

“PROJECT COST OVERRUN”

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ABSTRACT

Cost overruns has been a major issue in many Indian construction projects. The successful execution of construction projects and keeping them within prescribed schedule and cost is very important for effective cost performance. This research work is carried out on studying significant factors causing Cost overruns in Indian construction projects. A valid questionnaire for the survey was developed based on factors for cost overruns identified from literature review. Most of the construction project is successful only if the missions are achieved as per planned schedule and minimum cost i.e. without time and cost overrun. The main purpose of research which has categorized the causes responsible for time and cost overruns in projects. Investigation was carried out with quantitative approach of questionnaire survey to understand the perception of practitioners involved in construction industry towards various factors in causing time and cost overrun. A valid questionnaire for the survey was developed based on factors for cost overruns identified from literature review. The targeted respondents were client, contractor, owner and consultant representative involved in handling construction projects. The most critical factors are identified using questionnaire survey and analyzed the interrelationship and frequency of those factors using SPSS (Statistical Package for Social Sciences) Software Version 20. The study will helps to identify the critical factors for cost overrun and can find out the solutions and recommendations which can be considered to control those factors.

Keywords: Construction Industry, Cost overruns, India, SPSS software

1. INTRODUCTION

1.1 General

The construction industry has a great impact on the economy of all countries.

Construction activities contribute more than 10% of India's GDP.

One cannot think of widespread investment in manufacturing, agriculture, or service sectors unless the construction results of infrastructure facilities are in place.

A cost overrun, also known as a cost increase or budget overrun, involves unexpected incurred costs. Cost overruns are common in infrastructure, building, and technology projects.

As many as 432 infrastructure projects, each worth Rs 150 crore or more, have been hit by cost overruns of over Rs 4.29 lakh crore owing to delays and other reasons, according to a report of The Ministry of Statistics and Programme Implementation.

Large scale development activities are taking place in Indian construction industry and it has assumed the proportion and responsibilities of a big business and is closely associated with nation's economy. A large number of building projects and new infrastructures are being built on a great scale which contributes to the economic growth of country. Apart from the economy aspect, the speed with which construction is carried out is also an important factor. Like other countries, India is also facing a serious issue of time and cost overruns in construction projects. The unfortunate part is that very few projects get delivered in time and on cost. Time and cost overruns have become the hallmark of construction projects in India. However, the magnitude and causes behind these time and cost overruns remain understudied.

Most construction projects in developing countries are characterized by overruns in cost and time. In today's economic boom times and highly competitive business environment, the need for completing construction projects within the stipulated cost, time frame and performance expectations is becoming increasingly important. Delays and cost overruns extend the duration of a project, inflate the budget, reduce revenues, and degrade productivity. Through this study statistical analysis for time and cost overrun were done using SPSS Version 20. To achieve this goal, first reviews of the past literatures were studied. The project consists of three phases; The first phase for collecting literature review and find out the already identified risk factors. The second phase includes the questionnaire design for the identified risk factors and distribution of questionnaire to local contractors, consultants, owners and all stake holders

of construction industry. The third phase of these focused on the dataanalysis and result discussion.

1.2 Problem Identification

No data is disclosed before undertaking any project. And no method is announced through which the work will be carried out.

1.3 Objective

The objectives of this research are

- To identify the factors influencing cost overruns in construction projects and to evaluate their relative importance.
- To determine the owners, consultants and contractors perception towards the relative importance of key Cost performance indicators in construction projects in order to evaluate their performance.
- To formulate recommendations for improving cost performance.
- In the construction industry there are so many activities including mobilization, logistics, time management and material management etc.
- It is understood that each and every activity needs to be clearly monitored and should not allow lag at any point of time But in the current scenario, lot of studies need to be done to streamline the activities to make the profitable project.
- In this study, risk factors associated with construction projects have been identified and also the severity of the parameters will be analyzed and to rectify the problems of time and cost overrun in projects.

1.4 Need for construction management

The construction industry is the largest industry in the world. It is more of a service than a manufacturing industry. Growth in this industry in fact is an indicator of the economic conditions of a country. This is because the construction industry consumes a wide employment circle of labour. While the manufacturing industry exhibit high- quality products, timelines of service delivery, reasonable cost of service, and low failure rates, the construction industry, on the other hand, is generally the opposite. Most projects exhibit cost overruns, time extensions, and conflicts among parties.

1.5 Cost overrun and time overrun

Cost overrun is defined as the actual budget is more than the planningbudget. More than that, it is an unexpected cost incurred in excess of a budgeted amount due to an under-estimation of the actual cost during budgeting.

