



Study of Cost Overrun and Time Delay in Construction of 100 Bed Hospital in Malegaon, Maharashtra

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ABSTRACT

The construction project performance is generally expressed in terms of time and cost variance against its baseline. Out of the four fundamental constraints namely scope, cost, time and quality, cost performance is the most essential and common issue in the global construction industry. It is important to measure the cost variance in construction to understand the performance of the project and thereby to understand financial risks involved in the project execution. The cost variance, resulting as project cost overrun is denoted as a negative impact on economy and the profitability.

The change of governance structures for forecasting the project development as an external factor also threat the project planning and execution. It was found that projects do not perform as forecasted, in terms of costs: almost 9 out of 10 projects fall victim to significant cost overrun. The underlying causes of such inaccurate cost projections were investigated and summarized by using the case of 100 bed hospital in Malegaon, Maharashtra, India.

Keywords: *Cost Overrun, Time Delay, Hospital Construction*

1. INTRODUCTION

Cost overrun is an unexpected change in the project budget that ends up increasing the total project cost. It can happen due to three primary reasons: Economic factors that occur due to inaccuracies in project budget or scope. Technical reasons, including erroneous estimates or incorrect data gathering. Construction delays are considered as time lag in completion of activities from its specified time as per contract or can be defined as late completion or late start of activities to the baseline schedule, directly affecting specified various reasons were cited for the delays in the completion of these projects, including but not limited to – approvals & clearances from various ministries & departments, changes in the project plan, new requirements, inflation, incorrect estimations, project financing delays, tenders, etc.

The research is proposed to improve current construction practices of determining the construction cost and controlling the cost as the project progresses. The aim is to propose a framework for managing the risk factors involved in cost performance of non-infrastructure construction projects and thereby developing construction cost assurance. This will be achieved on proper understanding of various risk factors which are the causes of cost overrun and understanding their impact on the project execution. To obtain this, the causes of cost overrun are to be identified and classified according to the different stages and progress of the project.

2. AIM AND OBJECTIVE

To systematic study and analysis of time delay and cost overruns of Primary Healthcare Centre construction work in Malegaon of Maharashtra state.

- To identify the causes that lead to cost overrun, evaluate their relative importance.
- To identify the causes that lead to time delay in construction activity.

3. LITERATURE REVIEW

Evaluation of Cost and Time Overrun in Government Construction Projects:

The construction industry is regarded as one of the fast-growing industries in India. In the modern years, due to substantial increase in the amount of construction companies and change in government administrations in Kerala state, this construction projects are exposed to cost and time overrun or sometimes both, and has an impact on progress of the works associated with the construction industry. This study attempts to determine the factors contributing to cost and time overrun on construction projects in Kerala. Questionnaire survey was conducted among owners, clients and contractors of the projects. Data was analyzed for various indices analysis and correlation analysis, and the major delay causing attributes in the construction projects

were ranked. The results showed that "payment delay by the client" was the most critical factor that contributed towards the project delay followed by "clients' financial availability to pass the running bill" and "delay in payment to the contractor". These three major delays causing factors were supported by all three parties of construction. The study also recommended owners, contractor and clients to take responsibilities to avoid or reduce time and cost overrun of projects which can be achieved by good management of construction projects and also introducing new methods in storing materials from the initial phase of the project to avoid unnecessary delays in construction.

The construction industry is considered as one of the vital industries in the developing economy. The industry does not confine itself to builders, but also to those who design, develop and maintain structures and other resources such as capital, labour and material. The construction industry in India provides service to workforce to nearly 32 million and its market size is about Rs 248000 Crores as per the Construction Industry Development Council. The GSDP (Gross State Domestic Product) in Kerala construction sector in the year 2015-2016 was Rs 63831 Cr compared to Rs 59965 Cr in 2014-15 as per the Department of Economics and Statistics, Kerala State Planning Board. As the infrastructure complexity of projects increases it puts a greater need on the project manager to complete and deliver the project within the speculated time and planned budget along with a greater quality of work.

Causes of Cost Overrun in Government Hospital work

The Indian construction industry is an integral part of country's economy and its growth and a conduit for a substantial part of India's development investment. The industry plays a pivotal role in developing the country's infrastructure, a pre-requisite for high levels of economic growth. Most construction projects experience cost overrun and it put massive financial burden on the client or owner. Therefore, this research was carried out to identify the causes leading to cost overrun in construction projects. Desk study along with questionnaire survey was used to identify the causes of cost overrun. A total of 30 filled questionnaires were collected from clients, consultants and contractors. The respondents were asked to rate the listed causes on the basis of probability of occurrence and severity of impact. Importance of each cause was calculated on the basis of cumulative effect of occurrence and impact. Spearman rank order correlation analysis was used to evaluate whether consensus of opinions exists between groups of respondents (client versus consultant, client versus contractor and consultant versus contractor). From the analysis of the results, it was found that consensus of opinion exists between respondents on the causes of cost overrun. The results showed that, slow decision making, poor schedule management, increase in material/machine prices, poor contract management, poor design/ delay in providing design, rework due to wrong work, problems in land acquisition, wrong estimation/ estimation method, and long period between design and time of bidding/tendering are the major causes of cost overrun. The major causes as identified by this research were compared with the findings from other countries and there were fairly relevant similarities.

