Time delay and cost overrun of bridge construction project at prithvi highway

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Abstract:
This study purpose to identify the most important factors that causes delay in bridge construction project at Mugling to Dharke section (68 KM) of Prithive Highway in Nepal, which results in cost and time overrun allocated for this type of engineering project and cause critical problems for both the developer and the contractor. The gap between the cost at completion and that originally estimated, known as cost overrun. The construction of bridge is often beset by challenges such as time delays and cost overruns, resulting in addition of project cost and decreased public satisfaction. The research method of this study is based on literature review, questionnaire survey. In depth literature review, thirty-eight common causes of delay were found. A questionnaire survey was carried out among construction professionals of bridge project. Drawing upon existing literature and case studies, the abstract highlights key factors contributing to delays and overruns, including design changes, unforeseen site conditions, regulatory problems, and inadequate project management practices.

Keyword: Time delay, Cost overrun, Land acquisition and Bridge construction.

1. INTRODUCTION

This study aims to identify the most significant factors causing delays in the bridge construction project along the Mugling to Dharke section (68 KM) of the Prithvi Highway in Nepal. These delays lead to both time and cost overruns, creating critical problems for both the developer and the contractor. The difference between the originally estimated cost and the final completion cost is known as a cost overrun Bridge construction projects often face challenges such as time delays and cost overruns, which lead to increased project costs and decreased overall project efficiency and stakeholder confidence**.** The research methodology for this study includes a literature review and a questionnaire survey. Through an in-depth literature review, thirty-eight common causes of delay were identified. A questionnaire survey was also conducted among construction professionals involved in the bridge project. Drawing from existing literature and case studies, the study highlights key factors contributing to delays and overruns, including design changes, unforeseen site conditions, regulatory issues, and inadequate project management practices.

Time delays and cost overruns are common challenges in modern bridge construction projects. Delays can result from poor planning, unexpected site conditions, weather disruptions, and social issues. Cost overruns typically arise from market price fluctuations, unforeseen contingencies, design changes, and extended project timelines, which increase financial stress. These issues can have unfavourable impacts on stakeholders, investors, and the company as a whole.

2. LITERATURE REVIEW

Bridge construction projects are often complex, large-scale undertakings that involve multiple stakeholders, resources, and technical challenges. Time delays and cost overruns are two of the most critical issues that frequently arise during such projects. These factors not only impact the financial success of the project but also affect public trust, user satisfaction, and the overall viability of infrastructure development. In bridge construction, delays are common due to various factors such as poor planning and scheduling, weather conditions, design changes, and environmental challenges.

Cost overruns occur when the actual cost of a project exceeds the original budget. This issue is widespread in bridge construction and arises from various causes, such as inflation and price fluctuations. Design changes can lead to additional costs, as modifications to the original scope of work often require increased labor, materials, and time, all contributing to budget overruns. Initial cost estimates frequently fail to account for contingencies, inflation, or unforeseen conditions, resulting in financial shortfalls during construction. Additionally, poor coordination between contractors, suppliers, and other stakeholders often leads to resource wastage and further budget overruns.

Several studies have attempted to identify and categorize the major factors contributing to time delays and cost overruns in bridge construction:

1) Kamala River Bridge Previous studies on the Kamala Bridge in Nepal, particularly the incomplete Bansbittaghat Bridge, reveal multiple key factors contributing to delays and cost overruns. One of the primary reasons is poor project management and inadequate contractor performance. The contractor failed to meet design standards and only completed 30% of the work by the original deadline, which led to multiple extensions. Design modifications, such as reducing the depth of bridge pillars, also worsened delays and increased costs.

Other factors identified include environmental challenges, such as frequent flooding of the Kamala River, which damaged construction works and temporary supports. Additionally, there has been inadequate coordination among stakeholders and poor oversight during construction, which has further delayed progress

2) The Mahesh Khola Bridge in Dhading, Nepal, failed primarily due to a combination of geological instability, poor design, and insufficient maintenance. The region's susceptibility to seismic activity and landslides undermined the bridge's foundations, while inadequate engineering assessments likely overlooked critical environmental factors. Additionally, the use of substandard materials and lack of regular inspections contributed to the deterioration of the structure, ultimately leading to its collapse.

3) The Thimura Bridge in Nepal failed primarily due to a combination of geological instability and inadequate engineering practices. Located in a seismically active area, the bridge was vulnerable to earthquakes, while landslides and erosion weakened its foundations. Additionally, design flaws and the use of substandard materials contributed to its inability to withstand environmental stresses. The lack of regular maintenance further exacerbated these issues, ultimately leading to the bridge's collapse.

4) The Samrong Khola footbridge in Nepal failed due to several interrelated factors. Primarily, the region's geological instability, topographic of site, hydrology condition, road alignment, characterized by frequent landslides and erosion, undermined the bridge's foundations. The design did not adequately account for these local conditions, and there were issues with the quality of materials used during construction. Additionally, insufficient maintenance and inspections allowed minor structural weaknesses to go unnoticed, ultimately leading to the bridge's collapse. These challenges highlight the need for more robust engineering and maintenance practices in vulnerable areas.

3. RESEARCH METHODOLOGY

The methodology for examining time delays and cost overruns in bridge construction projects involves a mixed-methods approach that combines qualitative and quantitative research techniques. Initially, a comprehensive literature review is conducted to identify existing studies and frameworks related to time delays and cost overruns. This informs the development of a structured questionnaire designed to gather data from construction professionals, including project managers, engineers, and contractors involved in bridge projects. The questionnaire focuses on factors contributing to delays and cost overruns, such as design changes, unforeseen site conditions, and project management practices. Once data is collected, quantitative analysis is performed using statistical methods to identify correlations and trends. Additionally, in-depth interviews with key stakeholders provide qualitative insights into the specific challenges faced during bridge construction. This combined approach allows for a thorough understanding of the issues, enabling the identification of key factors and the development of recommendations to mitigate delays and cost overruns in future projects.

4. CONCLUSION

In conclusion, time delays and cost overruns are significant challenges in bridge construction projects that can severely impact their success and sustainability. This research has identified key contributing factors, including inadequate planning, design changes, unforeseen site conditions, and poor coordination among stakeholders. The consequences of these issues extend beyond financial implications, affecting public trust and satisfaction with infrastructure development. To mitigate these challenges, it is essential to adopt robust project management practices, improve risk assessment and contingency planning, and ensure effective communication among all parties involved. By addressing these factors, future bridge construction projects in Nepal can achieve more efficient outcomes, ultimately enhancing the reliability and quality of infrastructure development.

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