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Waste Management of Building Construction

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ABSTRACT:This research paper is about Management of waste material in Building construction. The construction waste, now days, is a serious concern to the construction sector. So there is need to reduce construction waste generation from construction site. The Indian construction industry also needs construction waste management due to its economic and environmental aspects. So there is need to increase awareness about waste reduction and implementation of construction waste management plan in India

KEYWORDS: Waste material, waste management

I. INTRODUCTION

This research work is based on material waste management in building construction through the dissertation work, attempt is made to find reasons of wastage in construction industry and how it can be minimized. Many opportunities exist for the useful reduction and recovery of materials that will preferably be destined for disposal as waste. Identification and separation of wastes, and economically viable means that of promoting environmentally and socially applicable means that of reducing total waste disposed.

Construction industry has been developing rapidly around the world. The development has led to serious problem in generation of construction wastes in many developing countries and expectation of the natural resources to large extend. Construction and demolition waste management has become one of the major environmental problems in many municipalities. Due to the increase in the economic growth after development and redevelopment projects in the country and subsequent increase in the urbanization in the cities has made construction sector to increase drastically, but also environmental impacts from construction and demolition (C & D) waste are increasingly Becoming a major issue in urban solid waste management.

This research work is based on material waste management in building construction through the dissertation work, attempt is made to find reasons of wastage in construction industry and how it can be minimized. Indian construction industry producing very high level of construction waste material due to poor knowledge on effective utilization of materials, the construction and demolition produces 75% of solid waste in Indian majority of construction waste ends up with landfills, uncontrolled sites. This mainly causes pollution of air, surface water, underground water, public health and loss of natural recourse, so in order to decrease the pollution we need to use the construction waste as a recyclable material. For sake of the future generation we need to save the natural resources so the waste should be recycled and reused. Utilizing the recycled waste materials will reduce the construction cost.

SCOPE OF PROJECT

This study deals with minimization and re-use of construction wastes. The way of study is conducted through questionnaire and interview to the contactors and project managers at construction site to get some information. By the result analysis, mitigation measures and various methods to be found out to control the generation of waste in construction.

OBJECTIVES:

1. To identify and evaluate factors influencing construction waste.
2. To find the causes by using literature and questionnaire survey.
3. To suggest the waste minimization techniques.

II. LITERATURE REVIEW

1. A study of management and control of waste construction materials in civil construction project(volume-2, issue-3, february 2013) Karrar Raoof Kareem, R.K. Pandey

Now days, the increased economic growth as well as urbanization in developing countries have led into extensive construction activities that generate large amounts of wastes. Material wastage in construction projects resulted into huge financial setbacks to

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builders and contractors. In addition to this, it may also cause significant effects over aesthetics, health, and the general environment. These wastes needs to be managed as well as their impacts needs to be ascertained to pave way for their proper management, however in many cities of India wastes materials management is still a problem. Responsible management of waste is an important facet of property building.

2. A STUDY ON BASIC MATERIAL WASTE IN BUILDING INDUSTRY (May 2011) Main Causes and Prevention Mahesh D. Meghani (PG- CEM student), B.V.M. Engineering college, Gujarat Technological University, VallabhVidhayanagar, India.

This research work is based on material waste management in building construction Through the dissertation work, attempt is made to find reasons of wastage in construction industryand how it can be minimized. In construction, 4-M (Material, Manpower, Money Machine) play crucial role. Depending on the type of a housing project, building materials account for 60 to 70% of the project cost. Through material waste management function, we can reduce the overall project cost by waste minimization or maximum utilization of resources (Material). In general, a very high level of waste is assumed to exist in construction. A wide range of measures have been used for monitoring waste, such as excess consumption of materials, quality failure costs, and maintenance and repair costs, accidents, and non-productive time (Oglesby et al. 1989).

3. CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT IN INDIA Harish. P. Gayakwad1, Neha. B. Sasane2 1 Harish. P. Gayakwad BE (civil) ME (Construction Management), RMD-SSOE, Warje, Pune, Maharashtra, INDIA

The construction industry has gained very fast growth in recent decades due to the increase in the population, increase in the IT sector and increase in the industrialization and also introduction of new infrastructure projects resulted in the increase of construction industry drastically. Due to which the demand for construction materials is huge for the construction activities which results in the generation of huge amount of construction waste. Construction material wastage resulted in the huge financial setbacks to builders, contractors, regionals authorities and also to the country. The production of waste due to the demolition of structures is more than the wastage which occurs during construction of structures, so there is need of management of Construction and Demolition (C&D) wastes, as distinct from Municipal Solid wastes, is a relatively new subject in India. To begin with the issue there is no proper estimate regarding the quantity of waste occurs in India.

III. METHODOLOGY

The research methodology adopted in this study was quantitative research method in the form of questionnaire sample survey. Quantitative research is defined as an inquiry into a social or human problem based on testing a hypothesis composed of variables with numbers and analysing with statistical procedure to determine whether the hypothesis holds true. Quantitative research methods are typically sample survey and experiment. Experimental research is based on the researcher manipulating certain controlled conditions in order to establish the relationship between particular variables and explain cause and affect relationships. In questionnaire survey, statistical methods are used to design a representative sample which will derive findings that can generalise the whole population.

