



International Journal of Advance Engineering and Research Development

*Conference of Nanotechnology & Applications In Civil Engineering-2018.
Volume 5, Special Issue 03, Feb.-2018 (UGC Approved)*

A Review for the causes of delay in Indian Construction Projects

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Abstract — Delays can be defined as time overrun or extension of time to complete the project. Delay is always the major loss to any construction project. As construction is one of the largest economic activity in India, the effects of delay are still in millions; which surely decreases the GDP of the country. Delay makes the process tardy and management of delay is extremely challenging as most of the projects do not meet the expected requirement and fails to perform within time. Therefore, various types and causes of delays should be studied accurately. There are many researches on construction delays but still some improvements are required, so there is a high requirement of a notable and feasible study on construction delays in India. The aim of the paper is to identify the causes of delays through literature reviews in Indian construction projects.

Keywords- Construction Delays, Delay Causes, Construction Projects

I. INTRODUCTION

What is the duty of a project manager? What should be the ability of a project manager? His duty is only to plan a new work as per requirement and manage the work as given in the plan! Really? No! He should not only do work as planned; A good project manager suspects the faults of the construction process and apply the necessary remedies to remove the negative factors and make the management better. A project manager should not only manage the work but also improve the work. In Indian construction industry it is essential to study the project management approach and to know: Do they really following the standard project management process? How mature are they? What are the reasons for delay? What remedies they need? It is necessary to know the answers of these questions as so many researchers conclude that lack of commitment and poor project management are the reasons for delays. So there should be a problem somewhere which needs to be solved.

India is one of the youngest country of the world and the country has to compete in this fast world. For that, the continuous improvement is necessary in construction industry. As construction is one of the major aspect of the country, the performance of the construction industry should be world class. The construction industry is largely depends on 4 M's: Man, Money, Material and Machinery. Poor management of these four important tools causes delays and the planning of the project often becomes the piece of paper only.

Here in this paper, there is an issue of delay in construction projects. Most of the projects do not perform as planned. There are so many case studies and researches which concluded that the comparisons of projects "as planned Vs. as performed" are different. The causes and effects are affecting the construction project. As a result, they are facing the problems like time overruns and cost overruns. The effects of delay are increase in price, increase in resources, loss of productivity and revenue, contract termination etc. Therefore, the identification of the causes of delay is necessary so that the further research can be done on the basis of this paper. This paper focuses on the causes of delays in Indian construction industry.

II. AIM

The aim of the paper is to identify the causes of delays through literature reviews in Indian construction projects.

III. OBJECTIVE

The objective of this research is to effectively identify the causes of delays.

IV. METHODOLOGY

The literature review is divided in two parts: primary literature review and secondary literature review. Primary literature review tends to journals, research papers, review papers, thesis, articles, magazines and current trends. Secondary literature review is been carried out by relating various delay causes into Indian construction projects.

V. NEED



Figure1. India GDP from construction

In India, GDP from construction has increased to 2339.19 INR billion in the second quarter of 2017 from 2197.52 INR billion in the first quarter of 2017. GDP from construction in India averaged 2084.55 INR billion from 2011 until 2017, reaching an highest of 2339.19 INR billion in the second quarter of 2017 and a lowest of 1855.78 INR Billion in the third quarter of 2012(fig.1).

Construction delays are expanding the time duration of the project and the project cannot meet the expected requirements. The effects of delay are increase in price, increase in resources, loss of productivity, decrease in revenue, contract termination etc. The causes of delays should be identified accurately so that future studies can be done on the basis of the literature. The construction industry is having many problems and there is a big issue of construction delay but still it managed to find a better place in largest economies in India. But imagine what if there is least minimum delay in the project? If there was no delay (or least minimum), the Construction industry would've saved huge number of time and cost. But it did not and it doesn't mean that it's impossible. We still can make it. So it is a need to make construction process more improved and powerful.

