

ATTITUDE AND BEHAVIOUR
OF CONTRACTOR
IN MANAGING
WASTE
MANAGEMENT
IN CONSTRUCTION

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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.

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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 2018

ACKNOWLEDGEMENTS

“Bismillahirrahmanirrahim”

“Dengan nama Allah Yang Maha Pemurah Lagi Maha Penyayang”

Firstly, thanks to Allah SWT with His permission I can complete this thesis. I would also like to thank both my parents who have given me a lot of encouragement in completing this research.

The highest appreciation to my supervisor, Mr Mohammad Syamsyul Hairi Bin Saad who has taught me a lot in preparing this thesis. The constant support I have added to my confidence is to complete this thesis successfully.

Thank you very much for helping colleagues who have helped many ideas to produce excellent and quality thesis to the community.

ABSTRAK

Di Malaysia, kajian mengenai sikap dan tingkah laku kontraktor terhadap masalah pembuangan sisa binaan adalah sangat sedikit. Cara yang terbaik adalah mungkin dengan Majlis Perbandaran menyediakan sebidang tanah untuk para kontraktor bagi membuang sisa binaan mereka secara sah di sisi undang-undang (The Star Online, 2016). Di dalam kajian ini terdapat 3 objektif. Objektif yang pertama sekali ialah untuk mengkaji sikap dan tingkah laku kontraktor dalam menguruskan sisa pembinaan. Objektif yang kedua ialah untuk mengetahui kesan sikap dan tingkah laku kontraktor dalam menguruskan sisa pembinaan. Objektif yang ketiga ialah untuk menganalisis dan mencadangkan penyelesaian terbaik untuk meminimumkan sisa pembinaan. Kajian ini menumpukan golongan kontraktor G7 dan sebanyak 56 responden telah berjaya menjawab borang kajian soal selidik tersebut. Tapak pembinaan yang dipilih ialah di sekitar Kuantan, Pahang kerana peningkatan arus pembangunan di bandar tersebut. Microsoft Excel merupakan sebuah program aplikasi yang telah digunakan untuk menafsirkan dan menunjukkan data seperti yang telah diperolehi dari borang kajian soal selidik. Kaedah Indeks Kepentingan Relatif (RII) telah digunakan untuk mengetahui jumlah kasar yang telah diperolehi dari borang kajian soal selidik. Kategori analisis data tertinggi untuk sikap kontraktor ialah kontraktor memberikan gaji yang rendah kepada pekerja manakala untuk kelakuan kontraktor pula adalah kontraktor mempraktikkan penyimpanan bahan-bahan binaan yang salah. Penyelesaian terbaik bagi hasil kajian ini ialah Sistem Bangunan Industri (IBS) iaitu sebagai cadangan berkesan bagi menyelesaikan masalah ini. Lembaga Pembangunan Industri Pembinaan Malaysia (CIDB) mahu menjadikan Sistem Bangunan Industri (IBS) sebagai mandatori pada tahun 2020. Akhir sekali, penyelidikan masa depan kajian ini adalah untuk menggunakan Pemodelan Maklumat Bangunan atau Building Information Modeling (BIM). Kerajaan telah menguatkuasakan penggunaan Pemodelan Maklumat Bangunan (BIM) untuk pembinaan projek-projek awam yang bernilai RM100 juta ke atas menjelang 2019.

ABSTRACT

In Malaysia, there are very uncommon research have been done regarding the issue of attitude and behaviour of contractor in managing waste management in construction. A parcel of land may the proper way for local councils to be provided to contractors since they are lazy to dump their construction waste legally (The Star Online, 2016). There are three objectives in this research. Firstly, to study attitude and behaviour of contractor in managing construction waste. Secondly, to obtain the effect of contractor's attitude and behaviour in managing construction waste. Thirdly, to analyse the solution to minimize construction waste. Since, the study is related to contractor, the primary target group is the contractor G7 and 56 respondents successfully got the respond from questionnaire. Construction sites are chosen around Kuantan, Pahang because of the increasing development percentage in Kuantan, Pahang. Microsoft Excel software is used to interpret and demonstrated the data as indicated by information from the questionnaire. The Relative Importance Index method, (RII) methods empower to figure out the crude information accurately got from the questionnaire. Overall the highest data analysis for attitude of contractor is a contractor give low wages to workers while for behaviour of contractor is a wrong material storage category. The recommendation of this research is to implement Industrial Building System (IBS) in project. Construction Industry Development Board Malaysia (CIDB) wants to make the Industrialised Building System (IBS) mandatory by 2020. Lastly, future research of this study is to use Building Information Modelling (BIM). The government is set to enforce the Building Information Modelling (BIM) for construction of public projects above RM100 million by 2019.

