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# Review paper on Construction Material Waste Minimization: Reasons and Suggestions

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**Abstract**: The need to minimize waste created at all stages and recycle construction and demolition waste is becoming increasingly important as landfills become scarcer. This study evaluated the awareness of construction professionals in Chennai on the perception of sustainable construction and waste management through a systematic questionnaire survey that helped provide empirical evidence on levels of significant contribution to waste reduction through waste minimization steps. Study has shown that government regulation on construction site waste was non- existent and other factors such as staff training, company waste management strategy, financial compensation and promotion were perceived by respondents as more helpful incentives to minimize waste.

**Keywords**: material waste minimization, reasons and suggestions.

## I. INTRODUCTION

With growing urbanization and economic growth, construction project have increased dramatically, contributing to the production of C&D waste. During the construction, renovation and demolition of building, roads, bridges, dam, and utility plants, construction and demolition waste (C&D) is created. The construction sector requires numerous processes and uses vast amounts of energy. The building industry requires various processes and uses vast amounts of capital. The construction, reconstruction and demolition of houses, highways, bridges, subways, runways, flyovers, factories and similar construction projects are followed by the growth of infrastructure inert and non-biodegradable materials such as concrete, ceramic, plaster, metal, broken tiles, brick masonry, etc. are mainly the waste production. Such wastes are heavy, have high density, very often take up substantial storage space on the site, on road sides or in the municipal waste bin.

Waste from residential building construction or demolition; makes its way into the local municipal bin, deposits of waste storage, rendering the municipal waste strong and inadequate for the further treatment such as composting or energy recovery and incineration. The increasing population in the country and the need for land for other uses have limited the availability of land for the disposal of waste. Vegetation growth often prevents surface infiltration from flowing into the groundwater table and results in a high degree of environmental imbalance. An significant method for handling such waste is re-use or recycling. In addition to increasing waste management issues, decreased raw material extraction, decreased transport costs, increased income and decreased environmental impact are other factors that encourage the implementation of the reuse/recycling strategy. In particular, the use of recycling/reuse technologies was required for the first depletion of traditional natural aggregate reserves in order to be able to retain the conventional natural aggregate for other essential works. In most countries, knowledge of resource efficient building activities is currently lacking. In building, unnecessary material waste, improper on-site management and low knowledge of the need for waste reduction are common.

## II. LITERATURE REVIEW FOR RESEARCH PAPER

**Jaime Solís-Guzmán, et al (2009)**, studied Currently, 'construction and demolition waste (C&D waste) is a worldwide issue that concerns not only governments but also the building actors involved in construction activity'. A detailed model is also provided to estimate the volume of waste that is expected to be generated on the building site. The quantification of C&D waste volume, from the project stage, is essential for the building actors to properly plan and control its disposal.

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**Rawshan Ara Beguma, et al (2010)**, studied 'Construction waste is becoming a serious environmental problem in many large cities in the world''. The minimization of construction wastes has become a pressing issue.

**Hong ping Yuan (2010),** 'In contrast to many advanced Western countries', China has had very few studies performed on its construction waste management issues. However, this study aims to understand the current state of construction waste management by performing a power, weakness, potential, and danger (SWOT) review.

**M. Osmani, et al (2010),** studied 'Present construction waste minimization thinking is heavily focused on many concerns related to physical construction waste and recycling guidelines. This paper examines previous studies on architects' approach towards construction waste minimisation; and by means of a postal questionnaire, investigates: the origins of waste.

**Hong ping YUAN (2011),** studied 'the investigated the most critical challenges and promising countermeasures of managing C&D waste in a typical economically developed region of Shenzhen in south China'. Data were gathered through a study of the literature as well as government legislation and studies, semistructured interviews, and focus groups with government and business participants. Five waste management practises in Shenzhen were established based on studies of C&D waste generation, waste regulations, and major waste management practises. drawbacks were revealed, which are "immature regulatory environment for managing C&D waste"

**Mohammed Arif, et al (2012),** studied 'School of the Built Environment, University of Salford, Manchester, UK, and Monty Sutrisna'. The expansion of the Indian economy has resulted in an increase in construction activity. The issue of waste generation on construction sites has been highlighted even more as a result of the increased construction activities.

**Suresh Kumar Lachimpadia, et al (2012)**., studied 'the waste created during the construction of high-rise buildings using three different construction methods'. Traditional construction (Category I), mixed construction (Category II), and industrialised construction (Category III) (IBS, Category III). The Construction waste was divided into mineral and non-mineral components for each construction group.

**M.Osmani(2012)**, studied New legislation, new technology and techniques in waste treatment and recovery, and a growing tide of public awareness are all conspiring to transform the face of waste management. Clients, contractors, manufacturers, and designers (architects/engineers) all have resources and obligations in eliminating construction waste.

**China Jiayuan Wanga, et al (2013)**, studied 'Construction waste minimization during the design stage is an important technique for waste reduction'' Prefabricated parts, large- panel metal formworks, less product changes, modular design, waste reduction investment, and economic opportunity

**Saheed O. Ajayi, et al (2014)**, studied aim of this research was to identify the most important site management strategies for minimising construction waste'. Data was obtained using a mixed methods methodology that included field research.
and survey research. Contractual requirements for waste minimization, waste segregation, resource reuse maximisation, and efficient logistic management are among these steps. The paper goes into more detail regarding the methods that may be used to accomplish each of the underlying steps.

