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Survey, Identification and Quantification of Construction Activity Waste

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ABSTRACT: It is one of the difficult aspect of construction industry to find out exact cause of construction waste. The construction waste productivity is increase day by day due to lack of standard waste management plan or system within the industry. Many software's are available for management of construction waste in market, but it is observed that due to prohibitive cost of software and their training they are not use frequently. This theory aimed to find out how much construction waste is costing construction project budgets and attempted to make alert to the industry on how profits can be maximized.

For the empirical investigation, a mixed methodology was used for data collection the construction sector, together with documentary and observational data, to examine the issue of construction waste and cost management. The research revealed that several construction companies in pune do not adhere to best practices and standards. Practices such as site waste management plan, waste minimization strategies were found to be non- existent in these companies.

KEYWORDS: Constructionwaste, Identification of waste, Quantification of waste.

I. INTRODUCTION

Construction waste and its management is one of the difficult and critical issue in the developing cities in the world. Once the construction waste is generated, it is very difficult to reuse the waste due to different type of waste generated from different construction activities. consequently, now a day's waste prevention and its minimization are the need of construction industry. Depleting natural source which increase market value of material, delay in activity time, excess use of labour as well as material, mis-communication, mis-leading, mis-guide are the negative impact on generate negative impact on project cost. considerable amount of waste is generated for each structure, it shall be understood that prevention of construction waste is beneficial for project rather than generating waste and reuse, recycle the waste. This paper focus of source of identification of construction waste and approaches to manage it.

II. LITERATURE REVIEW

i)Material wastage in construction activities: Hong Kong Survey

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Abstract: Construction wastes have become the major source of solid wastes in Hong Kong where construction and demolition activities generate thousands of tonnes of solid wastes every year. The increasing generation of construction wastes has caused significant impacts to the environment and aroused growing public concern in the local community. Thus, the minimization of construction wastes has become a pressing issue. This paper investigates the profile of waste generation from applying diverse types of building materials to diverse types of construction projects. It is considered that the application of various building materials to diverse types of projects has different impacts to the

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size of waste generation. Therefore, the paper attempts to identify the relations between waste generation and the application of building materials to diverse types of projects. Following this identification, proper methods are proposed to mitigate the generation of wastes by adopting proper construction and management methods, which allow the waste reduction from using building materials. Data from the construction industry of Hong Kong are used for the analysis.

ii) Impact of the Construction Waste on the Cost of the Project

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Abstract: Construction is a vital connection to the infrastructure and growth of industry in India. Building roads, bridges and other constructed facilities play a key role in shaping society's future. Now days the increased economic as well as urbanization in India have lead into extensive construction activities that generate large amount of waste material in construction projects resulted into environmentally unfriendly and costly to project budgets. So, the management of construction waste plays key role in the cost of project. This paper aimed to estimate the cost of construction waste and its impact on cost of project and attempts to suggest recommendations to the construction industry to maximize the profits and minimize the construction waste.

iii) Construction Materials Management on Project Site:

Abstract: This paper is written to fill a void created by the absence of proper materials management on construction sites. To managing a productive and cost-efficient site efficient material management is very essential. Research has shown that construction materials and equipment may constitute more than 70% of the total cost for a typical construction project. Therefore, the proper management of this single largest component can improve the productivity and cost efficiency of a project and help ensure its timely completion. One of the major problems in delaying construction projects is poor materials and equipment management. This paper describes the main results of survey carried out in Ahmedabad that investigated the material management of 3 well-known builders of Ahmedabad.

III. IMPORTANCE OF WASTE MINIMIZATION

Waste minimization deliver financial benefits for projects, such as reduction in cost of transportation, cost of purchase material, salary payment of man power cost of machinery, cost of waste storage etc. also there are other benefits of waste management such as site safety, increase in work efficiency, productivity of project and financial steadiness for project.

