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Construction Waste Management

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Abstract: ***The paper describes about an ongoing research project which gives a preliminary result to develop a method for waste control for construction sites. This project proposes waste quantification method for conventional construction. It is expected that the quantification of waste for various stages of construction will contribute additional knowledge on waste generation rate & trend could benefits contractors, property developers, consultants & local authorities in prediction of waste generation & facilitate future planning of waste management. In this dissertation with help of published literature in various journals and magazines, personal interviews of experts working in the field, information available on dedicated websites and actual case studies and field visits various risks associated with construction waste are identified. It is observed that due to inadequate and insufficient monitoring system the various problems such as in Physical waste of man-hour, waste of equipment, Financial waste, sudden increase in cost , project delay due to miscommunication, delay in approval of design etc. are studied which are associated with the waste generation on the site. For reduction in these problems analyzed various methods are being practiced and remedial measures are being suggested.***

I. INTRODUCTION & OBJECTIVES

To the benefits of construction practices, this research would set to be one of the preparatory efforts to encourage the construction industry. Problems of the industry would be redefine and reassess in order to reformat a new strategy and plan for improvement in the construction practices. This study is also used to set up some frame work for quantitative measurement on the performances and wastes measurement for construction industry.

A. To rectify the causes, sources and amount of waste generated on site in existing Scenario and practices in construction industry.
B. To find losses due generation of construction waste.
C. To find the solution to be put into effect at residential construction sites to reduce waste production.

II. METHODOLOGY: CASE STUDY

A. Selection of Companies

The selection of companies was done from the CREDAI Sangli & Kolhapur Builders Association website because it provides complete information of about 180 companies affiliated with it. Two criteria were used to select companies for the study. First, only private companies were chosen. Second, only companies doing predominantly residential construction works were chosen.

B. Data Collection

At this phase, questionnaires were designed to collect data. The questions were created based on the concepts acquired on the literature review. These were also designed in such a way that companies did not have to spend much time to answer. The questionnaire was designed to identify and rank the most frequent waste categories present on job site affecting the final cost of the residential projects.

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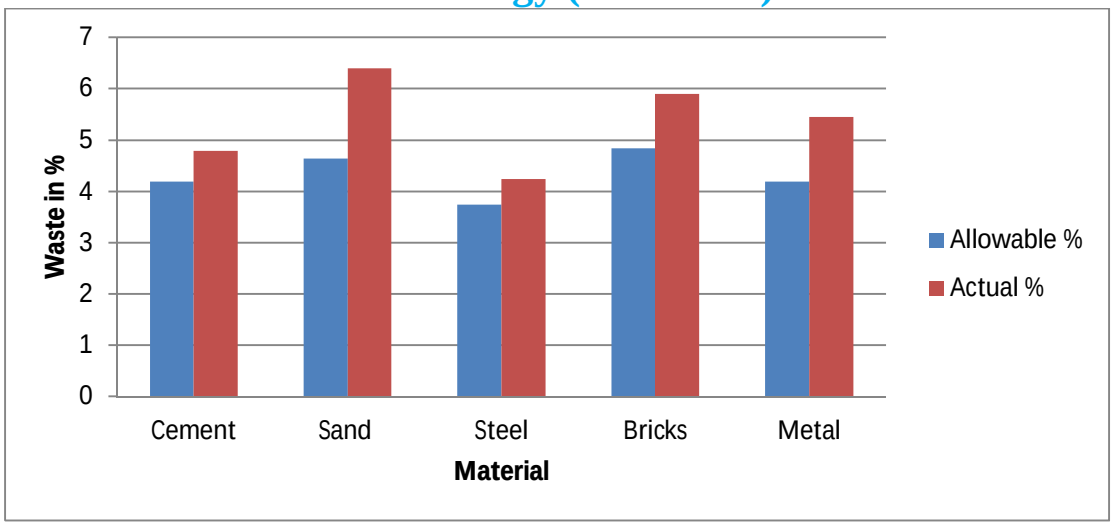

