Investigative Study on Factors Affecting Delays and Influencing Cost Overrun in Construction Projects

[1]Shaik Faizan Ali, [2]MA Hameed
[1]G Scholar, [2]Assistant Professor-Civil Engineering
Lords Institute of Engineering and Technology, Hyderabad 500091, Telangana

Abstract-The construction industry plays a critical role in shaping the infrastructure and economy of a country. It employs a vast workforce and stimulates growth across multiple sectors. However, one of the persistent challenges faced globally by the industry is the prevalence of time delays and cost overruns. These issues not only affect project profitability but also diminish stakeholder trust and disrupt planned development. This study focuses on identifying and analyzing the key causes of delays and cost overruns in construction projects, particularly in the Indian context. Using structured surveys and statistical tools such as the Relative Importance Index (RII) and Importance Index (IMPI), we gathered data from clients, contractors, engineers, and laborers.

The study reveals that poor equipment productivity, design errors, inadequate communication, and financial instability are the major culprits behind inefficiencies. Recommendations such as adopting modern project management tools, enhancing stakeholder coordination, and implementing stringent risk management strategies are proposed. This study aims to provide practical guidelines for improving the delivery performance of construction projects. Ultimately, the goal is to ensure the successful execution of construction projects that meet predefined criteria of cost, time, and quality, thereby strengthening public infrastructure and boosting economic progress.

Keywords: Construction Management, Project Delays, Cost Overrun, Relative Importance Index, Construction Planning, Time Management, Risk Mitigation.

LITERATURE REVIEW

Abdurrahman (2023) explored the impact of delays in construction in terms of time, cost, and quality where Construction systems have different quality confines Involving druggies in quality planning process is important. Construction systems have different quality confines. The study explores eight quality confines in construction assiduity perspective fastening on the construction assiduity using exploratory factor analysis.

Sindhu Vaardini identified that Time overruns are the crucial problems faced in the construction industry. Since delays are considered to be a serious problem in the construction industry this study examines the factors that cause delay in construction projects. Based upon the relative importance index method the most critical factors ranked were (1)Inaccurate construction planning (2) Owners delay in freeing the contractor financial payment (3) Improper scheduling resulting in poor judgment of time and resources (4)Shortage of construction materials at site and (5) Contractors financial difficulty.

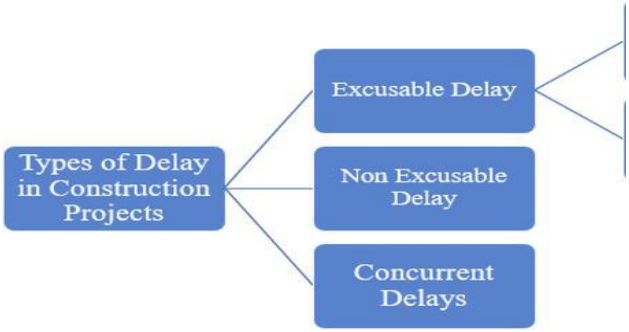
K. Shakya., Er., Himmi, Gupta.(2022) anatomized the factors causing detainments in construction systems, which can lead to time and cost overrun. 47 factors causing detainments in construction systems were classified into 8 parts and listed using RII. M, Dlamini., R, Cumberlege.(2021) delved on Detainments in time can lead to cost overruns and impact the quality of construction systems. It was linked that Key capabilities are needed to alleviate cost and time overruns are similar. design directors need to acquire crucial faculty chops through quantitative exploration approach.

