

Government Initiatives Pertaining to Construction Waste Minimization in Malaysia

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Abstract—Construction industry is one of the main contributors to waste streams in Malaysia. Construction activities caused a significant amount of construction waste increased since over the last two decades. Despite of being a waste contributor, construction waste has also been result into serious environmental issues in Malaysia. There are some actions been taken by the government but the results have not been translated in the form of strong legal instruments and enforcement. Therefore, it is important for government to address this issue by providing the legal instrument pertaining to construction waste minimization. This research has been conducted to proposed framework of implementation government initiative on construction waste minimization in Malaysia. Hence, this paper present the existing initiative by the government pertaining to construction waste minimization in Malaysian construction industry. Mixed methods of qualitative and quantitative research design by way of semi-structured interviews and supported by distribution of questionnaire for validation stage have been adopted in this research for proposing the framework of implementation government initiative on construction waste minimization in Malaysia. Results indicate that the Solid Waste and Public Cleansing Management Corporation and Construction Industry Development Board responsible to provide guidelines pertaining to construction waste minimization in Malaysia. The findings maybe used in the formulation of government initiative in addressing the construction waste minimization problem in Malaysia and indirectly improving the quality of construction waste management in Malaysia.

Keywords—Government initiative, construction industry, construction waste, waste minimization, Malaysia

I. INTRODUCTION

Construction industry is one of the industries benefiting to the country in term of economy and providing infrastructure. However, this thriving industry is responsible for one of the single largest waste streams in the country. Hence, the effectiveness of environmental management is very important in construction industry [1]. Construction waste management is one of the sustainable development approaches to minimize waste and avoid negative impacts to the environment. Management of waste includes monitoring, collection, transport, processing and waste disposal. In order to improve the quality of life, the effectiveness of waste management is needed [2]. [3] points out that the government responsible to improve the implementation of waste management in construction industry in term of regulation, policy, technology and guideline. Existing initiatives by the government in minimizing construction waste in Malaysia will be prioritized in this research in order to show the magnitude of the problems encountered. Thus, the purpose of this paper is to represents the existing initiative by the government pertaining to construction waste

minimization in Malaysian construction industry.

II. INSUFFICIENT OF EXISTING POLICY AND GUIDELINES ON CONSTRUCTION WASTE MANAGEMENT

It is common that the construction waste goes into landfill. In accordance with the waste issues, many countries have chosen to start recycling construction materials due to advantages in protecting the environment and conserving the natural resources [4]. The existing body of literature could be explored to identify the successful implementation of construction waste minimization initiatives formulated by the developed countries. Meaning we should learn, adopt and modify from more successful regimes. Furthermore, [4] has emphasize that many countries are also considered on the suitable site for construction waste location and equipment used; waste recycling operations; and also environment and safety regulations to protect environment. This statement is supported by a Ministry of Federal Territories and Urban Wellbeing under the purview of Entry Project Point (EPP) who has initiated EPP9 to Developing an Efficient Solid Waste Management Ecosystem. Practicing waste minimization by industries is not very common and just a few number of industries apply waste minimization [5]. The existing regulations and policies in Malaysia are more focused on household, municipal and hazardous industrial waste. Consequently, the others sectors seem to not follow the existing regulation because it is not mandatory to follow and not fully enforced in their sector. Other than that, the existing policies seem not clear in term of construction waste minimization.

The Malaysian government has taken serious initiatives in reducing waste on site because of waste issues. Thus, the government has regulated the usage of Industrialized Building System (IBS) as construction method to reduce the waste and apply sustainable development through the Construction Industry Master Plan (CIMP) 2006-2015 [6]. In 2008, Solid Waste Management in Malaysia had launched the Action Plan for Clean and Beautiful Malaysia and National Solid Waste Management Policy. However, empirical evidences shown by Alam Flora Sdn. Bhd only 76% is solid waste collection, 5% is recycle process and 95% of waste collected being disposed at 112 landfills in Malaysia. Furthermore, 25,600 tonnes of waste generated from multiple sources including construction waste on daily basis in Malaysia [7]. There are some actions been taken by the Construction Industry Development Board (CIDB) for example as the Guidelines on Construction Waste Management, even so, the results have not been translated in

the form of legal instruments and enforcement. Consequently, Malaysian contractors seem to apply their own policies and guideline pertaining to construction waste minimization which clearly does not reflect to existing policies implemented by the government [7]. The author also added that construction waste management remains poorly implemented in construction projects in Malaysia.

