

ANALYSIS OF DELAYS IN CONSTRUCTION PROJECTS

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ABSTRACT

Time delay is one of the biggest problems facing in many construction buildings in India. Completing projects on time is the key factor of the project, but the construction process is subject to many variables and unpredictable factors, which result from many sources such as availability of resources, external factors, performance of parties and type of building. Thus it's essential to study and analyse causes of construction delays. The purpose of this paper is to study the time delay analysis of construction project by literatures published in various journals. This methodology was used to consider the literature study from different Places of the world. This paper explains the causes of delay and various techniques to overcome this. Thus it's essential to study and analyse causes of construction delays.

I INTRODUCTION

In construction, delay could be defined as the time overrun either beyond completion date specified in a contract or beyond the date that the parties agreed upon for delivery of a project. Construction project schedules are normally dynamic and uncertain. The delay in the project has an adverse effect on project success in terms of time, cost and quality. A typical construction project suffers from high risks associated with schedule delays and time-based disputes, since time is of the essence of the construction contract. For example, the unique nature of construction makes the work susceptible to unforeseen site conditions and severe weather changes. In addition, a construction plan created for a project relies on the performance of owners, designers, contractors, subcontractors, and suppliers, as well as the co-ordination among them. A single event that deviates from the plan, such as a change in the scope of the project, can disturb the overall performance and can create turbulence among the parties. It is generally understood that the construction delay is the most critical factors affecting to deliver the project in time, within budget, and expected quality. It can be found rarely that a project was completed within the specified time.

Delay in construction can have a number of consequences in a project, such as late completion, lost productivity, acceleration, consequential damages, increased cost and contract termination. The party experiencing damages from delays needs to be able to recognize the delays and the parties responsible for them in order to recover time and cost. There are various negative effects of delays such as lawsuits between owners and contractors, increased costs, loss of productivity and revenue, and contract termination. Effects of delays

which predominantly affects are loss of Interest by the Stakeholder, blacklist by Authorities, waste of Money and Time, Declination of Reputation etc. Delays caused by contractors can generally be attributed to poor managerial skills. Lack of planning and a poor understanding of accounting and financial principles have led to many a contractor's downfall. The delays in construction projects have significant financial and social impact to all parties involved in the projects.

A number of methodologies have been developed to assess delays and their impacts, but honourable courts and administrative boards have not specified any standard method to evaluate delay impacts. Delay analysis can be conducted in a cursory manner or in such detail as to exceed the value of the underlying dispute. Each delay analysis method adopts a different approach to identify delay impacts and may yield different results. The most sophisticated delay analysis method using the highest level of detail does not guarantee success .

The challenge is to find out the net impact of construction delays. Most studies have focused on finding causes or resolving delay problems in the construction phase, few studies have analyzed delay problems in the planning and design phases.

1.1 Delay Analysis

The objective of delay analysis is to calculate the project delay and work backwards and tried to identify how much of it is attributable to each party (contractor, owner, or neither) so that time and/or cost compensation can be decided. The most widely used delay analysis techniques are

- Schedule Review/ Discussion
- As Planned Versus As Built Analysis
- Impact As Planned Analysis
- Collapsed As Built Analysis
- Time Impact Analysis
- Productivity Method

Schedule Review/ Discussion

Schedule review/discussion is the simplest method that involves arguing a claim with or without using a schedule, but relying mostly on the strength of the evidence and testimony. The method is an easy and inexpensive way to argue time-based claims when detailed calculations cannot be conducted. But the results of such an analysis are not acceptable to most analysts because it ignores the nature of each delay event and assumes that every delay has an equal impact on the project duration.

As Planned versus as Built Analysis

The as-planned versus as-built schedule delay analysis involves comparing the baseline, or as-planned, construction schedule against the as-built schedule or a schedule that reflects progress through a particular point in time. This analysis method is typically utilized when reliable baseline and as-built schedule information exists.

Impact as Planned Analysis

The impact as-planned method of delay analysis is a technique which forecasts or predicts a delay's effect on a project's completion date. This delay analysis method involves the insertion or addition of activities representing delays or changes into the baselines schedule to determine the impact of those delay activities. Use of the impact as-planned schedule analysis method is generally restricted to the quantification of delays for contemporaneous requests for time extensions.

Collapsed as Built Analysis

The collapsed as-built delay analysis methodology is a retrospective technique that begins with the as-built schedule and then subtracts activities representing delays or changes to demonstrate the effect on the completion date of a project but for the delay or change.

Generally, this method is applied in cases where reliable as-built schedule information exists, but baseline schedule and/or contemporaneous schedule updates either do not exist or are flawed to the extent that they are not reliable to support a delay analysis. Productivity Method

The productivity method compares the productivity achieved in an activity against normal productivity rates. The intent is to seek damages on the grounds that site productivity has been negatively affected by a delay. However, historically speaking, courts and boards have often arbitrarily reduced claims based on published impact standards because of the uncertainty as to their accuracy

1.2 Types of Delay

Many construction projects suffer from delay. Suspension means stoppage of work directed to the contractor by a form from the client, while delay is a slowing down of work without stopping it entirely. Delays that do not affect the project completion, or a milestone date, are noncritical delays.

