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Study of construction material wastage, its causes, rectification and financial impacts

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Abstract - The construction business has seen explosive expansion during the last few decades all around the world. The amount of garbage generated has skyrocketed as infrastructure and industrialisation have expanded. In general, there are two types of construction waste generators: those that produce large amounts of garbage and those that produce little amounts of waste. In order to reduce construction waste, projects must be well thought out and efficiently performed. The amount of construction practices has been almost doubled considering last decade and will keep on increasing day by day. As the construction practices are increasing day by day, large number of masses are getting involved in the activity of cons.There is huge amount of mismanagement caused on site in various aspects of construction such as scheduling, material management, labour management etc. Researchers in this study hope to find and implement ways to reduce waste in construction and better manage resources. In order to enhance construction waste reduction and management, semi-structured interviews and focus groups were undertaken. Potential short, medium and long-term plans have been outlined in this research study. Incentives for stakeholders, governmental policies to make garbage sorting easier, the growth of a mature recycling sector, and education are the five main techniques advocated. This research paper majorly focuses on waste-age caused during the process of construction activities due to various reasons as like natural calamities, human error, false calculations etc.The financial impact caused by such wastages are also formulated taking into consideration certain sites.

Keywords – construction, material, wastage

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1. INTRODUCTION

1.1 Construction Scenario In India

The Indian economy relies heavily on the infrastructure industry. To ensure India's timely construction of world-class infrastructure, the government places a high priority on the establishment of policies that would benefit the sector. It is possible to classify the infrastructure sector as either a whole or a subset of the aforementioned categories. Over the past 50 years, construction has accounted for around 40% of all development investment in India. Construction employs around 16 percent of the nation's workforce.

1.2 Building Material

A building material is any substance that may be used to create something, such as a home. There are a wide variety of building materials that may be used to construct a structure. To save money on construction projects, these materials were used. Buildings have been constructed using a wide variety of naturally existing materials, including clay, sand, wood, and rock. Many man-made things, some of which are more synthetic than others, are in use. Manufacturing of building materials is a well-established sector across the world; these products are often used in specialised professions such as carpentry and plumbing as well as roofing and insulation. Habitats and structures, including homes, are covered in this reference.

1.3 Material Wastage In Construction Industry

Waste is described by the new production philosophies as any inefficiency that results in the excessive use of equipment, materials, labour, or financial resources. Both material losses and unnecessary effort, which creates additional expenses but does not contribute value to the output, are instances of waste in manufacturing. In other words, any savings made by activities that result in expenditures but add no value to the final product in the eyes of the consumer should be referred to as "waste". Sorting garbage into separate

categories not only aids in understanding the broad concept of waste, but it also clarifies the wide range of potential corrective procedures associated with waste avoidance. A certain quantity of rubbish can only be reduced by a significant improvement in technological progress when it comes to limiting the amount of waste. There are two types of unavoidable waste (also known as natural or unavoidable waste): those that cannot be avoided and those that can only be avoided if the cost of waste is greater than the expense of avoiding it.

2. PROBLEM STATEMENT

"Study the construction material wastage, its cause, rectification and financial impact"

3. OBJECTIVE OF STUDY

In order to achieve the aim of this paper, two sites were considered. These sites were thoroughly examined for any and all kinds of material wastage on, before and during the execution of the construction activity. Various questionaries were also circulated to determine the material wastages encountered by the working staff and ways to curtail it. With the help of all the data available, the quantum of financial damage caused due to such wastages are calculated.

4. REVIEW OF LITERATURE

4.1 Bossink, B.A.G. and Brouwers (1996)

The building and construction business generates a substantial amount of garbage. The Dutch government's integrated chain management programme focuses heavily on reducing building waste. By reducing trash output, construction organisations save money on deposition charges and the cost of procuring new materials. There is a quick rundown of the most important aspects of Dutch sustainability policy. This policy calls for a reduction in the amount of construction waste generated.

4.2 Agyekum, K., Ayarkwa, J. and Adinyira, E (2012)

This analysis aims to identify the most wasteful building materials. To improve the performance of the construction business, any change in the management of building materials at construction sites might save money and increase efficiency, as well. As one example, the study tries to establish the quantity of subcontracting waste, the percentage of trash that contributes to project cost overrun, and the characteristics that contribute to waste on construction sites. A survey approach was used in the investigation. Both descriptive and inferential statistics were used to examine replies from 56 experts who were located on-site.

