



ANALYSIS OF COST OVERRUN IN CONSTRUCTION PROJECT

¹Prof.Janki Patel, ²Arpita Patel, ³Nehal Raval, ⁴Vijay Mandal

¹Professor, ^{2,3,4} PG student

Construction project management, Department of civil engineering,
Bhagwan Mahavir College of Engineering and Technology, Surat, India.

Abstract: Cost overrun is the most important problems that confound projects progress, since It reduces the contractor's profit leading to enormous losses, and leaving the project in great troubles. Construction cost is one of the peak criteria of success of a project throughout its lifecycle and is of high concern to those who are involved in the construction industry. All projects, regardless of size, complexity is saddled by targets and uncertainty. Mostly in developing countries construction projects are characterized by overruns in cost. Cost overruns occur in every construction project and the magnitude varies significantly from project to project. This leads to severe need of addressing the acute issue of construction cost overrun. This paper describes the state of art of the research on cost overrun factors in the construction projects. From the reviews, identify some main factors causing the cost overrun and their formula.

Index Terms - Cost Overrun, Construction Projects.

I. INTRODUCTION

In developing countries, where such overruns often exceed 100% of the projects estimated cost, this pattern is more extreme. A cost overrun, also known as a cost rise or budget overrun, entails unexpected costs incurred due to an underestimation of the actual cost during budgeting, in excess of the projected sum. A cost overrun, also known as a cost rise or budget overrun, entails unexpected costs incurred due to an underestimation of the actual cost during budgeting, in excess of the projected sum. According to a very detailed global construction research conducted by Flyvbjerg (2002), it was found that 9 out of 10 projects had cost overruns. A cost overrun is a major problem in both developed and developing countries. Hence, this problem is a critical factor to be studied to alleviate the issue in the future.

II. OBJECTIVE

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.

III. IDENTIFY AND PREVENT COST OVERRUN

As all project managers know, projects rarely go to plan. Even so, it's still best practice to do everything you can to keep the project costs within budget. That means identifying potential cost overrun before it becomes an untamable beast If you're beginning a project without a detailed budget outline to guide you, that's the first warning sign that you'll likely face cost overrun. Without an outline, you risk unexpected costs and will have no benchmark against which to track the project's actual spending. Once you're in the throes of the project, having an effective budget outline will make it easy to identify when costs are overrunning. For example, if

you anticipated spending \$35k within the first month of a 6-month project, but you can see your actual costs are \$45k, that's an early indication that you may face cost overrun later.

IV. LITERATURE REVIEW

4.1 Yervi Hesna¹, Jati Sunaryati and Ayu Hidayati¹ (2021)

The COVID-19 pandemic has brought fundamental disruption at the state, community, and construction industry levels. Based on the interviewee's opinion, the percentage of the causative factors on cost overruns examined 31 main factors influencing the construction cost in Indonesia. Owners, consultants, contractors and combination of respondents, the study concluded that incorrect planning, poor financial control on site, inexperience in managing contracts, materials cost, are factors that contribute to high construction costs and also this study will determine mechanisms that can reduce COVID-19's negative impact on building construction

4.2 Ghulam Abbas Niazia and Noel Painting (2017)

They used the questionnaire survey and Relative Importance Index (RII) method. Interviewee's opinion, the percentage of the causative factors on cost overruns examined 5 main factors influencing the construction cost in Afghanistan. The study concluded that Corruption, poor financial, Delay in progress payment by the client, inexperience in managing contracts, Security are factors that contribute to high construction costs.

4.3 Sindhu vaardini, Ezhilmathi, Karthiyayini (2016)

Based on this review paper, it was identified that poor climatic conditions, improper planning and scheduling, fluctuations in the material rate, lack of proper site management, monitoring and controlling, improper management of resources in construction project and poor financial control in site can yield to cost overruns. They mentioned various data analysis method like Frequency Index, Severity Index, Importance Index Method, Relative Importance Index.