INTRODUCTION

In recent decades, the construction industry has undergone significant transformation with the adoption of modern technologies and methodologies. Despite these advancements, projects often suffer from delays and cost overruns, compromising quality and stakeholder satisfaction. Delays refer to the postponement of project activities, which

subsequently affect the overall timeline and budget. These disruptions are usually the result of inadequate project planning, poor coordination among stakeholders, unforeseen site conditions, legal or administrative hurdles, and workforce inefficiencies. In the context of developing countries like India, these issues are further compounded by bureaucratic red tape, fluctuating material costs, and labor shortages.
Time and cost overruns lead to a series of negative consequences such as budget deficits, stakeholder disputes, reduced productivity, and in severe cases, project termination. Beyond the immediate financial implications, these issues affect public perception, policy trust, and future investment potential. Therefore, identifying the root causes of these problems is essential for timely and successful project delivery. This paper provides a detailed investigation into the delay and cost overrun factors and explores mitigation techniques tailored for the construction environment in Hyderabad, India. Furthermore, the research aims to contribute to a growing body of knowledge that bridges the gap between theory and on-site construction practices.

1.1: Types Of Delays



METHODOLOGY

The research follows a mixed-methods approach involving both quantitative and qualitative data collection. Initially, an extensive literature review and consultations with industry experts were conducted to draft a comprehensive questionnaire. The primary aim was to assess the perceived impact of various delay and cost overrun factors and compare stakeholder perspectives across roles.

3.1 Research Design:

- Quantitative: A survey was conducted using a structured questionnaire employing a 5-point Likert scale.
- Qualitative: Interviews and field visits were conducted to capture nuanced insights from professionals.
- Sampling: A purposive sample of 25 participants was selected, comprising 12 laborers, 6 engineers, 3 contractors, and 4 clients.
- Geographical Focus: The study was limited to urban construction sites in Hyderabad to maintain environmental consistency and obtain region-specific insights.

3.2 Data Analysis Techniques

- Relative Importance Index (RII): Used to rank delay causes based on survey responses.
- Importance Index (IMPI): Combines frequency and severity of factors to evaluate overall impact.
- Reliability Analysis: Cronbach's Alpha was used to assess internal consistency of the questionnaire ($\alpha = 0.923$).

DATA COLLECTION

Respondents were selected from ongoing construction projects in Hyderabad, Telangana. The participants were interviewed on-site to ensure authentic responses. A total of 25 completed responses were analyzed. The questionnaire focused on 20 commonly observed delay factors including financial constraints, labor issues, weather delays, material shortages, and documentation errors. To ensure inclusivity and diverse feedback, the surveys were conducted across different roles and experience levels in the industry. The data revealed consistent concern over logistical inefficiencies and inadequate planning at the early project stages.

Few Images taken during Case Study by Surveys & Interviews:

Table -1: Reliability Statistics

CRONBACH'S ALPHA	CRONBACH'S ALPHA BASED ON STANDARDIZED ITEMS	N OF ITEMS
0.923	0.924	25

Cronbach's alpha was calculated for the factors using the SPSS software to ensure the consistency of the results. Cronbach's alpha for delay factors was 0.923, beyond the threshold of statistical significance (alpha = 0.7). Therefore, the data gathered from respondents was valid and usable.

RESULTS

- Poor equipment productivity was identified as the most significant cause of delay, with a Relative Importance Index (RII) of 0.7425, ranked 1st among all factors.

- Design errors were the second major cause of delay, having an RII of 0.7397 and ranked 2nd overall.
- Client financial difficulty ranked 3rd, with an RII of 0.7384, highlighting financial issues as a key contributor to delays.
- Shortage in construction materials was the fourth most important factor, with an RII of 0.7342, indicating supply chain challenges.
- Intermittent design change had an RII of 0.7205, making it the 5th ranked cause among the major delay factors.
- Slow permits from municipality was the top-ranked minor delay factor, placed 6th overall with an RII of 0.7192.
- Poor communication followed closely as the 7th ranked delay cause, with an RII of 0.7164, indicating coordination issues.
- Shortage in manpower was the 8th and final listed factor, with an RII of 0.7123, pointing to labor availability concerns.

DISCUSSION

Construction delays and cost overruns are multifactorial problems involving technical, financial, managerial, and environmental variables. The analysis confirmed that outdated equipment, ineffective planning, and inadequate coordination among teams were significant contributors. Financial constraints, such as delayed payments and cash flow issues, were also commonly cited.