IV. IDENTIFICATION SOURCE OF CONSTRUCTION WASTE

Identification of construction waste is crucial part of project. if the source of waste is find out at the initial stage of activity, waste can be minimized at the initial phase of activity. The construction waste is categorized in two parts one is avoidable and another is non-avoidable. If the cost of waste is more than the prevention cost is called as avoidable waste and reduction of waste causes higher investment than economy produce called unavoidable waste. The reason and percentage of waste are varying from project to project. some common reason of waste found similar in different projects are enlisted below:

- i) improper movement of staff and labour,
- ii) wrong specification,
- iii) defective products,
- iv) change in design,
- v) inferior quality of work
- vi) lack of labour management
- vii) lack of training sessions
- viii) lack of communication within the team
- ix) lack of proper methodology of work process
- x) improper storage of construction waste

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xi) improper time management.

IV. QUANTIFICATION OF CONSTRUCTION WASTE

The study carried out on 5 different residential projects

SUMMARY				
Sr. NO.	DESCRIPTION	ESTIMATED COST	ACTUAL COST	DIFFERENCE IN COST
1	PROJECT : I	33,24,34,588.00	39,25,78,568.00	6,01,43,980.00
2	PROJECT : II	24,22,36,541.00	25,27,61,882.00	1,05,25,341.00
3	PROJECT : III	15,78,79,088.00	16,87,92,913.00	1,09,13,825.00
4	PROJECT : IV	13,76,60,992.00	15,76,80,524.00	2,00,19,532.00
5	PROJECT : V	24,45,92,272.00	29,26,72,455.00	4,80,80,183.00

PROJECT -I

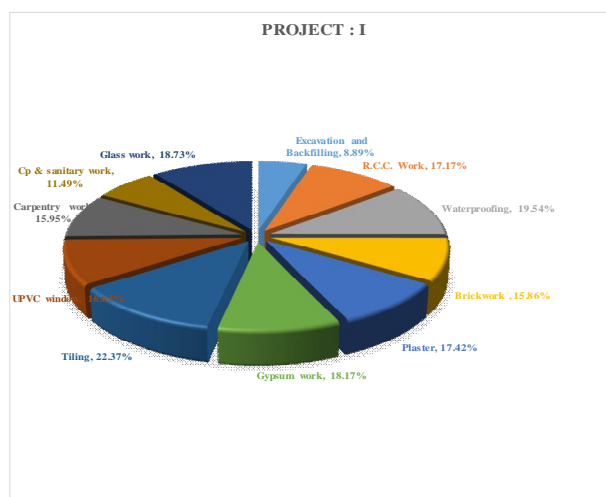
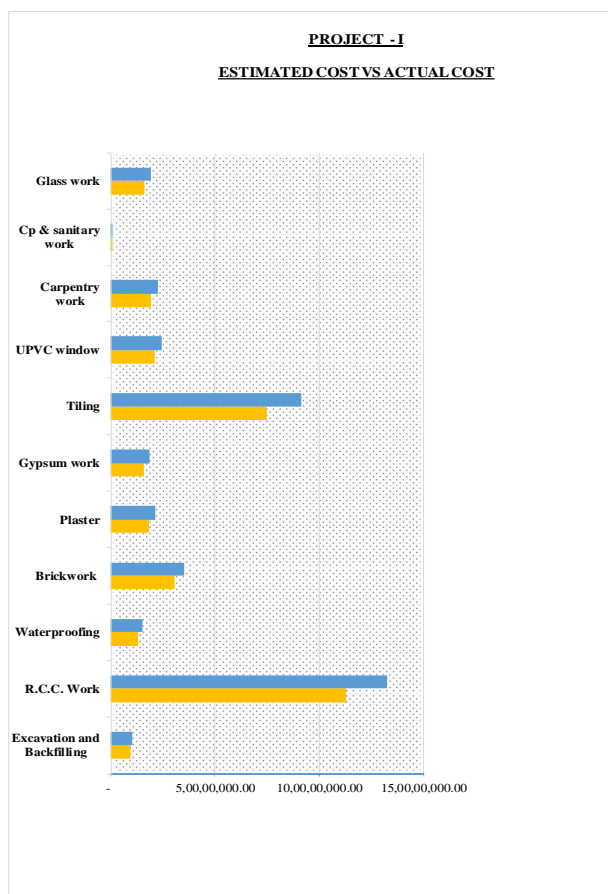
PROJECT :I					
PROJECT TYPE - RESIDENTIAL BUILDING					
Sr. No	Description	Estimated Cost (Ec)	Actual Cost (Ac)	Difference In Cost (Dc) = Ac - Ec	Wastage (Dc / Ec) %
1	Excavation and	95,53,722.00	1,04,02,668.00	8,48,946.00	8.89%
2	R.C.C. Work	11,29,56,480.00	13,23,54,294.00	1,93,97,814.00	17.17%
3	Waterproofing	1,30,30,417.00	1,55,76,207.00	25,45,790.00	19.54%
4	Brickwork	3,04,41,908.00	3,52,68,895.00	48,26,987.00	15.86%
5	Plaster	1,83,36,526.00	2,15,31,452.00	31,94,926.00	17.42%
6	Gypsum work	1,57,40,429.00	1,86,00,755.00	28,60,326.00	18.17%
7	Tiling	7,46,09,752.00	9,12,99,471.00	1,66,89,719.00	22.37%
8	UPVC window	2,11,57,750.00	2,46,75,602.00	35,17,851.00	16.63%
9	Carpentry work	1,95,33,167.00	2,26,48,606.00	31,15,439.00	15.95%
10	Cp & sanitary work	7,11,252.00	7,92,975.00	81,722.00	11.49%
11	Glass work	1,63,63,185.00	1,94,27,643.00	30,64,459.00	18.73%
	Total	33,24,34,588.00	39,25,78,568.00	6,01,43,979.00	

