



Optimizing the Profitability by Reducing Generated Waste at Construction Site

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ABSTRACT

The waste management on construction site is important as it plays an important role as it has many significant effects. During the last few years enormous growth in infrastructure has been seen, by wide range of diversity construction organization Construction industry in India produces a large range of different waste like bricks, dismantled building portion, M.S. steel etc. The amount and type of waste are created at all the stages of construction right from site preparation, demolition of existing structures to final product. Minimizing the waste and optimizing the profitability is possible by reducing cost of material with proper planning, scheduling, purchasing, procurement, receiving, inspecting, handling, storing and warehousing. Waste at construction sites in various forms accounts for upto 30-40% of the contract value. This can be brought down substantially if only one is aware that waste is of such huge magnitude. A study was made to eliminate waste in construction project site, based on complete availability of Technical data has been taken into consideration. Total minimization of wastage at construction site cannot be totally eliminated, but can be minimised to a great extent with proper planning and practise.

Key words: Waste management, minimizing waste

INTRODUCTION

Construction is the second largest economic activity in India next to agriculture. The construction industry has registered an enormous growth world-wide during the last few decades which have been characterized by a wide range of diversity in the operations. Indian Construction Industry is highly employment intensive and accounts for approximately 50% of the capital outlay in successive 5- year plans of our country. The projected investment in this industrial sector continues to show a growing trend Central pollution Control Board has estimated current quantum of waste puts enormous pressure on waste management system. The use of excess material constitutes a negative impact with to redeeming social benefit and the disposal of that waste causes further problems. If the waste is inert, it will occupy space and cause disruption during disposal. If it is a hazardous material, it also has the potential to cause continued and widespread ecological harm.

LITERATURE REVIEW

The term “wastage” refers to the variance, if any, between the estimated and actual consumption of an individual item and total factor consumption of all input in a construction project. Thus, wastage in the use of an individual item can be deduced from the detailed engineering drawings and methodologies of work execution. It is important to note that

wastage refers to the amount wasted. Waste is anything that is not needed anymore. But if somebody else can use it, rather as it is (called reuse), or by processing it (called recycling), then the waste created on site can turn out to be beneficial. It is environmentally irresponsible to produce excessive quantities of waste and to waste your waste.

Construction activity leads to generation of solid wastes, which include sand, gravel, concrete, stone, bricks, wood, metal, glass, plastic, papers etc. The Management of construction and demolition waste is a major concern for town planners due to the increasing quantum of demolition's rubble, continuing shortage of dumping sites, increase in transportation and disposal cost and above all growing concern about pollution and environmental deterioration.

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NECESSITY OF STUDY

Waste at construction sites in various forms accounts for upto 30-40% of the contract value. This can be brought down substantially if only we are aware that waste is of such huge magnitude.

Why waste is important?

- Revenue = Min required expense + Waste
- Profit is the air we breathe without which a business will die.

The true cost of waste is equal to: (pertaining to materials) Purchase price and transportation costs of materials that are being wasted + Cost of storage, transport and disposal of waste + Loss of income from not salvaging waste materials. However, this doesn't even include the cost of the time personnel spent managing and handling the waste. Waste reduction is based on meticulous planning and strict implementation. Proper planning of erection, commissioning and full capacity utilization of equipment reduces waste. Wastage can be controlled by good housekeeping. Designer, Materials manager and the project manager play a vital role in controlling waste. All personnel should be aware of waste at their site and should actively try to reduce the same. High cost of operation identified as a major problem that not only affect construction industry directly but also overall economy indirectly, as high input and process costs reflected in high cost of infrastructure, translate into higher user charges. This also reduces the surplus that can be ploughed back into construction technology up gradation and labour welfare. In today's world, increases of revenue is governed by external factors such as competition, market demand, customer etc. Profit cannot be increased by increasing revenue. So, profit can be increased by reducing or eliminating wastage. That is the reason why control of wastage is necessary for our survival. Controlling indirect expenditure is essential.

WASTE MANAGEMENT ON SITE

Storing material waste at site costs money. If material waste is stored in a bad manner, it may cause accidents. Minimize the transportation cost of waste to ensure that containers carrying waste are full to capacity. Segregation of different types of waste is done to simplify their disposal or reuse. Storage area should have easy access, should be away from vehicle movement, well protected from rain, moisture etc. Lot of wastage of materials takes place during handling and fixing like improper height of the cement feeding hopper, which leads to spilling of cement while feeding into the batching plant. Bricks, bolts/nuts, Scaffold fittings, etc. are dropped while transporting to the place of end use. Tins of synthetic paint, epoxy is left open. Over-production of concrete leads to dumping of excess quantity, which causes more problems for housekeeping and during clearing of the site. Wrong cutting of sheet metals also leads to large quantity of wastage. The site storage area must be protected from any vandalism and theft. Many forms of indirect waste also go unnoticed at the sites adding to the construction cost. Indirect waste may happen due to misuse of materials, extra laps in reinforcement, use of extra cement in concrete etc.

