

Minimizing Construction Disputes

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Abstract

The continuing incidence of costly disputes in the construction industry has led to a common interest of researchers in different countries to identify the generic aspects of conflicts, claims, disputes and their resolution. This thesis undertakes an extensive review of literature in the field of construction disputes examining the current understanding of the causes of disputes, as identified by other researchers in the field, and attempts made to minimize them. An analysis of the literature helps identify important themes for particular investigation: procurement methods, risk allocation, claims management and dispute resolution methods.

A preliminary examination of 20 projects in Lebanon confirmed the existence and revealed the extent of disputes on Lebanese projects. Twenty-four semi-structured interviews with practitioners actively involved in construction projects in Lebanon at the project management level are conducted, from which a set of dispute influencing areas emerge. Fifty cases of disputes occurring on four live case study projects in Lebanon are also analysed to examine the risk allocation and occurrence, the behavioural attitudes of key stakeholders, and the factors which lead to disputes between the parties. The findings demonstrate the relationship between those risks which are addressed in the contract and their interaction (when they eventuate) with the behavioural traits of the project participants involved. Furthermore, the dispute factors encountered in these fifty cases are categorized into dispute influencing areas to establish any correlation with the areas raised in the twenty-four interviews. Following comparison of the evidence gained from the literature, the interviews and the case studies, a set of provisional recommendations to minimize disputes is proposed and organized under three themes: a pre-contract award workshop; the drafting of general and particular conditions of contract; and the potential for improvement based behavioural on compliance of project participants. The validity of the provisional recommendations is tested by the reviews of five experts in the field of construction disputes, in accordance with which the recommendations are amended.

List of Abbreviations

AAN	Submittal Approved As Noted
ADR	Amicable Dispute Resolution
AHP	Analytic Hierarchy Process
ANR	Submittal Approved As Noted Resubmit
APP	Submittal Approved
BOQ	Bills of Quantities
CBR	Case Based Reasoning
CBT	Computer Based Training
CE	Concurrent Engineering
CIArb	Chartered Institute of Arbitrators
CIOB	Chartered Institute of Builders
CPAS	Case-Based Procurement Advisory System
CPIF	Cost Plus Incentive Fee
CPSS	Construction Project Success Survey
DAB	Dispute Adjudication Board
DAB	Dispute Adjudication Board
DEB	Dispute Resolution Board
DOI	Degree of Interaction
DRA	Dispute Resolution Advisor system
DSS	Decision Support System
EC	Engineering Contractor
EDL	Electricite Du Liban
EOT	Extension of Time)
EPC	Engineering, Procurement and Construction
EPCI	Engineering, Procurement, Construction, Installation
EPCM	Engineering, Procurement and Construction Management
ER	Employer Representative
ERA	Estimating using Risk Analysis

FBP	Final and Binding Power
FIR	Field Inspection Request
MOU	Memorandum of Understanding
NA	Submittal Not Approved
NEDO	National Economic Development Office
NPD	Notification of Possible Delay
NPV	Notification of Possible Variation
OCP	Overall Contractors Performance
PFI	Private Finance Initiative
PM	Project Manager
PMI	Project Management Institute
PPP	Public/Private Partnership
PPSM	Project Procurement System Selection Model
PRAM	Project Risk Analysis and Management technique
RICS	Royal Institute of Chartered Surveyors
RFI	Request for Information

CHAPTER 1: INTRODUCTION

1.1 Introduction

The continuing incidence of costly disputes in the construction industry has led to a common interest amongst researchers in different countries to identify the generic aspects of conflicts, claims, disputes and their resolution (Kumaraswamy, 1998). Construction of new facilities necessitates two parties (hereafter referred to as the Employer and the Contractor) to enter into an agreement. Each party normally expects to receive benefits and perform obligations. The Employer aims to achieve a quality project on time at a fair price. The contractor aims to deliver a quality project on time at a fair price. However, when unanticipated changes are required, often the consequences thereof are not clearly and timeously communicated by each party to the other. As a result, misunderstanding occurs and this leads to a claim and in some cases a dispute (Epling, 1987).

Unlike other types of industries where the development and manufacture of a product can be standardised and tested before being purchased, the nature of projects in the construction industry is extremely diverse. Every project is unique. Even where identical buildings are under construction, the site conditions in each differ and introduce new challenges. Moreover, it is a multi-party process where numerous specialised parties are involved due to the range of skills required. Thus maintaining a teamwork atmosphere and controlling potential conflicts is important. In addition, construction projects normally span for a long period between a decision to invest and completion of works. This leads to instability of supply and demand and a high sensitivity to economic fluctuation (Wood, 2001).

To better understand the causes of disputes in construction industry, a literature review is useful to examine research done in the areas of conflicts, claims, disputes, project success criteria, risks involved in construction projects, procurement techniques and dispute resolution strategies.

1.2 Research Question

Disputes have a direct economic impact on the construction industry. The problem of disputes is international in nature and disputes continue to occur. The literature reveals abundant research pertaining to different aspects of the problem and proposes preventive and remedial measures at the different stages of the construction project. Still the construction industry suffers from cost overruns due to disputes that jeopardize the success of the project procurement and construction. There is a need recognized by several different authors to identify the generic causes of disputes. Questions to be examined are:

1. What is the impact of risk allocation in contributing to the incidence of disputes on construction projects?
2. What is the significance of project management / contract administration in helping to mitigate claims and minimize construction disputes?
3. How does the behavioural attitude of the parties involved in projects affect dispute avoidance, management and/or escalation?

1.3 Research Aim

The aims of this research are to examine the causes of common disputes in the Lebanese construction industry; to identify possible relationships within and between the risk allocation strategies adopted during the procurement of the construction works, contract administration and the behavioural attitude of the parties; and to propose recommendations for improving practice.

1.4 Research Objectives

The research objectives are set as follows:

- Identify and map the interrelated factors causing disputes based on literature and previous research.
- Examine common practices in contract administration and claims management in Lebanon mainly focusing on the procurement trends, forms of Contract used, and risk allocation strategies.

- Gather and analyse data on the nature, incidence and frequency of disputes in the Lebanese construction industry
- Use the processed data to address the importance of sound contract conditions administered by experienced and knowledgeable practitioners and the likely impact on the minimization of disputes.
- Make educative recommendations for academics and practitioners

1.5 Research Methodology

The research methodology used to attain the objectives mentioned above can be summarized as follows:

- Perform an exhaustive literature review in the area of disputes that will include examining areas of risks, conflicts, claims, procurement methods, dispute resolution methods and the impact of behavioural factors.
- Carry out a pilot study on 20 major projects in Lebanon during the recent years to study the claims and the resulting time and cost overruns.
- Conduct semi-structured interviews with 24 participants where questions are raised to discuss different aspects that lead to dispute.
- Examine 50 dispute cases in-depth on 4 projects to identify the risks that have eventuated and the dispute factors that have emerged.
- Use the results from the case studies and the interviews will be used to reveal the common practice in drafting of contracts, the behavioral attitude of practitioners in contract administration along together with their knowledge of the area of dispute prevention and minimization.
- Analyze data collected by way of comparison of findings.
- Propose recommendation for minimizing disputes and gather feedback from 5 experts on their likely success.

1.6 Research Contribution

This study intends to make the following contributions to knowledge:

- It provides data on the common practices in procurement and dispute resolution in Lebanon as well as the nature, incidence and frequency of disputes.

- Results can be used as an educative tool to inform practitioners of specific recommendations for actions which are likely to help minimizing disputes on construction projects.

1.7 Organisation of Thesis

The thesis is divided into 9 chapters, the first of which is the introduction and the last is the summary along with the research limitation and the future research. The remaining 7 are divided as follows:

- Chapter 2 reviews the literature related to dispute causes including the study of risks, conflicts, claims, procurement methods, and behavioural aspects.
- Chapter 3 explores research methodology. It starts with examining how qualitative research developed. The full spectrum from subjectivist to objectivist approaches is presented and the ontology, epistemology and methodology of each of the four scientific paradigms: positivism, critical theory, constructivism and realism are described. The chapter then examines guidelines for case studies, interviews, analysis procedure where selection criteria and limitations of the case study approach are pointed out. Based on those guidelines, the research methodology stages are presented.
- Chapter 4 consists of a preliminary study conducted on 20 construction projects in Lebanon. Analysis of data collected in the preliminary study is undertaken to examine the extent of disputes and the disputed matters.
- Chapter 5 carries out interviews with 24 practitioners in the industry equally divided between Engineers and Contractors to provide an in-depth understanding of the dispute factors.
- Chapter 6 examines 50 dispute cases on 4 projects. Each of the 50 disputes is studied through listing the chronology of events that gave rise to the dispute. It then analyses those events to identify the resulting risks that eventuated, the behavioural attitude of participants and the dispute factors.
- Chapter 7 provides further context through a discussion of the contract clauses (under the FIDIC Red Book 4th Edition) identified in the interviews and case studies.

- Chapter 8 compares the findings/data collected from the literature, the interviews and the case studies in order to draw conclusions for each of the sixteen dispute influencing areas identified.
- Chapter 9 proposes recommendations to reduce the negative impact of disputes based on the conclusions drawn in Chapter 8. The veracity of these recommendations is tested through the critical assessment of three (is it 3 or 5???) expert opinions.
- Chapter 10 presents a summary of the thesis revisiting research criteria and the aims and objectives. It also describes the research limitations and proposes related future research areas.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter examines the literature related to disputes to differentiate between disputes and conflicts, understand the dispute causes and factors and propose remedial and avoidance methods. This has led to the study of the interrelated areas of risk, procurement practices, and the behavioural aspect of participants to understand their impact on dispute emergence.

2.2. Disputes

There have been numerous attempts towards dispute avoidance and minimization and as such there is considerable literature on the subject. In the UK this includes reports through initiatives made by a number of public and private bodies and research carried out by individual authors. From the Simon Report in 1944 to the Latham Report in 1994, several reports included research into construction disputes, as follows:

- The Banwell Report in 1964: The Banwell committee addressed matters with great brevity. It received 119 responses to the questionnaire and focused mainly on payment problems and the use of common form contracts.
- The Tavistock Institute in 1966 focused on the impact that human relationships had on the problems that were being encountered and on the importance of the client at the heart of the building process. However, it was theoretical in nature and not followed up by further research.
- The NEDO Report in 1975 considered relationships between the public sector and the construction industry. The contractual concerns examined were: inadequate preparation of documents, use of inappropriate contract forms, excessive variations, underpayment and delay in settling claims. NEDO sent over 300 questionnaires to public sector organisations relating to more than 2,000 contracts and then conducted 50 case studies.
- Building towards 2001 Report in 1989 was produced by the Centre for Strategic Studies in Construction. It was based on discussion groups drawn from the construction industry. The recommendations were generalised focusing on

contractual obligations linking all the parties together and the allocation of specific obligations to each member of the project

- The Latham Report in 1994 was based on the interpretations of the cross section of the industry through a series of discussions and debates. The findings reveal the insufficiency of trust and resources throughout the industry and further sheds light on the fact that many of the industry problems could be solved by either.

A summary of recommendations given in these and other reports by Wood (2001) is shown in Table 1.

Table 1 Recommendation for changes in the construction industry analysis (Wood, 2001)

	Culture	Process	Organisation
Simon (1944)		Tendering process	
Banwell (1964)		Contractual changes	
Tavistock (1966)	Co-operation Trust	Client centred Tendering process	Change pattern of relationships
NEDO (1975)		Tendering process Contractual changes	
Building Towards 2001 (1989)	Co-operation	Client centred Contractual changes Research and development	Recognize distinct phases of concept and delivery Change organisation
Latham (1994)	Co-operation Trust Fair dealing	Client centred Contractual changes Tendering process Research and development	Integrate design and construction Partnering
Atkin & Flanagan (1995)	Co-operation Transparency & trust Problem avoidance	Value management Better briefing Risk analysis	Partnering
National Power (1995)	Co-operation	Contractual changes	
Egan (1998)	Co-operation Quality driven Commitment to people	Client centred Integrated project process Research & development Staff development	Partnering & supply chain management Long term perspective Benchmarking and performance measurement Lean thinking Standardisation

2.2.1. Definition of Dispute

The definition of dispute is a matter 'in dispute'. Some authors refer to disputes as a simple disagreement, other refer to disputes as the consequence of rejecting a claim (Kumarasawamy, 1997). According to Ren *et al.* (2001) disputes result from the poor resolution of claims. The authors attribute the increased amount of disputes to social,

industrial and project factors. Diekmann and Girard (1995) define disputes in general terms as “any contract question or controversy that must be settled beyond the jobsite management staff”.

From a legal point of view conflict is considered to be behavioural whereas disputes are considered to be justiciable. The legality of disputes i.e. whether there is a dispute in the adjudication context, has been treated differently by different schools of thought. Where one party considers that the existence of a dispute is relevant to whether the contract provides for it, another school of thought considers that a claim made and not admitted is sufficient for the crystallization of a dispute. A third party shows reluctance from allowing disputes to be a tool by one party to commence dispute resolution prematurely (Lowe and Leiringer, 2006).

Put in simple terms, the dispute is considered to be as defined in rule 1 of the ICE Arbitration Procedure: ‘when a claim or assertion made by one party is rejected by the other party and that rejection is not accepted’ (Eggleston, 1993; Kumaraswamy, 1997; Bunni, 2005). Accordingly there has to be a claim, a rejection and a non-acceptance of the rejection. It is not considered to exist on the basis of a claim alone (Bunni, 2005).

2.2.2. Conflicts as opposed to Disputes

Disputes are often precursors of conflicts. As such several studies have aimed at the clarification of terminology between conflicts and disputes. A listing of the research in this area is shown in what follows:

Conflicts are unavoidable in the organizational life, have positive aspects in commercial risk taking, and are resolved by non binding resolution methods. Disputes on the other hand are avoidable, and may be resolved by binding or nonbinding resolution methods (Fenn *et al.*, 1997; Kumaraswamy, 1997). Kumaraswamy (1997) identifies the common root causes and the proximate causes and confirms the need of further studies to isolate the real root causes of avoidable claims and disputes. A list of the root causes and the proximate causes is shown in Figure 1.

Figure 2 shows an indication of how constructive conflicts can be channelled into improvements while less constructive conflicts may lead to disputes; conflicting

interpretations of contractual documents on instructions could also result in claims (Kumarasawamy, 1998).

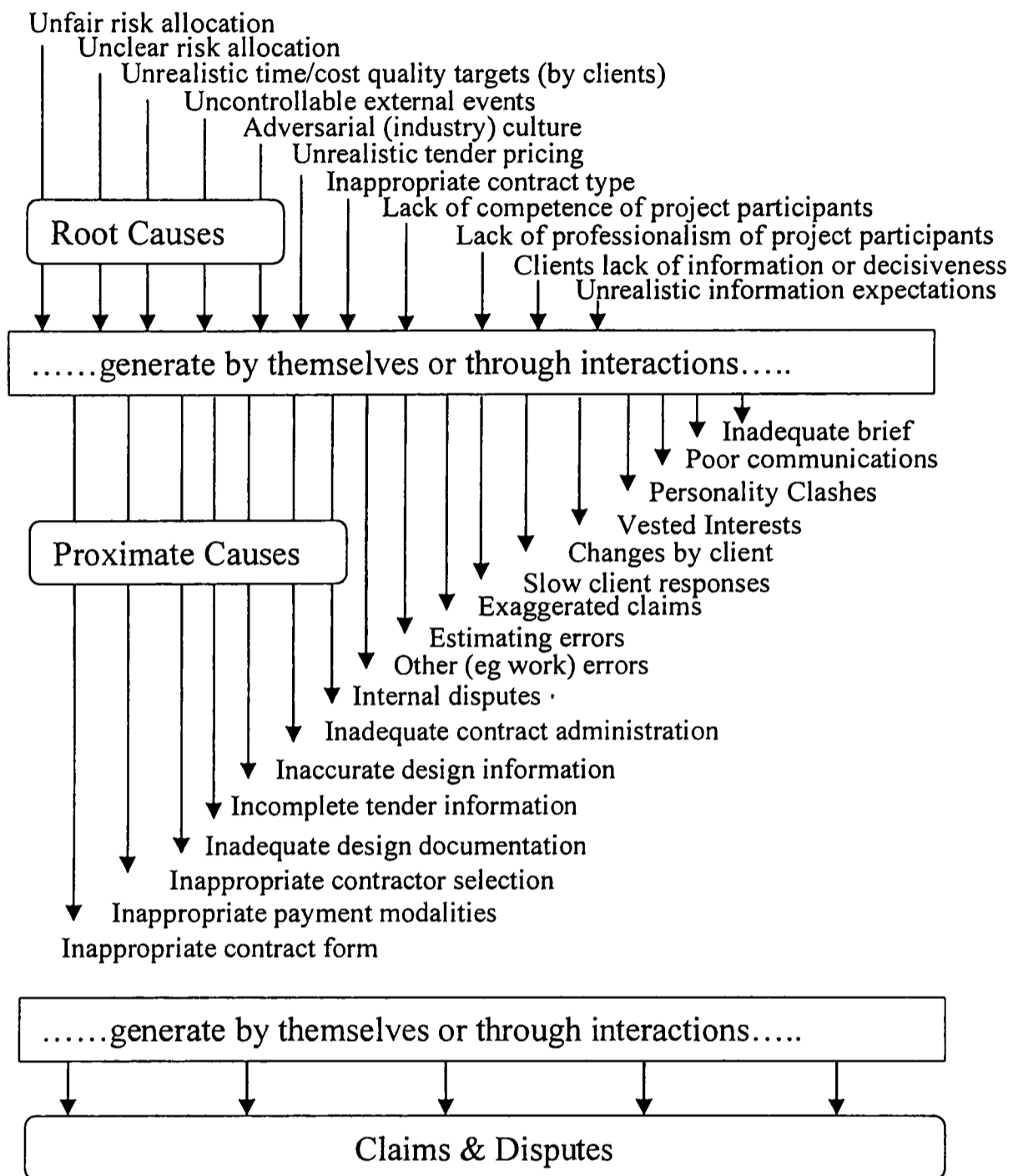


Figure 1 Root Causes and Proximate Causes by Kumaraswamy (1997)

Early conflict theory including that of Follet (1925) viewed conflict as a negative thing that should be avoided through conflict management. The recommended method of conflict management was integration (win-win situation) where each side refocuses its effort so that neither side loses (Lowe and Leiringer, 2006).

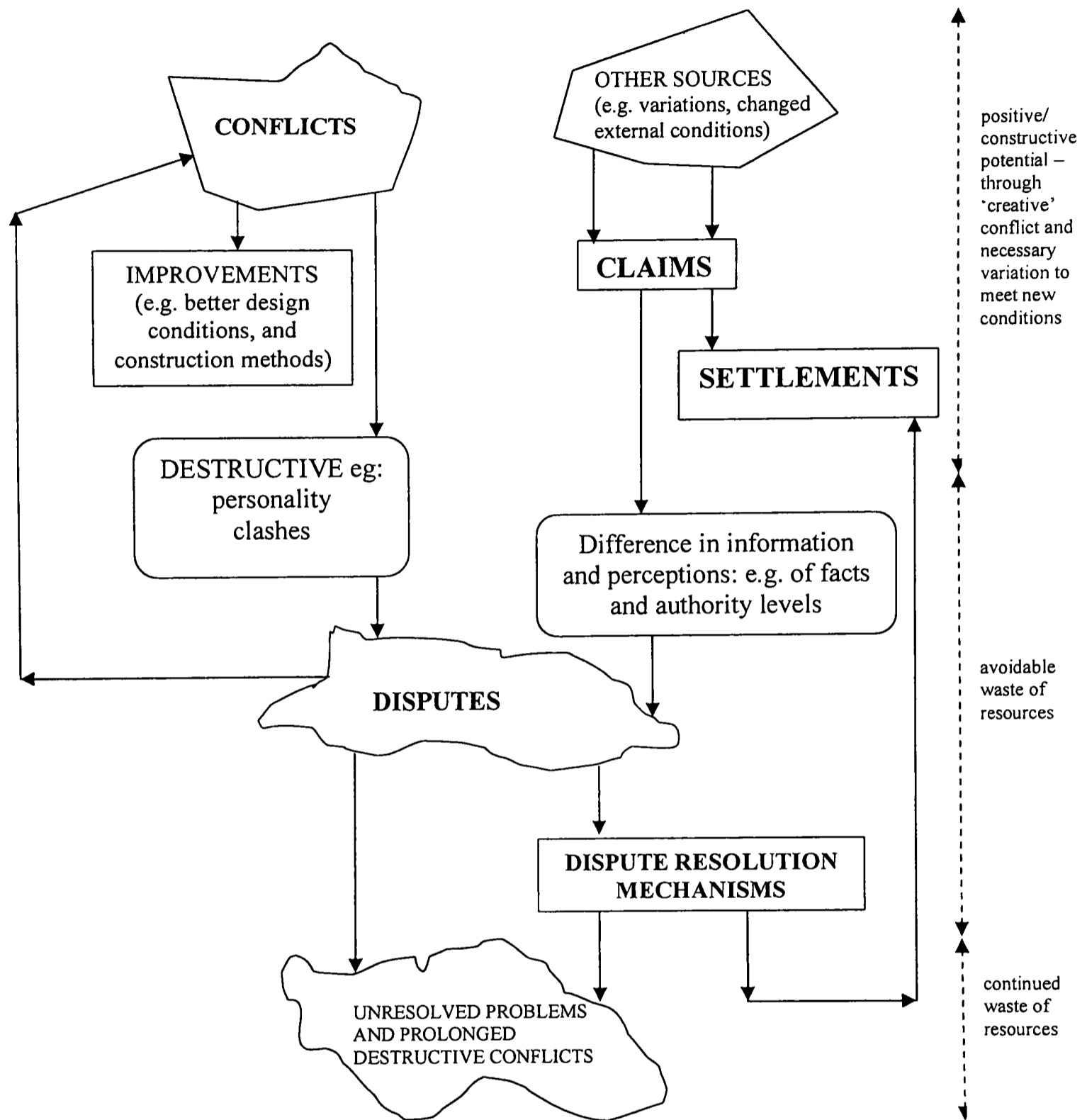


Figure 2 Concepts and Causal linkage of conflicts and disputes (Kumarasawamy, 1998)

Disputes are seen to develop when conflicts are not managed. The sooner the destructive conflict is resolved the higher the percentage of resolution success and the lower the cost (Harmon, 2003).

As such there is a common consensus among the authors discussed above that conflicts can be constructive or destructive. Accordingly, constructive conflicts should be encouraged whereas destructive conflicts that lead to disputes should be avoided.

2.2.3. Dispute Causes and Factors

To be able to prevent disputes one should be able to identify/predict the causes and factors. Fenn (2006) conducted an exhaustive study of previous research into or on causes of disputes. A chronological listing of his findings is shown in Appendix A. Similarly a chronological listing of other research on sources of dispute is examined in Appendix B. The listing includes empirical studies conducted by authors in USA, UK, Australia, Canada, Taiwan, Saudi Arabia, Hong Kong, Taiwan, China and Nigeria along with other theoretical studies. The depth and extent of research conducted by those authors differs. The most extensive research is that conducted by Kumaraswamy (1998) and Fenn (1997). It can be noticed that the naming of the categorisation in identifying the problem differs between: areas of dispute, factors in development of disputes, common contributing factors in claims, sources of disputes, major sources of disputes, heads of claims, primary causes of claims. In some cases, similarities in the specified areas are noticed. For example poor communication is identified as a factor in the development of disputes by Rhys Jones (1994); it is also identified as primary cause of claim by Bristow and Vasilopoulous (1995). Also, it is noticed that some like Diekmann *et al.* (1994) made general categorisation of people, process and project. Others like Watts and Scrivener (1994) defined 290 sources of disputes.

Fenn (1997) concludes that there is a need for research that would investigate the causes of general disputes. Kumaraswamy (1998) again emphasized the need for a deeper analysis of the causal linkage between conflicts, claims and disputes. Identifying common causes and consequences of unresolved conflicts and claims would allow for more effective dispute avoidance as well as more efficient resolution of 'unavoided and unavoidable disputes' (Kumaraswamy, 1998). In spite of abundant research in the area, the continuing emergence of costly disputes corroborates that further studies are needed to identify the causes of these disputes. The following section will examine research made in claims management.

2.2.4. Claims Management

Claims are defined in the Canadian Dictionary as ‘an assertion of the right to remedy, relief or property’ (Semple *et al.*, 1994; Kumaraswamy, 1997). Claims are raised usually for the assertions for extra money or time ‘based on the contract itself, a breach of contract, a breach of some other common law duty, a quasi-contractual assertion for reasonable (quantum merit) compensation, or an *ex-gratia* settlement request’. Due to the designer’s explicable inability to provide for all project’s eventualities, changes will be made to the project and where they involve additional work this will necessitate an assessment of the time and cost resulting (Harris and Scott, 2001). As such some construction claims are unavoidable and even necessary to contractually accommodate unforeseen changes (Kumaraswamy, 1997).

Semple *et al.* (1994) describe claims as the right of any party to the contract to request for compensation of damages incurred. The authors further suggest the following preventive measures that can help minimize risk and mitigate the causes of claims:

- to allow reasonable time for completing the design, drawings and specifications
- to adopt value engineering and implement constructability
- to set an efficient mechanism for processing and evaluating change orders
- to use critical path method scheduling, cost control and productivity analysis

Claim management is applied at the preconstruction phase through using the standard construction contracts, risk theory and project procurement (Ren *et al.*, 2001).

In an attempt to provide better claim management practices Vidogah and Ndekugri (1998) conclude that there is insufficient emphasis on the importance of claims management practice and related information systems.

Other authors again stressed the need of a structured instrument that would allow monitoring of construction claim process (Kululanga *et al.*, 2001). They proposed the following:

- Claim identification that implies timely and accurate detection of factors that give rise to claims

- Claim notification through informing the other party of the potential increase of time and cost in a non-adversarial manner.
- Claim examination through establishing the legal and factual grounds on which the claim is based.
- Claim documentation through collection of sufficient evidence to defend the case
- Claim presentation through demonstrating the resulting harm by way of legal and factual basis and an estimated recovery
- Claim negotiation through expert skills for proving rights in negotiation
- Use of total quality management to prevent claims

Other authors presented a model developed into an automated decision tool which encompasses the general claim model along with an on-line help that educates the user to the significance of each stage through providing a library of relevant claim cases and court rulings (Abdul-Malak *et al.*, 2002).

The literature examined proposes claim management practices that would help minimise disputes. These vary between applying better contract administration, stressing the significance of behavioural attitudes, and better claims documentation and presentation.

2.2.5. Dispute Avoidance and Resolution

General factors affecting the efficiency in avoiding disputes are set by Henderson (1991) as: clarity of original bid documents, ability of the Contractor to plan and execute the job, recognition by the Employer that changed conditions exist and ability of the owner to respond in a timely manner. Henderson (1991) ascertains that the best way to cope with the risk of disputes is through avoiding them. Proposed preventive measures for avoiding disputes proposed include:

- use value engineering and peer review
- have bid documents checked for constructability, clarity and completeness
- avoid too many or too complex addenda
- evaluate job cost during the design process using a professional estimator
- provide and use adequate CPM scheduling and update requirements

- provide adequate tracing mechanisms for requests for information , substitution requests and change order proposals
- review the A/E's specifications whether they represent your project requirements
- allow a reasonable time for designing the project and for bidding
- require that the contractor's bid documents be placed in escrow
- promote open and factual communication

Based on experience the author proposes minimizing disputes through using negotiation as a tool to identify the changes on the job and resolve them at the site personnel level and where necessary by top managers (Henderson, 1991). If resolved through negotiations this results in a change order or a modification. Otherwise it will become a dispute that is resolved through a dispute resolution method such as arbitration, mediation or litigation (Arditi and Patel, 1989).

Betant *et al.* (1995) again proposes general project requirements similar to that of Henderson (1991) that if fulfilled will help in reducing disputes in major projects. Unlike Betant *et al.* (1995) whose work addressed requirements during contract preparation, Henderson (1991) focussed on recommendations applicable in the procurement contract and executions of the works:

- Checking the contractor's tender sum for possible errors or underestimation of certain items that might be ambiguous.
- Drafting clear tender documents minimizing errors and ambiguities preferably using General Conditions of Contract that have sufficient interpretation.
- Clearly identifying Risk areas and discussing the allocation of risk provisions with the Contractor.
- Minimizing on the number of change orders resulting from design changes.
- Where changes are inevitable, these changes shall be discussed with the Contractor and the cost impact of which agreed to before order is issued.
- Interface with other Contractors should be avoided.
- Minimizing disputes through negotiating reasonable claims in good faith.

Spalj (2005) examines dispute avoidance for the Contractor's side based on his experience in the construction industry. He states that disputes become easy to resolve through anticipating, preparing and laying the grounds for resolution before

they occur. The author proposes dispute avoidance measures advised to Contractors at the different stages of construction.

- Before bidding and negotiating the contract, the author proposes investigating subsurface conditions, project site accessibility, weather and keeping records of all investigations.
- Before signing the contract the Contractor is advised to read the contract carefully and pay particular attention to clauses that pertain to: incorporation by reference provisions, flow-down clauses, differing site condition clauses, indemnification clauses, no damage for delay clauses and change clauses.
- During the course of the works the contractor should impose a discipline on the project management team to maintain proper job documentation that would serve as evidence when a dispute arises.

As such the literature examined sheds the light on the importance of preparation of clear contract documents. The contract documents are critical for two main reasons, they define the obligations of each party and they are the documents based on which the Contractor prices. Wherever there is little doubt to the language the Contractor might use that to aggressively interpret that to his benefit more so in competitively bid projects where the contractor was a low bidder. The short period for pricing will further intensify this problem. The Contractor might make hurried assumptions while pricing, and if they are contrary to the designer's intent, the contractor will raise a dispute as the designer's interpretation might cause more time and money (Spittler *et al.*, 1992). In current practice the Contractor is often given a mass of documents that include information and data that may or may not be well coordinated and organized. The Contractors are thus expected to process these documents checking and analyzing the information and the data and raising any discrepancies or missing information in a relatively short period of time where the tender is expected to be 'intelligent but profitable' (Zack, 1996).

Jannadia *et al.* (2000) investigate techniques that can be incorporated in preparing construction contracts and results showed that there was a common desire among the parties to draft dispute resolution clauses provided they are better educated about the importance of 'fair risk allocation'.

Effective project management might be more successful than resorting to claim experts. Jannadia *et al.* (2000) conclude based on previous studies that waiting until the end of the project to resolve disputes makes the procedure more time and cost consuming. Epling (1987) proposes gathering the information that is necessary for assessing the effect of the delay or change while it is fresh. Hence, it is very important to monitor any time or cost overrun through planning, estimating, budgeting and scheduling. This will not stop major disputes from arising but will allow minimizing them (Epling, 1987).

Mitropoulos and Howell (2001) recommend preventing opportunistic behaviour. According to the authors in some cases perception of the other party as being opportunistic is more problematic than opportunistic behaviour itself. Vaaland (2004) on the other hand discusses a process for minimising conflict through enhancing the understanding of the other party's perception, stimulating openness, reducing relational uncertainty, and analysing problematic issues before escalating the tension. Risk allocation strategies, procurement practices and the behavioural aspect of project participants is further examined in the following sections.

2.3. Risks

Two categories of cost identified by Jergeas and Hartman (1996) that are intangible ie add no material value to the project works but result in additional cost are risk premiums that the contractor allows for in bidding and cost for dispute resolution. Therefore there is an interest to reducing these costs early on in the project.

Risk has been the center of attention in the construction industry because of its impact on both time and cost overrun. It is involved in all three phases of the project development cycle: the conceptual phase, the planning and design phase and the procurement and construction phase (Uher and Toakley, 1999; Chan and Kumaraswamy, 1997). The conceptual phase entails the highest degree of uncertainty where it directly impacts the final cost, and where risk management is recognised to have high significance (Uher and Toakley, 1999) This level of uncertainty decreases and is clarified as the project is further developed and detailed (Mak and Picken, 2000).

2.3.1. Definition of Risk

Many attempts have been made at providing a clear definition of the term risk as follows:

- “the possibility that human actions or events lead to consequences that have an impact on what humans value” (Renn, 1998).
- a variable in the process of a construction project whose variation affects the final cost, duration and quality of the project (Bufaied, 1987)
- “the probability of occurrence of some uncertain, unpredictable and even undesirable event(s) that would change the prospects for the profitability on a given investment.” (Kartam and Kartam, 2001).
- a combination that occurs when threat and vulnerability overlap (Akintoye and MacLeod, 1997).
- Unforeseen factors that would adversely affect the successful completion of the project in terms of time, cost and quality (Kartam and Kartam, 2001).

Risk is calculated as the probability or frequency of the occurrence of a defined event multiplied by the consequences of the occurrence of that event. Construction projects are sensitive to an extremely large matrix of hazards and risks due to some of the inherent characteristics of the construction project (Bunni, 2005). Risk assessment is the process of defining the components of risk at stake, calculating the probability of (un)wanted consequences and aggregating both components (Renn, 1998). Many attempts have been made to identify the risk associated with construction projects. These are presented in a chronological order in Appendix C.

Changes, claims and litigation are a consequence of the manifestation of risks. This explains the similarity in some cases between causes of risk described in this section and causes of disputes in section 2.1.3. Accordingly proper management of risk will contribute to avoiding potential disputes or at least resolving them more easily (Jergeas and Hartman, 1994).

Even when all types of risks are identified, assessing and allocating the risk to the parties as may best suit the project remains a major concern. Previous literature has ascertained that the risk should be transferred to the party that has the competence and expertise for best assessing, managing, controlling and minimizing this risk (Kartam and Kartam, 2001; Pickavance, 2000; Akintoye and MacLeod, 1997). Risk allocation may be achieved through any one or a combination of risk retention, risk transfer, risk reduction and risk avoidance (Akintoye and MacLeod, 1997). During contract procurement, there are conflicting interests between the Owner and the Contractor. The Contractor by nature aims at getting paid as high as possible incurring the least amount of risk possible. The owner on the other hand tends to pay as low as possible while transferring as much risk as possible to the other party. (Pickavance, 2000).

2.3.2. Risk Categories and Risk Types

Bunni (2003) refers to the Grove report that sets four criteria for allocation of risks:

- The fault standard: cost and time impacts of risk caused (or not avoided) through the faults of a party should be borne by that party.
- The foreseeability standard: He who is best able to foresee the risk is allocated that risk.
- The management standard: He who is best able to control and manage the risk is allocated that risk.
- The incentive standard: risks should be placed on that party most in need of incentive (presumably already with the ability) to prevent and control them.

Willingness of parties to bear risk is affected by their general preference for risk/return trade-off, perception of the risk involved, ability to bear the consequences, ability to mitigate and the need to obtain work. Clear perception of the risk involved is a must; otherwise the risk/return trade-off will not apply correctly. As the owner assigns most of the risk to the Contractor, this privilege is associated with an increase in contract price. Experienced owners will find it more cost effective to handle part of this risk. Pricing should be based on identification of the risk categories that can be quantified with sufficient certainty. In the absence of adequate time, contract price is set based on management experience and 'gut feeling' (Ward *et al.*, 1991).

2.3.3. Trends in Risk Allocation

Several studies have been conducted to determine the trends in risk allocation. A survey conducted by Ahmed et al. (1999) in Hong Kong reveals that the Contractor has more readiness to take risk than expected by the Owner.

Employers tend to be risk averse and attempt to transfer at least some of the risks to the Contractor by using disclaimer clauses. By doing so the Employers feel they are limiting their liability if risks that result in cost overrun occur. However, the General Contractor would reduce his exposure by apportioning the risk to the subcontractor who in turn will be adding premiums to cover the same. Hence, it is the Employer who will be paying for the risk premium (Jergeas and Hartman, 1996).

Yeo (1991) notes that there is a tendency to avoid contingency allocation in budget submissions as these contingencies are considered as “fats”. As such no allowance is made in anticipation of risk or error in estimation. These “fats” are normally avoided not to raise the project budget too high. But then again this increases the risk of facing a crisis situation during the execution of the work if any of these risks rise. Where the contingency are set correctly in the budget, this will allow for proper comparison at tender analysis and a better allocation for project value.

2.3.4. Risks in Procurement Practices

Jergeas and Hartman (1996) quote the American consulting Engineers Council and the Associated General Contractors of America in the “Owner’s Guide to Saving Money by Risk Allocation”

“What threatens the stability and financial security of the construction industry is not design but the problems of distribution of risk inherent in the construction process among the owner, the construction contractor, and the architect and engineer...The industry can not be healthy unless the risk are forthrightly recognized and acknowledged, and the various contracting parties assume under the contract, without ambiguity, their respective parts of the risk.”

A comprehensive risk analysis should be completed at contract procurement stage to clearly define a risk allocation strategy. This coupled with sharing of information about risk among different parties builds trust and allows for more efficient construction

management. In the cases where there is no transparent comprehensive risk analysis, the parties will not have a clear perception of the level of risk involved. This will have an impact on the contract value. Where the Contractor is knowledgeable of details of the risk involved, the corresponding uncertainty decreases and the Contractor's price for this risk decreases. Also, if the Contractor assumes a risk that was inaccurately judged or underestimated, he/she will try to recover the cost from the other party through claims. Then again, where a risk eventuates and the party bearing the risk realizes that this risk was evident to the other party and was not properly pointed out during contract negotiations an adverse relationship emerges (Ward *et al.*, 1991). Zaghoul and Hartman (2003) stress the relationship between trust and contracting methods and its contribution to effective project management and contract administration. As such, Jergeas and Hartman (1996) proposed adding a new contract clause that makes the Contractor's risk premium visible to the Owner.

2.3.5. Risk Management

Given the significance of risk as described above and its impact on the ability to complete the project successfully, construction practitioners have raised awareness to the importance of risk management (Akintoye and MacLeod, 1997).

Risk management can be defined as "minimizing, controlling, and sharing risks and not merely passing them off onto another party". Risk management can be achieved through retention, transfer, mitigation, and prevention of risk or any combination thereof (Kartam and Kartam, 2001).

Two kinds of management actions defined in the literature by Shen (1997) are preventive actions and remedial actions as shown in Table 2.

Kartam and Kartam (2001) conducted a similar survey in Kuwait. Results showed that Contractors in Kuwait consider judgement and subjective probability using the experience gained from similar project undertaken in the past as very efficient preventive action. Quantitative risk analysis techniques were not considered to be highly effective preventive action for reducing risks. This reflects insufficient knowledge of risk analysis techniques and difficulty of finding probability distribution of risk in practice required in these techniques.

Table 2 Shen's (1997) Preventive and Remedial Actions

Preventive Actions	Remedial Actions
<ul style="list-style-type: none"> a. make more accurate time estimation through quantitative risk analysis technique. b. make proper time estimation and produce a proper programme with subjective judgement. c. make proper time estimation and produce a proper programme by referring to previous and ongoing similar projects. d. produce a proper schedule by getting updated project information. e. plan alternative methods/options as stand-by. f. consciously adjust for bias and add a risk premium to time estimation g. transfer or share risk to/with other parties. 	<ul style="list-style-type: none"> a. increase manpower and/or equipment b. change the sequence of work by overlapping activities c. provide close supervision to subordinates for minimizing abortive works d. increase the working hours e. change the construction method f. coordinate closely with subcontractor.

2.4. Procurement

There are different procurement options available such as: sequential traditional, accelerated traditional, design/build, turnkey, management contracting, and construction management (Cheung *et al.*, 2001). Other new procurement strategies replacing or supplementing traditional approach include Concurrent Engineering, Engineering, Procurement and Construction (EPC), Private Finance Initiative (PFI), Public/Private Partnership (PPP), Relational Contracting approaches such as alliancing and partnering (Love *et al.*, 1998; Bing *et al.*, 2005; Mahmoud-Joueini *et al.*, 2004; Palaneeswaran *et al.*, 2003).

Also, there are various methods for valuation of work done with different risk allocating strategies including Lump Sum/Fixed Price, Remeasured, Cost Plus Fixed Fee, Fixed Price Incentive contract and the Cost Plus Incentive Fee (Berends, 2000).

2.4.1. Procurement Selection Methods

Available theoretical models for procurement selection include discriminate analysis approach, multivariate analysis, decision support system, knowledge-based systems, procurement rating systems, procurement path decision charts, the multi-

attribute approach, the analytical hierarchical process, and the multicriteria/multiscreening model (Ng. *et al.*, 2002, Luu *et al.*, 2003).

- Studies made to examine the logic of the **multi-attribute utility approach** identified pitfalls in its application to procurement route selection which include: selection of priority variables, possibly inappropriate association of procurement routes with differing coefficients for priority variables due to the assumption of complete contracting; and the insensitivity to project attributes of the utility coefficients used to link routes to outcomes (Chang and Ive, 2002).
- Alhazmi and McCaffer (2000) propose the **project procurement system selection model** (PPSM) which has the potential to assist the client in procurement system selection. It is an integration of Parker's judging alternative technique of value engineering and analytic hierarchy process (AHP) and consists of feasibility ranking evaluation by comparison, weighed evaluation, and AHP.
- The **objective-subjective procurement method** makes use of the concept of multi-attribute utility technology with the development of utility factors table and the owner's preferences and the characteristics of the project to achieve objective procurement selection. The eight selection criteria for this method are speed, certainty, flexibility, quality level, complexity, risk avoidance, price competition, and point of responsibility (Cheung *et al.*, 2001),
- Due to the lack of consolidated knowledge about some of the specific merits of all potential procurement alternatives, Kumaraswamy and Dissanayaka (2001) identify **potential success criteria**. The study presents observations derived from a pilot exercise to assemble critical modules of the proposed model of the decision support system for optimizing procurement protocols and parallel managerial sub-systems.
- The lack of fuzzy selection criteria is considered to be one possible reason for not using these methods frequently in practice. The **fuzziness degrees of linguistic variables** used as procurement selection criteria is examined through an empirical study conducted in Australia by Ng. *et al.* (2002). The criteria studied are speed complexity, flexibility, responsibility, quality level, risk allocation and price competition (Ng *et al.*, 2002).

- Luu *et al.* (2003) again notice that the common procurement selection approaches fail to give an indication of the suitability of the procurement method selected. Their work proposes a **case based reasoning approach (CBR)** and the **case-based procurement advisory system (CPAS)** for construction.

There is no reference though of applications of those approaches and their success thereto.

2.4.2. Alternative Non-traditional Procurement Methods

For many years, rigid formal contracts have been adopted in construction. However, the recent changing roles of the parties in today's complex projects have necessitated a new set of contractual arrangements designed to promote more collaborative relationships (Cheung *et al.*, 2006).

2.4.2.1. Design-build

The design-build system has been developed to address the problems of the traditional system and cope with the growth in both the private and public systems (Chan and Yu, 2005). Design-build procurement have evolved over the years with different contractual arrangements: designer-led, builder-led, joint venture, in-house design build (Tenah, 2000).

Fifteen primary project characteristics listed in the importance of ranking in the selection model of the design build system were identified as: well defined scope, shared understanding of scope, adequate owner staffing, owner's construction sophistication, established budget, established completion date, availability of design/builders, willingness to forgo design input, owner's risk aversion, standard design specifications, size of project, technological advances, current state of the market and alternative financing options (Songer and Molenaar, 1997; Molenaar and Songer, 1998).

2.4.2.2. Partnering

Research in the construction industry on partnering has demonstrated the criticality of the owner-contractor relationship. Where there is no trust between the parties, successful project conditions may be jeopardized (Drexler and Larson, 2000).

In spite of being keen on the dedicated involvement in relational contracting, Palaneeswaran *et al.* (2003) warn against shortfalls in the contract and advise maintaining contractual safeguards.

The organizational and cultural factors and economic realities of supply chain relationships are two main barriers to achieving genuine win-win procurement solutions through a qualitative study where interviews were made with senior professionals operating at the policy level.

Facilitative mediation with partnering is proposed as an alternative process that entails holding partnering conference where each of the parties shares his concerns, perception of conflict, and previous experience. At the end of this intervention an agreement is signed by all members to the project team. This intervention will allow for continuous sessions to discuss difficulties that arise (Harmon, 2003).

2.4.2.3. Other

The literature includes work on other non-traditional procurement methods:

- Concurrent Engineering: Love *et al.* (1998) propose Concurrent Engineering (CE) as a holistic approach to the design development and procurement of a product. Multi-disciplinary project team is required whereby participants are brought together during the design to determine how downstream issues may be affected by design decisions. The Project manager in this case will be responsible for the initiating managing and maintaining coherence during the design development process.
- Incentive/Disincentive Contracts: Arditi and Yasamis (1998) studied a sample of Illinois BOT highways contracts that include I/D provisions to reveal milestones, the way they are executed, and the kind of work practices the contractor uses and the manner in which the contracting parties perceive I/D contracts' effectiveness.
- Engineering Contractor: Berends (2000) investigates the role of the Engineering Contractor (EC) for the Engineering, Procurement and Construction Management (EPCM) of capital investment projects. Where project development is carried out by the EC, the owner may negotiate the

EPCM contract with the same EC or put the work out for tendering. Cost Plus Incentive Fee (CPIF) are proposed by the author to have the best cost risk allocation scenario where the owner bears the cost risk consequences and gives incentive for cost risk management to the EC.