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PROJECT-II

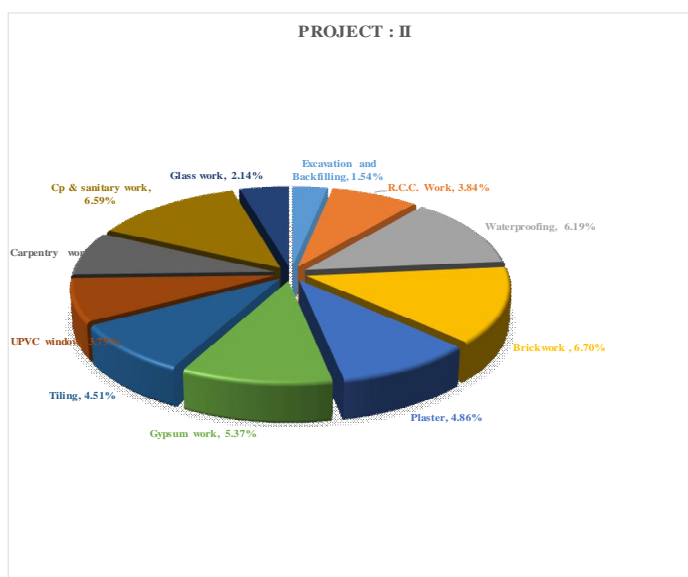
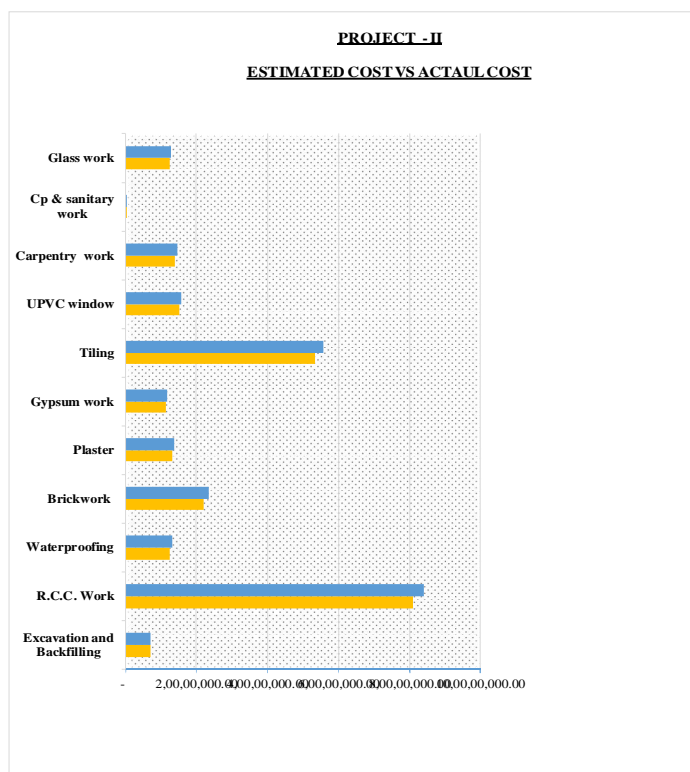
PROJECT : II					
PROJECT TYPE - RESIDENTIAL BUILDING					
Sr. No	Description	Estimated Cost (Ec)	Actual Cost (Rc)	Difference In Cost (Dc) = Rc - Ec	Wastage (Dc / Ec)%
1	Excavation and Backfilling	68,59,450.00	69,65,356.00	1,05,905.00	1.54%
2	R.C.C. Work	8,09,60,637.00	8,40,72,846.00	31,12,209.00	3.84%
3	Waterproofing	1,24,61,788.00	1,32,33,086.00	7,71,297.00	6.19%
4	Brickwork	2,19,58,090.00	2,34,29,729.00	14,71,638.00	6.70%
5	Plaster	1,31,29,090.00	1,37,67,521.00	6,38,431.00	4.86%
6	Gypsum work	1,12,70,265.00	1,18,75,224.00	6,04,960.00	5.37%
7	Tiling	5,34,44,020.00	5,58,53,169.00	24,09,149.00	4.51%
8	UPVC window	1,50,81,778.00	1,56,53,150.00	5,71,372.00	3.79%
9	Carpentry work	1,40,40,740.00	1,45,79,508.00	5,38,767.00	3.84%
10	Cp & sanitary work	5,06,509.00	5,39,888.00	33,378.00	6.59%
11	Glass work	1,25,24,174.00	1,27,92,405.00	2,68,231.00	2.14%
	Total	24,22,36,541.00	25,27,61,882.00	1,05,25,337.00	