The problem of cost overrun in the construction industry isa worldwide phenomenon, and its effects are normally a source of friction between owners especially government owners, project managers, and contractors.

Time overrun is defined as the difference between theestimated project duration and actual time taken tocomplete the project. Construction industry handles many resources such as Men, Materials etc. When these resources are not properly utilized, it leads to time as well as cost overrun. Time overrun is the slipping over its planned schedule and is considered as a common problem in construction industry.

1.6 Causes of time and cost overrun

Basic cause of time and cost overrun in construction projects that are given below;

1. Scope changes
2. Inappropriate and Inadequate procurement
3. Complexity
4. Inadequate site condition survey/data for finalizingScope of Work
5. Improper Design & Drawings
6. Unrealistic Time Period fixed for Completion
7. Delay in Environmental Clearance
8. Non-availability of complete land/site free fromencumbrances
9. Non-availability of construction material
10. Inadequate monitoring system
11. Shortage of manpower

12. Changing orders
13. Poor site management
- 14.

1.7 Likert scale

A psychometric response scale primarily used in questionnaire to obtain participant's preferences or degree of agreement with a statement or set of statement. Likert scales are a non-comparative scaling technique and are one-dimensional in nature.

Named after Dr. Rensis Likert, a sociologist at the University of Michigan. "A technique for the measurement of attitudes" was published in the archives of psychology in 1932.

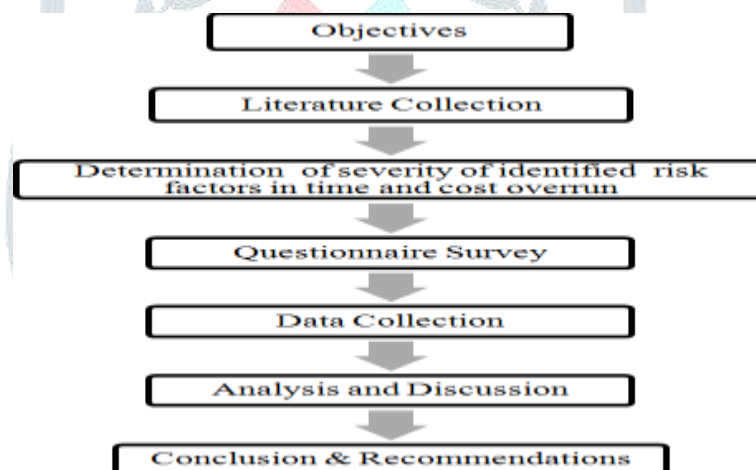
1.8 Likert scale strength

1. Simple to Construct
2. Likely to produce a highly reliable scale
3. Easy to read and complete for participants.

1.9 Reasons for cost overruns and time overrun

One major factor that has been identified as reasons for cost overrun in most projects in design errors. It is important to note that proper representation of client's requirement and the blue print to achieving good technical input to project execution are usually mapped out base on project designs.

2. METHODOLOGY



3. RESULT AND DISCUSSION

3.1 Statistical Package for the Social Sciences (SPSS)

"SPSS is a comprehensive system for analyzing data. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and complex statistical analysis." The following is a brief overview of some of the functionalities of SPSS:

- Data transformations
- Data Examination
- Means, test, ANOVA, Correlation,
- Nonparametric tests Regression
- Nonlinear Regression
- Nonparametric analysis
- Graphics and graphical interface.

SPSS is an integrated collection of quantitative analysis software that is particularly popular with social science researchers. SPSS is a desktop and larger computer based quantitative analysis package produced by SPSS Inc.

Using SPSS performs many data management and statistical analysis tasks. Statistical analysis tasks that can be performed with the base package include the generation of descriptive statistics, prediction of numerical outcomes, and prediction of identifying groups. Although SPSS is very popular with social science researchers, its ease of use and add on modules allows it to operate as a cross- disciplinary software package.