- EPC: Mahmoud-Jouini *et al.* (2003) study the time factor in the case of Engineering, Procurement and Construction (EPC) contracts. Based on an analysis of six projects, different phases in a project including preparation, learning, ongoing and backup, each of which with its own speed representing the global speed profile concept are analyzed. Their work identifies three types of contrasting planned profiles and four speed effective profiles.
- PFI/PPP: Bing *et al.* (2005) examine the risk in procurement and its allocation by the Private Finance Initiative (PFI) in the UK which is a form of Public/Private Partnership (PPP) Procurement. A three-level meta-classification is proposed, where risk is classified as macro (origins beyond the system boundaries of projects), meso (directly concerned with the nature of each project) and micro (associated with the relationships between the parties involved).
- Relational contracts: Cheung *et al.* (2006) examined the different types of contracts and classified them as traditional and relational. They examine the application of relational contracts by establishing a long term relationship of communication and trust to minimise adversarial tendencies. This study suggests that the main contract and the domestic subcontract are more relational than the nominated subcontract and the direct labour contract

2.4.3. Contractor Selection Discussion

The correct choice of the Contractor is a critical decision that will affect the expected performance on the project to be procured. Contractor selection is commonly done in two stages: eligible bidders are short listed through a prequalification model and then the best bid is selected among those bidders (Kumaraswamy, 1996).

Palaneeswaram and Kumaraswamy (2001) studied general contractor selection practices for various public clients in different countries including Hong Kong, USA, Australia, Sri Lanka, Singapore and Canada. The authors accordingly developed a model for contractor prequalification. The model provides a structured framework that can be used as a base for developing an intelligent client advisory decision support system that can be customized for different projects (Kumaraswamy, 1996). As for the bid selection, the lump-sum lowest bid method is commonly used especially in public project that awards the contract to the lowest bid price. Crowley and Hancher (1995) explain that since 30 years ago there has been a conflict of views between policy-makers and procurement practitioners. Policy-makers see competitive procurements as a very effective and efficient method that serves the public's interest. Procurement practitioners on the other hand find competitive procurement to be risky, as it exposes the Employer to accepting the wrong bid or accepting the wrong firm. Accepting the low bid that has been mistakenly been underestimated might lead to the "winner's curse". As such an error to the bid this would make the award unfair to the winning bidder, to the other bidders that might have made a more accurate estimate and to the Employer that will have to struggle to contain the running cost of the underfunded project. With the wrong firm the Employer is exposed to a firm that might study the bid closely and look for mistakes, ambiguities and possible change order and claims that the bidder can use after being awarded the contract to recapture monies and offset their original low bid.

To overcome this problem, selection of the 'average bid' was proposed as an alternative in Italy and Taiwan. In Singapore, tendering price advantage is assigned according to the "Construction Quality Assessment System" where a premium list is developed by the Construction Industry Development Board (Kumaraswamy, 1996). From 1984, the US Congress recognized the need for improved procurement procedures, the Best-Value procurement which selects the contractor with the offer most advantageous was devised where the price along with other factors such as technical and managerial merit, financial health and past performance are considered in evaluating offers. Disadvantages of this method include: added more time and effort needed in preparing the bid, evaluation process becoming complicated, and increased danger of bid protests (Gransberg and Ellicot, 1997). Wang *et al.* (2005) present an electronically

facilitated unit-price-based model for evaluating competitive bids through examining the lowest bid based on the unit prices of cost items of the project.

Wang and Yang (2005) have devised an electronically facilitated bidding model. The new method proposed examines the bidder's quantities and unit rates submitted and where found unreasonable adjusts them to be set as the contract quantities and unit rates. Also, the Contractor is requested to specify three equals with different trademarks for the significant products within a significant period after the contract is awarded.

The new management strategies are surfacing to replace or supplement traditional approaches but when these are not implemented this negatively affects the client's objectives. The dominant building procurement system in many parts of the world is still the typical/pure traditional building procurement system and the main cost control mechanism is the bill of quantities which is prepared from incomplete design because of time constraints (Rwelamila and Meyer, 1999). This is particularly true of the Middle East construction industry including Lebanon.

2.4. The Behavioural Aspect

The last factor examined in this chapter is the behavioural aspect among project participants. Maintaining a cooperative environment becomes a difficult task because conflicts are inherent in construction projects (Zack, 1995; Fenn, 1997). The conflict can be described as the progression of four related stages as shown in Figure 3 below (Robbins, 1994):

- **Antecedent conditions:** The first step in a conflict incidence is the presence of conditions that allows for conflict to occur.
- **Cognition and personalization of conflict:** If these antecedent conditions are present, they generate frustration and hence, conflict. The issue of conflict could be one of the following: scarce resources, collective procedures, policies or action, and role behaviour of individuals.

Behaviour manifestation: This is the point where the conflict is out in the open. Expression of the conflict can be subtle indirect and highly controlled or can take the form of aggressive, violent and uncontrollable struggle. The five principle interpersonal conflict handling behaviours are described in Table 3 below.

- **Aftermath of conflict:** More often, destructive outcomes of conflict are recognized over the potential benefits. These outcomes include physical or psychological injury, increased hostility and misperception, hardened antagonistic position and emotional exhaustion. Among the potentially positive outcomes are the development of a sense of solidarity among members of groups engaged in conflict; the emergence of creative ideas; the formulation of new policies, procedures and services, reformation and renewal of programs; and heightened enthusiasm and purpose among the conflicting parties.

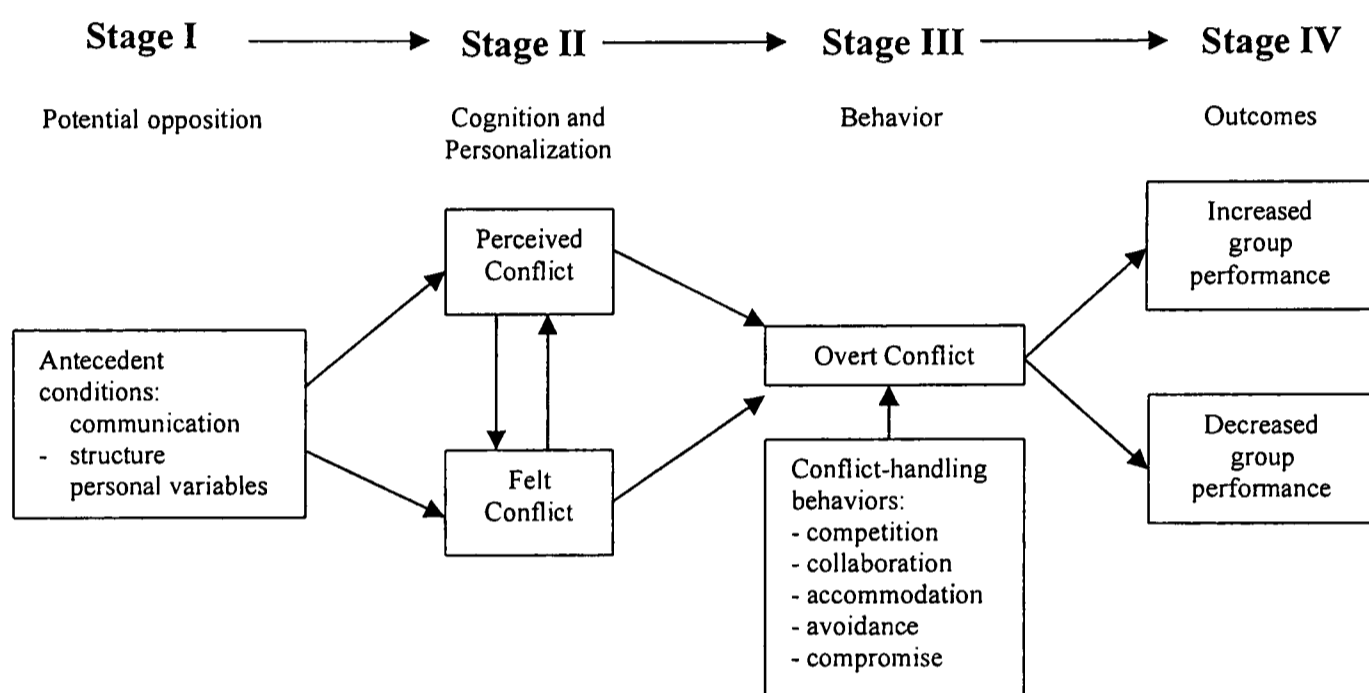


Figure 3 Stages of a Conflict (Robbins, 1994)

Rahim (1983) based his study on the conceptual scheme first presented by Blake and Mouton (1964) to classify the modes for handling interpersonal conflicts into five types: problem-solving, smoothing, forcing, withdrawal, and sharing. He differentiated styles of handling interpersonal conflict on two basic dimensions, concern for self and concern for others as shown in Table 3.

- **Integrating (collaborating):** This style is characterized by confrontation and problem solving where the open and direct communication allows for the problem solving.

Table 3 The Styles of Handling Interpersonal Conflict (Rahim, 1983)

		Concern for Self	
		High	Low
Concern for Others	High	Integrating	Obliging
	Low	Dominating	Avoiding

(Note: The word "Compromising" is circled in the original image, positioned between the four quadrants of the table.)

- **Dominating (competing\forcing):** the individual with high concern of self and low concern for the other party is identified with a win-lose orientation forcing behaviour to win one's position
- **Avoiding (withdrawal):** the unconcerned attitude toward the self, issues or parties results in postponing an issue and withdrawing from a threatening situation.
- **Compromising (negotiating):** this is the mixed motive style where both parties give up something to make a mutually acceptable decision splitting the difference or seeking other quick middle-ground positions (Rahim *et al.*, 2000).

Conflict styles are learned during childhood and are reinforced and modified as we experience conflict during our lives. The tendency is to use our learned style of conflict behaviour in stressful situations. In less-stressful situations, people have the ability to move between the styles. Movement between the styles can be helpful because each style has its place. For example, in a minor conflict where there will be no continuing relationship, the best course of action may be to minimize one's investment in the conflict by accommodating the desires of the other. For more meaningful conflicts, however, it is generally realized that outcomes produced by collaboration or compromise are superior to those produced by other methods. Dealing with conflict by arguing, fighting, appealing to the courts or other party, or voting are win-lose methods of resolving conflict (Brandt and Murphy, 2000).

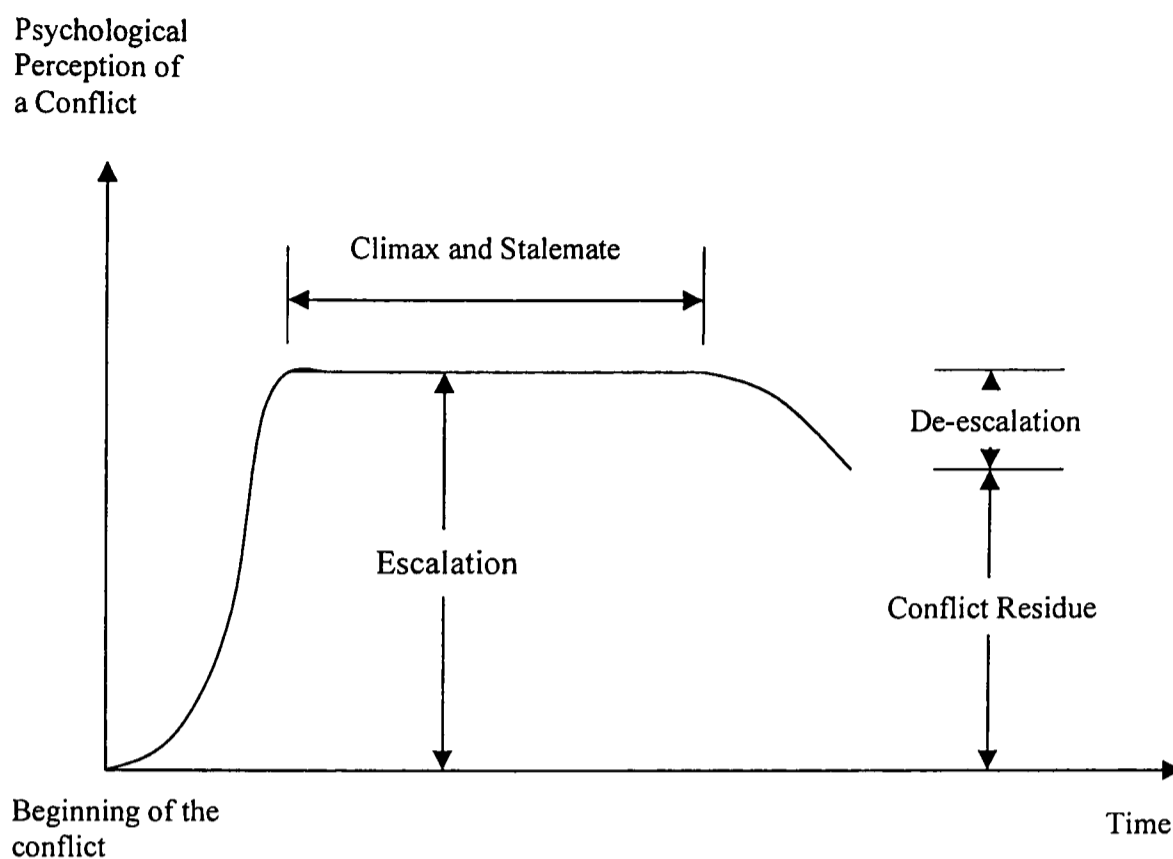


Figure 4 Psychological Cycle of a Conflict (Jong and Seung, 2003)

The psychological cycle shown in Figure 4 includes three stages: (1) the conflict escalation, (2) climax is reached and a stalemate continues, and (3) de-escalation. During the conflict escalation, four transformations are identified: conflict issues increase, changes from criticism of behaviour to a focus on personalities, use of stronger tactics to win, and more people engaged in the conflict. When the conflict reaches the peak i.e. the stalemate, the parties start reconsidering collaboration as a way to get what they want. During the de-escalation stage the parties move towards a settlement. The critical issue in this case is that the conflict residues that remain describe ill feelings in the conflicting parties' minds. The only method to avoid these conflict residues that might result in more desperate conflicts later on is through resolving the conflict by addressing mutual interests and relationships.

Of the three factors technical, contractual and behavioural on developments of disputes, people criteria (opportunistic behaviour) have proved in more than one study to have the most effect (Mitropoulos and Howell, 2001; Molenaar *et al.*, 2000). Diekmann and Girard (1995) studied the people, project and process criteria effect on emanating disputes. The results showed that the people criteria had the most effect followed by the

process criteria. People are the foundation of every construction project: they must deal with ever changing conditions, must manage the

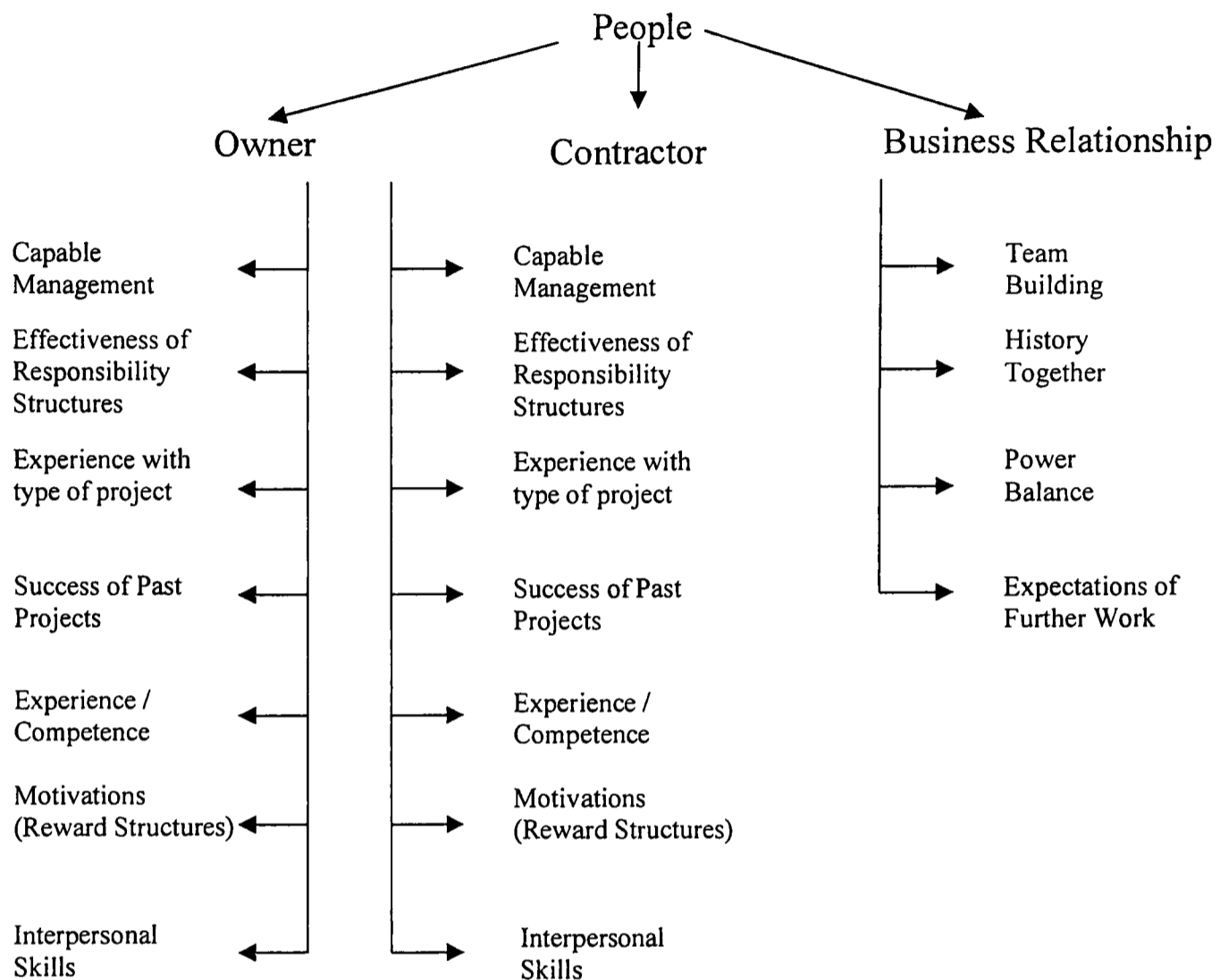


Figure 5 People Branch of the Hierarchy (Diekmann and Girard, 1994)

process, and most importantly must negotiate and deal with disagreements and disputes that are bound to arise. As shown in Figure 5 above, people criteria are arranged into three branches: the owner, the contractor and the business relationship that exists between the two.

The fact that team building can be used as a project management tool to reduce the occurrence of these conflicts was examined for each case as follows (Gardiner and Simmons, 1998):

- Conflict due to task interdependency: The construction industry calls for high level of interdependence among the different parties involved on a project

including clients, users, designers and contractors, where hundreds of tasks have to be undertaken and integrated to achieve the finished product. Accordingly, interorganisational team building and building of trust can reduce the conflict that may result if the cooperative spirit is not maintained.

- Conflict due to differentiation: Construction projects are traditionally environments where there is differentiation between different teams that have been brought together for the purpose of completing the project. Given the fact that organizational differentiation is a source of conflict, the effort made at the beginning of the project to bring the different teams together to understand and become familiar with the other participants' perception is important.
- Conflict due to differing values, interests and objectives: Since the different teams working in the project might have conflicting goals, it is essential for the project manager to set a shared common goal that is in the best interest of the project.
- Conflict due to communication obstacle: Due to the tight schedule, this might result in less collaboration and unreasonable demands as each party is unaware of the requirements of the other party. This again necessitates team building.
- Conflict due to tension: Anxieties may result from inconsistent demands among different parties. It is therefore essential to provide for social interactions that help alleviate these anxieties.
- Conflict due to personality traits: As there is evidence that relationships involve mixed motives. Managing these motives necessitates high behavioural flexibility among project team members. This can only be achieved through formal human resource management to select project team members. Objectives and qualities of team members are examined in the following section.

The study emphasizes the significance of team building and partnering. Organizational development at the beginning of the project has proved to achieve significant improvement in a relatively short period.

As there are constructive and destructive conflict, efforts should be made because the sooner the destructive conflict is resolved, the higher the percentage of resolution success and the lower the cost (Harmon, 2003). One way of conflict minimization is through enhancing the understanding of the other party's perception, stimulating openness, reducing relational uncertainty, and analyzing problematic issues before escalating the tension (Vaaland, 2004).

The three level influence diagram by Cheung *et al.* (2000) is shown in Figure 6. The factors (substantive influences) in the inner circle are mainly design changes, involvement of claim advisor, incentive to settle and project personnel relationships have the most influence on dispute resolution. Factor two (facilitative influences) comprise mainly contractual use of ADR and involvement of senior management level promotes dispute resolution. Factor three (indirect influences) in the outermost layer mainly claim consciousness of the contractor and change in tender price index cause lingering of disputes. It resembles a three level influencing diagram where the innermost circle has the most critical influence in the outcome of dispute resolution process.

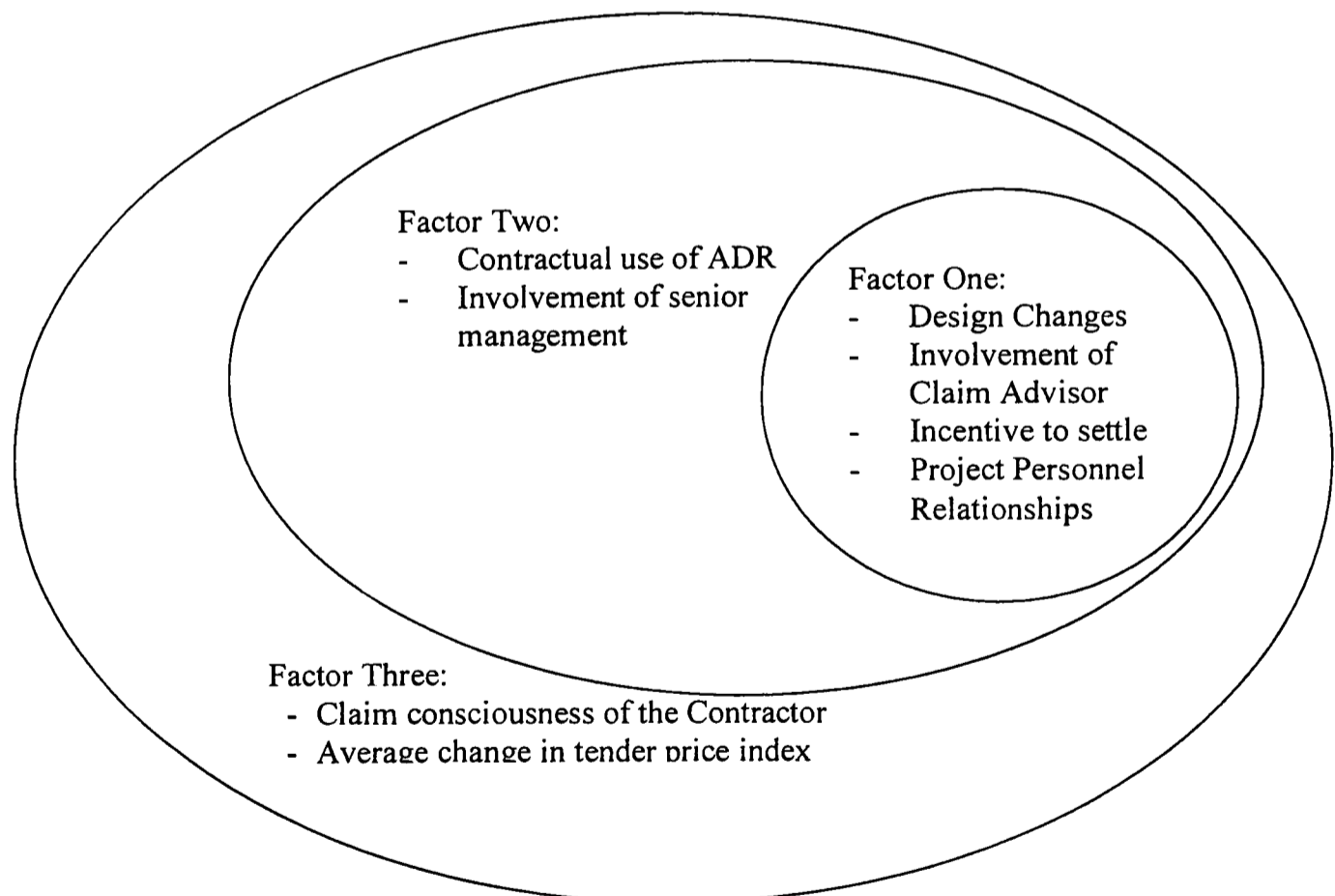


Figure 6 Level of Influence of the Factors (Cheung et. al., 2000)

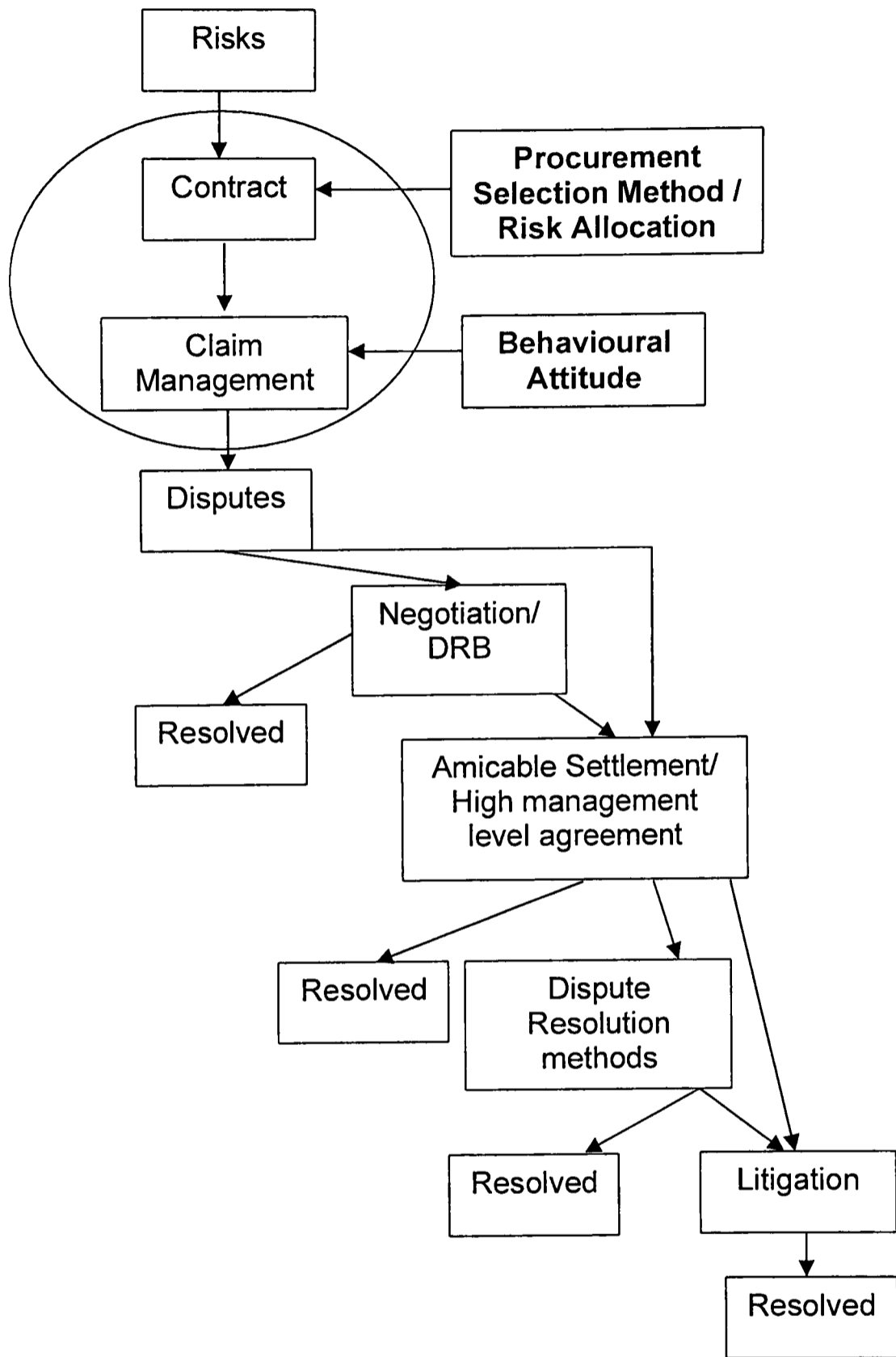


Figure 7 Conceptual Flowchart of Dispute Evolution and Resolution

According to Zack (1995), if the qualified people are assigned to both parties to a contract, they will begin to know, understand, respect and trust each other. The work experience will build solid relationship and thus the effectiveness in negotiating settlements will increase and the time spent negotiating settlements will decrease.

2.4. Summary

The literature reveals abundant research studying the interrelationship between different factors that influence the emergence of disputes and proposes preventive and remedial measures at the different stages of the construction project to minimize them. A study of disputes has led to the study of risks, conflicts, claims, and procurement methods. Figure 7 offers a conceptual flowchart that describes the trajectory of dispute evolution and resolution based on the literature review. The literature proves efforts carried out in different countries addressing categorization of risks and disputes, risk allocation, claim management, preventive and remedial measures that could help reduce eventuation of risks and the emergence of disputes, as well as the behavioral traits of the project participants. However, the construction industry continues to suffer from cost overruns due to disputes and there remains a need, recognized by many authors, to identify the generic causes of disputes.

It is worth noting that no research was found addressing disputes, risks, procurement practices and behavioral aspects of participants in the Lebanese context. The following chapters will try to examine the nature and causes of disputes in the Lebanese construction industry and to identify possible relationships within and between the risk allocation strategies adopted during the procurement stage and the behavioral attitude of the parties. This will be carried out based on the methodology described in Chapter 3 below.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

Scientific research methods began to take form in the eighteenth century. The earliest systematic discussions were overwhelmingly focused on the experimental method in science. This scientific methodology reflected an optimistic belief in “a determinate non-contradictory, self identical, and coherent world” that exists independently of the researcher’s perception (Pollnet, 1987; Weinberg, 2002). Until the 1960s and the 1970s research was influenced by the abstracted empiricism based on the use of quantitative methods (Morgan and Smircich, 1980). After the 1980s, qualitative research has become one of the big growth areas (Morgan and Smircich, 1980; Travers, 2001).

This chapter describes the research methodology adopted. It outlines the steps carried out in the following chapters in terms of fieldwork, analysis of data, and deriving a conclusion and a recommendation

3.2. Scientific Paradigms

Distinction between qualitative and quantitative approaches is at best approximated for both types as umbrella categories that cover many different actual methods (Gummesson, 2005; Long *et al.*, 2000; Wilson and Natale, 2001; Hanson and Grimmer, 2007). This can be better understood by looking at the full spectrum from subjectivist to objectivist approaches used in the contemporary social sciences by Burrell and Morgan (1979) shown in Table 4 (Morgan and Smircich, 1980). The adequacy of the methodology whether qualitative or quantitative depends on the nature of knowledge under study and the method through which that knowledge can be obtained (Gummesson, 2000).

Two major approaches to theory development are the deductive theory testing and the inductive theory building (Bonoma, 1985; Parkhe, 1993; Romano, 1989; Perry, 1998). The difference between them is defined by the scientific paradigms used. A scientific paradigm is defined by three elements: ontology, epistemology and methodology where ontology is the “reality” that researchers investigate, epistemology is the relationship between the realities and the researcher and methodology is the technique used by the researcher to investigate that reality (Guba and Lincoln, 1994; Perry *et al.*,

Table 4 Network of Basic Assumptions Characterizing The Subjective-Objective Debate within Social Sciences (Burrell and Morgan, 1979; Morgan and Smircich, 1980)

	Subjectivist Approaches to Social Sciences			Objectivist Approaches to Social Sciences		
Core Ontological assumptions	reality as a projection of human imagination	reality as a social construction	reality as a realm of symbolic discourse	reality as a contextual field of information	reality as a concrete process	reality as a concrete structure
Assumptions About Human Nature	man as a pure spirit, consciousness, being	man as a social constructor; the symbol creator	man as an actor; the symbol user	man as an information processor	man as an adaptor	man as a responder
Basic Epistemological stance	To obtain phenomenological insight, revelation	to understand how social reality is created	to understand pattern of symbolic discourse	to map contexts	to study systems, process, change	to construct a positivist sciences

1997; Healy and Perry, 2000). The deductive approach represents the positivist paradigm and the inductive approach represents the phenomenological paradigm (Easterby-Smith *et al.*, 1991; Perry, 1998). Phenomenological paradigm can be further broken down into three: critical theory, constructivism and realism (Guba and Lincoln, 1994). Going back to the continuum in Table 4, hard positivism is at one end and constructivism is at the other (Carson *et al.*, 2001; Jean Lee, 1992; Healy and Perry, 2000; Kidd, 2002; Guba and Lincoln, 2000).

A brief overview of each of the four paradigms shown in Table 5 is included in what follows:

Positivism is based on the assumption that it is possible to describe the world objectively from a vantage point (Travers, 2001) ie data does not change because it is being observed (Guba and Lincoln, 1994; Healy and Perry, 2000). It is based on quantitative research (Healy and Perry, 2000).

Critical Theory is one of the qualitative research options available. It emphasizes social realities. Critical theory researches critique and transform social, political, cultural, economic, ethnic, and gender values (Guba and Lincoln, 1994; Healy and Perry, 2000).

Constructivism has relativist ontology and considers that each person has his or her own reality. At the epistemological level, the achievement of objectivity is rejected;

Table 5 Elements of the four categories of scientific paradigms (Guba and Lincoln, 1994; Perry *et al.*, 1999; Healy and Perry, 2000)

	Positivism	Critical theory	Constructivism	Realism
Ontology	Reality is real and apprehensible	Virtual reality shaped by economic, ethnic, political, cultural and gender values crystallised over time	Multiple local and specific “constructed” realities.	Reality is “real” but only imperfectly and probabilistically apprehensible
Epistemology	Objectivist: findings true	Subjectivist: value findings	Subjectivist: created findings	Modified objectivist: findings probably true
Common Methodologies	Experimental/surveys: verification hypotheses, quantitative methods	Dialogic/dialectical: researcher is “transformative intellectual” changes the social world which participants live	A Hermeneutical/dialectical: wholesearcher is a “passionate withinparticipant” within the world being investigated	Case studies/convergent interviewing: triangulation, interpretation of research issues by qualitative and by some quantitative methods such as structural equation modelling

instead individuals are expected to understand particular viewpoints (Morgan and Smircich, 1980; Hanson and Grimmer, 2007).

Realism looks behind appearances to discover laws or mechanisms. Realistic researchers believe that the “real” world exists but it is only “imperfectly apprehensible” (Guba and Lincoln, 1994; Healy and Perry, 2000).

Other scientific paradigms include **interpretivism** and **poststructuralism**. For interpretivists there is no benefit with working with large data sets. They rather use very short decontextualized extracts from interviewees. Poststructuralism on the other hand is a radical philosophical movement that seeks to challenge the assumption that it is possible to obtain valid knowledge about the world (Travers, 2001).

3.3. Justification of the methodology

Realism has been adopted as the most suitable paradigm for the purpose of this thesis. Realism admits that there is an external reality. However, observation of that

reality is achieved through the limitations of the researcher's mental capacity (Tsoukas, 1989; Perry, 1998).

Six criteria presented by Healy and Perry (1998) that further confirm the appropriateness of realism methodology for the purpose of this research are:

- Ontological appropriateness: The research deals with complex social phenomena involving reflective people.
- Open fuzzy boundary systems: Social phenomena are fragile and the causal impacts are dependent on their environment. The research aims at developing a "family of answers" to cover several contingent possibilities (Pawson and Tiley, 1997; Healy and Perry, 1998).
- Epistemology: realists are value aware. They are neither value laden like positivists nor value free like constructivists (Guba and Lincoln, 1994; Manning, 1997; Healy and Perry, 1998). Realism relies on multiple perceptions which is achieved through triangulation of several data sources and the researchers interpretation of those triangulations (Healy and Perry, 1998).
- Methodological trustworthiness: Methodological trustworthiness in realism is similar to reliability in the positivism. It is the extent through which the researcher can be audited by developing a case study database and the use of quotations in the report (Lincoln and Guba, 1985; Healy and Perry, 1998).
- Analytic generalization: According to realists, theory building has to be built and confirmed or disconfirmed, before its generalisability to a population is tested (Healy and Perry, 2000).
- Construct validity: It is an assessment of the appropriateness of measures (Healy and Perry, 2000).

Although realism is considered to be more of an inductive rather than a deductive approach, case study research includes deduction based on prior theory. Formulation of the research problem is influenced by the literature review or the researcher's preconceptions; hence starting from scratch with a theoretical hypothesis is neither practical nor preferred (Perry, 1998).

3.4. Description of Methodology

The methodology adopted for this research work consists of the following stages:

- A thorough literature review is conducted for previous studies of disputes. This has led to examining areas of risks, procurement practices, and the behavioural aspect of project participants. The literature review revealed interrelationship of the four areas that was shown in Figure 8. There was abundant examination by several researchers on dispute factors and risk factors. However, no research on this subject was found to be conducted in Lebanon.
- Field work was carried out at three different fronts as shown in Figure 8:
 - **Preliminary Examination of Projects:** 20 projects are examined to draw an overview of the dispute conditions in facts and figures in the Lebanese construction context. Data related to 20 different projects is studied through a general examination of the scale of claim, time and cost overrun, the causes of disputes and the dispute resolution methods employed. This would give an indication of the dispute causes and extent in the Lebanese context.

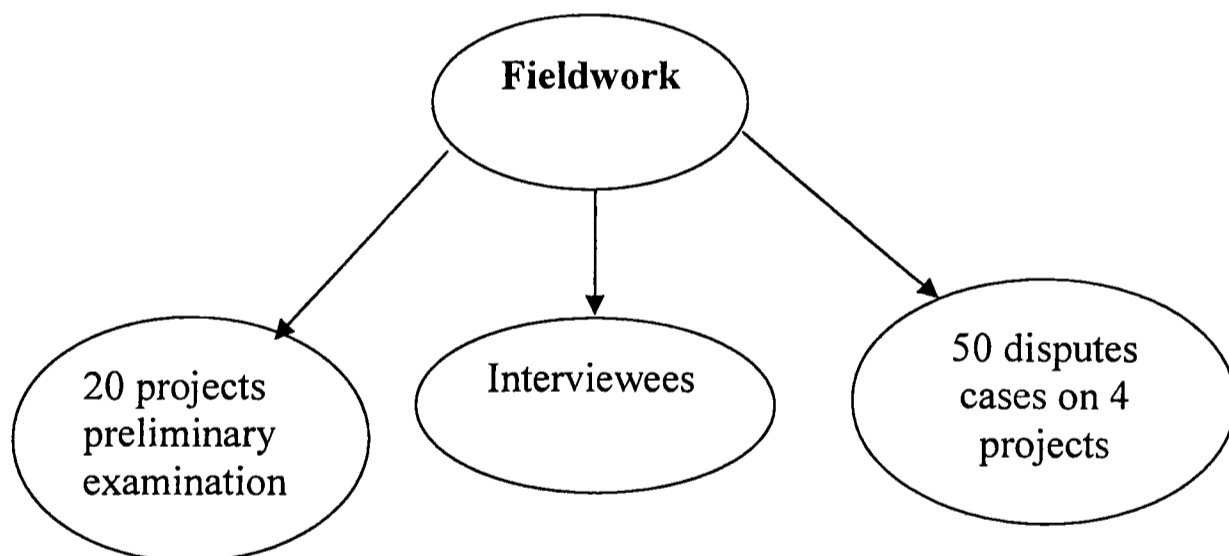


Figure 8 Research Fieldwork Types

- **Interviews:** The literature examined and the observations made in the 20 projects instigated questions that were raised in 24 interviews conducted with senior practitioners acting as Project Managers. This provided

feedback for practitioners on the causes of disputes and the common practice in handling disputes.

The interviews were conducted in the following effective interview spirit proposed by Gerson and Horowitz (2003):

- To guide respondents through the main theoretical concerns in an orderly fashion within a limited period of time.
- To have a theoretically informed and user-friendly interview schedule or an effective interview guide.
- To collect information in a manageable form for later analysis.
- To set the direction of the interview for the critical factors/outcomes that the interview needs to explore.
- To allow for “discovering the unexpected and uncovering the unknown.”

The interviews provided a deeper insight of the practitioners views on areas causing disputes. It also, gives an overview of the level of knowledge in contracts and in project management.

Guidelines to interviewing presented by experienced researchers state that interviews depend on the feedback received from the interviewees commitment. Convincing others to dedicate time and contribute to a project requires a strong belief of the interviewer in the value of the study and a persistent approach. Conducting the interview itself requires analytical skills and intense concentration. The best interviews become a conversation between two parties trying to examine the variables and their effects on the research problem. The interviewer should at all times listen carefully and supportively and refrain from drawing judgemental conclusions (Gerson and Horowitz, 2003).

- **Dispute Cases:** The interviews were followed up by scrutinizing 4 on-going projects where 50 disputes cases were investigated. This allowed for an in-depth objective examination of the causes of disputes and the

common practice in the construction industry beyond any subjectivity that might have been introduced by the interviewees above.

Case study is a research strategy that examines the dynamics present in a particular setting. Analyzing data is the most difficult and the least described stage. Within case analysis is the first stage of data analysis and it is very important in examining the particulars of each case to become familiar with its characteristics. Yin (2003) describes the stages of developing a theory from case studies in Figure 9. The researcher should stop adding cases when theoretical saturation is reached ie where incremental learning is minimal. However, in practice pragmatic constraints such as time and budget limit the number of cases examined (Eisenhardt, 1989).

The multiple case study or the collective case study is adopted for the purpose of this study (Denzin and Lincoln, 1994). The dispute cases are described in Chapter 6.

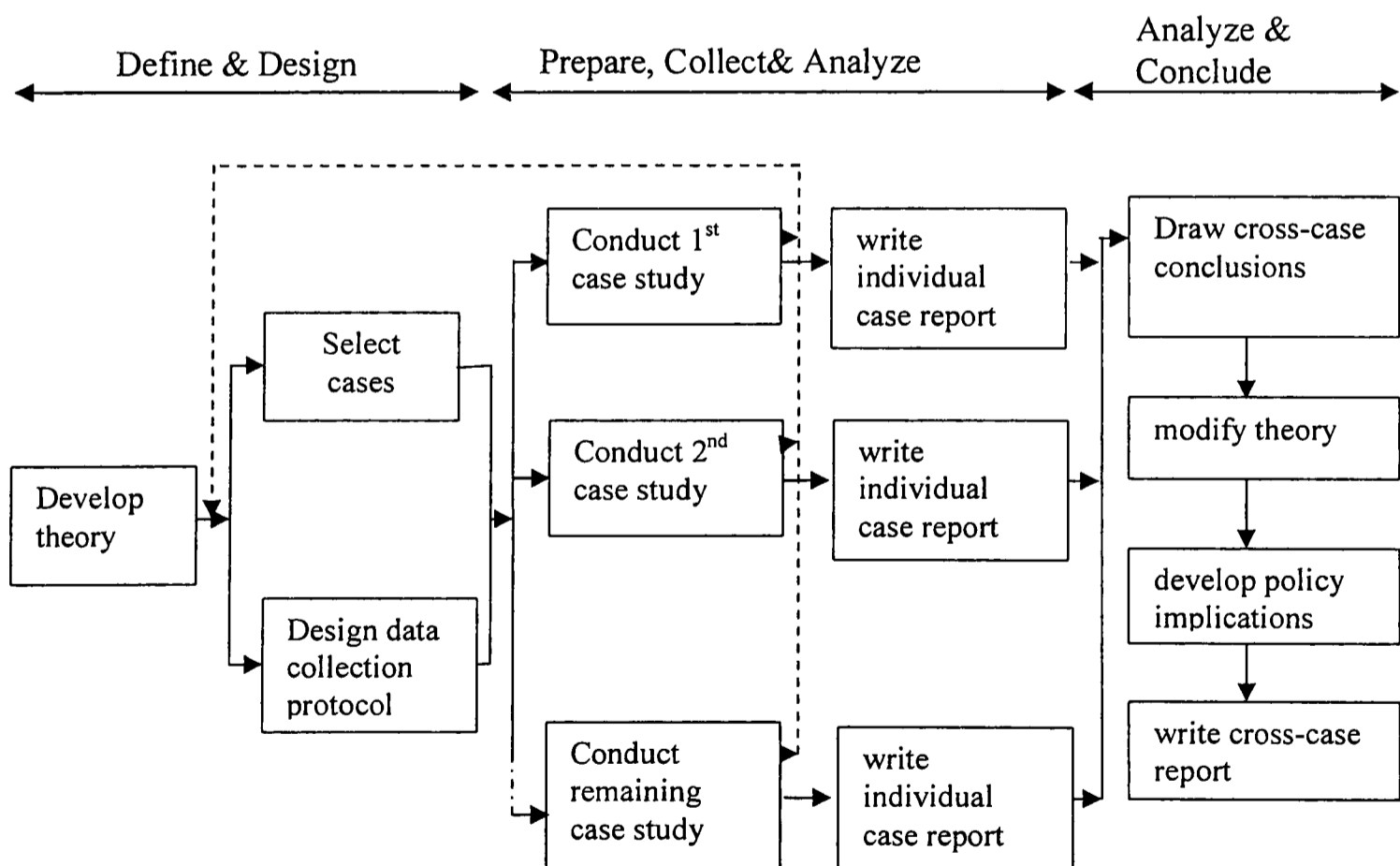


Figure 9 Case Study Method (Yin, 2003)

It should be noted that the information richness of the cases and the observational/analytic capabilities of the researcher are of more significance to the validity and meaningfulness of the case studies than the sample size (Patton, 2002). Patton (2002) lists 15 strategies of “purposeful sampling” of which mixed purposeful sampling was adopted. Also, the sample was chosen with little bias in a way to bestow confidence in the findings reflecting larger trends rather than idiosyncrasies of restricted groups as recommended by Gerson and Horowitz (2003).