**Andrew R.J. Dainty, et al (2014),** studied 'the effectiveness of waste- reduction initiatives used in high-profile UK-based projects was investigated'. The case studies revealed a wide variety of waste management techniques, the applicability of which was then investigated through a questionnaire survey of waste minimisation experts.
**O. O. Faniran, et al (2015)**, studied 'A survey of 24 construction firms in Australia was used to analyse waste minimization methods and the relative value of construction waste sources'. The findings found that a large number of respondents' companies lacked waste- reduction policies. Style shifts, residual material scraps, wastes from packaging and non-reclaimable consumables, design/detailing defects, and bad weather were listed as the top five sources of construction waste in the survey.

**B. A. G. Bossink1, et al (2015),** studied 'the Construction firms benefit from lower deposition costs and virgin material buying costs as a result of reduced waste generation'. Reduced building waste generation is in line with this approach. Following that, a review of the construction-waste sector is given available in literature

**Vivian W.Y. Tam (2016),** studied 'the increasing awareness of waste management concerns from construction and demolition waste' has led to the development of waste management as an important function of construction project

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management. ‘‘Propose methods for on-site reuse of materials’’ and ‘‘Propose methods for reducing waste’’ are the main benefits gained from the implementation of the WMP method.

**Jian Li Hao, et al (2016)** studied ‘The aim of this paper is to provide a decision-making mechanism for construction waste management on-site in order to enhance construction and demolition waste management’. Construction waste generation is dynamic and interactive. Therefore, the model developed can be used as a flexible tool to help practitioners to understand the causes and effects.

**Boonyarat Phadermroda, et al (2016)**, SWOT analysis, a commonly used tool for strategic planning, is traditionally a form of brainstorming. The evaluation results showed that SWOT analysis of the case study accurately reflected the organisation’s situations thereby demonstrating the validityof this study.

**Bruce Mcdonald, et al (2017),** studied The construction industry in Australia accounts for around 15% of all solid waste deposited in landfills per year, by amount. Like several other nations, it has regulations in place to reduce landfill requirements by half by the year 2000.The effects of the programme have been compared against a similar project built concurrently. Thetrial's findings showed major cost savings.
**Jiayuan Wang a, et al (2017),** studied and demonstrated the benefits of using a system dynamics approach in understanding the process and potential effects of the implementation of WMD. The developed model is potentially valuable as a utility tool for the dynamic assessment of the effect of design strategies on construction waste minimization (CWM).By comparing different simulation results generated under various scenarios, this study identifies the best practice ahead of implementation.
**Rawshan Ara Begum Chamhuri Siwar et al(2017)**., studied Building and infrastructure building programmes have resulted in an increase in the production of construction waste over the last two decades. The building industry has a major environmental impact, and the quality and quantity of waste it produces has a direct relationship with its environmental effects.

**Weisheng Lua, et al (2018),** studied WM legislation, waste management system (WMS), understanding of C&D WM, low-waste building technology, less design changes, research and development in WM, and vocational training in WM were defined as the CSFs for managing C&D waste.

**E. K. Lauritzen (2018),** studied the presentation will be accompanied by a survey of general disaster waste management concepts and a presentation of alternatives and obstacles to material re-use, as well as an evaluation of environmental and economic factors.

**Ortiz, et al (2018),** studied ‘the three separate waste management scenarios were contrasted in a case study’. in Catalonia (Spain): landfilling, recycling, and incineration, and these scenarios were analysed using Life Cycle Assessment. The Catalan Waste Catalogue's and the European Waste Catalogue's guidelines have been taken into account. The effect of transportation has also been measured. Recycling was found to be the most environmentally friendly treatment in terms of the Global Warming Potential, followed by incineration, and finally landfilling.

**Oyeshola Femi Kofoworola, et al (2019),** examined ‘the Thailand's building waste generation and management’. Thailand produced an average of 1.1 million tonnes of construction waste per year between 2002 and 2005, according to estimates. During the same time span, this represents around 7.7% of the overall volume of waste disposed in landfills and open dumpsites.

**Shan-shan Chung, et al (2019),** studied ‘the environmental desirability, economic optimization, social acceptability and equity, and administrative diligence are the four evaluative criteria established’. They began charging for waste material by the kilogramme in this implementation, so that construction industry contractors could prepare to handle waste and recycle waste material for reuse.

## III. CONCLUSION

Based on the results of our preliminary systematic analysis, it shows that there is a need to develop a construction material waste minimization. This research identifies issues of construction waste and the further improvement to reduce the waste which happens at site. The amount of waste which occurs at site and reduction of construction material waste.
The generation of construction waste on construction sites is a significant problem in many countries. Several studies have focused on the waste generated from construction site around the world. Wastage of construction materials,

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improper management on site and low awareness of waste reduction are common in Indian construction site. Calculation of the amount of waste generated is important and a requirement to formulate strategies for minimizing construction waste generation on site. This paper is planned to provide a better understanding on the generation of construction waste in site. The major wastes from construction are cement, sand, aggregates, steel and bricks. The common uses and the sources of construction waste generation were identified. Suggestions to minimize construction wastes are given to minimize the generation of actual waste from site.

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