

“Elements of Cost and Schedule Overrun in Construction Projects”

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Abstract: Construction industry is considered as one of the most important industries in India. It is well known that most construction projects exposed to time and cost overrun or both. These phenomena may affect the progress of construction industry in India as well as may expose many institutions of construction to be destroyed. Literatures of previous studies were classified into two main parts which are: (1) Factors influencing schedule overruns of project; (2) Factors influencing cost overrun. Most related studies were revised which included the study of these factors in many countries. The aim of this study is to assess factors influencing time and cost overruns on construction projects in our country. The objectives of the study were achieved through valid questionnaire. The study clarified that “Low productivity of labor”, “Delaying in Bill settlement”, “Lack of maintenance of the equipment” “Poor procurement programming of materials, Strikes, riots and other external factors was the most critical factor that influence project delay. The study illustrated that “delay in preliminary handing over the site” was one of the most important factors that may lead to cost overrun. Also it clarified that contractor's delay of material delivery and equipment has led to cost overrun. The study also clarified that prices inflation highly contributes to cost overrun.

Keywords: Elements, Cost Overrun, Schedule Overrun, Construction Projects.

I. INTRODUCTION

The construction industry is the total through which physical development is achieved, and that is truly the locomotive of the national economy. The more resources, engineering, labour, materials, equipment, capital, and market exchange are provided from within the national economy, the higher the factor of the extent of self-reliance. The increasing complexity of infrastructure projects and the environment within which they are constructed place greater demand on construction managers to deliver projects on time, within the planned budget and with high quality. It is known fact that a larger number of infrastructure projects in India have been delayed due to various issues. Infrastructure plays a paramount role in the economic growth of our country. Today, India is one of the leading outsourcing hubs in the world

Construction Industries In India

The construction industry is the total through which physical development is achieved and that is truly the locomotive of the national economy. The more resources, engineering labour, materials, equipment, and capital market exchange are provided from within the national economy, the higher the factor of the extent of self-reliance. The increasing complexity of infrastructure projects and the environment within which they are constructed place greater demand on construction manager to deliver projects on time within the planned budget and with high quality. The successful execution of construction projects and keeping them within estimated cost and prescribed schedules depend on a methodology that requires sound engineering judgment. To the dislike of owners, contractors and consultants, however, many projects experience extensive delays and thereby exceed initial time and cost estimates. This problem is more evident in the traditional or adversarial type of contracts in which the contract is awarded to the lowest bidder-the awarding strategy of the majority of public projects in developing countries like India. Although the construction industry in our country has suffered ever since last decade, recent events in the region coupled with the restructuring of economies, joining regional and global free trade organizations, and attracting foreign investment are expected to yield an unprecedented growth in the construction activities. Therefore, improving construction efficiency by means of cost-effectiveness and timeliness would certainly contribute to cost savings for the country as a whole. Efforts directed to cost and time effectiveness were associated with managing time and cost, which in this study were approached via investigating time and cost overruns of construction projects in India. The formal sector consists of public and private contractors. The Construction industry of India is an important indicator of the development as it creates investment opportunities across various related sectors. The industry is fragmented, with a handful of major

companies involved in the construction activities across all segments, medium-sized companies specializing in activities; and small and medium contractors who work on the subcontractor basis and carry out the work in the field. In 2011, there were slightly over 500 construction equipment manufacturing companies in all of India.

Schedule Overrun

Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors. Delays are incidents that impact a project's progress and postpone project activities, delay causing incidents may include weather delays, unavailability of resources, design delays etc. In general, project delays occur as a result of project activities that have both external and internal causes and effect relationship. The actual date of completion is invariably different from the expected date. Further it is defined that the time overruns as the difference between the actual completion time and the estimated completion time. It was measured in number of days. Project delays are those that cause the project completion date to be delayed. Thus time overruns is defined as the time increased to complete the project after planned date which caused by internal and external factors surrounded the project. Delays are incidents that impact a project's progress and postpone project activities, delay causing incidents may include weather delays, unavailability of resources, design delays, etc. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship.

Cost Overrun

Cost overrun is defined as excess of actual cost over budget. Cost overrun is also sometimes called “cost escalation”, “cost increase or budget overrun.” Cost overrun is defined as the change in contract amount divided by the original contract award amount. This calculation can be converted to a percentage for ease of comparison. The difference between the actual cost and the initially projected cost.

$$\text{Cost Overrun} = \frac{\text{Final Contract Amount} - \text{Original Contract Amount}}{\text{Original Contract Amount}}$$

