

# CONSTRUCTION DELAY IN INTERNATIONAL PROJECTS: WITH SPECIAL REFERENCE TO GULF AREA CAUSES, DAMAGE ASSESSMENTS AND ENTITLEMENTS

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**ABSTRACT :** For international projects in general and the projects in the Gulf area in Particular, the most common cause of construction disputes and claims is construction delay. This paper will present different surveys to identify the causes of delay, the parties responsible, and how delay can be avoided. This paper will outline how these factors impact damage assessment and entitlement. Furthermore, a case study will be presented to show how the responsibility and damages due to delay are assessed and how entitlements are calculated.

*Key words :* Construction delay, claims, variation orders.

## 1. CONSTRUCTION DELAY ANALYSIS

### 1.1 Introduction

Delays in construction projects are a universal phenomenon. They are almost always accompanied by cost and time overruns. Construction project delays often result in adversarial relationships between construction stakeholders (client, contractor, consultant, etc.), resulting in cash-flow problems, arbitration, litigation, and a general feeling of distrust amongst each other.

Major governmental contracts for construction in Kuwait are let as lump sum projects (design, competitive tendering, and appointment of contractor). They have been plagued by construction disputes, producing claims which have resulted in substantial increases in costs and delays. Although the study is focused on Kuwait, nevertheless Kuwait situations are typical of the almost all of the Gulf countries

In addition to the direct costs, the owner has also had to meet indirect costs, including the cost of preparing its defense, legal costs throughout the proceedings, costs involved during significant prolongation periods, overhead costs, direct costs of supervising the delayed construction, and loss of use of the facilities due to late completion.

The objective of this paper is to identify the major causes of delay in building construction in international projects. The primary aim is to identify the perceptions of the different parties regarding causes of delays, the allocation of responsibility, and the types of delay.

A literature review and questionnaire survey targeted at contractors in Kuwait have been used as the tools to carry out this study. The results have been analyzed to rank the

causes of delay and further classify the types of delay. Based on the analysis of the ranking and intensity of a delay cause, this paper suggests possible improvements that could be made in order to reduce delay in the construction industry.

There is a wide range of opinions on the causes of time delays for engineering and construction projects. Some are attributable to a single party, while others can be ascribed to several parties, and many relate more to systemic faults or deficiencies rather than to a group or groups. The successful execution of construction projects and keeping them within estimated cost and prescribed schedules depend on a methodology that requires sound engineering judgment [1].

Delays do not always result from a single catastrophic event. They frequently develop slowly during the course of work. Minor delays are generally overlooked until their cumulative effect becomes financially apparent. By the time a contractor recognizes that there is a problem, many different parties and natural forces have contributed to the situation. To avoid acceleration claims from contractors in delay situations, it is best to:

- Issue formal (change order) schedule extensions in a timely manner when justified.
- Avoid ordering early or inappropriate completion.
- Respond in a timely manner to any *Notice of Claim* from the contractor.

### 1.2 Related Research

Many studies have been carried out to assess the causes of delay in construction projects. Ogunlana and Promkuntong [2] studied the delays in building projects in Thailand, as an example of developing economies. They

concluded that the problems of the construction industry in developing economies could be nested in three layers:

1. Problem of shortages or inadequacies in industry infrastructure, mainly supply of resources;
2. Problems caused by clients and consultants; and
3. Problems caused by the incompetence of contractors.

Chan and Kumaraswamy [3] surveyed the causes of construction delay in Hong Kong as seen by clients, contractors and consultants, and examined the factors affecting productivity. The survey revealed differences in perceptions of the relative significance of factors between the three groups, indicative of their experiences, possible prejudices, and lack of effective communication.

Mansfield et al [4] studied the causes of delay and cost overruns in construction projects in Nigeria. The results showed that the most important factors are financing and payment for completed works, poor contract management, changes in site conditions, shortage of material, and improper planning.

