

# **CONSTRUCTION DELAY FACTORS IN DEVELOPED COUNTRIES**

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## **Abstract:**

Construction delays can be defined as the late completion of work compared to the planned schedule or contract schedule. Construction delays can be minimized only when their causes are identified. The objective of this study was to identify the major causes of construction delays, the effects of delays, and methods of minimizing construction delays. Construction delay is a major problem faced by the construction industry. In most construction projects, there are delays and their impact level varies from project to project ranging from a few days to years. It is generally understood that the construction delay is the most critical factor affecting the delivery of the project in time, within budget, and expected quality. It can be rarely found that a project was completed within the specified time in the available budget.

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**Keywords:** Types of delay, Causes of delay, Methods of minimizing construction delay, Effects of construction delay

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## **INTRODUCTION**

The three most important factors that contribute to the causes of delays are delay in revising and approving design documents, delays in sub-contractors work, and poor communication and coordination in change orders by owner during construction. Contractor-related delays are ranked the most significant groups that cause delays, followed by client-related delays, and consultant-related delays. Time and cost overrun were the common effects of delays in construction projects. To minimize delays in construction projects it has been identified that the top three

effective methods of minimizing construction delays includes: site management and supervision, effective strategic planning, and clear information and communication channels.

### **The Main Categories of Delay**

There are four basic ways to categorize type of delays:

1. Compensable delays or non-compensable delays
2. Concurrent delays or non-concurrent delays
3. Excusable delays or non-excusable delays

#### 4. Critical delays or noncritical delays

##### Compensable Delays versus Non-Compensable Delays

A compensable delay is a delay where the contractor is entitled to a time extension and to additional compensation. Relating back to the excusable and non excusable delays, only excusable delays can be compensable. Non-compensable delays mean that although an excusable delay may have occurred, the contractor is not entitled to any added compensation resulting from the excusable delay.

##### Concurrent Delays

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.

##### Excusable Versus Non-Excusable Delays

All delays are either excusable or non-excusable. An excusable delay is a 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:

- a. General labor strikes
- b. Fires
- c. Floods
- d. Acts of God

e. Owner-directed changes.

f. Errors and omissions in the plans and specifications.

g. Differing site conditions or concealed conditions.

h. Unusually severe weather.

i. Intervention by outside agencies.

j. Lack of action by government bodies, such as building inspection.

Non-excusable delays are events that are within the contractor's control or that are foreseeable. These are some examples or non-excusable delays:

a. Late performance of sub-contractors.

b. Untimely performance by suppliers.

c. Faulty workmanship by the contractor or sub-contractors.

d. A project-specific labor strike caused by either the contractor's unwillingness to meet with labor representative or by unfair labor practices.

##### Critical Versus Non-Critical Delays

Delays that affect the project completion, or in some cases a milestone date, are considered as critical delays, and delays that do not affect the project completion, or a milestone date, are noncritical delays. If these activities are delayed, the project completion date or a milestone date will be delayed.

Determining which activities truly control the project completion date depends on the following:

a. The project itself.

b. The contractor's plan and schedule

(particularly the critical path).

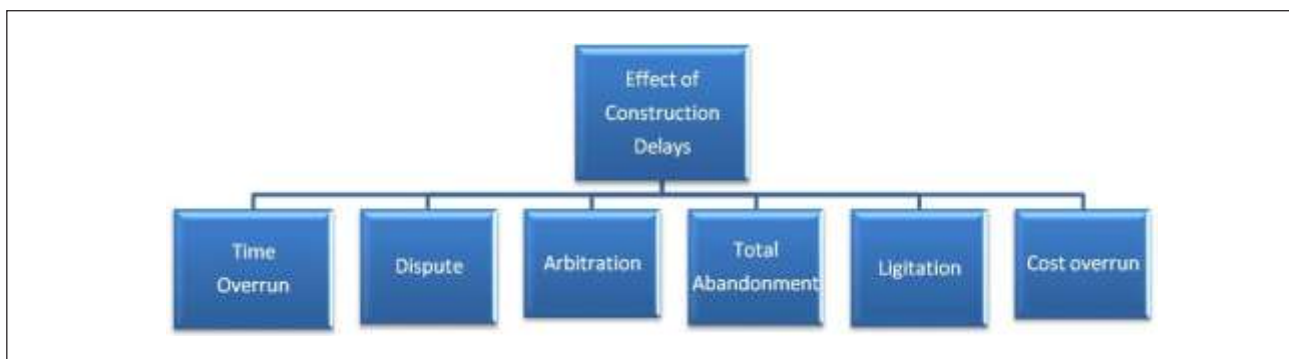
- c. The requirement of the contract for sequence and phasing.
- d. The physical constraint of the project, i.e. how to build the job from a practical perspective.