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LIST OF ABBREVIATIONS

11MP	11th Malaysian Plan
GDP	Gross Domestic Product
TRX	Tun Razak Exchange
DOE	Department of Environment
CIDB	Construction Industry Development Board
IBS	Industrial Building System
C&D	Construction and Demolition
SEF	Services Export Fund
FTA	Free Trade Agreement
MRA	Mutual Recognition Agreement

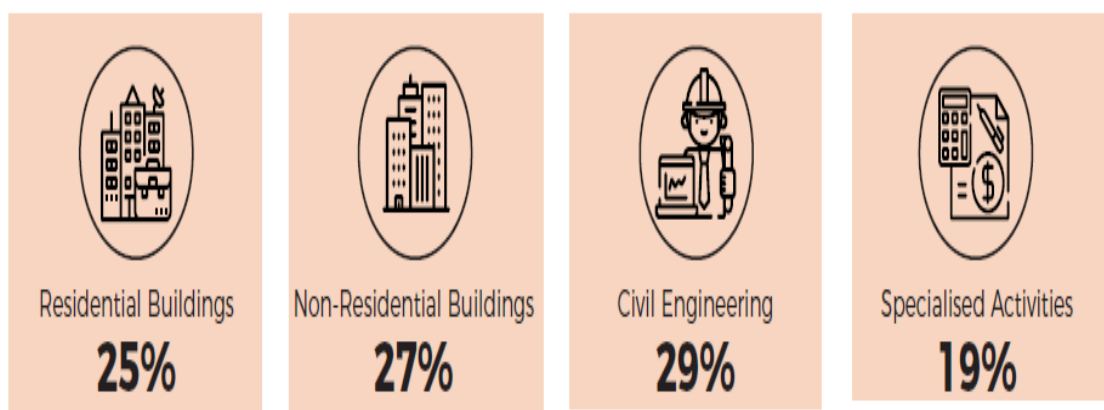
CHAPTER 1

INTRODUCTION

1.1 Background of Study

According to 11th Malaysia Plan (11MP) it is important to setup new plan, new strategy in order to achieve various targets, achievements and figure out the requirement to further strengthen Malaysia's productivity planning for better result. Malaysia have identifies that there is chance to produce better achievement that will allow us to feel the pleasure that we are on the proper path in committing on higher production to accomplish our targets. Thus, the Government is permitting stronger attention to the priority of productivity as the major handler to boost economic production over the long term.

Figure 6.1: Contribution of the Construction Sub-sector to GDP, 2016



Source: Department of Statistics, Malaysia

Figure 1-1: Contribution of the Construction Sub-sector to GDP, 2016.

In 2016, civil engineering topped the contribution of the construction sub-sector to Gross Domestic Product (GDP) which is at 29% followed by non-residential building activities (27%), residential buildings (25%), and specialised activities (19%)

(Productivity Report 2016/2017, 2017). The performance of various sub-sectors was driven by major construction projects such as the Klang Valley's Mass Rapid Transit (MRT), Tun Razak Exchange (TRX) in Kuala Lumpur and Petronas Refinery and Petrochemical Integrated Development (RAPID) project in Pengerang, Johor.

There are many construction that is ongoing around state of Malaysia in order to achieve "Malaysian Plan 2020". Unfortunately, there a lot of deadly, disastrous, destructive effects to ecosystem and environment when construction waste is being issued. Instead of Malaysia is being advanced in construction sector, managing waste management in construction have become a serious environmental issues. Traditional method of dumping waste still be used in Malaysia. People start to worry about this issue. The problem is not something new that we heard through mass media, still there are limited operation taken to regulate the waste construction. Bricks, wood, packaging, metal, soil and sand are common construction waste in Malaysia. A large chunk of it, some 66%, will be concrete and aggregate and at the moment, only 15% of this waste is picked up by contracted waste management companies. The rest, as much as 85%, is left uncollected (The Star Online, 2015). They may lack of understanding, realization, attention, responsibility and want to generate more income. In addition, the enormous, massive of construction waste is allowed by contractor to happen. The data about construction waste is very limited due to lacking research about this issue.