Indian economy have been on a very positive development curve for years now, posting impressive growth rate percentages. The Indian construction industry is an integral part of country's economy and its growth and a conduit for a substantial part of India's development investment. It is poised for solid growth due to industrialization, urbanization and economic development together with people's expectations of improved living standards. The construction sector employs approximately 31 million people, accounts for some 6-8% of GDP and, after agriculture, is the largest employment sector in the country. In general, it has been growing at 9- 11% year on year, primarily due to the strength of increased domestic and international manufacturing activities and industrial growth (Harris, 2011).

Labour costs are also increasing and there is currently a shortage of high-end skilled labour/experienced workforce in key city locations. This is likely to have a sizeable impact on tender prices and lead-in times, potentially requiring the use of less skilled labour teams to deliver fast-track projects. The impact could be a reduction in quality. As a result of the current levels of material and labour cost inflation and the buoyant market conditions, contractors are increasing their average margins by between 5% and 7%. These increases are reflected in higher tender prices, particularly on key landmark developments, although on smaller projects contractors are more likely to absorb the increased costs to remain competitive (Harris, 2011). Cost overruns are very common in the construction industry. Hardly few projects get completed within original costs. According to the reply Statistics Minister Srikant Kumar Jena gave to the Rajya Sabha, as on March 31, 2012, 555 projects (worth Rs 150 crore and above) were on-going, out of which 179 projects reported cost overruns. According to the statement laid in the House by the minister, total cost overrun of these 179 projects was Rs 1.23 lakh crore. The minister said, "The major reasons for cost overruns are under estimation of original cost, change in rates of foreign exchange and statutory duties, escalation in cost of land, high cost of environmental safeguards and rehabilitation measures, inflation and delay in projects." The details provided by the minister reveal that the cost overrun of projects in railways sector was Rs 69,551.81 crore followed by Rs 15,886.71 crore and Rs 15,113.80 crore in petroleum and power sectors. The cost of projects escalated by Rs 6,187.54 crore, Rs 5,272.90 crore, 4,838 crore in steel, urban development and atomic energy sectors respectively" (The Economic Times, 8 March 2013). The basic goal in any industry is to achieve the completion of project within time and stipulated budget. It is the same with construction industry. The construction industry being one of the most complex, fragmented, schedule and resource driven industry, is always facing serious problems like low productivity, low quality, delay, cost overrun etc. (Memon et al., 2011). Cost overrun in construction is a worldwide phenomenon, and its effects are normally a source of friction between owners, project managers, and contractors (Creedy et al., 2010). Azhar and Farouqui (2008) observed that the trend of is more severe in developing countries. As the construction industry continues to grow in size, so do planning and budgeting problems. This is because it is common for projects not to be completed on time and within the initial project budget (Apolot et al., 2012) It is noted that there were more cases of cost overruns than time overruns. This makes the problem of cost overruns to be of great significance (Kasimu, 2012). In fact, it is one of the most important challenges facing the construction industry today. An out-of-control construction cost adds to investment pressure, increases construction cost, affects investment decision-making and wastes the national finance. Hence, it is important to identify the factors that contribute to cost overrun to avoid and reduce the problems (Ali & Kamaruzzaman, 2010). Identifying the reasons is usually the first step when addressing a problem, and then corrective action can be taken. (Chang, 2002) George Jarfas (2010) notes that there is no single cause for cost and schedule overruns on construction and engineering projects. Although some of the factors may seem to be insignificant on one project, they may prove to be significant on another project, as the conditions of project are not always the same. It appears that, there is always need for debate and further

research because of the chronic problem of construction cost overruns. the identification of the cost related risks, underlying drivers and impediments for effective management must be assessed in the contexts of three key stakeholders, namely clients, contractors and consultants

4. Research Methodology

This is the section of the dissertation will explain how the research will be carried out, from where the data will be collected, the sort of data gathering techniques used, and so forth. The Primary data will be obtained for material wastage from the semi-structured survey and case study of public healthcare centers with time and cost. Also, the collected data from secondary source of literature review will be correlated with the present investigation.

Initially, the data will be collected from literature review and case study observations and a roadmap of research work will be prepared and reporting will be done on the bases of data obtained on investigation and final editing for black book will be formulated accordingly.

