

# Evaluation of Optimum Utilization of Resources in Construction Industry

Lakshmi Sravani Imadabathuni, SS.Asadi, D. Satish Chandra

**Abstract:** Construction Industry involves lot of resources. Unless Proper planning of resources is done, no activity can execute in fixed schedule. The main resources involved in construction industry are money, material, machinery, manpower. Proper management of resources should be done before executing a project. When utilizing this resource like materials lot of waste is generated so that the material gets increased and cost of the project gets increased which effects the money resource..So construction Industry produces a huge amount of solid waste which is not eco-friendly and uneconomical. The construction waste is a vital problem for contractors in controlling and managing. Poor management of resources results in degradation and constitutes a major risk to environmental security in the study area. This study aims to find out how much amount of waste is generated in proposed site and how it can effectively utilized so that it decreases the cost of the project and reduces its adverse effects caused by the construction waste to environment. The management of construction waste has a serious problem on final cost, quality, time and impact of the project on the environment. Questionnaire has been distributed among all the entities of the project management. The research revealed that optimization of resources will decrease the project cost. The technique used for utilization of resources in construction site is '3R' Concept.

**Index Terms:** Degradation, Optimization, Project, Resources,

## I. INTRODUCTION

The construction industry contributes economy growth of nearly 8.6% of GDP to India. Construction involves majorly four types of resources. They are money, material, manpower, machinery. So, proper resource balancing is required in construction industry. Resource balancing is a process of managing the resources in efficient way. The cost and time is direct depends on construction site.

### A. Factors which influence the resource in schedule

- Activities duration mainly depends on usage of resources and availability.
- Resources are a important component of the project cost
- Proper scheduling of resources will improve the efficiency of the construction project.
- Improve scheduling will result the cost overruns in construction project.

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## II. TYPES OF RESOURCES IN CONSTRUCTION INDUSTRY

### A. Manpower

Allocating the right person to a right work will improve the efficiency on the project. So, proper management of manpower is required for improvement of any organization.

### B. Materials

Materials play an important role in construction site. Efficiency of the work in site mainly depends on type of materials used in the project. If the organization neglects the quality of the materials, it loss its fame in society.

### C. Machinery

Machinery contributes about 10-15% of total cost of the construction project. If there is no proper machinery during execution of project, the efficiency of the project gets reduced.

### D. Money

Money is the most important factor in any industry. Without money, no work or activity can be started or completed. So, one should money properly for sustainable development of the organization.

### E. Resource Optimization

Optimization of manpower, machinery, money, materials effectively and efficiency in Construction.

So, one should pay attention towards resources in construction industry but while utilizing this resources in construction industry, huge amount of wastage is generated due to various construction activities. So waste management is required in construction site. Waste management is a biggest challenge in our society that should be paid attention. Global warming and environmental problems are caused by waste. The construction industry creates nearly 54% of carbon dioxide in atmosphere due to various activities and resources. In the present study, researcher attempt to investigate waste management application in the Guntur context. Now-a-days in order to decrease the amount of waste in construction industry, especially in the context of Guntur city, different new approaches of waste management has been considered to be applied. Among them 3R concept has been recognized as the most effective project gets decreased project gets decreased Among them 3R concept has been recognized as the most effective approach of waste management has been considered to be



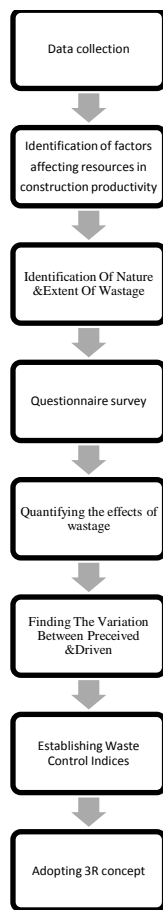
applied. Reduce is the most important factors compared to Reduce and Recycle for minimizing the waste in. Construction Industry. The benefits of using reuse materials in Construction sites are to decrease the usage of resources and to protect the environment and to reduce the landfills.

### III. RESEARCH SIGNIFICANCE

The present study aims to optimize resources effectively and efficiency in construction industry and to minimize the waste in construction site and to propose a best waste management technique in order to reduce waste in construction site and to reuse such construction waste effectively so that the cost of the project gets reduced.

### IV. DESCRIPTION OF WORK

The below Flowchart represents the methodology of the present study.



**Flowchart: Methodology**

First the data is collected and next we identify the factors which affect the resources in construction productivity and we identify the nature and extent of wastage in construction industry and we do questionnaire survey to know which factors driven the wastage of materials and we propose 3R concept in the construction site to utilize the waste effectively and efficiency so that the cost of the project gets reduced.

#### A. Project attribute

The project presents the details of residential building In terms of cost variance and wastages in each attribute.