Critical Versus Non-Critical Delays

The delays that affect the project completion time or date are considered as critical delays. And the delays that do not affect the project completion time or date are noncritical delays. If certain activities are delayed in the construction project life cycle, the project completion date will be delayed. The determining which activities truly control the project completion date depends on the following: The project itself, the contractor's plan and schedule (particularly the critical path), the requirement of the contract for sequence and phasing and the physical constraint of the project.

Excusable and Non-Excusable Delays

Delay that is due to an unforeseeable event beyond the contractor's or the subcontractor's control. Normally, based on common general provisions in public agency specifications, delays resulting from the following events would be considered excusable: General labor strikes, fires, floods, act of God, owner-directed changes, errors and omissions in the plans and specifications, differing site conditions or concealed conditions, unusually severe weather. Non-excusable delays are events that are within the contractor's control or that are foreseeable. These

are some examples of non-excusable delays: Late performance of subcontract project specific labor strike caused by either the contractor's unwillingness to meet with labor representative or by unfair labor practice.

Compensable and Non-Compensable Delays

Compensable delay is caused by the owner or the owner's agents. A compensable delay is a delay where the contractor is entitled to a time extension and to additional compensation such as payment for the delay. Non-compensable delay is caused by third parties or incidents beyond the control of both the owner and the contractor where the contractor is normally entitled to a time extension but no compensation for delay damages.

Concurrent or Non-concurrent.

Concurrent delays are two or more parallel and independent delays to the critical path of a project. The concept of concurrent delay has become a very common presentation as part of some analysis of construction delays. The concurrency argument is not just from the standpoint of determining the project's critical delays but from the standpoint of assigning responsibility for damages associated with delays to the critical path.

II. LIST OF FACTORS CAUSES SCHEDULE DELAY

Factors affecting project schedule and cause delay in construction projects based on research and literature survey are:

1. Consultant associated factors

- Absence of knowledge of consultant in construction
- Complications between design engineer and consultant
- Late in performing inspection and testing
- Late in revising and approving design papers

2. Contractor associated factors

- Changing of subcontractors again and again
- Lack of skill of contractor
- Unsuitable construction procedures
- Ineffective planning and scheduling
- Obsolete technology
- Rework due to errors

3. Design associated factors

- Complication in design
- Design errors made via designers
- Nonexistence of skill of design team in construction
- Errors and late in producing design papers
- Wrong understanding of owner's necessities by designer

4. Equipment associated factors

- Shortage of equipment
- Frequent equipment breakdowns
- Low efficiency of equipment

5. External associated factors

- Accidents during construction
- Changes in government regulations and laws
- Late in earning licences from municipality
- Late in final check and approval by a third party
- Late in giving services
- Price fluctuations
- Problem with neighbours
- Unfavourable weather condition

6. Labor associated factors

- Shortage of workers
- Small output of labour
- Own clashes among labor
- Strike
- Unqualified / inadequate experienced labor

7. Material associated factors

- Modifications in material varieties and specifications in the course of construction
- Destruction of arranged materials
- Late delivery of materials
- Shortage of construction materials

8. Owner associated factors

- Late in progress outflows
- Clashes between partners
- Late in site supply
- Wrong feasibility study of project
- Less understanding of owner in construction
- Absence of motivations for contractor to complete ahead of plan

9. Project associated factors

- Difficulty of project
- Legal disputes between project participants

- Unfavourable contract clauses

2.1 Effect of Delay

Following are the effect of delay in construction projects :

1. Overtime
2. Overcost
3. Disputes
4. Total abandonment
5. Litigation
6. Arbitration

III. METHODOLOGY

The methodology selected for this study is questionnaire survey. One of the most significant portion of the study is the “collection of correct data” for effective study of delay analysis. For this purpose, take a definite number of persons which are related to construction industry for collecting essential data record.

IV. CONCLUSION

1. Construction delay is a critical function in construction projects.
2. In general, the amount of time-delay and cost-increase (overrun), increased with an increase in the total cost of a residential project.
3. The major causes of delay which is found repeating in almost every project are external factors, financial difficulties, shortage of labor, insufficient labor productivity, owner interference and improper planning.
4. The management of time is very critical in construction industry. Basic knowledge of project schedule delay for the duration of whole project can save money and time. Because of difficulty and lengthy time of projects, Investment and risks are more in this industry.

Some recommendations would be proposed for reducing the chances of schedule delay:

- Contractors are recommended that proper care are taken in the project planning and scheduling stage. It is necessary to hire experienced contractors in the construction projects for timely completion of project and do not allow frequent changing of subcontractors in between project tasks.
- Owners are recommended that do not late in progress payments of contractors because it weakens the contractor ability to finance the work. Owners should have full knowledge about
- Construction work and also have that level of experience so that they easily handle the project. Feasibility study of any project is very important so owners should be very precautious before taking any final decision related to project.
- Designers should not make errors and late in producing design papers because it create schedule delay in project. For this they needed experienced design team for construction projects and it is also important for the design engineers that they clearly understand the requirements of the owner before starting the work.

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