The lack of a formal risk management framework and insufficient use of project management software were identified as weaknesses. To counteract these challenges, it is recommended that stakeholders incorporate predictive planning tools such as MS Project, Primavera, and BIM (Building Information Modeling). These tools allow for improved visualization, resource tracking, and scenario modeling.

Regular training programs, stakeholder engagement sessions, and contingency planning can also mitigate disruptions. For instance, conducting bi-weekly coordination meetings among contractors, clients, and suppliers can streamline decisions and reduce misunderstandings. A centralized communication protocol should be established to enhance transparency and efficiency across all phases of construction. The study also suggests a stronger regulatory framework to ensure that payment schedules and quality standards are strictly adhered to.

CONCLUSION AND FUTURE WORK

This study concludes that timely and cost-efficient construction project delivery hinges on proactive planning, robust stakeholder communication, and effective risk management. Poor productivity, design errors, and financial difficulties remain the primary culprits in project delays. The research underscores the importance of implementing modern management practices and suggests integrating real-time tracking systems to ensure better control.

Future work may involve expanding the geographical scope of the study, increasing the sample size for broader generalization, and incorporating advanced analytics or AI-based forecasting models to enhance decision-making accuracy in construction projects. Additional research can also explore policy-level interventions and how public-private partnerships might streamline project delivery in large-scale infrastructure developments.

REFERENCES

[1] M.N. Shah, S. Dixit, R. Kumar, R. Jain, K. Anand (2021), “Causes of delays in slum reconstruction projects in India” pp. 452 - 467

[2] Abdurrahman, Salihu, Abubakar., Nuzul, Azam, Haron., A., H., Alias., Law, Teik, Hua. (2023). Exploring quality dimensions from a construction perspective: a literature review. Jurnal teknologi, doi: 10.11113/jurnalteknologi.v85.19319.

[3] Essa, O.N., Alenazi., Zulfikar, A., Adamu., Ali, Al-Otaibi. (2022). Exploring the Nature and Impact of Client-Related Delays on Contemporary Saudi Construction Projects. Buildings, doi: 10.3390/buildings12070880.

[4] Hubert, Anysz. (2019). Managing Delays in Construction Projects Aiming at Cost Overrun Minimization. doi: 10.1088/1757-899X/603/3/032004.

[5] Ibrahim, Mahamid. (2021). Effects of Design Quality on Delay in Residential Construction Projects. Journal of Sustainable Architecture and

Civil Engineering, doi: 10.5755/J01.SACE.28.1.20531

[6] Jagannath, Daripa. (2022). Impacts of Delays in Project Completion in Terms of Time and Cost. International Journal For Science Technology And Engineering, doi: 10.22214/ijraset.2022.45788

[7] K., Shakya., Er., Himmi, Gupta. (2022). Indexing of Factors Affecting Time and Cost Overrun in Construction Projects. International Journal For Science Technology And Engineering, doi: 10.22214/ijraset.2022.45477.

[8] M, Dlamini., R, Cumberlege. (2021). The impact of cost overruns and delays in the construction business. doi: 10.1088/1755-1315/654/1/012029

[9] MI, Hoque., Md., Abu, Safayet., Md., Jewel, Rana., Abu, Yousuf, Bhuiyan., Golam, Sadmani, Quraishy. (2021). Analysis of construction delay for delivering quality project in Bangladesh. doi: 10.1108/IJBPA03-2021-0032

[10] Onur, Selçuk., Harun, Turkoglu., Gul, Polat., Miklós, Hajdu. (2022). An integrative literature review on the causes of delays in construction projects: evidence from developing countries. The international journal of construction management, doi: 10.1080/15623599.2022.2135939

[11] Osama, ElSahly., Salma, Ahmed., Akmal, S., Abdelfatah. (2023). Systematic Review of the Time-Cost Optimization Models in Construction Management. Sustainability, doi: 10.3390/su15065578

[12] P., Pallavi. (2023). Cost and Time Over Run in Construction Projects. International Journal For Science Technology And Engineering, doi: 10.22214/ijraset.2023.54703