VI. CONSTRUCTION DELAY AND EFFECTS

Delays can be defined as time overrun or extension of time to complete the project. Delay in construction project has a negative effect on consultants, owners, and contractors in terms of growth in adversarial relationships, cash-flow problems, mistrust, litigation, arbitration.

The project-team comes together to create the unique development on a particular site under conditions that will never be repeated. They may be complex, demanding high level of co-ordination of permissions, manpower, goods, materials and construction can begin despite many uncertainties and in this process, delays are common. Moreover, the involvement of advanced technologies and owner-desired-changes makes it even more difficult to keep a project on the scheduled track. Though, advanced software like PRIMAVERA and MS Project makes the projects manageable; Accurate planning and scheduling can be done in these software. Therefore, the control on cost minimisation and time minimisation process becomes less difficult but still there are very less number of projects which meets the planned requirements during the time of execution. There are many uncertainties in construction projects and all projects are performed under the limitations. Therefore, to balance the project and make it convenient and sustainable in time and in budget is a more difficult task to achieve, often leading to claims on cost overrun and time overrun.

Construction delays are considered as time consuming in completion of activities from its specified time as per plan or can be defined as late completion or late start of activities to the baseline schedule, negatively affects cost or increases cost of the project. As a result, there will be more time required which will further result in fine, increased cost due to inflation, termination of contract, disputes, court cases etc. Construction delays are often result of a mismanaged event and can be seen as a risk for the projects, which if identified, analyzed and managed in organised and standard process and could be managed, minimized, mitigated or accepted to give some standard results and minimize risk of further delay.

A construction project may be regarded as a successful endeavour until it meets the expected requirements of the cost, time, and quality limitations considered in the project. However, it is not uncommon to see a construction project failing to achieve its goal within the specified cost, time, and quality and sometimes it's abandoned, too. In order to counter the unforeseen delays beforehand the realm of "Project management" is resorted to which helps mitigating the delays. Project management is the application of knowledge, skill, tools and techniques to project activities to meet the project requirement and requires the effective management of the project management processes.

VII. DETAIL ANALYSIS OF DELAY FACTORS THROUGH VARIOUS LITERATURE REVIEWS

Ayman H. Al-Momani(2000) concluded that negligence of the owner, change orders, weather condition, site condition, late delivery, economic conditions, and increase in quantities are the main causes of delay. [2]

Michal Gluzak(2015) concluded most significant factor influencing delay in construction works was errors in design documentation. He stated that the investor should pay extra attention to the accuracy of design documents and quality of development before the construction begins. [8]

Sadi A. Assaf et al.(2006) stated some causes of delays on the basis of the owners, contractors and other responsible parties as: Financial difficulties, economic problems, financial problems, late supervision, tardy decision making, slow delivery of instructions, unavailability of materials, poor site management, construction mistakes and defective work, delay in delivery of materials to site. [11]

Hemanta Doloi et al.(2012) stated from the analysis, most critical factors of construction delay were identified as lack of commitment, inefficient site management, poor site coordination, improper planning, lack of clarity in project scope, lack of communication and substandard contract. [7]

Emre Chamak(2016) identified the causes of delays as: owner related disputes, contractor related disputes, design related disputes, contract related disputes, human behavior related disputes, project related disputes and external factors. [5]

Nuhu Braimah(2013) taken the case study of one project and compared planning and performance of the project. As the results indicated that there was a huge difference in "As planned Vs. As built" and the delays are heavily affecting the activities of the project and studied the delay through DATs (Delay Analysis Technique). [10]

N. Hamzah(2005) classified delays as owner related, contractor related and external delays. He identified the important factors of delay for the aim to study on the time overrun issue in Malaysian construction projects. [9]

H.M. Al-Humaidi(2010) classified the causes of delay as procedural, enabling and triggering causes of delays. He further developed a model to assess the likelihood of the project delay. Evaluation of the model was performed for applicability and adequacy of the model. Procedural delay classified as managerial, financial, operational and legal. Enabling delay classified as material related, equipment related and labor related. Triggering delay classified as weather, underground conditions, natural disasters. [6]

VIII. MAJOR FINDINGS

Construction industry is one of the fastest growing as well as largest firm in the country. Delays always result in extra time and cost and the project can't be completed within time and definite budget. Most of the construction project faces delays and the losses are high. Therefore, it is necessary to identify the causes of delay. There are so many researches done on delays but still projects are facing time overrun and cost overrun.

