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"An evaluation of the causes of construction project delays in the urban areas of South Gujarat"

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Abstract

In India, construction projects are facing major problems due to delays. These problems are harming economic success and development. The purpose of this study is to identify the most significant factors that cause delays in construction projects through a survey. A survey was carried out on the various stack holders of construction industries such as architects, engineers, owners, contractors, supervisors, and labours. Out of 30 reasons, 5 major factors are identified using the Relative Important Index (RII) method. The case study results suggest that the most critical factors are Poor monitoring and control, Rework due to errors during construction, High labour wages, Lack of communication with consultant/owner, and Shortage of labour. These findings are likely to contribute significantly to the Indian construction industry's control of project time and cost overrun.

Keywords: Causes of delays, Effects of delays, Project management, Construction time.

1.Introduction

The construction industry is India's second-largest industry, after agriculture.[1] One of the most common problems in construction projects is delay Construction delays are measured in terms of project success in terms of time, cost, quality, and safety. The timely completion of a construction project may help in the project's success. The construction project contributes a major role to national economies all around the world. Many countries' GDP and employment rates are controlled by the construction project.[2] Delays can arise for many reasons. Rework, poor organization, quality issues, equipment failure, design changes, natural disasters, and other variables could all play an important role.

When a project is delayed, the delivery time is either extended or the project's work is aggressively increased to meet the deadline.[1] Project delays in the construction industry have an impact not just on the construction industry, but also on a country's general economy. Unexpected project delays are difficult to manage and have a detrimental influence on project operations and outcomes. An unanticipated delay will extend the project's overall duration and raise project costs. It has time-related cost consequences, which means that it will use more resources and take longer to complete the project. During completion of the projects is a measure of efficiency, the building process is subject to several variables and unpredictable events that arise from many sources.

The construction industry in India faces various obstacles, but one of the most significant is labour productivity. Every project has some building challenges, such as material, money, tools, and the expense of construction by a local contractor. With the current state of construction labour productivity on the decline, it is crucial to identify the elements that influence it and then select the most important ones from the available options.[3] This study suggested factors, that will help construction projects by reducing contract disputes. Delays have a strong link to carry out work failure.[4] Construction projects are implemented up of many compared to controls such as labour, cost, material, schedule, and other resources, making it difficult to identify which reasons contributed to a project's delay.[5]

Several causes create delays in construction projects. Parties to the project have many issues.[6] A delay can be caused by multiple parties (client, contractor, consultant), or by none of them. In construction, a delay can be described as a timeout beyond the agreed-upon date for project

stakeholder delivery through the contract termination date.[7] It refers to the production and rentable area attributable to the owner as a result of a delay or loss of income owing to a plant function that no longer exists. Furthermore, delays might lead to disputes, arbitration, total abandonment, and protracted litigation between the parties. Construction is a large, dynamic business that requires a large amount of capital. The work usually has low rates of return by the level of risk involved.[8] Construction project delays are a common occurrence. There has most likely been significant research to reduce the impact of project delays and delayed discovery. Construction project delays are a worldwide occurrence, with time and expense overruns being more typical in undeveloped and developed countries.[1]

There are many options for completing the projects on the current site on time, but delays are unavoidable and harm the project's efficiency. There has most likely been extensive research to reduce the impact of project delays and delayed discovery.[7] The main objective of this research is to identify the reason behind the delay in a construction project in South Gujarat and rank the causes of delay in construction projects as well as identify the effect of delay on construction projects.

The construction industry is currently complex due to the vast number of parties involved, such as clients, contractors, consultants, stakeholders, shareholders, regulators, and others. Any construction project's failure is primarily due to issues and poor performance.[9] As a result, this research is critical in identifying and analyzing the major elements influencing the performance of building projects. This study is needed to evaluate the level of understanding and applying these delayed concepts in planning, design, and field operation.

2.Literature review

The literature on the previous research is gathered. Various performance factors affecting construction project performance were found in the literature. The collected literature is being used as a basis for the project's various stages. Most construction projects, whether simple or complex, face delays. A construction delay can be described as a time overrun that occurs after the contract deadline sometime after the parties' final timeline for completing a project.[10]

Without the use of new technology and project management approaches, construction projects continue to be delayed. This is why construction project delays have changed as a result of the interest of academics over the years. According to a recent survey, only 25% of projects were completed within their original timelines.[11] Sadi A. Assaf and Sadiq Al-Hejji researched a list of construction delay factors culled from the literature, which included various types of construction, nations, periods, and quantities of delay causes. According to their surveys, 70 percent of projects are above budget, and 45 of the 76 projects assessed are behind schedule.[12]

