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# Delay Analysis in Infrastructure Project

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**ABSTRACT:** India is a developing economy hence government of India undertakes various measures to increase its economy. Indian economy is mainly based on agriculture. The construction industry is second largest sector contributing to economy after agriculture. India's population growth and economic growth requires improved transport infrastructure including roads, railways, aviation and waterways. There is problem of delay in such projects not only in India but its worldwide phenomenon. Delays causes time lag as well as cost overrun which is not affordable in developing economy as it has limited resources. To avoid such delays different factors causing delay should be identified and analysed. This report discuss delay in infrastructure projects considering various factors causing delay. A questionnaire was prepared considering various factors causing delay and sent to various experts and people with experience in infrastructure industry for ranking of various factors. This data was used to analyse various factors causing delay. The results were studied and rankings were given according to their impact of delay in infrastructure projects. From this study factors identified causing delay are Lack of communication, Breakdown of equipment's, Shortage of labour, Delay in sub-contractor work, Shortage of equipment and low productivity of labour.

**KEYWORDS:** Delay, Tender, Schedule, Infrastructure.

## I. INTRODUCTION

Indian economy is mainly based on agriculture. The construction industry is second largest sector contributing to economy after agriculture. India's population growth and economic growth requires improved transport infrastructure including roads, railways, aviation and waterways. There is problem of delay in such projects not only in India but its worldwide phenomenon. Delays causes time lag as well as cost overrun which is not affordable in developing economy as it has limited resources. Delays are common problem delays means extension of time in completion of projects. Delays are classified as non-excusable and excusable delay. Delay can occur due to many reasons:

1. Owner related delay
2. Consultant related delay
3. Contractor related delay
4. Material related delay
5. Labour and consultant related delay
6. Project related delay
7. External related delay

Delays are insidious often resulting in time overrun, cost overrun, disputes and litigation. The most common delay analysis includes the CPM (critical path method), as planned expanded technique, collapsed but for technique, windows technique, bar chart etc.

## II. OBJECTIVES

The primary goal of construction is to finish the project as specified, on schedule and within the budget with proper utilization of all the resources like manpower, material, money and equipment. The main objectives of this study are:

1. To identify different causes of delay in Infrastructure project.

2. To analyse delay factors.
3. To quantify delay duration taking a case study.

### III. PROBLEM STATEMENT

Delay analysis is important in construction project as it will affect in project duration and cost. To avoid the project delay different factors causing delay should be analyzed and managed properly. Different recommendation or delay management strategy will be helpful for smoothening of the construction project. Some research works have been carried out in other developed countries and few in India. So, more investigation are required in Indian construction projects for recommendation of some guidelines to minimize project delay.

### IV. LITERATURE REVIEW

Refer to the paper by Abdul-Aziz A. Bubshait and Michael J. Cunningham —Comparison of Delay Analysis Methodologies published in Journal of Construction Engineering and Management, August, 1998 which describe construction project delay may result from many circumstances. Delay may cause by the owner, contractor, by the act of God or a third party. Network based scheduling is an excellent vehicle for negotiating settlement of changes, disputes and delay throughout the project. The result of this study indicates the outcomes of delay analysis are often not predictable, that one method may be universally over another in all situations. The study reveals the dependency upon the time and resource available; the accessibility of the project control documentation one method may be more practical or cost effective

Refer to the paper by William Ibbs and Long D. Nguyen on —Schedule Analysis under the effect of Resource Allocation published in Journal of Construction Engineering and Management, February, 2007 which shows that delay analysis without resource allocation practice substantially affects results of schedule analysis. Delays are the acts or events that extend the time necessary to finish activities under the contract. Performing schedule analysis without considering resource allocation may increase the owner and contractor risk of assuming delay responsibility which is not his or her fault. A case study was used to compare the analysis and result of the traditional and enhanced window analysis method

Refer to the paper by Alenas Vasilyeva-Lyulina, Masamitsu Onishi and Kiyoshi Kobayash on —Delay Analysis Methods for Construction Projects: Mathematical Modeling —published in International Journal of Transportation, 2015 which conclude variety of factors contribute to the delay of project completion in the complex interdependencies of a number of tasks. Although academic papers and guides published by authoritative societies introduce the protocol of delay analysis methods, those are described in the natural language. Being tempted by such a motive, this paper formalized typical delay analysis methods including impacted as-planned, time impact analysis and collapsed as-built commonly used in practice.

### V. RESEARCH METHODOLOGY

The purpose of the study is to critically review and identify the applicability of past studies on determining the factor causing time delay and cost overrun in current projects. When projects are delayed, they are either extended or accelerated and therefore, incur additional cost. Research literature from all around the world has been collected and consolidated for the better understanding and to conceive the overall picture of the issues. Different author focuses on selected categories for study and analysis. Cost and schedule overrun occur due to wide range of factors. There is an increase in the number of construction projects experiencing extensive delays leading to exceeding the initial time and cost budget. Most of the result has been analyzed from responses of the questionnaire survey

The study area of this project is delay analysis. Initially literatures were collected and studied. Based on the knowledge gained on literatures, the project is carried out. It involves:

1. Literature review.
2. Collection of data causing delay of construction projects from interviews and questionnaire survey.
3. Study the factors causing delay and to find out factors.



4. Delay analysis based on delay obtained from questionnaire survey.
5. Obtaining results and analysing the factors causing delay .
6. Delay analysis- a case study.
7. Conclusion

## VI. CONCLUSION

The Construction industry is second largest sector contributing to economy of India. In a developing country like India there is need to install various infrastructure facilities to boost its economy. There is problem of delay in these projects which not only cause time lag but also cost overrun , which is not affordable to developing countries with limited resources. Hence there is need of understanding and analyzing different factors of delay in infrastructure projects in India using various methods

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