

Cost Optimization of Residential Construction Project through Waste Management Technique

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Abstract- Material waste has been recognized as a major problem in the construction industry that has important implications both for the efficiency industry and for the environmental impact of the construction projects. Moreover, waste measurement plays an important role in the management of production system since it is effective way to assess their performance, allowing areas of potential improvement to be pointed out. This thesis describes the main results occurrence of material waste at two building sites located in different regions of Ahmedabad. Some typical figures for the waste of some key construction materials are provided and the main causes of waste in the sector are discussed. The results indicate that the waste of materials in the construction industry is fairly high and that a large variability in waste incidence is found across different projects. Most of this waste can be avoided by implementing inexpensive preventive measures, mostly related to managerial improvements. The various material wastage which is occurred on construction site in different amount. This amount of wastage should be in control. The data of wastage of different materials on site will be carried out in a proper manner according to site scenario of work. The data is also carried out by a opinion questionnaire survey from different sites in Ahmedabad. The implication of the conclusion of the study will reflected in terms of Cost & Waste Management. The lessons drawn from the study contribute towards a better management system for construction projects pertaining to private buildings as well as the methodologies there of. The major finding work are: introduction of the cost optimization model through waste management, reduce, reuse, and recycle process of construction waste material, find out the important factors of cause and effect for construction waste material, proposal for a shifting of views within the waste management.

Index Terms- material waste, Indian construction industry, economic relevance, cost optimization model.

The Indian construction industry is characterized by challenges such as low productivity, lack of skilled labor, time and cost overruns, etc. These are associated with considerable waste present in the construction sites. There is no Indian policy document which examines waste as part of a cycle of production consumption-recovery or perceives waste through a prism of overall sustainability. The new municipal solid waste management rules 2000, which came into effect from January 2004, fail, even to manage waste in a cyclic process. Waste management still liner system of collection and disposal, creating health and environment hazards and also affect it. Urban Indian is likely to face a massive waste disposal problem in the coming years. Until now, the problem of waste has been seen as one of cleaning and disposing as rubbish. But a closer look at the current and future scenario reveals that waste needs to be treated holistically, recognizing is natural resource roots as well as health impacts and also reduce the waste generation. Waste can be health wealth, which has terrible potential not only for generating maintenance for the urban poor but can improve the earth through composting recycling rather than spreading pollution as has been the case. Increasing urban shifting and a high density of population will make management a difficult issue to handle in the future. Construction industry in India generates about 10-12 million Tons of waste annually. While Retrievable items like bricks, wood, metal, tiles and other materials are recycled in India, Concrete and masonry waste (>50% of total waste) are not recycled. Central Pollution Control Board has estimated current quantum of solid waste generation in India to the tune of 48 million Tons per annum of which waste from Construction Industry accounts for 25%.

INTRODUCTION

AIM OF STUDY

- The aim of study is to investigate the incidence of construction material waste in Indian construction industry and to prepare a cost optimization model of project by efficient construction waste management.
- Obtain a current construction waste material management scenario on construction sites in Ahmedabad.

NEED OF STUDY

- Projects be different from each other in one or more affect factors such as clients, construction quality, specification and resource employed responsibilities dedicated kind of cost involved wastage in construction industry. Each one of this factor may have crucial effect on the development of the project.
- In major projects involves heavy investment, require higher level of technology need of effective management of resource.
- It is apparent that as construction project are very large as far as quantum of work is concerned there will be some kind of wastage of resources in terms of manpower, material, and machinery.
- Sometimes a check on wastage of material may lead into a lot of cost control on the project.

OBJECTIVE

- To examine different types of construction waste.
- To identify the critical sources and main causes of construction waste.
- To design and prepare a cost optimization model through waste management in construction project.
- To study negative impacts of waste in construction work.

SCOPE OF STUDY

- The scope of study is restricted physical wastage (reinforcement, concrete, and block) on residential building in Ahmedabad. To suggest improved methods of recycling/reuse/disposal of construction waste materials.

- Data collection through questionnaire survey from 10 different residential sites for reason of waste of particular materials.
- Prepare cost optimization model according to the wastage of materials.
- 3R methods (reduce, recycle and reuse) will be used for waste management.