A case study database was created where the data collected, including the case study notes and the case study documents, was stored in a dedicated area to allow for retrieval of the necessary information efficiently along the different stages.

- **Conclusion:** The dispute influencing areas are examined in light of the findings in each of the literature review, the interviews, and the case studies. The three sources are compared to reach a common consensus regarding the impact/influence of each of the dispute influencing areas. The use of multiple sources of evidence allows for converging lines of inquiry which reinforces the construct validity. This offsets the additional time and resources needed in providing these multiple sources. Efforts were made to maintain a chain of evidence to describe the basis of the conclusions reached. These two practices are important in preserving the reliability of the research conducted (Yin, 2003).
- **Provisional Recommendation:** The conclusion is used to formulate a provisional recommendation for minimizing the incidence of construction disputes. This provisional recommendation is further examined through feedback received from five expert opinions. The five experts are prominent members of chartered institutes such as the RICS, EIOB, and CI Arb who have practices contract administrators in Europe and with current experience in Lebanon/the Middle East.

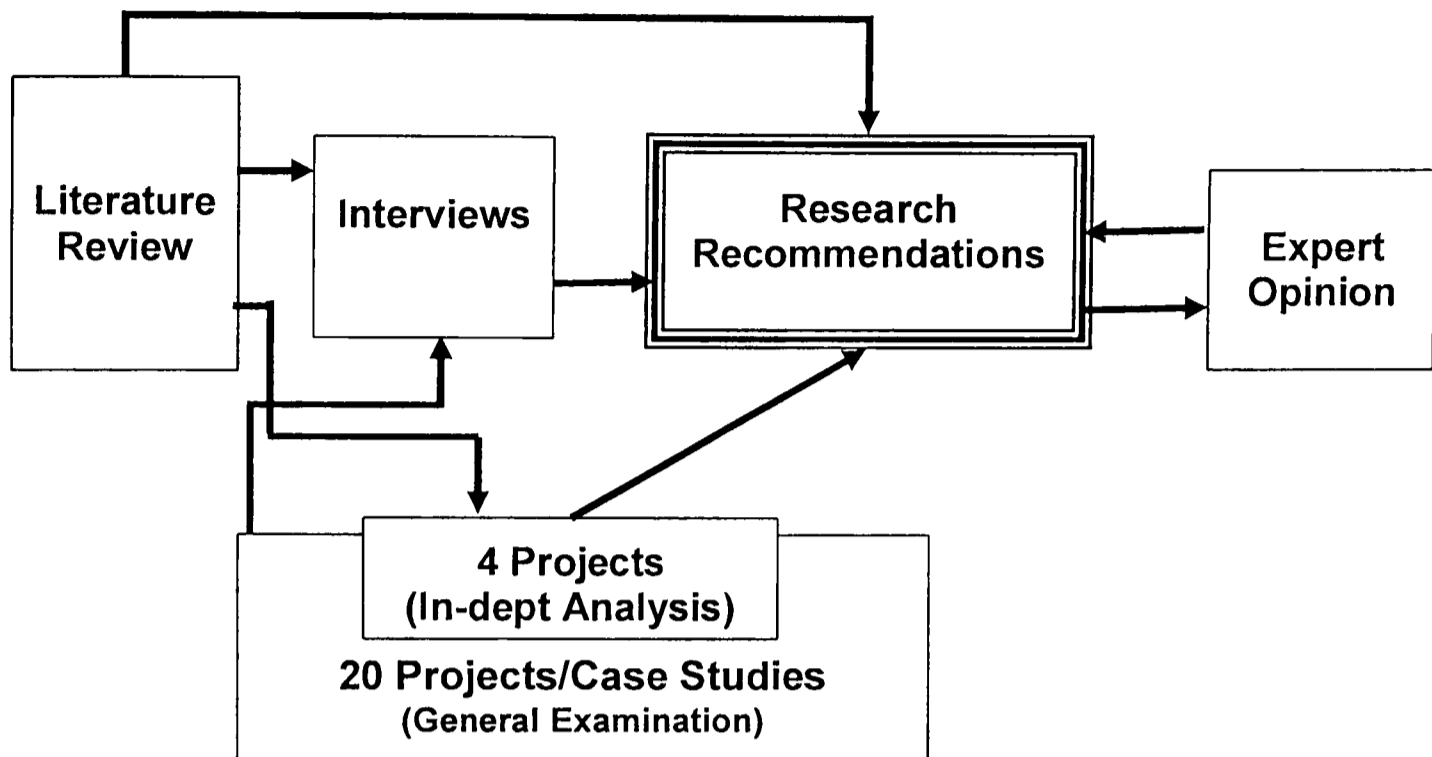


Figure 10 Research Methodology

It should be noted that the four tests to judge the quality of research design are as follows:

1. Construct validity: where the operational methods such as the sources of evidence and data collection are studied.
2. Internal validity: establishing causal relationships in data analysis by way of pattern-matching, explanation building, addressing rival explanations, and using logic models.
3. External validity: establish the limits within which the case study can be generalized.
4. Reliability: demonstrate that the case study operation can be repeated by using case study protocol and developing case study databases.

These four criteria will be adopted as the benchmark to check the quality of this research work. As such compliance with those four tests will be revisited in Chapter 10.

3.5.Summary

This Chapter starts with examining how qualitative research developed. The full spectrum from subjectivist to objectivist approach is presented along with the ontology, epistemology and methodology of each of the four scientific paradigms. The choice of the realism approach for this research is explained. The research methodology stages are then presented. It entails 3 fieldworks studies examining 20 projects to explore the nature and extent of disputes in Lebanon, interviewing 24 practitioners in the industry to discuss their experience in causes of disputes and scrutinizing 50 case studies to track the factors influencing disputes.

Findings from 3 sources (literature, interview, case study) are compared and recommendation is formulated accordingly. This recommendation is further refined based on comments received from 5 expert opinions on the veracity of the proposed recommendation.

CHAPTER 4: EXAMINATION OF CONSTRUCTION PROJECTS

4.1.Introduction

Since no research was reported in the literature to address disputes on construction projects. It was necessary to examine a sample of projects to substantiate the need for a study on dispute minimization in the Lebanese context.

A study of 20 projects in the Lebanese construction industry was undertaken to form an overview on causes of disputes along with time and cost overrun.

The 20 cases to be examined can be categorised as a combination purposeful sampling method described by Patton (2002) where two different sampling methods are applied by way of triangulation. These two methods are the:

- Maximum variation sampling where the cases are heterogeneous representing different parties to the contract and different procurement practices.
- Criterion sampling where all the cases examined are Lebanese construction projects.

The basic data gathered in these case studies consists of: project type, original contract value, value of variations, claimed value, final settlement value, original contract duration, final contract duration, type of contract, form of contract, dispute settlement procedure.

4.2.Cases Examined

Claims that have been submitted on these projects have been examined to identify the underlying causes. A short description of these claims of these projects is described below:

Case 1

The contract was signed for the execution of a private hotel. During the execution the Contractor claimed to have suffered from the following: **“lack of complete or fully coordinated design information, delay in issuing drawings, direction, clarifications, instructions, order or approvals, the extent and timing of instruction variations, suspension of the works, delay in nomination of specialist subcontractors, delay in**

consenting to sub-contracting parts of the works, invalid instructions, and failure of the Engineer to correctly value the works and certify payments.” The Contractor claimed accordingly and requested an extension of time and compensation. The Contractor considering the Engineer’s determination unfair requested an Engineer’s Decision. The Contractor then gave notice for arbitration where he found that the Engineer’s Decision was not rightful. A meeting was held after completion of the works and an amicable settlement was reached.

Case 2

The contract was signed for the execution of a diaphragm wall for a private building complex. During execution of the works an addendum was signed adding the mat foundation to the scope. However, the **permit was delayed** due to the political situation resulting in a suspension of two years. The Contractor claimed for extension of time and compensation. Upon resumption of the works another addendum was signed and an amicable settlement was reached regarding the extension and the compensation. During the execution of the works, the Contractor submitted several claims for **new regulations** for dumping material that resulted in extra cost, **escalation of prices**, and an **error in design calculations**. The Engineer agreed in principle to these claims. In the case of price escalation although the contract did not allow for it the Engineer presented the Contractor’s case to the Employer proposing to compensate for the unexpected cost incurred. The Employer accepted this proposal. An assessment for these claims was prepared and presented to the Employer. The Contractor did not approve to the Engineer’s assessments and all claims were put in one basket where an amicable settlement was reached at a higher management meeting.

Case 3

The contract was signed for the execution of a private residential building. Several design modifications were requested during the execution of the works that delayed the works. However, the Contractor also suffered delay due to failure of concrete strength tests. The Contractor submitted a claim for extension of time and compensation due to **design modifications**. The Contractor also submitted a claim for **escalation in steel rates** although the contract did not allow for price escalation. The Engineer upon receiving the

Employer's approval certified payment for 50% of the price adjustment claim for escalation of steel rates. An assessment of the EOT and compensation was made. The Contractor disputed the same. However, an amicable settlement was reached after completion of the works at a higher management meeting.

Case 4

The contract was signed for public highway works that included a bridge. The Contractor claimed for compensation due to **increase in custom duties, price escalation of fuel, crushed material and cement, additional cost due to new design requirements, design modifications**. He also claimed compensation for an extension of time that was previously granted conditional to waiver of compensation. The Contractor had signed conditional waiver on receiving this extension. These claims were rejected by the Engineer. The Contractor proceeded with arbitration as the claim value constituted 42% of the original contract value.

Case 5

An agreement was signed for the execution of a major public facility. The Contractor was granted an extension of time due to the **nonavailability of work areas**. The Contractor claimed for incurred cost during the delayed period due to site overhead, inability to execute other projects during this period, interest rates, extended warranties and head office overhead. The case was resolved through an amicable settlement.

Case 6

The Contract was signed for the execution of a public university. The Contractor was granted an extension of time due to **delayed possession of the site**. The Contractor claimed for **escalation of prices of quarry material and cost of steel** during the extension. This claim is expected to be resolved through an amicable settlement. However, to date no compensation has yet been made.

Case 7

An agreement was signed for a public university building where the Contractor suffered from delay due to the following: **late handover of the site due to illegal occupants**,

addition to the scope of work, delay in the completion of infrastructure works by other contractors and change in design specification. Five extensions of time were granted. However, the decisions were issued on condition that the Contractor desists from any claim for compensation. At the last extension of time the Contractor refused to sign this condition and submitted a claim for compensation for costs incurred during the total extended period. An amicable settlement was reached.

Case 8

An agreement was signed for a private residential building. During tender negotiations the Employer decided to **add the scope of the works** and accordingly added the value of these works. The Employer later on decided to **change the concept of the design** dramatically and add basements. The Contractor had to suspend the works. Upon issuance of the new design drawings the works were resumed. However, the municipality stopped the works due to **permit noncompliance** with the executed new design. The Contractor further requested an extension of time and compensation. The disputed claim was resolved amicably.

Case 9

The consultant was appointed to a public hospital project 7 months after the start date of the project. This led to a **delay in the processing of submittals and approvals** of shop drawings and materials, abortive shop drawings, and delay in procurement of long lead item. Upon the appointment of the consultant the inadequacy of the electrical and mechanical design which was finalized 10 years before awarding the contract resulted in **redesign** and abortive shop drawings, in addition to the disruption of the regular progress of works and associated costs. This dispute was resolved through arbitration.

Case 10

An agreement was reached regarding a private residential project. The Contract allowed for deletion of parts of the works without compensating loss of profit. The Employer shielded himself under this clause on numerous occasions. The **modification of design** had resulted in delay of project completion. An extension of time was granted but the issue got resolved through arbitration.

Case 11

The Contract for a private residential building was signed. During execution of the works **design modifications** due to structural redesign along with the ongoing unstable political situation in the country resulted in a **shortage of manpower**. This caused delay to the works. The Contractor claimed for an extension of time and compensation. The Engineer's determination was not accepted by the Contractor but an agreement was reached regarding extension of time with the Employer conditional to the Contractor's acceptance of further design modifications to be transmitted on a preset schedule. **The war** of July 2006 led to the halt of the works and the demobilization of labor. The Contractor disputed the Engineer's assessment for an extension of time due to the war. Further delay was incurred by the Contractor due to further **design modifications and late reply to submittals**. The Engineer's assessment was late. The Contractor requested an Engineer's Decision. The Engineer issued an Engineer's Decision which was disputed by the Contractor. The Contractor issued a notice to proceed with arbitration. The dispute was resolved through amicable settlement.

Case 12

The Contract was signed for the execution of the electromechanical works of a public facility. The Contractor suffered from the prolongation of the project duration due to the **nonavailability of work areas**. The claimed value was based on the incurred cost during the delayed period due to site overhead, inability to execute other projects during this period, interest rates, extended warranties and head office overhead. The Contractor submitted the claim three times over five years each time presenting more substantiation as requested by the Engineer. An amicable settlement was reached.

Case 13

An agreement was signed for public road works. The Contractor suffered losses due to **late expropriation** of the land, **deletion of tremendous scope of the work (63%)**, providing the Contractor with **wrong benchmark and reference** points (which led to redesigning the works), and **wrong design criteria** (which led to defects upon construction). Also, the Contractor claimed that he was put under a tremendous pressure to sign an MOU which was unfair and which was breached later on by the Employer. The

Contractor stated that the Engineer in this case was acting as an Employer's Representative and was not being impartial. The Contractor found the Engineer's Decision to be unfair and proceeded with arbitration.

Case 14

The Contract for the execution of a public water supply project was delayed due to **failure by the Employer to pay the Advance Payment, delays in issuing the Order to Commence, Re-design of approximately 50% of the project, failure by the Employer to expropriate and grant possession of all sites, delays resulting from the legislation relating to the closure of all sources of quarries in Lebanon and delays due to exceptionally adverse climatic conditions.** The Contractor presented a claim for extension of time and compensation showing the impact of the above mentioned delay factors. A settlement has not been reached to date for this public project.

Case 15

The Contract was signed for a public irrigation scheme public project. The Contractor gave notices during the execution of the works and claimed for the delay incurred due to different delay factors. The Contractor did not agree to the Engineer's determinations. All claims were then compiled at the end of the project for an extension of time and compensation claim for: **price escalation of quarry material, steel and fuel due to changes in legislation, additional abortive engineering works due to redesign, disruption and loss of productivity, delays in settlement of the advance payment, price fluctuation due to Euro/U.S Dollar exchange rate.** A settlement has not been reached to date.

Case 16

Agreement was reached for building a private shopping complex. The Contractor for this project was awarded the contract after his bid value was reduced 25%. This reduced the overhead and profit allocated by the Contractor. The contract duration was very tight. **Design modifications** were requested as the contract design was finalized 10 years prior to contract award and therefore it was no more suitable for the purpose of this shopping complex. The Contractor was granted an extension of time with no compensation as there was delay on the part of the Contractor running in parallel. This had placed the Contractor in a difficult financial situation as he could no more afford to provide extra

resources. The Contractor has been promised that his request for compensation would be considered towards the end of the project. This approach however, indirectly caused project delay.

Case 17

The Contract was signed for the building of a residential compound. The Contractor proceeded with the works and many **design modifications** were issued. Also, part of the scope was deleted. The unit rates for the additional works were disputed. According to the Contractor payments were withheld for unjustified reasons. All this resulted in cost implications that caused cashflow problems that delayed the works. The dispute is being resolved through arbitration.

Case 18

This project was awarded for building a university facility. However, tender was released in a short period where the design was not fully developed and coordinated. This led to underestimated BOQ quantities. **Variation to the design** induced during the execution of the works delayed the progress of work. This has led the Contractor to request Engineer's Decision for fair entitlement. The Decision was disputed by the Contractor. The latter proceeded with arbitration during execution of the works which resulted in tension built-up and further delay in the progress of works. The dispute is ongoing.

Case 19

The claims arising out of this residential project related to **design, price escalation due to increase in cost of steel, mixed aggregates, and fuel**. The Contractor claimed for an extension of time and compensation. The dispute is expected to be resolved in an amicable settlement.

Case 20

An agreement was signed for a public waterworks facility. The Contractor claimed an extension of time and compensation for additional cost incurred due to **late expropriation and design modifications**. The project had been completed in 2005. An amicable settlement has not been achieved yet.

4.3.Data Analysis

The data collected from these projects have been presented below in graphs to give an indication of the time and cost overruns on these projects. It should be noted that some of the data presented below needs to be further verified.

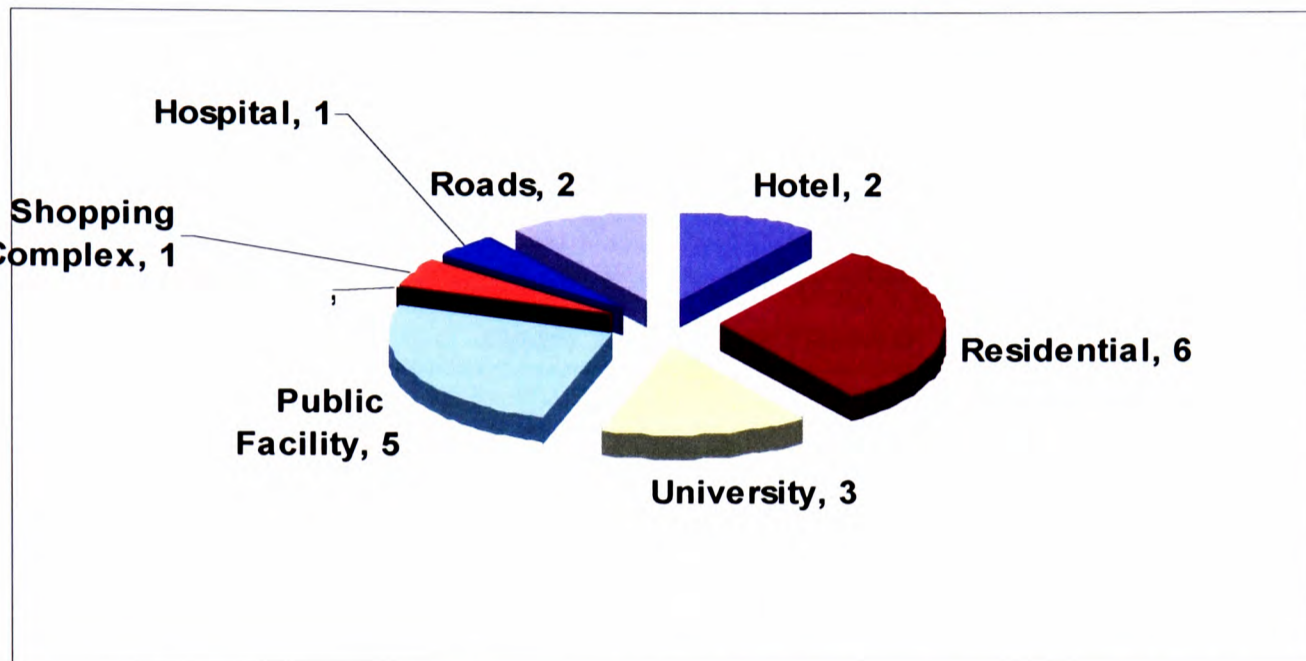


Figure 11 Types of Projects

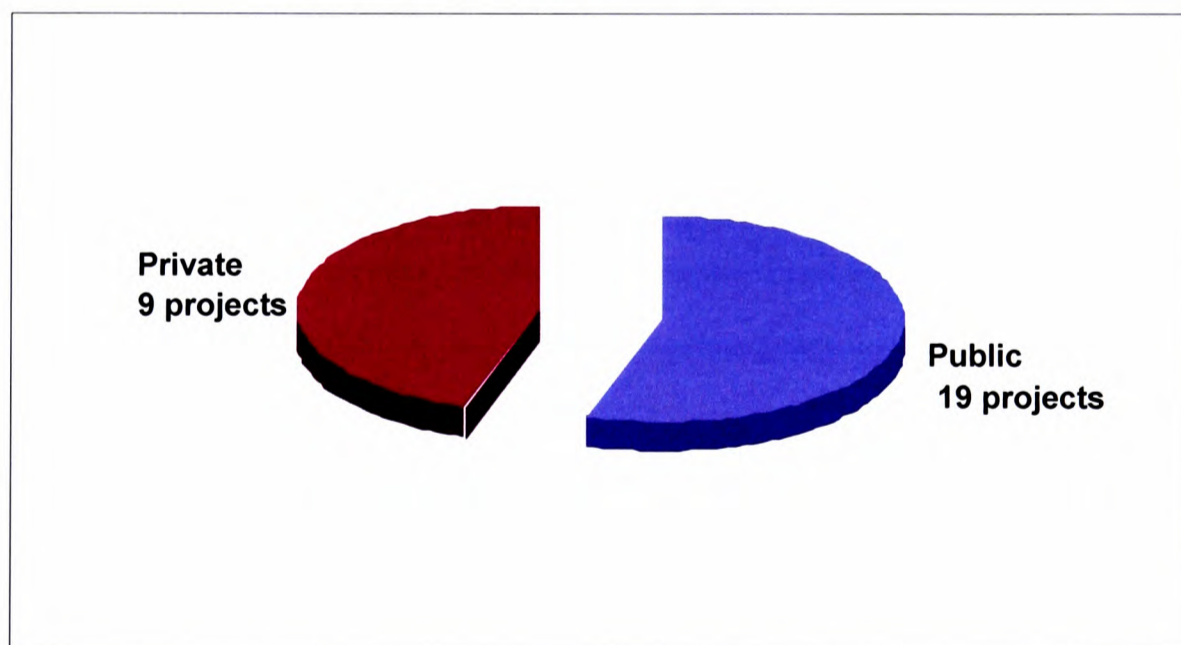


Figure 12 Type of Employer (Public vs. Private)

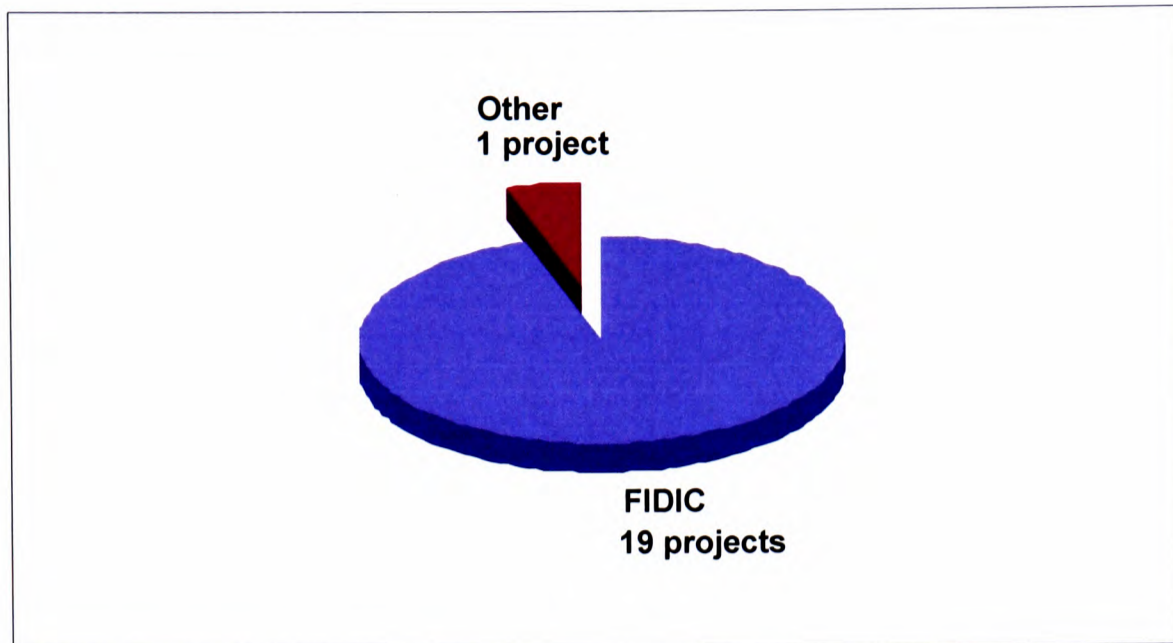


Figure 13 Forms of Contract

Figure 11 shows the industry or sector the project originates from; the three biggest sectors being: residential, public facilities, and universities. It is worth noting that this breakdown is not representative of the Lebanese construction industry. It only aims at categorizing the projects under study. Figure 12 shows that projects under study are almost equally divided between public and private sectors. Figure 13 shows that except for one, the remaining 19 projects adopt the FIDIC Red Book Fourth Edition. Figure 14 below shows that two third of the projects examined are resolved through amicable settlement.

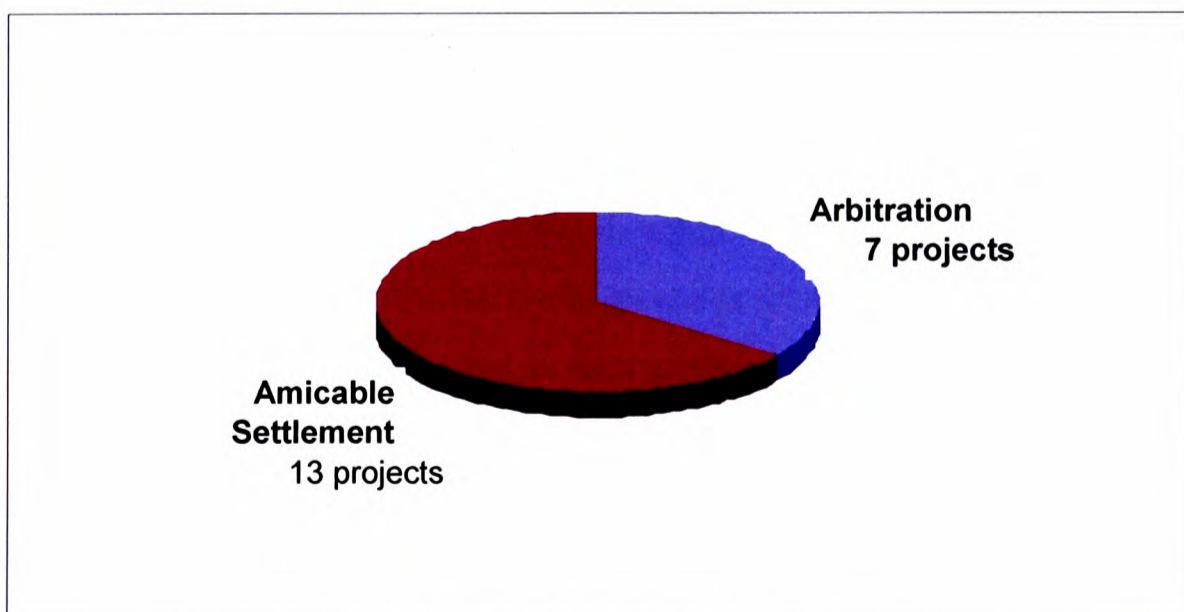


Figure 14 Dispute Resolution Method

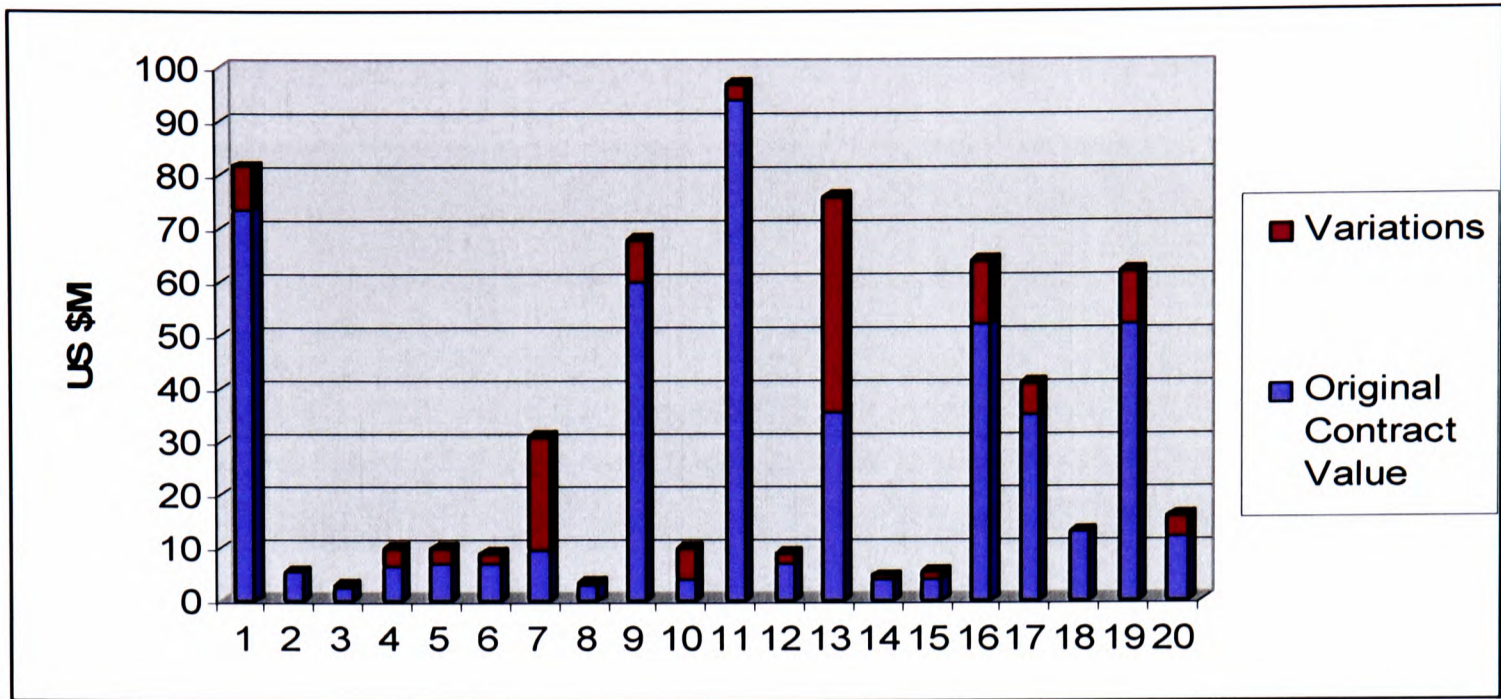


Figure 15 Amount of Variations

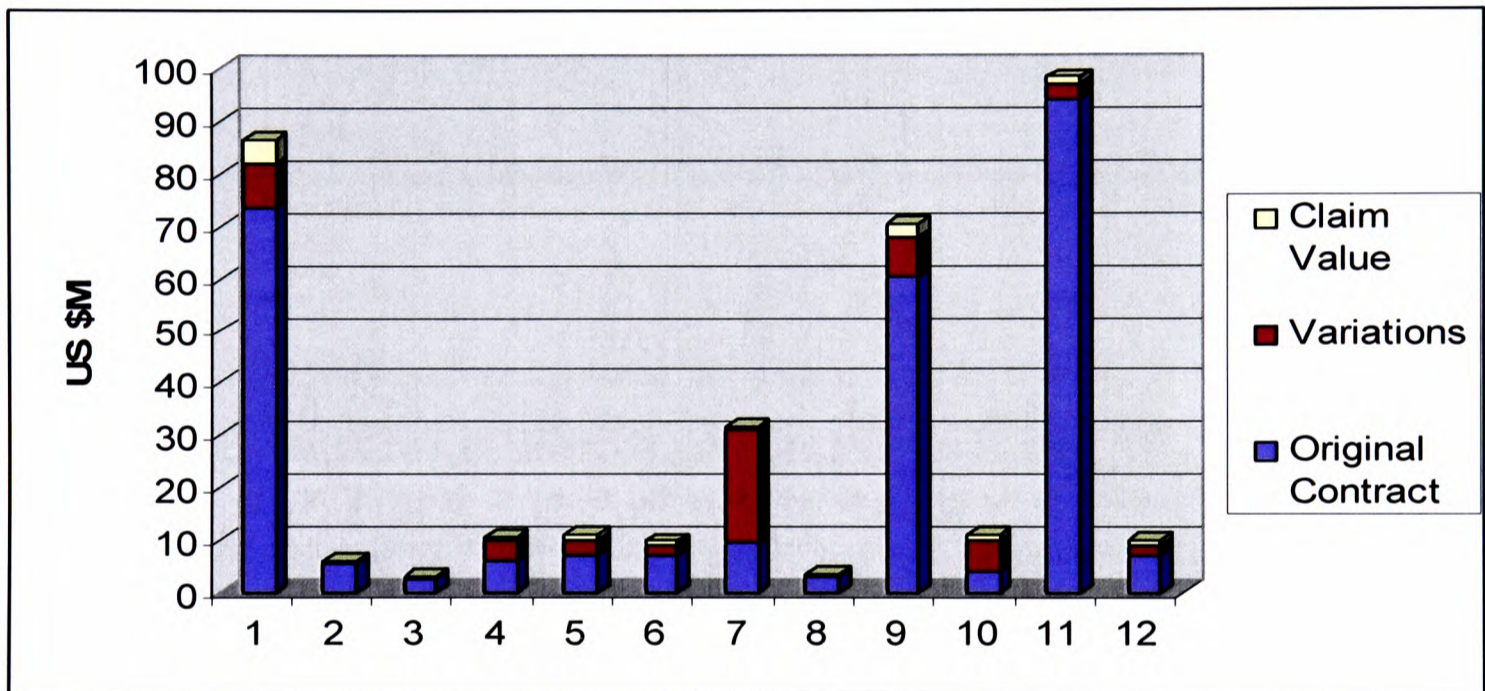


Figure 16 Final Contract Value vs. Original Contract Value

The causes of disputes as shown in the description of case studies above included: design modification, price escalation, failure to grant possession, delay in issuing order to commence, failure to pay, late expropriation, late reply to submittals, shortage of manpower, and permit noncompliance. However, the modification to design is noticeably a common cause of claim in almost all projects. This is also confirmed in Figure 17 which shows in the 20 projects an average of 45% variations to the original amount. Also, looking at this figure it is noticeable that the amount of variations exceeds 50% in four projects of which 2 exceed by 150%.

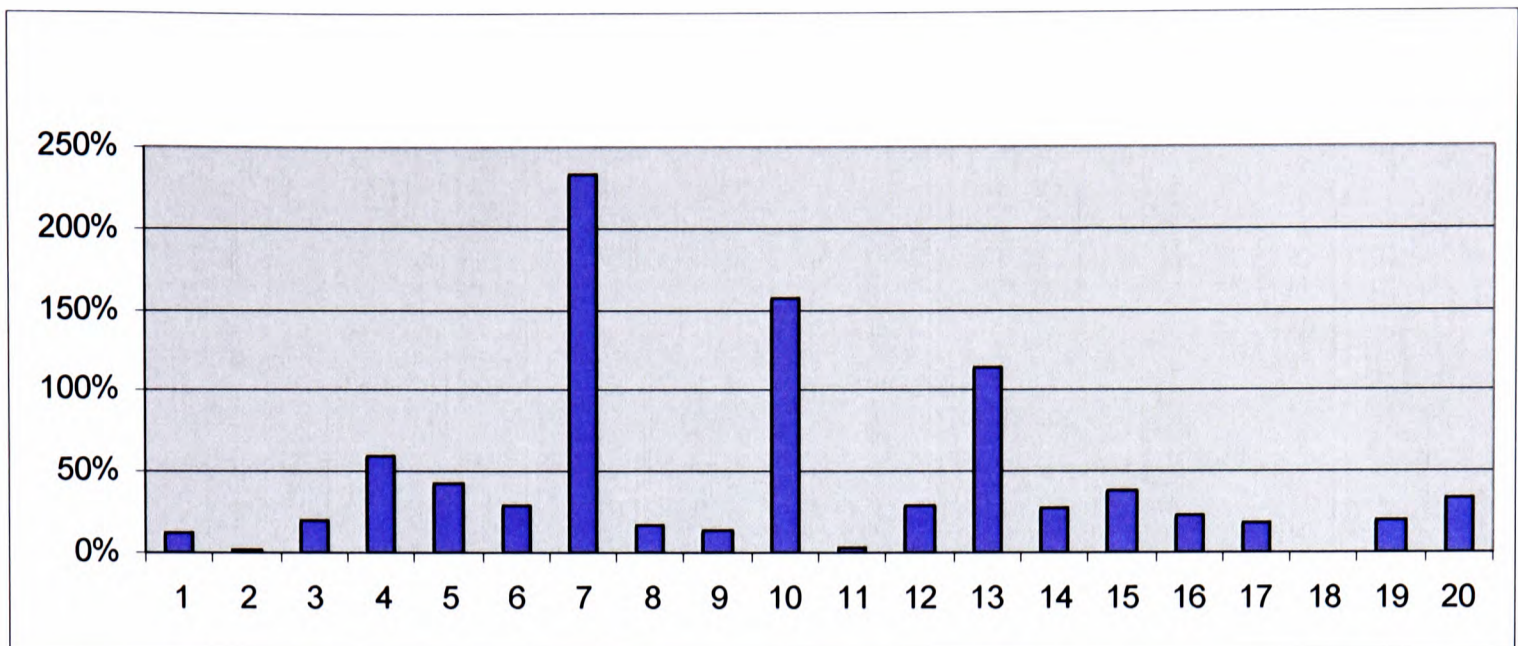


Figure 17 Percentage of added variations to original scope of work

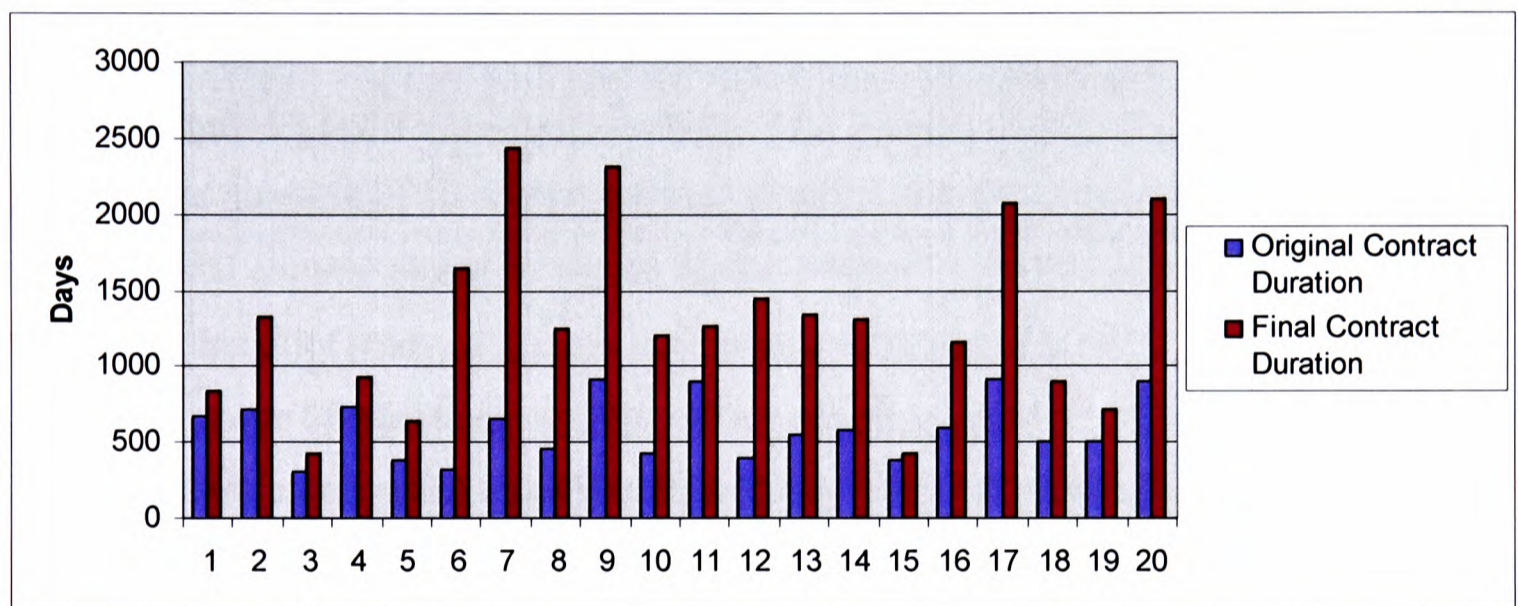


Figure 18 Final Contract Duration vs. Original Contract Duration

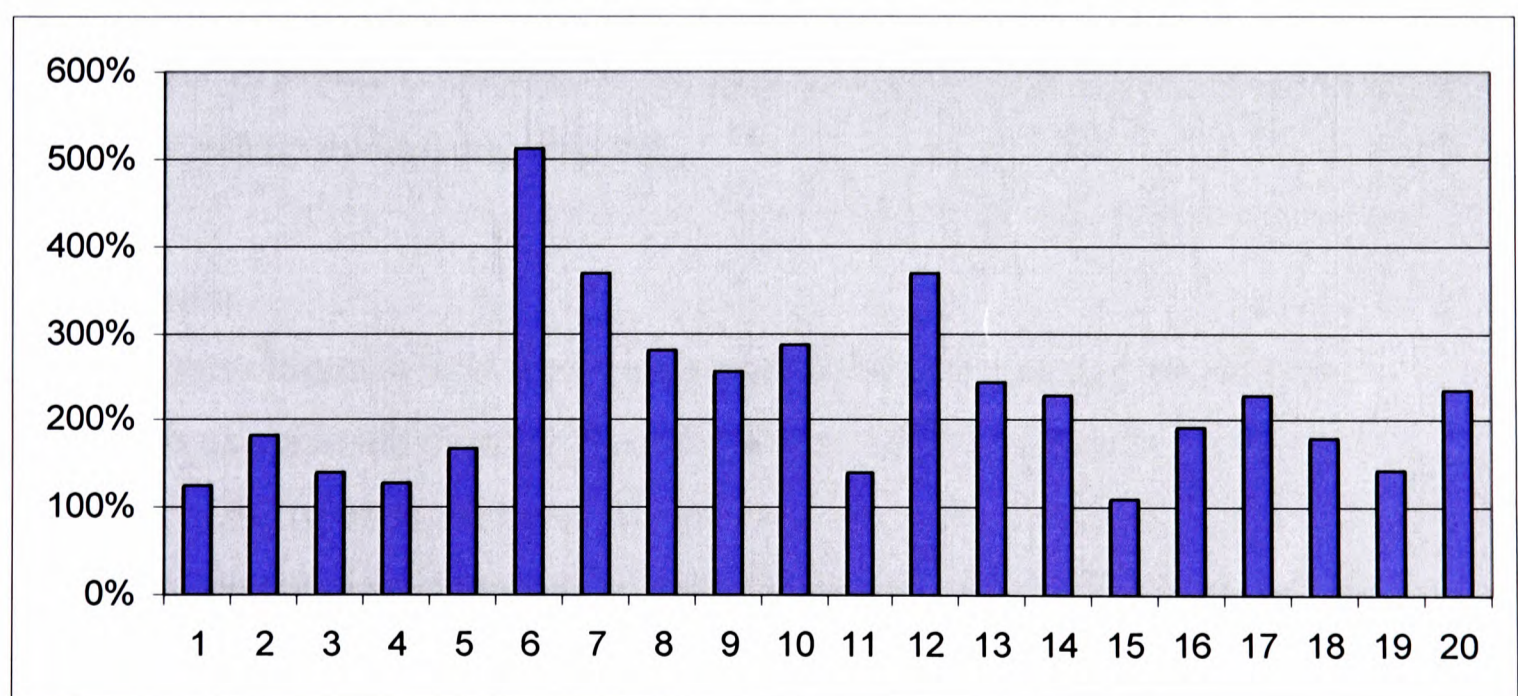


Figure 19 Time Overrun (Final Duration/Original Duration)

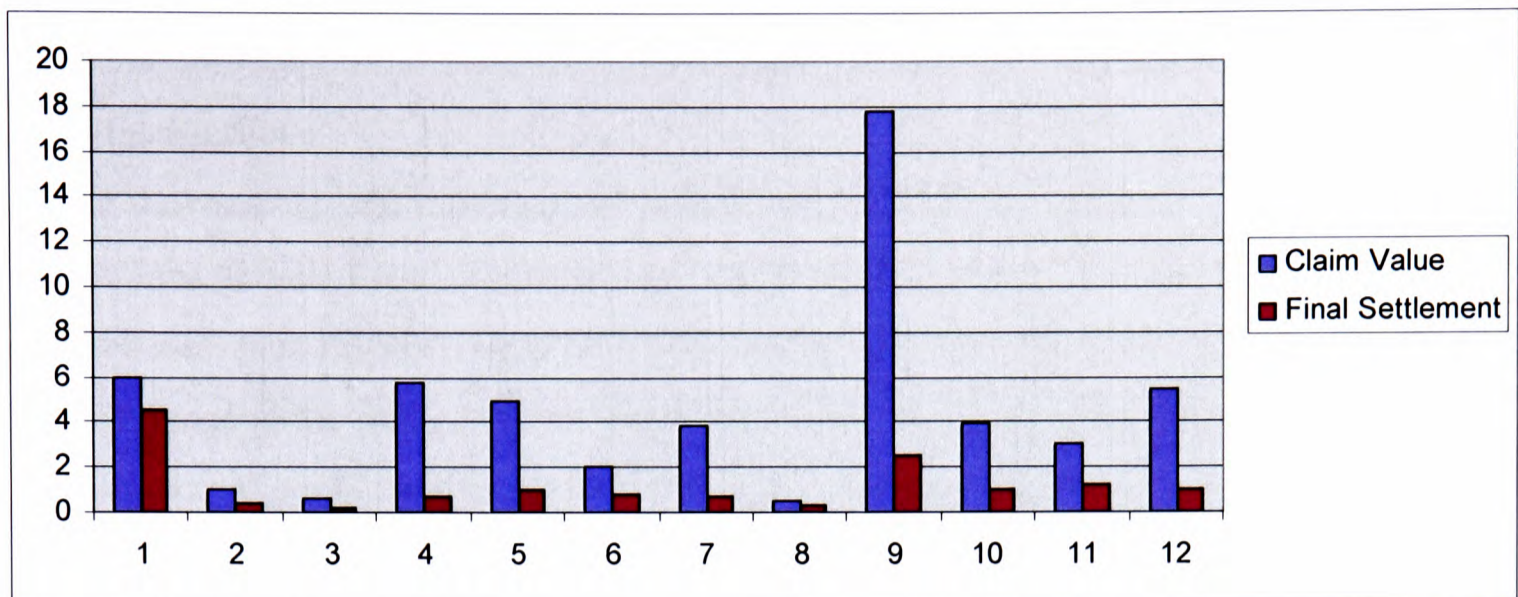


Figure 20 Claim Value vs. Final Settlement

Figures 18 and 19 similarly show the time overrun which exceeds 100% in all of them i.e. the duration of all projects at least doubles with an average of 226% extension to the original contract duration. These figures reflect a high value of time and cost overrun in this pilot study. Although those might be mainly the direct result of the increase in scope of variations or other risk eventuating, the claims examined with respect to the final settlement value show an alarming amount of disputes. Figure 20 compares the final settlement value vs. the original claim value. This shows that the settlement/award value is on average equal to 20% of the claimed value. It can be deduced from this figure that disputes in the value of 80% of the project value on average existed on these projects. The existence of disputes in the sample of projects examined confirms the need for a study to help minimizing disputes.