Date collection done in two ways, first one is to collect the waste materials, which are produced in construction site, collection of latest published papers and research methodology, and second one is personal interaction with construction company officials, in personal interviews with project in charge, site engineers and labours. In that case we enquired that whether the company has following any waste reuse methods, recycling methods, or not, and also collected the data regarding waste recycling material list as we collected how much waste material can produces in construction site.

Sources and causes of materials waste as well as waste minimization measures which have been extensively studied were extracted from the literature. The sources and causes of materials waste gathered from literature were pre-tested through interviews of ten selected construction practitioners to evaluate their applicability to the current study.

The structured questionnaire is probably the most widely used data collection technique for conducting surveys to find out facts, opinions and views. In this study, interviews, structured questionnaire and site visits were used in the gathering of data. The interviews were adapted to collect detailed information about respondents‟ experiences and impressions about materials wastage. It was also used to collect preliminary information to help in structuring the questionnaires. The questionnaire survey was also adapted to get feedback on opinions of respondents‟ about wastage of building materials.

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The questionnaire, which consisted sets of questions was designed to obtain data on the sources and causes of materials waste, the questionnaire further sought to obtain information on the level of knowledge of construction professionals on the concept and benefits. Interviews were also used to obtain more specific information about material waste.

The questions were constructed using the Likert's scale. The respondents were asked to rank on a scale of 1-5 factors that cause materials waste on construction sites where 1= "Not Influential", 2= "Less Influential", 3= "Quite Influential", 4= "Influential" and 5= "Very Influential".

Evaluation of Reducing Waste Materials in Construction Projects Using Ranking Analysis,

$$\text{Ranking analysis} = \sum_{i=1}^{10} \frac{(Xi \cdot Yi)}{N}$$

Where,
Xi= Response rating
Yi= number of points (value from 1 to 5)
N= total number of responses

IV. RESULTS

The average years of experience of the firms surveyed in the construction market are between 10 and 20 years (Table 5.1). This implies that all the firms have significant experience in the building industry to ensure reliability and accuracy of data.

Sr. No.	Respondents Characteristics	Experience
1	Consulting Engineer	15-20
2	Consulting Engineer	10-15
3	Architect, Engineer and Contractor	15-20
4	Civil Engineer and Contractor	>20
5	Site Engineer	5-10
6	Contractor	5-10
7	Site Supervisor	1-5
8	Site Supervisor	1-5
9	Consulting Engg.. and Building Contractor	5-10
10	Consulting Engineer	15-20

To avoid wasting a lot of blocks on construction sites, it is advisable to take into consideration its storage and handling operations on site.

1. The blocks should be stacked on pallets or on level grounds
2. It should be stored in a container or a covered place
3. It should not be stored in a walk way where people will always step on it. For instance in Figure

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a) Blocks arranged on site b) Correct arrangement of blocks on site

To avoid wasting the aggregates (coarse and fine), proper equipment should be used. Instances of proper batching of concrete making materials are shown in Figures 4.6 (a), (b), (c) and (d) respectively. To assist in minimizing the wastage of concrete making materials resulting from batching, it is recommended that the following procedures be adhered:

1. Use separate aggregate bins for each size of coarse aggregate. Bins should be capable of shutting off material with precision.
2. Use controls to monitor aggregate quantities during hopper charging.
3. Use standard test weights for checking scale accuracy.
4. Maintain mixer blades. Watch for wear and coating.
5. Operate mixer at manufacturer-recommended speed.
6. Mix all concrete thoroughly until it is uniform in appearance, with all ingredients evenly distributed.

Waste minimization is a process of elimination that involves reducing the amount of waste produced in society and helps to eliminate the generation of harmful and persistent wastes, supporting the efforts to promote a more sustainable society. Savings and environmental good that is achieved through waste minimization and recycling, it helps to achieve the goal in right time which leads overall business development. Being able to prove that you have succeeded in the past is therefore essential. Having a goal and measuring your results provides that proof.

V. CONCLUSION

The survey results show that the general practice of Solid Construction Waste Management and site waste management as a whole is very poor and has room for a lot of improvement.

Through questionnaire survey 11 factors affecting waste management and 32 causes of waste generation were identified and significance of the same was analysed.

11 Factors affecting waste management as follow:

a. Management Support for Waste Management
b. Staff Knowledge of Waste Management
c. Waste Minimization Motivation
d. Material Storage Practice
e. Estimating/Ordering Practice
f. Design Issues
g. Sustainable Development Awareness
h. Material Supply Issues
i. Cost of New Materials Against Recycled
j. Individual Value Judgment
k. Waste Disposal Costs

First 10 causes of generation of waste out of 32 as follow:

1) Design changes
2) Design errors
3) Complicated design
4) Inexperience designer
5) Interaction between various specialists
6) Improper material storage
7) Damage during transportation
8) Poor quality materials
9) Equipment failure
10) Delay during delivery

3. In this study major sources of waste are also been identified related to the respective construction wastes from the wastes causes.
4. From the results and analysis of questionnaire the various suggestions are given to reduce the construction waste on site.
5. It is suggested to provide a proper storage for all these materials at the site and the handling should be done in a proper manner. More careful is needed while placing and the materials. It we reduce these types of waste;

the project can be completed in an economical and effective manner.

6. To implement an efficient waste control program in construction projects is necessary to identify what is generating waste and its causes.

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