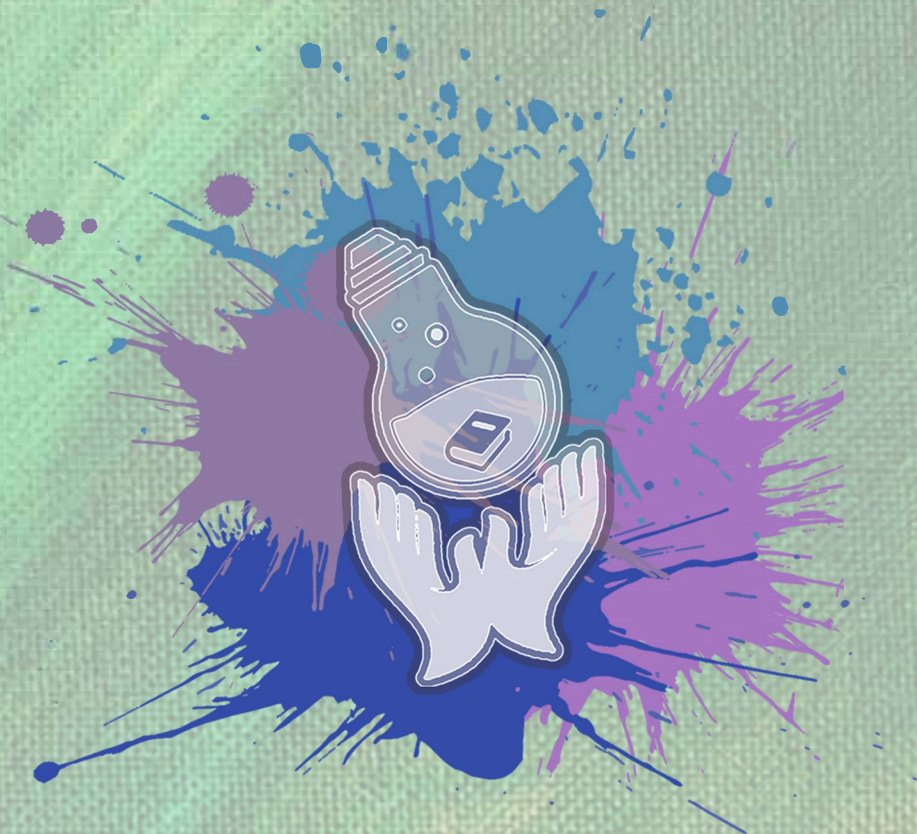




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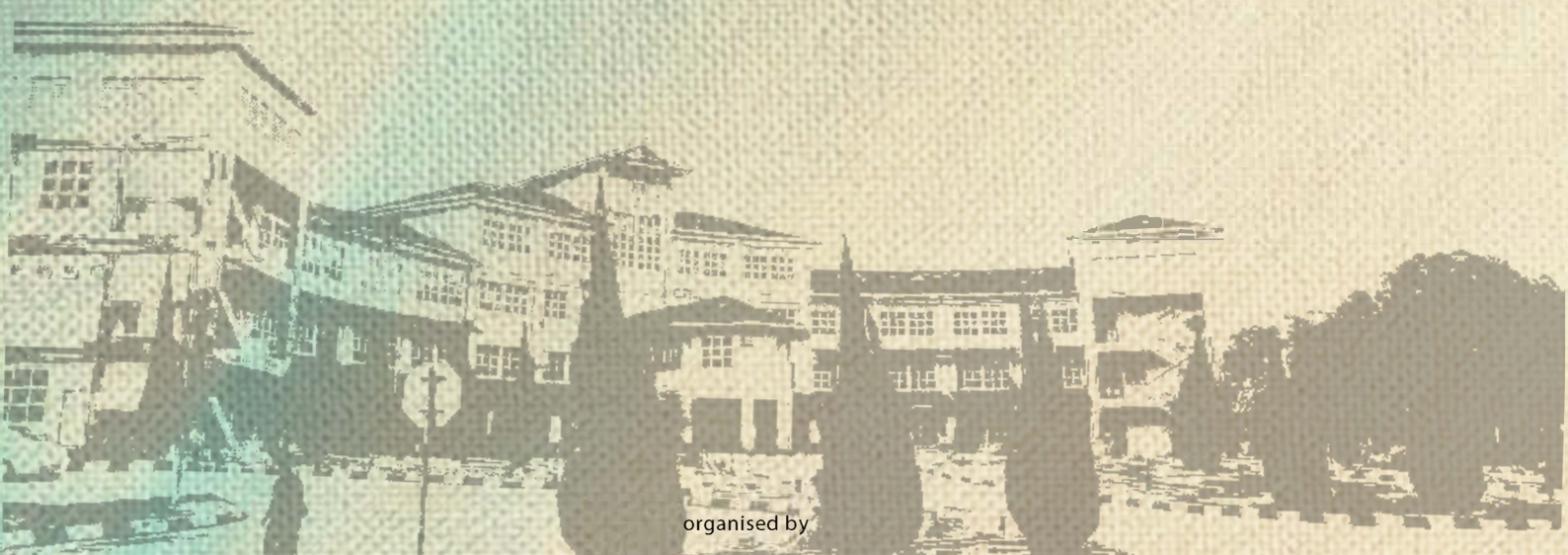


