identified from previous researches related to construction waste that were carried. Chapter 3: Questionnaire survey on identifying the significant causative factors of construction waste generation in Malaysia construction industry. It describes the design of the questionnaire, implementation of the survey and also the analysis of the collected data. Chapter 4: Development of structural equation model which indicates the structural relationship of causative factors toward the construction waste generation using the multivariate approach.

Keywords: Causative, construction, disposal, structural, multivariate

Causative Factors of Construction Waste Generation

in Malaysia

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**ISMAIL ABDUL RAHMAN
SASITHARAN NAGAPAN**



2015

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First Publish 2015

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Perpustakaan Negara Malaysia Cataloguing—in—Publication Data

Ismail Abdul Rahman

Causative Factors of Construction Waste Generation in
Malaysia / ISMAIL ABDUL RAHMAN,
SASITHARAN NAGAPAN.

Includes index

Bibliography: pages 149

ISBN 978-967-0764-02-3

1. Construction industry--Waste disposal--Malaysia.

I. Sasitharan Nagapan. II. Title.

363.72809595

Published by:

Penerbit UTHM

Universiti Tun Hussein Onn Malaysia

86400 Parit Raja,

Batu Pahat, Johor

No. Tel: 07-453 7051 / 7454

No. Faks: 07-453 6145

Website: <http://penerbit.uthm.edu.my>

E-mail: pt@uthm.edu.my

<http://e-bookstore.uthm.edu.my>

Penerbit UTHM is a member of
Majlis Penerbitan Ilmiah Malaysia
(MAPIM)

Printed by:

Percetakan Surya Sdn. Bhd.

Plot 29, Jalan IKS BK 2

Taman Bukit Katil

75450 Bukit Katil, Melaka

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PREFACE

Construction sector in Malaysia has been growing rapidly since the last few decades along with social development. The sector has contributed significantly to Gross Domestic Product (GDP) of the country. Even though rapid development of construction contributes to a better and higher number of facilities which are needed by the people, it also gives negative impact to economy, social and also environment. The development in the construction sector is causing an increase of construction waste generation every year. Thus, Malaysia needs to take up the challenge in reducing waste generation by finding an environmental-friendly way in minimizing the waste.

This research book is based on a study to identify significant causative factors of construction waste generation in Malaysia construction industry. The book is targeted to students, researchers and also construction practitioners who are dealing with construction issues. It is resourceful and helpful not only to postgraduate students who are carrying research work but also for undergraduate students who are studying construction. It describes the research process which includes data analysis in a systematic manner and is organised in four chapters as follows:

- Chapter 1:** Overview of waste generation in construction industry. It covers the classification of the wastes, causes and effects of the generated wastes and also the disposal issues.
- Chapter 2:** Identification on causative factors of construction wastes generation. These factors were identified from

previous researches related to construction waste issue

Chapter 3: Questionnaire survey on identifying the significant causative factors of construction waste generation in Malaysia construction industry. It describes the design of the questionnaire, implementation of the survey and also the analysis of the collected data.

Chapter 4: Development of structural equation model which indicates the structural relationship of causative factors toward the construction waste generation using the multivariate approach.

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful

Alhamdulillah, all praises to Allah for the strengths and His blessing in completing this first research book for Universiti Tun Hussein Onn Malaysia (UTHM). Special appreciation goes to Miss Nurfarhan Ismail for her invaluable helps in proofreading the manuscript of this book. Special thank to our respondents especially from Jabatan Kerja Raya (JKR), Perbadanan Pengurusan Sisa Pepejal dan Pembersihan Awam (PPSPPA), Pejabat Daerah, Dewan Bandaraya Kuala Lumpur, Gamuda Bhd, Mudajaya Sdn.Bhd., Putrajaya Holding Sdn. Bhd., WCT Berhad, MRCB Engineering Sdn. Bhd., Setia Putrajaya Sdn. Bhd., Tune Hotels Sdn. Bhd., Ahmad Zaki Sdn. Bhd, Bahagian Pembangunan Politeknik, and others.

We would like to express our appreciation to the UTHM's Publisher for their support and cooperation towards publishing this book. And also, sincere thank to all our friends for their kindness and moral support in making this book published.

The Authors,
Faculty of Civil and Environmental Engineering, UTHM

CHAPTER 1

CONSTRUCTION WASTE

1.1 Construction Development

Construction sector in Malaysia has been growing rapidly since the last few decades along with social development. The sector has contributed significantly to Gross Domestic Product (GDP) of the country. The construction growth trend in GDP since 2004 is illustrated in Figure 1.1.