Assaf et al [5] studied the causes of delay in large building construction projects in Saudi Arabia. The most important causes of delay included approval of shop drawings, delays in payments to contractors and the resulting cash-flow problems during construction, design changes, conflicts in work schedules of subcontractors, slow decision-making and executive bureaucracy in the owners' organizations, design errors, labor shortages and inadequate labor skills.

Mezher and Tawil [6] conducted a survey of the causes of delay in the construction industry in Lebanon from the viewpoint of owners, contractors and architectural/engineering firms. It was found that owners had more concerns in regard to financial issues, while contractors regarded contractual relationships the most important, and consultants considered project management issues the most important causes of delay.

Battaineh [7] evaluated the progress reports of 164 building and 28 highway projects constructed during the period 1996-1999 in Jordan. The results indicated that delays are extensive: the average ratio of actual completion time to the planned contract duration is 160.5% for road projects and 120.3% for building projects.

Al-Moumani [8] conducted a quantitative analysis of construction delays by examining the records of 130 public building projects constructed in Jordan during the period 1990-1997. He presented regression models of the relationship between actual and planned project durations for different types of building facilities. The analysis also included the reported frequencies of time extensions for the different causes of delay. He concluded that the main causes of delay in construction projects relate to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantities.

Shi [9] presented a paper on methods for computing activity delays and assessing their contributions to project delay. The method consisted of a set of equations which could be easily coded into a computer program that would

allow speedy access to project delay information and activity contributions.

Al-Kass et al [10] presented a paper which discusses different delay analysis techniques that are currently used in the construction industry. It also discusses a proposed new delay analysis technique called the Isolated Delay Type (IDT). These techniques were tested against a case example and their strengths and weaknesses highlighted.

A detailed study made in 1992 by the New South Wales (NSW) Australia Royal Commission [11] into Productivity in the Building Industry of twenty commercial high-rise buildings with a total design and construction value of over \$2.0 billion found 22 specific causes of time overrun. Weather, industrial disputes, client scope changes and variations, and consultant problems were some of the causes occurring with the highest frequency.

There has been considerable and continued interest in the effects of construction delay. The information available is diverse and widespread. Despite the necessity for such research, little work has been described in the literature concerning public projects. The previously identified factors contributing to construction delay were frequently observed in public projects. The actual frequency and magnitude of these factors is not known, which has proven to be a serious and very expensive problem for the construction industry.

### 1.3 Methodology

The preliminary data for this research were collected through a literature review and the use of a questionnaire survey targeted at contractors in Kuwait. The literature review was conducted through books, conference proceedings, the Internet, and leading construction management and engineering journals. In this step, all the causes for delay that may be encountered in a construction project were identified. The causes of delay were then classified into five broad categories (design-related, construction-related, financial/economic, management/administrative and code-related) depending on their nature and mode of occurrence. The data collected through the questionnaire survey were analyzed, and recommendations are made to mitigate the delays.

Furthermore, for analysis and establishing causes for claims, a study made by Al-Sabah et al [12] of the arbitration tribunal awards and project records of eight completed major construction projects constructed in the 1980s, held in Kuwaiti Ministries, is included. They accessed and analyzed these records and found that the awards to the contractors amounted to KD31 million, while the contract process was approximately KD100 million.

Analysis of the tribunal findings allowed categorization of the claims according to various elements related to owners' and engineers' activities. All claims were classified based on causes of claims, including project delays, formal variation orders, defective specifications and drawings, constructive variation orders, variations in estimated quantities, differing site conditions, limited site access, and indirect damages.

**1.4 Results**

The survey was distributed among major contracting firms that have completed major governmental building projects in Kuwait. The response rate is shown in Table 1.