4.4 Simon Jackson (2002)

In this research paper firstly, that complete project information leads to more accurate capital cost budget estimates. One of most serious problem when a budget is being estimated is that little information is often available. The requirement is to invest more time in the early briefing stages of design to clearly define a project's scope and complexity. The secondly key is that change may be classified as the greatest risk. No matter how much design information is produced for estimating, this can be counter balanced by any design changes that are subsequently made. They also include some reasons with their examples like design change, design development, site conditions, claims, design team performance

4.5 Jomin P Jose¹ and Annie Sonia Xavier (2018)

From the literature, 27 prominent factors lead to cost overrun were identified. They are Unexpected inflation/Material price escalation, Additional work/Direct change orders by client, Inaccurate estimates 16 Bureaucracy and political interference in tendering method, Improper planning and scheduling, Inadequate monitoring and control, Fluctuation in prices of labor, increase in cost of skilled labor, Adverse effect of weather 19 Project materials monopoly by some suppliers, Poor contract documentation and management, Disputes/Strikes/Accidents on site, Lack of experience, Delay in inspection and approval of completed works.

V. INDEX ANALYSIS

5.1 Importance index:

This index states the overview of factors based on both their frequency and severity. Importance index is computed as per following formula Importance Index

$$(IMPI)(\%) = [F.I.(\%) * S.I.(\%)]/100 \quad (5.1)$$

5.2 Relative Importance index:

Chan & Kumaraswamy, 1997 used the Relative Importance Index method to calculate the relative importance of the various causes of cost overrun.

$$\sum W RII = A * N \quad (5.2)$$

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.

5.3 Frequency index:

This index states occurrence frequency of factor responsible for delay and cost overruns. It is computed as per following formula:

$$(F.I.) (\%) = \Sigma a (n/N) * 100/4 \quad (5.3)$$

Where a = constant expressing the weight assigned to each responses (ranges from 0 for Nothing happen to 4 for Always happen), n = frequency of each response, N = total number of responses.

5.4 Severity index:

This index articulates severity of factor that caused delay and cost overruns. It is calculated as per following formula:

$$(S.I.) (\%) = \Sigma a (n/N) * 100/4 \quad (5.4)$$

Where “a” is the constant expressing weighting given to each response (ranges from 1 to 4 i.e., from rarely up to always), “N” is total number of responses and “n” is the frequency of the responses.

VI. INDEX ANAL FACTORS CAUSING COST OVERRUNS

Based on the literature and related work, following are some factors causing cost overruns in construction projects,

6.1 Contractor's Site Management Related-

Contractor's Site management related factors majorly include Rework of bad quality performance. Often it is seen that project participants either the contractor or owner, for their personal benefits compromise with the quality of work. However, in most of the cases such works are to be carried out again as they are not matching the substantial standards. Factors taken under contractor's site management are poor site management and supervision, lack of experience of contractor, mistake during construction, relationship between management and labour, shortage of labour, late delivery of material, shortage of material, problem with sub-contractor, dispute between parties.

6.2 Cost Estimating Related-

During the cost estimation of project if factors like inflation, fluctuation in price of material, transportation cost, high maintenance and cost of machinery, change in material specification, change in orders and poor estimation of original cost occurs then it will directly cause cost overrun.

6.3 External Factors-

Bad weather condition, labour strike, theft on site, unexpected ground condition and act of God are some external factors which may cause delay in completion of work and subsequently lead to cost overruns.

6.4 Design Related-

Design related factors which leads to overruns are critical in construction projects. Often these factors lead to cost increases and affect the project performance. These factors include late in revising and approving of design document by consultant and client, incomplete design, frequent design changes, mistake in design and lack of involvement of contractor during design. Sometimes the time allowed for the preparation of an estimate is less comparing to the size and span of project which often leads to mistake in estimating.

6.5 Project management related factors

Project management tools and techniques play an important role in the effective management of a project. Through literature review it is appearing that project management responsible about success of project in construction industry. Construction project have huge works which needed huge numbers of equipment, materials and labours. All these need to manage and control. Cost management is important part to improve the cost performance in construction projects. Cost management considered as vital part in project management that targeted to achieve efficient cost performance through efficient project planning and execution within the limited budget of the project. Causes of cost overrun related to management identified by different researchers as: poor site management and supervision, poor contractor management, lack of project management support, consultant poor contract management, availability of management finance and plans, poor contract management practices, contract management.