IDENTIFICATION OF DELAY TYPES

Types of delay:

- i. Critical and Non-critical delay
- ii. Excusable and Non-excusable delay
- iii. Compensable and Non-compensable delay
- iv. Concurrent delay

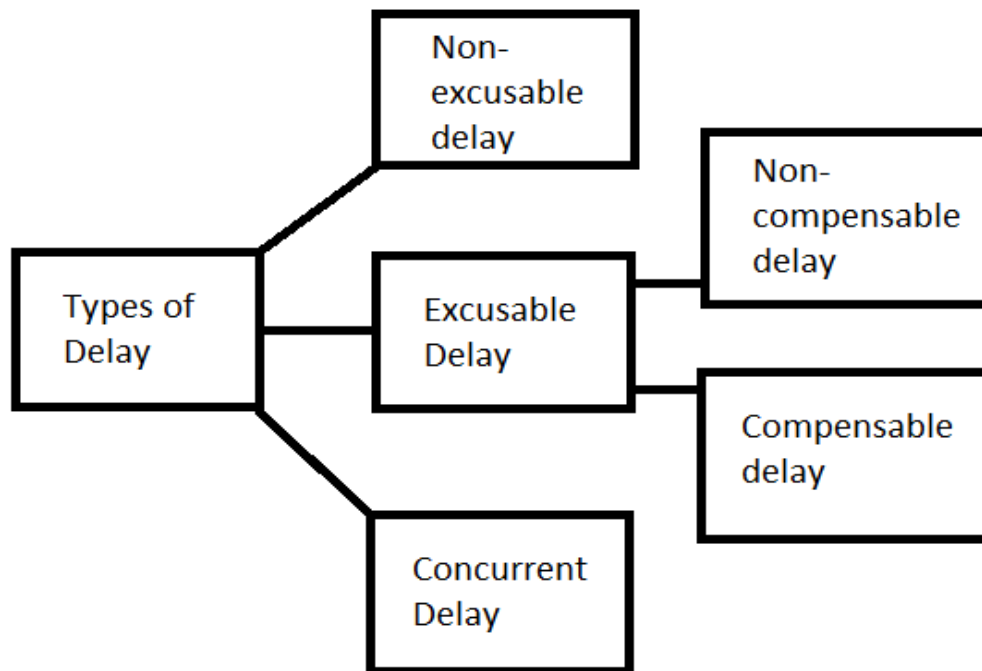


Figure 2.Types of Delay

To practically understand the delays:

- One must determine whether the delay is critical or non-critical.
- Additionally, all delays are either excusable or non-excusable.
- Both excusable and non-excusable delays can be defined as either concurrent or non-concurrent.
- Delays can be further broken down into compensable or non-compensable delays.

Critical delay is the delay responsible for extending project duration. A delay that is not responsible for extending project duration is called non-critical delay.

Excusable delays are divided into two parts: compensable and non-compensable delays. Compensable delays are caused by the owner or the owner's agents; Consultant, designer etc. In this type of delay, the construction contract allows the contractor to claim additional money equal to the money lost by the contractor due to the delay and also additional time.

Non-compensable delays are caused by third parties or incidents beyond the control of both the owner and the contractor. Non-compensable delays are commonly called 'acts of god' because they are not the fault of owner, contractor or any other party. These delays are also referred as triggering delays.