**Table 1.** Response Rate

Questionnaires Sent	By Regular Mail	Via Internet	Total
No. of Participants	19	23	42
No. of Participants Responded	9	3	12
Response Rate	47 %	13 %	29 %

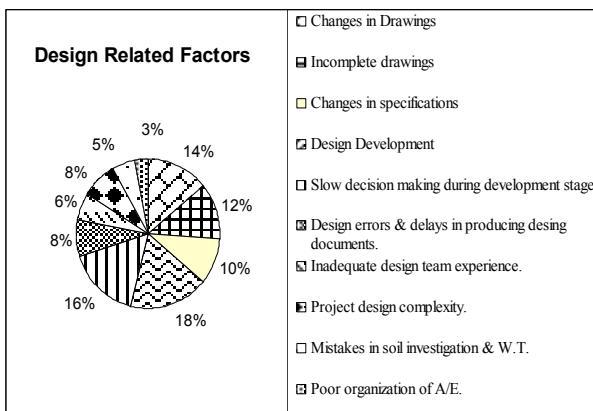
The key causes of delay are analyzed based on the questionnaire survey. Depending on their chance of occurrence, the key delays are ranked from the highest to the lowest level in each of five categories, as shown in Figures 1, 3, 5, 7 and 9.

The identification of responsibilities and types of delay, as found from the questionnaire survey, are shown in Figures 2, 4, 6, 8 and 10. Responsibility was rated among the parties that may be involved on a construction project, starting from the Owner, Contractor, Consultant, and Government to Shared (Owner-Contractor, Owner-Consultant, etc). The types of delay are classified as:

- Non-excusable: construction company gets no time or money and pays liquidated damages,
- Excusable Non-Compensable construction company gets time, but no money,
- Excusable Compensable: construction company gets both time and money,
- Concurrent: Construction Company will not get either time or money and no liquidated damages will be applied.

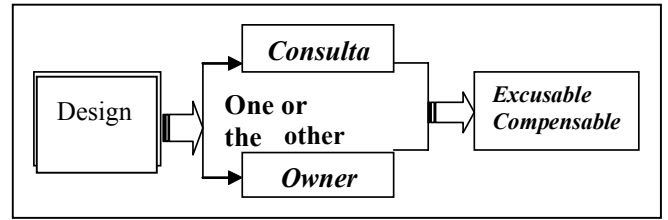
**1.4.1 Design-Related Delay:**

This is one of the most critical categories among the five delay categories because all of the causes were



**Figure 1.** Ranking of design-related key delays

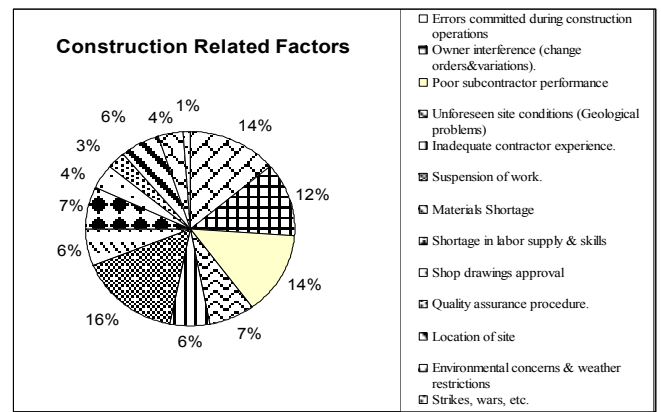
identified as key delays, which means that a delay is most likely to happen due to a design-related problem. According to the survey, design-related delays are considered to be excusable compensable delays.



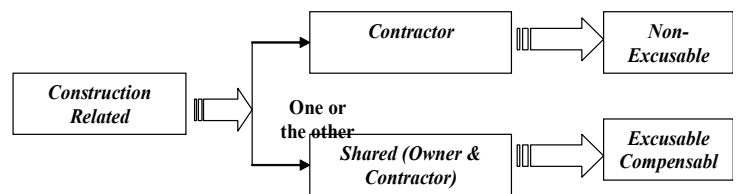
**Figure 2.** Flow diagram for responsibility of design-related delays

**1.4.2 Construction-Related Delay:**

Basically in the construction stage, the contractor will always have the responsibility and the construction company will get no time or money if a delay occurs. Delays due to lack of inspections are the most common in this stage.



