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## Factors that cause delay in construction project- A critical review

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### ABSTRACT

The occurrence of a delay in the construction project is a common problem in civil engineering. The delay is defined as a situation where the actual progress of a construction project is slower than the planned schedule or late completion of the project. The problem of delay occurs during the life of the project leading to disputes and litigation. The delay will result in several negative effects like conflicts between owner, contractors and consulting, loss of productivity and exaggerated prices. This paper presents a major construction delay caused by rank order retrieved from past literature. The list of construction delay causes is collected and grouped together, are ranked. The result of this paper gives the major causes of delay.

**Keywords**— Causes of delay, Construction project

### 1. INTRODUCTION

In India, construction industries face many problems in that delay in the project are a major and common problem in all over the industry. Delay is defined as time overrun either beyond the completion date specified in a contract or beyond that the parties agree upon for delivery of a project. It is lapping over of planned schedule and is considered as a common problem in the construction project. The delay in construction project affects the company performance and overall economy of the country as well. construction project accomplished 70% of time overruns and 76% of contractors and 56% of consultants have identified that they face average time overrun of 10%-30% from an original period that causes 50% cost overrun.

A project is now thought of as a cluster of activates interrelated, which could embody a task of specialist and specialized work deception the information and talented men out there to be order taken in most systematic manners. These involve the adoption of techniques are applied to project management. In the construction industry, contractors tend to maximize their profit for market growth. To achieve this aim, it is crucial for contractors to carefully describe the factors that affect the success of the project and estimate their impact before bidding stage.

The projects may differ in scale size, a period of project, goals, uncertainty, complexity, pace and some other dimensions. The delay means incompletion of the project within the specified period of time agreed upon in the contract. It is widely endorsed that construction project schedule plays a key role in project management due to its influence on project success.

Delays in the various project are common and cause considerable losses to projectors. The literature has identified several factors causing a delay in a construction project in domestic and all over the world in numerous manners of decades. The problem studied in different countries with different scholars, due to the reason that it differs from one country to another, in time variation or even one project to another. And to find the various factors and groups of factors that caused delay. The causes of delay in the construction process, which comprises pre-construction, construction, and post-construction.

Typically, the work offers a low rate of return in relation to the amount of risk involved when the delay causes effects on the construction project. So it is essential to define the actual causes of delay in order to minimize and avoid the early in any construction project. The following section represents the literature review, methodology, result in ranking and discussions and conclusion.

### 2. LITERATURE REVIEW

Several studies have been carried out to determine the causes of delay in a construction project.

Betty W.Y.CHIU (2017) a review of key electrical construction factors in Hong Kong. A study was conducted in Hong Kong, where these projects find critical activities. In bridging this knowledge gap the study found that 56 delay factors, belonging to 10 groups

are formed as a questionnaire survey and passed to professional parties. As a result, the study of the cause of delay was done and with scheduling, the factors delay are controlled.

Chidambaram Ramanathan (2012) a critical review of construction delay causing risk on time and cost. A comparison study is made from the collected literature review and questionnaire survey by standard deviation, variances, weighted average, and relative important index. These studies have identified 113 factors classified into 18 groups responsible for the delay. As a result, the comparison revealed the ranking given by all the researchers. These ranks are compared for better understanding.

Ghulam Abbas Niazai (2013) reported a project delay is less than 12 months highly contributes. The paper found 83 causes of delay and with major point, they concluded that two causes of delay are common between all parties, which are corruption and security. Stakeholders face Poor security is the most difficult challenges in the construction project, which delays the project and increase cost. In Afghanistan, corruption is a serious threat which significantly affects the project.

Desai Megha (2013) paper discusses the methodology for ranking of causes of delay for residential construction projects in India context. From the various literature review, 9 major groups are classified. Relative importance index and important index as a function of frequency index and severity index. Based on these techniques a questionnaire is prepared and major causes of delay were found.

Dinesh Kumar R (2016) presented the causes and effect of delay in Indian construction project. The main aim of this paper is to identify the significant delay causes in the construction industry. From the questionnaire survey conducted by the Indian construction industry, the top 20 significant factors with respect to Indian context is found out. Finally, recommendations are given to avoid delay in the construction project.

Frank D.K. Fugar (2010) study focused on the delay of construction of a building project in Ghana. About 32 factors were categorized into 9 groups and ranked by relative important index method. As a result, the financing group of delay factors was considered as the most influential factors and the material factors as second factors, followed by scheduling and controlling factors.