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PROJECT -III

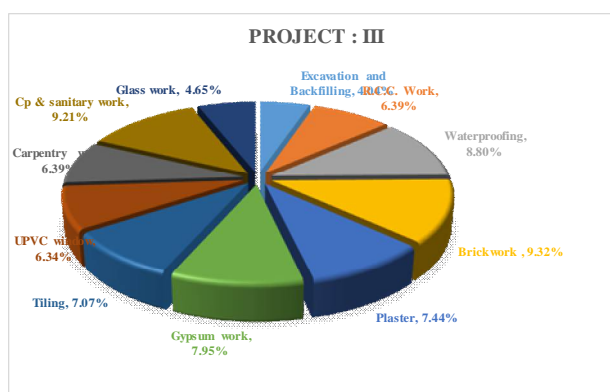
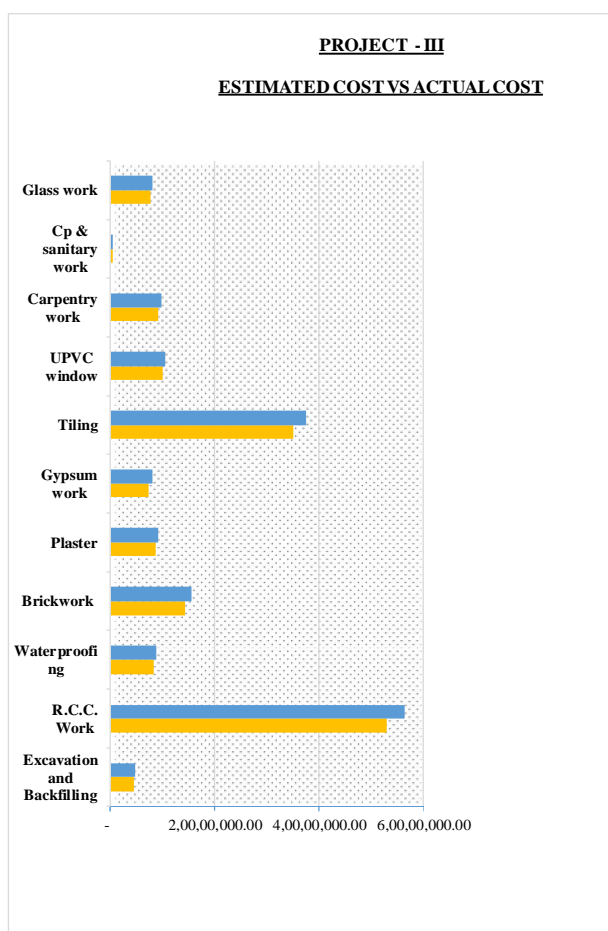
PROJECT : III					
PROJECT TYPE - RESIDENTIAL BUILDING					
Sr. No	Description	Estimated Cost (Ec)	Actual Cost (Rc)	Difference In Cost (De)= Rc - Ec	Wastage (De / Ec)%
1	Excavation and Backfilling	44,78,307.00	46,59,077.00	1,80,770.00	4.04%
2	R.C.C. Work	5,29,48,350.00	5,63,33,441.00	33,85,091.00	6.39%
3	Waterproofing	81,58,383.00	88,75,991.00	7,17,608.00	8.80%
4	Brickwork	1,42,69,644.00	1,55,99,758.00	13,30,113.00	9.32%
5	Plaster	85,95,246.00	92,34,459.00	6,39,213.00	7.44%
6	Gypsum work	73,78,326.00	79,65,216.00	5,86,890.00	7.95%
7	Tiling	3,49,73,321.00	3,74,47,049.00	24,73,727.00	7.07%
8	UPVC window	99,17,696.00	1,05,46,102.00	6,28,407.00	6.34%
9	Carpentry work	91,56,172.00	97,40,894.00	5,84,722.00	6.39%
10	Cp & sanitary work	3,33,400.00	3,64,093.00	30,694.00	9.21%
11	Glass work	76,70,243.00	80,26,833.00	3,56,590.00	4.65%
	Total	15,78,79,088.00	16,87,92,913.00	1,09,13,825.00	