**Figure 3.** Ranking of construction-related key delays



**Figure 4.** Flow diagram for construction-related delays

**1.4.3 Financial/Economic-Related Delay:**

Delayed payments were selected as the only key delay. According to the results, it appears that delays rarely occur because of Financial/Economic reasons. The Owner of the project will always have the responsibility, which means that the delay will be excusable compensable.

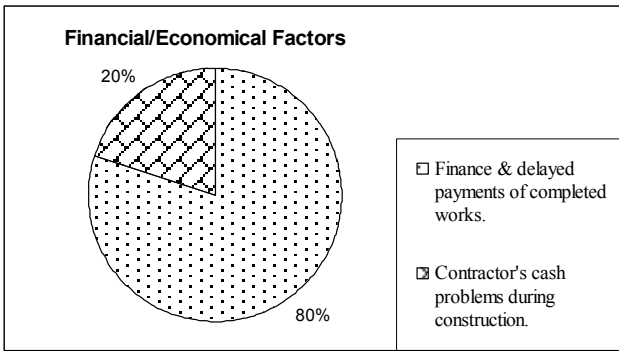


Figure 5. Ranking of financial/economic key delays

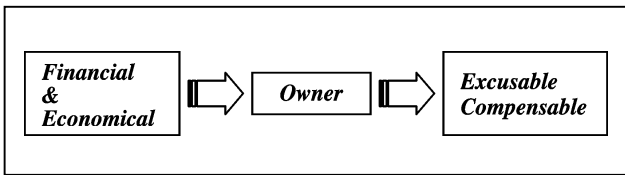


Figure 6. Flow diagram for financial/economic-related delay

**1.4.4 Management/Administrative-Related Delay:**

Similar to the previous category (Financial/Economic), this also has just one key delay: Contract Modifications. However, there are two parties involved (Owner and contractor) that have to bear the responsibility depending on the cause of the delay and the type of delay is also dependent on what caused the delay. Figure 8 classifies the type and responsibility of Management/Administrative-related delay.

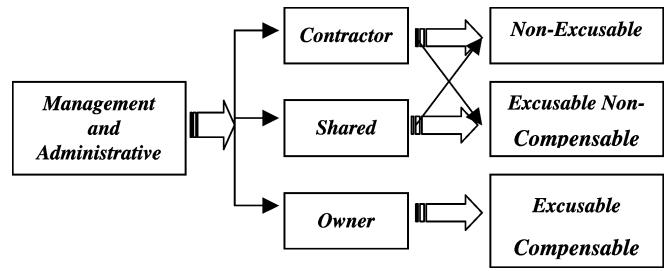


Figure 8. Flow diagram for management/administrative Related Delays

**1.4.5 Regulations and Code-Related Key Delays:**

This is the category that has the most influence on delay, especially on projects built in coastal areas. Very often, the Government is responsible and, in this case, the delays are considered excusable compensable. However, there is a small chance that the Contractor will be responsible, in which case the delay is non-compensable. Figure 10 classifies the type and responsibility of code-related delay.