6.6 Materials and machinery related factors-

Construction materials account for over half of the final cost of house building while the cost of labour account for less than third, and overheads and profit stand for the rest. Inflation of materials, equipment and labour costs may vary geographically within the country and contracts between subcontractors and suppliers may involve different inflation protection terms as agreed with the client. As inflation increases, interest rates also increase and the project costs will also increase. The factors affected in cost overrun related to materials and machinery as stated by various studies are: fluctuations in the cost of building materials, fund constraints by government party, material cost increase by inflation, high cost of machineries, supply of raw materials and equipment by contractors and project materials monopoly by some suppliers.

VII. CONCLUSION

Cost overruns are one of the critical problems faced in the construction industry. A project may be considered to be a successful project only when it is completed within the budgeted cost. Based upon the various literatures reviews various factors causing cost overrun can be identified. And with the appropriate method of data analysis the most significant factors influencing the cost overruns can be analyzed. Based on the reviews it was identified that poor climatic conditions, improper planning and scheduling, fluctuations in the material rate, lack of proper site management, monitoring and controlling, improper management of resources in construction project and poor financial control in site can yield to cost overruns. Future studies can be done on different types of projects like infrastructure projects, water supply, industrial and other specialized projects. And also various studies can be done to predict the actual cost of a project based upon the significant delay factors by constructing a prediction model.

REFERENCES

- [1] A M Faten Albtoush¹, R A Bahamid¹, S I Doh¹ and A R Rahimi¹, M S Syamsyul Hairi¹ and S Adilen Lucia², Faculty of Civil Engineering Technology, University Malaysia Pahang, 26300 Gambang, Pahang, Malaysia 2Politeknik Metro Kuantan, Jalan Tun Ismail, 25000 Kuantan, Pahang, A Review on Causes of Cost Overrun in the Construction Projects.
- [2] Abhimanyu S. Rathi, Study of Factors Influencing Cost Overruns: An Overview”, department of Civil Engineering, PRMCEAM, Badnera- Amravati (MS) India, International Journal of Science and Research (IJSR).
- [3] Shah Mohd Shahbaz¹, Sohith Agrawal², Dr. Mukesh Pandey³,¹ B. Tech, MTech (INT) P.G student, Construction technology and Management, I.T.M University Gwalior, Madhya Pradesh, India. ²Asst. Professor Dept. of Civil Engineering, I.T.M University Gwalior, Madhya Pradesh, India. ³Head of Civil Engineering, I.T.M University Gwalior, Madhya Pradesh, India. Study of Factors Causing Cost Overrun in Construction Industry Using AHP Technique: A Review.
- [4] A case study of cost overruns in a Thai condominium project, by Kwanchai roachanakanan, may 2005.

- [5] Chhavi gupta, student of m. Tech in construction management, al-falah college of engineering. & technology, faridabad, India, Study of factors causing cost and time overrun in construction projects.
- [6] What is cost overrun, and how can you prevent it? written by: Hannah Taylor
- [7] Ghulam Abbas Niazia, Noel Paintingb, aTransportation Engineering Faculty, Kabul Polytechnic University, Kabul, Afghanistan, School of Environment and Technology, University of Brighton, Brighton, United Kingdom, Significant Factors Causing Cost Overruns in the Construction Industry in Afghanistan.
- [8] Yervi Hesna1*, Jati Sunaryati1 and Ayu Hidayati1 1Department of Civil Engineering, Faculty of Engineering, Andalas University, Indonesia,2021. COVID-19 pandemic impact: an identification of the cause of cost overrun in construction project.
- [9] Sindhu vaardini, Ezhilmathi, Karthiyayini, Assistant Professor, Sri Ramakrishna Institute of Technology, Coimbatore 3 PG Scholar, Sri Ramakrishna Institute of Technology, Coimbatore, study on cost overruns in construction projects –a review.
- [10] Simon Jackson, School of Construction Management and Engineering, The University of Reading, Whiteknights, PO Box 219, Reading, RG6 6AW, UK., Project cost overruns and risk management.
- [11] Jomin p jose1,annie sonia xavier2,1 MTech student, civil engineering, toc h institute of science and technology, Kerala, india,2 assistant professor, civil engineering, toc h institute of science and technology, Kerala, India. Literature review on cost Overrun in kerala based on Construction industry.