4.4. Summary

In this chapter, a field study was conducted on 20 construction projects in Lebanon to examine the disputed claims that were leading to disputes. It gave an indication of the types of contracts utilized on these projects mainly the FIDIC Red Book 4th Edition and the dispute resolution methods adopted. Also, analysis of the data collected reflected a high occurrence of major time and cost overruns as well as disputes on all the projects.

CHAPTER 5: INTERVIEWS

5.1. Introduction

Following the preliminary examination of 20 projects in Lebanon which confirmed the prevalence of disputes in the construction industry, interviews have been conducted with practitioners to explore their perception of dispute factors. As they share their experience in the field, this would give an insight on the “people” factor referred to in the literature through examining their knowledge and impressions.

The questions were set to allow for discussing conflicts and disputes to cover the dispute impacting aspects as had been reported in previous research and as perceived from the causes of disputes on the 20 projects examined in Chapter 4. As such the questions addressed the difficult construction project phases ie procurement stage, contract execution and dispute resolution. This allowed the interviewees the freedom to expand on any of the areas that impacted disputes.

The interviews have been conducted with 24 professionals in the industry divided equally between contractors and consultants. The 24 interviewees belonging to different companies represent a cross section of the leading contracting and consulting companies in Lebanon. They include 6 consulting companies and 9 contracting companies. Employers were not interviewed because of the difficulty in reaching them noting that many of them were reported to be individual investors with limited experience in the construction industry.

The questions focused on minimizing construction disputes throughout the project lifecycle i.e. at the procurement stage, during execution of the works and at dispute resolution stage (which might sometimes occur during execution of the works). These questions were derived from the literature review.

The interviews were not recorded to allow the interviewees to discuss openly sensitive disputed matters. Any reference to names or project specifics is kept confidential as promised to the interviewees. The interviews were semi-structured in nature. In many cases in answering one question the interviewees addressed remaining questions. Accordingly, although all interviews covered the main questions originally set, the flow of the discussion dictated the order in addressing these questions.

These interviewees were semi-structured in nature and carried the qualitative trait. As such they differed from a questionnaire where the answers are quantitatively compared. Also, as the questions were general, some interviewees elaborated on some questions more than others.

The findings can be classified into two types:

- Direct questions such as: “Who is the most influential party in dispute resolution? whether the Engineer is impartial? Is the DAB introduced in the new FIDIC 1999 a better substitute to the Engineer’s Decision?”
- Discussions where each interviewee elaborated on his/her views and looked at the issue from different angles. Some interviewees touched on certain issues that others did not discuss as if the interviewees were adding different pieces of information that would help draw the full picture. These types of discussions were difficult to compare.

Gerson and Horowitz (2003) describe in-depth qualitative interviews as follows (a check against the comment confirms that this has been witnessed in the 24 interviews carried out):

“The best interviews become a conversation between two engaged people, both of which are searching to unravel the mysteries and meanings of a life.

Inevitably, some interviews will provide more useful information than others. No single interview, however, revealing, can offer more than limited insight into general social forces and processes. Only by comparing a series of interviews can the significance of any one of them be fully understood. And in the long run, each interview will add to the final story... Some participants are able to offer great detail and insight, while others find it difficult to recollect past circumstances or contemplate future possibilities...

Where new interviews are more likely to confirm earlier insights than to spark new discoveries there is a good chance that theoretical saturation has been reached...If all goes well, these categories will be quite different than the ones that seemed obvious before the study began”.

Meeting the writers’ recommendation for good qualitative interviewing practices confirmed that the interviews were conducted in a healthy qualitative method and where

the results compliment each other rather than allow for direct comparison the full picture would be drawn accordingly. Similar to an interview survey conducted by Dozzi *et al.* (1996), the study sample here is small and does not lend itself to statistical analysis. As such responses were analyzed and evaluated through drawing inferences and observing some trends and commonalities.

5.2. Interview Questions and Answers

The seven questions addressed in the interviews are listed below. The replies received were defined under different sub-headings to better identify the problem areas that were raised by the interviewees.

Question 1

Does risk allocation have an effect on dispute arising on a project? What is the effect of unfair/unclear risk allocation? How do you expect the contractor to control a major risk when it arises? How should the tenderer be selected? What about unrealistic tender pricing from the contractor's side as opposed to unrealistic time/cost/quality targets from the Employer's side?

Risk Allocation Best Practice/ Common Practice

Almost all interviewees were aware and agreed to the common principle that risk should be allocated to the party that is best able to handle it. Otherwise the Employer would be paying for it upfront whether the risk occurs during project execution or not. When asked about the common practice in risk allocation at the procurement stage in Lebanon, all interviewees stated that the contracts in general are being unbalanced where most of the risk is shifted to the contractor.

Replies to the question 'who is responsible for specifying these conditions?' came as follows:

- Sixteen of the interviewees said the Employer is not educated and so the Engineer would put these conditions that suit the Employer to protect his/her interest by minimizing the chances of cost overrun.

- Eight of the interviewees (mainly Engineers) said the Employer would ask for these conditions, especially if he/she has a restricted budget and can not afford cost overruns.

Two main reasons behind the tendency to allocate risk to the Contractor identified from the replies were:

- The Employer desires to minimize headaches and cost overruns (some interviewees added that the Employer might have limited budget and be obliged to have these conditions)
- The Engineer allocated the risks based on previous experience to safeguard the Employer's rights and keep the contract in his/her favor. This will also allow the Employer to have an upper hand. Two contractors and three consultants said such practices an attempt to avoid abuse by the contractor based on previous experience.

The question was asked whether the contract can still be considered to be fair in spite of the unbalanced risk allocation. The answer was that since the Contractor has read it, verified it, accepted it and signed it then it is considered to be a fair contract.

Employer's Influence in risk allocation

According to the interviewees, Employers allocate all the risks to Contractor mainly for the following:

- The Employer has the upper hand because if the risk arises he might elect to pay for it as a gesture of will. However, the contractor has no rights to such compensation.
- They do not want to keep the budget open

The above is applicable to both the public and private sectors. However, the Government would be concerned with maintaining a healthy market and would look into a Contractor's major possible/potential losses. Private Employers do not share this concern. Some interviewees added that supply and demand have a major impact. Contractors would not have to sign/accept these Contracts where there is high demand in construction.

The Employer by going to the very low bids incurs the risk of:

- The Contractor using cheaper alternatives to the specifications.
- The Contractor searching for potential claim areas that would compensate the losses.
- The Contractor failing to complete the project.

Contractor's allowance for risk premium/ Contractor's ability to sustain risk

In practice both the Engineers and the Contractors stated that contractors do not allow for risk or allow for a nominal (2-3%) risk that would not fall short of covering the risks that are allocated to the Contractor should they surface.

The reason behind this was explained as follows:

- Maintaining a competitive edge
- Adopting a marketing strategy where the project would add to the Contractor's profile
- Shortage of qualified professionals in pricing to identify the risk and allow for the necessary markup and proper estimation of the resources necessary for the proper execution of the works
- Short periods for tender submission
- Identifying potential claim areas that would provide for profit sources during execution of the works

Interviewees added that this will not allow the contractor to afford the risks when they surface. They agreed that if the Contractor is not allowed for a risk premium in his offer where the risk eventuates a dispute is bound to occur. Even if the Contractor is not entitled to it, he will still claim for it if it has a major impact on the cash flow and affects his financial stability. Two contractors of the same contracting firm stated that their firm would refuse to sign under these conditions and this is normally set in their qualifications.

Contract Documents

Most interviewees stressed the importance of having a complete design before tender and drafting clear contract documents with accurate BOQ quantities and

specifications that are written for the specific needs of the project rather than copied and pasted from other projects. The importance of having a complete design was considered to be more detrimental in lump sum projects. Examples were given by some interviewees where cost and time overrun were incurred due to missing design information where the Engineer elaborated on the design during the execution of the works or where major redesign was made during execution of the works due to it being outdated. Also, clear achievable design/specifications issued were raised as an important factor that could minimize ambiguities and disputes resulting from contradicting explanations of the contract requirements.

Tender Evaluation

Most of the interviewees emphasized the importance of prequalifications in screening the tenderers. Having set the criteria for the participating contractors the two main criteria raised were the bid price and the project duration. In examining the bid price, some interviewees added that the qualifications included in the tender are to be examined to ensure proper comparison of bids. Also, almost all interviewees raised their concern regarding the importance of closely examining the lowest bid where it is found to be out of range.

Tender Period

The insufficiency of bid period allowed was raised by 2 consultants and 5 contractors. However one consultant argued that the bid period could be sufficient when was the main contractor prices the Concrete and the Architectural works only and the remaining parts are broken down to packages to be priced by the subcontractors. Other Contractors considered having experienced and adequate number of staff for pricing as more important than the bid period itself.

Question 2

What is the form of contract most commonly used? Why is the FIDIC Red Book 4th Editions more commonly used than the most recent one? What are the hazards of introducing particular conditions? Are they normally coherent or

unbalanced or affect the clarity? If the answer is in the affirmative then what aspects are normally unbalanced? Could using a different form of procurement serve the purpose of the project better?

Fairness of Contract

FIDIC 4th Edition Red Book was confirmed to be commonly used due to familiarity. Some stated that FIDIC 4th Edition is popular because it is being adopted on projects by the lead consultant companies in the country. One interviewee added that the saying “The devil that you know is better than the devil that you don’t know” could partly explain why practitioners are resistant to adopting new forms.

Types of Contract

The types of contracts used as per the reported popularity are as follows:

- Lump Sum: Very commonly used on projects. Reasons for using this type were explained to be:
 - Employer’s need to cut down on the risk of cost overrun
 - Engineer’s desire to cut down on the load of work in issuing lump sum payments rather than remeasured
 - Very prone to disputes especially in cases where tender quantities were not correct and there were major design changes
- Remeasured: Again commonly used especially in the private sector
- Cost Plus: There seemed to be a common agreement between Engineers and Contractors that this type of contract would reduce disputes especially those related to assessments and payments. It is not as common as the lump sum and the remeasured because there is a fear of seeing the Contractor abusing it as well as higher possibilities of cost overrun.
- Design build: Engineers and Contractors agreed that it reduces disputes especially resolving design issues. However, the Employers in Lebanon do not adopt it because it would give the Employer little control during the progress of the works.

- Partnering: Only few of the interviewees were familiar with the concept of partnering. They considered the culture not to allow for it.

Particular Conditions/ their influence on contract consistency

According to interviewees particulars are necessary to reflect specifics of a project. However, if not dealt with correctly, they might:

- Create an ambiguity where new conditions are added that do not match with general ones or even a loop hole where clauses are deleted and not replaced.
- Make conditions of contract unbalanced by shifting risks.

Modifications made to the general conditions and which normally become problem areas include:

- Price escalation . This is one major risk that rose lately where the government is looking for compensation and the syndicate of contractors is working on it.
- Procedure for notification of possible variation.
- Design liability.
- Employer's prior approval to any Engineer's time and cost determination
- Order of precedence of Contract documents. One interviewee stated that on one project precedence was given to the Engineer's discretion who in turn gave preference to the document that best covers Employer's benefit.
- Deletion of works to be assigned to another contractor without compensation of profit

Question 3

Who is/are the key person/persons on a project that can contribute to resolving a dispute? Is the role of the construction manager and/or the project manager critical (in other words would lack of competence in this case affect the project)? How do you best describe the role of the Employer's representative? Would the behavioral attitudes of these persons contribute to the amount of disputes on the project?

Key Persons on the Project

When asked who of the 3 people (the Project Manager, the Engineer, or the Contractor) has the most influence on minimizing disputes, out of the 24:

- 11 answered the Engineer should hold the threads, maintain a cooperative spirit, be fair and make recommendations to the Employer
- 5 answered the Contractor has control over the actual progress of works, makes critical decisions and minimizes disputes especially when allowed for good risk and profit margins.
- 4 answered the Employer Representative (ER) has the most influence. If the Engineer is competent but does not have a well experienced ER that would collaborate on critical issues then there is little that the Engineer can do. ER would have the final decisions on Engineer's recommendations as the Engineer would have no right to waive any of the ER's rights
- 2 answered the three of them should be qualified
- 2 answered the Engineer and the Contractor

Proactive attitude in resolving problematic issues

All interviewees strongly agreed to the fact that the behavioral attitude has a major effect on the progress/success of the works (time and cost overruns). The following was repeatedly heard in this regard:

- Personal conflicts might occur between any of the three parties
- The Engineer should have a personality that could weigh difficult situations and resolve them
- There is 'chemistry' between the people working on the same project. By that the interviewees meant the instinctual reaction of participants that would influence them liking or disliking each other. Sometimes one person that might be a troublemaker on one project, might fit perfectly on another project with a different team.
- Behavioral attitudes might have a bigger effect in Lebanon because the people by nature are more emotionally driven.

Employer's Representative

- Most interviewees (21) stated that the Employer's Representative should only interfere on strategic issues related to time and cost. His interference should be motivated by the significance of the variation. He may pinpoint mistakes or issues that the PM might be overloaded to notice. However, his important role is in examining recommendations by the Engineer and taking the decision that is in the best interest of the project.
- The remaining three (mainly Contractors) stated that ER has no role under the FIDIC and is not needed on a construction project.

Direct Dispute Factors

During the execution of the works disputes were attributed to a variety of reasons:

- Engineers considered that the Contractor suffered from bad planning and lack of coordination with subcontractors. This leads to time and cost overrun which the contractor tries to cover through claims.
- Contractors stated that an Engineer who does not have the necessary site expertise which would allow him to have reasonable constructible instructions instead of insisting on every detail in specification would drive towards increased number of disputes.
- Disagreement on time and cost entitlement assessment was raised as a problem area by both Engineers and Contractors.

Question 4

What are the interviewees' views on: the importance of giving notice, proper claim documentation and presentation, the Engineer's prompt attendance to the claim? Would it help the project to resolve disputes early on? Would you be willing to compromise on some of the disputed issues to resolve them?

Timely response to contractual matters (giving notice, making determinations...)

All agreed that it is very important to give a notice of a time or cost overrun so as to allow the Engineer to take alternative decisions where necessary. Also, it is very important for the Engineer to make timely determinations. Where the effect is ongoing, interim determinations should be made so that Contractor can make financial decisions accordingly.

One Contractor said that the Engineer might be late in answering because he tries to delay the negative answer. One consultant said the reason for late reply was the shortage of staff required to handle the necessary workload in a timely manner.

As for the time constraint for the Engineer's assessment introduced in the 1999 suite of the FIDIC contracts:

- 91% stated that it would be fairer to the Contractor to receive his determination within a specified time period.
- 9% (2 Engineers) warned that this might have a negative drawback. If the time frame set is not closely examined to be reasonable & where the Engineer might not have enough staff this might induce the Engineer to make premature determinations.

Contractor's willingness to compromise

Both Engineers and Consultants stated the following:

- The Contractor might compromise to resolve disputes depending on the value of the dispute and its impact on his cash flow.
- Where the Contractor knows that the disrupted cost implications are significant in value and that he is fairly entitled to it, he will be willing to proceed with arbitration.

Question 5

If the Engineer makes a determination regarding a disputed issue, what factors contribute to making a different Engineer's Decision? What are your views on DAB in the FIDIC 1999 Red Book as an alternative?

Engineer's Decision

Most consultants stated that the Engineer would only revert from/alter his decision if this is in contradiction with the original determination. Most of the contractors on the other hand stated that the Engineer rarely changes the original determination. Some added that the Decision is influenced by the Employer. Interviewees from both sides said it would be a better practice to have the Engineer's Decision made by a different entity in the Engineer's office as opposed to the Engineer's representative on site.

Half of the interviewees stated that the Engineer's Decision provides a chance for the Engineer to be impartial and avoid the Employer's influence on determinations.

DAB in FIDIC

Only 2 interviewees reported using the new 1999 FIDIC on 2 projects but the DAB clause was removed in both.

When questioned about their views on adopting in the 1996 Supplement to the 1992 Red Book Fourth Edition and later in the 1999 FIDIC suite of Contract and whether that would help reduce disputes different replies were received. There were divided as follows:

Engineer's views on DAB

- 4 of the Engineers were not familiar with the 1999 FIDIC
- 5 believed that it would be another buffer that would help resolve disputes and would help maintain a more fair and impartial environment. It allows for mediation attempt that the Engineer is not allowed for.
- 3 believed that the Engineer is more familiar with the project and is able to better assess the situation. If he is given the power under the contract he is best qualified to resolve disputes. Also, there was a concern about the availability of professionals that would qualify as DAB members.
- One Engineer added that: "The DAB might not be able to meet the expected results in terms of dispute resolution. Arbitration at some point in time was

considered to be the best approach to dispute resolution but in many cases it failed to meet the aspired results.”

Contractors views on DAB

- 3 of the Contractors were not familiar with the 1999 FIDIC
- 7 agreed that the 1999 FIDIC is a better option for the Contractor as it would provide impartiality where the Employer can no longer have direct influence on the decision.
- 2 expressed concern about the new DAB as it might introduce more individuals to give their opinion on the dispute and this might further complicate the dispute.

One Contractor added that one hazard of the 1999 FIDIC is that “the Engineer would no longer have his original role of being the fair ‘judge’ between the Contractor and the Employer. In fact the Engineer who has a very critical role on the project might automatically turn into an Employer’s representative on all issue and the DAB will be the judge.”

Question 6

After the Engineer’s decision is issued, if one of the parties is not content with the decision, this party should give a notice of intention to proceed with arbitration within 84 days? Would this affect the ongoing relationship between the parties? How is the dispute dealt with beyond this point?

Arbitration, adjudication, mediation

All interviewees agreed that proceeding with arbitration would create adversarial relationships between different parties. Therefore, it is better not to proceed with it till the end of the project due to two reasons:

- An amicable settlement might be reached
 - It will require a lot of effort/resources from the people working on the project.
- Thus, it is not advisable during the execution of the works.

Few of the interviewees added that the Contractor might need to proceed with arbitration if:

- The number of disputes increases
- The value of the disputes impacts his financial stability

Negotiation Basket and Amicable Settlement

Interviewees stated that there is a common trend to amicably resolve disputes after completion of the works.

The negotiation basket approach used to reach an amicable settlement was reported to be to the Employer's benefit as it:

- Withholds payment of all claimed amounts till the end
- Allows the Employer to exert pressure on the Contractor and in some cases propose an amicable settlement whereby one party waives his right to liquidated damages against the other party's entitlement to claims.

Delaying dispute resolution till the end might avoid adversarial relations. However:

- Late payment might cause financial problems to the Contractor.
- There will be a trend of submitting more claims to have a stronger case at the end, thus encouraging more disputes.

Question 7

Has the ongoing political situation in Lebanon had an effect on the causes of dispute and/or on dispute resolution?

Regarding the effect of political situation in the country:

- All interviewees agreed that the war does not have a direct effect on the enforceability of the contract. It does however have indirect effect and causes:
 - Dispute due to delay impact where internal political conflicts/turmoil occur
 - Dispute over the contractor's entitlement to compensation due to Employer's risk

- Employee turnover and in some cases loss of experienced personnel during execution of the works

5.3. Analysis of Replies

The replies obtained were consistent with similar studies conducted by Dozzi *et al.* (1996) and Hartman (2003), and Shleifer (1990) which had derived the following observations:

- Contractors save claims until the project is complete or almost complete because they do not wish to compromise/ jeopardize their relationship with the owner. This was also the opinion, though not as strong, for relationships with the consultants.
- Construction contracts apportion risks unfairly to the contractor and to subcontractors. They do not apportion risk unfairly to the owner or the consultant.
- Exculpatory clauses increase the likelihood of a contract dispute.
- Consultants who act as contract administrators on behalf of their clients often lack objectivity in making decisions about contract issues and their interpretation.
- More efficient risk management will reduce the final cost of construction to the owner.
- Contractors should be screened and prequalified before being allowed to bid on a contract.

Furthermore, two main observations can be drawn from these replies:

- Although the subject areas raised by interviews reflect their understanding of the different dispute factors, not all were equally knowledgeable in certain contractual aspects. This is evident from the DAB question where around one third of the respondents were unfamiliar with the new FIDIC 1999. The statement made by three respondents (contractors) that the Employer's representative had no role under FIDIC was not correct. 70% of the interviewees expressed lack of knowledge of new procurement methods such as partnering. Little knowledge was reported in dispute resolution techniques devised abroad and the concept of team building.

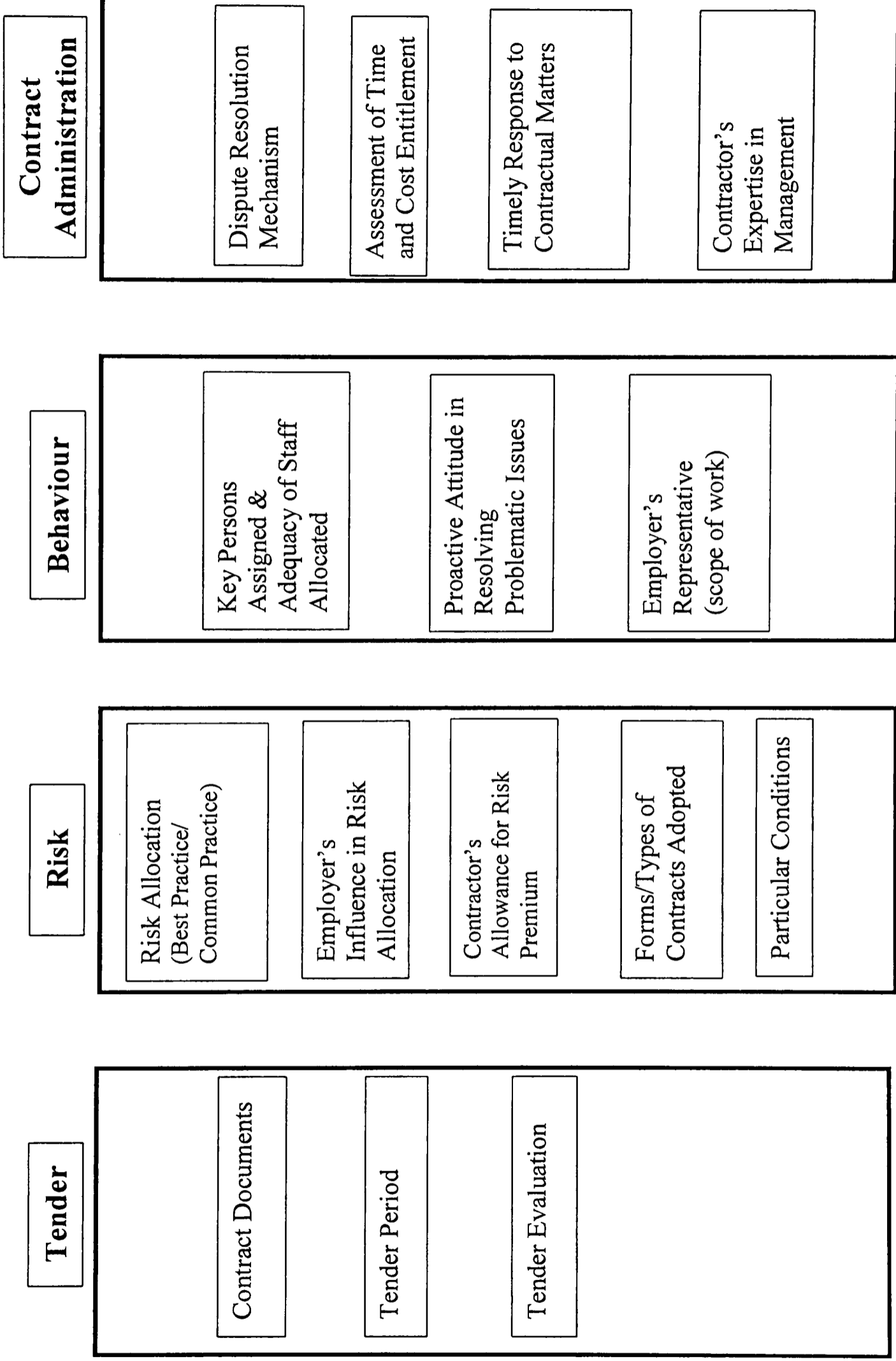


Figure 21 Dispute Influencing Areas Emerging from Interviews

- The seven questions raised in the semi-structured interviews helped identify 15 dispute influencing areas that emerged from the discussions. These are shown in Figure 21 below. They have been categorized under four themes: Tender, Risk, Behavior and Contract Administration. These are identified as dispute influencing areas because each has its contribution in creating or augmenting the incidence of disputes. By way of example, an ambiguity in the contract documents would give rise to a dispute, lack of chemistry among participants or even the lack of proactive attitude would worsen the situation. Thus the deficiency in the dispute resolution mechanism would prevent efficient resolution. Moreover, if a Contractor risk eventuates in an unbalanced contract where proper risk allocation is not accounted for and the Employer doesn't interfere to resolve the same, then a dispute is likely to result due to the financial difficulties.

5.4. Summary

The interviews of 24 practitioners in the industry equally divided between Engineers and Contractors were carried out as the second level of fieldwork. It reflected the understanding and comments of practitioners of the common practices. The respondents highlighted through their replies the significance of 15 dispute influencing areas. These were categorized under four themes: tender, risk, behaviour, and contract administration.

The interviewees expressed an understanding of healthy practices in procurement that would allow for minimizing disputes in line with what was recommended in the literature examined. Examples of such healthy practice includes allocation of risk to the party that could best handle it, the importance of having complete design, the importance of closely examining the lowest bidder, the impact of manipulating the particular conditions, the impact of behavioural factor of participants, the importance of giving notice. The interviewees also expressed differing views on matters such as who was responsible for risk allocation in contract formation, the advantage of replacing the Engineer's Decision by a Dispute Adjudication Board (DAB). The DAB mechanism was not reported as per the Interviewees experience on Lebanese projects.

Although the interviewees expressed awareness of the contractual implications on disputes, one third of the interviewees who are assigned to administer contracts, had limited knowledge related to more recent forms of FIDIC and new methods of procurement adopted in other countries.

CHAPTER 6: DISPUTE CASE STUDIES

6.1. Introduction

Following the two fieldwork analysis carried out in previous chapters to examine disputes in Lebanon through analyzing project data and through interviewing practitioners, this chapter analyses disputes through an in-depth analysis of 50 case studies on four projects. As such the case study approach adopted is the multiple case design with embedded units of analysis (50 dispute cases). The data related to the dispute cases was gathered through examining project documentation including correspondences, claims and Engineer's Decisions.

6.2. Analysis Approach

The Case Study approach adopted is the multiple-case design with embedded units of analysis. The Cases are four ongoing projects that consist of shopping complex, residential tower, university building, and hotel with the following values: US\$15M, US\$75M, US\$ 52M and US\$95M. All four projects use the FIDIC form of contract. However, extracts of the Particular Conditions modifying the General Conditions are shown in Appendix D to show how risk was allocated and shifted in many cases to the Contractor. The extracts of clauses 2.1, 2.7, 5.2, 70.1, and 70.2 confirm what was said in the interviews regarding common practice in modifying the risk allocation in FIDIC form of contract. The FIDIC form of contract is further described in Chapter 7.

After the chronology of events for each of the 50 cases was listed, an analysis of the events was necessary. Through the analysis both the risks eventuating and the dispute factors would be examined. However, this necessitated devising a uniform framework for analysis. For this reason, the interrelationship between the risk, dispute factors, contract conditions and behavioral attitudes was to be examined. This was done as follows:

- Risks that could eventuate on a project were identified using Bunni's (2003) generic spectrum of risks. These are listed in Table 6.
- Zack (1996) had in his work identified the list of risks that are addressed in the conditions of contract (noting that different forms of contract might address them differently). The risks identified by Zack are included in Table 7.

Examining Bunni's risks against Zack's risks, it is noticed in Table 8 that Zack's risk addresses those specified by Bunni except for those relating to behavioral attitudes. This can be verified by the mere fact that the contract although does attend to time frames for submittals and replies does not make provisions for the cases where the parties have developed adversarial relationships. The contract however makes provisions for dispute resolution mechanisms where disputes arise due to the same.

Table 6 Spectrum of Risks identified by Bunni (2003)

Spectrum of Risks	
Riot and civil commotion, Arson, Strike, Malicious acts	Brief and remuneration
War, nuclear reactions etc	Financial stability
Acts of God (Excessive Rainfall, Flood and inundation, Wind and storm, Hurricane, tornado and whirlwind, Extremes of temperature, Cyclone, Earthquake...)	Inefficiency and delays
External stability of Government	Extended duration of construction
Internal stability of Government	Programming the work
Inappropriate choice of design	Negligence and lack of care
Negligence and lack of care	Incompetence
Lack of knowledge and checking	Inadequate site supervision
Adequacy of site investigation	Inadequate site management
Adequacy of surveys and inspections	State of the art, codes and knowledge
Unforeseen Site Conditions (Topography and surface water runoff, Adverse geological and underground characteristics, Underground obstructions...)	Defective design
Variation from contract documents	Risks associated with dispute resolution
Choice of site	Failure to take account of foreseen problems
Transit to site	Use of untested and proven techniques
Defective workmanship and material	Technical Complexity and new methods
Defective design, workmanship and quality control	Removal of Support
Mechanical and electrical breakdown	Dangerous substances and items during constructions and commissioning
Defective Temporary works and their design, Corrosion, Collapse, Collapse of temporary works	Taxes and the Stability of the Legal System, Red tape
Human error	Acceptability of projects by locals
Failure to comply with insurer's conditions and requirements	Inadequate performance of equipment
Choice of contractor or subcontractor	Lack of safety precautions
Theft and Burglary, Illegal activities, Faud and infidelity, Impact	Lack of communication
Adequacy of finance and related aspects	Owner Choice of Professional Team

Table 7 Risks identified in Contract by Zack (1996)

Force Majeur
Impracticality/impossibility
Latent site conditions
Quantity variations
Site access
Weather
Defective work
Labor forces
Subcontractor, supplier failure
Contract Termination
Cost Escalation
Failure to pay
Project funding
Taxes
Acceleration
Delays and disruptions
Early use of facility
Suspension of work
Untimely responses
Changes
Contractor-furnished equipment/materials
Coordination
Defective contract documents
Interpretation of requirements
Means and methods of construction
Permits and licenses
Productivity
Site safety
Work Quality

As such analysis was carried out where the following are examined for each of the 50 case studies: Zack's risks, and dispute factors including behavioral attitudes. For this reason an analysis sheet as shown in Figure 23 was devised where dispute factors are listed at the right side vertical column. Zack's risks are listed in the lower horizontal rows. Behavioral description attitudes examined through the analysis are listed in the last row.

CS no: 4

Subject: Façade glass

Project: A

Section: Facade

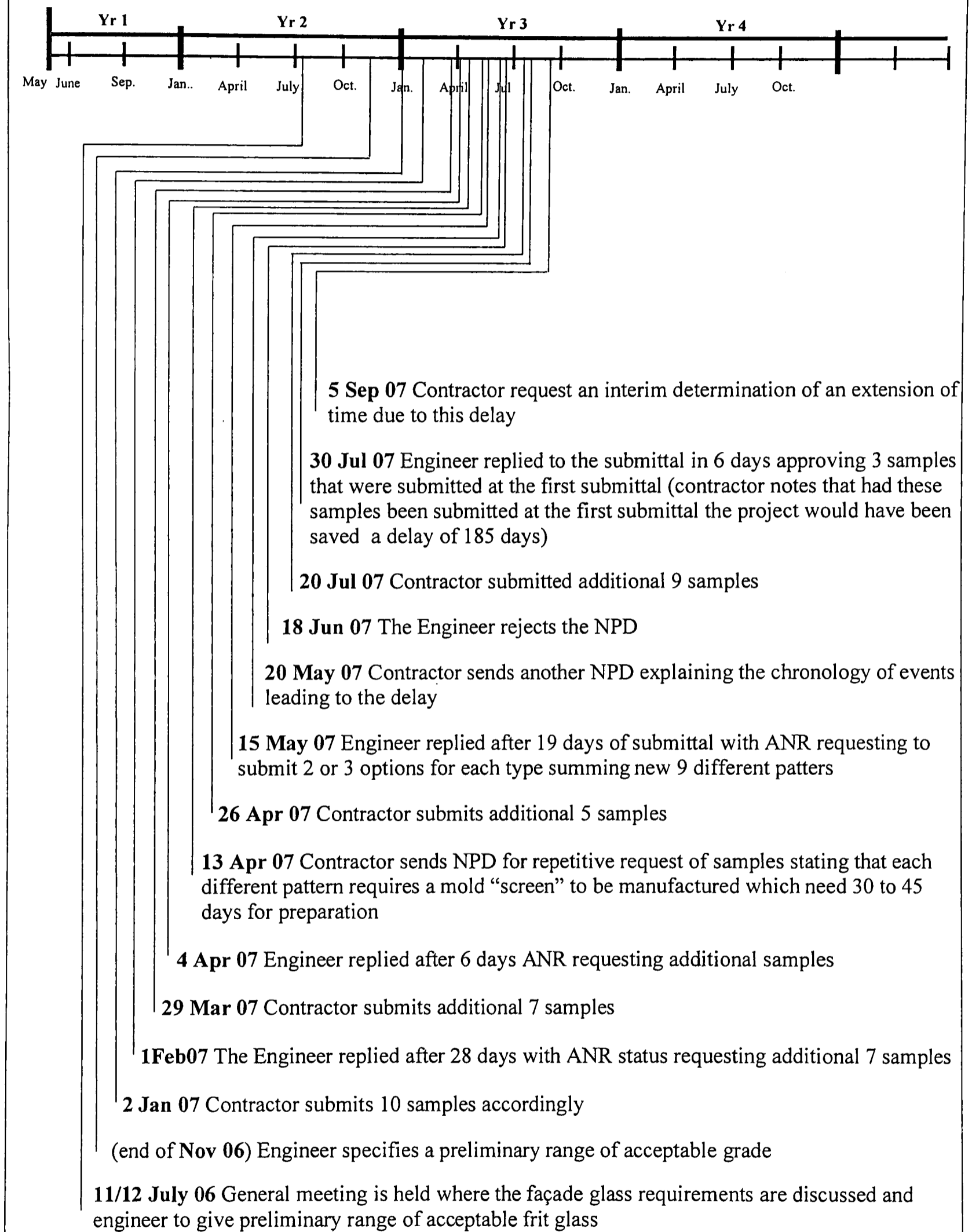


Figure 22 Sample Chronology of Events for Dispute Case

CASE ANALYSIS		Project: A
Case No.: 4	Subject: Façade glass	Section: Façade
<p>Synthesis:</p> <p>Façade details were raised in a <u>workshop meeting held after 14 months</u> in a 30 months contract, this issue given its criticality and that it is not clearly specified in terms of frit design should have been initiated earlier on. Also, both parties did not account for the time period required to receive each sample. The Contractor had clearly underestimated the time needed to provide samples in the programme. This item was described as design build in the BOQ. There was <u>misunderstanding</u> regarding the description as the Contractor considered the internal skin as a design build system to meet specified load whereas the Contractor considered the fritting on the external skin as an aesthetical item to be chosen by the Engineer and not a design build system. It was the Engineer's understanding that both the internal skin and external skin are design-build. The Engineer did not <u>request full range of samples</u> at the first submission to save time. Moreover the notification of possible delay was <u>rejected although this issue had become critical to the project and was delaying the works and an extension of time was later granted for this delay.</u></p>		<p>General Observations:</p> <p>Late intervention of subcontractor</p> <p>Clear risk allocation and highlighting</p> <p>Lack of experience Trial and error attempts Assessment of delay effect</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delay and Disruption Untimely responses Interpretation of requirements</p>	<p>The process of providing the 4 samples took time The Engineer was late in replying to the submittals The responsibility of designing the frit glass pattern was not allocated clearly</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer insisted on the fact that the delay was the Contractor's responsibility. - Both parties were late in attending to this subject. 		

Figure 23 Sample Analysis Sheet for Dispute Case

For each of the 50 dispute cases, a chronology of events was prepared and the analysis sheet was filled. The chronology of events and the analysis sheet for a sample dispute case is shown in Figures 22 and 23. The chronology of events for the 50 dispute cases is included in Appendix G. The analysis sheets are included in Appendix H.

As such and to graphically depict the observation made in this analysis, the interrelationships between the risks, disputes and the behavioral attitudes are drawn in Figure 24. The risks eventuating on a project pass through a filter. Risks that are not captured by the filter will turn to a dispute factor. The soundness of the filter which describes the project environment is defined by two criteria:

- the clearness/soundness of the Contract Documents including Conditions of Contract
- the behavioral attitude of the project participants that involve not only the site personnel but also the higher management that have an influence on the works on site.

It was noticed that a 'behavioral risk' by itself did not promote a dispute but contributed to the dispute formation. However, although a 'contractual risk' is needed as a primary dispute factor, the 'behavioral risk' had a wider effect as it contributes to a bigger number of dispute emergence. In the case of Dispute 14 (Façade aluminum colour), the primary contractual risk that eventuated was the "missing specifications". This was the contractual risk. However, the "trial and error" approach used by the Engineer as opposed to clearly specifying the requirement emerged as a secondary behavioral risk. Had the project environment directed the participants behavior towards adopting a proactive approach in specifying requirements, the matter would have been resolved. In this case both risks seeped through the filter to become a primary contractual dispute factor and a secondary behavioral dispute factor. It should be noted that the trial and error approach contributed as a secondary behavioral factor in 6 other disputes on the same project.

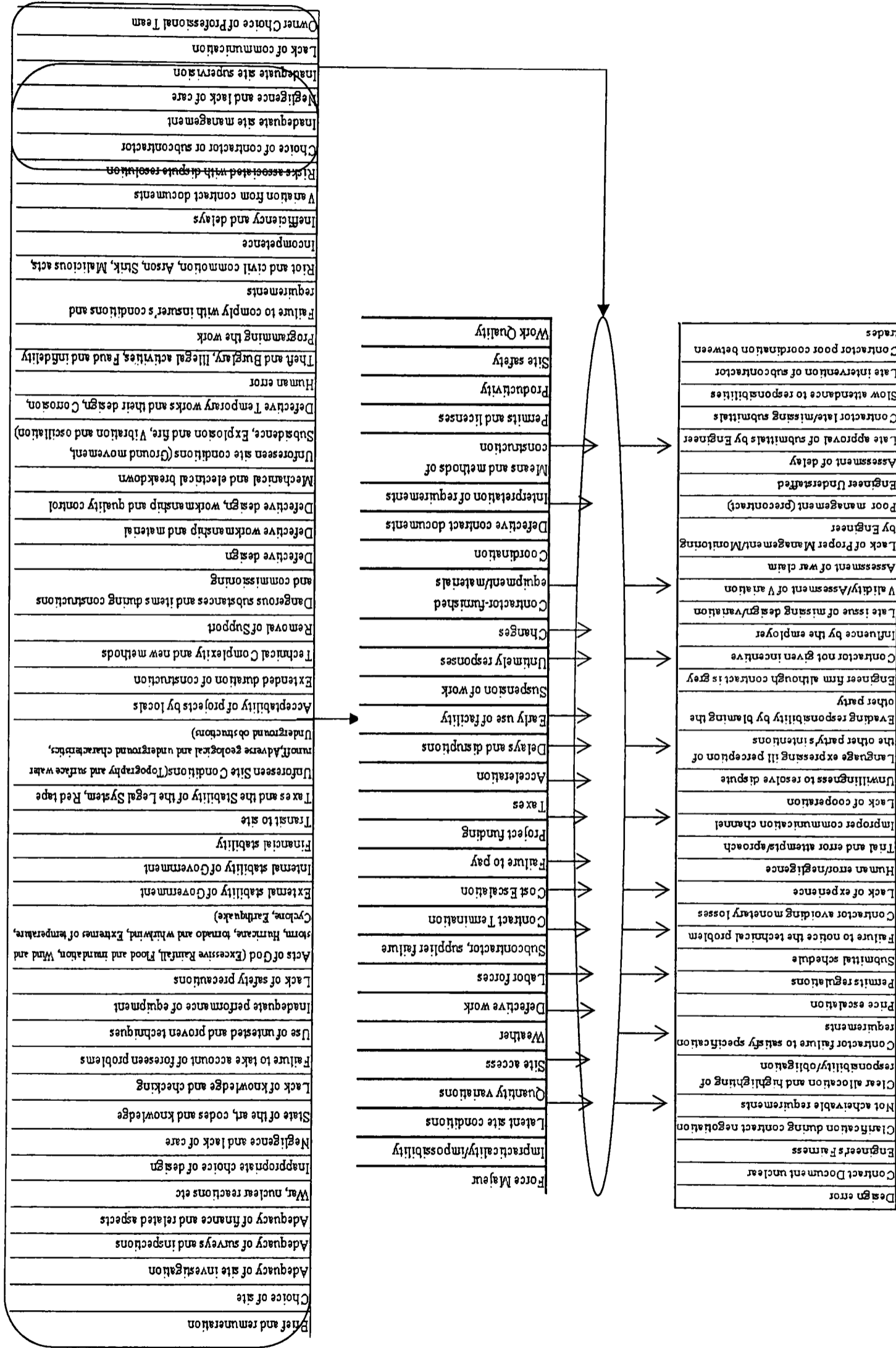


Figure 24 Risks Eventuating to Dispute Factors

Table 9 Risks as categorized by Zack (1996) identified in the dispute cases

	Force Majeur	Impacticity/impossibility	Latent site conditions	Quantity variations	Site access	Weather	Defective work	Labor forces	Subcontractor, supplier failure	Contract Termination	Cost Escalation	Failure to pay	Project funding	Taxes	Acceleration	Delays and disruptions	Early use of facility	Suspension of work	Untimely responses	Changes	equipment/materials	Coordination	Defective contract documents	Interpretation of requirements	Means and methods of construction	Permits and licenses	Productivity	Site safety	Work Quality
1	A																												
2	A																												
3	A																												
4	A																												
5	A																												
6	A																												
7	A																												
8	A																												
9	A																												
10	A																												
11	A																												
12	A																												
13	A																												
14	A																												
15	A																												
16	A																												
17	A																												
18	A																												
19	A																												
20	A																												
		3	1	0	1	0	0	3	2	0	3	0	0	0	0	0	13	0	1	13	12	0	6	9	10	1	2	2	1
		CASE A																											

Table 9 Risks as categorized by Zack (1996) identified in the dispute cases (cont'd)

	Force Majeur	Impracticability/impossibility	Latent site conditions	Quantity variations	Site access	Weather	Defective work	Labor forces	Subcontractor, supplier failure	Contract Termination	Cost Escalation	Failure to pay	Project funding	Taxes	Acceleration	Delays and disruptions	Early use of facility	Suspension of work	Untimely responses	Changes	equipment/materials	Coordination	Defective contract documents	Interpretation of requirements	Means and methods of construction	Permits and licenses	Productivity	Site safety	Work Quality
1 B																													
2 B							✓																						
3 B											✓																		
4 B																													
5 B																													
6 B	✓							✓										✓											
7 B																													
8 B																													
9 B																													
10 B																													
	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	3	0	1	6	8	0	0	5	8	0	0	1	0	
1 C																													
2 C											✓																		
3 C																													
4 C			✓																										
5 C	✓							✓																					
6 C																													
7 C																													
8 C																													
9 C																													
10 C			✓																										
	1	0	2	0	0	0	0	1	0	0	1	0	0	0	0	7	0	1	4	5	0	1	5	5	0	0	1	1	0

Table 9 Risks as categorized by Zack (1996) identified in the dispute cases (cont'd)

	Force Majeur	Impracticability/impossibility	Latent site conditions	Quantity variations	Site access	Weather	Defective work	Labor forces	Subcontractor, supplier failure	Contract Termination	Cost Escalation	Failure to pay	Project funding	Taxes	Acceleration	Delays and disruptions	Early use of facility	Suspension of work	Untimely responses	Changes	equipment/materials	Coordination	Defective contract documents	Interpretation of requirements	Means and methods of construction	Permits and licenses	Productivity	Site safety	Work Quality		
1 D																✓															
2 D																✓															
3 D																✓															
4 D																✓															
5 D																✓															
6 D																✓															
7 D																✓															
8 D	✓							✓								✓															
9 D																✓															
10 D																✓															
	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	0	0	4	8	0	1	5	3	0	0	0	0	0	0	
	6	1	2	1	0	0	1	6	2	0	5	0	0	0	0	32	0	3	27	33	0	8	24	26	1	2	1	3	2		
	CASE D																														

As shown above the 50 disputes from 4 different project were categorized by the areas of risk identified by Zack (1996) in Table 7. The areas of risk from Table 10 are listed in what follows in the order of frequency of occurrence:

Table 10 Risk Type Occurrence

Risk Type	Occurrence
Changes	33
Delays and disruptions	32
Untimely responses	27
Interpretation of requirements	26
Defective contract documents	24
Coordination	8
Force Majeur	6
Labor forces	6
Productivity	5
Cost Escalation	4
Work Quality	3
Suspension of work	3
Site safety	2
Subcontractor, supplier failure	2
Permits and licenses	2
Latent site conditions	2
Defective work	1
Quantity variations	1
Means and methods of construction	1
Impracticality/impossibility	1

Other risks mentioned by Zack such as site access, weather, contract termination, failure to pay, project funding, taxes, acceleration, early use of facility, and contractor-furnished equipment material were not witnessed in these case studies. The top 5 risks with the highest frequency of occurrence are described below:

Changes: The risk with highest occurrence is “changes” where the Contractor’s entitlement to additional cost is disputed. This is the case in 13 out of the 20 disputes in project A, 8 out of 10 disputes in project B, 5 out of 10 in project C and 8 out of 10 in project D. These changes result in some cases to delays, the assessment of which is

disputed. Also, as seen in the cases, the changes might result in abortive works the value of which is again disputed.

