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CAUSES OF DELAY AND SUGGESTED IMPROVEMENT IN INFRASTRUCTURE PROJECT IN INDIA

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ABSTRACT

These days delay in development are the most significant issue in construction industry in India. It is second biggest industry after agriculture in India for the improvement of an economy. Delay in development projects is considered one of the most common issues causing a large number of negative impacts on the development projects. Construction delays can be minimized just when their cause are distinguished. The goal of this investigation was to identify the major reasons for construction delays. It is consistently helpful that a Project complete on time effectively. Unfortunately because of different reasons, enormous number of development projects fails to follow the arranged schedule and hence delayed in project. This paper presents the reasons for delay occurring on a progressing bridge construction project a case study.

KEYWORDS: Project delay, reasons of delay, bridge construction, etc.

1. INTRODUCTION

Delay in construction project is a big issue. In development, the expansion of time is the finish of project is called as Delay. In brief pause implies neglect to finish project in focused time and assessed cost as chosen/Planned. The initial segment of deferral in development measure incorporates office work like Planning, planning, assessing, arranging, buying, booking, controlling, bookkeeping, and so on are needed to be done cautiously in the workplace before execution of work on site. A portion of the defer happened in the preconstruction stage which is characterized as the period starting from the underlying origination of the project to the marking of agreement between the proprietor and contractor; anyway some of them may occur in the development stage that is time of execution of work at site. Different components are controllable and wild may influence the project schedule and cause delays. These delays unquestionably make negative effect on project execution. Deferral in schedule in the consummation of development project is a significant issue for contractor leading to dispute and spoiled connection between project members.

The test is to quantify the net effect of development delays precisely. Without which postpone claims between all gatherings engaged with the development cycle would get genuine and lead to suit. Time for execution of a task is especially a significant thought for the proprietor and the contractor. Delay can be brought about by a few gatherings hence the impacts and cures shift from case to case. Simultaneous postponements are at least two deferrals happening simultaneously and are consistently hard to determine. Along these lines, in this paper defer events on a scaffold venture is given as for the development of braces as a contextual investigation

2. LITERATURE REVIEW

1. Analysis of Causes of Delay and Time Performance in Construction Projects(2012)

Published at: Journal of Construction Engineering and Management, This paper centers around the connection between defer causes and their effects on time execution to give some knowledge into this complex issue. This paper presents a procedure for investigating the qualitative (postpone causes) and quantitative (time execution) measurements of the defer issue that utilizes two markers, (1) RNC as the reason for deferral, and (2) DI as a delay indicator. This procedure was tried in two contextual analyses of building

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projects. The system gave data to extend chiefs to settle on better choices about the postpone causes and helped with focusing the executives' activities toward alleviating defer impacts consistently. In such manner, the delay causes with the best effect on project time execution could be recognized through the weighted average of the reason for noncompliance.

2. Effect of construction delays on project time overrun; Indian scenario: Ashwini Arun Salunkhe, Rahul S. Patil (2014)

Published at: International Journal of Research in Engineering and Technology, This paper features the sorts of development delays because of which project endure time and cost overrun. This paper considers external and internal components that impact the development cycle and layouts the impact of delay in huge development projects. Different media reports shows incidents of expanded delays and huge cost overrun in infrastructure projects.

3. Causes and effects of delays in Malaysian construction industry: Murali Sambasivan , Yau Wen Soon (2006)

Published at: International Journal of Project Management, this investigation adopts a coordinated strategy and endeavors to analyze the effect of specific causes on specific impacts. A questionnaire review was led to request the circumstances and end results of delay from clients, consultants and contractor.

4. Daily Windows Delay Analysis: Tarek Hegaz and Kehui Zhang (2005),

Published at: Journal of Construction Engineering and Management, Vol. 131, No. 5, May 1, 2005, this paper introduced another strategy for representing to as-constructed data and for delay investigation utilizing a continues windows approach. The proposed approach considers the step by step vacillation in basic ways along the project span, and in this manner shows up at precise and repeatable outcomes for allocating project delays among included parties. With the conventional windows examination requiring extensive manual effort, the exceptionally mechanized and modernized nature of the proposed approach makes it a straightforward and useful solution.

5. Study of Delay in Project Planning and Design Stage of Civil Engineering Projects: Enas Fathi Taher, R.K.Pandey (2013)

Published at: International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249–8958, Volume-2, Issue-3, February 2013, the main purpose of proposed research work is to identify and rank delay causes in the planning and design phases. A structured questionnaire was sent to engineers at the companies for public construction projects in India. Based on 95 valid responses, this study identified the delay causes and analyzed the importance and frequency of delays using the relative importance index. Analytical results reveal that changes in client's requirement are the main causes of delays in both planning and design phases.