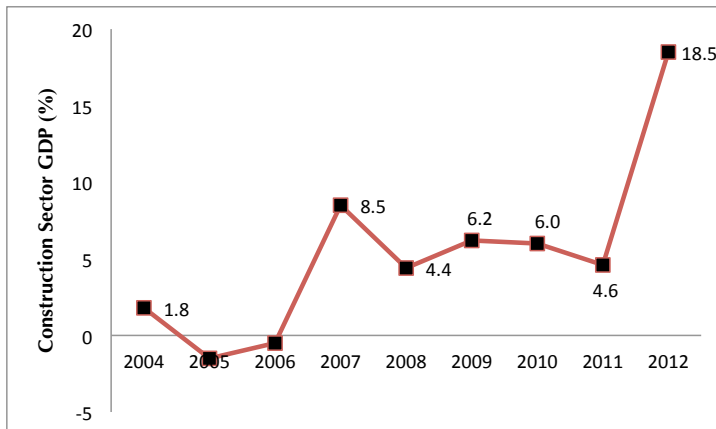


Figure 1.1: Construction Sector Growth Trend from 2004 to 2012
(Source: Khan et al., 2014 & CIDB, 2013a)

CHAPTER 2

FACTORS CAUSING CONSTRUCTION WASTE GENERATION

2.1 Introduction

Like other countries, Malaysia is also facing a serious problem of waste generation in its construction industry (Noor et al., 2013, Hassan et al., 2012, Aadal, Rad, Fard, Ghasemi, & Sabet, 2013). Increased of waste generation is concurrent with the increased of demand for major infrastructure projects, commercial buildings and housing development (Begum et al., 2010, Mokhtar & Mahmood, 2008). However these wastes are not properly managed and have resulted in the increased of illegal dumping sites. The construction waste generation is caused by various factors which need to be uncovered in order to avoid or minimise its generation.

Many researchers stated that Malaysia does not have a proper database of construction waste flows and also a list of factors which are causing waste generation on-site or off-site (Begum et al, 2007; Yuan & Shen, 2011; Lu & Yuan, 2011b). Construction Industry Development Board of Malaysia (CIDB) and National Solid Waste and Public Cleansing Corporation (PPSPPA) are the authorities empowered to deal with construction waste have encouraged researchers to investigate more on construction waste fields for the benefits of the country (Hamid, 2011, Taha, 2012). Even though several researchers have studied the

CHAPTER 3

IDENTIFICATION OF CAUSATIVE FACTORS TO CONSTRUCTION WASTE GENERATION

3.1 Introduction

This chapter presents a study on identifying significant factors which contribute to construction waste generation in Malaysia's construction industry using questionnaire survey approach. It starts by describing the designing of the questionnaire and then the pilot study among the experts in the construction industry. The purpose of pilot study was to determine the relevancy of these factors for Malaysia construction environment. After conducting the pilot study, the questionnaire for actual survey was modified based on the findings obtained from the study. The modified questionnaire was used for actual survey where the numbers of respondents are larger in order to give better representation of various parties involved in Malaysia construction industry. It further describes the analysis using descriptive approach on the data collected from this survey to find out the required level of significance of each of the factor in contributing to construction waste generation in Malaysia.

CHAPTER 4

PLS-SEM MODEL OF CAUSATIVE FACTORS OF CONSTRUCTION WASTE GENERATION

4.1 Introduction

This chapter presents the development of structural relationship of causative factors toward the construction waste generation using PLS-SEM method. It describes the development process of the model by showing how the model is developed. Then, the assessments required on the measurement and structural components of the model. Finally, the model is tested for its hypothesis and also validation to ensure that the model is valid for representing the structural relationship of causative factors with the construction waste generation.

4.2 PLS-SEM Approach

Structural Equation Modelling (SEM) first appeared in the marketing literature in the early 1980s (Bagozzi & Yi, 1988; Fornell & Larcker, 1981), but in recent years, its application has become quite well-known (Hair et al., 2011). SEM is regarded as an extension of standardized regression modelling used to deal with independent variables and is ideally suited and still new in the fields of construction engineering and management (Molenaar et al. 2000; Rahman et al 2013). It is a

Appendix A: Content of Pilot's Questionnaire

Part A: Demographic

Instruction: Please fill in the blanks or tick '√' the box or circle to answer the question.

1. Name and address of company/organization

.....

2. Type of your organization?

Contractor Client
 Consultant others

3. What is your category of organization?

Government
 Private others

4. Your working experience in Malaysian construction industry?

≥ 36 year 26-30 years 16-20 years 6-10 years
 31-35 years 21-25 years 11-15 years ≤ 5 years

5. State the size of projects you are/ever involved in terms of contract amount of projects.

Above than 10 million RM 500,000 – RM 1 million
 RM 5 million – RM 10 million RM 200,000 – RM 500,000
 RM 3 million – RM 5 million Less than RM 200,000
 RM 1 million – RM 3 million

Appendix C: Content of Survey's Questionnaire

Part A: Demographic

Instruction: Please fill in the blanks or tick '√' the box or circle to answer the question.

1. Name and address of company/organization

.....

2. Type of your organization?

Contractor Client
 Consultant others

3. What is your category of organization?

Government
 Private others

4. Your working experience in Malaysian construction industry?

≥ 36 years 26-30 years 16-20 years 6-10 years
 31-35 years 21-25 years 11-15 years ≤ 5 years

5. State the size of projects you are/ever involved in terms of contract amount of projects.

Above than 10 million RM 500,000 – RM 1 million
 RM 5 million – RM 10 million RM 200,000 – RM 500,000
 RM 3 million – RM 5 million Less than RM 200,000
 RM 1 million – RM 3 million

6. What is the highest academic qualification you have achieved?

Diploma Bachelor Degree
 Master Degree Doctor of Philosophy

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