Delay and Disruption: Delay and disruption is a risk raised in 13 out of the 20 disputes of Project A. 3 of 10 in Projects B. 7 of 10 in Project C. and 9 out of 10 in Project D. These can be divided into 2 categories: allocation of responsibility of delay and assessment of the delay effect. Allocation of responsibility of delay as in the case of dispute 1 from Project A where the lift overhead problem required more than 6 months to be resolved technically and where both parties share responsibility of this delay as the contractor failed to submit coordinated shop drawings and the Consultant failed to notice the error in calculation and its nonconformance to the permit requirements. Assessment of the delay effect is yet another area disputed as in the cases of war effect, the Contractor would attribute the delay due to the loss of labor to the incidence of war whereas the Employer would argue that there were other factors that further augmented this delay. It is worth noting that the political situation in the country and the hostile events that resulted caused a disputed delay claim in all four projects. Assessment of delay is also a dispute factor in the case of delay by the Engineer to provide further technical details where the Engineer might consider it part of the Contractor's obligation to investigate the market and find the item that both meets the specification requirements and is fit for purpose as in the case of the frit glass in dispute 8 of project A, safety film in dispute 10 of project A, and lighting works in project D.

Untimely response: The third recurring risk among the cases is the untimely response where the Engineer is late in providing the missing/additional information required by the Contractor. This is the case in 13 out of the 20 disputes in project A, 7 out of 10 disputes in project B, 4 out of 10 in project C and 4 out of 10 in project D. A total of 28 out of 50 cases shows that again more than 50% of the time there was a problem with untimely response. This delay was mainly critical in the cases of replies to submittals and replies to notifications of possible variations.

Interpretation of requirements: The fourth in order of recurrence is the “Interpretation of requirements where both parties disagree on the reading of the contract requirements. This is the case in 10 out of the 20 disputes in project A, 8 out of 10 disputes in project B, 6 out of 10 in project C and 4 out of 10 in project D. A total of 28 out of 50 cases which is more than 50% of the time. These include cases of disputed reading of liability in verifying the functionality/performance of the trench heater design or in designing an aesthetic item such as façade frit glass.

Defective contract documents: This risk is of equal recurrence as the risk of “Interpretation of requirements. This is the case in 9 out of the 20 disputes in project A, 5 out of 10 disputes in project B, 6 out of 10 in project C and 8 out of 10 in project D.

In Table 11, the disputes factors on each of the 50 dispute cases are identified. These are listed in the order of frequency of occurrence in Table 12.

Table 11 Dispute Factors identified in the Dispute Cases

	Design error	Contract Document unclear	Not achievable requirements	Clear allocation and highlighting of responsibility/obligation	Contractor failure to satisfy specification requirements	Price escalation	Permits regulations	Submittal schedule	Failure to notice the technical problem	Contractor avoiding monetary losses	Lack of experience	Human error/negligence	Trial and error attempts/approach	Improper communication channel	Lack of cooperation	Unwillingness to resolve dispute	Language expressing ill perception of the other party's intentions	Evidencing responsibility by blaming the other party	Engineer firm although contract is grey	Influence by the employer	Late issue of missing design/variation	Validity/Assessment of Variation	Assessment of war claim	Lack of Proper Management/Monitoring by Engineer	Assessment of delay	Late approval of submittals by Engineer	Contractor late/missing submittals	Slow attendance to responsibilities	Late intervention of subcontractor	Contractor poor coordination between trades									
1	A	Lift Overhead	x																																				
2	A	Facade False Ceiling																																					
3	A	Procurement of new material																																					
4	A	Facade glass																																					
5	A	War Effect																																					
6	A	Add. Shop dwgs. for agreed late variations																																					
7	A	Facade Lighting																																					
8	A	Frit Glass																																					
9	A	Employee Turnover																																					
10	A	Safety Film																																					
11	A	False Ceiling																																					
12	A	Lighting Fixtures																																					
13	A	Increase Labor Rate																																					
14	A	Facade Alum. Color																																					
15	A	Steel Structure Design																																					
16	A	Trench Heaters																																					
17	A	Shop drwg. Submittal schedule																																					
18	A	Marble Works																																					
19	A	EDL																																					
20	A	PS for Health cub																																					
		CASE A	3	8	3	3	1	2	2	5	7	2	6	0	1	1	0	6	7	5	3	7	3	8	11	9	6	11	3	2									

Table 11 Dispute Factors identified in the Dispute Cases (cont'd)

	Design error	Contract Document unclear	Not achievable requirements	Clear allocation and highlighting of responsibility/obligation	Contractor failure to satisfy specification requirements	Price escalation	Permits regulations	Submittal schedule	Failure to notice the technical problem	Contractor avoiding monetary losses	Lack of experience	Human error/negligence	Trial and error attempts/approach	Improper communication channel	Lack of cooperation	Unwillingness to resolve dispute	Language expressing ill perception of the other party's intentions	Evading responsibility by blaming the other party	Engineer firm although contract is grey	Influence by the employer	Late issue of missing design/variation	Validity/Assessment of Variation	Assessment of war claim	Lack of Proper Management/Monitoring by Engineer	Assessment of delay	Late approval of submittals by Engineer	Contractor late/missing submittals	Slow attendance to responsibilities	Late intervention of subcontractor	Contractor poor coordination between trades
1 B	Rejected NPVs	x		x														x												
2 B	Tree Damage											x																		
3 B	Optional Works	x				x																								
4 B	Cleanouts																													
5 B	Fire Alarm System																													
6 B	War Delay																													
7 B	Soft Landscaping																													
8 B	Smoke detectors																													
9 B	Fire Fighting System																													
10 B	Towel Dryer																													
	CASE B	1	4	0	6	4	1	0	0	9	0	1	0	0	0	2	2	7	4	1	0	9	1	0	2	2	0	0	0	0
1 C	Louvers at Roof																													
2 C	Chillers																													
3 C	Restoration																													
4 C	Glass Balustrade																													
5 C	War Effect Delay																													
6 C	External Works																													
7 C	Stone Flooring																													
8 C	Submittal Schedule																													
9 C	Alum. Composite Panel																													
10 C	Points of Drainage																													
	CASE C	2	3	0	2	2	1	0	1	4	1	0	0	0	0	0	1	4	1	0	3	6	1	1	6	3	1	5	0	1

Table 11 Dispute Factors identified in the Dispute Cases (cont'd)

	Design error	Contract Document unclear	Not achievable requirements	Clear allocation and highlighting of responsibility/obligation	Contractor failure to satisfy specification requirements	Price escalation	Permits regulations	Submittal schedule	Failure to notice the technical problem	Contractor avoiding monetary losses	Lack of experience	Human error/negligence	Trial and error attempts/approach	Improper communication channel	Lack of cooperation	Unwillingness to resolve dispute	Language expressing ill perception of the other party's intentions	Evading responsibility by blaming the other party	Engineer firm although contract is grey	Influence by the employer	Late issue of missing design/variation	Validity/Assessment of Variation	Assessment of war claim	Lack of Proper Management/Monitoring by Engineer	Assessment of delay	Late approval of submittals by Engineer	Contractor late/missing submittals	Slow attendance to responsibilities	Late intervention of subcontractor	Contractor poor coordination between trades					
1 D	x																																		
2 D												x																							
3 D																																			
4 D																																			
5 D																																			
6 D																																			
7 D																																			
8 D																																			
9 D																																			
10 D																																			
	1	3	0	0	0	0	0	0	0	0	0	1	0	1	2	0	1	0	1	1	7	7	1	4	7	2	0	6	0	0	0	0			
	7	18	3	11	7	4	2	3	2	18	8	4	6	1	3	3	4	17	13	7	13	29	6	13	26	16	7	22	3	3	3	3			
	CASE D																																		

The top 5 dispute factors with highest frequency of occurrence from tables 12 are: validity/assessment of variation, assessment of delay, slow attendance to responsibilities, contract documents unclear, contractor avoiding monetary losses, late approval of submittals by Engineer. They match with the top 5 risks with highest frequency of occurrence. This further confirms the observation made earlier and depicted in Figure 24 that disputes are the offspring of the risks trespassing the filter. The 5 dispute factors with highest occurrence are further described below.

Table 12 Dispute Factor Occurrence

Dispute Factor	Occurrence
Validity/Assessment of Variation	29
Assessment of delay	26
Slow attendance to responsibilities	22
Contract Document unclear	18
Contractor avoiding monetary losses	18
Late approval of submittals by Engineer	17
Evading responsibility by blaming the other party	16
Lack of Proper Management/Monitoring by Engineer	13
Engineer firm although contract is grey	13
Late issue of missing design/variation	13
Clear allocation and highlighting of responsibility/obligation	11
Lack of experience	8
Design error	7
Contractor failure to satisfy specification requirements	7
Influence by the employer	7
Contractor late/missing submittals	7
Trial and error attempts/approach	6
Assessment of war claim	6
Price escalation	4
Human error/negligence	4
Language expressing ill perception of the other party's intentions	4
Not achievable requirements	3
Submittal schedule	3
Lack of cooperation	3
Unwillingness to resolve dispute	3
Late intervention of subcontractor	3
Contractor poor coordination between trades	3
Permits regulations	2
Failure to notice the technical problem	2
Improper communication channel	1

Validity/Assessment of Variation is the dispute factor with the highest occurrence. 29 cases out of the 50 are related to disagreement regarding the validity or assessment of the variation order. In some cases disagreement regarding the validity is related to contract documents being unclear. In other cases it is the valuation of the variation that is being disputed.

Assessment of delay is the dispute factor with the second highest occurrence. As mentioned above it is more prevalent in projects A and D. This dispute factor has been correlated with the dispute factor “Late attendance to obligations by both parties” that will in most cases lead to disputed assignment of responsibility and assessment of those delays.

Slow attendance to responsibilities: these are cases of delay that do not have contractual timelines but even where they are not critical they would be consuming the float allocated to the respective activities and any delay thereafter becomes a critical delay. This is confirmed by the high correlation with the dispute factor ‘Assessment of Delay’. It is evident in Projects A, C and D but did not occur in Project B.

Contract documents not clear: Two cases of unclear contract document include ambiguity in the specification of technical requirements such for the external façade detail in cases 4 and 8 of project A and louvers at roof in case 1 of project B. Other cases of ambiguity relate to unclear description of the allowed number of submittals per week, the method of calculating the additional cost of new material procured as per late instruction and time validity of optional works included in the contract.

Late approval of submittals by Engineer was noted in 16 cases. Although the Engineer in many of these cases referred to the Contractor’s failure to submit/abide by the submittal schedule, this does not relieve the Engineer from his/her responsibility to fulfill the contractual obligation in the best interest of the project.

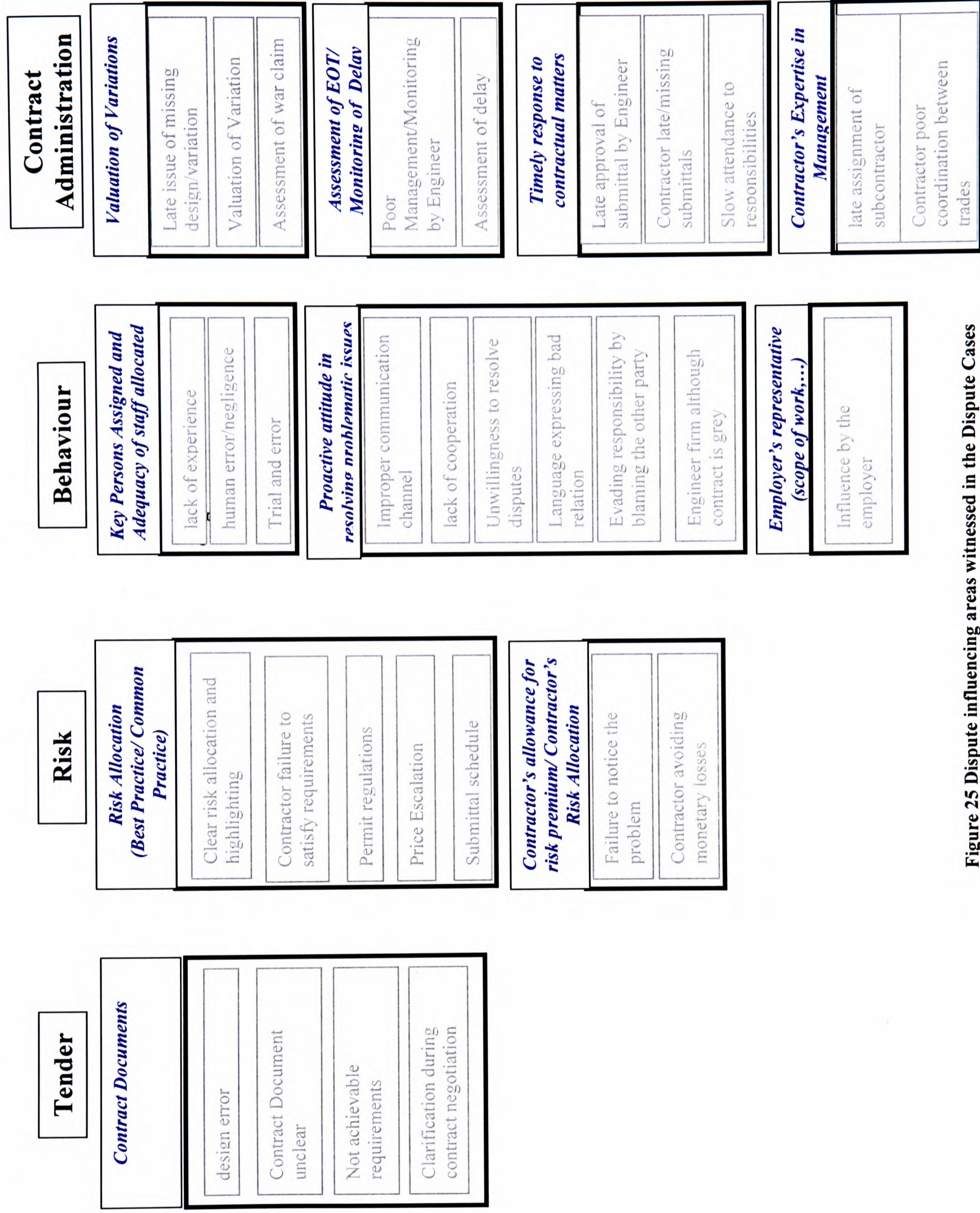


Figure 25 Dispute influencing areas witnessed in the Dispute Cases

6.3. Dispute Influencing Areas

The dispute factors are categorized in Figure 25 under the dispute influencing areas examined previously. This further confirms the impact of these areas on disputes as witnessed in the dispute cases.

6.4. Summary

This chapter was devoted to examine 50 dispute cases on four ongoing projects. For each of the dispute cases the chronology of events that gave rise to the dispute was listed. An assessment sheet was filled where the risks that eventuated, the behavioural attitudes and the dispute factors were tracked. An interrelationship is drawn between those 3 aspects of risks, disputes and behavioural attitude. Also, the risks and the dispute factors with the highest occurrence were examined. The dispute factors identified were categorised under the dispute influencing areas already identified through the interviews in Chapter 5.

It is worth noting that not all dispute influencing areas that surfaced in the interviews were witnessed in the case studies. The reasoning behind this is that the analysis of the 50 case studies was an in-depth analysis of disputes occurring during the execution of the works. As such, the influence of factors such as the tender period and the tender evaluation technique on disputes could not be tracked. Similarly, no inference could be made of the Employer's influence on risk allocation and the impact of the Forms/Types of Contract adopted including the Particular conditions. The dispute resolution mechanism was again beyond the scope of the case study analysis as it necessitates examining the project over a longer period.

CHAPTER 7: THE FIDIC FORM OF CONTRACT

7.1 Introduction

The FIDIC 4th Edition of the Red Book is the form of contract used commonly in Lebanon as witnessed from the fieldwork conducted in this research. The abbreviation stands for Federation Internationale Des Ingenieurs-Conseils and is a national association of Consulting Engineers. It has been in existence since 1913 and have their headquarters and secretariat in Lausanne in Switzerland. FIDIC has produced standard forms of contract for civil engineering projects since 1957. The second edition was published in 1969 and the 3rd in 1977.

7.2 Conditions of Contract

The FIDIC conditions of contract comprise two parts: Part 1 General Conditions and Part 2 Particular Conditions.

Previous empirical studies on the sources of disputes also reveal that the conditions of contract always appear in the analysis and that certain conditions of contract contribute to a higher frequency of disputes (Fenn *et al.*, 1997).

Particular Conditions refer to the changes made to the General Conditions of Contract. Corbett (1991) advises that ‘great care’ must be taken when amending the general conditions. He explains the danger of amending those conditions as follows: *“These FIDIC conditions are generally well-balanced and, as with any contract, there are a great number of links and relationships between different clauses, not all of which are express or otherwise obvious. With any amendment, therefore, there is the danger of upsetting the balance or of creating unintended consequential changes to related provisions. It is in the interest of all parties that changes should be kept to minimum.”*

The Contract assigns duties and obligations to the parties involved. The Engineer is expected to have a double duty under the contract. The Engineer is expected to be the agent for the Employer in ensuring that the Contractor satisfies contract

requirements. The Engineer is also expected to be impartial in contract administration and dispute resolution. The Engineer's duty to have due consultation meetings with both parties on 25 occasions regarding time and cost prior to requesting Engineer's Decision by any of both parties. Consultation in this case is intended to provide for a clear sign of Engineer's impartiality. According to Corbett (1991) "*impartiality depends upon the ability of the Engineer to exclude from that part of his mind which is making a determination under the contract all considerations other than those required to achieve a fair decision in accordance with the spirit of the Contract.*"

The Employer may add restrictions to the Engineer's authority where the Engineer would be required to seek his approval before exercising such authority. However, these restrictions should be carefully set as the Engineer has a role as an adjudicator and should exercise his discretion impartially. Also, 24 sub-clauses require the Engineer to conduct due consultation meetings with Employer and Contractor before cost assessments and Extensions of time are determined. As such the Employer under the general conditions should be duly consulting with the Engineer and not dictating him/her (Bunni, 2005).

The obligations of the Employer's representative as set in the FIDIC General Conditions of Contract 4th Edition include the following (Corbett, 1991):

1. Appointment of the Engineer
2. Give possession of site
3. Refrain from taking any action that would impede or interfere with the progress of the works
4. Supply materials and carry out works if these form part of the work as defined in the contract
5. Nominate specialist sub-contractors and suppliers when they are required
6. Make payments on time

7. Among other obligations give consent where the contractor wishes to assign the contract or any part thereof.

Knowles (2005) in his book “150 Contractual Problems and their Solutions” raises 150 contractual questions that are normally disputed. By examining these questions and in some cases the controversy among awards made addressing those disputes, it becomes evident that by setting the general conditions the forms of Contract do not attend to numerous particular questions that might surface during the execution of the contract and that might eventually lead to disputes. Such potential dispute areas surfaced in the interviews and case studies.

7.3 Dispute Influencing Clauses

Since the FIDIC Red Book 4th Edition was used in most of the projects in the fieldwork conducted, a brief overview of the corresponding dispute influencing clauses as witnessed from the interviews and the dispute cases is addressed in what follows:

- Price escalation

Clause 70.1 Increase or Decrease of Cost:

There shall be added to or deducted from the Contract Price such sums in respect of rise or fall in the cost of labour and/or materials or any other matters affecting the cost of the execution of the Works as may be determined in accordance with Part II of the Conditions.

Part II of the Conditions describes 3 alternative methods for dealing with the fluctuation issue: no adjustment, adjustment based on difference of prices between base prices and the current prices, adjustment based on indices to a formula. FIDIC advises that projects spanning for more than a year should contain fluctuation clauses based on the view that the Employer should take the risk of fluctuated prices as opposed to asking tenders to quote fixed rates that account for possible increased cost. In civil code countries the *Theorie de l'imprevision*, that allows for reducing

the Contractor's losses to reasonable limits through compensation by the Employer, would be applicable in cases where the fluctuation clause has been deleted. However, the Contractor's claim in this case is prone to be disputed (Corbett, 1991).

Clause 70.2 Subsequence Legislation:

If, after the date 28 days prior to the latest date for submission of tenders for the Contract there occur in the country in which the Works are being or are to be executed changes to any National or State Statute, Ordinance, Decree or other Law or any regulation or by-law of any local or other duly constituted authority or the introduction of any such State Statute, Ordinance, Decree or other Law or any regulation or by-law which causes additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be added to or deducted from the Contract Price and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

This clause of the general condition is clear in allocating the risk of changes in legislation to the Employer is the one taking the risk of changes in legislation. According to Corbett (1991), the Contractor would be taking 'grave' risk if he accepts amendments to this clause. This clause is considered to be an equivalent to the doctrine of *Fait du Prince* where the Contractor is fully compensated if he has suffered increased costs or losses due to a change in the law.

- Procedure for notification of possible variation and time barring.

Clause 52.2 Power of Engineer to Fix Rates:

Provided that no varied work instructed to be done by the Engineer pursuant to Clause 51 shall be valued under sub-Clause 52.1 unless, within 14 days of the date of such instruction and, other than in the case of omitted work, before the commencement of the varied work, notice shall have been given either:

- a. *by the Contractor to the Engineer of his intention to claim extra payment, or a varied rate or price, or*
- b. *by the Engineer to the Contractor of his intention to vary a rate or price.*

This clause requires a notice of varied work within 14 days of receiving an instruction. The Clause has been varied from the 3rd Edition which required notice “as soon after the date of order as is practicable.” A failure to give notice would lead to loss of entitlement claim. Similarly in clause 44 (Extension of Time) the Engineer should give notice for possible delay within 28 days. Under clause 53 the Contractor should give notice of claim for any additional payment within 28 days and substantiating the claim in a timely manner thereafter (Corbett, 1991). Brewer (1993), Kangari (1995) and the Wood Report (1975) stress the importance of having proper project activity documentation and factual evidence. The importance of preparing claims with required detail level and supporting documents should be recognized by contractors. In reality proper human expertise that would ensure continuous attention to claims-related matters is not allocated.

Design Liability:

Although FIDIC gives guidance for amendments of the Red book to ‘Lump Sum’ form. According to the Guide The ‘Lump Sum’ form is to be used on projects where the design has been developed by the Employer to a sufficiently complete stage where from the information supplied the Contractor can prepare all drawings and details necessary for construction without having to refer back to the Engineer for clarification or further information. However, the intention of this lump sum form as presented by FIDIC is for works which are simple and straightforward of relatively low value. For larger works it is recommended that the FIDIC Conditions of Contract for Design-Build (which is also a lump sum form) be used.

This recommendation is being disregarded in common practice when a multimillion dollar project is awarded on Lump Sum basis.

- Employer's prior approval to any Engineer's time and cost determination
Clause 2.1 Engineer's Duties and Authorities: of the General Conditions:
 - (a) *The Engineer shall carry out the duties specified in the Contract.*
 - (b) *The Engineer may exercise the authority specified in or necessarily to be implied from the Contract. provided, however, that if the Engineer is required, under the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising any such authority, particulars of such requirements shall be set out in Part II of these Conditions. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Engineer.*
 - (c) *Except as expressly stated in the Contract, the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.*

As witnessed in the Particular Conditions of the four projects examined in Chapter 6, the following restriction was added to this clause:

Provided that the Engineer shall obtain the specific approval of the Employer before exercising any of the following duties or authorities:

- a) *Approving an extension of the Time for Completion of the Works*
- b) *Approving any additional payment to the Contract Price.*
- c) *Giving consent to the Contractor to Subcontract any part of the Works pursuant to Sub-Clause 4.1.*
- d) *Issuing an instruction to suspend works pursuant to Sub-Clause 40.4*
- e) *Issuing an instruction in respect of any Provisional Sum pursuant to Sub-Clause 58.2.*

The requested Employer's approval for Engineer's assessment in granting an Extension of Time and additional payment contradicts with the Engineer's role under the contract as an impartial contract administrator.

- Order of precedence of contract documents.

Clause 5.2 Priority of Contract Documents:

The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instruction thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

- 1- The Contract Agreement (if completed)*
- 2- The Letter of Acceptance*
- 3- The Tender*
- 4- Part II of these Conditions*
- 5- Part I of these Conditions; and*
- 6- Any other document forming part of the Contract*

This sub-clause has been amended from the 3rd Edition to provide a full listing for the contract documents. However, as noticed in Appendix D on some projects the order of precedence is removed leaving the interpretation of contracting documents to the Engineer's sole discretion which in turn could become a dispute cause.

Engineer's Decision

Engineer's Decision: Clause 67.1 FIDIC states that if 'any dispute whatsoever' arises between the parties it can be referred to an Engineer's Decision. This means that the category of disputes to be referred to the Engineer includes breaches of contract. As such the Engineer under this clause is under obligation to become an impartial judge to take decisions towards his own actions or breaches or even the Employer's breaches. No arbitration may be instigated without an Engineer's decision. The Employer has no power to remove and replace an Engineer unilaterally. The reason being stated in the FIDIC's guide that the contractor in

calculation of his tender took the identity of the Engineer as one of the criteria (Corbett, 1991).

The Dispute Adjudication board was introduced in the 1996 Supplement to the 1992 Fourth Edition of the Red Book where the decision-making role of the Engineer under clause 67.1 was reallocated to an independent impartial and neutral Dispute Board. The Dispute Board concept originated in the late 1960's with the Dispute review board which proved to be a success (Bunni, 2005). Gaitskell (2005) states that broadly around 97 percent of disputes raised to DRB are resolved before going to arbitration. Interesting enough, the author observes that an “unexpected dynamic develops” among parties working with each other on site as they view the DRB as intruders. As such when the DRB arrives on site the parties will put on a common front and resolve small disputes so that they do not have the DRB interfering with what is considered to them “the site’s private business” (Bunni, 2005).

In 1995 it received major encouragement when the World Bank introduced a mandatory requirement of assigning a DRB in its standard bidding document for the Resolution of disputes. Unlike the DRB, the DAB is neither consensual nor amicable in nature. It is binding until the decision is revised in an amicable settlement or an arbitral award. Although it has not been implemented in construction contracts in Lebanon and although interviews had mixed views towards its implementation , the success reported would encourage introducing the DAB as a replacement to the Engineer’s Decision under clause 67.1 (Bunni, 2005).

□ *Assessment of extension of time*

Clause 44.1 Extension of Time for Completion

In the event of:

- (a) The amount or nature of extra or additional work,*
- (b) Any cause of delay referred to in these Conditions,*
- (c) Exceptionally adverse climatic conditions,*
- (d) Any delay, impediment or prevention by the Employer, or*
- (e) Other special circumstances which may occur, other than through a default of or breach of contract by the Contractor or for which he is responsible,*

being such as fairly to entitle the Contractor to an extension of the Time for Completion of the Works, or any Section or part thereof, the Engineer shall after due consultation with the Employer and the Contractor, determine the amount of such extension and shall notify the Contractor accordingly, with a copy to the Employer.

Where a delay occurs on a project, the forms of contract normally state that the Employer shall determine the Contractor's entitlement for extension of time. However, there has been in the literature a list of different approaches to delay analysis. If the Engineer makes an analysis using one approach and the Contractor makes the analysis based on a different approach this will create a dispute. Also, in using the same delay analysis approach where there is a case of concurrency i.e. a delay event by the Employer that is running in parallel with a delay event by the Contractor, there is no hard and fast rule concerning which delay would be a dominant one. This could lead to specific situations where for example a delay by the Contractor would be delaying the works for 4 weeks and the Employer makes a change at the fourth week which only delays the project one day. There has been a good number of legal proceedings that on different projects have addressed this question from a different perspective and have thus passed different judgments. The fact that each case would be judged at its own merits and that each party will try to defend its best interest by supporting its stand by referring to these contradictory cases would by itself create an area of dispute that has two valid points. Yogeswaran et al. in reviewing principles applied in

extension of time claim explain that most general conditions of contract do not spell out clearly details of the principles that will be used for the assessment of claims for extension of time and this is left to the parties involved in each project.

The Society of Construction Law issued the Delay and Disruption Protocol in October 2002 was intended to be a useful guide in delay and disruption issues. It is meant to be a balanced and viable approach to resolve and avoid unnecessary disputes. The protocol provides that although standard forms of contract address the issue of delay and compensation for prolongation they do not do so completely by presenting a balanced view to a number of issues that “do not have absolute answers” and in most cases turn into a dispute that is often referred to a third party. The Protocol further provides a unified mechanism to assess delay and disruption matters. The AACE International Recommended practice published in 2009 again proposes a unified technical reference for forensic application of critical path method.

□ *Valuation of fair rates*

In study performed by Kumarsawamy (1997) in projects in Hong Kong variations and delayed site possession proved to be a frequent cause of conflict and disputes.

In the FIDIC Form Fourth edition, Valuation of Variation is dealt with in clause 52.1 of the Conditions of Contract:

All variations referred to in Clause 51 and any additions to the Contract Price which are required to be determined in accordance with Clause 52, shall be valued at the rates and prices set out in the Contract if, in the opinion, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as the basis of valuation so far as

may be reasonable, failing which, after due consultation by the Engineer with the Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such rates or prices as are in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such times as rates or prices agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issues in accordance with Clause 60.

One common cause of disagreement is the difference of opinion towards the unit prices of resources necessitated by a variation order. Vidogah and Ndekugri (1998) emphasizes the importance of agreeing to some of the matters whose assessment are normally disputed such as percentage for main office overhead and unit cost of resources.

The principles of and approaches to valuation generally stem from established or common practice. Courts take a subjective view and hold that the rate must be “fair” in the ICE conditions or “appropriate” in the case of FIDIC conditions. Disputes normally arise often due to disagreement over the manner in which fair rates are to be calculated; whether prorated rates from existing unit rates of similar BOQ items can be implemented and on whether the Contractor is entitled to profit in these variations. In the case of Weldon Plant vs. Commission for New Towns (2000) for example, Weldon was contracted the construction of Dunston Mill Reservoir. The Contractor was instructed to excavate all the gravel below the bed and backfill it with clay to the design level. The Arbitrator decided that Weldon was entitled to the cost of these works but not to the overheads and profit based on the premise that “the amount paid should keep the contractor in the same financial situation he would have been in

had the instruction not been issued” and that awarding Weldon would put him in a better position. Weldon appealed the issue to the courts. The courts held that a fair valuation has “ordinarily to include elements for cost of labour, the cost of plant, cost of materials, the cost of overheads and profit, otherwise it would not be a fair valuation within the meaning of the contract.” This is an example where ‘fair valuation’ was defined differently by an arbitrator and a judge on the same project. The valuation of variation clause should be more detailed in the particular conditions.

7.4 Summary

This Chapter addresses the Dispute Influencing Clauses that surfaced from the fieldwork done through the preliminary examination of projects, interviews and case studies. This is done in the context of the FIDIC Red Book 4th Edition which is the Form of Contract commonly used in Lebanon. This examination reveals that with certain clauses care should be taken in applying amendments so as not to disturb the balance of the contract. Much risk is allocated to the Contractor where for example the Contractor’s right to compensation in the cases of entitlement to price escalation and subsequent legislation. Again, similar high risk is allocated to the Contractor when the liability to proceed with execution of a lump sum contract is assigned to the Contractor where the contract design is not complete. Also in the cases where the particular conditions required the Engineer to have the Employer’s approval to an Engineer’s Determination contradicts with the FIDIC’s definition of the Engineer’s role of being the fair judge. Other clauses need further detailing in the Particular conditions namely the valuation of variation and the extension of time.

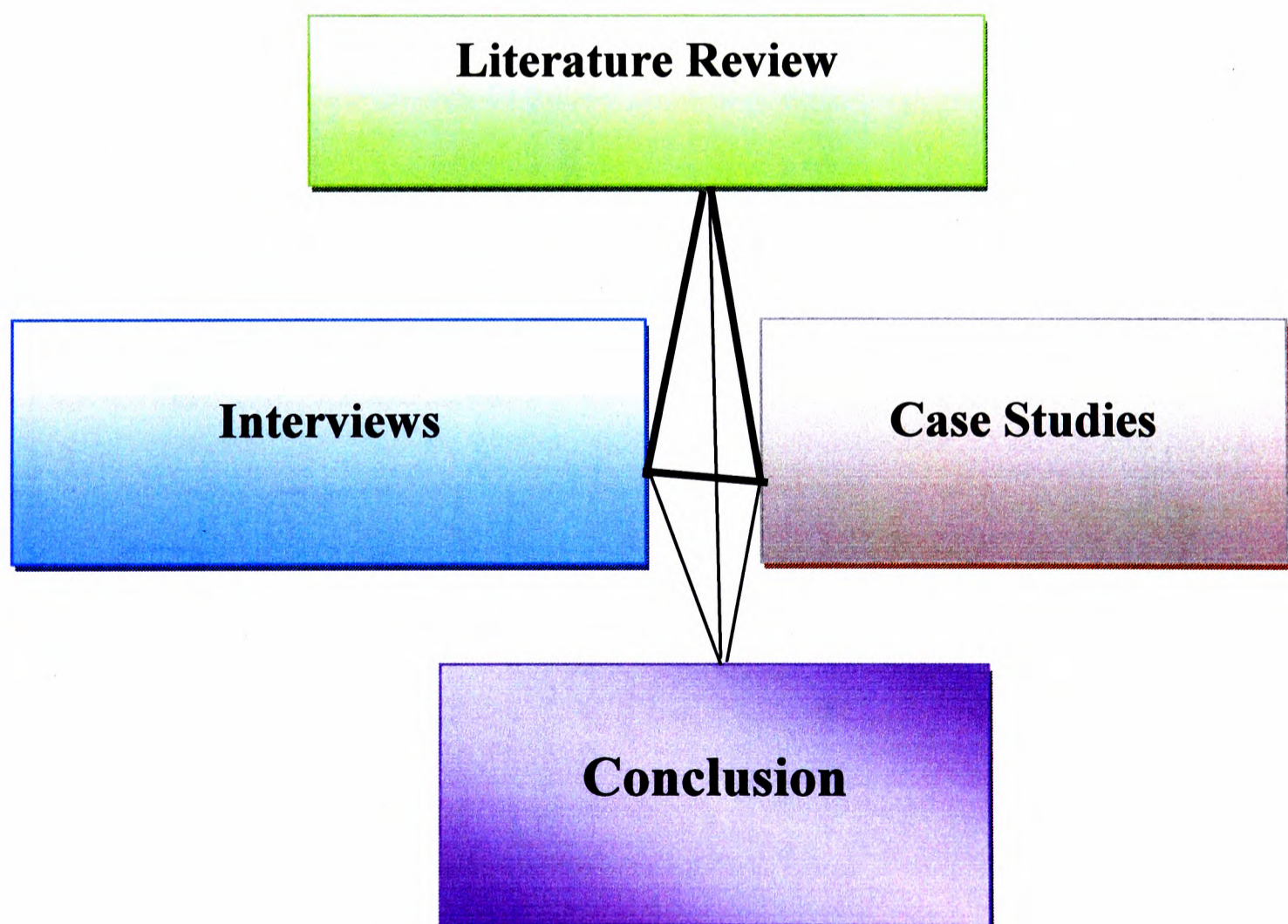
CHAPTER 8: CONCLUSION ON DISPUTE INFLUENCING AREAS

8.1. Dispute Influencing Areas

The Dispute influencing area identified in Chapters 5 and 6 are shown in Figure 26. Section 8.2 below analyses each of these areas in light of the interview and case study findings. Conclusion for each is drawn through comparison of the finding from the interviews, the case studies and the literature review.

8.2. Analysis of Findings

For each dispute influencing area, a comparison figure is drawn where the upper rectangle shows finding from the literature review, the rectangle on the right describes the observations from the case studies whereas the figure at the left includes the finding from the interviews. Comparison of the three boxes yields the lower box which is the conclusion.



Dispute Escalation Influencing Areas

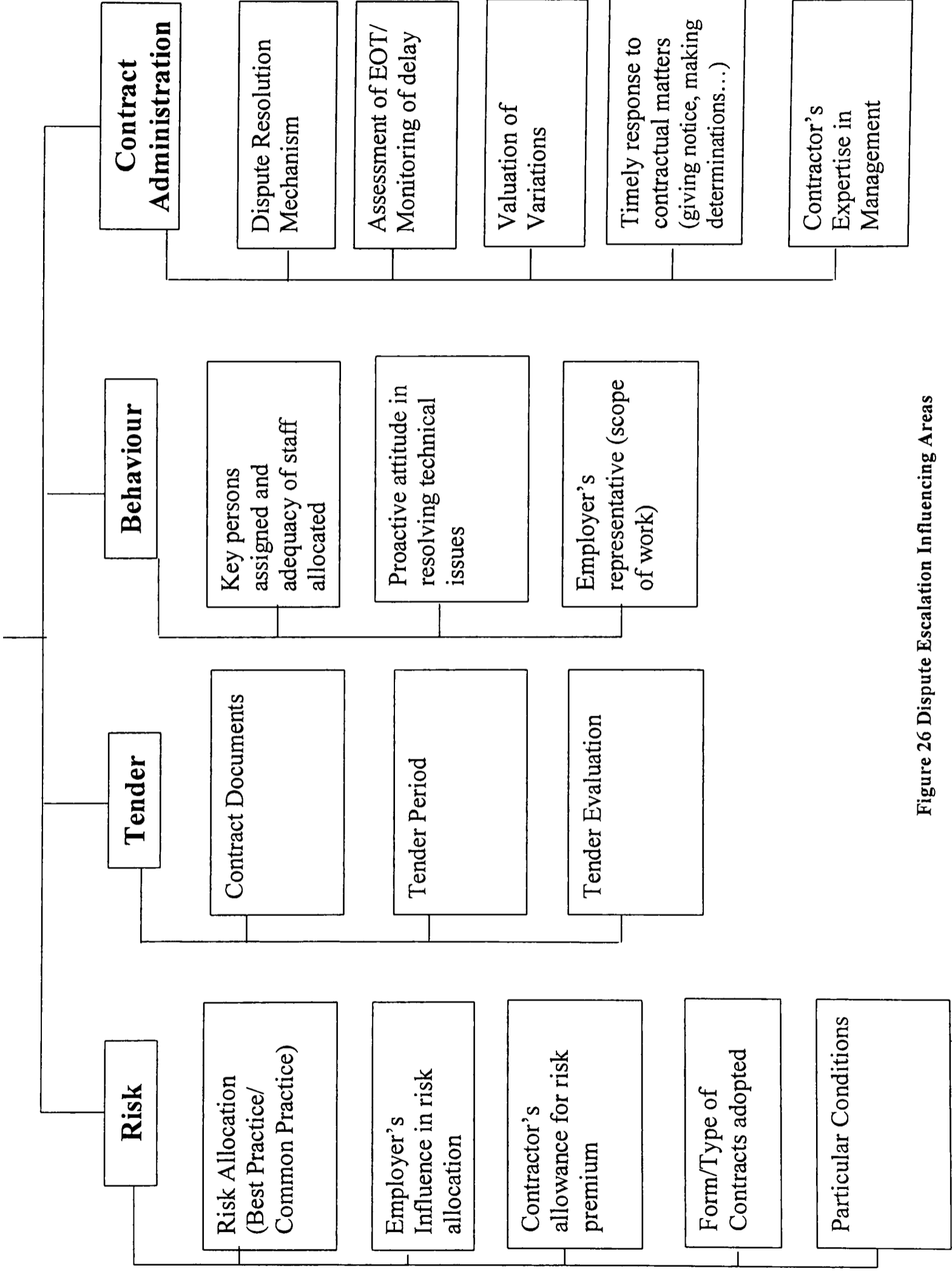


Figure 26 Dispute Escalation Influencing Areas

RISK

- ***Risk Allocation (Best Practice/ Common Practice)***

Risk must be allocated to the party that is best able to handle it. Modern projects have more complicated risks and due to the tough economic situation that has continually decreased the Contractor's profits. Risk allocation should be clearly recognized and communicated. Risk sharing was proposed as one possible option to achieve cost reduction. Dissimilar perception of fairness is a source of conflict that might result in dispute.

The interviews state that there is a tendency to allocate much of the risk to Contractors.

The quality of the modern projects is more complex with more intricate design that in many cases leads to discrepancies, missing details, and in some cases underestimation of the cost of specified systems at the bidding phase. Some interviewees considered the contract to be unfair where others stated that since the contractor has examined the tender documents and accepted them then the contract can not be considered unfair. All interviewees agreed that risk should be allocated to the party that is best able to handle it. Deviation from this rule were explained by Employer's desire to minimize cost overrun and safeguarding against Contractor's abuse of some clauses.

Looking at the case studies, it is noticed from the extract of the Particular Conditions shown in Exhibit D that risk is being shifted to the Contractor in the clauses examined

The risk should be clearly identified and better allocated and a relationship of trust must be developed between the parties.

- *Employer's Influence in risk allocation*

The literature states that the Employer must have a clear understanding that allocating all the risk to the contractor will not reduce the actual cost of the project.

The interviewees stated that the tendency to allocate the risk to the Contractor is partly driven by the Engineer preparing tender documents and partly driven by the Employer who would try to reduce this risk exposure.

The influence of the Employer's interference in risk allocation is beyond the period examined in the case studies. As such no inference can be made regarding this dispute factor from the case studies.

Both the interviews and the literature confirm the influence of the Employer in risk allocation. The literature adds that there should be awareness by the Employer at Contract Award stage that the project is subject to time and cost overrun.

