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Study on cost deviation in construction of residential projects

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ABSTRACT

Cash flow and cost control are the main concerns for the success of any construction project. Effective cost control methods are carefully selected for the steady cash flow in the building project. The client's and contractor's aim are to achieve a better profit by controlling the cost contributing to a building project. Different factors contributing to the cost deviation are identified at various stages of the building projects. The study is conducted by categorizing building projects below 50 Lakhs, projects within 50 lakhs to 1 crore and project above 1Cr as budget cost. This paper discusses the problems of cost control and techniques effectively utilized for the management of construction cost of the building projects.

Keywords: Cost, Cost overrun, Cost control, Cost management.

INTRODUCTION

Successful project means that the project has to be completed within schedule time and schedule costs, which remain within the budget cost. The big cost difference in construction caused by the various construction practices.

The aim of the research

Construction projects which delivered with delayed schedule time will directly lead to cost overruns of the project.

- 1) Identify the Cause of cost overrun in project
- 2) Factors mostly influencing the cost deviation in building projects
- 3) To Suggest a recommendation to avoid cost overrun in building projects

LITERATURE REVIEW

The process of estimating the exact cost is a real challenge because this is affected by many factors which cannot be identified or controlled because they are future things that are difficult to predict at the design phase. Decision making at

this stage impact on subsequent stages of the construction countries. This is serious and further need to study this issue to reduce the problems. [1] In control and manage the Construction projects four fundamental constraints needed to be considered they are scope, cost, time, and quality. To control the project success, important to consider the project remains within this constraint. It's Contributes to Malaysia GDP (Gross Domestic Product) is estimated to be 4.5%. [2] Precise guidance is not available to owners and Contractor on how we should manage the building construction process. Advances in architectural quality, the complication of the building, the number of storeys and the extent of industrial conflicts increase construction time and cost. [3] The discussion on the obstacles occurs in the construction projects in Uganda, to study the factors and the causes the cost overrun in the project selectively contractors from Nakawa Division, the research identifies factors delaying and causing cost overrun is delayed by clients to release the money, lack of knowledge on the cost management, lack of decision making. The study

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found the problem was not the technique issue its lack of knowledge on the cost control techniques. [4] Koushki discusses the time-delays and cost-increases in the private residential construction projects in the State of Kuwait. They identified cost overflows in the residential project cause by contractor-related issues, material-related disputes and, owners' financial constraints. [5] Serdar Durdyev states most of the disputes in residential projects are produced from poor resource management. Good practice in planning, coordinating, controlling and control methods can make good cost management. They believe it by focusing on the relative degrees of impact of the identified sub-factors, the project team and owners could be guided properly in their efforts to discussing the factors in a cost-effective manner.

RESEARCH METHODOLOGY

From the extensive literature study, it is much clearer that factors which contribute directly to the successful completion of the project, there are influenced by the cost factor of the project. In particular, researches were conducted in a small extent to explore cost management in construction projects. These factors have an impact on the performance of the cost management of a residential project. To yield the desired performance, it is necessary to ensure that the project works effectively. A questionnaire survey was conducted among construction professionals to spot their opinion towards cost management system in their organization. The obtained data will be analysed to find out the frequency of response for various factors.

Questionnaire Preparation

Based on the literature and factors considered, a Questionnaire was designed as a measurement of risks of the cost overrun that tends to arise in the cost Management. The questionnaire consists of 19 questions relating factors influencing. Also, the respondents were asked to rate their response according to the respective five-point rating scale.

Details of costing planning and cost control in residential construction project

The schedule can be used for forecasting and statistical analysis of the cash flow of each activity. To determine the project back on track cost control requires proper detection of deviations. When the proposed design changes then cost control should respond accordingly.

Cost Estimate

There are many ways for preparing cost plan and estimated. Rough calculations to the detailed budget have to be done based on technical information. It is the most proper management for costing plan even if calculations estimates are not precise at the beginning of the project life cycle.