The descriptive analysis on the respondent's perception was mainly focused on identifying the no. of counts on waste recognized as considered for four waste category as

Design

Operation

Material Handling

Procurement

Materials	Approx. Qty.	Rate	Amount
Cement	12674 Bag	310	3802200
Sand	988 m3	4300	1496400
Aggregate	1152 m3	1700	690200
Steel	98000 Kg	44	4312000
Brick	311000 Nos.	4.4	1368400
		Total	11669200

	Approx.Qty.	% Waste	Quantity	Rate	Cost
Cement	12674 Bag	7	887.18	310	275025.8
Sand	988 m3	7	24.36	4300	104748
Aggregate	1152 m3	6	24.36	1700	41412
Steel	98000 Kg	4	3940	44	173360
Brick	311000 Nos.	6	18660	4.4	2104
				Total	676649.8

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	Quantity	Wt. in kg	Wt. in tonne
Cement	887.18	887.18	1339.65
Sand	24.36	24.36	37.27
Aggregate	24.36	24.36	56.7
Steel	3940	3940	3.94
Brick	18660	18660	48.51
		Total	1488

1) *Disposal of waste generated:* The disposal cost primarily consists of two costs,

a) *Handling Cost:* Almost 2.5hrs/tone were taken to gather & carry construction waste to dump by 4 labours. However, this number can widely vary waste on the material and the distance from the job site to dump site. The cost of handling construction waste rarely considered in contractors total waste management cost.

b) *Transportation cost:* The truckling cost includes ownership cost, operation cost & drivers labour with the available resources, assuming that 4 labours take 15 minutes for 1 tone, so as to fill the dumper of capacity about 10 tonnes 4 labours will take 2.5hrs. & assuming that the disposal site is 2km away then 1 day 2 truck load can be taken away from the construction site to disposal site. The rate of dumper is taken as ₹ 250 per trip & ₹ 150 per head are to be paid to labours.

The summary of the total approximate quantity of the five major construction materials & their cost according to the rates during visit are given by following table below.

The expenditure of the purchase of these five materials accounts of about 40% of the total project cost.

Then for the total waste of- **1488 tonne** generated

No. of days required would be **75 days**

Sr. No.	Particulars	Cost
1.	Cost of total trip 150 x 250	37500
2.	Amount to be paid for labour	45000
3.	Hence total cost of disposal	82500

Total cost of waste= cost of purchase + Cost of Disposal

= 676649.8 + 82500

= 759149.8 /-

According to contractor, 10% of the total cost of project is considered for benefit from that project.

As per above mentioned data in table ,the total cost of project = **1,16,69,200/-**

Therefore, 10 % contractor profit = **11,66,920/-**…….. say Y

So, Y is to be the net profit. But due to cost of waste material & its disposal cost, the net profit will get reduced nearly upto **6.5 %** i.e. **407770.2/-**

Here,

Cost of waste = **759149.8 /-**

So it is necessary to practice CWM in each & every of the project wherever possible.

III. CONCLUSION

It is apparent from the finding that the losses incurred due to construction waste are enormous & sufficient proactive measures need to be taken to avoid unnecessary cost of construction.

Also from the studied it is noticeable that the construction waste is affecting quality of air, water & land and also affects the health of construction workers.

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Waste reduction is the best and usually the economical of the different waste Management alternatives. To implement an efficient waste control program in construction projects is necessary to identify what is generating waste and its causes. As established at the beginning of this study, the objectives of this study were to identify the most frequently occurring waste categories affecting the final cost in residential projects, identify the types of waste occurring on the top three waste categories affecting the final cost and determine their possible causes, and recommend guidelines to be applied in conduction projects and helps to reduce waste. To accomplish these goals, construction company's responded two questionnaires, the obtained data was analyzed and guidelines to reduce waste were recommended based on these findings.

