

## Underlying Causes of Construction Project Delay: A Review

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**ABSTRACT** – Delay is a worldwide problem which normally occurs in every project. Delay of the project occurs when a period of time of the completion date is late or postponed. Since the project is delayed, the cost of the project will have escalation which will risk the contractors. Instead of getting a benefit from the project, they gain losses. Similarly, other construction projects in different countries are prone to face delays. The aim of this study is to summarise the causes of delay in the construction project from previous study. Regarding the causes of construction project delay, the major countries in the world have faced slow decision making, poor site management and supervision, shortage of labour, changes of scope of work during construction, late in revising and approving design documents, etc. The identification of important delay causes helps a contractor to plan well before the project start.

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## INTRODUCTION

According to [1] delay is typical in construction project. A time overrun in any activity or operation has an impact on the work's completion, resulting in disputes and lawsuits. As a result, it's crucial to look into and evaluate the reasons for building delays in construction. Construction delays have been viewed as a global problem that will affect the timely completion, budgeting, and quality of construction projects. It's the most common, costly, and dangerous issue that arises in both private and public construction projects. Despite the fact that the previous study focused on construction projects in Somaliland, it broadens and increases their understanding of delay factors in a global context, and as a result, it can be applicable to other nations and future research [2]. The implications of these findings for reflective practise in the planning and control of construction activities are important. The findings of the study will help the construction industry by revising the delay causes and realign project management techniques to ensure that projects are completed on time [3]. A construction project's success is determined by three factors: completion on schedule, within budget, and according to specifications. Construction projects are currently suffering a number of issues, with delays being one of the most serious, particularly in Egypt. Analysing the reasons of construction delays and working to limit their impact is critical [4].

## TYPE OF DELAY

Delay is something that happens later than unplanned or also even planned and an action that is not timely. In construction sectors, it is common for delays to occur and it determine by late completion of the project deadline. There are four delay categories which are critical or noncritical, excusable or non-excusable, compensable or non-compensable and concurrent or nonconcurrent. Figure 1 shown a general overview and the interpretation of a typical construction contract.

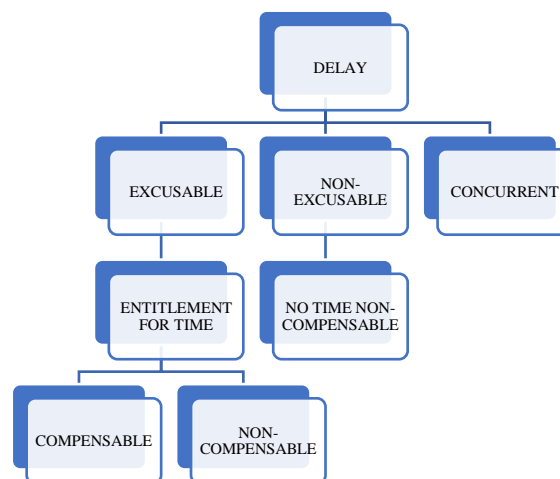


Figure 1. Type of Delays [6].

## Excusable Delays

Generally, an excusable delay is a delay that is due to an unforeseeable event beyond the contractor's control. These conditions may be reasonably unforeseeable, not within the contractor's control, and not the contractor's fault or responsibility. When a delay is determined to be excusable, the contractor will be entitled to an extension of the time to complete the project work. The characterization of a delay as excusable must be made within the context of the specific contract. The contract should clearly define the factors that might justify entitlement to a time extension to the contract completion date. For example, some contracts may not allow for time extensions caused by weather conditions, regardless of how unusual, unexpected, or severe, even though such delays would be beyond the control of the contractor [6]. Extending the time required to arrange the author's supervision may cause delays in the execution of works. The client's interference in the competencies of the contractor, modifications of earlier findings and a long decision-making process are the reason which caused the possible delay of the project [7]. Excusable delays can be further classified into compensable and non-compensable delays.

### Excusable Compensable Delays

Excusable compensable delays are those in which the contractor is entitled to additional payment (compensation), such as monetary compensation and time extension. However, the decision that a delay whether it is compensable or non-compensable is taken as per the contract between client and contractor. Natural disasters or some reasons which are out of control are not taken into account. An example of such delay could be is that client does not allow access to the site even after notice to proceed is given; other such delays which are due to the client are compensable [8]. Excusable delay in compensation is caused by the client's actions or inactions. When contractors encounter this type of delay, they are entitled to time extension as well as monetary compensation due to the delays. There is another example of an excusable delay in compensation would be when the client refuses access to the site even when the notice to proceed is given. This delay is because of the sometimes-unpredictable situation and it is not the fault of the contractor. The external factor is something tough to verify because it indicates the future and event [9].

