

Cost Overrun in Construction Projects

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ABSTRACT

Cost overrun is one of the major challenges in construction projects because it affects budget, project duration, quality, and stakeholder satisfaction. This study identified its main causes, effects, and solutions through a questionnaire survey of construction professionals, and the responses were analyzed using Mean Score and Relative Importance Index (RII). The findings showed that inflation and rising material prices are the leading causes, while poor planning, weak monitoring, delayed decisions, improper site investigation, and poor material management were also found responsible. It was observed that cost overrun causes delays, financial losses, reduced quality, and lower client satisfaction. Better planning, accurate estimation, regular monitoring, and effective coordination can be adopted to control cost overrun and improve project performance.

Keywords – Cost Overrun, Construction Projects, RII, Questionnaire Survey, Project Management

1. INTRODUCTION

The construction sector plays a vital role in the economic growth of any country, as it supports infrastructure development, creates employment opportunities, and improves overall productivity. Roads, bridges, buildings, and other essential facilities are developed through this sector, which directly contributes to national progress.

However, cost overrun remains one of the major and continuing challenges in the construction industry. Cost overrun occurs when the actual project cost becomes higher than the amount estimated during the planning stage. This issue is widely seen in construction projects around the world and is often more severe in developing countries because of financial, managerial, and technical difficulties.

In India, cost overrun has become a growing concern due to rapid urbanization and increasing investment in large infrastructure projects. Many projects exceed their planned budgets, which creates financial pressure on owners, contractors, and other stakeholders. Profits are reduced, resources are wasted, and project completion is delayed, ultimately affecting the overall success of the project.

The main objective of this study is to examine the key causes and effects of cost overrun and to identify suitable measures for controlling it in construction projects. Primary data was collected through questionnaire surveys to determine the most significant factors affecting project cost performance.

2. LITERATURE REVIEW

Cost overrun has been studied in both developed and developing countries, and it still remains a major challenge to project success. Arditi et al. reported that many public projects face cost increases due to administrative delays, weak planning, and poor coordination among departments. When activities are not organized properly from the start, delays and extra expenses are often created during execution [1].

In the Indian construction industry, Wanjari and Dobariya [6] found that rising material prices, delays in scheduled work, and lack of coordination are common causes of cost overrun. Frequent market price changes create financial pressure, while poor communication among owners, contractors, and consultants affects project progress [6].

Technical factors were highlighted by Venkateswaran et al., who identified design changes during construction as a major reason for cost increase. Rework, material wastage, labour inefficiency, and time extensions are often caused when changes are made after work begins [11].

Doloi et al. emphasized managerial issues such as poor communication, weak decision-making, and lack of stakeholder alignment. When proper coordination is not maintained, disputes arise, progress slows down, and project costs are increased [16].

Table 1: Classification of cost overrun factors

Code	Factors	Category	Author(s)	Ref. No.
A1	Design changes / complexity	Technical	Venkateswaran et al.; Kavuma et al.	[11], [3]

A2	Estimation / BOQ errors	Technical	Youssefi & Celik; Wanjari et al.	[10], [6]
A3	Improper material planning	Technical	Soundarya et al.	[2]
A4	Unforeseen site conditions	Technical	Senouci et al.	[18]
A5	Inadequate site investigation	Technical	Kansal & Agarwal	[13]
A6	Errors in drawings/specifications	Technical	Kavuma et al.	[3]
B1	Inflation & price escalation	Financial	Adepu et al.; Tayyab et al.	[8], [17]
B2	Contractor cash flow issues	Financial	Wanjari et al.	[6]
B3	Delay in payments	Financial	Rajan et al.	[12]
B4	Poor financial planning	Financial	Annamalaisami et al.	[20]
B5	Underestimation during tendering	Financial	Youssefi & Celik	[10]
B6	Market conditions / interest rates	Financial	Ma et al.	[14]
C1	Poor planning & scheduling	Managerial	Soundarya et al.; Rajan et al.	[2], [12]
C2	Delay in decision-making	Managerial	Doloi	[16]
C3	Lack of coordination	Managerial	Larsen et al.; Doloi	[21], [16]
C4	Ineffective monitoring	Managerial	Senouci et al.	[18]
C5	Lack of experienced staff	Managerial	Rajan et al.	[12]
D1	Delay in approvals	External	Venkateswaran et al.	[11]
D2	Weather conditions	External	Senouci et al.	[18]
D3	Political/regulatory changes	External	Zhu et al.	[19]
D4	Legal disputes	External	Rajan et al.	[12]
D5	Force majeure	External	Eliasson; Adepu et al.	[4], [8]

Table 1 shows classification of factors from this literature review of past studies on cost overrun.

3. RESEARCH METHODOLOGY

A quantitative research methodology was adopted in this study to identify and examine the factors responsible for cost overrun in construction projects. Primary data was collected through a structured questionnaire survey conducted among construction professionals. The questionnaire was prepared using findings from previous studies and a detailed literature review on cost overrun in the construction industry.