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PROJECT -IV

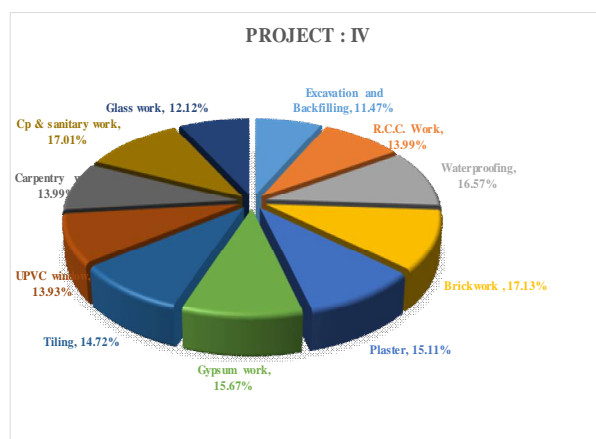
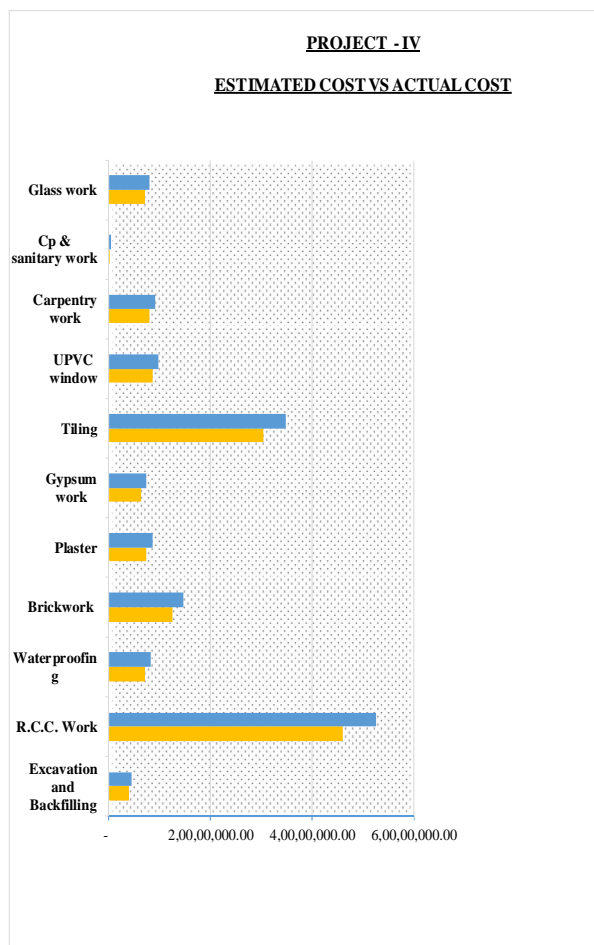
PROJECT : IV					
PROJECT TYPE - RESIDENTIAL BUILDING					
Sr. No	Description	Estimated Cost (Ec)	Actual Cost (Rc)	Difference In Cost (Dc) = Rc - Ec	Wastage (Dc /
1	Excavation and Backfilling	38,98,168.00	43,45,200.00	4,47,032.00	11.47%
2	R.C.C. Work	4,60,09,250.00	5,24,47,190.00	64,37,940.00	13.99%
3	Waterproofing	70,81,930.00	82,55,200.00	11,73,270.00	16.57%
4	Brickwork	1,24,78,598.00	1,46,16,175.00	21,37,577.00	17.13%
5	Plaster	74,61,151.00	85,88,597.00	11,27,446.00	15.11%
6	Gypsum work	64,04,797.00	74,08,125.00	10,03,328.00	15.67%
7	Tiling	3,03,71,787.00	3,48,42,900.00	44,71,113.00	14.72%
8	UPVC window	85,70,848.00	97,64,910.00	11,94,062.00	13.93%
9	Carpentry work	79,79,235.00	90,95,139.00	11,15,904.00	13.99%
10	Cp & sanitary work	2,87,845.00	3,36,798.00	48,953.00	17.01%
11	Glass work	71,17,383.00	79,80,290.00	8,62,907.00	12.12%
	Total	13,76,60,992.00	15,76,80,524.00	2,00,19,532.00	