• *Contractor's allowance for risk premium*

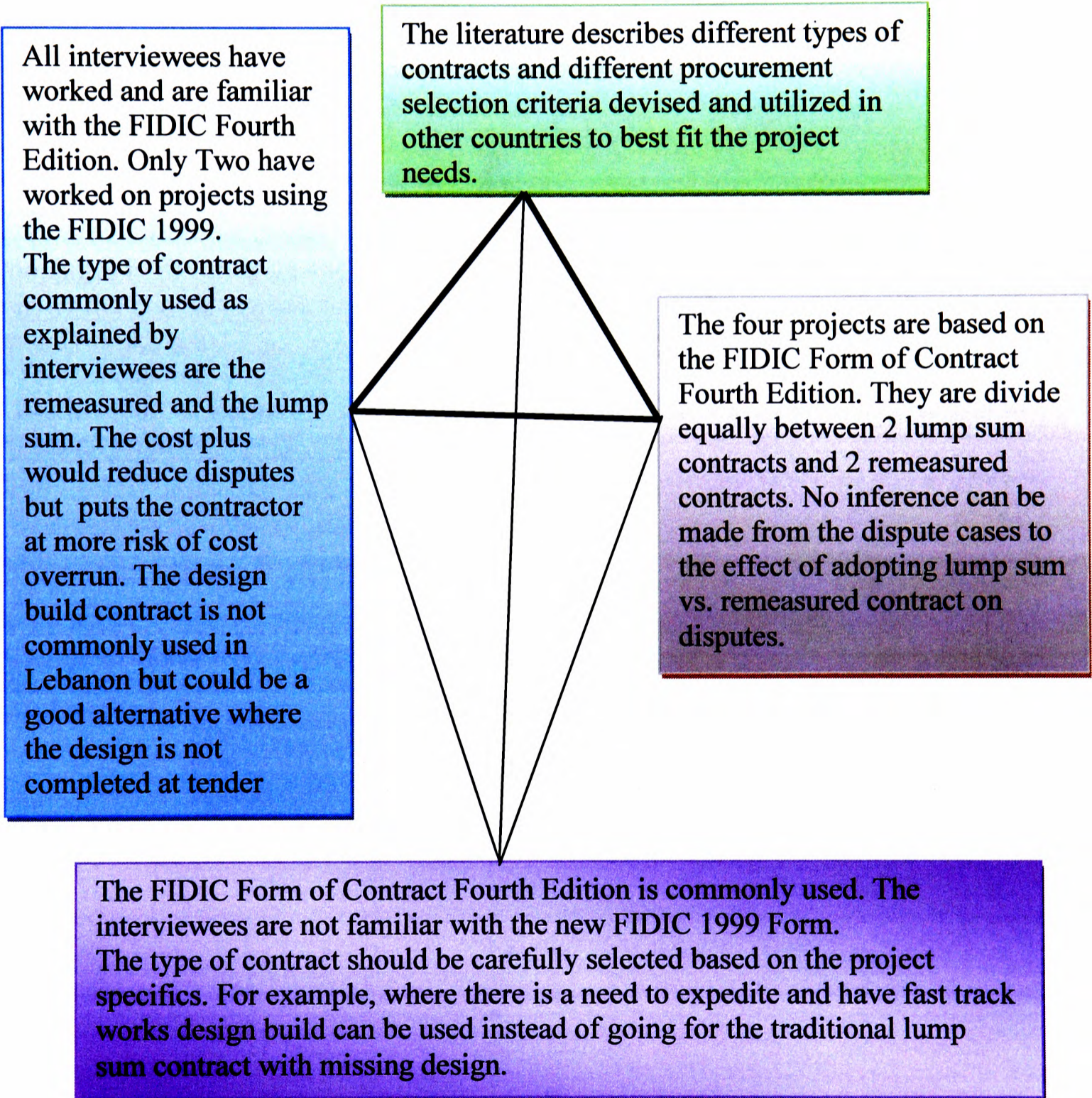
There is a tendency to avoid contingency allocation in budget submissions not to raise the project budget too high. But this increases the risk of facing a crisis situation during the execution of the work if any of these risks arise. The Engineer should ascertain whether "the additional burden imposed on the Contractor can be carried out without the risk of financial failure".

The interviewees stated that moving the risk to the Contractor will mean including a high premiums to account for this risk which will lead to employer paying for the risk ahead of time. However, interviewees confirmed that the contractor doesn't allow for risk premiums to maintain the competitive edge which might lead to incurring substantial losses not accounted for when these risks arise.

Looking at Projects B & C, it can be inferred that since the Contractors were reported to be awarded the contract at a rate much lower than the average, they had not allowed for the inherent risks. This becomes evident from the high occurrence of the dispute factors of 'Contractor avoiding monetary losses' and 'Validity/assessment of variation'. The Contractor's in Projects A and D were again claiming for risks/ambiguities that led to cost overruns. But no inference can be made regarding their allocation of risk premiums.

It can be concluded that if a bid is excessively low and has not allowed for risk premiums then the Contractor is at financial risk. If the risk eventuates the project will suffer.

- *Form/Type of Contracts adopted*



• *Particular Conditions*

“These FIDIC conditions are generally well-balanced and, as with any contract, there are a great number of links and relationships between different clauses, not all of which are express or otherwise obvious. With any amendment, therefore, there is the danger of upsetting the balance or of creating unintended consequential changes to related provisions. It is in the interest of all parties that changes should be kept to minimum.” (Corbett, 1991)

The Interviewees pointed out contract clauses that create loopholes in the contract and render the contract unbalanced mainly relating to:

- Price escalation
- Notification of claims
- Design liability.
- Employer’s prior approval to any Engineer’s time and cost determination
- Order of precedence of Contract documents
- Deletion of works

The clauses mentioned by the interviewees were examined where the risk was shifted to the Contractor through the particular conditions as shown in Exhibit D. Inference of their direct impact on influencing disputes could not be made through the case study examination.

Care should be taken in changing particulars not to cause loopholes or make the Contract unbalanced.

TENDER

- *Contract Documents*

"Insufficient or incorrect design information" was identified in the literature as the most significant of the eight risk areas examined by Shen (1997). Careful planning and specifications were identified as important factors that could reduce disputes. The hazards of short design periods were also discussed. "Insufficient or incorrect design information" was identified in the literature as the most significant of the eight risk areas (Shen, 1997). Also, Contract documents were identified to be critical. (Spittler et al.,1992).

The importance of having complete and clear contract document and its effect on time and cost overrun was stressed by all interviewees. Clear achievable design/specifications was raised as an important factor that could minimize ambiguities and disputes resulting from contradicting explanations of the contract requirements. The importance of having complete and clear contract document and its effect on time and cost overrun was stressed by all interviewees.

Design error and contract documents unclear occurred in 22 out of the 50 dispute cases. This led to disputes of additional time and cost or both. Also, two cases of unclear design requirement resulted in trial and error approach in specifying the unclear items, which in turn resulted in delay. "Defective contract documents" had the fifth highest recurrence among the risk areas in Table 10 of Chapter 5 (21 out of 50) and the Contract documents not clear had the highest frequency of occurrence among Table 12 of dispute factors (18 out of 50).

Insufficient and incorrect design could cause disputes due to the fact that ambiguities will be argued as the contractor would want to reduce his losses and go for the cheaper solution. The Engineer would want to maximize on the quality and go for the more expensive reading. The specifications should be written/tailored for the particular aspects of the project and not copied and pasted from other projects trying at all time to have clearly specified requirements otherwise disputes will arise.

- *Tender Period*

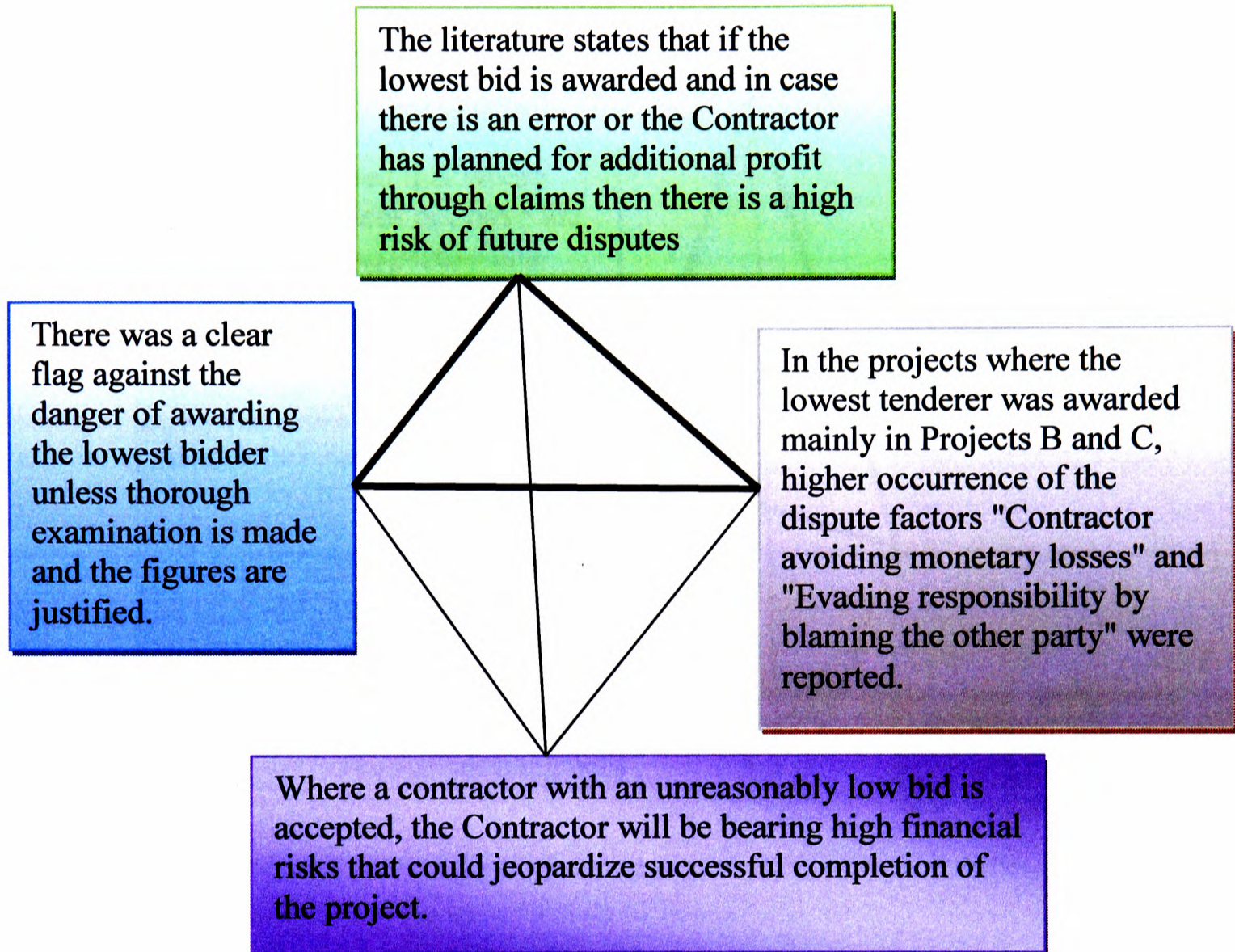
The literature mentions that in some cases short bid times are given to price a mass of documents. The Contractor might make hurried assumptions while pricing, and if they are contrary to the designer's intent, the contractor will raise a dispute as the designer's interpretation might cause incurring more time and cost.

The Bid Time was raised as a problem issue in the interviews however, some of the interviewees argued that the bid time allowed might be enough. Mostly it was agreed that the bid time must be set based on the complexity of the project.

Although the Contractor is deemed to have satisfied himself with the Contract Documents, the dispute areas and the Contractor's claims in many cases indicate that the Contractor might not have been aware/did not price certain items in the tender. However, even if the Contractor has not accounted for them, this does not lead to the conclusion that a longer bid period would have reduced those cases.

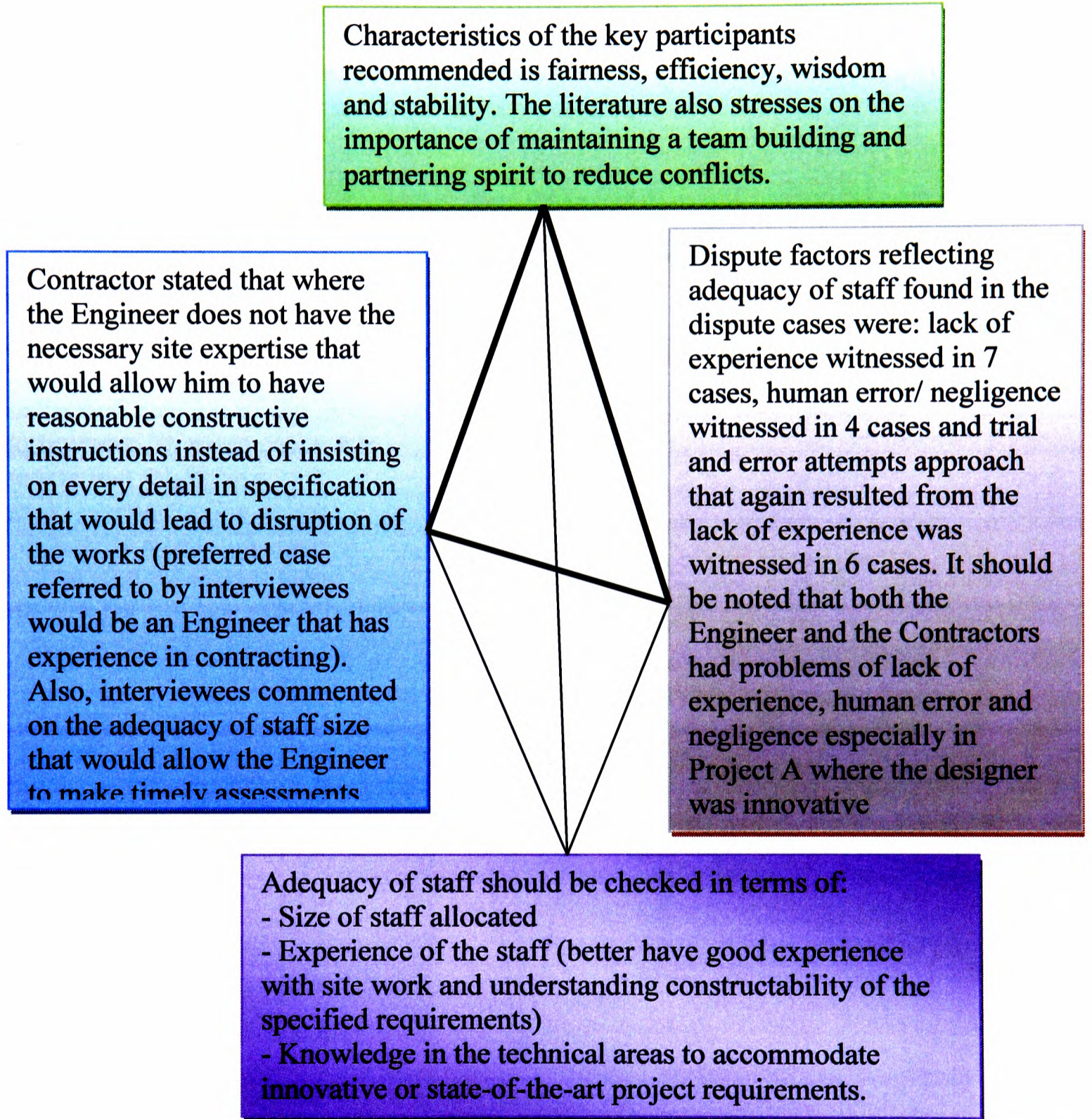
The Contractor should be allowed for sufficient bid time so that any ambiguities or discrepancies are cleared especially where the clause 'Sufficiency of Tender' will clearly allocate risk of missing information to the Contractor. However, there is no conclusive evidence of the influence of tender period on disputes in both the interviews and the case studies.

- ***Tender Evaluation***



BEHAVIOUR

- *Key persons assigned and adequacy of staff allocated*



• *Proactive attitude in resolving problematic issues*

Cooperation spirit must be maintained where participants focus on finding the best solution. The relationship is affected by: previous experience, perceived fairness, satisfaction with previous dispute resolution process, and behavior during the job.

Proactive behavior can be better achieved by keeping contractual methods simple. The contractor's financial positions will affect his behavior towards disputes. As such Distributive attitude of contractors resulting from low or even no profit margins should be avoided.

The notion of 'chemistry' among participants as raised by the interviewees in referring to the instinctual reaction of the participants. In some cases, one person that might be a troublemaker on one project, might fit perfectly on another project. Behavioral attitudes might have a bigger effect in Lebanon because the people in the eastern society are more emotionally driven.

11 interviewees said the Engineer has the most influence and should be holding the threads to a project. 4 stated the Contractor has control over actual progress of the works. 4 stated that the Employer's interference is important on critical matters.

Behavioral attitude in attending to disputed issues was witnessed through the dispute factors: Improper communication channel, Lack of cooperation, Unwillingness to resolve disputes, Language expressing bad relation, Evading responsibility by blaming the other party, Engineer firm although contract is grey, Contractor not given incentive

Care should be taken to the ongoing spirit to detect any negative attitude among the participants that could risk the progress of works.

Behavioral attitude of participants should be examined to make sure that the proactive behavioral attitude is maintained in a spirit of cooperation and problem solving. This includes at the initial stages of the project ensuring proper tender evaluation that might create a distributive attitude if the contractor's position is at risk.

- *Employer's representative (scope of work)*

The Employer may add restriction to the Engineer's authorities set in the general conditions however these restrictions should be carefully set to maintain the Engineer's role of being impartial. Some owners demand full audit of the claim assessment before authorizing payment.

Most interviewees agreed that the Employer's Representative should only interfere on strategic issues related to time and cost. He may pinpoint mistakes or problematic issues that the PM might be overloaded to notice. However, his principle role is in examining recommendations by the Engineer to take decisions that are to the best interest of the project.

6 cases report the Employer's interference as a dispute factor. It is worth noting that the cases of Employer interference witnessed in these dispute cases are the ones that were obvious from the documents examined and do not necessarily reflect all attempts of Employer influence.

Employer's representative scope of work should be agreed to and set clearly in the conditions of contract. His role should focus on ensuring proper management of the works by the Engineer without influencing the Engineer's impartiality.

- ***Dispute resolution mechanism***

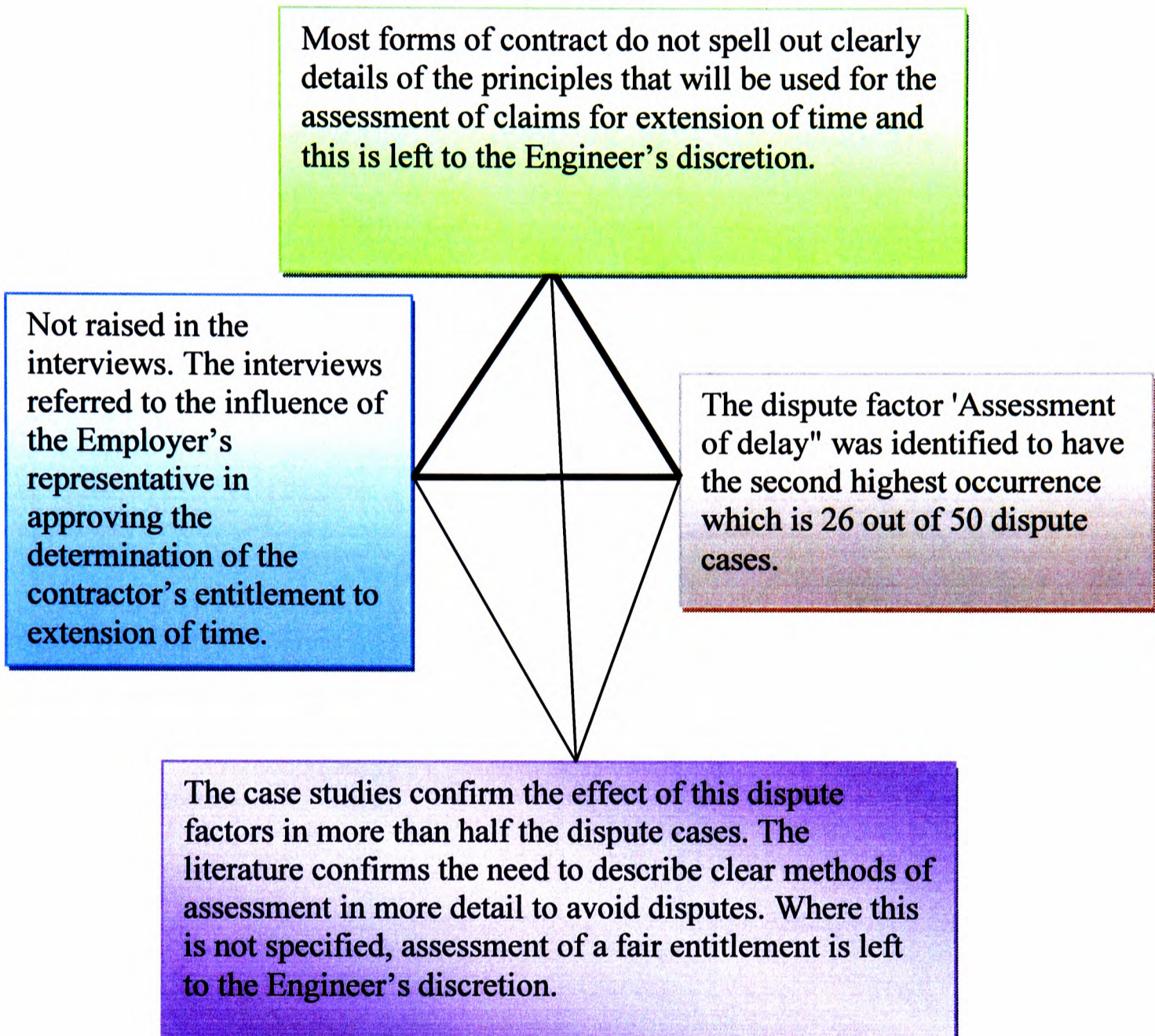
The Engineer's decision is a vital part of the dispute resolution mechanism in the FIDIC Fourth Edition where the Engineer becomes an impartial judge. The FIDIC 1999 specifies the dispute adjudication board instead. The DRB which is a more consensual and amicable version of the dispute boards has proved to be cost effective for medium sized projects and upwards.

Interviewees from both sides said it would be a better practice to have the Engineer's Decision carried out by a different entity from the Engineer's head office. The participants had conflicting views regarding the benefits of having a DAB. However, it is worth noting that none of the interviewees had the experience of working on a project to which a DAB was assigned. Interviewees stated that there is a common trend to resolve disputes in amicable settlement towards the completion of the works. This trend normally encourages the Contractor to submit more claims to have a bigger negotiation basket.

The four projects have the FIDIC Fourth edition dispute resolution mechanism specified which implies that any of the parties in disagreement with the Engineer's assessment would proceed with requesting an Engineer's Decision. Where any of the parties is not satisfied with the Decision and where amicable settlement is not reached within the specified period, a notice to proceed with arbitration would be given. It was noted in the cases examined that the Engineer's Decision was rejected by the Contractor and was not successful in resolving disputes

The Engineer's Decision did not prove to be efficient in resolving disputes in the case studies examined on the four projects. The interviews reflected conflicting views of whether replacing the Engineer's Decision with a DAB would provide better dispute resolution mechanism noting that the interviewees have no experience with DAB. However, the literature confirms based on previous experience the efficiency of using a DAB.

- *Assessment of extension of time/ monitoring of delay*



- *Valuation of variations*

The importance of agreeing to some of the matters whose assessment are normally disputes e.g. percentage for main office overhead and unit cost of resources was raised. A case where 'fair valuation' was defined differently by an arbitrator and a judge was reported as an example

The requirement in the Contract for the Employer's representative approval to assessment of variations was reported to be a dispute factors.

The dispute factor "Validity/assessment of variations" was identified to have the highest occurrence in 28 out of the 50 dispute cases.

Similar to the case of assessment of EOT, there is a need for detailed mechanism in particular conditions for assessment of variations. This would help maintain objectivity in assessment and minimize Employer's representative influence reported in the interviews.

- ***Timely Response to Contractual Matters***

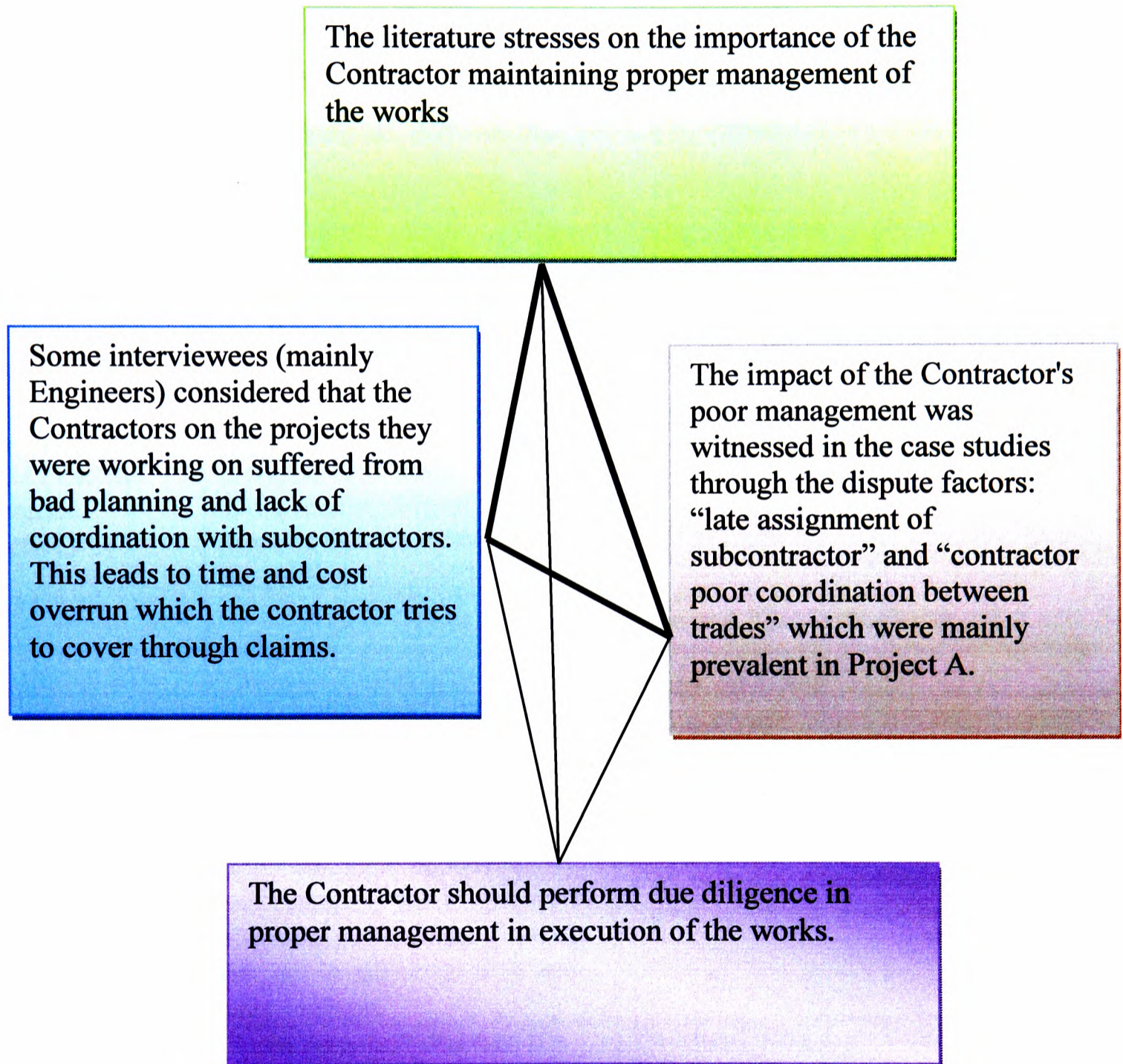
The contractor should at all times remind the head office and the field personnel of giving timely and proper notice. On the other hand 'the ability of parties to identify on a regular basis the claimant's entitlement with adequate documentation to ensure an interim payment mechanism' is as well necessary.

It is very important for Contractor to give a notice of a time or cost overrun to allow the Engineer take alternative decisions as may be necessary. Also, the Engineer should make timely determinations. However, specifying contractual periods for Engineer reply to request of time and cost assessments might have a negative impact.

Timely response to contractual matters were examined and proved to be dispute influencing through the dispute factors:
Late approval of submittal by Engineer
Contractor late/missing submittal
Slow attendance to responsibilities

To maintain proper progress of the works, the Contractor should give timely notices and prepare the necessary substantiation to allow the Engineer to make the determinations. The Engineer on the other hand should not be late in issuing those determinations as this might affect the Contractor's cash flow and his progress of works.

- *Contractor's Expertise in Management*



8.3.Summary

This Chapter examines the sixteen dispute influencing areas identified through the interviews and the case studies. Each is examined through the literature, interviews and case studies where conclusion is drawn through triangulation.

CHAPTER 9: RECOMMENDATION

9.1. Provisional proposals as derived from the Conclusions

Based on the conclusion reached in Chapter 8, a proposed recommendation is set below to minimize disputes for each of the dispute influencing areas. These proposals are then combined in a recommendation that was sent to 5 experienced practitioners for their review and comment.

Dispute Influencing Area	Conclusion	Recommendation
Risk Allocation (Best Practice/ Common Practice)	The risk should be clearly identified and better allocated and a relationship of trust must be developed between the parties.	Pre-bid meeting and Pre-award conference: Risks that are included in the Contract and allocated to the Contractor should be discussed especially those deviating from the risk allocation set in the General Conditions. The particular conditions should be addressed. The Contractor would verify/confirm his allocation of risk in the Tender submitted.
Employer's Influence in risk allocation	Both the interviews and the literature confirm the influence of the Employer in risk allocation. The literature adds that there should be awareness by the Employer at Contract Award stage that the project is subject to time and cost overrun.	During preparation of contract documents, the Employer/Employer's representative should be educated on the alternative of contract types available and the Engineer's recommendation should be transmitted. This shall include a discussion/agreement regarding the risk allocation strategy.
Contractor's allowance for risk premium/ Contractor's ability to sustain risk	It can be concluded that if a bid is excessively low and has not allowed for risk premiums then the Contractor is at financial risk. If the risk eventuates the project will suffer.	Pre-award workshop: Risks that are included in the Contract are allocated to the Contractor that should be discussed especially those deviating from the risk allocation set in the General Conditions. The particular conditions should be addressed. The Contractor would verify/confirm his allocation of risk in the Tender submitted.

Dispute Influencing Area	Conclusion	Recommendation
Form/Type of Contracts commonly used	<p>The FIDIC Form of Contract Fourth Edition is commonly used. The interviewees are not familiar with the new FIDIC 1999 Form.</p> <p>The type of contract should be carefully selected based on the project specifics. For example, where there is a need to expedite and have fast track works design build can be used instead of going for the traditional lump sum contract with missing design.</p>	<p>During preparation of contract documents, the Employer/Employer's representative should be educated on the alternative of contract types available and the Engineer's recommendation should be transmitted. This shall include a discussion/agreement regarding the risk allocation strategy.</p>
Particular Conditions	<p>Care should be taken in changing particulars not to cause loopholes or make the Contract unbalanced.</p>	<p>Particular Conditions: The provisional recommendation addresses the following critical areas that should be carefully addressed in the particular conditions:</p> <ul style="list-style-type: none"> Employer's prior approval to any Engineer's time and cost determination Engineer's Decision Price escalation Amendments for Lump Sum Contracts
Contract Documents	<p>Insufficient and incorrect design could cause disputes due to the fact that ambiguities will be argued as the contractor would want to reduce his losses and go for the cheaper solution. The Engineer would want to maximize on the quality and go for the more expensive reading. The specifications should be written/tailored for the particular aspects of the project and not copied and pasted from other projects trying at all time to have clearly specified requirements otherwise disputes will arise.</p>	<p>Pre-bid meeting and Pre-award conference: The Engineer is taking a responsible role to avoid unnecessary disputes. It is true that the Contractor upon reading and pricing a tender is deemed to have understood the requirements and raised queries for any ambiguity. And although contractually upon signing the contract the Contractor becomes liable for all contract requirements. By hosting the workshop, the Engineer is minimizing the risk of having a Contractor that has unreasonably priced (whether deliberately or mistakenly). Such a Contractor could be a 'recipe for disputes' even on issues that he is clearly not entitled to. This will be extremely important for lump sum projects that have design development responsibility.</p>

Dispute Influencing Area	Conclusion	Recommendation
Tender Period	The Contractor should be allowed for sufficient bid time so that any ambiguities or discrepancies are cleared especially where the clause 'Sufficiency of Tender' will clearly allocate risk of missing information to the Contractor. However, there is no conclusive evidence of the influence of tender period on disputes in both the interviews and the case studies.	Same recommendation as that of Contract Documents above applies.
Tender Evaluation	Where a contractor with an unreasonably low bid is accepted, the Contractor will be bearing high financial risks that could jeopardize successful completion of the project.	Pre-award meeting: The Engineer should carry out an independent pricing of the project. Also, at tender analysis thorough comparison should be made against the Engineer's pricing and across different tenderers. This should confirm the reasonable contract value and allow for identifying deviations in pricing by tenderers. These deviations should be raised and cleared. Where the Engineer ascertains that the Tenderer's pricing is too low, the Engineer should not accept such unjustifiably low pricing.
Key persons assigned and adequacy of staff allocated	Adequacy of staff should be checked in terms of: <ul style="list-style-type: none"> - Size of staff allocated - Experience of the staff (better have good experience with site work and understanding constructability of the specified requirements) - Knowledge in the technical areas to accommodate innovative or state-of-the-art project requirements. 	The workshop mentioned above is to be sponsored by higher management from both sides. Unlike the pre-bid meeting the pre-award conference shall be attended by most of the project participants to get familiarized with the project requirements, introduce participants to each other and serve as a facilitation workshop to promote a team building spirit. The higher management's intention to maintain a cooperative spirit shall be expressed and an MOU shall be signed. This should reflect the higher management's support to generate and sustain a collaborative approach. The follow up meetings of higher management should reinforce the collaborative approach through predefined reward system. However, it should be noted that previous literature has warned
Proactive attitude in resolving problematic issues	Care should be given to the ongoing spirit to detect any negative attitude among the participants that could risk the progress of works.	

Dispute Influencing Area	Conclusion	Recommendation
Proactive attitude in resolving problematic issues (Cont'd)	Behavioral attitude of participants should be examined to make sure that the proactive behavioral attitude is maintained in a spirit of cooperation and problem solving. This includes at the initial stages of the project ensuring proper tender evaluation that might create a distributive attitude if the contractor's position is at risk.	that such approach will not survive if surrounding economic conditions become unfavorable. As such maintaining a 'gainshare/painshare' arrangement is imperative.
Employer's representative (scope of work)	Employer's representative scope of work should be agreed to and set clearly in the conditions of contract. His role should focus on ensuring proper management of the works by the Engineer without influencing the Engineer's impartiality.	Pre-bid meeting and Pre-award conference: The workshop should be preceded by a meeting between the project manager and the Employer to inform the Employer of the tender finding and the agenda of the workshop meetings clarifying the intent of the meeting and the steps that will follow. Also, during preparation of contract documents, the Employer/Employer's representative should be educated on the alternative of contract types available and the Engineer's recommendation should be transmitted. This shall include a discussion/agreement regarding the risk allocation strategy and the dispute resolution mechanisms to be set in the contract. Also, the Employer Representative's duties and obligations could be agreed to during this meeting.
Dispute Resolution Mechanism	The Engineer's Decision did not prove to be efficient in resolving disputes in the case studies examined on the four projects. The interviews reflected conflicting views of whether replacing the Engineer's Decision with a DAB would provide better dispute resolution mechanism noting that the interviewees have no experience with DAB. However, the literature confirms based on previous experience the efficiency of using a DAB.	

Dispute Influencing Area	Conclusion	Recommendation
Assessment of Extension of Time/Monitoring of Delay	The case studies confirm the effect of this dispute factors in more than half the dispute cases. The literature confirms the need to describe clear methods of assessment in more detail to avoid disputes. Where this is not specified, assessment of a fair entitlement is left to the Engineer's discretion.	The clause for assessment of extension of time should be modified in the particular conditions to account for the following details that would reduce disagreement on time assessments
Valuation of Variations	Similar to the case of assessment of EOT, there is a need for detailed mechanism in particular conditions for assessment of variations. This would help maintain objectivity in assessment and minimize Employer's representative influence reported in the interviews.	Clarifications are proposed to better define what is deemed by the contract as being "appropriate" and "suitable" in the FIDIC Red Book Fourth Edition or "appropriate rate" and "reasonable profit" in the FIDIC 1999 suite to reduce disagreement on cost assessments.
Timely response to contractual matters	To maintain proper progress of the works, the Contractor should give timely notices and prepare the necessary substantiation to allow the Engineer to make the determinations. The Engineer on the other hand should not be late in issuing those determinations as this might affect the Contractor's cash flow and his progress of works.	Pre-bid meeting and Pre-award conference: An agreement should be reached on administrative matters such as time of reply of submittals, no. of submittals per month allowed, notice of variations, notice of delay, encouragement of open communication.
Contractor's Expertise in Management	The Contractor should perform due diligence in proper management in execution of the works.	No specific proposal is made beyond the Contractor exercising his due diligence in proper management of his obligations.

9.2. Provisional Proposals

Almost each of these areas has been addressed by the literature producing recommendations to promote better practice. In spite of those attempts, the disputes witnessed have led us to consider further recommendations. Those recommendations presented in 3 sections were based on conclusions triangulated from the literature, interviews, and dispute cases in Chapter 7. They intend to add or even re-emphasize what has already been recommended, published and known as best practice based on collected empirical evidence. The nature of the recommendation developed under three themes presents not a list of instructions but rather a reminder to the spirit that needs to be instilled pre- and post- contract signature. It is worth noting that the recommendation was based on problem areas witnessed and substantiated through our case studies, other areas of equal significance in dispute minimization could be similarly examined focusing on the contractual mechanism for dispute resolution.

Section 1: Conditions of Contract

Recommendations regarding drafting the particular conditions are of two types: promote introducing more details in some conditions mainly related to time and cost that have proved in our study to be highly prone to disputes and warn against upsetting the balance of the general conditions through commonly witnessed amendments to certain clauses.

I.I. Introducing Mechanism for Time and Cost Assessment

The 50 dispute cases examined showed the highest occurrence of disputes resulting from disagreement on time and cost assessments. Also, the Contractor's entitlement to time and cost resulting from occurrence of Employer's Risk events and was disputed in the four projects examined. As such the following is recommended to minimize such disputes.

I.I.I. Extension of Time

(applicable to Clause 14 in FIDIC Red Book Fourth Edition)

The clause for assessment of extension of time should be modified in the particular conditions to account for the following details that would reduce disagreement on time assessments:

- Form and size of baseline programme to be submitted i.e. number of activities, level of resource detailing should be set in the Contract.
- The period for submitting updates (whether weekly or bi-weekly) and the format for listing the delayed activities, the float available for each activities, their impact on the project completion should also be specified.
- The delayed activities should be identified as Employer's delay or Contractor's delay. The Employer's right to mitigate his own delay should be agreed and clarified. Where the delay is by the Contractor, he/she should submit details of the plan to mitigate the same. Where there is an ongoing delay by the Employer, the level of detail required to substantiate a claim for extension of time shall be set. Where the Contractor fails to do so, the Engineer shall make the assessment to the best of his knowledge based on the data available.
 - o Where EOT is granted or actual sequence of work has changed this shall be reflected in a revised programme. Accordingly, a list of all changes made to the baseline programme should be submitted. Failing to do so, the Engineer's planner shall revise the programme to accommodate the changes reflected in the new sequence of ongoing works on site until such time that the Contractor provides the update. The updates prepared by the Engineer shall be binding and shall be used for assessment of EOT for any ongoing excusable (Employer's) delay.
 - o Contentious issues such as concurrency and disruption should be addressed. The definition of concurrency should be clearly set out i.e. whether concurrent delay will be defined as two or more delay events occurring at the same time or the Employer Risk event and the Contractor risk event having concurrent effects should be cleared. Also, basis and technique for disruption substantiation and analysis should be specified.

- The SCL Delay and Disruption Protocol should be used as a guide for the points raised above including the delay analysis method to be adopted, the float ‘ownership’, concurrency, acceleration...etc.

The particular conditions could specify the following for example:

- *Maximum number of activities in the baseline programme not to exceed 5,000 activities*
- *Updates submitted on a bi-weekly basis detailing the progress of work through the ongoing activities, the float of these activities, any delay incurred in these activities.*
- *For delay occurring from Contractor’s Risk events, the Contractor shall submit proposal to accelerate or resequence the work to reduce this delay. This shall be submitted in the bi-weekly programme to be checked and approved by the Engineer.*
- *For delay occurring from Employer’s Risk event, the Engineer shall make necessary efforts in agreement with the Contractor to reduce the delay impact such as expediting the material and approval submittal cycle.*
- *The Window Analysis techniques should be used for assessing the Contractor’s entitlement to delay resulting from Employer’s events. This shall be based on bi-weekly windows as per the submitted updates.*
- *Concurrency is considered to take effect when an Employer’s Risk Event and Contractor’s Risk Event occur in the same window and have concurrent effects.*
- *Claims for Disruption submitted shall be substantiated by comparing disrupted operations with performance of similar works in another window.*

I.I.II. Valuation of Variations

(applicable to Clause 52 in FIDIC Red Book Fourth Edition)

The clause for valuation of variation should be further detailed in the particular conditions. FIDIC’s guide to the Fourth edition suggests a variation procedure to reach an agreement prior to issuing a variation. This however, introduces the risk of

delay in executing the works where a timely submission of rates is not made or where an agreement is not reached. The following clarifications are proposed to better define what is deemed by the contract as being “appropriate” and “suitable” in the FIDIC Red Book Fourth Edition or “appropriate rate” and “reasonable profit” in the FIDIC 1999 suite to reduce disagreement on cost assessments:

- In the case of additions/omissions of quantities, the applicability of contract rates throughout the contract period should be clearly specified. Also, a mechanism should be set for the fixing of rates beyond that period.
- In the case of new items, it should be stated whether prorated contract rates apply or whether market rates should be adopted. This should be clarified in line with the concept of ‘equitable price adjustment’ discussed below.
- The Contract should state the Contractor’s entitlement to overhead (if applicable) and profit (along with subcontractor’s overhead and profit) to be set as a percentage to both cases of additions and omissions of works.

It should be noted that in the cases where price adjustment for escalation of material and labor rate is not allowed, the matter of ‘equitable price adjustment’ should be cleared. This concept preserves the Contractor’s entitlement to a price adjustment that would leave the Contractor in the same economic position he/she would have been in had the variation not been issued. It is intended to make the “Contractor whole.” This matter has been raised in the *Weldon Plant v Commission for New Towns* [2000] (TCC BLR 496) case where arbitrator basing his award on the concept of equitable price adjustment allowed for the incurred additional cost but not for overhead and profit. Where reference was made to the court, the judge remitted the award and held that the Contractor is entitled to overheads and profits.

This can be based on the 1999 Red Book clause 12.3 as amended below:

For each item of work, the appropriate rate or price for the item shall be the rate or price specified for such item in the Contract or, if there is no

such item, specified for similar work. However, a new rate or price shall be appropriate for an item of work if:

- (a) (i) the measured quantity of the item is changed by more than 10% from the quantity of this item in the Bill of Quantities or other Schedule,*
- (ii) this change in quantity multiplied by such specified rate for*

This item

exceeds 0.01 % of the Accepted Contract Amount,

(iii) this change in quantity directly changes the Cost per unit quantity of this item by more than 1%, and

(iv) this item is not specified in the Contract as a fixed rate item”:

In this case the additional quantities shall be assessed based on market rates. The Contractor will be entitled to the overhead and profit percentage for variations set in the Appendix to Tender.

or

- (b) (i) the work is instructed through variation*
- (ii) no rate or price is specified in the Contract for this item, and*
- (iii) no specified rate or price is appropriate because this item of work is not of similar character, or is not executed under similar conditions, as any item in the Contract*

In this case

- if the instructed work necessitated new items replacing other items specified in the contract (the latter will be removed in the assessment as an omission) then the Contractor will be entitled to the difference in market rate between the new item and the replaced item at the time the variation order was issued along with the overhead and profit percentages specified in the Appendix to Tender.*

- *If the instruction work necessitated new items constitute additional works and do not replace any other items in the Contract, then market rates at the time the variation order was issued will be used as base for assessing the cost of executing the works. The Contractor will be entitled to the overhead and profit percentages specified in the Appendix to Tender.*

For variation orders issued beyond the contract period, market rates at the time issued will be used as base for assessing the cost of executing the works. The Contractor will be entitled to the overhead and profit percentages specified in the Appendix to Tender.

**I.I.III. Details of Compensation Entitlement in the case of Employer's Risk
(applicable to Clause 65 in FIDIC Red Book Fourth Edition)**

- Given the fact that Lebanon is going through a political turmoil that might result at times in political instability, a clear listing of the Contractor's entitlement to extension of time due to suspension or loss of productivity resulting from an Employer's risk, could minimize disputes regarding the same.