3. SUMMARY OF LITERATURE REVIEW

As an outline of papers introduced here that significance is given to different parts of bridge construction. It tends to be seen at last significance of project arranging and reasons for delay plays a significant role in each part of development of bridge in foundation and superstructure. Likewise literature survey directs and gives diverse strategy for investigation of delays physically as well as digitally.

1. Theory: Delays in Construction Projects

There are various definitions for delay. In the development the management setting, the simple meaning of a delay is "an occasion or a condition that outcomes in completing the project later than specified in the agreement." Delays can likewise be characterize by in construction claims as "the time during which some piece of the development project has been extended or not executed inferable from an unforeseen occasion".

- **Causes of Construction Delays:**

SR. NO.	REASONS FOR DELAY	RESPONSIBILITY/ SOURCE
1	Delay in giving over of site	Client
2	Unforeseen ground conditions	Consultant
3	Conflicts between client and other parties	Other
4	Improper arranging of contractor during bidding stage	Contractor
5	Poor methods for contracting contractor	Contractor

ISSN: 2277-9655
Impact Factor: 5.164
CODEN: IJESS7

6	Inaccurate determination of site condition	Client
7	Unrealistic time plan given in contract	Consultant
8	Faulty soil examination report	Client
9	Slow choice from owner	Client
10	Bureaucracy in client's organization.	Client
11	Ambiguity in specifications and conflicting understanding by parties.	Client
12	Unrealistic inspection and testing methods proposed in contract.	Client
13	Delay in approval of finished work (i.e. stage passing)	Client
14	Delay in endorsement of shop drawings and samples	Client
15	Non availability of drawing/ design on time	Client
16	Consultant or Architect's reluctance for change	Consultant
17	Obtaining permissions from local authorities	Client
18	Poor organizational structure for client or consultant	Client/Consultant
19	Financial Constraints of contractor	Contactor
20	Delay in running bill payments to the contractor	Client
21	Inadequate experience of contractor	Contractor
22	Poor labour productivity	Contractor
23	Lack of command over subcontractor	Contractor
24	Frequent change of subcontractor	Contractor
25	Poor site execution	Contractor
26	Use of inappropriate or outdated construction techniques	Contractor
27	Increase in extent of work	Client
28	Rework because of mistakes in execution	Contractor
29	Rework because of change in design	client
30	Delay in finalization of rates for extra items	client
31	Poor coordination among parties	client
32	Delay in material conveyance by suppliers	Other
33	Delay in material to be provided by the client	client
34	Delay in material purchasing (action by the contractor)	Contractor
35	Change in material prices/ price escalation	Other
36	Improper storage of materials leading to damaged material when necessary	Contractor
37	Inefficient utilization of equipment	Contractor
38	Lack of skilled operators for specialized equipment	Contractor
39	Extreme climate conditions	Other
40	Local political issues	Other
41	Restricted access at site	Client
42	Site accidents due to absence of safety measures	Contractor
43	Site accidents due to Negligence	Contractor
44	Lack of inspiration for contractor (viz. Incentive for early completion etc.)	Client
45	Changes in Govt. guidelines and laws	Other

Table no 1: Causes of Delay

ISSN: 2277-9655
Impact Factor: 5.164
CODEN: IJESS7

- **Types of Construction Delays**

General kinds of construction delays should be clearly analyzed before plan delay investigation starts. Schedule development delays are sorted from various perspectives.

There are four primary groups of construction delays:

1. Critical or noncritical
2. Excusable or non-excusable
3. Compensable or non-compensable
4. Concurrent or non-concurrent COMPETITION

