



**6th UNDERGRADUATE
SEMINAR ON BUILT
ENVIRONMENT
AND TECHNOLOGY
(USBET) 2023**

**SUSTAINABLE BUILT
ENVIRONMENT**

25 - 27 SEPTEMBER 2023

E-PROCEEDING



USBET 2023



e-Proceeding

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Published by,

Department Of Built Environment Studies And Technology
Faculty Of Architecture, Planning & Surveying
Universiti Teknologi MARA Perak Branch, Seri Iskandar Campus
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Universiti Teknologi MARA Perak Branch, Seri Iskandar Campus

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eISSN 2821-3076



02 October 2023 | Perak, Malaysia
Universiti Teknologi MARA, Perak Branch, Seri Iskandar Campus

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SUSTAINABLE CONSTRUCTION DEBRIS MANAGEMENT IN BINA DARULAMAN BERHAD (BDB)

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ABSTRACT

The study focuses on sustainable construction debris management and explores its current state through a quest survey distributed to key stakeholders in the Bina Darulaman Berhad (BDB). To achieve sustainable debris management, the study advocates for education, stricter regulations, recycling, and promoting circular economy principles, emphasizing the need for collaboration among stakeholders. Overall, the research provides valuable insights to guide policymakers, industry stakeholders, and environmental advocates towards a greener and more resilient construction sector. A structured questionnaire was designed to collect primary data from key stakeholders, including construction companies, waste management agencies, local authorities, and environmental experts. The survey aimed to assess existing debris management practices, challenges faced, and the implementation of sustainable strategies. The collected data underwent rigorous analysis using statistical tools and qualitative techniques. The research delved into understanding prevalent disposal methods, recycling rates, and the level of awareness regarding sustainable debris management practices. Moreover, the study investigated the effectiveness of regulations and policies in promoting responsible waste management.

Keywords: *Sustainable Construction Debris Management*

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INTRODUCTION

The construction sector plays a crucial role in the socioeconomic growth of every nation, driven by increasing living standards, infrastructure needs, changing consumer patterns, and population growth. However, this rapid expansion has led to a significant increase in waste generation, becoming a major global concern. Solid waste management is particularly challenging in Southeast Asia, where countries have the highest per capita garbage creation globally. Malaysia, in particular, faces a growing waste problem due to industrial and construction expansions, urbanization, lifestyle changes, and unsustainable consumption.

Construction waste can be categorized as physical waste and non-physical waste. Physical waste mainly results from material losses and contributes significantly to landfill volumes. Studies indicate that over 50% of construction waste is disposed of in landfills. After demolishing old structures, large amounts of construction debris are discarded as demolition rubbish, including concrete considered useless. However, much of this waste is inert and can potentially be repurposed for building materials, offering a sustainable solution to waste disposal. Common components of construction debris include reclaimed asphalt, soil, wood, metal, cardboard, gypsum, and concrete. The recycling and reuse of concrete waste, which makes up the majority of construction and demolition waste, present opportunities to address waste disposal challenges while conserving natural resources.

LITERATURE REVIEW

The global problem of construction waste requires a real solution, and adopting sustainable building principles is an effective strategy to address environmental, economic, and social concerns. Embracing sustainable waste management is crucial to ensure overall sustainability in construction practices.

In Malaysia, prefabrication has been utilized to reduce waste during the design process, but waste avoidance requires careful coordination among all parties involved in construction. Building strong relationships and open communication with clients, consultants, and contractors is essential to prevent misunderstandings and improve waste management practices.

Disposal should be the last resort and least favored option for managing construction waste sustainably. However, many countries, including Malaysia, still rely heavily on landfill disposal. Contractors' attitudes towards direct landfill disposal of construction waste need to be addressed and changed. To effectively manage construction waste, adopting sustainable building principles is paramount, considering environmental, economic, and social aspects. This approach emphasizes accomplishing the most appropriate waste management procedures based on the type and conditions of

waste generated. Implementing sustainable waste management practices is crucial to address the global challenge of construction waste effectively.

Success Factors In Managing Construction Debris.

Construction waste is a global issue with significant implications for project performance, society, and the environment. Inefficient waste generation during construction leads to material loss, time wastage, and increased costs. Proper management of construction debris is crucial for achieving sustainable construction practices, reducing environmental impacts, and conserving resources. This literature review focuses on the success factors in managing construction debris, examining best practices, challenges, and the contributions of stakeholders in achieving successful waste management.