Every year there are many construction is ongoing in Malaysia, but attitude and behaviour of contractor in managing waste management in construction is not satisfied yet. There are many open burning and dumping in an open area which the contractor use as their dumping site. Actually, the cost of waste is a cost that client need to bear. That is why attitude and behaviour of contractor in managing waste construction is very important in order to develop productivity and performance of construction industry. This study shown how attitude and behaviour of contractor in managing waste construction.

1.2 Problem Statement

According to Malaysian Construction Industry Master Plan 2005-2015 stated that it was compulsory for changes in construction industry market. It is important to achieve

long term sustainability in industry. Financial affordability is the main part in construction industry especially towards clients, stakeholders in order provide long life term of a company. So, it is important for the company to identify attitude and behaviour of contractor in managing waste management in construction in order to overcome construction waste issues for beneficial financial of a company.

Nowadays, massive amounts of population growth have led to an increase in solid wastes in most developing countries. The wastes produced from a variety of human activities includes industrial and domestic. This situation can give negative impacts toward our health, environment and ecosystem. A parcel of land may the proper way for local councils to be provided to contractors since they are lazy to dump their construction waste legally (The Star Online, 2016). The explanation above is obvious that long term unpleasant environmental have social impacts toward nearby neighbourhood and environment. This situation would result a bit of cost in clearing construction waste especially when involve air pollution due to sand and lorry exhaust around the construction site.

Majority of contractors would blame others and did not take this problem as a serious issue. The main priority for contractor is timing, so they did not spend time to manage construction waste at their site. They just think about their completing of project rather than environment and health people around. So, attitude and behaviour of contractor in managing waste management in construction is need to be discuss in order to reduce construction waste issues in Malaysia.

1.3 Research Objective

The objectives of this research are:

1. To study attitude and behavior of contractor in managing construction waste.
2. To obtain the effect of contractor's attitude and behavior in managing construction waste.
3. To analyze the solution to minimize construction waste.

REFERENCES

- Nur Haziqah A Malek. (2018). CIDB confident IBS to be made mandatory by 2020. *The Malaysian Reserve*.
- Abdullah, M. R., & Egbu, C. O. (2009). Industrialised building system in Malaysia: Issues for research in a changing financial and property market. *In Proceedings of the BUHU 9th International Post Graduate Research Conference*, 15-25.
- Afiq Aziz. (2018). Malaysia lags 20 years behind on adopting IBS. *The Malaysian Reserve*.
- Ahmad Firman Masudi^{1*}, C. R. (2011). Construction Waste Quantification and Benchmarking: A Study in Klang Valley, Malaysia. *Journal Of Chemistry And Chemical Engineering*, 909-916.
- Akhir, N. S. (2015). Risk Level OF Factors Causing Construction Waste Generation Throught Construction Project Life Cycle. *Universiti Tun Hussein Onn Malaysia*, 10.
- al, L S Ng et. (2017). Current practices of construction waste reduction through 3R practice among contractors in Malaysia: Case study in Penang. *IOP Conf. Ser.: Mater. Sci. Eng.*, 271.
- al, L. S. (2017). Current practices of construction waste reduction through 3R practice among contractors in malaysia: Case study in penang. *IOP Conf. Series: Materials Science and Engineering*, 271.
- Al-Hajj, A., & Hamani, K. (2011). Material wastes in the UAE construction industry : Main causes and minimisation practices. *Architectural Engineering and Design Management*, 221–235.
- Assem Al-Hajj, Karima Hamani. (2011). Material Waste in the UAE Construction Industry: Main Causes and Minimization Practices. *Architectural Engineering and Design Management*, 221-235.

- Begum, R. &. (2009). Attitude and Behavioral Factors in Waste Management in the Construction Industry of Malaysia. *Resources, Conservation and Recycling*, 321-328.
- Chuen, K. P. (2011). A choice experiment analysis for solid waste disposal option: A case study in Malaysia. *Environmental Management*, 2993-3001.
- Daily, T. S. (2 August, 2017). *thesundaily*. Retrieved from thesundaily.my: <http://www.thesundaily.my/news/2017/08/02/dengue-fever-most-prevalent-infectious-disease-malaysia>
- Digest, M. (25 May, 2017). *Malaysian Digest*. Retrieved from malaysiandigest.com: <http://malaysiandigest.com/news/613026-43-rivers-in-malaysia-polluted-says-minister.html>
- Enshassi, A., Mohamed, S. and Abushaban, S. (2009). Factors affecting the performance of construction projects in the Gaza strip. *Journal of Civil Engineering and Management*, 269 - 280 .
- Esin, T. &. (2007). A study conducted to reduce construction waste generation in Turkey. *Building and Environment*,, 1667-1674.
- Fishbein, B. (2008). Strategies to Reduce Construction and Demolition Waste in Municipal. *Building for The Future*.
- Franchetti. (2009). Solid Waste Analysis and Minimization. *A Systems Approach (USA:McGraw-Hill)*.
- Hassan, S. H., Ahzahar, N., Fauzi, M. A., & Eman, J. (2012). Waste Management Issues in the Northern Region of Malaysia. *Procedia - Social and Behavioral Sciences*, 175-181.
- John Saunders, P. W. (2004). Attitudes towards waste minimisation amongst labour only sub-contractors. *Emerald Insight*, 148-155,.
- Jun Huang, P. W. (2013). Effects of rainfall intensity, underlying surface and slope gradient on soil infiltration under simulated rainfall experiments. *Catena*, 93–102.