TYPE OF PROJECT: Construction of a Resident building  
 BUILT UP AREA : 13500 sq ft  
 NO OF STOREYS : G+12

#### B. Construction resources and cost

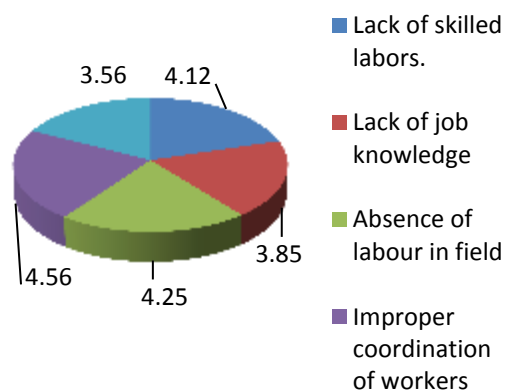
The entire project cost break-up is shown in Table I.

**Table I: Project cost break-up**

Material	40%
Manpower	25%
Machinery	15%
Profit	10%
Indirect cost	05%
Overhead	05%

### V. RESULTS

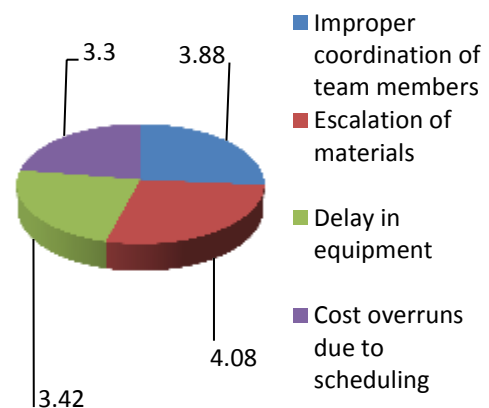
#### A. Factors affecting manpower



**Fig. 1: Factors affecting manpower**

The above Fig.1 represents the factors affecting the manpower.

#### B. Factors affecting material



**Fig. 2: Factors affecting material**

The above figure represents the factors affecting the material



C. Factors affecting money

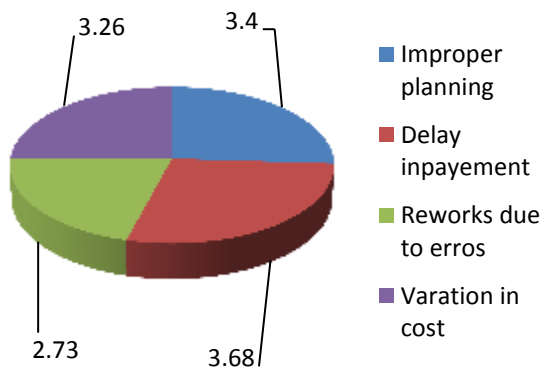


Fig. 3: Factors affecting the money

The above figure represents the factors affecting the money

D. Wastage analysis

Wastage Analysis is done by calculating the variation between estimated consumption of materials and Actual consumption of materials.

S. No	Item	Estimated Consumption	Actual Consumption
1	CEMENT	4320 BAGS	4497BAGS
2	STEEL	14760MT	14967MT
3	AGGREGATE	6310375Cu.m	6340375Cu.m
4	SAND	61120Cu.m	61360Cu.m
5	BRICKS	20700Cu.m	20940Cu.m
6	TILES	22800Sqft	22875Sqft
7	PAINTS	1296 Liters	1401Litres

**Waste cost impacts:** The wastage cost of resources adds directly to the project cost considering the present day price of resources.

S. No	Material	Wastage	Cost Impacts
1	Cement	177 BAGS	177BAGS×RS310 =54870
2	Steel	202 MT	202MT×40000 =8080000

E. Waste control indices

Waste Control Indices (WCI) of materials can be calculated as under the actual consumption of resources in particular for the project.

For example, let us consider cement

$$\text{WCI (Cement)} = \frac{\text{Actual Consumption}}{\text{Estimated Consumption}} = \frac{4497}{4320}$$

$$= 1.04$$

The percentage wastage of cement is as follows

$$= 1.04 \times 100 = 104$$

$$= 104 - 100 = 4$$

This indicates that percentage wastage of cement is 4%

VI. CONCLUSION

The construction wastage is mainly due to improper management of resources and due to negligence of the management. Manpower is majorly affected due to improper coordination of workers and materials are affected due to escalation of materials. Delay in payment is the important factor which affects the money. So, the construction industry should take care of all factors affecting the resources so that project would complete within the time.

Due to construction industry, lot of waste is generated. This waste effects the environment. So a proper management of waste is required to reduce these wastes and to use this waste effectively so that cost of the project gets reduced. So, we adopt 3R concept in our construction site i.e., Reduce, Reuse, Recycle. By adopting this technique waste generated due to various constructions and it is very economical and it promotes sustainability.

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