

Time & Cost Management In Construction Project

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ABSTRACT

Despite the availability of various control techniques and project control software many construction projects still do not achieve their cost and time objectives. Research in this area so far has mainly been devoted to identifying causes of cost and time over runs. There is limited research geared at studying factors inhibiting the ability of practitioners to effectively control their projects. Subsequently some mitigating measures have been developed for the top five leading inhibiting factors - design changes, risks/uncertainties, inaccurate evaluation of project time/duration, complexities and non-performance of subcontractors were recommended. These mitigating measures were classified as: preventive, predictive, corrective and organizational measures. They can be used as a checklist of good practice and help project managers to improve the effectiveness of control of their projects.

Large construction projects are inherently complex and dynamic. Many projects start with good ideas, huge investments and great efforts. However, most of them do not achieve much success. The objective of the research is to explicitly declare the scope of the research to be considering only the scope, time, cost and quality as process success parameters and how specifically the cost element would influence the project success when all other elements or factors other than cost are represented in terms of cost factor along with the contract conditions as basic rules or constraints that drive the strategic cost based on applying the CRASP methodology concept. The concept of benchmarking would provide right meaning of project success when allowing to properly distributing the meaning of customer profitability to the project providers (project owner and contractors).

Keyword: - Cost control, project control, project management, Cost Management, Strategic Cost Management, Project Management Benchmarking, and Project Success.

1. INTRODUCTION

The main aim of this topic is to discuss reasons behind the cost over runs due lack of time management. A construction project contain great deals, times and expense, so close management is required if they are to be completed within a time and cost constrains. A construction project is called a successful if it fulfils the requirement regarding fitness for purpose completed on time, within budget, profitability of contractor, absence of claim and court proceedings. In construction industry the main use of time cost management is to ensure the project complete on time within budget and achieve other project objectives.

It is the complex task undertaken by project manager in practice. It involve constantly measuring progress, evaluating plans, taking corrective measure if required. Today we have many project control method. Method like gantt chart, project evaluation and review technique (pert), critical path method (CPM). There are verity of software available to support the application of these project control technique.

1.1 Objective

The main objective is to find a problem that arise in construction project and find their mitigation process and apply to the respected problem. This study will help to reduce time & cost of construction project and help the project to reach their predefined time & cost. This makes the projects time & cost effective.

2. LITERATURE REVIEW

1. Frimpong et al., 2003 Found out that in Ghana, including all the factors mentioned above, construction cost overruns are also affected by problems with the payment of agencies' fees.

Studies have also shown that, the size of a building project influences the rate of cost overrun. Large projects are generally more complex and in such complex projects, some items are fraught to be missed out or may be forgotten during the planning and design phases. Hence, the complexity may increase the rate of cost overrun. The factors that could increase construction costs are numerous.

2. Chan and Park, 2005 Stated that the cost of a building project is affected by a large number of factors. This is so because construction is a multidisciplinary industry and its work involve many parties such as the project owner and various professionals, contractors and suppliers. Thus a building project cost does not only depend on a single factor but on a cluster of variables that are related to the characteristics of the project, the construction team as well as the market conditions.

3. Robert F. Cox 2007 Project owners identified five reasons for project cost overruns. They were incomplete drawings, poor pre-planning processes, escalating cost of materials, lack of timely decision and excessive change orders. The User's Guide 2005 also shows the following factors that affects the project cost overruns with time: poor project management, design changes, unexpected ground conditions, inflation, shortages of materials, change in exchange rates, inappropriate contractors, funding problems and force majeure.

4. Peters and Madauss, 2008 Stated that the biggest factor that contributes to overruns of budget is inaccurate estimation of original or initial cost of the project. This is due to technical problems on how to estimate project costs and also insufficient project information at the early stages of the project.

- Inflation of project costs

Inflation of materials, equipment's and labour costs may vary geographically within the country and contracts between sub-contractors and suppliers may involve different inflation protection terms as agreed with the client. As inflation increases, interest rates also increases and the project costs will also increase.