### Excusable Non-Compensable Delays

There can also be delays which are justified but are not point to compensation since none of the parties is liable for their occurrence. Such delays include weather conditions, changes in regulation and other random events. Random cases include theft, failures and technical problems in the construction equipment used and the occurrence of archaeological excavation. Some of them are related to the need to perform time-consuming procedures and processes [7]. Excusable Delay without Compensation is delays where neither the client nor the contractor is deemed responsible. Under such circumstances, only time extensions are granted and no monetary compensation is provided since there are no grounds for damages. These delays are commonly called "acts of God" because they are not the responsibility or fault of any particular party [10]. This delay is allowing to extent of time to finish construction without giving any compensation to the contractor. The factors that include this delay are a protest from the labour, unexpected weather, unexpected of late delivery equipment and unexpected of late delivery materials.

### Non Excusable Delays

These delays are such that contractors and subcontractors don't have any excuse or no excuse can be given to them. They arise due to carelessness or actions and inactions of contractors and subcontractors, through no fault by the owner. The contractor is generally not entitled to relief and must either make up the lost time through acceleration or compensate the owner. Therefore, non-excusable delays usually result in no additional money and no additional time is granted to the contractor which will affect the whole duration of the project. In such cases, the client is liable to get liquidated damages [11]. Example of such delay could be constructing something wrong which is not given in drawings, not completing work on time and improper resource allocation. The client can claim their loss if had in the contract agreement. This delay had to identify the client because they rarely to check the schedule of the construction. The factors that contribute to the non-excusable delay are the usual and expected whether, delay caused by a subcontractor, the inefficiency of the contractor to manage the construction site, financial of the contractor, lack of labour, failure to manage their work according to the contract schedule and always make mistake or failure to fulfil of owner specification [12].

### Concurrent Delays

Concurrent delays which contain two or more excusable delays results in time extension, when compensable and non-excusable delays are concurrent a time extension can be given or delay can be distributed between client and contractor. The concurrent delay is a more complicated and this is very typical of a construction project. This situation happened when more than one factor delays the project at the same time or in overlapping periods of the moment. It is necessary to find out what type has caused an overall delay in project completion. Therefore, different factors like time of occurrence of delay, duration of the delay, the impact of them, float ownership etc. have to be considered carefully. Construction delays in residential and light construction are often the result of miscommunication between contractors, subcontractors, and property owners. These types of misunderstandings and unrealistic expectations are usually avoided through the use of detailed critical path schedules, which specify the work, and timetable to be used, but most importantly, the logical sequence of events which must occur for a project to be completed. Delays in construction projects are frequently

expensive since there is usually a construction loan involved which charges interest, management staff dedicated to the project whose costs are time-dependent, and on-going inflation in wage and material prices [12].

Construction is very much different from other industries in which the activities are carried out in the open where control is relatively difficult. It is usually large in size and often funded by the government, so utilizing public money. More importantly, a construction project is very fragments, in the sense that are many parties involved, from the professionals such as engineers, architects, and quantity surveyors to the tradesmen such as carpenters, masons, and painters [13]. Delays are costly and often results in disputes and claims, impair the feasibility of project owners, and retard the development of the construction industry. To improve the situation, the findings of this research must be addressed by a joint effort of all participants in the construction industry [14]. A framework presented will help decision makers identify the impacts of the causal factors of delay to provide a more realistic project estimation in terms of schedule and cost [15]. According to [16], a monitoring and quality assurance system would be required in these areas to minimize the risk of the probable construction delay.

For many years issues of delay in Malaysia construction project has been phenomenal. Its impacts were so significant that tends to decelerate the implementation of Malaysia Plans. The improvement of delay factors is not only limited to technical factors but also factors in project management perspective from both aspects of processes involve and influence of human attitudes, mentality, skills, and behavior. This study is based on some issues and problems but looking from a different angle and been conducted and delay framework have been proposed [17].

The construction industry is a major player in the economy, generating both, employment and wealth. However many projects experience extensive delays and thereby exceed initial time and cost estimates [18]. The construction sector in Malaysia, a fast-developing country in South-East Asia has not escaped the problem of delays. In 2005, about 17.3% (of 417 government contract projects in Malaysia) were considered sick (more than 3 months of delay or abandoned) [19]. Ranking of factors from most important to least one would help to implement agencies to keep an eye on weak points and potential improvement fields so that the same may be avoided in future hydropower projects [20].

## CAUSES CONSTRUCTION DELAY

Delays will also result in several negative effects like lawsuits between house owners and contractors, exaggerated prices, loss of productivity and revenue, and contract termination. So, a comprehensive study of these delays is important [21]. Table 1 shown the findings from previous researchers on the top 5 causes of delay.