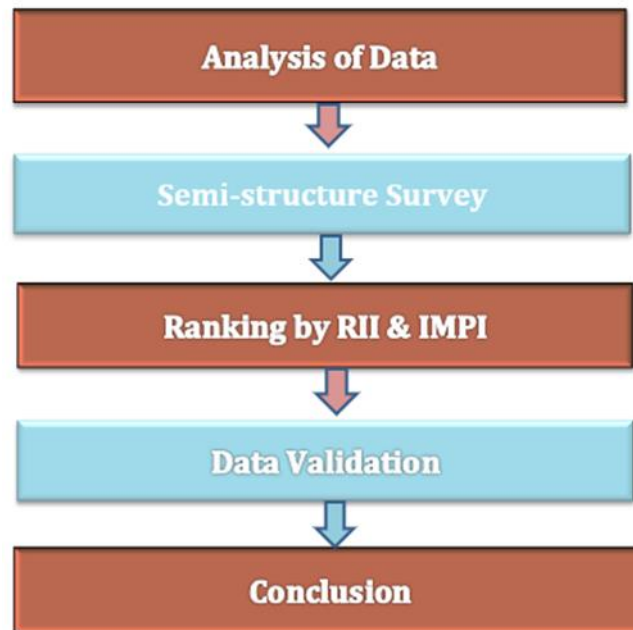


Figure 1: Research Methodology of Semi Structured Survey

5. CASE STUDY

5.1 Project Details

The systematic study of cost and time line parameter of government healthcare center construction particularly in North Maharashtra region has been studied with the help of live case studies. The first case study is the new construction of 100 bed Mother and Child Hospital Wing building in Malegaon, Maharashtra. The details of project as follows:

Table 1: Project Details of Case Study I

Srl No.	Particular	Details
1.	Name of Project	100 Bed Mother and Child Hospital Wing Building, Malegaon, Maharashtra
2.	Cost of Project	₹ 33.77 cr
3.	Name of Contractor	Shri. Balasahe R Bhadane (Government Contractor)
4.	Name of Architect	Ar. Rakesh Bacchav
5.	Date of work order	25-10-2021
6.	Duration of project	18 Months
7.	Civil Status of Work	RCC work completed, brick work in progress

5.2 Semi Structured Survey

A questionnaire was established to evaluate the insights of contractors, consultants, and clients with the help of Relative Importance Index (RII) by using Likert Scale for the causes and factors of cost overrun and delay in public healthcare project. Factors influencing time and cost in public healthcare projects were first examined and identified through a relevant literature review and by conducting a pilot study that sought advice from competent construction practitioners. Data collected through survey will be validated by Skewness and Kurtosis analysis method.

First the data collected from the semi-structured survey, will be checked by Skewness and Kurtosis method of analysis to validate the collected data.

Table 2: Skewness and Kurtosis of Survey

Srl No	Factors	Skewness	Kurtosis
1	Material Waste on Site	0.4	-0.6
2	Poor quality of material	-0.5	0.7
3	Shortage of material	-0.3	-0.8
4	Lack of skilled labor	0.0	-0.7
5	Construction delay	0.3	-0.6
6	Slow or delay payment	-0.5	-0.8
7	Delay in decision making	-0.1	0.7
8	Land acquisition	-1.0	-0.8
9	Inaccurate Site investigation	0.6	0.5
10	Local or Political Issue	0.4	-0.6

The 10 causes ranked by RII Technique was computed for each cause to identify the most significant causes. The causes were ranked based on RII values. From the ranking assigned to each cause of delays, it was possible to identify the most important factors or causes of delays in Malegaon project. Based on the ranking, the 10 most important causes of material management by RII were as follows table:

Table 3: Rank of Factors Delaying Railway Project as per RII

Rank	Factors Delaying Railway Project
1	Slow or delay payment
2	Delay in decision making
3	Shortage of material
4	Poor quality of material
5	Inaccurate Site investigation
6	Local or Political Issue
7	Construction delay
8	Lack of skilled labor
9	Land acquisition
10	Material Waste on Site

As per the ranking on the bases of RII value, it can be observed that the top three factors responsible for delay in Malegaon project are slow or delay payment, delay in decision making, Shortage of material which clearly represent the importance of timely payment in construction of government projects



Figure 2: Site Visit Photographs

6. CONCLUSION

The growth of India's healthcare system has been battling various issues, including the low number of institutions and healthcare less-than-adequate human resources for quite a while now particularly in three tier cities. The need of good healthcare center pinch is also felt at the time of pandemic. "Public Health and Hospitals" being a state subject, the primary responsibility of strengthening public healthcare system lies with the respective State Governments.

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