4.3 Akanni, P. O.

This study focuses on the waste of construction materials on building sites in Nigeria's South. It is the purpose of this study to determine how much trash is generated on building sites and how much is permitted in estimations. Researchers spent six months compiling data on 30 public building projects. Comparing the states in the zone's trash levels necessitated a one-way ANOVA. Using paired t-tests, the significance of the difference between the actual and permitted waste values was determined.

4.4 Ajayi, O.M., Koleoso, H.A., Soyingbe, A.A. and Oladiran O. J. (2008)

This article summarises the results of a comprehensive study of the literature on the benefits, drawbacks, and opportunities of Nigeria's move to offshore manufacturing. There is currently a shortfall of 17 million homes in Nigeria, despite several mitigating efforts. It has been shown in seminal literature that this issue is primarily caused by a wide range of difficulties, including the expensive nature of new building, the scarcity of skilled workers, the length of time it takes to build new homes and the poor quality of existing stock. Offsite manufacturing has been suggested as a novel solution to these problems because of these concerns. The study data from key literature on offsite construction and the Nigerian construction industry were coded and analysed using thematic analysis and Nvivo software.

4.5 Formoso, C. T., Isatto, E. L., and Hirota, E. H. (1999).

An ongoing research effort attempts to establish a system for managing trash on construction sites, and this article gives the first findings of the project Using qualitative and quantitative data gathering approaches and a pull learning strategy, the method aims to create waste control measures as part of site management on a regular basis. Additionally, the project seeks to contribute to the development of the Lean Construction theory by putting some of its principles into practise.

4.6 Teo, S.P, Abdelnaser, O. and Abdul, H. K. (2009)

Pre- and post-contract phases of a project look into the causes of waste and overruns in terms of budget and time. Material waste has grown to be a serious concern in the construction industry, requiring rapid attention, while cost overruns affect 90% of all completed projects. For the past 70 years, there has been a debate about how to reduce the cost of a project because of on-site waste of resources. The paper employs a desktop methodological strategy. To see if there is any connection between waste of materials and overruns in the budget, experts compare the causes of both in the literature.

4.7 Shen, L. Y, Tam, V. W, Tam, C. M, and Drew, D, (2004)

Six construction sites in Hong Kong were selected for this study, and the free-flow mapping presentation method was used to map the waste management processes in each of the sites. Waste management has become an essential part of construction project management due to the growing awareness of the environmental implications of building wastes. Waste classification, waste management techniques (avoid waste, reduce waste, reuse trash, and recycle waste), and waste disposal technologies have all been created in the current research and practises, which may be categorised into three main categories: As a result of these approaches, the management of waste disposal on building sites is not given the same level of attention. Waste management may be improved by streamlining the process by which construction waste moves from generation to disposal.

4.8 Shen, L. Y., Tam, V. W. Y and Tam, C. M., (2002),

Using different types of building materials in various construction projects is the subject of this paper's investigation. Hong Kong's building and demolition operations create thousands of tonnes of solid garbage each year, making it the city's primary source of solid waste. The environmental effect of building wastes has risen sharply in recent years, and the local population has become increasingly concerned about it. As a result, building waste reduction has become a major concern. Various construction materials are thought to have varied effects on waste output depending on the type of project. Since waste creation and construction material use are linked, this article makes an effort to uncover the details of those connections.

4.9 Ekanayake, L L and Ofori G (2004)

According to research, a facility's layout has a significant impact on trash generation. Researchers in Singapore conducted this investigation in order to identify the most significant sources of construction-related site waste creation and to create a model for assessing building designs in terms of their potential to generate construction-related materials wastes. The study's findings are based on a poll of major Singaporean construction firms. Pre-design, operation, and material handling were all shown to be major sources of waste on the site. Respondents' ratings on a five-point Likert scale were used to determine weights for the various building subsystems in the BWAS model. In order to create the BWAS model, the Building and Construction Authority of Singapore's building design evaluation system was modified and employed.

5. SUMMARY

The concept of this paper is to determine the wastage of construction material caused before and during the construction duration. The construction industry in India is increasing day by day, as a result during this construction activities a lot of material wastage is encountered. These wastages are generally caused due to material mishandling, improper inventory control, flaws in design, excess material orders etc. In order to avoid these kinds of errors proper training is needed to be provided to the working staff, inventory control should be done precisely, proper design estimation must be done, etc. This paper also provides an overview of financial impact caused due to the wastage of material. Such impact can be huge for the projects costing large tender amounts.

6. CONCLUSION

The Study is established from the following:

1. Study of research papers based on material wastage during construction.
2. Study of case papers, literature reviews & future scope of the research papers.
3. Understand important aspects of retrofitting through literature study and done on many research papers.

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