According to [8] Site Waste Management Plan (SWMP) by CIDB seems like not being enforced and still new in Malaysia. An unsuccessful practice in minimizing construction waste is caused by lack of implementation by the government. In addition, the aspects in Solid Waste Management Policy in Malaysia seem quite general which not specified the classification of waste such as construction waste. Thus, the questions need to be addressed are; what are the existing initiatives implemented by Malaysia government pertaining to construction waste minimization; what are the issues related to the existing initiatives pertaining to construction waste minimization in Malaysia and why the issues existed? Hence, this research conducted to identify the existing initiatives by government pertaining to construction waste minimization.

III. RESEARCH AIM, OBJECTIVES AND RESEARCH QUESTIONS

The aim of this research is to proposed framework of implementation government initiative on construction waste minimization in Malaysia. The objective of this paper that has been formulated underpinned by the stated aim is to identify the existing initiatives implemented by Malaysian government pertaining to construction waste minimization. The following research questions have been formulated as a result from the current scenario on construction waste minimization in order to gauge the research endeavor:

1. RQ 1.1: What are the existing initiatives implemented by Malaysian government pertaining to construction waste minimization?
2. RQ 1.2: What are the issues related to the existing initiatives pertaining to construction waste minimization in Malaysia and why the issues existed?

IV. PREVIOUS STUDIES RELATED TO THE RESEARCH

Various researches have been conducted on similar research pertaining to construction waste minimization. The number of similar research seems to show the sustainable and green environment are gaining worldwide concerns. Almost similar researches have been conducted but different in terms of area concerns. Hence, this research will be carried out to fill in the gap between the previous researches. Table 1 shows the previous studies have been conducted on construction waste minimization in Malaysia.

Citation	Previous studies	Gaps
[7]	Barriers to Practice of Non-Hazardous Solid Waste Minimization by Industries in Malaysia	This research was concerned on the barriers of waste minimization practices in Malaysian industries.

[9]	The Construction Solid Waste Minimization Practices among Malaysian Contractors	The author only focusses on the type of construction solid waste produces and discussed the waste minimization practice by the contractors at construction sites
[10]	The Quantification of Local Construction Waste for the Current Construction Waste Management Practices: A Case Study in Klang Valley	This research only focuses on the classification of construction waste generated at sites.
[11]	Urban Solid Waste Minimization in Malaysia - The case of Shah Alam City Hall, Selangor.	Focusses on the awareness and level of involvement in waste minimization.
[12]	Initial Findings on Perspectives of Local Contractors on Waste Minimization Barriers and Incentives on Construction Sites	Concerns on factors influencing waste minimization barriers and incentives on construction site in Kuching, Sarawak.
[13]	Identifying Causes of Construction Waste - Case of Central Region of Peninsula Malaysia	This research focuses on factors causing construction waste in Malaysia.
[14]	Municipal Solid Waste Management in Malaysia: Current Practices, Challenges and Prospect	This research only concerns on current practice and challenges municipal solid waste management in Malaysia.
[15]	Waste Minimisation as Sustainable Waste Management Strategy for Malaysian Industries	This research only review on waste minimization strategies and guidelines in UK and Thailand
[16]	Sustainable construction waste management in malaysia: a contractor's perspective	This research focusses on the current status of waste management practices in the Malaysian construction sector

Table I

V. LITERATURE REVIEW

Waste minimization is important in construction industry to protect the environment. Waste minimization is one of the waste management approaches being applied in construction project to reduce the amount of waste generated. On the other hand, there are several authors have discuss and produced their own definition of waste minimization. According to [17] waste minimization is defined as the reduction of waste during process of products. In addition, it is also called as production material which is environmental friendly. Generally, there are three methods to minimize waste according to USA's Environmental Protection Agency's (EPA) which are reduction, recycling and

treatment. Moreover, [9] states that there are three main practices in minimizing waste during construction activities which are; avoiding waste, reuse materials and recycling waste.

According to [18] waste minimization is often not to be considered in early stage of construction project. Nevertheless, in the hierarchy of waste management, waste minimization is one of the highest levels which are important to achieve the sustainable development. Importantly, it is a ways to reduce waste at source and in order to achieve the waste hierarchy towards 2020 at its objective. The hierarchy of waste in Malaysia is reduce, reuse, recycle, treatment and dispose to minimize the waste generated. Target of Malaysian for recycling is 22% out of waste generated by the year 2020 [11]. Implementation of good practices in management of construction waste contributes to sustainable development and helps to minimize waste in construction site otherwise it will be sent to landfill [19].

