

RESEARCH ARTICLE



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TO FIND SOURCES OF CONSTRUCTION WASTE MATERIALS IN EXECUTION PHASE

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ABSTRACT

Construction industry is the basic input for socio-economic development of any country. The construction industry generates greater employment. Hence, it is the second largest employer sector in India. Due to increasing construction industry, the waste of construction material is rapidly increasing and it has greater impact on environment and economy of the project. This paper identified the root cause of generation of construction waste during construction phase and sources of construction waste using Delphi technique. Those factors contributed to the generation of waste are grouped as direct wastage of materials and indirect wastage of materials.

Keywords: Construction industry, Sources and Impact of construction waste, Delphi technique, Generation of waste.

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I. INTRODUCTION

A. Introduction of Construction Industry:

After the agriculture, construction industry is the second largest employer sector in India. Due to the rapid growth of population, increase in standard of living, increasing natural consumption and increase in infrastructure demand, the rapid growth of construction industry can occur. The construction sector employs approximate 31 million people and accounts for 6-8% of Gross Domestic Product (GDP). This led to the development of nation as it contributes more than one half of gross domestic investment to the nation. Due to the infrastructure development, the development of roadway, railways, airports, ports, irrigation, water supply etc. can occur.

B. Introduction of Construction Waste:

Waste is a product or material that is unwanted. Construction waste means any substance, matter or thing which is generated as a result of construction work. Waste in construction industry is not only important for perspective view of efficiency but also concern about the adverse effect of it on environment. Material waste is however concerned as it is extremely expensive and is made up of non renewable resources. The cost of project is directly increased as the wastage of material is increases. When the material is damaged and cannot be used further, it is considered to be waste. This leaves the material with no other alternative but to dispose of it. It can also be defined as excessive use of material.

There are two types of waste such as direct and indirect waste.

1. Direct Waste:

Direct waste can define as the waste arises from construction activities including site clearance; land excavation, civil and building construction. It includes sand, brick, blocks, steel, concrete debris, tiles, bamboos, plastic, glass, wood, paper, vegetation and other organic material. This waste consists of a complete loss of material as they are irreparably damaged or simply lost.

2. Indirect Waste:

Indirect waste means waste generated from use of equipment, material, labour and money in the construction process. Waste in construction is not only focused on the quantity of material on site, but also overproduction, waiting time, material handling, inventories, unnecessary movement of workers. This type of waste has least attention in wastage of construction industry.

II. METHODOLOGY

We used Delphi technique in which we carried out interviews of various site personals such as Sr. engineer, Jr. engineer, project manager etc. the interview contained questionnaires regarding sources of waste. We took their views regarding the waste. We also observed the sources of wastage of material ongoing site. Hence we found the remedies for the same.

III. RESULTS AND DISCUSSION**A. Sources of Construction Waste during Execution Phase:**

There are many factors which generate the waste, these are classified as follows:

1. Transportation:

During transportation excessive handling, use of improper equipments or bad condition of pathways can cause wastage of material. Also the wastage of material can occur due to the poor layout and lack of planning of material flows.

This type of waste can be reduced by:

- a) Proper use of equipment or machinery
- b) Proper planning
- c) Feasible road communication
- d) Proper handling of material.

2. Processing:

It is related to the nature of processing of a particular activity, which could only be avoided by changing the construction technology.

This type of waste can be avoided by reducing the change in construction technology at last minute.

3. Production of defective product:

This waste can be occur due to poor design and specification, lack of planning and control, poor qualification of the team work. It occurs when the final product does not match with specified quality. This may leads to rework of unnecessary part of a building indirectly.

Eg. Excessive thickness of plastering

This waste can be reduced by:

- a) Follow proper integration between design and production
- b) Proper planning and controlling
- c) Use of skilled labour.

4. Overproduction:

This waste can be occurring due to the production of quantity greater than required. This may cause waste of materials, man-hours or equipment usage.

Eg. Overproduction of mortar that cannot be used on time

This waste can be reduced by:

- a) Production of material in given quantity with quality
- b) Production of material in given specification.

5. Material handling:

The wastage of material can be occur during transportation, improper storage, material supply in loose form, improper stocking, age of workers and attitude of labours towards the work.

This waste can be reduced by:

- a) Use of suitable equipment
- b) Proper handling and storage
- c) Change the attitude of labours towards the work.

6. Inventories:

The wastage of material can be occur due to the excessive inventories i.e. due to the improper storage or stoking condition on site, robbery etc. the wastage can also be occur due to the lack of resource planning.

This waste can be reduced by:

- a) Proper resource planning with the help of software
- b) Proper methods of storage of material.

B. Impact of Construction Waste:

1. Construction cost
2. Construction time
3. Productivity

1. Construction cost:

It is the major impact of construction wastage. To control the cost of any construction project, management of wastage of construction material is important factor. So, cost of construction is increases with increase in construction waste. With increase in construction waste the cost of wastage handling, storage, transportation and disposal increases considerably. The cost benefit analyses indicate that it is possible to save up to 2% of construction cost by achieving good practice. As the wastage increases on site the cost of project is also increases indirectly.

2. Construction time:

The duration of construction depends upon the rework time, inspection time, move time, wait time. As the wastage are increases on site the cost as well as time of a project increases.

3. Productivity:

Construction material wastage causes the reduction of productivity of the total construction project. It defines efficiency improvements as ways to cut waste in time, cost, material, energy, skills and labour. As efficiency is improved the overall productivity is also improved. A material management is an important function in order to improve productivity in construction project.

Causes that affect the productivity of whole project:-

- a) Damage or loss of items
- b) Subsequent design changes
- c) Incorrect materials take off from of requirement, causing loss of productivity.
- d) Delay in material receiving.

IV. CONCLUSION

Once the root causes of waste generation are identified then it can be either avoided or minimized to benefit the project for future. This paper has identified major factors contributing to material waste in construction project. By identifying the significant factors in construction process, construction players are able to notice the best ways to apply new practice for reducing material waste, time delay and cost overrun in any project.

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