This would include clear listing of the costs the Contractor will be entitled to in the case of Employer's Risk and the details of the substantiation that should be provided: site staff salaries, head office overhead calculation formula, site operational cost based on invoices, subcontractor's compensation, cost of extension of advance payment guarantee, performance bond, and site insurance as substantiated with bank receipts, plant and equipment depreciation (if allowed under this clause), any other cost the Contractor adds to this Clause during Tender and the Engineer approves.

I.II. Warning Against Amendments to Particular Clauses

I.II.I. Employer's prior approval to Engineer's time and cost determination (applicable to Clause 2 in FIDIC Red Book Fourth Edition)

Employer's prior approval that is set in the particular conditions should not introduce obstacles to the Engineer in performing his duties for the cases where he/she should act as an independent certifier. As such the requirement of the prior approval of the Employer should be limited to approval in principal to variations unless deemed necessary at the technical level. However, a budget limit for variations could be set:

For example, US\$300,000 or 0.001% of contract value can be set by the Employer as a VO budget. The Engineer proceeds with the assessments of the VOs. Where this budget is reached, a cost report is submitted by the Engineer to the Employer for his/her review/approval detailing the list of variations certified and their values and an assessment of the VOs issued that are not yet certified. This would allow the Engineer to proceed with the valuation while giving the Employer an update/indication of the value of the ongoing variations and control on budget overruns.

It is worth noting that the general conditions of the FIDIC Red Book Fourth Edition and the 1999 Red Book do safeguard the Employer's right to seek a decision and arbitration where the Employer is in disagreement with the Engineer's determination as an independent certifier.

I.II.II. Engineer's Decision

(applicable to Clause 67 in FIDIC Red Book Fourth Edition)

Although none of the projects examined adopted the DAB, however, based on the following:

- In the cases examined, the Engineer's Decision was a reconfirmation of the Engineer's determination previously made. And these cases were referred to arbitration. As such the Engineer's Decision had no contribution in resolving the disputes.

- The DAB has been reported to be cost effective for medium sized projects and upwards. That is the reason why the World Bank made the procedure mandatory for all International Bank for Reconstruction and Development –finance project exceeding US\$50M.

As such it is recommended that DAB be adopted through the 1996 Supplement to the FIDIC Fourth Edition or through the 1999 Red Book in projects exceeding US\$50M.

I.II.III. Amendments for Lump Sum Contracts

(applicable to several Clauses in FIDIC Red Book Fourth Edition)

Although FIDIC gives guidance for amendments of the Red book to ‘Lump Sum’ form, the ‘Lump Sum’ form is used on projects where the design has been developed by the Employer to a sufficiently advanced stage where from the information supplied the Contractor can prepare all drawings and details necessary for construction without having to refer back to the Engineer for clarification or further information. However, the intention of this lump sum form as presented by FIDIC is for works which are simple and straightforward of relatively low value. For larger works it is recommended that the FIDIC Conditions of Contract for Design-Build (which is also a lump sum form) be used.

As such care must be taken in adopting the ‘Lump Sum’ form of Contract and it is advisable that this form be avoided for complicated and large projects.

I.II.IV. Price Adjustment

(applicable to Clause 70 in FIDIC Red Book Fourth Edition)

Although the particular conditions allow the drafter to omit the Contractor’s entitlement to price adjustment, this has only been advised for short term contracts ie one year maximum. For long term contract periods, this would be in contradiction with the civil code where the Théorie de l’imprévision provides for reducing the Contractor’s losses to reasonable limits by way of compensation where

the Contractor experiences excessive losses due to the same. However, if the drafter intends to reduce price escalation allowance then a percentage limit could be set beyond which cost escalation of labor and material clause would be applicable. This would reduce the Contractor's allocation for such risk in his tender price. On the other hand, where the market rates decrease, the Employer would be allowed to cost savings.

The adjustment to the monthly statements in respect of changes in cost could be set as per the following formula:-

$$P_n = A + b(B_n/B_o) + c(C_n/C_o) + d(D_n/D_o) + e(E_n/E_o) + f(F_n/F_o) + g(G_n/G_o) + h(H_n/H_o) + i(I_n/I_o)$$

where:

*P_n is a price adjustment factor to be applied to the amount for the payment of work carried out in the subject month, excluding variations (set as per conditions (a) and (b) of item 1.1.2 above) and daywork; **The Price adjustment would be applicable where P_n > 1.1.***

The following are specified in the Appendix to Tender:

A is a constant representing the nonadjustable portion in contractual payments;

b, c, d etc., are coefficients representing the portion of each cost element in the following order: cement, reinforcing steel, aggregates, copper, black steel, galvanized steel, labor wages, Euro rate (for items imported from Europe) in the works carried out in the subject month; the sum of A, b, c, d, etc., shall be one;

B_o, C_o, D_o, etc., are the base cost indices or reference prices corresponding to the above cost elements on the day 28 days prior to the latest date of submission of Tender. Sources of base cost indices except for Euro Rates shall be those issued by Governments as set in item 3.6.5 below.

B_n, C_n, D_n, etc. are the current cost indices or reference prices of the cost

elements for month "n", determined on the average of the past 4 months prior to the last day of the period to which monthly statement n relates. Sources of current cost indices except for Euro Rates shall be those issued by Governments as set in item 3.6.5 below.

If the Contractor fails to complete the Works within the Time for Completion, adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favorable to the Employer.

Section 2: Procurement Practices

The Procurement practices presented below is meant to minimize on disputes that would result from misinterpretation given the prevalent contract documents condition at the time of tender in terms of design completeness, contract clarity, risk allocation. This shall be achieved at three stages:

II.I. Pre-bid Meeting

This meeting is intended to clarify: scope of project and design intent, the conditions of contract, the project programme, method of measurement, technical requirements, design development expected, design verification and calculation required for certain systems, definition of equivalents, aesthetical requirements, acceptable range for certain architectural items like marble should be presented. This meeting shall be minuted to be followed by queries raised in the question and answer period.

- The pre-bid meeting is commonly conducted. Reference is made to it as a reminder to its significance and impact in ensuring that the bidders understand the project well enough to provide responsible and responsive bids. As such the Engineer should utilize this meeting to clarify ambiguities which have proved to be a major source of disputes in our empirical studies.
- For items in the specification where the architect insists on a specific supplier or a product and to avoid monopoly of prices, offers for these prices should be

received negotiated and included in the contract as nominated suppliers for which the Contractor will be entitled to an overhead and profit.

II.II. Pre-award Conference

This conference shall be held after tender analysis to achieve the following:

- The conference will consist of two parts. The first part will consist of scrutinizing and negotiating the bid, checking qualifications, making sure that there are no errors in pricing and that all items required including risks allocated to the Contractor in the Conditions have been reasonably priced. The second part of the meeting should be attended by most project participants attending/involved to reconfirm the Contractor's understanding of all points/issues raised in the pre-bid meeting and the Q&A in more detail. This is the last attempt to reduce grounds of misinterpretation.
- Any detail that is not mentioned or raised during this workshop does not relieve the Contractor from his/her contractual obligations. However, the Engineer will be held responsible for all statements made by him/her during the conference. All discussions shall be minuted.

II.III. Higher Management MOU

The workshop mentioned above is to be sponsored by higher management from both sides. Unlike the pre-bid meeting the pre-award conference shall be attended by most of the project participants to get familiarized with the project requirements, introduce participants to each other and serve as a facilitation workshop to promote a team building spirit.

The higher management's intention to maintain a cooperative spirit shall be expressed and an MOU shall be signed. This should reflect the higher management's support to generate and sustain a collaborative approach.

The MOU shall be signed in the presence of all project participants. Provisions should be made for a periodical higher management follow up meetings to monitor:

- *Progress of the work and any ongoing critical delay that would require a higher management involvement.*
- *Disputes that were not resolved at the project management level.*
- *Direct control of on-site participant behavior. Major attitudinal clashes that might create tension should be identified where action may be taken as necessary to relocate such personnel to different responsibilities.*

The follow up meetings of higher management should reinforce the collaborative approach through predefined reward system. However, it should be noted that previous literature has warned that such approach will not survive if surrounding economic conditions become unfavorable. As such maintaining a ‘gainshare/painshare’ arrangement is imperative.

Section 3: Regulating the Industry

- It is contingent upon the Engineer’s willingness and commitment to take more responsibility towards achieving a successful project as opposed to preparing a set of contract documents that would provide a good ‘shield’ during contract administration keeping both the Engineer and Employer at the safe side of the contract. This spirit will have to be encouraged and sponsored by the Employer. Where correct practices are not adopted by the Engineer and the Employer who ‘set the rules of the game’; they will be taking the risk of increased disputes at their own peril. This does not by any way undermine the significance of having the Contractor with the right ingredients “qualifications, finance, responsiveness”.
- The above requires a certain degree of awareness and self-monitoring by project participants. However, where wrong practices are applied whether intentionally or due to lack of knowledge, the consequence will be an increased amount of disputes and an unhealthy construction environment. The Construction industry has a significant contribution to GDP (8.2% reported in 2005). This justifies the need for a regulatory body (set by the government) to set rules and regulations for this industry similar to those set in other sectors (banking, aviation,...).
- In their direct role as clients in public projects, governments in other countries maintain relationships with contractors which transcend that between parties to a

normal construction contract. Such efforts are made to nurture local construction companies in some Far Eastern countries. Japan protects its local industries often under the 'infant industry' principle. Singapore makes special efforts to make their contract terms favorable to and supportive of contractors. Government also influences the industry indirectly through the availability of labour and the levels of wages which are dependent upon regulations on the recruitment of foreign workers, statutory charges payable, insurances required, and so on (Ofori, 1990).

- The ministries responsible for construction in the developed countries maintain subsidiary bodies for policy formulation, implementation and monitoring. In Singapore for example, the regulatory body has administrative responsibility for the construction industry training center. It administers all the schemes formulated to facilitate the technological upgrading of the construction industry. These take the form of tax incentives, financial assistance for the acquisition of plant and equipment. The Board has initiated or acted as the point of focus for research into problems facing the local industry. It maintains a central register of contractors, and has published a number of guides on good construction practice (Ofori, 1990).

3.6. Similar regulatory body in Lebanon could prevent misuse/abuse of contracts by both parties and thus promote a healthy environment. This could be achieved by enforcing regulations for the following five areas:

- ***Drafting Conditions.*** *Unbalanced unfair contracts should be prohibited. Care should be taken to clauses that are likely to cause disputes. Particular conditions should be standardized where the Engineer is allowed to modify the conditions only to account for project specifics and not to manipulate/exploit them such as removing the Contractor's entitlement to 'Employer's Risk Event' consequences or extension of time due to 'Other Special Circumstances'.*
- ***Procurement Practices:*** *Procurement practices including the pre-bid and pre-meeting mentioned above along with the proper tender analysis methods should be reinforced.*

- **Professional skill requirements:** *In public projects merit schemes are devised on certain countries where good performance records of contractors are awarded merit stars that give them a bidding preference. On individual level, qualifications could be set recognising necessity of main project participants from both sides to be members in institutes like the PMI, CIOB, RICS or CI Arb. A Lebanese PMP (Project Management Practitioner) degree could be designed and awarded, and set as a requirement for practitioners in the industry. As such practitioners would undergo an exam that would test their knowledge of contracts, drafting conditions (item 3.6.1 above), and procurement practices (item 3.6.2 above). Seminars could be hosted to provide necessary training and yearly seminars to be attended by those holding the degree. This can be done in collaboration with the institutes mentioned above.*
- **Violations of Safety Code:** *The site might be periodically inspected by officials of public agencies for building control purposes and for ensuring that working conditions are safe and healthy. Flagrant violation of safety codes should be dealt with as felony offenses punishable by more than just monetary penalties.*
- **Price Indices:** *The government should issue on a monthly basis price indices reflecting increase/decrease of rates for material used in the construction industry such as: cement, reinforcing steel, aggregates, copper, black steel, galvanized steel along with labor wages. These shall be used as basis in calculating entitlement to price adjustment.*

9.3.Recommendations

The replies received from the experts is summarized below. The full commentary received is presented in Appendix

Section 1: Conditions of Contract

Introducing Mechanism for Time and Cost Assessment

All experts except Expert C confirmed on the importance of both parties to adopting the proposed philosophy and act professionally throughout. The Employer must recognize the Contractor's aim to make money and the Contractor must recognize the Employer's aim to achieve value for money. This also places emphasis on the Employer who should recommend the correct procurement, and empower the Engineer to act impartially.

Extension of Time

Three of the five experts agreed that a more detailed clause would help minimize disputes. Expert A considered it a necessary condition for the success of the introduced mechanism is set as 'the Engineer genuinely acting not only impartially but independently without the influence of the Employer.' The clause will help obviate the tactic of continual referral for 'further and better particulars' employed by the Engineer. Expert B states that it will make the Contractor prepare the resource required for proper implementation of this clause. Expert C and D disagreed stating that detailed requirements would increase the risk of certain disputes. But at the end of the section Expert C states that a Lebanese version of the 'SCL' Protocol could work for projects over a certain value.

Valuation of Variations

All 5 experts agreed that introducing more clarity would help reduce disputes. The importance of introducing greater certainty and clarity is stressed by expert A as long as both parties fully understand the risk. Substantiation of the words "appropriate" or "reasonable" for something with pre-defined parameter from FIDIC 1999 would assist reduce disputes as stated by Expert B. Expert C confirmed that detailed wording of this clause would provide transparency in establishing and agreeing rates but expressed concern to the sample amendments presented as it might lead to detailed measurement and calculation of numerous items.

Details of Compensation Entitlement in the case of Employer's Risk

All experts agreed that detailing compensation entitlement in the case of Employer's Risk would help reduce disputes. Expert B adds that the conditions should firstly better define and classify political uncertainty or instability as Force Majeur. Expert B also, proposes expansion of sphere of any works to areas such as Afghanistan, Iraq, Kurdistan etc to merit some specialist advice from experience in these areas.

Warning Against Amendments to Particular Clauses

All experts agreed that care must be taken in amending particular conditions. Expert B commented that the amended forms of contract used in the Middle East are so heavily in favour of the Employer that the Contractor is carrying an unreasonable and disproportionate amount of risk (in his views) and the contractor that wins the tender will invariably be the one that either is incompetent in assessing the risks or, is hoping all goes well regardless and that he can just muddle through.

Employer's prior approval to Engineer's time and cost determination

Four experts agreed that the Engineer should be allowed to act impartially. Expert A states that the proposed mechanism does not provide the Contractor with any greater cost certainty until such approval is received. However, he recognizes the importance of "agreement in principle". Expert C disapproved of this "agreement in principle" since delay will cause disputes.

Expert B neither agreed nor disagreed. He proposed an alternative employed in the UK under certain tripartite financing arrangements, which can be incorporated in certain forms of Contract, is provision for a "Bank Monitoring Surveyor" typically in Development Projects, usually an RICS Chartered Quantity Surveyor directly employed by, and acting specifically to protect the interests of the Funding Bank.

Engineer's Decision

The five Experts encourage the use of DAB as a better alternative in a balanced contract. Both Experts A and B refer to the success of the Adjudication process that became mandatory in the UK and helps avoid protracted litigation.

Amendments for Lump Sum Contracts

The five Experts agree to the importance of choosing the correct procurement route and contractual mechanism as a major factor in the success of a project. Expert D defended the use of lump sum contracts as it has proved to be successful on many projects provided competent consultants are approved.

Price Adjustment

The five experts agree to introducing a price escalation formula. However expert B proposes adopting the British Cost Information Service and Royal Institution of Chartered Surveyors approach of fair and transparent adjustment of fluctuations by using simple weightings published on a monthly basis in times of base price turbulence. Expert D proposes implementation of Clause 70.1 fully details as an alternative.

Section 2: Procurement Practices

Four experts agreed to the procurement practices proposed. Expert A had attended such workshops and considers these processes can greatly reduce the incidences of claims through misinterpretation of the tender and Employers requirements. Expert A stated that the combined result of both meetings should be that the Employer is made fully aware of what he is buying for the proposed Contract price and the Contractor is fully aware of what the Employer is expecting to get for this price.

Expert C disagreed to the significance of such procurement practices as it would be too late to make meaningful changes. However, Expert C reported no previous experience in attending such workshops.

Expert D had experience on projects carried out on 2 stage competitive basis where meetings were conducted at “time of issue” and “mid tender”.

Section 3: Regulating the Industry

All three Experts agreed to the significance of regulating the industry and its impact on reducing disputes. Expert A reported that regulating the industry in the UK had a mostly positive effect particularly in terms of dispute resolution.

9.4. Summary

A provisional recommendation was formulated in this Chapter based on the conclusion reached of the dispute influencing factors. The provisional recommendation consisted of 3 sections. The first section addresses conditions of contract where introducing a mechanism for time and cost assessment is proposed. For other dispute influencing clauses a warning is set against amendments in particular conditions that would render the conditions unbalanced. The second section addresses procurement practices where prebid meeting/pre-award conference is encouraged. Also, this section proposes having an MOU of higher management. The last section recommends regulating the industry mainly the procurement practices, professional skill requirements, violations of safety code and price indices.

These recommendations were sent to five experts for their review. There was common consensus by at least 3 of the 5 experts on each of the points raised in the recommendation.

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CHAPTER 10: SUMMARY, LIMITATIONS AND FUTURE RESEARCH

10.1. Summary

The research conducted to minimize disputes started with a thorough literature review. The examination of disputes has led to the study of risks, conflicts, claims, procurement methods, and behavioral attitude of participants which were found to be interrelated. The literature revealed abundant research studying different aspects of the problem and proposing preventive and remedial measures at different stages of the construction project. Different studies of the behavioral aspect of parties to a construction contract and their impact on disputes resolution was also examined.

The literature review allowed for having a broad overview of the interrelated factors that influence disputes. At this point different forms of research were examined to devise a methodology that would best serve the purpose of our study and provide valid and reliable findings. The realism paradigm was adopted and accordingly guidelines for conducting preliminary examination of projects, interviews and case studies along with selection criteria and analysis procedure. A pilot study was conducted on 20 projects in Lebanon where figures project cost and duration reflected the time and cost overruns on these projects and the occurrence of disputes. As such a need for investigating the Lebanese construction industry further was established to identify the disputed influencing areas.

Based on both the literature review and the pilot study, questions were set for a semi-structured interview that was conducted with twenty four practitioners in the Lebanese construction industry including both project managers and contract administrators divided equally between Engineers (the Consultant as defined under a FIDIC form of Contract) and Contractors. The responses received led to identifying fifteen dispute influencing areas which were categorised under four themes: risk, tender, behaviour, and contract administration. Also, the interviews revealed that one third of the practitioners at the project management level had limited knowledge in contractual matters.

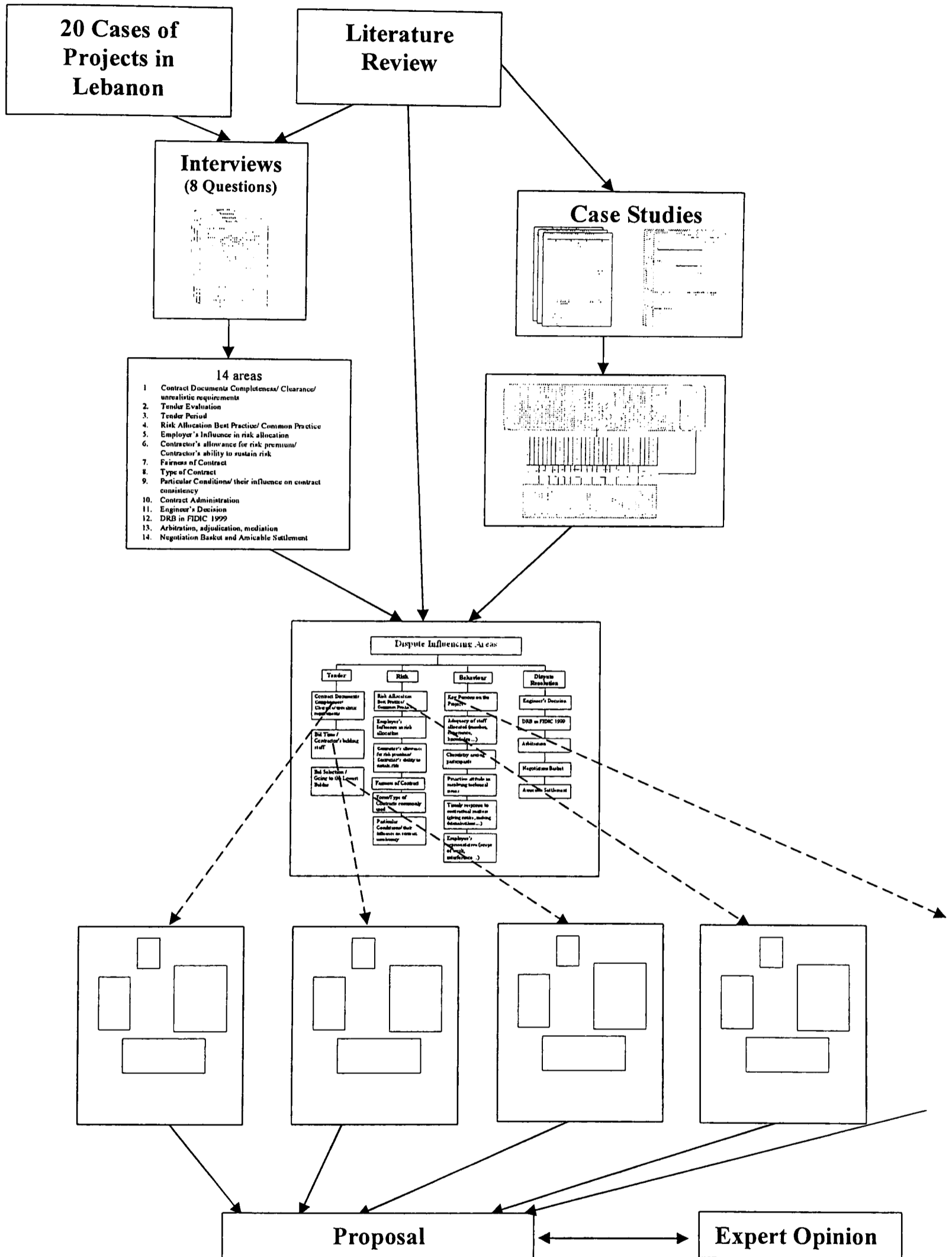


Figure 27 Summary of Research Methodology

Fifty dispute cases on four ongoing projects were closely examined where for each the chronology of events was drawn and the cases were analyzed where risks that eventuated and dispute factors were identified based on categorisation of previous literature. Again, the dispute factors were categorised under ten dispute influencing areas of those identified from the interviews.

The dispute influencing areas from both interviews and cases studies were combined in a set of sixteen dispute influencing areas categorised under the four themes mentioned earlier. For each of these dispute influencing areas, data was collected from the literature, the interviews and the case studies and compared. Conclusions were derived through comparing this data. A set of provisional proposals were suggested against these conclusions. These were reviewed by 5 expert opinions. An overview of the work carried out in this thesis is illustrated in Figure 27.

In brief, the research conducted identified sixteen dispute influencing area as witnessed from the interviews and the case studies. Although many of the dispute influencing factors had been addressed in the literature carried out in other countries, these dispute influencing factors have proved to be existent in the Lebanese construction industry. Moreover, further dispute influencing areas related to the conditions of contract and the behavioral aspect of participants were more evident in the research examined in this thesis than had been reported in the previous literature. A set of recommendation is proposed which includes the ‘good practice’ principles but also stresses on approach that could help resolve specific dispute influencing factors that had not been directly addressed in previous studies.

10.2. Research Criteria

The four tests to judge the quality of research design were satisfied as follows:

1. Construct validity: comparison of the results from different sources was adopted where a chain of evidence is maintained between them to maintain construct validity.
2. Internal validity: was establishing through explanation building where the iterative approach of examining the cases helped confirm the causal like through several iterations.
3. External validity: replication logic among the four projects and among the 24 interviewees that work for prominent consultant and contracting companies allows for generalization inside the Lebanese borders.

4. Reliability: Procedure of different stages along with the case study database was properly documented to allow other researchers reach the same results by following the same steps.

10.3.Meeting the Aim and Objectives

The initial research aim was met where the causes of common disputes in Lebanese construction industry were identified through 16 dispute influencing areas listed in Figure 26. Also, the relationship between disputes, risk allocation and behavioral attitudes in contributing to dispute emergence was defined as shown in Figure 24. Recommendation was proposed to minimize the occurrence of disputes.

Each of the following objectives set in Chapter 1 were met. They are re-listed below:

- Identify and map the interrelated factors causing disputes based on literature and previous research.
- Examine common practices in contract administration and claims management in Lebanon mainly focusing on the procurement trends, forms of Contract used, and risk allocation strategies.
- Gather and analyse data on the nature, incidence and frequency of disputes in the Lebanese construction industry
- Use the processed data to address the importance of sound contract conditions administered by experienced and knowledgeable practitioners and the likely impact on the minimization of disputes.
- Make educative recommendations for academics and practitioners

10.4.Research Limitations

The following limitations were faced / witnessed while carrying out this research work:

- The research for dispute factors led to a study of different interrelated areas as shown in Figure 7. This made the research broad in nature examining those interrelated factors extensively. As such there was a limitation to the level of detail and depth that could be achieved in studying each of those areas. Examination of the interrelated areas could be the focus of future studies.

- There was a limitation to the access of empirical evidence including the pilot studies, the interviews and the dispute cases. There is also a limitation to the time for collecting these information within the research time frame.
- The subject by itself examines details of disputes some of which have reached arbitration and litigation and are ongoing. As such given the sensitivity of the dispute details draws lines of confidentiality. Also, there might be a limit to the openness in the interviews in discussing the amounts of disputes encountered especially on ongoing projects as this may reflect weak management.
- Another limitation is having the research carried out in the Lebanese context only due the time and budget constraints. There was an initial interest to conduct this research in the Middle East context but that could not be achieved given those limitations. However, similar future research can be conducted in other countries and data can be further compiled and compared among countries accordingly.

10.5.Future Research

Future research can be carried out at two level:

- Similar research using the same methodology can be used to examine the dispute occurrence, causes and factors in other countries. Similar work has already been carried out in some countries as witnessed thorough literature review but that leaves yet other countries where similar research could be conducted. But the significance of the subject and its impact on the construction industry should promote more research. Findings in other countries could identify approach in contract procurement and administration which prove to be successful.
- More focussed studies could be carried out in Lebanon to tackle some of the influencing areas identified in this work:
 - Behavioural examination could be performed through a study of one ongoing project where daily in-depth examination of behavioural attitudes of participants towards disputes would be studied. Also, the change in their reactions could be tracked to better understand this aspect of participant behaviour. In previous studies this was done through attending the project weekly meetings and requesting the

project participants to reflect their views on the ongoing disputed matters through daily agendas.

- Attempts made in adopting the recommended procurement practices could be tested on new projects to further refine the process including the terms of the MOU, and its application.
- Also, further studies could be made to examine the dispute resolution techniques and their success. This would allow focusing on dispute resolution technique with an emphasis on how best the accumulated disputes can be resolved towards the end of the project to avoid arbitration and litigation. As such the success of different amicable dispute resolution methods could be tracked.
- Follow up work could be done with the governmental bodies provided they become aware of such a need and accept to devise a system for regulating the industry which would include specifying a set of regulations. This would include researching regulating attempts made in other countries to benefit from their experience. This exercise could also account for setting standards of knowledge for practitioners.

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**Appendix A:
Chronological Listing of Research
on Sources of Dispute (Fenn, 2006)**

Researchers	Findings (sources of disputes)
Diekmann & Nelson (1985)	The two most common causes of contract claims were (1) design errors (46%) and (2) discretionary or mandatory changes (26%). Other claim headings include: differing site conditions; weather; strikes and value engineering.
Mathews & Ashley (1985)	96 items were concluded as construction disputes within contract clauses
Watts & Scrivener (1992)	59 categories of disputes and 117 sources of disputes within which the subgroups are: (1) determination of the agreement, (2) payment, (3) the site and execution of work, (4) time, (5) negligence and nuisance, (6) final certificate payment.
Lewis et al. (1992)	Five causes of conflict: (1) one of the potential risk events occurs, (2) one or more of the parties suffers some loss as a result of it, (3) the damaged party had not identified the risk as relevant to the project, (4) the risk was identified but insufficient steps were taken to mitigate its effects, (5) the allocation of risks between the various parties to the contract was not clearly established in the first place.
Revas (1992)	Seven most frequent causes for claims: (1) inadequate site and/or soil investigation prior to starting the design, (2) starting design efforts and/or soil investigation too late prior to starting the design (3) calling for bids with an incomplete set of drawings, (4) endeavouring to complete design through shop drawing review, (5) introducing untimely design revisions without allowing commensurate time extension for the completion of the project or without recognizing the contractor's right to impact costs, (6) interfering both with the sequence and the timing of construction (e.g. to compensate for the delay in the delivery of owner-supplied equipment/material), (7) continuing to introduce changes under the guise of correcting deficiencies.
Construction Industry Council (1994)	Six categories of main reasons for disputes: (1) general, (2) consultants, (3) client, (4) contractor, (5) subcontractors, (6) manufacturers and suppliers.
Dickman <i>et al.</i> (1994)	Three areas: (1) people, (2) process, (3) project.
Jergeas & Hartman (1994)	Well known reasons by which claims arise: (1) increase in scope of work, (changes, extras and errors), (2) inadequate bid information, (3) faulty and/or late owner-supplied equipment and material, (4) inferior quality of drawings and/or specifications giving rise to ambiguities in contract requirements, (5) insufficient time for bid preparation, (6) stop-and-go operations because of lack of coordination, design information, equipment, or material, (7) work in congested areas and overcrowding, (8) acceleration to regain schedule, (9) inadequate investigation before bidding, (10) unbalanced bidding and underestimation
Lee (1994)	Disputes from contract problems: (1) unfair contract clauses, (2) vague definition of contract documents (in terms of performance period, payment, quality and variations), (3) not comprehensive stipulation
Rhys Jones (1994)	Ten factors in the development of disputes: (1) poor management, (2) adversarial culture, (3) poor communications, (4) inadequate design, (5) economic environment, (6) unrealistic tendering, (7) influence of lawyers, (8) unrealistic client expectations, (9) inadequate contract drafting, (10) poor workmanship

Table 2 Chronological Listing of Research on Sources of Dispute (Fenn, 2006) (cont'd)

Researchers	Findings (sources of disputes)
Sample <i>et al.</i> (1994)	The most common contributing factors in claims are: (1) increase in scope of the work, (2) weather, (3) restricted access, (4) acceleration
Watts & Scrivener (1994)	290 sources of disputes are identified from 60 cases in each country and the 21 categories are grouped into five sub-groups. The most frequent source of disputes in the UK is negligence, while in Australia failure and determination have the highest occurrence
Assaf <i>et al.</i> (1995)	56 factors, which were grouped into nine major areas; (1) materials, (2) manpower, (3) equipment, (4) financing, (5) environment, (6) charges, (7) government relations, (8) contractual relationships, (9) scheduling and controlling techniques
Bristow & Vasilopoulous (1995)	Five primary causes of claims: (1) unrealistic expectations by the parties, (2) ambiguous contract documents, (3) poor communications between project participants, (4) lack of team spirit among participants, (5) a failure of participants to deal promptly with changes and unexpected conditions
Murdoch & Hughes (1996)	Background to disputes: (1) motivation factors of individuals, (2) pre-conceptions about roles, (3) project success or failure, (4) the roots of contractual disputes, (5) business relations
Sykes (1996)	Two major sources: (1) misunderstanding due to lack of clarity, (2) unpredictability of unforeseen circumstance
Kumaraswamy (1997a)	Heads of claim categories: (1) cost, (2) time extension
Kumaraswamy (1997b)	Two categories: (1) root causes, (2) proximate causes
Hu (1998)	Factors of construction disputes: (1) defective performance in quality, (2) unfair contract clauses, (3) conservative attitude of public employer and supervising engineers, (4) negligence of design and supervision
Vidogah & Ndekugri (1998)	Eight heads of claims likely to be disputed (in rank order): (1) cost of disruption, (2) head office overheads, (3) interest and finance charges, (4) cost of preparing claims, (5) loss of profit, (6) inflation of costs, (7) on-site overheads, (8) others
Al-Momani (1999)	Seven categories: (1) poor design, (2) change orders, (3) weather, (4) site condition, (5) late delivery, (6) economic condition, (7) increase in quantity
Fenn (1999)	Three independent variables predicted construction disputes well: (1) the level of variations, (2) the success of the employer's advisors on a past project, (3) the tender period
Gould <i>et al.</i> (1999)	Nine areas of issues in dispute: (1) project delays, (2) change in the scope of the work, (3) payment issues, (4) differing site conditions, (5) design issues, (6) defective work or product, (7) site administration problems, (8) property damage, (9) personal injury
Liang (1999)	Four types of most frequently seen claims: (1) scope of work claim, (2) delay claim, (3) change of site condition claim/adverse physical conditions or obstructions, (4) acceleration claim
Sykes (1999)	Origins of disputes: (1) omission and unforeseen events, (2) lack of capacity to settle claims, (3) different expectations.

Table 2 Chronological Listing of Research on Sources of Dispute (Fenn, 2006) (cont'd)

Researchers	Findings (sources of disputes)
Molenaar <i>et al.</i> (2000)	Three factors found to have influence on or be closely related to dispute potential: (1) people issue, (2) project complexity, (3) owner management ability
Mitropoulos & Howell (2001)	Basic factors driving the development of disputes are: (1) project uncertainty, (2) contractual problems, (3) opportunistic behaviour
Kululanga <i>et al.</i> (2001)	Four basic sources: (1) contract documents due to errors, defects and omissions, (2) failure to appreciate the real cost of a project at the beginning, (3) changed conditions, (4) stakeholders involved in a project
Ren <i>et al.</i> (2001)	Three factors: (1) social, (2) industrial, (3) project
Tsai (2001)	Five areas of disputes: (1) performance period, (2) payment, (3) quality, (4) quantity, (5) contract
Wang (2001)	Grounds for claims: (1) unfairness of contract/unfairness of risk allocation, (2) variations, (3) defective contract documents, (4) delay claim, (5) circumstance changes, (6) breach of obligations of employers, (7) termination of contract
Yao (2001)	Disputes can be categorized into two stages: (1) before contract award, (2) after contract award
Kehinde & Aiyetan (2002)	Highest source of contractual claims in most building contracts is constituted by (1) variations, (2) additional works
Lo (2002)	Causes of construction conflict: (1) differences in goals and objectives of parties in the project, (2) differences in contract interpretation between the construction manager and contractor that have to be compromised by serious negotiation which may take a long period of time, (3) lack of understanding about the needs of others also involved in the planning, design and construction process, (4) uncertainty about role, responsibility, authority and procedure ambiguity, (5) unclear reward structure or opportunity for the project participants, (6) specific allocation of limited resources such as materials, capital, labour, etc., (7) excessive demands on resources normally depended on to assist in the resolution of conflict, (8) incorrect assumptions made from biased perceptions, (9) demands for higher quality than specified, (10) failure to provide products in conformity with user requirements, (11) insufficient time to make required decisions, (12) inability to do the job, (13) subcontractor performance problems, (14) frustration over a lack of control of events affecting performance, (15) desire to take advantage of those in a weaker position, (16) adverse relationship between client and contractors, (17) work slowdowns and strikes, (18) interpersonal conflicts, (19) regulatory problems, (20) lack of communication
Yan (2002)	Construction disputes in Taiwan fall into four categories: (1) problems occur in planning and designing stage, (2) problems occur in contract performance stage, (3) problems occur in completion and acceptance stage, (4) problems occur in maintenance stage, ; four sources of disputes: (1) contractual factors, (2) technological factors, (3) external factors, (4) artificial factors
Chang & Ive (2003)	Natures of two types of disputes are: (1) pure cognitive dissonance, (2) opportunism intention to take advantage of one party's vulnerability

**Appendix B:
Chronological Listing of Other Research
on Sources of Dispute**

Researchers	Findings (sources of disputes)
Assaf and Al-Khalil (1995)	<p>They conducted a survey in Saudi Arabia to study the causes of disputes over delay in large buildings. It was based on a questionnaire that was filled by 24 Contractors, 15 Consultants and 9 Public Owners. The authors identified an extensive list of 56 delay factors that include: shortage, changes in types and specifications during construction, slow delivery of material, damage of material in storage, delay in the special manufacture of the building material, shortage of labour, labour skills, nationality of labourers, equipment failure, equipment shortage, unskilled operators, slow delivery of equipment, equipment productivity, financing by contractor during construction, delays in contractor's progress payment by owner, cash problems during construction, design changes by owner or his agent during construction, design errors made by designers, foundation conditions encountered in the field, mistake in soil investigation, water table conditions on site, geological problems on site, obtaining permits from municipality, obtaining permits for labourers, excessive bureaucracy in project owner operation, building code used in the design of the project, preparation and approval of shop drawings, waiting for sample material approval, preparation of scheduling networks and revisions, lack of training personnel and management support, lack of database in estimating activity duration and resources, judgement of experience in estimating time and resources, project delivery systems used, hot weather effect on construction activities, insufficient available utilities on site, the relationship between different subcontractor's schedule, the conflict between the consultant and the contractor, uncooperative owners, slowness of the owner decision making process, the joint ownership of the project, poor organization, difficulty of coordination between the various parties, insufficient communication between owner and designer at the design phase, unavailability of professional construction management, inadequate early planning of the project, inspection and testing procedures used in the projects, errors committed during field, application of quality control based on foreign specification, controlling subcontractors by general contractors in the execution of the works, the unavailability of financial incentives for contractor to finish ahead of schedule, negotiations and obtaining of contracts, legal disputes between various parties, social and cultural factors, traffic control regulation practiced in the site of the project, accidents during construction.</p>
Alkass <i>et al.</i> (1996)	<p>They attribute disputes over delays in general terms to strikes, rework, poor organization, material shortage, equipment failure, change orders, acts of God.</p>
Maden (2005)	<p>He studied the causes of disputes and categorised them as follows: Legal: Existence of contract, notice issues, performance criteria, payment, interference, over-inspection, breach of contract, contract interpretation, condition precedent, site access, shop drawing processing. Technical: Compliance with plans and specifications, quality, changed conditions, performance, quantity, constructive changes, design error, warranty, incomplete design, supervision, incomplete design, effect of conditions on operations, use of equipment. Quantum: Total costs claim/modified, cost estimating, damage analysis, cost accounting, overhead, delay analysis.</p>
Molenaar <i>et al.</i> (2000)	<p>They considered the significance of the behavioural practice of the project participants and classified factors that affect the disputes in three categories: people issue, process issue and project issues. Each category comprises several project</p>

	<p>characteristics. Characteristics that were considered to be significant indicators of disputes were classified into seven hybrid variables mainly: owner management and organisation, contractor management and organisation, project complexity, project size, financial planning, project scope definition, and risk allocation. The writers conclude that this model can be similarly used in other types of analysis in the construction industry where the latent variables can be better measured through surrogate variables.</p>
<p>Mitropoulos and Howell (2001)</p>	<p>They move beyond individual factors and study the effect of interaction of technical, contractual and behavioural factors on developments of disputes. The research was based on 24 claims which occurred on 14 projects. For each claim the writers examined the development of disputes which was analyzed through studying (1) the issue and basis of initial disagreement, (2) attempts to solve the problem, (3) the type of magnitude of dispute that developed due to the failure to solve the problem and (4) the level of dispute escalation. Also, the amount claimed and settled and the levels of resolution were specified. The writers then identify three basic factors that directly affect disputes: project uncertainty, contractual problems and opportunistic behaviour. A model was developed inductively to understand and explain how disputes developed. The writers explain that the proposition of the model should be considered as a hypothesis for further research.</p>
<p>Essex (1996)</p>	<p>He focuses on disputes arising from unforeseen subsurface conditions. The author examines four improved contracting practices to minimize disputes resulting from unforeseen subsurface conditions mainly: geotechnical baseline reports, alternative dispute resolution, escrow bid documents and partnering.</p>

**Appendix C:
Chronological Listing of Risk Categorization**

Researchers	Categorization of Risks
Zack (1996)	<p>Zack (1996) presents an exhaustive list of risk allocated in standard construction contracts that includes: physical risks, acts of God, impractical/impossibility, latent site conditions, quantity variations, site access, weather, capability-related risks, defective works, labour forces, subcontractor, supplier failure, economic risks, bonding, contract termination, cost escalation, economic disasters, failure to pay, insurance, project funding, taxes, time-related risks, acceleration, delays and disruptions, early use of facility, suspension of works, untimely responses, union strike, engineering and construction risk, changes, contractor furnished equipment/material, continuation of work, coordination, defective contract documents, interpretation of requirements, means and methods of construction, owner-furnished equipment materials, permits and licenses, productivity, site safety, and work quality.</p>
Shen (1997)	<p>Shen (1997) categorised the general risks as construction risks, legal risks, incorrect design information, shortage of materials/plant resources, poor accuracy of project programme, subcontractor's manpower shortage, variation in ground and weather conditions, abortive works due to poor workmanship, shortage of skills/techniques, and poor coordination with subcontractors. A survey was conducted in Honk Kong to study the Contractor's perception of the relative importance of risks.</p>
Chan & Kumaraswamy (1997)	<p>Chan & Kumaraswamy (1997) conducted a survey in Honk Kong based on 83 hypothesized delay factors based on the results of previous studies and interviews with local clients, consultants and contractors. The 83 factors were grouped into eight major factor categories: project-related, client-related, design team-related, contractor-related, materials, labour, plant/equipment and external factors. Respondents were required to indicate the relative importance of these factors. Results received from respondents in Hong Kong were compared to those in Saudi Arabia and Nigeria.</p>
Akintoye & MacLeod (1997) Kartam & Kartam (2001)	<p>Akintoye & MacLeod (1997) and Kartam & Kartam (2001) identified major construction risk categories risk categories as physical, environmental, design, logistics, financial, legal, political, construction and operation risks. Akintoye & MacLeod (1997) requested the survey respondents to indicate the importance set by their organisations to these risks. Contractors and Project managers agreed that the two most important risks are the contractual and financial risks. Contractual risk is associated with flaws in contract documents, inappropriate documents or improper contractual relationships. These risks normally result in claims and disputes, disruption of works, stoppage of work, lack of coordination, delays, and inflated costs. Financial risks on the other hand are associated with the owner's capability of providing the necessary cash flow. Financial capabilities are essential for the proper progress of the works.</p>

Researchers	Categorization of Risks
Ahmed <i>et al.</i> (1999)	Ahmed <i>et al.</i> (1999) in comparing the Contractor and Owner perception of risk allocation in Hong Kong identify 26 different types of risk that include: acts of God, change in works, change order negotiations, changes in government regulations, contractor competence, cost of legal processes, defective design, defective materials, deficiencies in specifications and drawings, delayed payment on contracts, delays in resolving contractual issues, delays in resolving litigation, arbitration disputes, environmental hazards of the project, financial failure, inflation, labour and equipment productivity, labour disputes, labour, equipment and material availability, permits and ordinances, political uncertainty, quality of work, safety, site access right of way, suppliers subcontractors poor performance, third party delays, and unforeseen site conditions.
Pickavance (2000)	Pickavance (2000) classified risk in 10 main categories that include legal risk, dispute risk, design risk, buildability risk, procurement risk, biddability risk, construction risk, financial risk, political risk and insured risk.
Kartam & Kartam (2001)	Kartam & Kartam (2001) further defined 26 risk types that included permits and regulations, scope of work definition, site access, labour, material and equipment availability, productivity of labour and equipment, defective design, changes in work, differing site conditions, adverse weather conditions, acts of God, defective materials, government acts, accuracy of project program, labour disputes, accidents/safety, inflation, contractor competence, change order negotiations, third party delays, coordination with subcontractors, delayed dispute resolutions, delayed payment on contracts, quality of work, financial failure, actual quantities of work and war threats.
Bunni (2003)	Bunni (2003) presented a full spectrum of more than 50 types of risks that were categorised as feasibility, design, site and its location, technical aspects, and acts of man.