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CONTRACTORS' PERSPECTIVE ON CONSTRUCTION WASTE MINIMISATION : STRATEGIES AND BARRIERS

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Abstract:

Higher demand in construction sectors in Malaysia has contributed the increasing of construction material waste which causes environmental concerns by bringing them for final disposal in landfills. The limited numbers of landfill to handle the increased generated waste by construction parties increase illegal dumping sites. Practicing waste minimization is the most desirable method in waste management hierarchy that can be useful in reducing the possibility of removal of waste from landfill. Thus, the aim of this research is to assess contractors' perspectives towards waste minimization by the extent to which waste minimization strategies are adopted and the barriers faced in minimizing construction waste. A total of 115 Questionnaires were distributed to building contractors in Kelantan and 46 completed questionnaires were analyzed using the Statistical Package for Social Science (SPSS). The result indicated that 'Monitoring laborer's attitudes, 'Ensuring the compliance of the waste management plan' and 'site management' are perceived as the three most important strategies adopted by contractor. Furthermore, lack of financial incentives become the most important barriers faced by contractor in minimizing construction waste. From this study, useful information concerning strategies and barrier to waste minimization from the perspectives of contractor are obtained.

Keywords:

Construction waste minimization; Strategies; Barriers; Contractors;

1.0 INTRODUCTION

Rapid growth in construction industry due to increase in standard of living will contribute construction waste which can also increase project cost and add to environmental pollution. Data from Solid Waste and Public Cleansing Management Corporation of Malaysia confirms that approximately 8 million tonnes of construction wastes per year generated from construction projects (Taha,2015). Another issue to be addressed is most of the construction project stakeholders especially contractors seem to pay less attention to construction waste minimization. The attitudes of the contractor heavily affecting the behavior regarding construction waste management and minimization, where most of the contractors in Malaysia partially or never implemented the construction waste management and minimization on their construction site. Thus, this research undertaken to assess the contractors' perspectives on waste minimization strategies adopted and barriers faced in minimizing construction waste.

2.0 LITERATURE REVIEW

2.1 Construction Waste Minimization Strategies

Waste minimization is defined as the reduction of waste from the beginning of a construction project by reviewing the sources and causes and using the best management practices to reduce its generation. Apart from waste landfill, which has been widely discouraged as a waste minimization strategy, several strategies are being employed towards diverting waste from landfill. One of the strategies that find repeated mention in the literature is the strategy often referred to as 3Rs reduce, reuse, recycle. Finding from previous studies indicates that implementation of different waste minimization strategies in an effort to reduce waste generation as the following:

1. Monitoring Labourer's Attitudes (Ling and Song Anh,2013)
2. Site management (Arif et al., 2012)

3. Ensuring the compliance of the waste management plan, (Arif et al., 2012), (Gangoellis et al.,2014)
4. Just in time delivery, (Umar et al., (2016)
5. Collaboration and communication among project team members, (Gangoellis et al., 2014)
6. On-site sorting technique of wastes. (Gangoellis et al.,2014)
7. A written contract among sub-contractors stating their obligation in adhering to the on-site waste management plan (Ling and Song Anh,2013)
8. Site assessment and supervising the material waste (Umar et al., 2016)
9. Adequate and secured storage of materials (Umar et al., 2016)
10. Implementation of training programmes (Mahayuddin et al.,2008)
11. Promoting good practices in construction waste management. (Mahayuddin et al., 2008)

2.1 Barriers in Minimizing Construction Waste

The literature identified a variety of constraining factors that impede the construction industry to adopt a waste minimization practice. Guerrero et al. (2017) discovered extra barriers to those already reported in existing literature which are ‘first priority is financial profit and not environmental issues’, ‘emphasis on investment cost, not on low cost on long term’, ‘lack of time to develop plans for waste reduction’, ‘a belief that waste reduction efforts will never be sufficient to completely eliminate waste’, ‘deficiency of environmental regulations’, and ‘lack of available information regarding the requirements of environmental norms’. In addition, Crawford et al., (2017) stated that the most recurring barriers to minimize construction waste depend to the costs and time with sorting and recycling waste, lack of incentives, industry culture and lack of education.

3.0 METHODOLOGY

Questionnaires were distributed to G7 contractor in Kelantan. The list of contractors was obtained from the Construction Industry Board (CIDB) directory. The questionnaires were divided into three sections. There are section A (Demographic), Section B (Construction Waste Minimization Strategies) and Section C (Barriers in Minimizing Construction Waste). The data were analyzed using Statistical Package for Social Science (SPSS) Version 25.0 and presented in table and graph.