The study of causes of delays in the Indian construction industry's residential construction projects proposes a method for ranking causes of delay using two separate techniques: relative importance index and importance index based on severity and frequency, and it also discusses the ranking of the causes. Both techniques ranked labour-related issues first, whereas external factors were rated last and were thought to have the least impact on delay.[8]

The data recorded in the project contrasts both activities and key activities, as well as delays and reasons for delays. Each factor is given a ranking based on surveys to questionnaires, and the most influential factors are selected.[13]

In the United Arab Emirates (UAE), 50 percent of construction projects are behind schedule.[14] Delay had a significant impact on the cost and timeliness of the 61 construction projects studied. The study shows a 17.34 percent increase in the total cost estimate.[15]. Therefore, it is necessary to identify the main variables that contribute to the project's construction taking longer than expected. We found some major elements affecting construction project delays, such as payment, traditional approach, and so on.

Data Collection and Analysis

The data collecting and questionnaire design processes begin with the creation of a sample questionnaire and a thorough assessment of the literature. A pilot study using a questionnaire was conducted on 7 stakeholders to identify the key causes and effects of delay. As a result, the questionnaire's clarity, completeness, and applicability are confirmed. A list of 30 reasons for construction project delays was created based on the design. In construction research, the relative index technique has been regularly used to assess attitudes toward the assessed variable.

Table- 1: Respondent Details

Sr.No.	Respondent	Questionnaire Distributed	Questionnaire Received	Percentage
1	Architect	15	7	46.67
2	Site engineer	20	16	80
3	Engineer	20	`11	55
4	Contractor	30	21	70
5	Owner	35	23	65.71
	Total	120	78	65

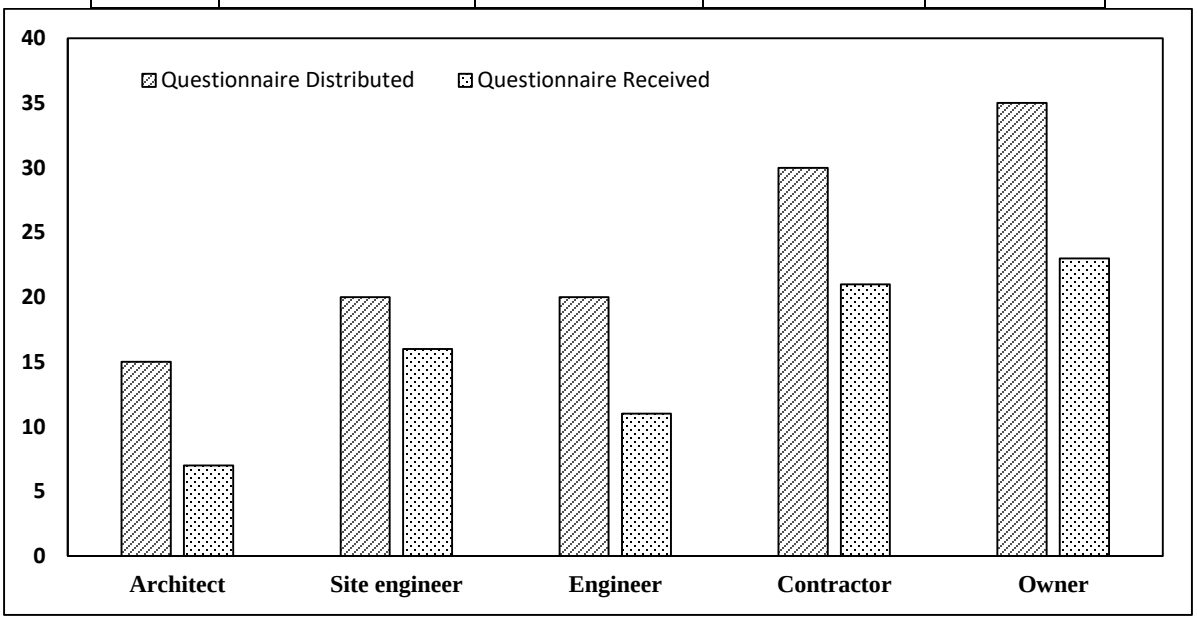

Figure 1 Respondent Details

3.Research methodology

From a review of the literature and discussions with construction industry stakeholder reasons for the delay were identified. A survey was designed to assess the relative importance of the listed causes using the Relative Important Index.[12] Data was collected through a survey and analysed using the Relative Important Index, with architects, engineers, owners, contractors, supervisors, and labour all taking part. The need of reducing construction project delays was recognized as a result of the study's findings.

Respondents were asked to rank the importance of each element on a scale of one to five. The five-point scale ranging from 1 (less important) to 5 (extremely important) is adopted and it is transformed into a relative importance index (RII) for each factor.

$$RII = \sum W / (A \times N)$$

Where W is the weighting assigned to each aspect by respondents, ranging from 1 to 5 (n1= Very low, n2= Low, n3= Medium, n4= High, n5= Very high). The maximum weight (i.e. 5 in this study) is "A," and the total number of samples is "N." A relative importance index is a number between 0 and 1.