3.2 Details of questionnaire collection

This analysis is used for identifying the major factors that affect the construction equipment and improved efficiency of construction project. Number of questionnaire distributed: 50 Number of response: 30

<i>Parameters</i>	<i>Mean</i>
Nominated subcontractors by owner	2.90
Improper site coordination	2.83
Mistakes/rework during the construction stage	2.83
Inadequate contractor experience	2.93
Lack of proper qualified and experienced members among the contractor's team	2.87
Inappropriate organizational structure of the company linking to the project	2.70
Lack of communication between different subcontractor trades involved in construction	3.10
Conflicts between different subcontractors schedules during project execution	2.77
Absence of frequent site meetings chaired by higher officials to have better coordination between engineers	2.97
No financial incentives for the sub-contractors to finish ahead of schedule	2.80
Deficiencies in initial planning and scheduling schemes made	2.97
Change in the construction methods followed from the actual plan	2.63
Lack of database in estimating activity duration and resources	3.07
Poor judgment and experience of involved people in estimating time and resources	2.80
Non-availability of professional construction management experts	3.03
Inadequate early/primary planning of the project	2.77
Unrealistic schedules for construction	2.93
Accidents occurred during construction	2.67
Traffic control regulations practiced at the construction site	3.13
Lack of training people and management support in the client project team	2.57
Inefficient in handling the conflicts between the contractor and consultant	2.67
Slow decision making	2.67
Payment: delay in making payment to the contractor after the completion of milestones	2.97

Absence of strong administrative will to complete the project as per the planned time and budget	2.73
Design changes by owner or agent during construction	2.97
Payment: delay in making monthly payment	2.93
Site clearance for the work to proceed	3.17
Project delivery systems used (design-bid- build, design-build, cost plus, lump sum, etc.)	3.00
Obtaining permits from concerned authorities to start work	3.17
Change in BOQ's or scope of work during construction	2.57
Lack of adequate man power at construction site as expected/planned	2.80
Decline in labour productivity	2.90
Lack of skilled manpower	3.03
Delay due to waiting time for approval of sample materials	2.77
Revisions in designs during the time of construction	2.83
Waiting time for approval of tests and quality- control inspections	2.83
Delay in preparation and approval of shop drawings	2.97
Ambiguity in the specification written or conflicts in interpretation by owner and contractor	2.70
Negotiations on cost and durations of the project for securing contracts	2.83
Contract management/disputes between owner and contractor	3.10
Differential site condition clauses written in contract	2.90
Site closure issues between client and contractor	3.00
Joint ventures in a project	2.67
Lack of quality material/material not matching the required specification	4.35
Damage to materials during storage at the construction site	4
Delay in the delivery of special manufactured materials	3.6
Shortage in the availability of material	3.4
Equipment availability as planned	2.53
Unskilled equipment operators	2.63
Equipment breakdown/maintenance	3.00
Extreme weather conditions	2.27
Unfavourable/unexpected weather conditions	2.80
Problems with the neighbours around the site	2.67
Unforeseen site conditions	2.70
Insufficient utilities available on site	2.63
Inflation: escalation of material prices	2.63

Increase in labour wages	3.17	3.3
Absence of proper cash flow (working capital) during construction	3.20	

Frequency Tables for Material Related Factors

1. Lack of quality material/material not matching the required specification

	Frequency	Percent	Valid Percent	Cumulative Percent
1	3	5.0	5.0	5.0
2	7	15.0	15.0	20.0
3	16	60.0	60.0	80.0
4	4	20.0	20.0	100.0
Total	30	100.0	100.0	

Inference The inference made from response of construction employees and owners 10% are Very poor Severity rating of time and cost overrun in construction projects are due to “Damage to materials during storage at the construction site”, 20% Of the respondent says poor,50 % of the respondent says fair,15% of the respondent says good, 5% of the respondent says Very good.

2. Damage to materials during storage at the construction site

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	2	10.0	10.0	10.0
2	9	20.0	20.0	30.0
3	11	50.0	50.0	80.0
4	7	15.0	15.0	95.0
5	1	5.0	5.0	100.0
Total	30	100.0	100.0	

Inference The inference made from response of construction employees and owners 10% are Very poor Severity rating of time and cost overrun in construction projects are due to “Damage to materials during storage at the construction site”, 20% Of the respondent says poor,50 % of the respondent says fair,15% of the respondent says good, 5% of the respondent says Very good.

3. Delay in the delivery of special manufactured materials

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	3	10.0	10.0	10.0
2	3	10.0	10.0	20.0
3	20	66.7	66.7	86.7
4	2	6.6	6.6	93.3
5	2	6.7	6.7	100.0
Total	30	100.0	100.0	

Inference The inference made from response of construction employees and owners 10% are Very poor Severity rating of time and cost overrun in construction projects are due to “Delay in the delivery of special manufactured materials”, 10% Of the respondent says poor,66.7 % of the respondent says fair, 6.6% of the respondent says good,6.7% of the respondent says Very good.