VI. RESEARCH METHODOLOGY

Well planned research methodology is a guide to achieving the aim and objectives of research. Qualitative research have been adopted in this research. The methodology divided into two correlative stages which are theoretical framework and qualitative research. For this paper, a body of knowledge on existing initiatives by government pertaining to construction waste minimization has been explored by way of semi-structured interview question. Theoretical framework on the factors contributes to waste minimization problem in construction projects investigated and identified. The purposes of this exercise are to address research question 1.1 and 1.2 underpinned by objective of this paper as mentioned before. Interview protocol has been prepared to ensure reliability and validity of qualitative data. Samples selected based on related agencies in construction waste minimization. Selection of local authorities, Construction Industry Development Board (CIDB) and contractors G7 within Selangor and comparative study has been made based on the interview beforehand.

VII. SCOPE AND LIMITATION

The scope of research is one of the first sections which set out what, why, where, who and how the research is going on. This research focused on existing initiatives by government in minimizing construction waste in Malaysia. The current problem in implementing existing initiatives on construction waste minimization has been identified. Other than that, the gaps in the existing policies and current practices among government and contractor in Malaysia has been carried out to investigate the reason of gaps emerged and ways to minimize these gaps. Since the research will be involved construction industry, the main target group are Construction Industry Development Board (CIDB), Solid Waste and Public Cleansing Management Corporation and local authority within the Selangor (Petaling Jaya, Shah Alam, Ampang Jaya, Kajang, Klang, Selayang, Sepang and Subang Jaya) which are among the important agencies pertaining to construction waste minimization in Malaysia to find out the

details on this issues. The limitation of this study is limited to the main entities or individuals that play a significant role in the construction waste minimization in Malaysia.

VIII. SIGNIFICANCE OF RESEARCH

The significance of this research is to highlights Malaysian government strategies in the implementation of policies on construction waste minimization in Malaysia; from there, framework of implementation government initiative on construction waste minimization will be proposed. This research will not only benefit to the government, but also to the others as follows:

1. Theory/knowledge
 - i. This research will add in to the existing body of knowledge on construction waste minimization issues and policies.
 - ii. The findings are expected to be the cornerstone for more active development of sustainable construction towards sustainable development. The construction waste minimization issues are one of the primary concerns in sustainable construction, thus it is comprehend to sustainable development.
 - iii. There is a gap in terms of what has been planned and implementation actions in particular construction waste. Generally, construction waste minimization issues in construction industry have not been seriously addressed, thus more empirical evidence and research is required to provide information on the current scenario and actions should be taken.

It can be anticipated that this research will generate interests from sustainable development researchers and related agencies, as it will provide fundamental elements towards more rigor construction waste minimization.

2. Benefits in the future
 - i. This research provides stakeholders in construction industry with background information on construction waste minimization towards sustainable development. It is expected to provide preliminary findings for potential solution for construction waste minimization problems surrounding construction industry ever since.
 - ii. The findings should provide intangible, potential functional solutions for implementing effective minimization of waste in construction industry. Thus, in long term it should offer an economic advantage to the construction organizations by maximizing their resources and protecting the future of the company.
 - iii. The adoption of effective implementation construction waste minimization will give raise to sustainable construction practices in which will offer environmental protections as well economic advantages for consumers and

communities offering substantial savings in construction costs.

This research is expected to emphasize the importance of implementation of efficient construction waste minimization towards sustainable development/construction in order to sustain ecological system and enhance the social well being of all Malaysian citizens and future generations.

IX. RESULTS AND DISCUSSION

Respondents	Description	Number of respondents
Construction Industry Development Board	Manager/Assistant Manager	2
Solid Waste and Public Cleansing Management Corporation	Chief Assistant Director/Engineer/Manager	3
Local Authorities (Petaling Jaya, Shah	Architect/Environmental Officer/Officer	8

Alam, Ampang Jaya, Kajang, Klang, Selayang, Sepang and Subang Jaya)		
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Table II

Thirteen respondents has been interviewed in this research. Working experience of respondent selected is at least 5 years or more. Two respondents that had been involved with the semi-structured interviews are highly experienced in Construction Industry Development Board. On the other hand, three of the respondents are from Solid Waste and Public Cleansing Management Corporation and the others are from local authority within Selangor (Petaling Jaya, Shah Alam, Ampang Jaya, Kajang, Klang, Selayang, Sepang and Subang Jaya) which are represented by eight respondents.