- Kolbæk, Ditte. (2014). A Seven-Year Study Of Proactive Review As An Education Design For Learning From Experience In A Global, High-Tech Company Classified As Big Business. *Learning from experience in the context of work* , 61-78.
- Lu, W. Y. (2011). An empirical investigation of construction and demolition waste generation rates in Shenzhen city, South China. *Waste Management*,, 680–687.
- Lu, W., & Tam, V. W. Y. (2013). Construction wastes management policies and their effectiveness in Hong Kong : A longitudinal review. *Renewable and Sustainable Energy Reviews*, 214–223.
- Majed I Al-Sari, I. A.-K.-K. (2011). A Study on The Attitudes and Behavioural Influence of Construction Waste Management in Occupied Palestinian Territory. *Waste Management & Research*, 122-136.
- Mohamed Marzouk, S. A. (2014). Environmental and Economic Impact Assessment of Construction and Demolition Waste Disposal Using System Dynamics. *Resources, Conservation and Recycling*, 41– 49.
- Nagapan, S. R. (2013). Study of site's construction wastes in Batu Pahat, Johor. *Malaysian Technical Universities Conference on Engineering & Technology*, 99–103.
- (2017). *Productivity Report 2016/2017*. Petaling Jaya, Selangor.: Minister of International Trade and Industry.
- R.A Begum, C. S. (2004). A case study in Malaysia. Proceedings of the Nineteenth International Conference on Solid Waste Technology and Management, Philadelphia, USA,. *Recycling and Reuse of Construction*, 593-599.
- Riddell, T. (8 December, 2016). *Esub Construction Software*. Retrieved from esub.com: <https://esub.com/top-issues-facing-the-construction-industry-2017/>
- Rotter S, Wei Z. (2008). The current situation of construction & demolition waste management in China. *a Proc. of the 2nd Int. Conf. on Bioinformatics and Biomedical Engineering (IEEE)*, 4747- 4750.

- Shant A. Dajadian1, *. D. (2014). Waste Management Models and Their Applications on Construction Sites. *International Journal of Construction Engineering and Management*, 91-98.
- Spies S. (24 November, 2011). 3R in Construction and Demolition Waste (CDW)—potentials and constraints. *GTZ—German Technical Cooperation, Inaugural Meeting of the Regional 3R Forum in Asia, Tokyo, Japan*.
- Tam, V. S. (2007). Controlling construction waste by implementing governmental ordinances in Hong Kong. *Construction innovation: information, process, and management*, 149-166.
- The Star. (2011). An Irresponsible Act: Tropical Mangrove Swamp has Become a Construction Dumpsite. (R. Murali, Ed.) *The Star*, 3.
- The Star Online. (2014). Dispose of Waste at Appointed Sites. *The Star Online*.
- The Star Online*. (Friday November, 2015). Retrieved from thestar.com:
<https://www.thestar.com.my/metro/community/2015/11/20/aiming-for-zero-construction-waste-by-2030-seminar-looks-at-adopting-sustainable-practices-in-a-bid/>
- The Star Online*. (Wednesday July, 2016). Retrieved from thestar.com:
<https://www.thestar.com.my/metro/focus/2016/07/20/state-govt-taking-steps-to-improve-waste-management/>
- Wang, J. a. (2010). “Factors affecting contractors’ risk attitudes: case study from China”. *International Journal of Project Management*, 209-19.
- Winkler, J. &. (2007). Comparative evaluation of life cycle assessment models for solid waste management. *Waste management*, 27, 1021-1031.
- Yahaya, N. a. (2008). Federalising Solid Waste Management in Peninsular Malaysia. *Proceeding of International Solid Waste Association (ISWA) World Congress, Singapore*.