4. Shortage in the availability of material

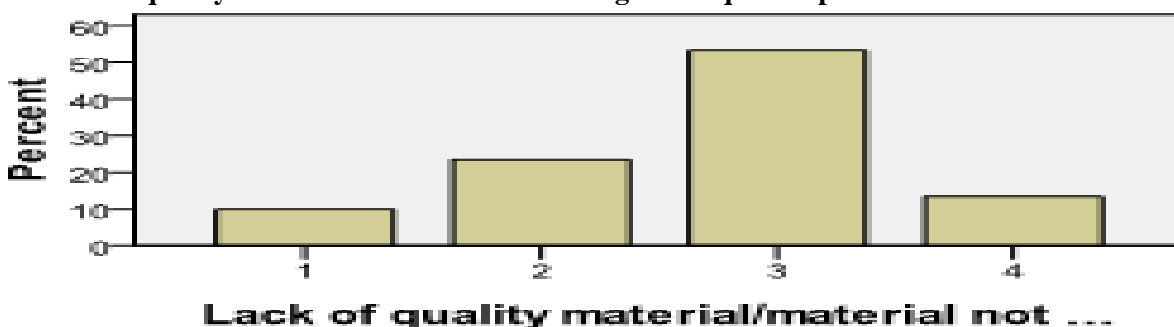
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	4	12.0	12.0	12.0
2	10	30.0	30.0	42.0
3	5	25.0	25.0	67.0
4	10	30.0	30.0	97.0
5	1	3.0	3.0	100.0
Total	30	100.0	100.0	

Inference

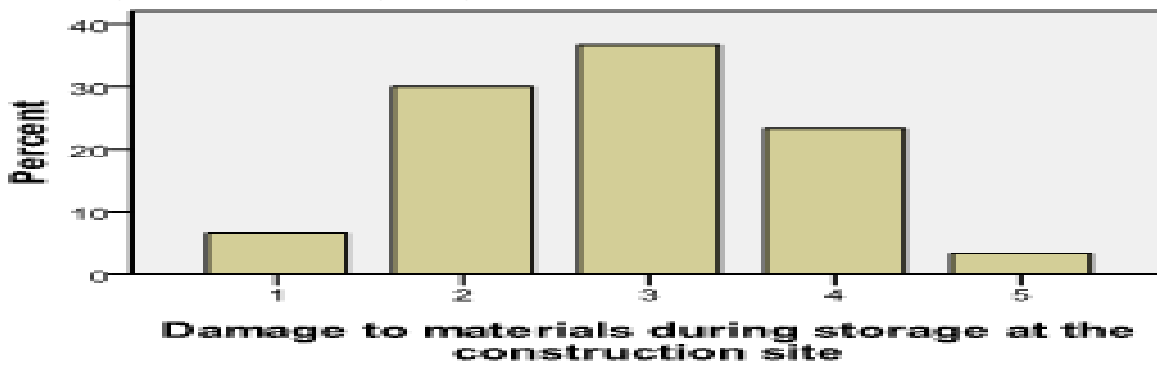
The inference made from response of construction employees and owners 12% are Very poor Severity rating of time and cost overrun in construction projects are due to “Shortage in the availability of material”, 30% Of the respondent says poor,25 % of the respondent says fair ,30% of the respondent says good,3% of the respondent says Very good

3.4 Bar Charts for Material Related Factors

1. Lack of quality material/material not matching the required specification



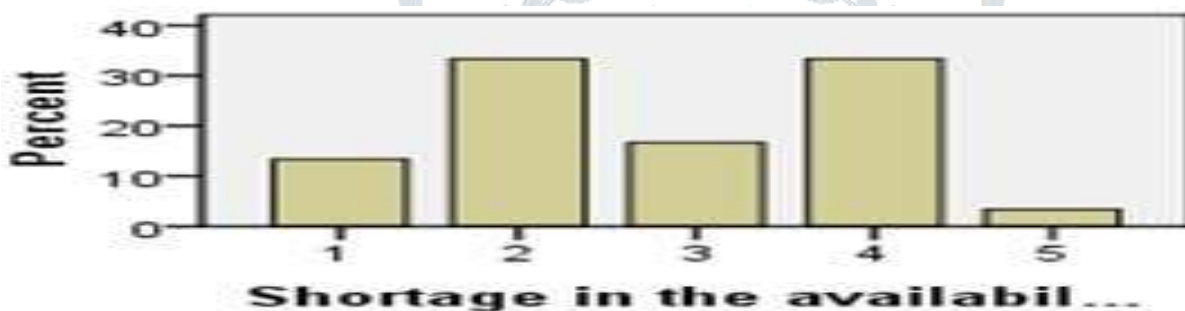
2. Damage to materials during storage at the construction site



3. Delay in the delivery of special manufactured materials



4. Shortage in the availability of material



4 CONCLUSION

4.1 General

Efficient and effective management of a project is the key attribute towards successful, timely and profitable completion of the project. Planning, monitoring, controlling cost and Quality are the major components of project management and intelligent use of these tools gives a cutting edge to the execution of projects— whether of similar type or different. In this study, it was understood that the risk severity varied in construction projects. In construction project, top risk attributable to material mobilization.