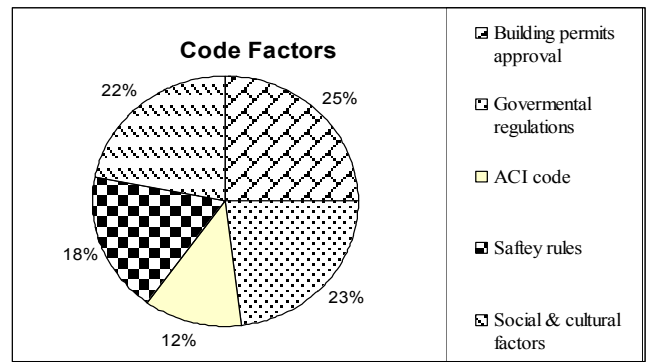


Figure 9. Ranking of code-related key delays

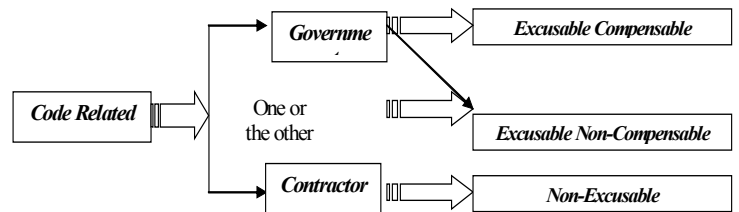


Figure 10. Flow diagram for code-related delays

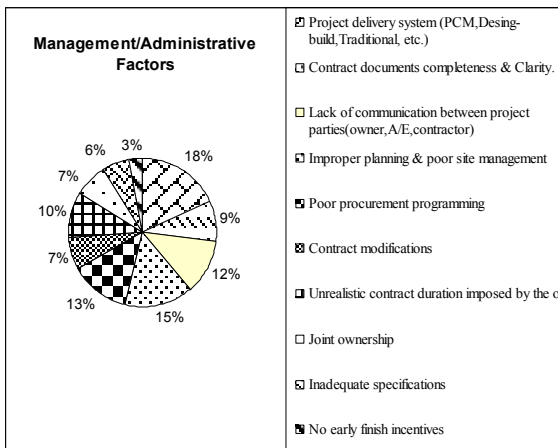


Figure 7. Ranking of management/administrative key delays

**1.4.6 Cost of Construction delays.**

Table 2 shows that the main cause of claims was project delays, close to 50 per cent. The second most important cause was variation orders, close to 20 per cent. Most of the delays were due to variations; therefore, if the variations and delays are taken together, they represent 70 percent of the value of the claims. This shows how critical it is to focus on delays and to address them in a timely and comprehensive way.

**Table 2.** Total award amount for each claim cause

Claim cause	Total award amount	Percentage of the total award amount
Project Delays	KD 15.3 m	48.9 %
Formal Variation Orders	KD 4.8 m	15.5%
Indirect Damages	KD 4.6 m	14.6 %
Defective Specifications and Drawings	KD 3.2 m	10.2 %
Constructive Variation Orders	KD 2.2 m	6.9%
Variations in Estimated Quantities	KD 1.2 m	3.8 %
Differing Site Conditions	KD 33.6 K	0.1 %
Limited Site Access	KD 10.0 K	0.0 %
<b>TOTAL AWARD AMOUNT</b>	<b>KD 31.4 m</b>	

## 2. CIVIL LAW CLAUSES RELATED TO DELAY ISSUES

The Kuwaiti civil code address the Compensation in Lieu of Performance in the following articles:

### ARTICLE 300.

(1) Where the damages have not been determined in the contract or in a provision of the law, the court shall do so.

(2) Damages include the loss suffered by, and the lost profit of the creditor, provided that the same was a natural result to non-performance or delay in performance of the obligation; harm is deemed to be a natural result if the creditor was incapable of avoiding it by making a reasonable effort.

(3) Where, however, the obligation originated (stemmed) from the contract, the debtor who has not committed fraud or gross fault shall be liable only to damages for the harm which normally could have been foreseen at the time of entering into the contract.

### ARTICLE 303.

Damages fixed by agreement shall not accrue if the debtor establishes that the creditor did not suffer any harm; the court may reduce the amount of such damages if the debtor establishes that the estimation was grossly exaggerated or that the principal obligation has been performed partially; any agreement violating the foregoing provisions shall be null and void.

### ARTICLE 304.

Where the harm exceeds the value of damages fixed by agreement the creditor may not claim more than the said amount save where he has proved that the debtor had committed fraud or gross fault.

According to slow articles the employer has to protect himself against a damages a main contractor to a main contractor and high overhead of the contractors during delay caused by the owner. By using the following clauses.