Leena Mali (2016) paper was an attempt to study on causes of delay in the construction industry in Pune region of India. The paper reveals about the delay, type of delay, causes and effect of delay. From the former literature review and survey, the cause of the delay is categorized and from a questionnaire of this paper is prepared. The respond rating gives the causes of delay in a construction project.

Marine Hamzah (2011) presented the cause of construction delay by a theoretical framework in Malaysia construction projects. From a review of three journal paper, the author shows the improvement of delay factors and the factors perspective on project management. As a result, a deep study on positive and negative effect are determined and suggested for future study of the project to the critical framework.

Mohamed M. Marzouk (2014) presented analyzing delay causes in Egyptian construction projects. This paper mainly focuses on the Egyptian construction project delay. A questionnaire survey was disturbed to construction expert and obtained their feedback. Frequency index, severity index, and important index are evaluated to value top ten delay causes. Statistical analysis is carried out using the ANOVA method to test delay causes in the Egypt construction project. As a result, most delay causes are leveled significantly in five categories.

Murat Gunduz (2013) paper is to identify delay factors on construction projects and analyze these factors with the relative important index method. About 83 different delay factors are found, grouped into nine major groups and visualized by Ishikawa (Fishbone) diagram through detailed literature review and interviews. As a result, most important delays are ranked and discussed with some recommendation.

Owolabi James D (2014) paper aim is to investigate the causes and effects of delay on building construction project delivery time. Factors that induce delay are limited to 15 factors causing delay and they are ranked according to the mean index score. The result formulated from the questionnaire survey were experienced at least 10 years. As a result, the major causes were found to 51.1% client, 35.5% contractors and 13.3% of a consultant. The effects were also discussed in the session, where time and cost plays major as a result.

K. Rajkumar (2016) carried out an empirical study of factors affecting the construction delay. This study was made in India, where the delay in the project was found high. The study reveals that 70% of a project undertaken by government departments and agencies were delivered late and a recent research by Building Cost Information Services (BCIS) found that nearly 40% of all studied project had overrun the contract period. As a result of this study causes and recommends for delay factors will help the company to develop their economy rate.

Remon Fayek Aziz (2013) paper was to improve delay control in an Egypt construction project, which determines the influence ranks of ninety-nine (99) factors causing delay. Under 9 primary categories, the factors were explored. The result was compared by studying all participants to cope with all factors causing a delay in construction projects in Egypt. The factors are grouped and ranked by computed with relative importance indices (RI). As a result, most and least important factors and groups were achieved through ranking results.

Tsegay Gebrehiwet (2017) carried out a survey analysis of delay impact on construction project based on RII and correlation coefficient an empirical study. The comparison between three construction stages such that owner, contractor, and consultant were ranked. As a result, the topmost important causes of delay in the Ethiopian construction project identified. The research gives the major causes and effect delay in the Ethiopian construction projects based on the construction process.

Shabbas Al Hammadi (2016) carried out a study of delay factors in construction projects. A survey was conducted in Saudi Arabia to determine the exact factors responsible for project delay. This was achieved by critical analysis of literature review and questionnaire survey. From delay weightage, position and ages five critical factors of delay in a construction project. From a comparative study of delay rank, most influence groups are discussed.

Suhas G. Awari (2016) carried out analysis for case identification for delays in building construction industry. A case study on Mumbai construction project delay is carried out to find the delay factors in the building. From the literature and questionnaire, 51 causes of delay in 8 different groups were evaluated. Using the relative important index method the cause of the delay of the project is outlined. As a result, the effect is discussed and a solution to overcome that delay.

Suhas G. Awari (2016) presented identifying the cause of delay in the construction industry in Mumbai region. This paper mainly focuses on the method and causes of delay to minimize the delay in construction projects in Navi Mumbai. From interview and literature, about 52 causes of delay in 8 different categories were evaluated. From collected data delay happen due to mistakes in the design document, delay in contract payment, slow decision making, private project contractor's payment by the owner, shortage of material, labour & equipment.

Umesh Pawar (2017) presented delay analysis in the residential project by using a case study. This article represents the basic analysis of delay. The data collected was found through qualitative and quantitative methods. The questionnaire survey was divided into three parts and result obtains through that gives causes of delay.