Studies highlight that waste material significantly affects project costs and the environment. Massive volumes of waste can lead to illegal on-site dumping, exacerbating the problem. Construction waste is generated throughout the project, starting from the pre-construction stage through rough construction and finishing. Identifying and understanding the causes of waste generation is essential to limit it at the source. This research investigates the origins and impacts of construction waste.

The success of managing construction debris lies in implementing best practices, engaging stakeholders, demonstrating leadership commitment, promoting collaboration, and employing technological solutions. Prioritizing sustainable debris management strategies and involving all stakeholders throughout the construction process can significantly reduce waste, conserve resources, and lead to a more environmentally responsible and sustainable future.

Overview Of The Construction Waste Problem From Contractor's Perspective

Construction waste is a pressing environmental problem globally, and contractors play a crucial role in controlling it for efficient, economical, and sustainable projects. This literature review focuses on studies that analyze construction waste from the contractors' perspective and emphasize waste management techniques. Challenges faced by contractors include a lack of suitable incentives, unclear rules, and inadequate recycling and waste separation infrastructure.

In Malaysia, construction waste poses a significant issue due to the absence of effective waste management systems and regulatory enforcement. The government has taken steps to address the problem by promoting green building methods and supporting waste recycling, but further actions are required. Sustainable construction debris management is essential for minimizing environmental impacts and conserving resources. However, improper disposal practices can hinder sustainability goals. The literature review highlights the adverse effects of landfilling building debris.

on the environment, such as leachate production, greenhouse gas emissions, and soil pollution. The need for alternate waste minimization measures is emphasized to mitigate these negative consequences.

Contractors' improper disposal of construction waste at unlawful dumps leads to pollution and health risks, underscoring the urgency for responsible waste management practices. To achieve sustainable construction practices, collaboration between contractors, policymakers, and other stakeholders is vital. Effective management of construction debris is essential for sustainable construction practices and reducing environmental impacts. However, non-significant investment or inadequate funding can be a significant challenge in implementing and improving waste management strategies. This literature review examines studies that focus on the impact of non-significant investment in managing construction debris on site and its implications for sustainable waste management practices.

The research highlights barriers in developing countries, particularly financial constraints, which hinder the adoption of sustainable construction waste management practices. Non-significant investment in waste management infrastructure and recycling facilities limits the progress towards sustainable practices. The need for targeted funding and incentives to overcome these barriers is emphasized.

Another study in Shenzhen, China, discusses the economic implications of construction waste management based on the low-carbon economy. Non-significant investment in waste reduction technologies and recycling initiatives can lead to missed economic opportunities and hinder the transition to a greener construction industry.

Overall, non-significant investment in improving the management of construction debris on site poses significant challenges to sustainable waste management practices. Addressing financial constraints and inadequate funding through targeted funding, incentives, and government support is essential to promote a greener and more responsible construction industry.

Funding Issues

Effective management of construction debris on site is essential for sustainable construction practices and reducing environmental impacts. However, funding issues can present significant challenges in implementing and improving waste management strategies. This literature review focuses on studies that examine the funding issues faced by construction projects in managing construction debris on site and the implications for sustainable waste management practices.

One study in Malaysia explores the cost and benefit analysis of construction waste management practices and identifies funding constraints as a major challenge in

adopting sustainable waste management strategies. Understanding the economic benefits of sustainable waste management can encourage stakeholders to allocate funds more effectively.

Another study highlights the potential of green financing to support construction waste management projects. Government financial intervention and incentives play a critical role in funding waste management initiatives, encouraging construction companies to invest in sustainable practices.

Funding issues pose significant obstacles to improving the management of construction debris on site. Strategies to address these challenges include understanding the cost-benefit analysis of sustainable waste management, fostering public-private partnerships, considering the impact of debris management fees, exploring green financing options, and integrating waste management into project budgeting.

METHODOLOGY

Research methodology refers to the procedures and strategies used to find, select, process, and analyze information in a study. It helps the reader assess the relevance and reliability of the research. The research design is a concise and logical plan that guides the data collection, interpretation, analysis, and discussion to address the research questions. The study in question aims to determine success factors of construction debris management from a contractor's perspective and analyze factors contributing to sustainable construction debris management.

