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Cost Control Factor and Key Strategies of Cost Reduction in Costruction Industry

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Abstract: ***Cost overrun remains a critical challenge in the construction industry despite the availability of various cost control techniques. This study investigates the key factors influencing construction cost and evaluates effective strategies for cost reduction in building projects. A questionnaire-based survey was conducted among construction professionals to identify major cost drivers and mitigation approaches. The results indicate that construction management practices, environmental conditions, and design-related issues significantly influence project cost. The advanced strategies complement traditional cost control methods and emphasize proactive planning, technology integration, and process optimization to achieve sustainable cost reduction in construction projects. In this study we discussed the factor affecting on cost of project and strategies of cost reduction in construction. The findings of this study contribute to improving cost control practices and enhancing decision-making in construction projects. This document gives formatting instructions for authors preparing papers for publication in the Proceedings of an IEEE conference. The authors must follow the instructions given in the document for the papers to be published. You can use this document as both an instruction set and as a template into which you can type your own text.***
Keywords: Cost Overrun, Cost Reduction, Construction Management, Value Engineering, BIM, Project Planning.

I. INTRODUCTION

The construction industry plays a vital role in the economic development of any nation by contributing to infrastructure growth, employment generation, and overall societal development. However, one of the major challenges faced by the industry is the persistent issue of cost overrun in building construction projects. Despite the availability of various cost control techniques and management tools, many projects fail to achieve their estimated budgets, leading to financial losses and project delays.

Cost escalation in construction projects is influenced by multiple factors, including poor project planning, ineffective construction management practices, design changes, environmental conditions, and inefficient resource utilization. Previous studies have highlighted that construction management and contract arrangements, environmental factors, and design-related issues are among the primary contributors to increased project costs. These factors not only affect the financial performance of projects but also impact their timely completion and overall quality. To address these challenges, several cost reduction strategies such as value engineering, efficient material management, and improved project planning have been proposed. While these strategies have shown potential in minimizing construction costs, their implementation is often limited due to lack of proper coordination, inadequate monitoring systems, and absence of skilled professionals. Moreover, most traditional approaches rely heavily on manual processes and do not leverage modern digital technologies. In recent years, advanced tools such as Building Information Modelling (BIM), artificial intelligence (AI), and data analytics have emerged as effective solutions for improving cost estimation, monitoring, and control. However, their integration into routine construction practices remains limited, especially in developing regions. Additionally, many existing studies are based on survey data and lack real-time project validation, life cycle cost analysis, and comprehensive risk assessment. Therefore, there is a need for a more systematic and technology-driven approach to cost management in construction projects. This study aims to identify key cost influencing factors and evaluate effective cost reduction strategies while highlighting the importance of integrating modern tools and techniques for improved decision-making and project performance.

A. Problem Statement

Cost overrun remains a major challenge in construction projects, leading to financial losses and delays. It is mainly caused by factors such as poor project planning, inefficient management practices, design changes, environmental conditions, and improper resource utilization. Although various cost control techniques exist, they are often applied in isolation and lack proper implementation. Therefore, there is a need to identify key cost-influencing factors and evaluate effective cost reduction strategies to improve project performance and decision-making.

B. Objectives:

1) To identify the major factors affecting construction project cost.
2) To evaluate effective cost reduction strategies in building construction projects.
3) To study the role of both traditional and advanced cost control techniques in minimizing project cost
4) To suggest practical measures for improving cost control and enhancing decision-making in construction projects.
5) To study the impact of rework, design changes, and site management inefficiencies on cost escalation
6) To develop a systematic framework for integrating cost control strategies with project management practices.

II. LITERATURE SURVEY

A Number of researcher have investigated the causes of cost overrun and the effectiveness of cost reduction strategies in construction projects.

Oyewobi L. O. et al. [1] analyzed factors affecting construction cost using a questionnaire-based survey. The study identified construction management practices, environmental conditions, and design-related issues as the major contributors to cost escalation. The authors also highlighted value engineering and material management as effective strategies for cost reduction.

Doloi Hemanta [2] examined cost overrun factors in Indian construction projects and emphasized that poor planning, inefficient resource management, and lack of coordination significantly affect project cost. The study suggested that improved project management practices can reduce cost overruns.

Love Peter E. D. et al. [3] focused on the impact of rework on construction cost and project performance. Their findings revealed that rework due to design errors and poor communication leads to significant cost increases and delays in project completion.

Azhar Salman [4] studied the application of Building Information Modeling (BIM) in construction projects and concluded that BIM improves cost estimation accuracy, reduces design conflicts, and minimizes rework, thereby contributing to cost reduction.

Eastman Chuck et al. [5] discussed the role of BIM in project lifecycle management and highlighted its potential in enhancing coordination, improving visualization, and reducing project cost through better planning and decision-making.