### **3. DISCUSSION**

Although different researchers from different area study the cause delay in a construction project, some of the explored delay causes are similar. So, based on different literature study many delay causes were placed under different groups with their different subgroups. The main groups of delay and their sub-groups like Owner related Consultant related Consultant related Contractor related, Material related, Labor and equipment related, Project related, Design related, Externally related are categorized and discussed in a detailed manner in the below as follow table, in construction projects are as follows.

**Table 1: Causes of delay**

<b>S.no</b>	<b>Causes of delay</b>	<b>Category</b>
1	Slow decision making	
2	Suspension of work	
3	Late in revising and approving design documents by owner	
4	Delay to furnish and deliver the site to the contractor	
5	Delay in finance and payments	
6	Variation orders/changes of scope by the owner during construction	
7	Type of project bidding and award (negotiation, lowest bidder)	
8	Unrealistic contract duration	
9	Ineffective delay penalties	
10	Change orders	
11	Conflicts b/w joint-ownership	
12	Delay in approving design document	
13	Lack of capable representative	
14	Poor communication and coordination between consultant and contractor	
15	Inadequate planning	
16	Mode of financing and payment for completed work	
17	Inappropriate contractual procedure	
18	Selecting inappropriate contractors	
19	Additional work	
20	Lack of owner experience in construction project	
21	Lack of incentives for the contractor to finish ahead of schedule	
22	Owner interference	
23	Inadequate experience of the consultant	
24	Delay in approving shop drawings and sample materials	
25	Mistakes and discrepancies in design documents	
26	Unclear and inadequate details in drawings	
27	Conflicts b/w consultant and design engineer	
28	Delay in performing inspection and testing	
29	Inaccurate site investigation	
30	Inadequate project management assistant	
31	Poor communication and coordination b/w owner and contractor	

32	Late in revising and approving design documents	Contractor-related
33	Inflexibility of consultant	
34	Quality assurance/control	
35	Difficulties in the financing project by contractor	
36	Poor site management and supervision	
37	Ineffective planning and scheduling of project	
38	Rework due to errors during construction	
39	Frequent change in subcontractor	
40	Delays in sub-contractors work	
41	Inadequate contractor experience	
42	Inappropriate construction methods	
43	Incompetent project team	
44	Obsolete technology	
45	Poor communication and coordination b/w owner and consultant	
46	Inadequate site investigation	
47	Inappropriate contractors policies	
48	Delay in preparation of shop drawings and material samples	
49	Delay in site mobilization	
50	Shortage of construction materials in the market	Material related
51	Changes in material types and specifications during construction	
52	Delay in material delivery	
53	Damage of sorted material	
54	Delay in manufacturing material	
55	Escalation of material prices	
56	Unreliable suppliers	
57	Poor procurement of construction material	
58	Late in the selection of finishing materials due to the availability of many types in the market	
59	Poor quality of construction material	
60	Shortage of labors	Labor and equipment related
61	Equipment availability and failure	
62	Unqualified workforce	
63	Equipment allocation problem	
64	Frequent equipment breakdown	
65	Improper equipment	
66	Inadequate modern equipment	
67	Low efficiency of equipment	
68	Shortage of equipment	
69	Slow mobilization of equipment	
70	Absenteeism	
71	Low motivation and morale of labor	
72	Personal conflicts among labor	
73	Slow mobilization of labor	
74	Labor strikes due to revolutions	Project related
75	Labor injuries on site	
76	Unqualified/inadequate experienced labor	
77	Low productivity level of labors	
78	Effects of subsurface conditions (e.g., soil, high water table, etc.)	
79	Traffic control and restriction at the job site	
80	Unavailability of utilities in site or Delay in providing services from utilities such as (water, etc.)	
81	Accident during construction	
82	Problem with neighbors	
83	The complexity of the project (project type, scale, etc.)	
84	Inadequate definition of substantial completion	External related
85	Ineffective delay penalties	
86	Original contract duration is short	
87	Unfavorable contract clauses	
88	Legal disputes b/w project participants	
89	Weather effect (hot, rain, etc.)	
90	Environmental restrictions	
91	Changes in government regulations and laws	
92	Slow permit by government/municipality	
93	Delay in performing final inspection and certification by a third party	
94	Lack of communication between the parties	
95	Fluctuations in cost/ currency	