- Fluctuation in price of raw materials

In most cases where it is difficult to estimate the material cost accurately, price fluctuation gives rise to cost overruns. Fluctuation may also be associated with high changes in prices of materials especially in developing countries.

5. Kenny (2010) In a major report for the World Bank, Kenny (2010) argues that this is a major global problem with construction being a US\$1.7 trillion industry worldwide with a significant proportion involving publicly financed projects. Kenny states that government investment in road transport alone can account for 2-3.5% of a country's GDP. He cites the example of India where approximately half of all road projects have cost exceeds greater than 25% and time blowouts outrun 50%.

3 METHODOLOGY

General 3.1

This research adopts a combination of quantitative and qualitative methods. It was conducted in two stages. The first stage was conducted using a quantitative method through a questionnaire survey in a bid to generate information from a large sample population. The second stage of the study was conducted using the qualitative method using semi-structured interviews.

Questionnaire Survey

The focus of the survey is to establish the current common practice of time and cost control in the construction industry, including control methods and software applications being used by practitioners as well as inhibiting factors.

The question consist of all the factor that influence time & cost overrun factors included in questionnaire are given below

1. Design change
2. In accurate evaluation of projects time and duration
3. Complexity of work
4. Risk and uncertainty associated with project
5. Nonperformance of sub-contractor and suppliers
6. Lack of proper training and experience of project manager
7. Discrepancies in contract documentation
8. Low skilled man power
9. Conflicts between project parties
10. Un predicted weather condition
11. Financing and payment for completed work
12. Contract and specification interpretation disagreement
13. Dependency in imported material
14. Lack of appropriate software
15. Inflation of price
16. Weak regulation and control
17. Project fraud and corruption
18. Unstable government policies
19. Unstable interest rate
20. Fluctuation of currency/ exchange rate

Interview

The second stage was conducted using a qualitative method – semi-structured interviews. The aim is to explore the main issues revealed after analysis of the questionnaire survey and experiences of practitioners. The same population used for the quantitative stage of the research was used. The offices of the companies that the questionnaires were sent to during the quantitative study were contacted, explaining the objective of the research and requesting for a relevant contact (construction directors, project directors, commercial directors, senior project managers etc.) that could be interviewed. A total of 7 companies presented relevant practitioners for interview.

Table 1 provides more information on each of the interviewees. As can be seen from the table the interviewees were a mix of contractors and consultants with varying but quite often similar kind of projects. They were highly experienced practitioners. Majority of the interviewees are senior employees of their company and many of these companies are large organization's with national or regional presence in the Delhi Mumbai & Jeddah (Saudi Arab) some also have international coverage.

TABLE:-1 INFORMATION OF INTERWEES

Roles	Years*	Company Type	Project types	Interview Duration
Senior general project manager	30	Main Contractor	Construction, civil engineering, nuclear etc.	35 min
Contracts manager	24	Main Contractor	Social housing/regeneration	30 min
Planning director	28	Main Contractor	Building, Transport infrastructure, Civil engineering	35 min
Senior programme manager	11	PMC	Infrastructure, construction	30 min
Head of project planning	20	Main Contractor	Building and construction	30 min
Director	22	Consultants and contractor	Construction, infrastructure and Engineering	30 min
PMC Consultant	25	Main Contractor	Construction	40 min

4. DATA ANALYSIS

Relative Importance index:

Chan & Kumaraswamy, 1997 used the Relative Importance Index method to calculate the relative importance of the various causes of cost overrun. $RII = \Sigma W / A * N$

Where

w = weighting given to each factor by the respondents and ranges from 1 for not significant to 5 for extremely significant,

A = highest weight (i.e. 5 in this case), and

N = total number of respondents.