**Table 1.** Previous Research on Causes of Delay [22].

Title	Researchers	5 Top Causes Of Delay	Method of Analysis
Delays In Construction Projects: The Case of Jordan	[18]	<ul style="list-style-type: none"> <li>• Shortage of manpower</li> <li>• Presence of unskilled labour</li> <li>• Shortage of materials</li> <li>• Delay in material delivery</li> <li>• Material price fluctuations</li> </ul>	Drewin's Open Conversion System, one-way ANOVA
Time Overrun in Construction Projects from the Perspective of Project Management Consultant (PMC)	[23]	<ul style="list-style-type: none"> <li>• Cash flow and financial difficulties faced by contractors</li> <li>• Contractor's poor site management</li> <li>• Inadequate contractor experience</li> <li>• Shortage of site workers</li> <li>• Ineffective planning and scheduling by contractors</li> </ul>	SPSS (Statistical Package for Social Science), Kendall's coefficient of accordance W
Analysing Delay Cause in Egyptian Construction	[24]	<ul style="list-style-type: none"> <li>• Ineffective planning and scheduling</li> <li>• Financing project by contractor</li> <li>• Variation orders</li> <li>• Type of project bidding and award</li> <li>• Effects of subsurface condition</li> </ul>	(SPSS), Kruskal-Wallis test (non-parametric ANOVA)
Cause and Effects of Delays in Malaysian Construction	[19]	<ul style="list-style-type: none"> <li>• Contractor's improper planning</li> <li>• Contractor's poor site management</li> <li>• Inadequate contractor experience</li> <li>• Inadequate client's finance and payments</li> <li>• Problems with subcontractors</li> </ul>	Relative Importance Index (RII)
Analysing Factors Affecting Delays in Indian Construction Project	[25]	<ul style="list-style-type: none"> <li>• Lack of commitment</li> <li>• Inefficient management</li> <li>• Poor site coordination</li> <li>• Improper planning</li> <li>• Lack of clarity in project scope</li> </ul>	Relative Importance Index (RII)

**Table 1.** Previous Research on Causes of Delay [22] (cont.)

Title	Researchers	5 Top Causes of Delay	Method of Analysis
A Framework for Identifying Causal Factors of Delay in Nuclear Power Plant Projects	[15]	<ul style="list-style-type: none"> <li>Missing schedules update</li> <li>Design Error/ECRs (Engineering Change Request)</li> <li>Scope change</li> <li>Inadequate contractor performance</li> <li>Materials specification</li> </ul>	Critical Path Method (CPM)
Cost Escalation and Schedules Delays in Road Construction Project in Zambia	[26]	<ul style="list-style-type: none"> <li>Inclement weather</li> <li>Scope changes</li> <li>Environment protection and mitigation cost</li> <li>Schedule delay</li> <li>Strikes</li> </ul>	Weighted opinion averages
Fire Service Installation Related Contributors of Construction Delays	[16]	<ul style="list-style-type: none"> <li>Improper site coordination and management</li> <li>Lack of timely decision making</li> <li>Workload of project staff</li> <li>Procedures for equipment approval</li> <li>working experience</li> </ul>	Relative Importance Index (RII)
Cause of Construction Delay- Theoretical Framework	[17]	<ul style="list-style-type: none"> <li>Variation orders</li> <li>Late documents approval</li> <li>Inclement weather</li> <li>Financing project by contractor</li> <li>Conflict with subcontractors</li> </ul>	Categorize into 1) Excusable compensable delay, 2) non-Excusable delay and 3) Concurrent non-compensable delay.
Exploring Delay Causes of Road Construction in Egypt	[27]	<ul style="list-style-type: none"> <li>Owner financial problems</li> <li>Equipment shortage</li> <li>Inadequate contractor experience</li> <li>Construction material shortage</li> <li>Equipment failure</li> </ul>	Relative Importance Index (RII) and Overall Relative Importance Index (ORII)
Causes of Construction Delay: Traditional Contracts	[14]	<ul style="list-style-type: none"> <li>Owner interference</li> <li>Inadequate contractor experience</li> <li>Consultant contract management</li> <li>Shortage in material</li> <li>Labour productivity</li> </ul>	Relative Importance Index (RII)
Reasons for Delay in selected hydro-power projects in Khyber Pakhtunkhwa	[20]	<ul style="list-style-type: none"> <li>Force majeure</li> <li>Lack of coordination of project teams</li> <li>Delay payment by client</li> <li>Bad law and order situation</li> <li>Non-compliance with contractor with</li> <li>contractual provision</li> </ul>	Relative Frequency Index (RFI), Relative Severity Index (RSI), Independent Relative Importance Index (IRII)

## SUMMARY AND RECOMMENDATION

In summary, this paper reviewed causes of construction delays from previous studies. The most important delay causes of construction projects are prioritized according to their significance to five highest ranking. The identification of important delay causes helps a contractor to plan well before the project start. There are some common causes of delay at different countries. There are no straightforward solutions to the delay happened in construction projects. However, some steps can be taken to minimise their causes and effects through the analysis of the causes of delay in construction project in the world, it is concluded that the construction industry should establish a construction readiness checklist in order to avoid and reduce delay to occur. Through a construction readiness checklist, we can prepare on issues, challenges and problems occur at early stage of construction which leads to delay and in sick project status. Furthermore, construction project will complete on time with specified budget and satisfied quality requirement.

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