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PROJECT -V

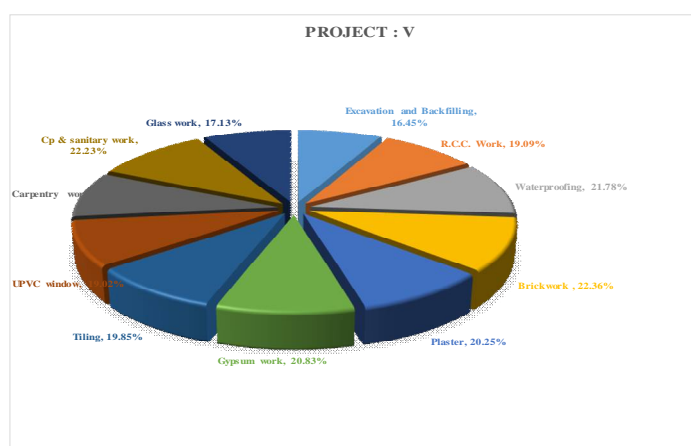
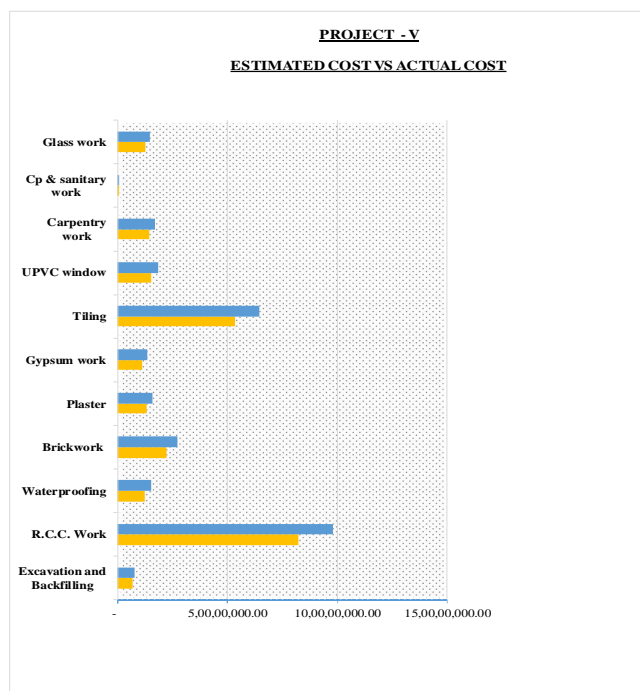
PROJECT : V					
PROJECT TYPE - RESIDENTIAL BUILDING					
Sr. No	Description	Estimated Cost (Ec)	ActualCost (Rc)	Difference In Cost (Dc)= Rc - Ec	Wastage (Dc / Ec)%
1	Excavation and Backfilling	68,83,706.00	80,15,974.00	11,32,268.00	16.45%
2	R.C.C. Work	8,22,28,335.00	9,79,22,687.00	1,56,94,352.00	19.09%
3	Waterproofing	1,25,05,854.00	1,52,29,096.00	27,23,241.00	21.78%
4	Brickwork	2,20,35,737.00	2,69,63,748.00	49,28,011.00	22.36%
5	Plaster	1,32,03,253.00	1,58,77,499.00	26,74,245.00	20.25%
6	Gypsum work	1,13,33,929.00	1,36,95,193.00	23,61,265.00	20.83%
7	Tiling	5,36,40,737.00	6,42,87,041.00	1,06,46,303.00	19.85%
8	UPVC window	1,54,76,503.00	1,84,20,525.00	29,44,023.00	19.02%
9	Carpentry work	1,41,83,090.00	1,68,88,991.00	27,05,901.00	19.08%
10	Cp & sanitary work	5,06,207.00	6,18,762.00	1,12,555.00	22.23%
11	Glass work	1,25,94,921.00	1,47,52,939.00	21,58,018.00	17.13%
	Total	24,45,92,272.00	29,26,72,455.00	4,80,80,182.00	

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V. REVIEW OF QUANTIFICATION

The review of quantification shows excess amount of waste is generated in each construction activity also having some amount of un avoidable wastage which can reduce with proper waste management planning of each construction activity.



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VLSUGGESTIONS

- i) firm management and control on material, man power, machinery and method are required
- ii) forming awareness of consequence of construction waste among employee
- iii) Correct material planning and management required
- iv) introducing incentive scheme
- v) introducing waste management plan

VII.CONCLUSION

The Survey conclude that additional amount of unavoidable construction waste is generated which can reduce with the help of proper waste management plan. If the addition amount of unavoidable construction waste is managed the project budget will not have any bad consequence. Hence waste management plan is need of toady's construction industry.

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