The identified factors were divided into six groups: technical, financial, managerial, external factors, effects of cost overrun, and mitigation strategies. After responses were collected, the data was analyzed using Mean Score and Relative Importance Index (RII) to measure the importance of each factor. This method helped determine which factors affect cost overrun more significantly in construction projects.

3.1 Data Collection

The questionnaire survey was distributed among construction professionals, including contractors, consultants, engineers, and project managers. Respondents with practical experience in managing construction projects were mainly selected so that reliable and relevant data could be collected for the study. Their industry experience helped identify the actual issues related to cost overrun that are commonly faced during project execution.

This study mainly focuses on construction projects in the South Gujarat region of India. Responses were collected through direct interaction as well as online platforms to improve convenience and reach a wider group of professionals. All submitted responses were carefully reviewed, and incomplete or inconsistent entries were removed from the final analysis to maintain the accuracy and quality of the study.

3.2 Data Analysis Methods

The collected data were analyzed using statistical techniques to determine the relative importance of each factor.

1. Mean Score Analysis

The mean score for each factor was calculated to determine the average response level and overall significance.

2. Relative Importance Index (RII)

The Relative Importance Index (RII) method was used to rank the factors affecting cost overrun. The RII is calculated using the following formula:

$$RII = \frac{\sum W}{A \times N} \dots (1)$$

Where:

- W = Weight assigned to each factor by respondents
- A = Highest weight (5 in this study)
- N = Total number of respondents

The RII value ranges from 0 to 1, where higher values indicate greater importance of the factor.

3.3 Ranking of Factors

Based on the calculated RII values, all factors were ranked in descending order. The factor with the highest RII value was considered the most significant contributor to cost overrun. The ranking was performed separately for:

1. Causes of cost overrun (A–D)
2. Effects of cost overrun (E)
3. Mitigation strategies (F)

This classification helps in better understanding the problem and identifying appropriate solutions.

4. DATA ANALYSIS AND RESULTS

The data collected from the questionnaire survey were analyzed using statistical tools such as Mean Score and Relative Importance Index (RII). A total of 90 questionnaires were distributed, out of which 61 valid responses were received, resulting in a response rate of 68.89%, which is considered adequate for the study.

4.1 Stakeholder Distribution

The distribution of respondents is shown below in Table 2:

Table 2: Stakeholder Count

Sr. No.	Stakeholder	Number
1	Contractor	32
2	Engineer	20
3	Project Manager / Consultant	24
4	Owner	14

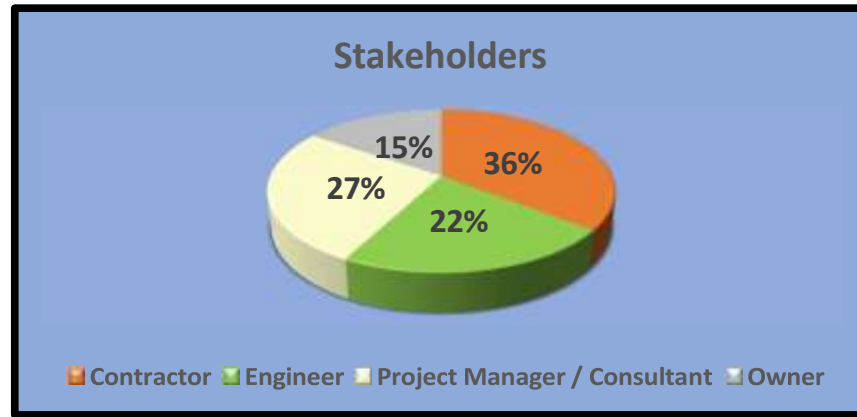


Figure 1: Technical factors

The stakeholder distribution in Figure 1 shows that most responses were received from contractors, followed by project managers/consultants and engineers, while the fewest responses were provided by owners. This indicates that a major part of the data came from professionals directly involved in project execution and daily site management. Contractors shared practical insights on site issues and cost challenges, while engineers and consultants contributed technical and managerial views. Although owner participation was lower, their responses still helped explain financial concerns and decision-making matters. Overall, the involvement of different stakeholders made the study more balanced, practical, and closer to real industry conditions.

4.3 RII-Based Ranking of Causes

The RII ranking of the factors are given below in table 3.