Cost Budget

The budget indicates an overview of the routine and budget costs of the Building project. The cost estimates define the cost of each activity since the budget distributes the costs over the time duration. Cost control is an approved time-phased budget that is used to measure the actual cost performance construction project. Budget planning helps in the way to keeping an eye on the costs of operating business. Budget planning forces project manager and contractor to think in a way to control expenses and find the expenses you need to rank to meet project objectives.

Cost performance

Cost is among the main concern during the project and recognized one of the major targets of the successful project. Earned Value Analysis (EVA) is adapted to calculate the cost performance of various stages of projects. The model is adapted to calculate the project whether the project met within the allocated cost or extending through the original cost. cost studies of buildings project help project to reside in economics cost

$$\begin{aligned} \text{Planned Performance} &= \frac{\text{Planned Earning}}{\text{Planned Expenditure}} \\ \text{Actual Performance} &= \frac{\text{Actual Earning}}{\text{Actual Expenditure}} \\ \text{Efficiency} &= \frac{\text{Actual Performance}}{\text{Planned Performance}} \end{aligned}$$

Costs Overrun

According to the review journals as an example, the average increase in the cost of largescale building projects was estimated between 6-10% of the expected value of the project cost. The problem may find in both developing and developed

Develop a Project Resource Plan

A Resource Plan requires identifies the physical sources to execute the project. list the required resource such as labour, equipment and materials and amount of each requires for each and every activity.

- 1) Resources required to complete the project
- 2) Time frames for each resource
- 3) The quantity of each resource required per week/ month

Material Cost

The cost control of construction material starts with the selection of material suppliers and the surplus of material consumption. Construction industry should select suppliers which have a less freight, excellent quality and reasonable price of the supply unit, and set up a long-term relationship with such suppliers. Before the procurement of materials proper plan is necessary, Meanwhile, construction companies should set up the site management which makes material procurement and supply in precise accordance with project management.

Machinery Cost Management

The cost management of construction machinery refers to the cost occurs in using construction machinery it accounts for 20% -25% of the total construction cost. regular maintenance of construction machinery is needed to make sure the operability of machinery to avoid unnecessary losses.

Cost Accounting

Actual cost accounting of the construction project is evidence of the cost analysis and assessment. Project personnel should account for individual happened cost during project implementing. every end of the month to record the exact progress in the month and the actual

consumption of labours, materials and machines, so that companies can know the condition of cost change at any time, compare the original cost with budget cost and determine their difference.

Factors causing cost overrun in building project

There are factors contribute to cost overrun in the construction industry it finds which from the researchers' study. Factors are listed to conduct the study and analysis the major among the all. Factors are listed below.

- 1) Financial Difficulties by Contractor
- 2) Shortage skilled Labour
- 3) Delay in delivery material
- 4) Lack of Material at Market
- 5) Lack of designer's experience
- 6) Inaccurate estimates
- 7) Unqualified subcontractor
- 8) Equipment unavailability
- 9) Low productivity of labours
- 10) Complexity of the project
- 11) Delayed cash flows by owners
- 12) Mistakes in design documents
- 13) Accepting lowest offers
- 14) Rising prices
- 15) Inadequate contractor experience
- 16) Change orders by owner
- 17) Import materials
- 18) Ineffective planning of project
- 19) Change functional program

Inaccurate Estimation of Cost

The main factor that contributes to the budget cost overruns is an inaccurate estimation of the original cost of the project. It is because of technical knowledge on how to estimate project costs and also not available project information at the early stage of the project.

Mistake in design

The seriousness of this design failure that must be considered determining its result on the overall outcome of the project. There has been a considerable amount of investigation that has studied design error causation. The major issue is the inaccuracy of the drawings, the volume of design errors, omissions of design detail and specifications that affect the quality of the project.

Inflation in Project Costs

Cost inflation of materials, equipment, labours costs, subcontractors and suppliers may involve different inflation. As the inflation increase, the cost will also increase too.