- The top seven factors that affected cost are mentioned below.
 1. Unsettled or lack of project funding.
 2. Delayed or long process times by other authorities.
 3. Unsettled or lack of project planning.
 4. Errors in construction work.
 5. Lack of identification of needs.
 6. Inexperienced or newly qualified consultants.
 7. Investing the money of project A into other project B.

In this study we found that the organization deploys separate teams for planning, accounting, procuring and other servicing works. But it was found that several factors have direct impact on the unsuccessful completion of the project due to lack of control on certain parameters. In our study, it was found that the top most risk factor attributable to time and cost overrun of the project is material management. Handling of materials at site and timely mobilization of materials play a vital role in successful completion of the project. The current market prices of the bulk materials and escalation prices for the total project duration to be predicted and materials to be procured based on the project requirement. If the inventory is maintained properly and proper stock management will have a good result in terms of timely completion of the project which mainly drives the cost of the project.

5. FUTURE SCOPE

5.1 How to Avoid Cost Overrun

Cost overrun, or any sort of expense that pushes a project past the agreed-upon budget, is something of which a project manager must be constantly vigilant about. There are several ways one can prevent cost overrun. Here are seven that help keep a reign on your budget:

1. **Thorough Project Planning** : The best way to stop cost overrun is to plan against it before executing a project. The more thorough and accurate your estimates, the more likely you'll stay within budget. There are risks, but those can be accounted for with an exhaustive risk management plan. When planning for any project, you must consider all possible scenarios, using historic data, interviews and experience. Once that plan has been detailed, have it signed off by the stakeholders of the project, so everyone is on the same page in terms of expectations.

2. **Know Your Vendors**: Many projects are going to contract with outside vendors, whether to do specific tasks, or supply materials and equipment. A relationship with any outside vendor opens your project up to cost overruns that are often beyond your control. Therefore, it's critical to do due diligence before relationships are cemented. First, understand the capacity of the vendor, and if they're going to meet your needs. When the vendor quotes a cost, make sure it's accurate. Then, before signing the contract, do a bit of background-checking to see if the vendor meets deadlines, and what others have to say about working with them.

3. **Keep to Planned Scope** : Scope creep is one of the biggest threats to sending a project into cost overrun. Change requests always bog down the desks of project managers. These come from stakeholders or clients, but also from team members. They all have wants and needs. Many of them may be appropriate and even beneficial to the project. However, too many changes can drastically impact the project, making cost overruns unavoidable. Think long and hard about the big picture before you increase project scope.

4. **Use a Project Planning Tool**: It's a given a good tool is going to make a project manager's work easier, add to the productivity of the project, and increase efficiencies. It will also assist in keeping cost overrun at a minimum. A scheduling tool like a Gantt chart is going to help keep the project on track and prevent cost override.

5. **Keep Stakeholders Updated** : If there isn't a clear line of communication between stakeholders and project managers, delays are inevitable. Delays lead to cost overrun. There is too great a risk work will start on the wrong thing at the wrong time. This wasted time threatens to send the whole project off track. Stakeholders as well as teams need proper communications, but each should get the right information. Teams want details, and stakeholders want broad strokes, to make sure the project is progressing as planned.

6. Monitor Progress

The real-time dashboard from ProjectManager.com is also ideal for tracking progress of a project as it happens, not after the fact. Before issues become problems that threaten to take the project off-track and over-budget they can be resolved. The real-time dashboard measures not only the project's progress, but the team's workload, timelines for planned and actual completion, including project slippage, and much more.

7. **Reassign Resources**: You're going to respond by reallocating resources if you discover a project spending more than budgeted. But you can also prepare for that scenario by evaluating resources beforehand, and placing them where they'll be most effective. This is especially true with your most valuable resource: your team. By assembling the most experienced and skilled team members you can have a more productive and efficient project. These resources might cost more, but if you've done your planning and set aside funds you'll save money on the backend when there are fewer issues to handle.

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