Table 3: Ranking of Cost Overrun Causes

Rank	Code	Factor	Mean	SD	RII
1	B1	Inflation & price escalation	3.95	0.82	0.790
2	C4	Ineffective monitoring & control	3.91	0.85	0.781
3	B3	Delay in payments	3.89	0.88	0.777
4	C2	Delay in decision-making	3.83	0.90	0.765
5	A5	Inadequate site investigation	3.79	0.87	0.758
6	A3	Improper material planning	3.78	0.89	0.755
7	B2	Cash flow problems	3.76	0.92	0.752
8	A2	Estimation / BOQ errors	3.74	0.86	0.748
9	D1	Delay in approvals	3.73	0.91	0.745
10	B5	Underestimation in tendering	3.71	0.93	0.742
11	C5	Lack of experienced staff	3.70	0.95	0.739
12	C1	Poor planning & scheduling	3.68	0.88	0.735

13	B4	Poor financial planning	3.66	0.94	0.732
14	B6	Market conditions	3.64	0.97	0.729
15	A6	Drawing/specification errors	3.63	0.89	0.726
16	C3	Lack of coordination	3.62	0.96	0.723
17	A1	Design changes	3.60	0.91	0.719
18	A4	Unforeseen site conditions	3.58	0.93	0.716
19	D3	Political/regulatory changes	3.57	0.98	0.713
20	D4	Legal disputes	3.53	1.02	0.706
21	D5	Force majeure	3.49	1.05	0.697
22	D2	Weather conditions	3.39	1.10	0.677

The collected data was analyzed using mean, standard deviation, and Relative Importance Index (RII) to understand the major factors affecting cost overrun in construction projects. The results show that most factors have a moderate to high influence on project cost performance. Among all variables, inflation and price escalation (B1) received the highest mean value and RII, which confirms it as the most critical cause. This indicates that market changes and economic conditions strongly affect construction costs, especially in developing regions.

Managerial issues were also ranked highly in the analysis. Ineffective monitoring and control (C4) and delays in decision-making (C2) were identified as major contributors to cost overrun. Poor supervision, late approvals, and weak coordination often increase project expenses. Financial problems such as delayed payments (B3) and cash flow issues (B2) were also found to disturb project progress and raise indirect costs.

Technical factors like inadequate site investigation (A5) and poor material planning (A3) showed a noticeable impact on project costs. These issues can lead to rework, wastage of resources, and delays. Factors such as design changes (A1) and unforeseen site conditions (A4) were ranked slightly lower, but they still affect the final project cost.

The standard deviation values helped measure the consistency of responses. Lower values showed strong agreement among respondents, while higher values for factors like weather conditions (D2) and force majeure events (D5) reflected different opinions. Overall, the study shows that financial and managerial factors are the main causes of cost overrun, while technical and external factors also contribute depending on project conditions.

4.4 Analysis of Effects of Cost Overrun

Table 4: Ranking of Effects

Rank	Factor	Code	RII
1	Reduced client satisfaction	E4	0.755
2	Delay in project completion	E1	0.748

3	Financial performance impact	E2	0.745
4	Reduction in quality	E3	0.713

The analysis in Table 4 shows that cost overrun affects project performance in many ways. Reduced client satisfaction (E4) was ranked highest, indicating that stakeholder trust and project reputation are greatly impacted. Project completion is often delayed, and financial performance (E2) is also affected due to increased costs and budget pressure. In addition, construction quality (E3) may be reduced when cost overruns occur, which can create future maintenance and operational problems.

4.5 Analysis of Mitigation Strategies

Table 5: Ranking of Mitigation Measures

Rank	Factor	Code	RII
1	Detailed planning & scheduling	F1	0.813
2	Accurate cost estimation	F2	0.790
3	Risk identification & contingency	F3	0.787
4	Regular progress meetings	F8	0.781
5	Material planning	F7	0.777

The ranking of mitigation strategies in Table 5 shows that strong planning and good management are the most effective ways to control cost overrun. Detailed project planning and realistic scheduling (F1) were ranked highest, which highlights the importance of proper preparation at the beginning of a project. Accurate cost estimation (F2) and early risk identification (F3) also help reduce uncertainty. Regular progress review meetings (F8) and proper material planning (F7) further support cost control. The results suggest that managerial improvements often create a greater impact than relying only on technological solutions.

5. CONCLUSION

1. The study clearly shows that cost overrun is not caused by a single issue, but by a combination of financial, managerial, and technical factors working together throughout the project lifecycle.
2. Among all the factors, inflation and price escalation stand out as the most influential, indicating how strongly external economic conditions can impact construction project costs.
3. It is also evident that project management practices play a crucial role, as issues like weak monitoring and slow decision-making directly lead to inefficiencies and increased costs.

4. Technical shortcomings, especially poor site investigation and improper material planning, further add to the problem by causing rework, delays, and wastage of resources.
5. The impact of cost overrun goes beyond just budget increase; it affects project timelines, reduces construction quality, and weakens client trust and satisfaction.
6. The findings suggest that better planning at the initial stage, along with realistic cost estimation, can significantly reduce the chances of cost overrun.
7. Continuous monitoring, proper coordination among stakeholders, and timely decisions during execution are equally important to keep the project on track.
8. Controlling cost overrun requires a balanced approach that combines strong financial control with effective project management and practical site-level planning.

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