Table 2 Relative Index Table Result

S.NO.	FACTORS	ΣW	A	N	RII
1	Design change	23	5	7	0.66
2	In accurate evaluation of projects time and duration	15	5	7	0.43
3	Complexity of work	15	5	7	0.43
4	Risk and uncertainty associated with project	30	5	7	0.86
5	Nonperformance of sub-contractor and suppliers	18	5	7	0.51
6	Lack of proper training and experience of project manager	17	5	7	0.49
7	Discrepancies in contract documentation	14	5	7	0.40
8	Low skilled man power	14	5	7	0.40
9	Conflicts between project parties	12	5	7	0.34
10	Un predicted weather condition	25	5	7	0.71

11	Financing and payment for completed work	20	5	7	0.57
12	Contract and specification interpretation disagreement	15	5	7	0.43
13	Dependency in imported material	7	5	7	0.20
14	Lack of appropriate software	7	5	7	0.20
15	Inflation of price/ economic instability	29	5	7	0.83
16	Weak regulation and control	14	5	7	0.40
17	Project fraud and corruption	14	5	7	0.40
18	Unstable government policies/ political situations	28	5	7	0.80
19	Unstable interest rate	15	5	7	0.42
20	Fluctuation of currency/ exchange rate	21	5	7	0.60

5. RESULT & DISCUSSION

Based on all the projects, this section analyses the main reasons for cost overruns and time overruns and they have many factor. This section is based on the results of all the projects. The interviewees were asked about the main reasons for cost and time overruns in the poor performance projects and the factors which avoided in good performance projects. The interviewees were explained with the definition of cost overrun, according to this research so as to prevent their own perception from clouding the responses. The data about each case were mainly collected from the interviewees, so it is important to make sure that they knew the definitions of the research. Some information was also collected from Internet.

The answers given by the project managers, contractors, consultants, construction managers, and representatives of clients from the survey are analysed. Some information about the company has been given from the interviewees and the information given has been verified through Internet research. Case studies were used in the research from the reputed construction company in India. The interview protocols were sent to various people by the us. Four interviewees have acknowledged to have semi-organised meeting. Along these lines, the whole research configuration of this thesis was focused around the four meetings which were conveyed by the two task administrators of an organisation and the review after effects of members. Each of the undertaking administrators was talked with around two separate activities unified with great execution and an alternate with poor execution. According to the necessities of the exploration, the interviewees must be either senior venture pioneers or at the base ought to be working at a managerial level. To guarantee that the interviewees met the necessities, a portion of the inquiries were about the points of interest of interviewees.

6. CONCLUSIONS

This study is conducted to investigate the cost & time overrun in construction projects through a questionnaire survey. The analysis of the participants' responses reveals that the cost overrun and time overrun in construction projects is a severe problem. Majority of the respondents indicated that the average cost overrun that they have experienced is between 10% and 30% of the project's estimated cost Inputs of the consultants underline that the top five factors affecting cost overrun in building construction projects are: political situation, fluctuation of prices of materials, level of competitors, risk and uncertainty associated with project, design change and economic instability.

There is a good data consistency and agreement between parties on the severity and frequency of the identified cost overrun factors. It shows that the participants are highly agreed on the impact and frequency of the top affecting factors. Based on the study findings, the following points are suggested in order to minimize and control cost overrun and time overruns in construction projects.

- (i) Political situation: at the start of any construction projects the agreement with govt. authority's terms and condition related to taxation and construction rules should define properly and make sure it will not change for that particular project. If any change has to be occur govt. should take the extra liability of project.
- (ii) Fluctuation of price of materials: revise the data of last 5 to 10 years of fluctuation of material price and take the average of price hike and plan the project according to it.

- (iii) Level of competitors: to defeat competitors make your project fast with effective quality in planning and execution.
- (iv) Risk and uncertainty associated with projects: always revise all safety and security which is related to particular construction project. Up to date with all personal protection equipment
- (v) Design change. During planning stage revise the design either structural or architectural and evaluate to its future use and make correction according to it.
- (vi) Economic instability: The buyer's amount which is paid by buyer should be deposited in a separate account and maintained schedule bank to cover the cost of construction and land cost and should be use that purpose and have a transparency with all the buyers and investors associated with project.
- (vii) Unpredicted weather condition: revise detailed history regarding weather related to project site and find their respective solution before initiate the project.

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