Lack of Experience

Lack of a contractor's knowledge in financial management causes the most cost deviation in cost overrun. The distribution of the costs does not plan well in the projects might cause over of budgeted cost.

Financial Difficulties by Contractor

The financial difficulty faced by contractors are spending company liquid cash on buying equipment to run their business. Contractors biggest problem in maintaining cash flow are spending cash from one project to another project by assuming everything will be balanced out in the long run of time. Many of the contracts have to pay for their vendors and subcontractors on the work completion even without receiving money from the project owners. The contractors have to settle everything projects from one bank account without recording whether they've got payment from the particular project owner. The financial difficulty faced by contractors are spending company liquid cash on buying equipment to run their business.

Shortage of Skilled Labour

The condition of the labour scarcity is a serious condition on the construction site. There is no scarcity of workers searching employment at construction sites, its only unskilled and semi-skilled labours. Problem finding labourers for the

construction work with skilled and knowledge on work like masons, barbenders and carpenters. when there is a lack of skilled workers availability, the only choice is to train them by the company.

Delay in Delivery Material

Delay in delivering construction material cause a time overrun beyond the project completion date agreed by the Contractor. The delay in the material cause the project schedule delay in short time or long time as per the delay cause and material of the project

Low Productivity of Labour

Delay in delivering construction material cause a time overrun beyond the project completion date agreed by the Contractor. The delay in the material cause the project schedule delay in short time or long time as per the delay cause and material of the project

RESULTS AND DISCUSSION

The questionnaires were distributed through Google forms. 94 responses were received from site engineers, project managers and owners to assess the factors influencing construction cost management of the residential project.

General Criteria

I collected response from various residential projects to understand the factors which contribute more on the cost deviation because of the lack of control. Over 71% of the respondent agree on the factor lack of skilled labour causes the schedule delay and cost over of the residential project. 61% of respondents accept the factor cause the cost overrun in the residential project

Table 1 Factor analysis of factors identified

Factor Analysis	Initial	Extraction
Financial Difficulties by Contractor	1.000	.614
Shortage skilled Labour	1.000	.756
Delay in delivery material	1.000	.576
Lack of Material at Market	1.000	.616
Lack of designer's experience	1.000	.411
Inaccurate estimates	1.000	.587
Unqualified subcontractor	1.000	.638
Equipment unavailability	1.000	.518
Low productivity of labours	1.000	.714
Complexity of the project	1.000	.612

Delayed cash flows by owners	1.000	.596
Mistakes in design documents	1.000	.439
Accepting lowest offers	1.000	.619
Rising prices	1.000	.602
Inadequate contractor experience	1.000	.611
Change orders by owner	1.000	.315
Import materials	1.000	.636
Ineffective planning of project	1.000	.577
Change functional program	1.000	.593

Factor analysis shows the shortage of skilled labour is the first among other the factor causing the major, followed by Low productivity of labour factor, unqualified subcontractor and Import material. Respondent is collected by the five scales reading from the site engineer, project manager, owner and contractor. The analysis is done to understand the point of view on the various problems in the construction of the residential building which caused the cost overrun and the schedule deviation because of low productivity and the other causes.

Shortage of Skilled Labour

Shortage of skilled labour is the main factor most of the engineers and contractors reported for the cost overrun in the residential project. Lack of skilled labour causes the project to delay from the scheduled date and need of more labour to do the work, which significantly increases the project cost and burden for the contractor to complete the project with the allotted budget cost.

Table 2 Responds on Shortage of skilled labour

Shortage of skilled labours				
	Below 50 Lks	50 Lks to 1 Crs	Above 1 Crs	Total
Strongly agree	33	22	12	67
Agree	11	4	0	15
Neutral	9	0	0	9
Disagree	2	1	0	3
Strongly Disagree	0	0	0	0
Total	55	27	12	94