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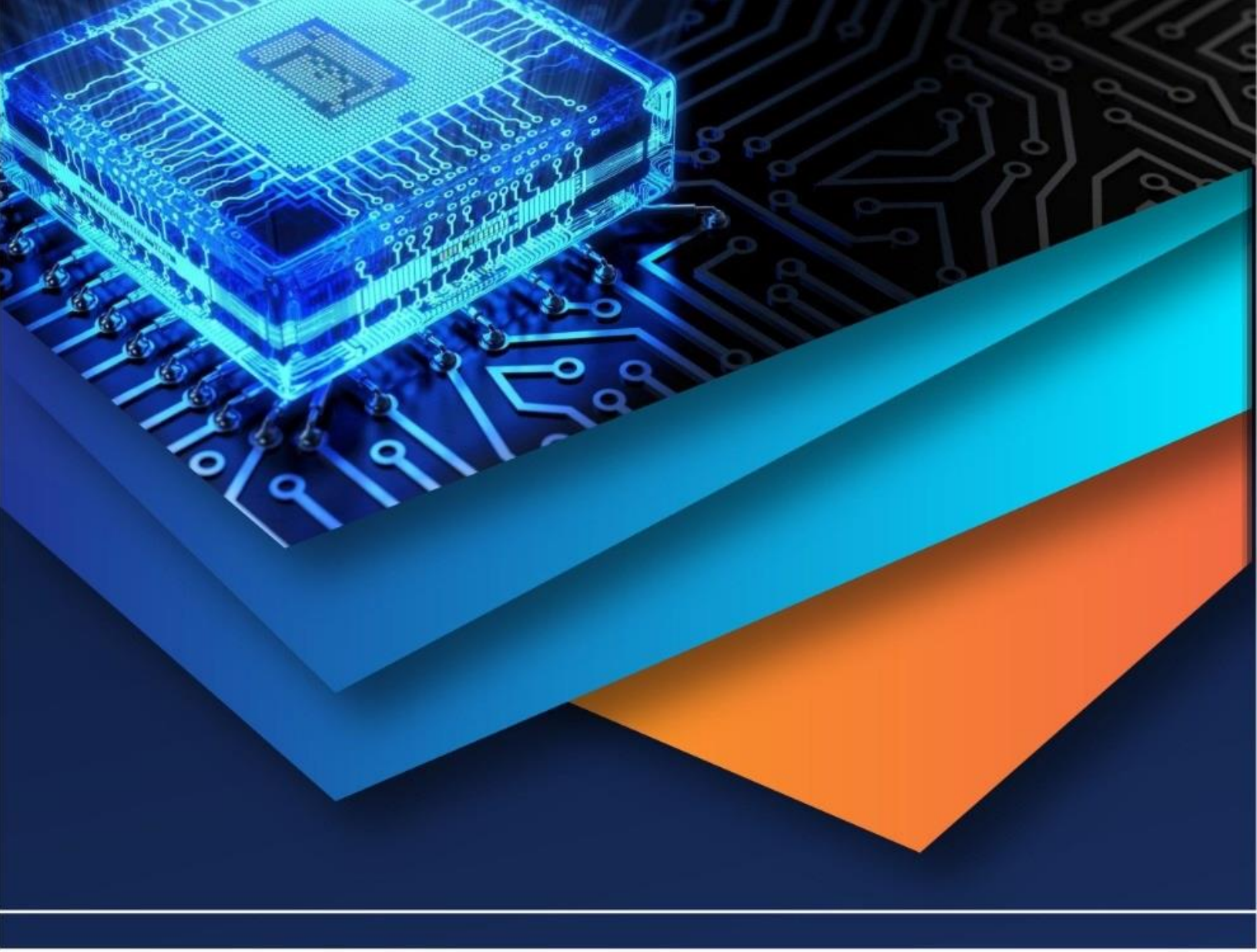

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