96	Force Majeure as war, revolution, riot, strike, and earthquake, etc.	Design related
97	Different tactics patterns for bribes	
98	Sudden failure action	
99	Global financial crisis	
100	Slow site clearances	
101	Inadequate production of raw material in the country	
102	Inappropriate government policies	
103	Mistakes and ambiguities in contract document	
104	Insufficient details in contract document	
105	Corruption	
106	Unrealistic contract duration and cost	
107	Effect of social and cultural factors	
108	Lack of clear understanding of contract document	
109	Thefts did on site	
110	The complexity of project design	
111	Design changes by the owner or his agent during construction	
112	Design error and omissions made by designers	
113	Insufficient data collection and survey before design	
114	Lack of design team experience in construction project	
115	Mistakes and delay in production design document	
116	Misunderstandings of owners requirement by design engineer	
117	Poor use of advanced engineering design software	
118	Unclear and inadequate details in the drawing	
119	Incomplete project design	
120	Defective design made by designers	
121	Mistake and discrepancies in the contract document	

#### 4. RESULT

This research review's purpose is to help the constructors understand different aspects posed by the research on the Cause of Time Delay and ways to face prevent that by understanding the ranking on factors of delay. This is significant because many people have a different approach to a delay in the construction project, often not realizing there are other points of view. There has been much research and discussion conducted on these opinions of the Construction delay, including culture, eugenics resulting in cultural genocide, and conflicts with a lack of identity. Most of the research found was on the Construction Management and its Funding. More research and testing is required to gain a better understanding of why those who undergo construction are facing the confusion and struggle of not identifying with either group for inevitable delay that happens So, It is important to conduct more studies on the results like these and find reasons and rank them so that the problem that been facing for more than a decade can be prevented and solved with a wider vision for the benefit of the entire society. The table below shows the major causes of delay which is ranked from the past literature review.

**Table 2: Major causes of delay**

S. no	Major causes of delay	Ranking
<b>Owner related</b>		
1	Slow decision making	1
2	Suspension of work	3
3	Late in revising and approving design documents by owner	4
4	Delay to furnish and deliver the site to the contractor	2
5	Delay in finance and payments	1
6	Change orders	3
7	Poor communication and coordination between consultant and contractor	3
<b>Consultant related</b>		
8	Inadequate experience of consultant	1
9	Delay in approving shop drawings and sample materials	3
10	Delay in performing inspection and testing	2
11	Poor communication and coordination between owner and contractor	4
<b>Contractor related</b>		
12	Difficulties in the financing project by contractor	4
13	Poor site management and supervision	1
14	Ineffective planning and scheduling of project	2
15	Rework due to errors during construction	6
16	Delays in sub-contractors work	7
17	Inadequate contractor experience	5
18	Inappropriate construction methods	3
<b>Material related</b>		
19	Shortage of construction materials in the market	2

20	Changes in material types and specifications during construction	3
21	Delay in material delivery	1
<b>Labor and equipment related</b>		
22	Shortage of labors	1
23	Equipment availability and failure	2
24	shortage of equipment	4
25	unqualified/inadequate experienced labor	3
26	Low productivity level of labors	1
27	personal conflicts among labor	2
<b>Project related</b>		
28	Effects of subsurface conditions (e.g., soil, high water table, etc.)	1
29	Traffic control and restriction at job site	3
30	Unavailability of utilities in site or Delay in providing services from utilities such as (water, etc.)	2
31	Accident during construction	2
32	legal disputes b/w project participants	4
<b>External related</b>		
33	Weather effect (hot, rain, etc.)	1
34	Changes in government regulations and laws	3
35	Slow permit by government/municipality	2
36	Fluctuations in cost/ currency	4
<b>Design related</b>		
37	insufficient data collection and survey before design	2
38	mistakes and delay in production design document	1
39	misunderstandings of owners requirement by design engineer	3

## 5. CONCLUSION

The purpose of this review was to view the trends determine the causes of delay in a construction project for the past ten years and see how delay on Construction project has changed and is still changing. It is clear from the research reviewed that evaluative time delay in the project is very immersed and widely practiced throughout composition programs to prevent it. Along with this, it is also clear that the field of construction studies just in regards to the types of factors that construction projects receive on their time delay is varied and continues to be studied and analyzed in order to most benefit composition builders and society at large. Owners vs. Contractors perspective on time delay is still being debated, though, and continues to be problematic in the discourse community of composition and even creates a conflict to drop out the entire project sometimes. This field of this inquiry is very important as at its center is a concern with helping builders, Owners and Employees this review is been done. Helping constructors become better on time management and getting better to see the importance in completing projects in time as its extremely important in our current society with declining the loss of time, productivity and exaggerated prices by providing in a completely in a ranked order for the time delay that happens so people and contractors can benefit on that.

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