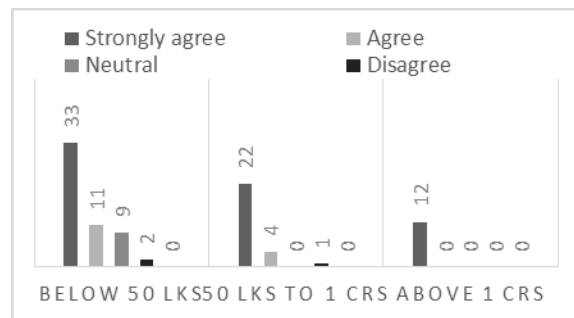


Fig 1 Responds Chart

Low Productivity of Labours

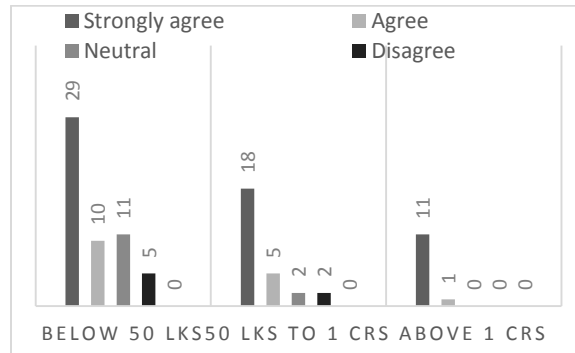


Fig 2 Responds Chart

Second majorly accepted factor for the cost overrun is due to the factor low productivity of the labour in the construction site. This directly link

with the lack of skilled labour at the construction of residential building

Table 3 Responds on Low productivity of labour

Low productivity of labours				
	Below 50 Lks	50 Lks to 1 Crs	Above 1 Crs	Total
Strongly agree	29	18	11	58
Agree	10	5	1	16
Neutral	11	2	0	13
Disagree	5	2	0	7
Strongly Disagree	0	0	0	0
Total	55	27	12	94

Unqualified Subcontractor

I Understood the lack of experience of the subcontractor and lack of management and skill of the subcontractor will affect the productivity of the project, which causes the redoing of work and

delay in the schedule and setback of the project schedule date. The inefficient subcontractor causes huge cost overrun by delaying, waste material and affecting other activity of the project.

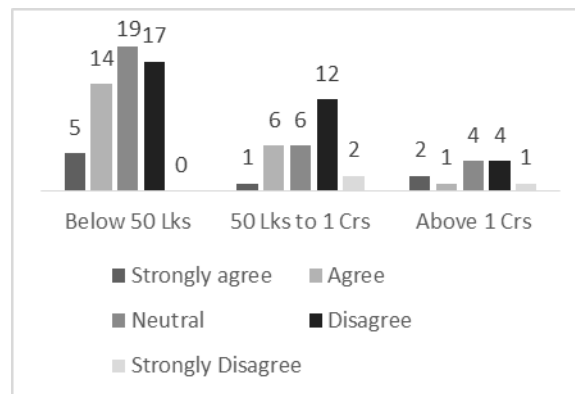


Fig 3 Responds Chart

Table 4 Responds on Unqualified Subcontractor

Unqualified Subcontractor				
	Below 50 Lks	50 Lks to 1 Crs	Above 1 Crs	Total
Strongly agree	5	1	2	8
Agree	14	6	1	21
Neutral	19	6	4	29
Disagree	17	12	4	33
Strongly Disagree	0	2	1	3
Total	55	27	12	94

CONCLUSION

Cost management system is considered to perform key role in an organization, which are responsible to complete the company's project within budget within a certain period of time.

This Study "Study on deviation in construction of residential projects" will help us to identify the risks involved in current cost management and cost control system.

The online survey results show that 71% of response says there is a deviation in the cost and budget of the residential project due to lack of skilled labour in the project which causes the low

productivity of the product and causes the cost and waste due to low productivity of labour. Recipients also accept the factor by 67% on the low productive is causing the major cost deviation in the project.

Finally, we concluded that the lack of skilled labour and low productivity of the labour on site mostly cause the cost overrun in the residential project. Regular recording labour productivity and training the unskilled labours can improve the productivity of labours and reduce the cost deviation from the budget cost.

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