Construction waste scenario in India:

- India produces 10-12 million tons of Construction, Demolition, and Excavation waste material annually. The traditional practice in India is to dispose of this waste in landfills or illegally dump in rivers and water bodies. As per the Central Public Health & Environmental Engineering Organization (CPHEEO), the Indian Real Estate Industry alone is facing a shortage of aggregates to the extent of 55,000 million cum. In addition, 750 million cum of aggregates would be required to achieve the targets of road construction sector, which will lead to tremendous pressure on natural resources.
- Waste in Delhi alone produces more than 4000 tons of C&D Waste and due to improper disposal, this waste is choking storm water drains and polluting the Yamuna river bed.

To address the above issues and understanding the need and opportunity available to do value addition with the C&D Waste Material, IL&FS Environmental Infrastructure & Services Limited (IL&FS EISL) chose CDE Asia as its preferred technological partner to Design, Manufacture and Supply of the first C&D Waste recycling plant in India back in 2012. A 500 tons per day (TPD) capacity C&D processing plant was set in Burari, New Delhi.



Fig. wastage of cement, sand and blocks

- There are some major or minor components are responsible for wastage:

Major components:

- Cement, concrete, Bricks and plaster
- Steel (from RCC, and railing of staircase)
- Rubble, stone
- Timber(wood)
- Clay soil (from excavation)
- Minor components:
- Conduits (iron, plastic), Pipes (GI, Iron, Plastic)
- Electrical fixtures (copper/aluminum wiring, wooden baton, Bakelite / plastic switches, wire insulation)
- Panels (wooden, laminated)
- Plastic carry bags, sachets of tobacco and other plastics, Clothes, Cement bags, gunny bags, Thermocol, etc.

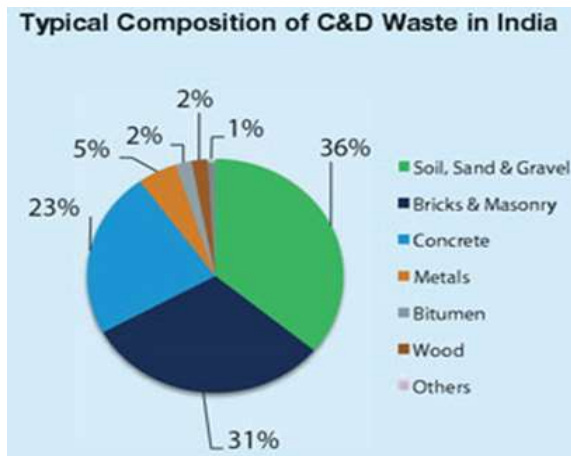


Fig .Typical composition of C&D waste in India

Various waste materials on construction site:

Steel Reinforcement:

Wastage of steel reinforcement should be controlled on construction site. Otherwise it will become a major problem about waste. To reduce the steel wastage engineers have to give attention on steel cutting procedure and making of steel stirrups. Because due to improper cutting length of steel the wastage will increased day by day. The labor should be aware about the steel wastage and how to reuse it in various steel reinforcing work.

Due to changing in structural drawing the steel cutting length also affected.

Many construction sites don't have scale of weighing of steel reinforcement. Due to it the original figure of wastage cannot estimated. In professional field the conversion table for calculate steel weight also used. Labors should have find out the cutting length of steel in advance from engineers.

Concrete:

- Some amount of concrete is always wasted during construction. Normally we consider 3- 5 % as wastage while estimating the materials quantity for particular construction work. But more than 3-5% wastage may increase the overall cost of the project and affect the work progress. Hence it is very important to concrete wastage at the site during concreting.
- The wastage of concrete can be reduced by proper planning of pour. Concrete pour card should be prepared before concreting. So we can know the quantity of concrete to be poured before starting concrete mixing.
- Production of concrete should match with the pouring speed to reduce waiting time and to avoid the setting of concrete before placing in the form.
- The approximate concrete quantity should be estimated and when the pouring work is near to be completed, do inform the batch plant operator to stop extra concrete supply.
- During concrete placement, there may be some issues at site which can stop concrete pouring for some times. In such situations, the supervisor should inform the batching plant operator to pause the concrete production and supply.



Fig. Concrete waste generated due to pumping line system

Block or brick:

- On many sites there are lack of awareness to cutting the blocks in proper manner according to required dimensions the wastage can be occurred. The placing and handling of block should be done properly, due to improper placing and handling of block from one place to another the wastage will increased.
- The main reason of wastage of block is occurred during transportation.



Fig. AAC Block wastage on site due to improper handling and placing

CONCLUSION

The construction industry should have to minimize the wastage of materials on site and it can affect the environment and also affect the estimated project cost. To reduce this ill effects of wastage on project construction industry should develop a fixed scenario of usage of wastage and recycle it in a proper manner.

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