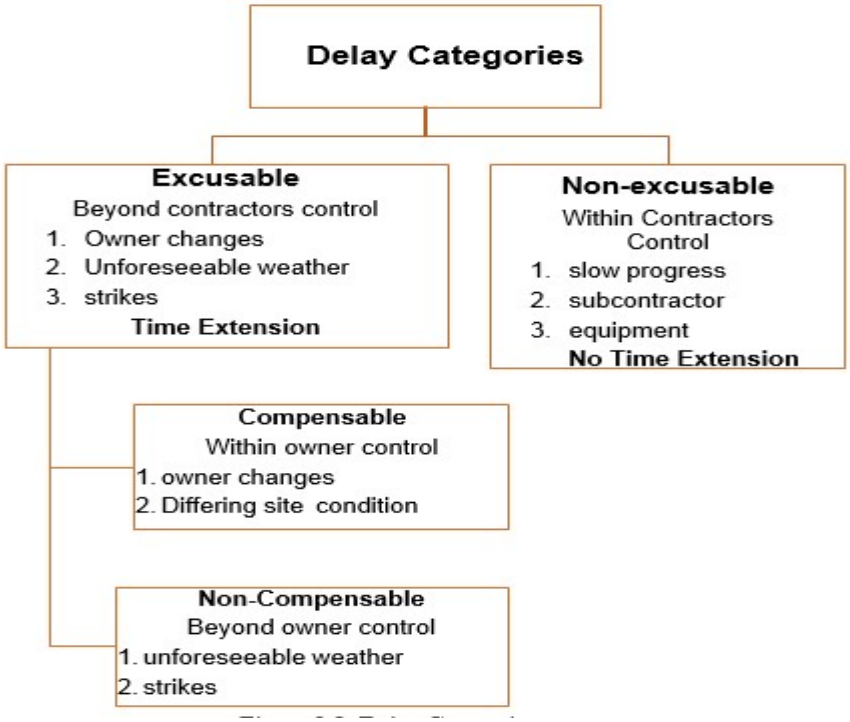

Figure no 1: Delay Categories

❖ **Research Methodology:**

Exploration Methodology is framed after assessment of the extent of the targets to be satisfied. For this investigation information gathered from a case study a cable stayed Major Bridge across stream Sabarmati, Gandhinagar, Gujarat. There was a major contrast in progress rate and duration needs for completion between arranged schedule and actual execution in supports of different span construction on site. For gathering information by continuous site visits were done to locate the basic factors that control time performance as well as the components which govern the rate of progress to discover major as well as general reasons for delay in development.

❖ **Use of Software for Project Planning and Scheduling :**

Primavera P6 Professional Management, the recognized standard for elite project the management software, is intended to deal with enormous scope, exceptionally complex and multifaceted task. It tends to be utilized to put together projects up to 100,000 exercises, and it gives limitless resources and a limitless number of target plans.

5. DATA ANALYSIS

Data was collected to examine different types of delays in execution phase of bridge and their impact on delay of project. This chapter deals with analysis and classification of delays into several groups. Construction delays are categorized in many ways. There are four main groups of construction delays:

1. Critical or noncritical
2. Excusable or non-excusable

ISSN: 2277-9655
Impact Factor: 5.164
CODEN: IJESS7

3. Compensable or non-compensable
4. Concurrent or non-concurrent

❖ **Graphical representation of frequency of occurrence**

From the above study we can say that there are some delays which occur frequently and some occur rarely. In this section most frequent delays are shown with their respective time of occurrence and number of occurrences. This analysis clearly reveals that it is the major portion of delay in total of 275 days delay in construction of the bridge.

Most frequent delays are:

1. Non-availability of labour/ skilled labour
2. Conventional method of bar cutting
3. Insufficient crane capacity
4. Limitation of crane to lift material at higher elevation

Less number of labours deployed.

Following graph shows cumulative delay of most frequent delays occurred. This graph gives a comparison of all most frequent delays.

Figure no 2: Frequency of delay due to various reasons

5. RECOMMENDATIONS

Delay occurred in execution phase of project starting from September 2018 to December 2019 was derived above.

Inexcusable delay occurred on site is due to following reasons.

1. Non availability of labour / skilled labour
2. Non availability of bar bender
3. Non availability of steel on site
4. Non availability of cement
5. Improper site layout
6. Conventional method of bar cutting
7. Shortage of aggregate
8. Concrete pump failure
9. Insufficient crane capacity
10. No facility of crane to lift material at higher elevation

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Impact Factor: 5.164
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11. Less number of labour deployed

6. CONCLUSION

This examination was pointed toward researching the significant reasons for delay in development of extension on stream Sabarmati close to Gandhinagar, Gujarat. Construction activities on the site were thoroughly noticed, studied, examined and correlation was done among arranged and as executed schedule.

Data was collected for 16 month period starting from September 2018 to December 2019 which reveals that only 50% of work has been done as against the planned. For a bridge construction project of this size it is very important that a correct site layout is prepared to stream line communication and transportation for movement of personnel, material and equipment.

Similarly a specialized skill labour supply chain should have been maintained throughout the project life span. In this project use of labours is very high compared to equipment. Possibility of same in future is very high and hence immediate preventive action is required to avoid further delay. Supply of construction material should have been planned with proper provision of stock to avoid delays for want of material. Choice of appropriate construction equipment could play important role in avoiding delay in construction. Proper project planning at the planning stage has great impact on timely completion of the project. Required approaches should have been constructed at an early stage so that concreting could be done from the top of girder with the use of RMC transit mixers to reduce necessity of concrete pump and thereby considerable time could have been saved. The majority of the purposes behind delays are identified with contractor capacity, for example, site management, worker productivity, and lack of proficiency in supervision etc. Delay in drawing and design come under customer's responsibility.

It is clear that consultant has a generally less responsibility. A portion of the reasons for delay are beyond the ability to control of all the project stakeholders, for example, varying site conditions, unexpected climate and so on.

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