The study utilizes a quantitative research method, gathering data through both primary and secondary sources. The primary data will be collected through a survey using a questionnaire given to contractors at a specific facility. The secondary data will be sourced from online academic journals and articles. The use of diverse data collection methods enhances the study's systematic perspective. Regarding sampling, purposive sampling is commonly used in case study research. The selection process considers the case's distinguishing qualities, typicality, relevance, and other factors to ensure a comprehensive analysis. Overall, this research employs a quantitative approach, using both primary and secondary data sources, and employs purposive sampling for its case study research design.

The research approach used in this study was discussed and demonstrated in this chapter. The study used quantitative data gathering methods to attempt to answer research questions in order to meet the study's goals and objectives. The research involves two steps of data collecting. They are as follows: a literature review, and a questionnaire survey. However, a triangulation strategy is used throughout the research activities, which began with numerous data sources in the literature review

and different quantitative research methodologies. The combined research strategy used in this study is founded on the principle of triangulation, which means that it attempts to look at things from several perspectives.

DATA ANALYSIS

Google Form was used to deliver the questionnaire to the Bina Darulaman Berhad employees. The Google Form link (<https://forms.gle/XFa6aCsj9KXFR5Xm9>) is connected over WhatsApp, and the relevant response receives the same information. There were 55 surveys in all that were gathered online. Population-based factors including gender, age, and employment inside the firm were included in the demographic study. There were no data shortages. Descriptive analysis' primary goal is to comprehend the respondent's profile. Below is a summary of the description analysis in Table 1.

Demographic Data

Table 1 : Demographic Profile of the Respondents

Variable	Category	Number	Percentage (%)
Gender	Male	28	50.9%
	Female	27	49.1%
Respondent Age	22 - 25 Years Old	15	27.3%
	26 - 30 Years Old	6	10.9%
	31 - 35 Years Old	2	3.6%
	35 Years Old - Above	32	58.2%
Occupation	Technician	4	7.27%
	Maintenance Team	6	10.91%
	Multi Media	0	0%
	Construction Manager	13	23.64%
	Others	32	58.18%

Section B (Questionnaire)

- **Challenges to improve the management of the construction debris on site**

Table 2 : Challenges To Improve The Management

Description	Point	Number	Percentage (%)
Funding Issues	Strongly disagree	5	9.43%
	Disagree	10	18.86%
	Moderate	18	33.96%
	Agree	15	28.30%
	Strongly agree	5	9.43%
	Total	53	100%



Figure 1: Questionnaire

The data includes responses from a total of 53 or 54 respondents. Each question presents a statement, and respondents were asked to rate their agreement or disagreement on a five-point scale. Based on the responses, it is evident that funding issues are perceived as a challenge in improving the management of construction debris. A significant proportion of the respondents (33.96%) expressed a moderate opinion on this issue, highlighting the need for adequate funding.

CONCLUSION

The study focuses on the management of building waste at a site in Alor Setar, Kedah. Therefore, the goal of the study is to learn what, in the eyes of contractors, makes debris management successful. As a result, the sampling is only of housing industry contractors. The questionnaire is created to collect the data, and it is then distributed to the respondents. The waste management system and construction debris management at the construction site will be the main areas of attention in order to gather knowledge regarding sustainable construction debris management.

This discovery will raise the standard of building projects, which will help the industry as a whole. By developing recyclable construction materials and enacting legislation mandating appropriate waste disposal, environmental goals can be achieved. Acceptable recycling methods must be developed in order to protect the environment and make money from the trash. Building and demolition waste reuse and recycling will increase within the industry, which will help protect limited natural resources. The research objective was to determine the success factors of construction debris management from the contractor's perspective and analyse the factors that contribute to effective management of construction debris. Construction companies can effectively manage construction debris, reduce waste generation, promote recycling, and contribute to a more sustainable and environmentally conscious construction industry.

ACKNOWLEDGEMENT

The author would like to extend a sincere thank you to Universiti Teknologi MARA (UiTM) Seri Iskandar for all of their support and guidance during the author's academic journey. The supervisors and professors at UiTM Seri Iskandar are to be applauded for their dedication as well as for providing the author with the opportunity to pursue a wonderful education. This has helped the author develop his or her knowledge and skiing skills.

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