Hwang Bon-Gang and Ng Wei Jie [6] investigated cost performance in green construction projects and found that although initial costs are higher, effective planning and management can lead to long-term cost savings.

Sweis Ghaleb J. et al. [7] identified key factors such as delays, design changes, and financial issues as major causes of cost overrun and recommended improved contract management and monitoring systems.

Kaming Peter F. et al. [8] analysed time and cost overruns in construction projects and concluded that inaccurate cost estimation and poor site management significantly contribute to increased project cost.

Punam Kokate[9] she focused on Effective cost planning, alternative materials, waste reduction, and accident prevention help reduce project cost.

III.METHODOLOGY

For this research we need to identify the pathway which is given below

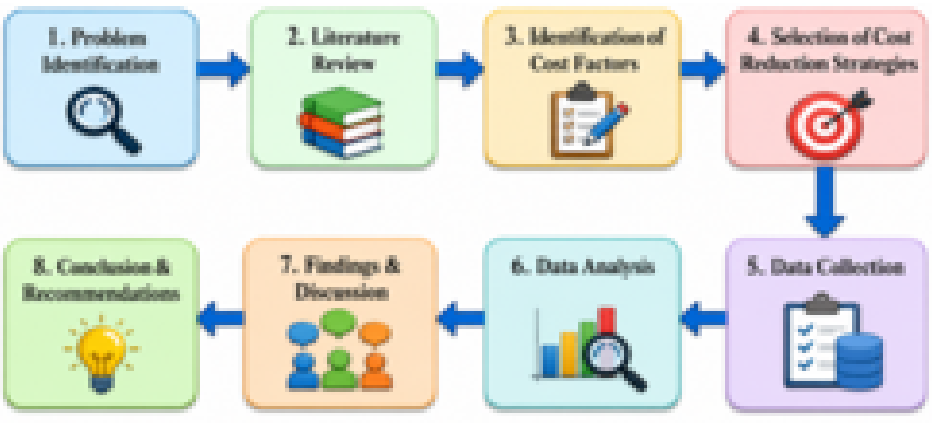

Fig.1.1 Process of Study

A. Major Factors Affecting Construction Project Cost Is Given Below

1) Project Size and it's Complexity: In this we need to know what to built or what is our aim and what we are doing for achieving our goal and it directly influences on material, labour , equipment ,time and design cost.
2) Material Cost: Prices of major material like cement, sand and steel frequently fluctuate.
3) Design and Scope changes: frequent change or modification in design change it leads to rework and it effect on directly cost of project.
4) Project planning and Scheduling: Due to the unrealistic schedules it effect on cost of project (e.g Cost increases -Equipment idle time increased expenses)
5) Construction Management Efficiency: Ineffective supervision and coordination Cost increases.
6) Efficient project planning and scheduling to avoid delays and idle resources
7) Optimized material procurement and inventory management to reduce wastage and control price fluctuations
8) Use of modern construction techniques and technologies to improve productivity
9) Value engineering to find cost-effective alternatives without affecting performance
10) Strong site supervision and coordination to reduce errors, rework, and material wastage.

B. Role of Both Traditional and Advanced Cost Control Techniques in Minimizing Project Cost

1) *Traditional Cost Control Techniques:*

a) Cost Estimation and Budgeting: Prepare the detailed project budget before starting construction and it will help in setting a financial limit for materials, labour, and equipment.
b) Use of Bar Chart and CPM Scheduling: It helps the tracking and identifying the delay.
c) Monitoring and Site Supervision: regular inspection by site engineers and supervisors and checking material usage and quality.

2) *Advance Cost Control Techniques*

a) Building Information Modeling (BIM): It detects design clashes early as well as reduces rework cost.
b) Earned Value Management (EVM); It provides the early warning of cost overruns.
c) ERP (Enterprise Resource Planning) Systems: Enhances coordination and reduces financial leakage.

C. *Practical measures for improving cost control and enhancing decision-making in construction project:*

1) Strong Project Planning and Realistic: It reduces cost overruns caused by poor planning and unrealistic assumptions.
2) Use of Modern Construction Technologies: Improves accuracy in cost estimation and reduces human errors.
3) Regular Cost Monitoring and Reporting: Helps in early detection of cost deviations and corrective actions.
4) Approach of Value Engineering: Ensures cost savings without compromising quality

D. The impact of rework, design changes, and site management inefficiencies on cost escalation

1) Impact of Rework on Cost Escalation:

❖ Causes:
- Construction mistakes due to unskilled labour
- Poor quality control and supervision
- Incorrect interpretation of drawings or specifications

❖ Impact:
- Additional material and labour consumption
- Delay in project completion
- Increased wastage of resources

2) Impact of Design Changes on Cost Escalation:

❖ Causes:
- Client requirement changes
- Design errors or incomplete drawings
- Improper planning at initial stage

- Impact:
  - Rework of completed structures
  - Delay in procurement of new materials
  - Increased engineering and labour costs

3) Impact of Site Management Inefficiencies on Cost Escalation

- Causes:
  - Lack of skilled site engineers or supervisors
  - Poor coordination between teams
  - Improper material and equipment planning
- Impact:
  - Idle labour and equipment time
  - Material wastage and theft
  - Delays in project execution

IV. CONCLUSIONS

This study concludes that construction project cost is mainly affected by factors such as poor planning, material price fluctuations, design changes, rework, and inefficient site management. Effective cost control can be achieved through proper planning, strong supervision, value engineering, and the use of modern technologies like BIM and EVM. The integration of traditional methods with advanced tools helps in reducing cost overruns and improving project efficiency and decision-making in construction projects.

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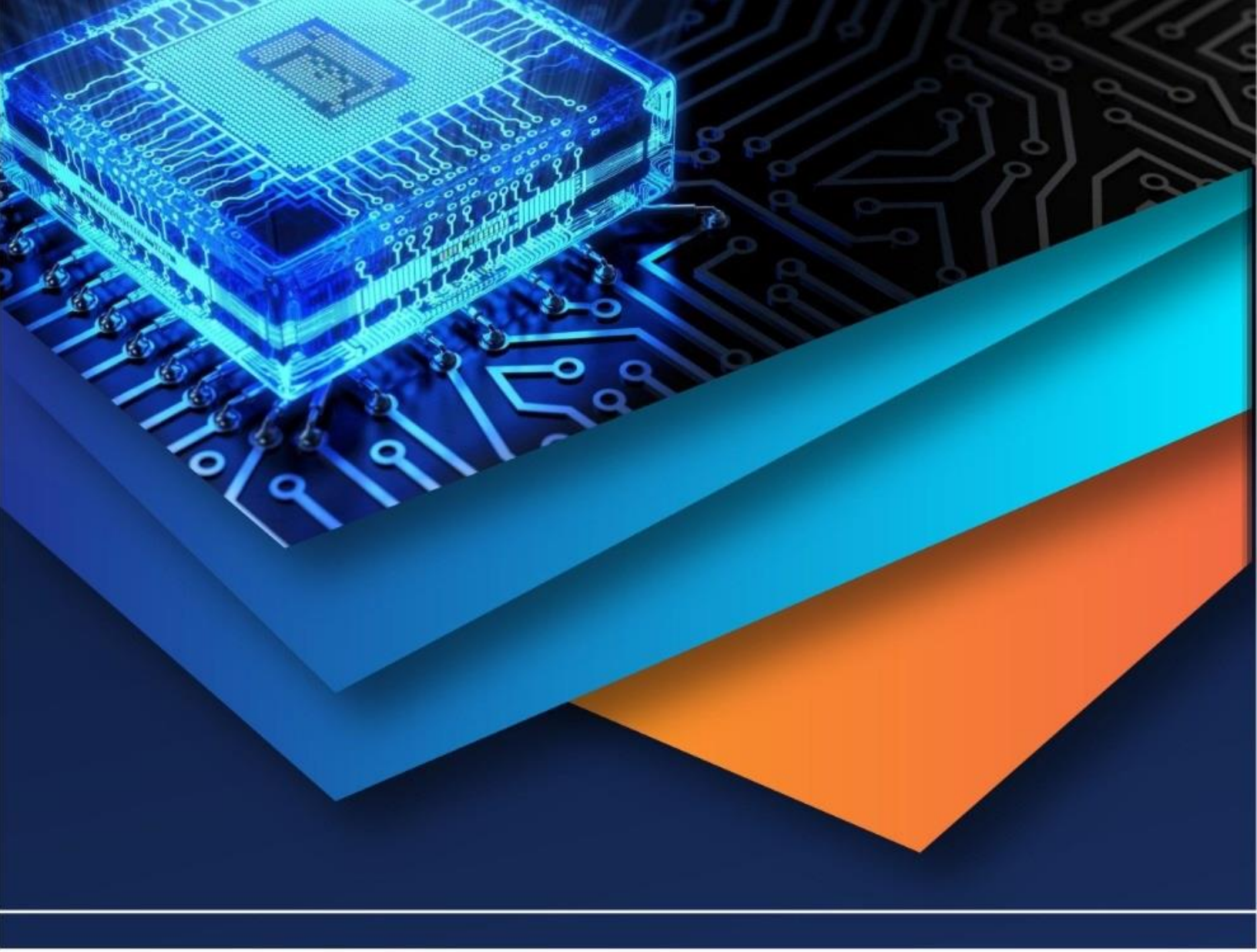

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