Waste due to negligence

- Unauthorized issues
- Thefts, flood losses, fire losses, delay in reporting the same
- Unauthorized entry to stores

- Materials received during night
- Failure to insure
- Failure to claim insurance
- •Transfer of unserviceable materials from one site to the other

Cause of wastage

Major thrust areas responsible for waste generation identified are enlisted as under.

These can be classified into two main categories:

- i. Construction Practices
- ii. Construction Management.

Construction Practice

- Left over in case of mortar/ concrete (due to excessive preparation)
- Unplanned cutting of steel and non-utilization of cut pieces
- Unsystematic handling of materials and poor record-keeping
- Incorrect use of Tools and Machinery
- Changes in Design, Specifications and/ or Materials
- No prior Estimation of precise quantities
- Poor workmanship
- Low level of Mechanization

CONSTRUCTION WASTE MANAGEMENT GUIDELINES

Prevent Waste in the firstPlace

- Design with standard sizes for building materials.
- Specify materials and assemblies that can be easily disassembled at the end of their useful life.
- Design precast concrete member for concrete (Tilt-up) construction.
- Choose durable non-toxic interior finishes or materials
- Design spaces to be flexible for changing uses
- Consider reusing materials (on-site) or installing salvaged materials from of site sources.
- Plan for waste prevention.
- Use Construction methods that prevent waste.
- Practice job-site waste prevention method.
- Purchase to prevent waste.

Salvage, Reuse and recycle

- Survey the site before demolition or deconstruction.
- Develop a construction waste management plan.
- Identify reusable or salvageable items.
- Select salvage removal alternatives.
- Plan for recyclable materials
- Estimate the costs and savings.
- Consider other project costs and savings.
- Identify hazardous waste considerations.

Design of Waste Management plan

- Make a waste management plan.
- Decide which materials to recycle.

Put the waste management plan intoaction

A well-developed construction waste management plan combine's good communication with attention to details.

- Educate everyone about the waste management program
- Find the space
- Make it convenient
- Promote and educate
- Prevent contamination

- Track your success

Use Recycled-content Building Materials

An important part of the cycle of reclaiming materials is the reuse of those materials. Buying recycled content building materials supports efficient use of our natural resources without compromising building standards.

- Identify recycled-content building materials.
- Know the types of recycled content materials.
- Discover how to buy recycled.
- Recycle.
- Co-mingle
- Source separated
- Reuse
- Salvage

CONCLUSION

The study classifies the causes of waste based on the degree of severity. It is found that about 11% of all the causes are highly severe and can lead to substantial amount of waste on site. The high potential of material wastage on site due to improper planning, Poor management, Improper quality control, lack of individual responsibility and overall negligence. The secondary cause due to improper specification, Improper Labour and Supervision to Faulty systems and procedures. The low potential causes include Lack of technological know-how, Unavailability of resources at required time, unhygienic working environment, Lack of standardization, poor distribution network and theft of Pilferage.

REFERENCES

- [1]. Abd. Majid, M. Z. and McCafer R. (1997), Discussion of Assessment of labor Performance of Maintenance Contractors in Asian nation. *Journal of Management in Engineering, ASCE*. Vol. 13, No. 5, pp91
- [2]. Addis, B. Talbot, R (2002). *property Construction procural: A Guide to Delivering Environmentally responsible comes*. CIRIA, London, CIRIA C571
- [3]. AziziYahya, ShahrinHashim, JamaludinRamli, Yusof Boon, Abd. Rahim Hamdan (2007). *MenuasaiPenyelidikanDalamPendidikan*. PTS delicate
- [4]. Christini G., Micheal F., Chris H (2004). *Environmental Management systems and ISO 14001 Certification for Construction corporations*. *Journal of Construction Engineering and Management*. 330 - 336
- [5]. *Hired Institute of Building (CIOB) (1989). Project Management in Building*. hired Institute of Building
- [6]. *Leased Institute of Building (CIOB) (1989). Decide to Reduce Building Waste*. UK: hired Institute of Building.
- [7]. *City of Burnaby (n.d.). Management and disposal of construction waste out there at: WWW.city.burnaby.bc.ca cityhalldepartmentsdepartments_buildingbldng_artcls bldng_artcls_mnmnt.html*. (Accessed01/08/08)
- [8]. CIRIA (1994). *Environmental reference for Building and technology Projects- Construction section*. London: CIRIA Special Publication.
- [9]. Conway H. (1990). *Setting ought to modification the angle*. Transport