## 3. DAMAGE ASSESSMENT

In absence of evidence to prove the actual damages, the courts in the Arab area use the following formulae to ascertain the estimated costs which needs to be compensated to the Contractor due to project delays caused by the owner's responsibility.

$$\text{Estimated costs due to delay} = \frac{(\text{TPC} - \text{CM}) \times \text{DD}}{\text{PO}} + \text{I}$$

where

TPC = Total Project Cost

CM = Cost of Materials

PO = Project period in days

DD= Project Delay in days

I= Interest calculated by applying appropriate rate, (Fixed by the Central bank of Kuwait) from the date of filling the statement in Court. It shall be noted that the maximum interest payable is equal to the award value and in no case will be exceeded.

Example:

For a project with total cost (TPC) is KD 6 million and the Cost of materials (CM) is KD 3 million and original project period is 600 days and with a delay assessed under the responsibility of the owner: is 400 days

$$\text{The Estimated costs due to delay} = \frac{(6 \text{ million} - 3 \text{ million}) \times 400}{600} = 2 \text{ million}$$

## 4. CONCLUSIONS

There is a significant delay problem in construction projects in Kuwait, especially in governmental projects. Most governmental projects exceed their completion time by 100%, in addition to exceeding their budget. This study focuses on the critical problem of delay in the construction of governmental building projects.

For the eight major Kuwaiti construction projects analyzed [12], arbitration tribunals awarded total claims of KD31 million on the then contract price of approximately KD100 million, at 1980 prices. This 31% averaged over the eight projects represents a significant amount. The results show that 50 percent of the value of the claims was due to delays, 20 percent to variations, and 15 percent to defective specifications, drawings and variations in estimated quantities. This leads to the conclusion that contract documents were far from complete at formation of the lump sum contracts in many instances, thus projects were tendered prematurely without the necessary construction documents being sufficiently detailed to reflect the full scope of work.

In today's competitive market, an owner wants to make sure that his/her project will finish on or near the expected completion time. Unnecessary delay results in extra direct and indirect costs, loss of potential revenues, claims and counter-claims, lengthy litigation, and unavailability of the facility for use on time. Based on the results of the questionnaire survey and information gathered from the literature review, the following conclusions can be drawn.

In general, the ten most critical causes of delay (across the

five sub-headings given above) are:

1. Building Permit Approval
2. Change Orders
3. Changes in Drawings
4. Incomplete Documents
5. Inspections
6. Changes in Specifications
7. Decisions during Development State
8. Shop Development
9. Changes in Laws and Regulations

Based on the overall results of this study, it is concluded that the following is the ranking of responsibilities of the contractual parties from the most responsible (1) to the least (5):

1. Contractor
2. Owner
3. Government
4. Shared
5. Consultant

In most cases it is found that, when the contractor has the responsibility, the type of delay is Non-Excusable; when the owner or government or consultant has the responsibility, it is an Excusable Compensable delay.

Consultants play a very important role in design-related delay because they are in charge of the design process in conjunction with the owner of the project. On the other hand, the government plays the most important role in code-related delay, while the contractor has the major responsibility in construction-related delay.

Delay due to financial/economic causes, as well as management/administrative causes share an intermediate position of importance, just presenting one key delay: Delayed Payments. These categories do not have the same negative impact on project completion times as other factors considered in this study, such as code-, design- and construction-related issues.

Based on the findings of this study, it is recommended that the Buildings Permit Approval Process be streamlined as much as possible, and changes in Laws and Regulations be made keeping in mind the negative impact they cause in terms of construction project cost and time. Design-related issues such as changes in drawings, and incomplete and faulty specifications and change orders have a very damaging effect on project completion times and invariably lead to cost escalations as well. These are issues that can be controlled with proper design process management and timely decision-making. It is a well-known fact that decisions made early in the life of a project have the most profound effect on the project's objectives of delivering a safe, quality project within the time and budget allocated.

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