4.0 ANALYSIS AND FINDINGS

Only 40% of the questionnaires were analyzed. A total of 63.3% of the respondents were male and 30.6% respondents were female. 40% of the respondents with less than 5 years experiences, 24% with 6 – 10 years and 28.6% was above 10 years. Majority 49% of respondents has bachelor’s degree and 36.7 % of respondents age above 35 years old.

4.1 Construction Waste Minimizing Strategies

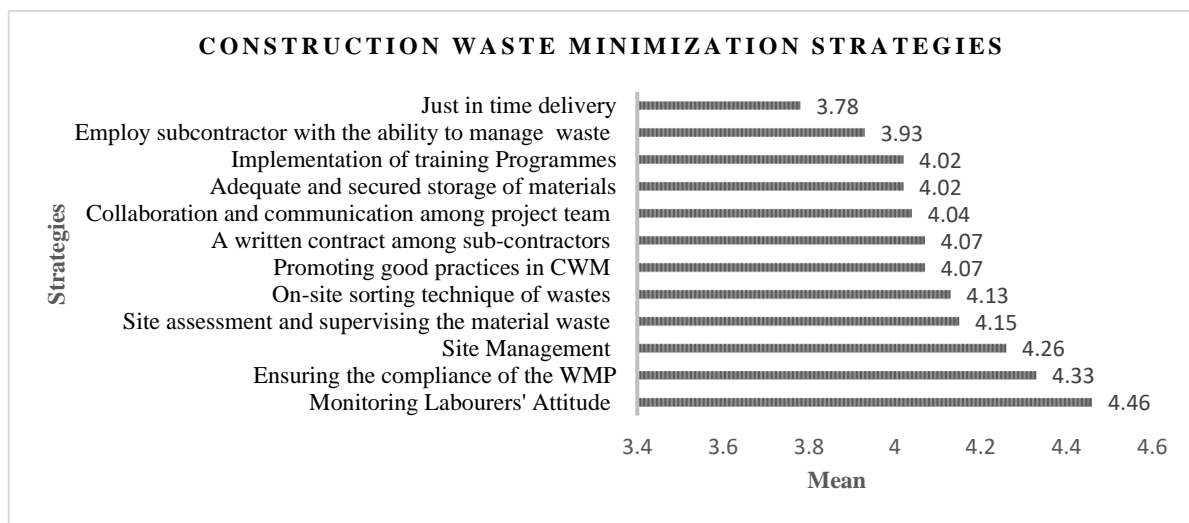


Figure 1: Construction Waste Minimization Strategies

Figure 1 depicts waste minimization strategies which were considered best in minimizing wastage during construction stages. The result shows that most of contractor agreed that “Monitoring laborer’s attitudes” was the most effective strategy to minimize construction waste with mean score 4.46 followed with ‘ensuring the compliance of the waste management plan’ and ‘site management’ in the second and third rank respectively. The attitude of labour are important issue that need to be consider due to they occupy a critical position in the construction waste production and their have a direct and generally immediate impact upon its efficiency. The least of three strategies which lowest rating but it still considered important strategies identified by the respondents include: ‘Implementation of training programs’, ‘employ subcontractor with the ability to manage the waste efficiently’ and ‘just in time delivery’. This result differs from Ikau et al., (2013) that indicated implementing of training as the most important waste minimization strategies to be adopt in construction site.

4.2 Barriers in Minimizing Construction Waste

Table 1: Barriers in minimizing construction waste

Barriers	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average Index	Rank
Lack of financial incentive	-	1	5	18	22	4.33	1
First priority is financial profit and not environmental issues	-	1	6	17	22	4.3	2
Lack of awareness of environmental implications of waste disposal and adoption waste minimization	-	1	5	25	15	4.17	3
Higher project costs	-	1	6	25	14	4.13	4
Lack of enforcement of construction and waste management policies and plans	-	1	6	26	13	4.11	5

Table 1 show that the top five of barriers in minimizing construction waste. The higher Average index for waste minimizing barriers is 4.33 i.e. lack of financial incentive. This finding is supported by Crawford et al., (2017) mentioned that any best practices in minimize of waste can be carried out in case there is a clear financial incentive to do so. More specified, informants established a clear hierarchy of incentives by ranking financial and environment barriers as the two key aspect that could drive waste minimization. This result supported by Osmani and Villoria-Saez (2019) concluded that “financial rewards” and “legislation” seem to be the main incentives that could drive waste minimization in the construction industry. So, it could be concluded that the contractor’s attitudes and behaviors in improving waste minimization practices are depends on financial returns and financial incentives.

5.0 CONCLUSION

In conclusion, a better understanding of the waste minimization strategies and barriers in minimize construction waste is obtained. The result indicated that the attitude of labour will influenced the generation of waste on site and the contractor should play a more proactive role in monitoring labour in minimize waste. On the other hand, the most important waste minimization barrier received by respondent was related with financial aspect. This research will be able to increase the awareness of the construction parties to adopt sustainable waste minimization strategies in minimizing waste.

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