### Effects of Delay

Aibinu and Jagboro (2002) studied the effects of construction delays on project delivery in

Nigerian construction industry. The six effects of delay identified were:

- a. Time overrun;
- b. Cost overrun;
- c. Dispute;
- d. Arbitration;
- e. Total abandonment; and
- f. Litigation.



### Causes of Delay

Group 1: Causes of delay by <u>employer</u>	
No	Causes of Delay
1	Delay in progress payments by owner
2	Delay to furnish and deliver the site
3	Change orders by owner during construction
4	Late in revising and approving design documents
5	Delay in approving shop drawing and sample materials
6	Poor communication and coordination
7	Slowness in decision making process
8	Conflicts between joint-ownership of the project
Group 2: Causes of delay by contractor	
1	Difficulties in financing project by contractor
2	Conflicts in sub-contractors schedule in execution of project
3	Rework due to errors during construction
4	Conflicts between contractor and other parties(consultant and owner)
5	Poor communication and coordination
6	Ineffective planning and scheduling of project

7	Improper construction methods implement
8	Delays in sub-contractors work
9	Inadequate contractor's work
10	Frequent change of sub-contractors
11	Poor qualification of the contractor's technical staff
12	Delays in site mobilization
Group 3: Causes of delay by Consultant	
1	Delay in approving major changes in the scope of work
2	Poor communication and coordination
3	Inadequate experience of consultant
4	Mistakes and discrepancies in design documents
5	Delays in producing design documents
6	Unclear and inadequate details in drawings
7	Insufficient data collection and survey before design
8	Un-use of advanced engineering design software

<b>Group 4 : Causes of delay by materials</b>	
1	Shortage of construction materials in market
2	Changes in material types and specifications during construction
3	Delay in material delivery
4	Damage of sorted material while they are needed urgently
5	Delay in manufacturing special building materials
6	Late procurement of materials
<b>Group 5 : Causes of delay by equipment</b>	
1	Equipment breakdowns
2	Shortage of equipment
3	Low level of equipment-operator's skill
4	Low productivity and efficiency of equipment
5	Lack of high-technology mechanical equipment
<b>Group 6 : Causes of delay by labors</b>	
1	Shortage of labors
2	Working permit of labors
3	Low productivity level of labors
4	Personal conflicts among labors
<b>Group 7 : Causes of delay by external factors</b>	
1	Effects of subsurface conditions (e.g. soil, high water table, etc.)
2	Delay in obtaining permits from municipality
3	Hot weather effect on construction activities
4	Traffic control and restriction at job site
5	Accident during construction
6	Changes in government regulations and laws
7	Delay in providing services from utilities (such as water, electricity)
8	Delay in performing final inspection and certification by a thirdParty

### Methods of Minimizing Construction Delays

When a construction delay occurs, there is no question that the owner suffers financially. But the extent to which an owner can recover his loss of income from the contractor, and more

importantly minimize the risk that such delays will occur, depends largely on how the construction contract was drawn up. Based on several studies of project success factors and rectification of delays in construction project, a total of 15 methods have been identified as follow:

### Methods of Minimizing Construction Delays

<b>No</b>	<b>Methods</b>
1	Frequent progress meeting (Majid, 2006)
2	Use up-to-date technology utilization (Majid, 2006)
3	Use proper and modern construction equipment (Majid, 2006)
4	Use appropriate construction methods (Majid, 2006)
5	Effective strategic planning (Majid, 2006)
6	Proper material procurement (Majid, 2006)
7	Accurate initial cost estimates (Majid, 2006)
8	Clear information and communication channels (Majid, 2006)
9	Frequent coordination between the parties involved (Majid, 2006)
10	Proper emphasis on past experience (Majid, 2006)
11	Proper project planning and scheduling (Majid, 2006)
12	Complete and proper design at the right time (Assaf, 2006)
13	Site management and supervision (Long, 2008)
14	Collaborative working in construction (Kumaraswamy, 1997)
15	Compressing construction durations (Long, 2008)

### CONCLUSION

Although delay and cost overrun may seem very inherent in most projects, the good news is that it can be reduced or totally eliminated

using a proper project performance monitoring and control system that will integrate all the key activities of each phase of the project. This system could be designed such that a close loop information feedback and feed forward package is obtained from definition to close out of the project. The cycle is usually advantageous because planning, measuring, monitoring, and taking corrective action are all usually included in the control cycle.

Another additional tactic used to achieving a project with little or no delay and cost overrun is in the definition of project success factors and criteria. The integration of these factors will lead to a better understanding of the issues in which the project manager needs to address and design a control system that will monitor these issues. The project owner and the project manager should be able to clearly define the management success and product success so that the project team has clear knowledge of its objectives. It is important to note that even through delay and cost overrun due to “act of God” cannot be prevented; a good monitoring and control system can however reduce the effect of such occurrences on project performance.

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