Table-2: Design of Questionnaire

Sr. No.	Delay factors	Sr. No.	Delay factors
1	Shortage in labour	16	Delays in contractor's payment by the owner
2	Shortage of materials	17	Suspension of work by the owner
3	Shortage of equipment	18	Rework due to errors during construction
4	Delay in materials delivery	19	High labour wages
5	Failure of equipment	20	Labour health problems when working in a hazardous condition
6	Lack of communication with consultant/owner	21	Labour safety problems
7	Problem with neighbors	22	Weather effect on construction activities
8	Poor planning and scheduling of the project by the contractor	23	An improper technical study by a contractor during bidding
9	Delay in the approval of contractor submissions by the engineer	24	Lack of experience/incompetence of contractor's key staff
10	Mistakes in soil investigation	25	Change in design
11	Poor monitoring and control	26	Slow decision making by developer
12	Using obsolete technology	27	Delay in testing results
13	Delays in site preparation	28	Delay by owner in approval of the design from government authority

14	Severe weather conditions on the job site	29	Rework due to errors during construction
15	The slowness of the owner's decision-making process	30	Inappropriate construction methods

4.Result

Table-3: Top five causes of delay

Sr.No.	Delay factors	RII	RANK
1	Poor monitoring and control	0.751	1
2	High labour wages	0.710	2
3	Lack of communication with consultant/owner	0.705	3
4	Rework due to errors during construction	0.703	4
5	Shortage in labour	0.700	5

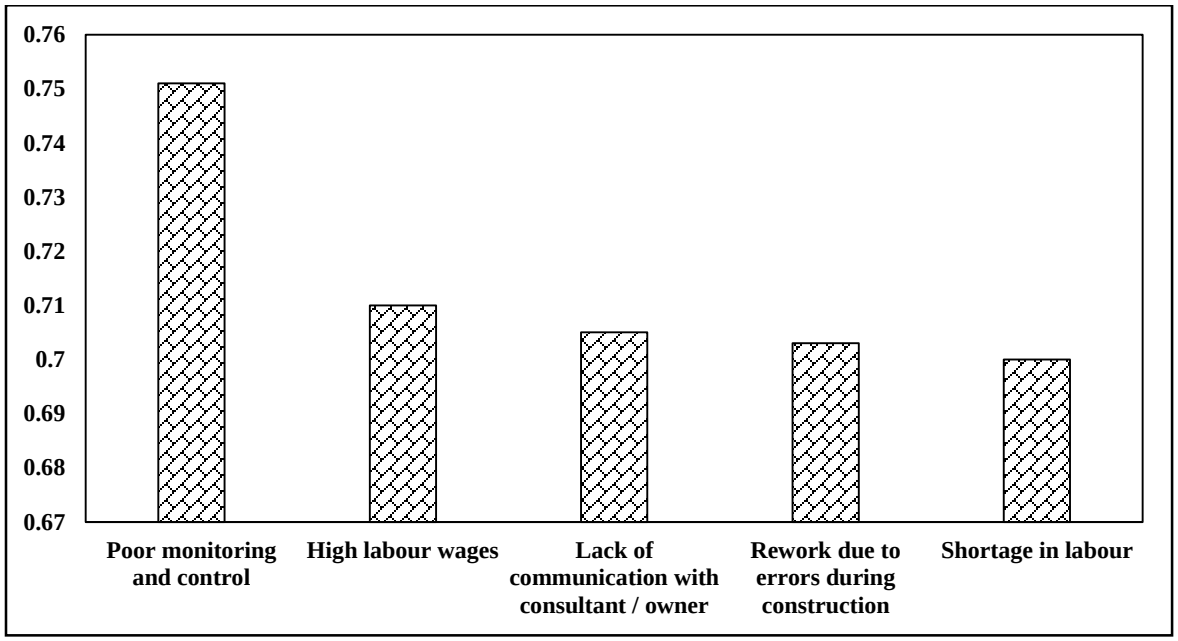

Figure-2: Top 5 delay factors of Construction Project

5.Conclusion

Based on the data collected through preventative measures and suggestions, guided by strict criteria, based on the opinions provided by respondents involved in the construction industry, as well as prior studies conducted by previous researchers. factors affecting the completion time of the project and their effects on construction projects at high risk that affect their performance. These causes are Poor monitoring and control, High labour wages, Lack of communication with consultant/owner, Rework due to errors during construction, and Shortage of labour. Effects of these delays are cost overruns, time overruns, and loss in profit. Furthermore, the findings of this study will reach in identifying key issues and reducing project delays even more.

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