A non-excusable delay is delay caused by the contractor or its suppliers, there is no fault by the owner. The contractor is generally not entitled to compensate and must either make up the lost time through acceleration or support the owner. Therefore, non-excusable delays usually result in no additional money and no additional time being granted to the contractor because he is the only responsible member in the project.

Concurrent delays can easily be defined as simultaneous delays caused by owner and contractor which affects the time and cost of the project. Moreover, the losses can be entitled to be compensated to cover extra damages in these types of delays.

IX. CONCLUSION

Delay is a major and complex issue in Indian construction projects and causing continuous damage to the industry. It is a very hard task to reduce the delays. However, it can be controlled by accurate and timely precaution. The output of the construction delay is time overrun and cost overrun. Therefore, the GDP of the country is affected by project delays. Based on the literatures, the types and causes of delays have been identified and the identified delays require further

research that can prevent the delays and make the construction project operations as fast as it can be. In south and central Gujarat region, a further research can be done on this issue.

Table 1. Excusable compensable delays or Owner caused delays

Excusable compensable delays or Delays by Owner or Owner's agents (Consultant, Designer etc.)	
1.	Poor qualification of designer
2.	Delay in checking and approving specifications
3.	Delay in approving submittals
4.	Lack of communication and coordination between members
5.	Weak and slow decision making process
6.	Poor designing skills of design engineer
7.	Change orders by owners during construction
8.	Conflicts between the joint ownership of the project
9.	Errors in specifications
10.	Complex project design documents
11.	Disputes between consultant and owner
12.	Consultant with lack of experience
13.	Contract modification
14.	Lack of detail knowledge about designing
15.	Suspensions
16.	Delay in payments by owner
17.	Type of project bidding and award
18.	Delay in the approval of completed work by owner
19.	Lack of incentives to the contractor for early finish
20.	Delay in obtaining funds to finance the project
21.	Delay in performing inspections and testing by consultant
22.	Faulty design documents provided by designer
23.	Unclear and inadequate details in drawings
24.	Complex project design by designer
25.	Insufficient data collection and survey before design
26.	Misleading of owner's requirements by design engineer

Table 2. Non excusable delays or Contractor caused delays

Non excusable delays or Contractor or contractor's supplier caused delays	
1.	Financial problems by contractor
2.	Lack of contractor's experience
3.	Rework due to errors during construction
4.	Conflicts between contractor and consultant/owner
5.	Poor quality site management and supervision by contractor
6.	Lack of communication and coordination with other parties by contractor
7.	Lack of detailed knowledge of contractor
8.	Less knowledge about new techniques and methods for construction
9.	Weak qualification of contractor
10.	Underestimation of productivity
11.	Poor quality of the contractor's technical staff
12.	Ineffective management skills in estimating time and resources
13.	Inadequate review
14.	No standard technology
15.	Wrong equipment selection
16.	Delay in supplying materials
17.	Low productivity level of labors
18.	Ineffective planning and scheduling by contractor
19.	Less control over sub-contractor
20.	Faulty interpretation of design documents by contractor
21.	Delay in site mobilization

Table 3. Triggering delays or Delays due to third parties or Acts of God

Triggering delays or Delays due to third parties or Acts of God	
1.	Damage and delay by fire
2.	Damage and delay by wind
3.	Damage and delay by flood
4.	Ground conditions
5.	Effect of social and cultural factors
6.	Arbitration
7.	Construction accidents
8.	Suspensions
9.	Delay in performing final inspections and certification by third party
10.	Transportation delays
11.	Equipment breakdowns
12.	Labor strikes
13.	Materials in market
14.	Unforeseen changes in the existing law
15.	Short contract duration
16.	Obtaining permissions from local authorities
17.	Change in material price in market
18.	Traffic control and restriction at job site
19.	Unavailability of utilities on site (Water, Electricity etc.)
20.	Delay in obtaining permits from municipality
21.	Personal conflicts among labors
22.	Delay in providing services from utilities (Water, Electricity etc.)

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