II. LITERATURE REVIEW

- Sai Murali Krishna Reddy.Raya and S.S Bhanu Prakash (2016), “Cost and Time Overrun in Indian Construction Industry” A lot of research and studies have been done to identify the root cause of the time overrun and cost overrun in construction projects which lead to the delay in the project completion Time and cost are the lifelines of any and every project. It is of supreme importance to study, analyze and evaluate the common factors leading to these constraints and suggest the best mitigation measures to overcome time and cost overrun constraints. During the construction phase it is the prime responsibility of the project managers to monitor cost and time and avoid the overruns of the both cost and time. Due to these limitations, this paper discusses the effective cost and time control overrun practices in construction industry.
- Ram Singh(2009), “Delays and Cost Overruns in Infrastructure Projects: An Enquiry into Extents, Causes and Remedies” Ram Singh say media reports abound on instances of prolonged delays and excessive cost overruns in infrastructure projects. Only a small number of projects get delivered in time and within the budget. Examples of successful project implementation, like construction of the Delhi Metro Rail, are few and appear only far in between. Indeed, the problem of time and cost overruns in India is widespread and severe. Yet, very few empirical studies exist on the subject. Even rarer are the studies based on completed projects. As a result, the extents as well as the causes behind delays and cost overruns have remained under-researched. This study investigates the various issues related to delays and cost overruns in publically funded infrastructure projects.
- Ramanathan Chidambaram and Narayanan Sambu Potty(2014), “Qualitative analysis of Time delay and Cost overrun in Multiple Design and Build Projects” Projects are more complicated involving huge contract values, participants from multi-discipline, more specialized works, tighter schedule, stringent quality standards, etc. Ultimately, cost and time are the two key parameters that plays significant role in a project success. The study focuses on multiple Design and Build project which has complicated risk and is governed by fixed contract sum (Lump sum). As such, there is no such specific study to address this problem faced in Malaysia construction industry. Qualitative research was applied at three stages of projects for time delay and two aspects for cost overrun. This paper presents one aspect each for time delay and cost overrun.

- T. Subramani, et al (2014), “Causes of Cost Overrun in Construction” 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. 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.

III. OBJECTIVE AND PROBLEM STATEMENT

A. Objective

The main objectives of this study are as follows:

- Investigate the increasing frequency of cost overruns and time delays on construction projects, and to provide recommendations for addressing the situation. Identification of the distribution and trends of the cost overruns and schedule delays of contracts.
- Investigation of the reasons and the responsibilities for cost overruns and schedule delays by collecting, reviewing, processing and analyzing change order and contract information data.
- Analyses for identifying the factors that significantly influence cost overruns and schedule delays.
- Development of a set of recommendations to help construction industry manage the problem of cost overruns and schedule delays.
- To assess which causes need the most attention by stakeholders.
- To assess how frequent each of these causes occur.
- To find out the impact of over-runs on the stakeholders, especially the client.

B. Problem Statement

- Unavailability of materials.
- Excessive amendments of design and drawings
- Poor coordination among participants
- Ineffective monitoring and feedback
- Lack of project leadership skills.

IV. METHODOLOGY

The data has been collected by interviewing the officials of the construction industry. The study has been broadly undertaken as follows:

- Identified the projects, which has undergone time and cost over-runs.
- Studied all the available plans, estimates, schedules and work procedures in detail and collected all the relevant data about the project.
- Analyzed the data obtained and compared the estimated and actual schedules and budget to understand the causes and implications of overruns.
- Examined the reasons for the over-runs through either personal interviews or questionnaires.
- Listed out all the shortcomings.
- Identified the reasons of Time and cost overruns through a general survey of opinion from Architects, Consultants and Contractors and suggest the possible remedial solutions.

V. DATA COLLECTION

Based on the all the projects, this section analyses the main reasons for cost overruns and delays and they have many risk factor. This section is based on the results of all the projects. The interviewees were asked about the main reasons for cost overruns in the poor cost performance projects and the factors which avoided it 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.

In this research, two renowned Indian construction companies with similar characteristics were chosen. Four different projects were selected from these companies, two with good cost performance and two with poor

cost performance as shown in Table. Due to confidentiality issues, the name of the companies will not be revealed.

The answers given by the project managers, contractors, consultants, construction managers, and representatives of clients from the survey are analyzed. Some information about the company has been given from the interviewees and the information given has been verified with Internet research. Four case studies were used in the research from the reputed contracting company in India. The interview protocols were sent to various people by the researcher. Four interviewees have acknowledged to have a one-hour semi-organized 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 organization and the review aftereffects 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.

VI. CONCLUSION

Time and cost overrun have been a major recurring problem in construction industry. Brief reasons for time overruns as reported by various project implementing agencies are delay in land acquisition, delay in equipment erection, inadequate mobilization by the contractor, delay in forest clearance, fund constraints, change in scope of work, cancellation of tender, law & order problem, delay in supply of equipment, slow progress of civil work, escalation in cost.

Realizing the importance of subject, construction delay not only results in time overrun but also in cost overrun. There are various causes due to which project suffers from these delays. As the project is running on many number of factors & participant, these all are having individual causes. But the important participants like owner, contractor, and consultant have more influence on project performance. Hence the causes of these participants are discussed which will helpful to improve the project delivery in terms of time as well as cost efficient.

For owner the causes which affect the project are like, changes in plan by owner during construction, less capability of understanding technical terms. Also from the finance point of view, if owner delays in payment of completed work it is going to affect the further work of project.

Contractor's improper planning & scheduling have more influence on project duration, as well as lack of experience will affect the ability of decision making which will result in rework & financing problems. Consultant's improper drawings, late revising the specification, less coordination with contractor also conclude in project time overrun.

- Training courses and workshops should be conducted to improve managerial skills of project participants.
- Material prices and labor rates should be updated continuously.
- Sufficient time should be given for preparing feasibility studies, planning, design, information documentation and tender submission. This helps avoiding or minimizing late changes.
- Progress payment should be paid on time.
- More communication and coordination between project participants during all project phases.
- Top management must react positively to political and environmental changes by means of managerial and financial policies.

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