Fig. 1

Timeline of solid waste management transition in Malaysia is showed in Figure 1. Results showed that the government of Malaysia has implementing the waste minimization, reuse and recycling in 8th Malaysia Plan (2001-2005) as its main policy goals. Furthermore, in 9th Malaysia Plan (2006-2010), the plan has been modified in order to achieve sustainable waste management to reduce, reuse, recovery and recycling of waste. In 2011, the government of Malaysia has introduced the Solid Waste and Public Cleansing Management Act 2007 (Act 672) to address the waste issue. Two new federal institution has been established which are National Solid Waste Management Department and Solid Waste Management and Public Cleansing Corporation to implementing the solid waste management policies. However, Solid Waste and Public Cleansing Management Act 2007 (Act 672) were enacted only throughout peninsular Malaysia except (Perak, Selangor and Pulau Pinang) and the Federal Territories of Kuala Lumpur and Putrajaya. Unfortunately, in 2007 only 76% of solid wastes are successful collected in Malaysia, 5% is recycled and 95% of collected wastes disposed at 112 landfills. It is clear to see that current practices do not reflect to waste management policy in Malaysia.

Other than that, the existing regulation and policies in Malaysia are more focus on household, municipal and hazardous industrial waste. Consequently, the others sectors decide to not follow the existing regulation because it is not mandatory to follow and not fully enforced in their sector especially the construction industry. According to Respondent 3, the existing policy has not yet been implemented directly in the Malaysian construction industry but it has been implemented in others industry.

“...existing landfill site in Malaysia is for domestic and schedule wastes only...we don’t have in term of construction waste” (Respondent 3).

Furthermore, Respondent 4 has added that;

“...we have built facility for recycling construction material in Sungai Kertas, Gombak on April 2014...but only used for Kuala Lumpur area... actually Sungai Kertas is only for construction waste disposal, our recycling machine park near there...but the problem now is delivery issue due to distance factor from construction site which involve high cost...so far, this method unsuccessful

because of contractor don't want to follow... ” (Respondent 4).

Factors that contribute to disconnect between existing policy and current practices are insufficient of implementation, weak enforcement and uncertainty over roles and responsibilities amongst governing authorities. Other than that, Construction Industry Master Plan (2006-2015) also has been introduced to improve the performance of construction industry. Strategic Thrust No. 3 strives for the highest standard of quality, occupational safety and health, and environmental practices. One of the major concerns related to the environmental is the production of construction and demolition wastes. In order to improve the current practices in the construction industry, CIDB has been prepared the Guidelines on Construction Waste Management to assist the stakeholders in construction industry in order to manage wastes on site.

According to Respondent 1, in order to improve the current practices in the construction industry, CIDB have prepared the Guidelines on Construction Waste Management in 2008 to assist the stakeholders in construction industry in order to manage wastes on site;

“...for the mean time, there is no any initiative regarding to construction waste management except Guidelines on Construction Waste Management that have been introduced in 2008...but the guideline is not being implemented because there is lack of enforcement...the implementation of guideline is depend on contractor whether they want to follow or not...the guidelines have not been successful implemented because this guideline existed due to public pressure for contractors” (Respondent 1).

However, the weaknesses of this guideline is not being enforced and translated in the form of strong legal instruments. Hence, Malaysian contractor decided to adopt their own company initiatives for construction waste minimization during construction activities which clearly does not reflect to existing policies implemented by the government. Even though the CIDB has tried to assist stakeholders in minimizing construction wastes and moving towards sustainable construction practices through this guideline, it is seem to be less efficient because there is lack of enforcement.

As a result, since the practices among the contractor and the initiatives by government in Malaysia still low compare than others developed countries such as Japan, Hong Kong, Singapore and United Kingdom, this research is attempts to propose a framework of implementation government initiative on construction waste minimization Therefore, the proposed framework will be highlighting new strategies in implementing government initiatives that can be used in legal instrument and enforcement in order to capture the successful of government initiative in minimizing construction waste. The research output is expected to add in to the existing body of knowledge on the theoretical mechanism to reduce adverse environmental impacts by way of effectiveness government

initiatives in minimizing construction waste.

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