Appendix D:
Extracts of the Particular Conditions on the 4 Projects

Clause	Title	General	Particular			
			A	B	C	D
Clause 2.1	Engineer's Duties and Authority	<p>(a) The Engineer shall carry out the duties specified in the Contract.</p> <p>(b) The Engineer may exercise the authority specified in or necessarily to be implied from the Contract. provided, however, that if the Engineer is required, under the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising any such authority, particulars of such requirements shall be set out in Part II of these Conditions. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Engineer.</p> <p>(c) Except as expressly stated in the Contract, the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.</p>	<p>Provided that the Engineer shall obtain the specific approval of the Employer before exercising any duties or authorities:</p> <p>a) Approving an extension of the Time for Completion of the Works</p> <p>b) Approving any additional payment to the Contract Price.</p> <p>c) Giving consent to the Contractor to Subcontract any part of the Works pursuant to Sub-Clause 4.1.</p> <p>d) Issuing an instruction to suspend works pursuant to Sub-Clause 40.4</p> <p>e) Issuing an instruction in respect of any Provisional Sum pursuant to Sub-Clause 58.2.</p>	<p>The Engineer shall obtain the specific approval of the Employer before exercising his rights under the following clauses:</p> <p>7.1.1a & b, 7.1.2, 7.2, 8.2, 17.1, 36.7, 36.8, 36.11, 37.3, 37.4, 48.1, 48.2, 48.3, 49.2, 49.3, 54.8, 62.1</p> <p>Hence the Engineer shall in no way and under no circumstances be responsible for any approval, consent and the like neither on selection of materials, equipment and samples nor on the approval of construction drawings, coordination drawings and as-built drawings.</p>	<p>The Engineer shall obtain the specific approval of the Employer before taking any of the following actions:</p> <p>i. Approving the subletting of any part of the works in accordance with Clause 4.</p> <p>ii. Certifying additional cost determined in accordance with sub-clause 12.2</p> <p>iii. Determining an extension of time in accordance with subclause 44.1</p> <p>iv. Issuing a variation in accordance with subclause 51.1.</p> <p>v. Fixing of rates or prices in accordance with sub clause 52.2</p> <p>vi. Approving equivalent materials and/or equipment.</p>	<p>The Engineer shall obtain the specific approval of the Employer before taking any of the following actions:</p> <p>i. Approving the subletting of any part of the works in accordance with Clause 4.</p> <p>ii. Certifying additional cost determined in accordance with sub-clause 12.2</p> <p>iii. Determining an extension of time in accordance with subclause 44.1</p> <p>iv. Issuing a variation in accordance with subclause 51.1.</p> <p>v. Fixing of rates or prices in accordance with sub clause 52.2</p> <p>vi. Approving equivalent materials and/or equipment.</p>

		Particular				
Clause	Title	General	A	B	C	D
Clause 2.7	Replacement of the Engineer				<p>If the Employer intends to replace the Engineer, the Employer shall not less than 42 days before the intended date of replacement give notice to the Contractor of the name, address and relevant experience of the intended replacement Engineer.</p> <p>The Contractor shall have no right to object to the replacement of the Engineer and will have no ground for a claim in connection therewith.</p>	<p>If the Employer intends to replace the Engineer, the Employer shall not less than 42 days before the intended date of replacement give notice to the Contractor of the name, address and relevant experience of the intended replacement Engineer.</p> <p>The Contractor shall have no right to object to the replacement of the Engineer and will have no ground for a claim in connection therewith.</p>

		Particular				
Clause	Title	General	A	B	C	D
Clause 5.2	Priority of Contract Documents	<p>The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:</p> <ol style="list-style-type: none"> (1) The Contract Agreement (if completed); (2) The Letter of Acceptance-, (3) The Tender; (4) Part II of these Conditions; (5) Part I of these Conditions; and (6) Any other document forming part of the Contract. 	<p>The several documents forming the Contract are to be taken as mutually explanatory of one another and what is required by any one document shall be required by all, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract. The priority of the documents forming the Contract shall be as determined by the Engineer.</p>	<ol style="list-style-type: none"> 1) The Contract Agreement and the Annexes 2) The Tender and its Appendix 3) Part II of these Conditions 4) Part I of these Conditions 5) Addenda excluding Bills of Omissions and Additions 6) The Specifications 7) The Drawings 8) Bills of Omissions and additions issues as part of the Addenda 9) The Bills of Quantities 10) Breakdown of Unit rates 11) Any other document forming part of contract 	<ol style="list-style-type: none"> (1) The Contract Agreement (if completed); (2) The Letter of Acceptance-, (3) The Tender; (4) Part II of these Conditions; (5) Part I of these Conditions; and (6) Addenda excluding Breakdown of the lumpsum (7) Specifications (8) Drawings (9) Breakdown of the lump sum (10) Break down of unit rates (11) Any other document forming part of the Contract. 	<ol style="list-style-type: none"> (1) The Contract Agreement (if completed); (2) The Tender; (3) Part II of these Conditions; (4) Part I of these Conditions; and (5) Specifications (6) Drawings (7) The Bill of Quantities (8) Breakdown of the lump sum (9) Any other document forming part of the Contract.

		Particular				
Clause	Title	General	A	B	C	D
Clause 70.1	Increase of Decrease of Cost	There shall be added to or deducted from the Contract Price such sums in respect of rise or fall in the cost of labour and/or materials or any other matters affecting the cost of the execution of the Works as may be determined in accordance with Part II of these Conditions.	No adjustment shall be made to the unit rates, prices or sums in the Breakdown of the Lump Sum, nor to the Contract Price, nor to unit rates in Daywork Schedule, nor the Schedule of Unit Rates for Works of Phase 3, in respect of increases or decreases in the costs of labour, materials, Plant, Temporary Works, Contractor's Equipment or other matters, including but not limited to variations in rates of currency exchange, affecting the cost of execution of the Works from the date of signing the Contract by the Contractor. The provisions of this sub-clause shall not apply to any subsequent legislation pursuant to sub clause 70.2.	Subject to Subclause 70.2 the Contract Price shall not be subject to any adjustment in respect of rise or fall in the cost of labour, materials, fuel or any other matters affecting the cost of the execution of the contract.	The Contract Price shall not be subject to any adjustment in price in respect of rise or fall in the cost of labour, materials, fuel or any other matters affecting the cost of the execution of the Works.	No payment will be made to the Contractor on account of increases in rates of wages, custom and import duties of the market prices of materials and goods specified for incorporation in the works which occur after submission of the tender, unless such increase are a result of Subsequent Legislation as defined in sub clause 70.2 The following material shall be exempted from the hereabove: 1. The reinforcement steel 2. The sand 3. The gravel 4. The silica fume

		Particular				
Clause	Title	General	A	B	C	D
Clause 70.2	Subsequent Legislation	<p>If, after the date 28 days prior to the latest date for submission of tenders for the Contract there occur in the country in which the Works are being or are to be executed changes to any National or State Statute, Ordinance, Decree or other Law or any regulation or bye-law of any local or other duly constituted authority, or the introduction of any such State Statute, Ordinance, Decree, Law, regulation or bye-law which causes additional or reduced cost to the Contractor other than under Sub-Clause 70.1, in the execution of the Contract, such additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be added to or deducted from the Contract Price and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.</p>		Delete the words "other than sub-clause 70.1"	The Contract Price shall not be subject to any adjustment in respect of subsequent legislation which causes additional or deduced cost to the Contractor in the execution of the Contract.	

Appendix E:
A Brief Overview of the Dispute Cases

PROJECT A

Dispute 1 - Lift Overhead: During execution of the works, an approved shop drawing is noticed to have a mistake in calculating the overall structure height on top of the lift area. With the correct calculations, the already ordered lift was found to be not adequate for the available space. Responsibility was disputed.

Dispute 2 – Façade False Ceiling: The Specification allows for 3 alternatives for facade false ceiling in the addendum to the contract. However, when the engineer chooses the more expensive option, the Contractor disputes the same stating that the price reduction was applied at time of signature based on a VE priced based on the least expensive alternative.

Dispute 3 – Procurement Date: A variation order is issued where the contractor is requested to procure new material different than that originally specified for parts of the works. The Engineer sets the rates based on the unit rate one month after the release of order. The Contractor argues that more than one month is required in certain cases to procure.

Dispute 4 – Façade Glass: The frit glass of the façade has a very general specification that only give details of percentage transparency but no pattern. Reaching the approved pattern requires the submittal of 31 patterns in 4 submittals. The Engineer argues that it is part of the contractor's obligation to provide an approved sample. The Contractor's request for additional cost and an extension of time is disputed.

Dispute 5 – War effect: War breaks in Lebanon in July 06 where the works are put on halt for security reasons. Even after the war ends there is a continuing effect due to loss of labor and productivity. The cost and time impact of the same are disputed.

Dispute 6 – Additional Shop Drawings for variations: At contract signature allowance is made for set of design modifications where the time frame for the issuance of these modification is set. However, the additional cost of preparing shop drawings due to the same is not mentioned in the contract documents. This creates an ambiguity in assessment that causes a dispute.

Dispute 7 – Façade Lighting: The façade lighting consist of an LED system along with a crown lighting system at the top of the building. The required lighting effect does not define the technical specifications of the lighting color. This requires multiple trial and error attempts to reach the required lighting effect which leads to dispute on the time and cost incurred.

Dispute 8 - Frit Glass: The Frit glass for the façade is specified in the contract to provide a 10 year guarantee. However, the Specification does not mention whether it shall be applied at Face 1 or Face 2 of the double glass. The Contractor considers the Engineer's request to have it on Face 1 as a variation. The Engineer insists on having the frit glass on face 1 to achieve the required façade design intent.

Dispute 9 – Employee Turnover: The Contractor claimed that there was employee turnover due to the war in the region. The Engineer rejects the claim on the basis that Employees are being lost due to the boom in the Gulf and this does not constitute an Employer's risk event.

Dispute 10 – Safety Film: A variation order was issued to remove the roller shutter and replace them with an anti-vandalism glass. Different alternatives for anti-vandalism glass were submitted. Examining the different options consumes time as the new specifications are not set clearly in the variation order. This leads to an extension of time dispute.

Dispute 11 – False Ceiling: The Engineer requests the Contractor to install C-channels to the false ceiling system. The Engineer considers the same as a requirement to achieve the stability. The Contractor claims that this is a designed efficiency and it is not the contractor's duty to design the system.

Dispute 12 – Lighting Fixtures: The Contractor submitted an alternative lighting fixture without samples. The Engineer requests samples and detailed comparison sheets of both the specified fixture and the alternative. Upon receiving the same the Engineer rejects the alternative as being not equivalent. The Contractor disputes the rejection as being not justified.

Dispute 13 – Increase Labor Rate: Following the war the Contractor claimed that due to the unstable political situation, there has been an ongoing increase in the labor rates. The Engineer disagreed as the increase of rate due to the war is only justifiable for a limited period after the 2006 war ended.

Dispute 14 – Façade Aluminum Color: The Contractor submits the RAL color for the façade Aluminum and sends a field inspection request to the Engineer. The Engineer requests the mockup to be relocated and then requests additional mockup submittals for two other colors. The Engineer approves the original mockup after 105 days. The contractor requests an extension of time due to the same which the Engineer rejects.

Dispute 15 – Steel Structure Design: The Contractor submits the roof steel structure shop drawings reply of which are delayed for more than 3 months. The Contractor sends an alternative for painting instead of hot dip galvanizing. The Engineer accepts the same rejecting any delay effect as there are estimated time savings in the new accepted proposal. The contractor disputes the same.

Dispute 16 – Trench Heaters: The Contractor submits marble shop drawings which are approved. After tiling starts the Engineer instructs that the trench heaters should be moved away from the façade to prevent heat buildup and possible glass breakage. The Contractor considers the same as a variation. The Engineer argues that it is the Contractor's responsibility to coordinate and ensure the performance of the system.

Dispute 17 – Shop drawings submittal schedule: The Contractor submits a material and shop drawing submittal schedule as requested by the Contract. The Engineer does not approve the same and requests leveling of the number of weekly submittals. The Contractor resubmits the same several times and no agreement is reached. Several notifications of possible delay due to delayed reply of submittals follow during the project lifecycle which the Engineer rejects on the basis that there is no approved submittal schedule.

Dispute 18 – Marble Works: An inspection for the marble cladding around the bathtub is submitted. The Engineer inspects the same several times and requests several modifications which are implemented by the Contractor. The Contractor considers that modifications took place through a trial and error procedure which entitles the Contractor for an extension of time.

Dispute 19 – EDL: The Engineer approves the transformers giving clearance to buy these transformers on condition that EDL approval be obtained for the same. The EDL room file is delayed due to several modifications along with design error in the original EDL file. The Contractor claims his entitlement for an extension of time due to the several modifications to the permit file and the EDL delay in approving the revised file which is an Employer's risk. The Engineer considers the same to be part of the Contractor's responsibility to coordinate.

Dispute 20 – PS for Health Club: The works for this provisional sum are released and then deleted. The Contractor claims for abortive works. The Contractor's entitlement to overhead and profit in the deleted items is disputed.

PROJECT B

Dispute 1 – Rejected NPVs: The Engineer rejects the Contractor's NPV's for additional scope of work on the basis that these are part of his duty to develop construction drawings. The Contractor disputes the same as it is a result of erroneous details in Contract Drawings.

Dispute 2 –Tree Damage: During the execution of the works, an accident occurs which results in permanent disfiguration of a tree. The Engineer informs the Contractor that an amount of money will be deducted from his account for compensation. The contractor argues that compensation in the Contract is allowed for the case of "major damage" considering that to mean "death of tree".

Dispute 3 –Optional Works: The Engineer instructs the Contractor to carry out optional works as per the rates submitted by the Contractor during Tender. The Contractor argues that these rates are not applicable anymore as the Engineer did not instruct these works at Tender approval.

Dispute 4 – Cleanouts: The Contractor claims that the Engineer's request to add cleanouts on the Construction Drainage Drawings entitles him for a variation. The Engineer states that the Contractor is under obligation to provide the same as these are required by the National Plumbing Code specified in the specifications.

Dispute 5 – Fire Alarm System: The Engineer issued comments to the Contractor's Shop Drawings for the Fire alarm system that requires adding fire detectors, emergency bulbs, etc. The Contractor considered the same to be a variation. The Engineer disputed that these are part of the Contractor's duty to develop construction drawings that satisfy code requirements.

Dispute 6 – War Delay: After the War the Engineer assesses the extension of time due to the war as 55 days. The Contractor argues that the Engineer ignored the governmental decree that gives an extension of time of 5 months. The Engineer stated that the decree is not applicable for construction projects. The Contractor disputes the same.

Dispute 7 –Soft Landscaping: The Engineer informed the Contractor that the Employer wishes to furnish the planting works at a lump sum amount. An agreement is reached and the Contractor submits a notification of possible variation at the agreed value. After a month the Contractor submits a revised amount that the Contractor rejects.

Dispute 8 –Smoke Detectors: The Engineer required access doors next to the motorized fire and smoke dampers as per code requirement. The Contractor disagreed with the Engineer's

reading of the specifications confirming that these access doors are not required by specifications. The Engineer disagrees to the same and reiterated his request.

Dispute 9 – Fire Fighting System: The Engineer requests the Contractor to submit the Sprinkler flow calculations. The Contractor disputed the Engineer's reading of the Contract requirements insisting that the hydraulic calculations are not part of his scope of work.

Dispute 10 – Towel Dryers: The Contractor had priced towel dryers based on a certain model that satisfies the specifications. The Engineer changed the model and assessed the Contractor's entitlement to the market rate. The Contractor disputes that the profit margin in the original BOQ rate should be maintained.

PROJECT C

Dispute 1 – Louvers at roof: The Contractor claims for extra payment for pitched louvers at roof as he has priced to use straight louvers. The Engineer refuses the same as these pitched louvers are necessary for the pitched roof, the straight louvers would not satisfy the technical requirements.

Dispute 2 – Chillers: The Engineer assesses the additional cost for increase of capacity of chillers instructed based on prorated contract unit rate. The Contractor disputes the same and requests actual market rates.

Dispute 3 – Restoration: During demolition of the building unforeseen conditions of the existing structure necessitated the use of new bracing systems for which the Contractor claimed entitlement for additional cost. The Engineer rejects the same as the restoration of the existing building is considered to be the Contractor's responsibility.

Dispute 4 – Glass Balustrade: In answering the request for information regarding the material of the support of the balustrade, the Engineer states that it should be in stainless steel. The Contractor considers the same to be a variation. The Engineer disagrees as the specification for the railing system is clear in that respect.

Dispute 5 – War effect: During the war the Contractor and his staff took the risk of attendance at site offices. The Engineer assessed the extension of time the Contractor is entitled to accordingly. An agreement was reached in this regard. However, the cost implication of the same is disputed.

Dispute 6 – External Works: The Contractor requested missing external works/drainage layout. The Engineer was delayed 3 months in providing the same. The Contractor stated that the layout is still missing.

Dispute 7 – Stone Flooring: The Engineer changed the type of granite specifying the new type. The Contractor submitted the samples. After 60 days the Engineer requested a different type. The Contractor claimed for delay due to the same.

Dispute 8 – Submittal Schedule: The Engineer fails to reply to the Contractor's shop drawing and material submittals in a timely manner. The Engineer argues that these submittals were not submitted in a timely manner as stipulated in the Contract as per the consented programme. For this reason major delay is incurred for long lead items among others.

Dispute 9 –Aluminum Composite Panel: The Engineer requested that the aluminum composite panels be replaced by plaster and paint. However, the instruction was not clear in certain areas which caused disruption delays to the fabrication and execution for which the Contractor claimed.

Dispute 10 –Points of Drainage: The Contractor requested the Engineer to issue a complete developed coordinated design showing the points of drainage. The Engineer argued that the Contractor could have detected the drainage location easily had he coordinated the shop drawings.

PROJECT D

Dispute 1 – Access to Roof Area: There has been a series of missing design information requested from the Engineer one of which was the unresolved access to the Roof Area along with direct verbal instructions which caused delays and disruptions to the programme.

Dispute 2 – Raised Flooring: The Engineer requested a quotation for raising the floor at the higher levels of the building after concrete works started. The Contractor stated that the Hourdi Blocks required are not available in the market and that the activity itself will necessitate a longer period. The Engineer then requested the Contractor to proceed instructing him to use a different type of Hourdi Block that is available in the market. The delay effect of this instruction was disputed.

Dispute 3 – Additional Fireplaces: The Engineer instructed making provisions for real fire places. This necessitated coring the reinforced concrete. Late feedback from the Engineer caused disputed delay. The cost implication of the same was also disputed.

Dispute 4 –New Kitchen: The Contractor was requested to execute new kitchen details. The method of payment for these additional works was disputed as the Engineer considered it to be remeasured work while the contractor considered it is a variation order. The Employer interfered to reach a settlement against this matter which dragged as a dispute.

Dispute 5 –Aluminum Works: The Contractor submits a shop drawing which gets rejected by the Engineer. The Contractor argues that this rejection is unjustified and that this rejection was intended to prove a delay by the contractor when the delay in fact is due to a variation added on these shop drawings.

Dispute 6 – Lighting Works: The Contractor requested missing information regarding the audio visual wall outlets. The Engineer issued an A3 sketch that is not sufficient. The Contractor considers this as a failure of the Engineer to provide information of time which is delaying the works.

Dispute 7 – Labor Decrease: The Continuous political instability in the country caused loss of laborers. As such even on days where the log showed high levels this did not give a clear indications as most of the laborers left during the day. Calculation of this delay impact was disputed.

Dispute 8 – EDL Room: The Engineer sent the Contractor of supplier for the transformer room. The Contractor claimed additional cost for the unloading and placing of the transformers insider the EDL room. The Cost of the same was disputed.

Dispute 9 – Fire Rated Door: the Engineer requested 2hr fire resistant system in basement 4 however details of the same were missing. As such the Contractor informed the Engineer that the area was put on hold. Later the Engineer cancelled these items. Both parties disputed the time implication of the same was disputed.

Dispute 10 – Late Issuance of Drawings: Direct communication between the nominated subcontractor and the Engineer to agree on details in specific areas. The lack of detail caused continuous delay for which the Contractor is claiming.

Appendix F:
Dispute Factors identified in the Dispute Cases

Tender

1 Design Errors have higher occurrence in project A for the cases of the lift overhead that can not be executed as per design, the trench heater that shows an architectural detail that does not guarantee the functionality of the system and the EDL permit file that is erroneous in calculating the required transformer load. Other cases of design error include several design discrepancies in project B that led to the contractor incurring additional cost, erroneous design for external works and points of drainage in project C and missing access to roof in project D. The cases confirm that these design errors have induced disputes. However, it is difficult to further construe whether the cause of these design errors is related to short design period, negligence by the designer or lack of experience. It is worth noting that these errors were not noticed or raised by the Contractor at tender stage.

2 Contract documents not clear: Two cases of not clear contract document include unclarity in the specification of technical requirements such as the external façade detail in cases 4 and 8 of project A and louvers at roof in case 1 of project B. The second case of unclarity relates to unclear descriptions for the allowed number of submittals per week, the method of calculating the additional cost of new material procured as per late instruction and time validity of optional works included in the contract.

3 Clarification during contract negotiation include cases of clarification of unclear specification requirements or clarification of contractor's obligations that are by common practice understood to be part of the Contractor's obligations but are not clearly stated so in the Specification requirements.

4 Not achievable requirements occurred in the cases of variations that failed to specify what is required in terms of execution.

Risk

5 Clear allocation and highlighting of responsibility/obligation was identified in 11 cases of unclear allocation of responsibility for providing design or even the execution of particular systems. For example in case 4 of Project A there was a clear disagreement to

whether the Contractor should provide the design of the fritting of the external glass or whether it was the Engineer's responsibility to provide this design. Also in case 16 of Project A, there was a clear disagreement to whether it was the Contractor's responsibility to coordinate the trench heater system with the glass and curtain system to ensure proper functionality of the system. The dispute factor of 'clear allocation and highlighting of responsibility' is noticed to be more of a problem in project B where it is identified for 6 out of the 10 disputes. It is worth noting that this dispute factor can be directly correlated with the dispute factor 'evading responsibility by blaming the other party'.

6 Contractor failure to satisfy specification requirements appeared as a dispute factor in 6 cases. All cases referred to contract specifications except for the case of lighting fixtures where the contractor failed to meet the specifications transmitted as a variation to the original design and in this case the designer was unable to provide technical details.

7 Price escalation was identified as a dispute factor in four cases namely the cases of 'procurement of new material', 'employee turnover' and 'increase in labor rate' in Project A where the additional cost incurred was augmented due to ongoing price escalation. Also, the case of Optional Works in Project B where the Contractor is requested to execute optional works priced at tender stage. In the case of Chillers in Project C, the Contractor's is claiming for new market rate. Price escalation cases examined included both cases of increase in material rates and increase in wages. The occurrence of this dispute factors is correlated with that of 'Contractor avoiding monetary losses'. It is worth noting that although price escalation was only identified in 4 out of the 50 cases, the occurrence of such price escalation during the construction period of those projects could had an indirect effect on the contractors incurring financial losses and accordingly on their defensive behaviour in some cases to avoid monetary losses.

8 Permits regulations was a dispute factor in 2 of the 50 dispute cases examined. In the case of lift overhead the responsibility of abiding by permit height regulations while developing shop drawings was deemed by the Engineer to be the Contractor's responsibility. Whereas in the case of EDL, the error in permit file submitted that did not satisfy permit regulations was the Engineer's responsibility.

9 Submittal schedule was raised as a separate dispute case in Projects A and C. It was noticed to be a dispute factor in case of Fire Fighting System in Project B where the Engineer made reference to the Contractor's failure to abide by the submittal schedule requirements. As such in 3 of the 4 projects there was a problem in submitting, approving or abiding by the submittal schedule which is a contract requirement.

10 Failure to notice the technical problem refers to both parties failure to notice the technical problem which occurred in the cases of Lift Overhead and Trench Heaters in Project A. The late perception of the technical problem resulted in delay.

11 Contractor avoiding monetary losses was recorded as a dispute factor in 18 cases, 5 of which were related to price escalation (mentioned earlier). The remaining 13 occurrences related to cases of occurrence of the dispute factors: 'Contract documents unclear' and 'clear allocation and highlighting of responsibility/obligation' except for the case of glass balustrade where the Contract specification is clear but the Contractor insists on claiming the additional cost.

Behaviour

12 Lack of experience was identified in 8 cases 7 of which were in Project A. This could give an indication that both parties on project A had a problem with lack of experience in architectural details. This does not necessarily mean that the parties involved in Project B, C and D were more experienced noting that Project A was adopting some of the state of the art systems that were not yet familiar. This dispute factor can be correlated with the 'trial and error attempts/approach'.

13 Human error/negligence was identified in 4 cases. In the cases of Frit Glass in Project A and Tree Damage in Project B negligence was the Contractors' fault. In the case of Raised Flooring it was the Engineer who was negligent towards the concern raised by the Contractor. In the case of Lift overhead both were equally negligent.

14 Trial and error attempts/approach was as mentioned earlier correlated with lack of experience where the Engineer was unable to make decisive replies to the shop drawing and material submittals before different trial and error attempts were made. All 6 cases identified were on Project A. As mentioned earlier this can be partly explained by the state of the art systems used on Project A.

15 Improper communication channel was only witnessed in the case of Late Issue of Drawings in Project D where the Engineer passed the information directly to the subcontractor.

16 Lack of cooperation refers to cases where attempts to clear the disputed matter could have been resolved earlier and delay to the works would be avoided had the parties sat together in a dedicated technical meeting.

17 Unwillingness to resolve disputes was witnessed in three cases. The first case is the 'Additional shop drawings for agreed late variations' where the agreement regarding the same was reached after contract signature. And where the Contract does not attend to the additional cost incurred, both parties could have agreed to the same and resolved the dispute.

18 Language expressing ill perception of the other party's intentions was found in the written correspondence examined in the cases of 'War Delay' and 'Soft Landscaping' in Project B where the Contractor accused the Engineer by stating: 'it seems that you are willing to take position with respect to the interpretation of the law'. And in the case of 'Submittal Schedule' in Project C where the Contractor accused the Engineer of 'holding back his replies to submittals in anticipation of forthcoming changes/variations or revision of the Works'.

19 Evading responsibility by blaming the other party was witnessed in 17 cases: 6 on Project A, 7 on project B and 4 on project C. These were mostly correlated with cases of 'Contract documents unclear' and 'Clear allocation highlighting of responsibility/obligation'.

20 Engineer firm although contract is grey was noticed in 13 cases: 7 cases on Project A, 4 projects on project B, 1 case on Project C and 1 on Project D. Although the Contract is not clear in most of these cases, yet the Engineer firmly reiterates his position. In the case of the Façade False Ceiling and the case of the New Kitchen in project D, the Employer interferes to accept a variation that is being firmly rejected by the Engineer.

21 Influence by the Employer is marked in 6 cases 4 of which are on project B and are cases of Employer's late reply due to interference in assessments and approvals of variations. These 6 cases refer to cases where the Employer's interference was a dispute factor. There might be further cases where the Employer interfered to resolve the dispute

which are not identified as such. It should be noted that the cases of Employer interference witnessed in these dispute cases are the ones that were identified through correspondence/ documents examined and do not necessarily reflect all cases of Employer interference.

Contract Administration

22 Late issue of missing design/variation is a dispute factor in 13 cases. There are 3 cases in project A and 3 cases in project C. However, this dispute factor is prevalent in Project D where it is witnessed in 7 out of the 10 dispute cases. This dispute factor shows the Engineer's failure to meet his obligations. Also, this dispute factor is correlated with Assessment of Delay.

23 Validity/Assessment of Variation is the dispute factor with the highest occurrence. 29 cases out of the 50 are related to disagreement regarding the validity or assessment of the variation order. In some cases disagreement regarding the validity is related to contract documents being unclear. In other cases it is the valuation of the variation that is being disputed.

24 Assessment of war claim is witnessed in all four projects since all four projects were ongoing during the recent political instability and the war hostilities that followed. Assessment of war emerging as a dispute factor in all four projects signifies that the clause for assessment of contractor's entitlement for extension of time and compensation for this Employer's risk is causing dispute as both parties are disagreeing to its interpretation.

25 Lack of Proper Management/Monitoring by Engineer is prevalent in project A (8 cases of 20) and project D (5 cases of 10). This could signify bad management by the Engineers on these two projects. These two projects are also the most prevalent in the case of the dispute factor 'assessment of delay.'

26 Assessment of delay is the dispute factor with the second highest occurrence. As mentioned above it is more prevalent in projects A and D. It has been correlated with many of the dispute factors mentioned earlier since it is a normal consequence of late attendance to obligations by both parties that will in most cases lead to disputed assignment of responsibility and assessment of those delays.

27 Late approval of submittals by Engineer was noted in 16 cases. Although the Engineer in many of these cases referred to the Contractor's failure to submit/abide by the submittal schedule, this does not relieve the Engineer from his/her responsibility to fulfill the contractual obligation in the best interest of the project.

28 Contractor late/missing submittals is a dispute factor that is prevalent in Project A and all 7 cases of contractor late/missing submittal resulted in a dispute in 'assessment of delay'.

29 Slow attendance to responsibilities these are cases that do not have contractual timelines but even where they are not critical they would be consuming the float and any delay thereafter becomes a critical delay. This is confirmed by the high correlation with the dispute factor 'Assessment of Delay'. It is evident in Projects A, C and D but in none of the cases in Project B.

30 Late intervention of subcontractor is a dispute factor that is mainly caused by the Contractor's late assignment of subcontractor or the poor management of subcontractors. The 3 cases that revealed this dispute factor occur in Project A and are related to the lift overhead case that involves the lift subcontractor and the façade glass and frit glass cases that involve the façade subcontractor.

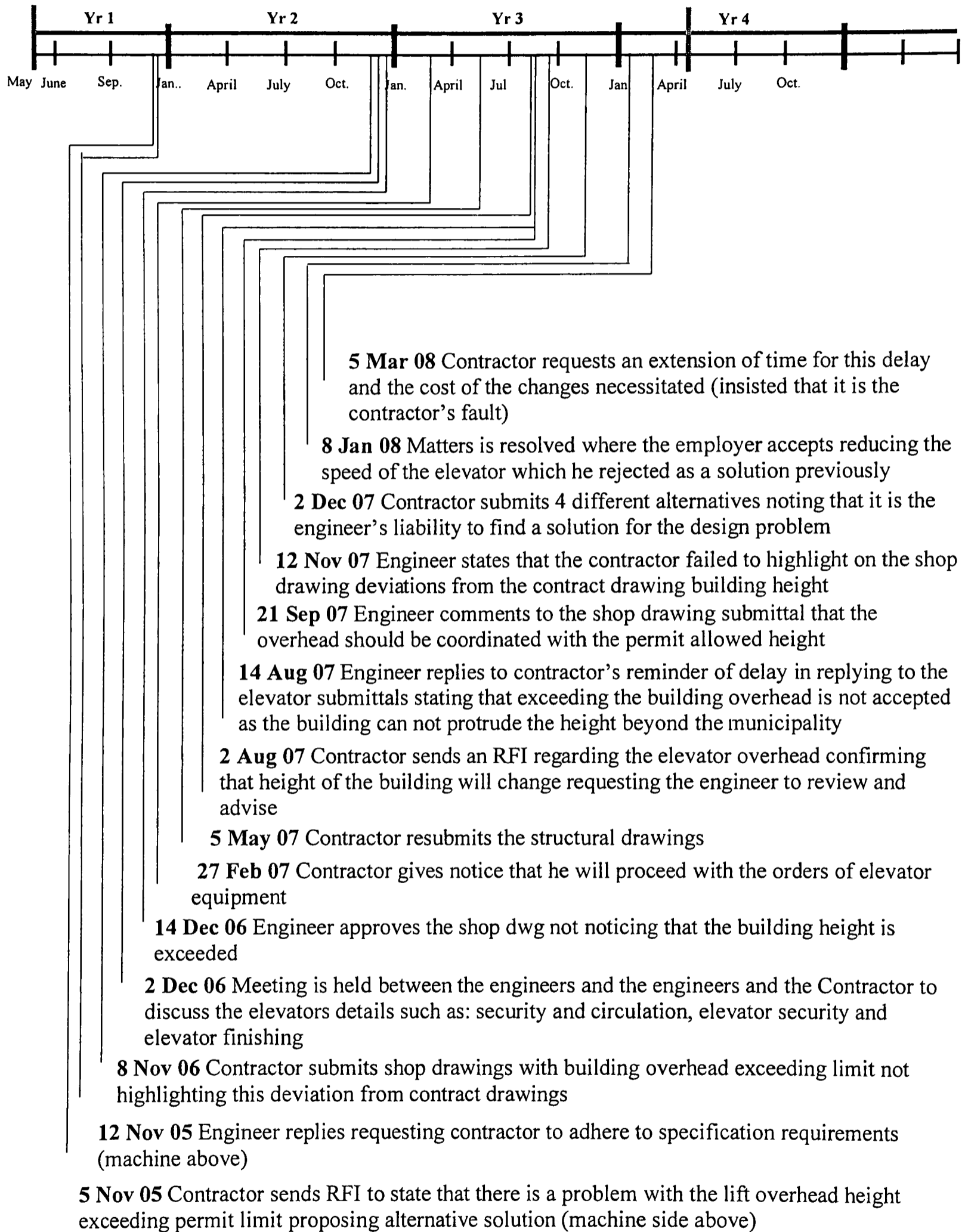
31 Contractor poor coordination between trades is witnessed in 3 dispute cases: Trench Heaters and EDL in project A and points of drainage in project C. All three occurrences have caused delay and the assessment of this delay was disputed.

**Appendix G:
Dispute Cases (Chronology of Events)**

CS no: 1

Subject: Lift Overhead Project: A

Section: Mechanical-Lifts

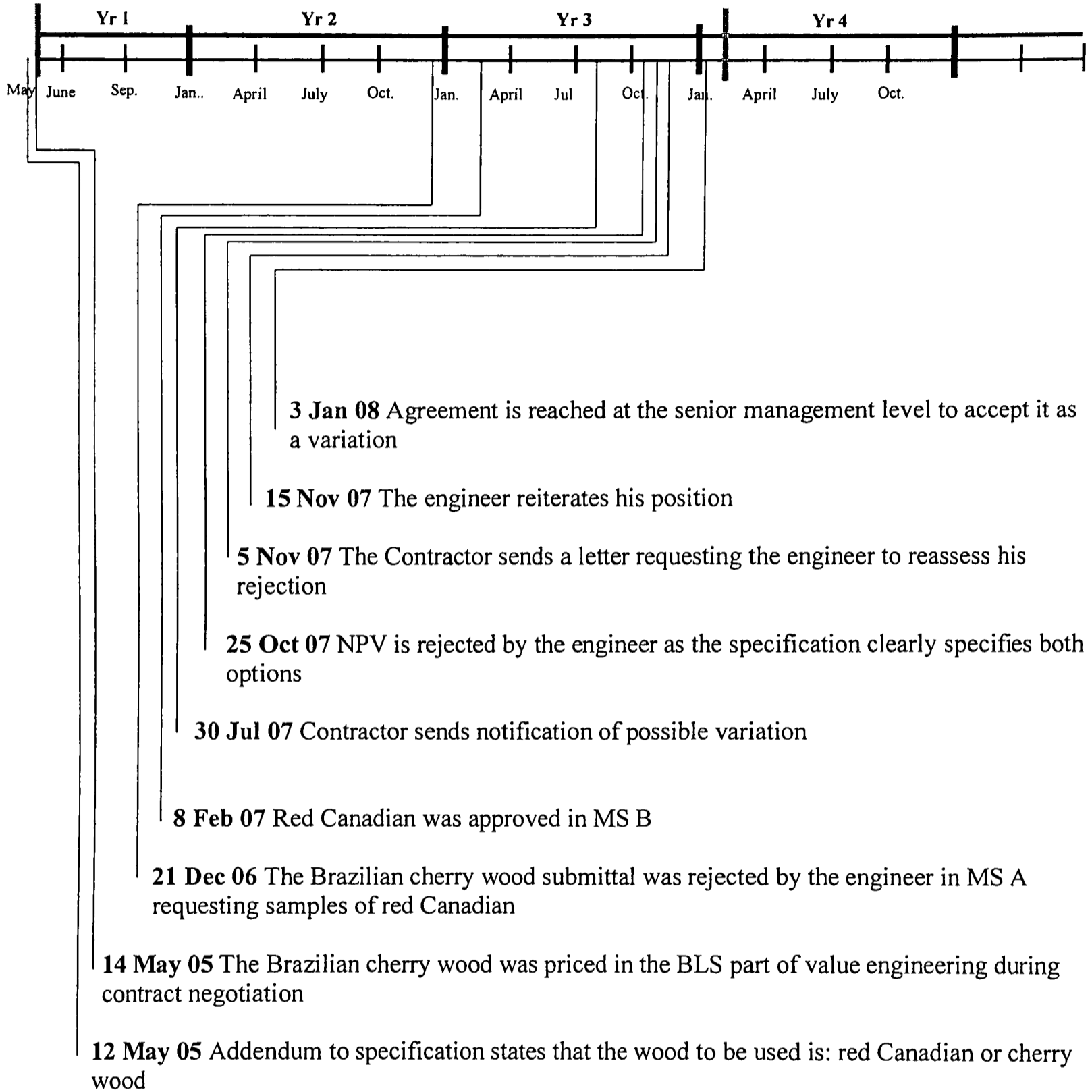


CS no: 2

Subject: Façade False Ceiling

Project: A

Section: Finishes

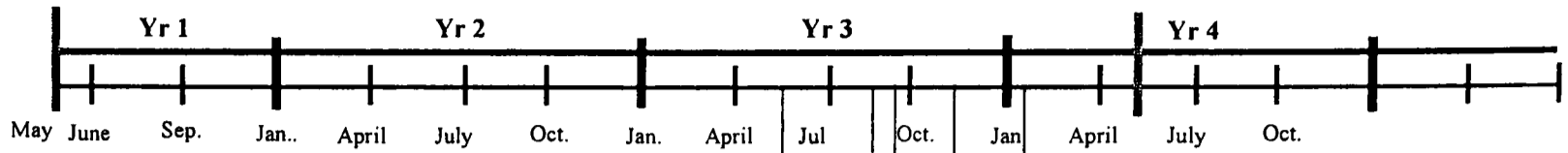


CS no: 3

Subject: Procurement of new material

Project: A

Section: General Reqmts



6 Jan 07 The contractor stated that some of these materials take more time in procurement due to complexity of the items. The Engineer's assessment was disputed.

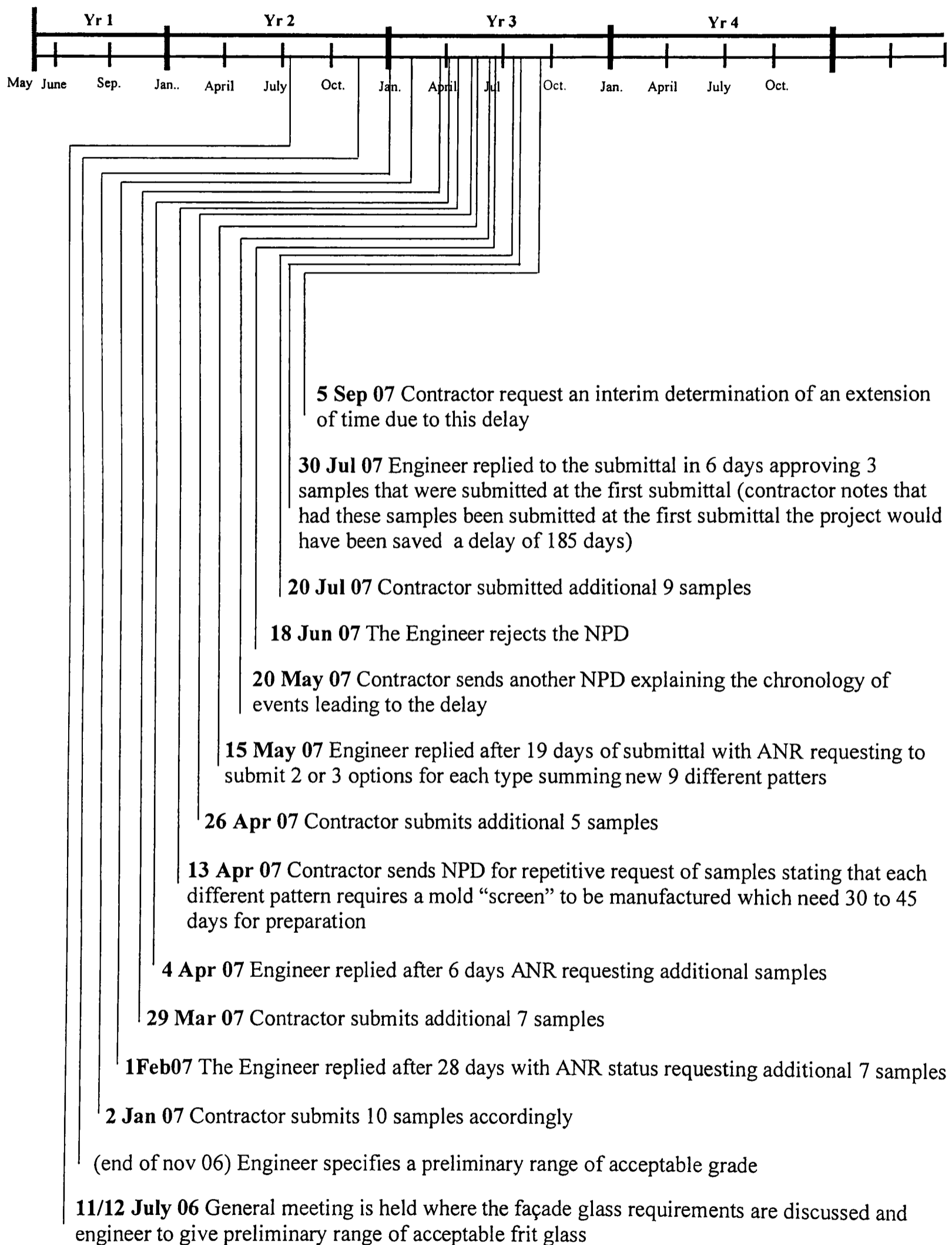
5 Nov 07 The engineer stated that the contractor will be allowed for a period of one month after the variation is issued for submitting the material and procurement.

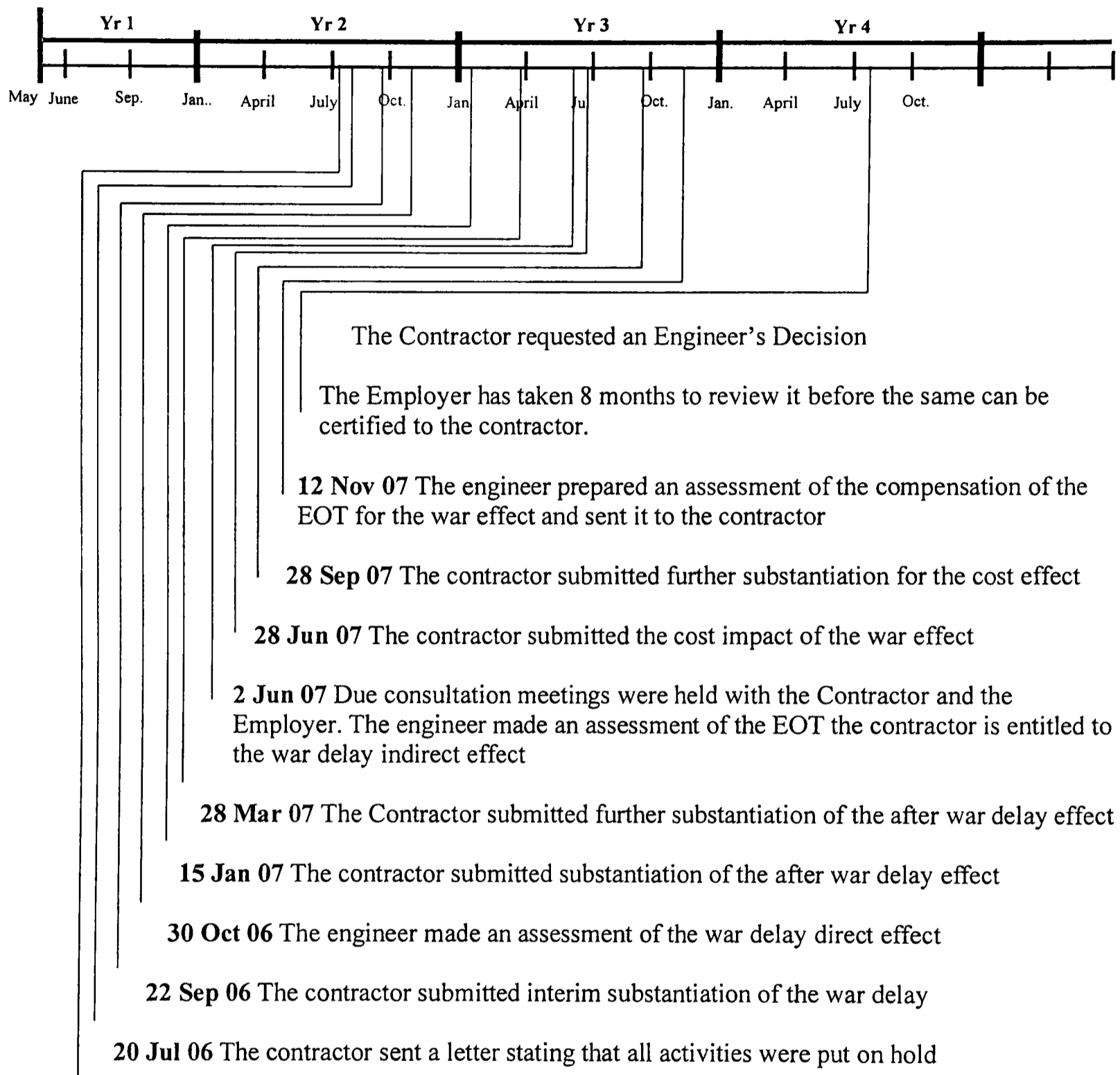
12 Sep 07 The contractor stated that he can not buy these items on the same day.

30 Aug 07 The Engineer fixed the new rates based on date these variations were released.

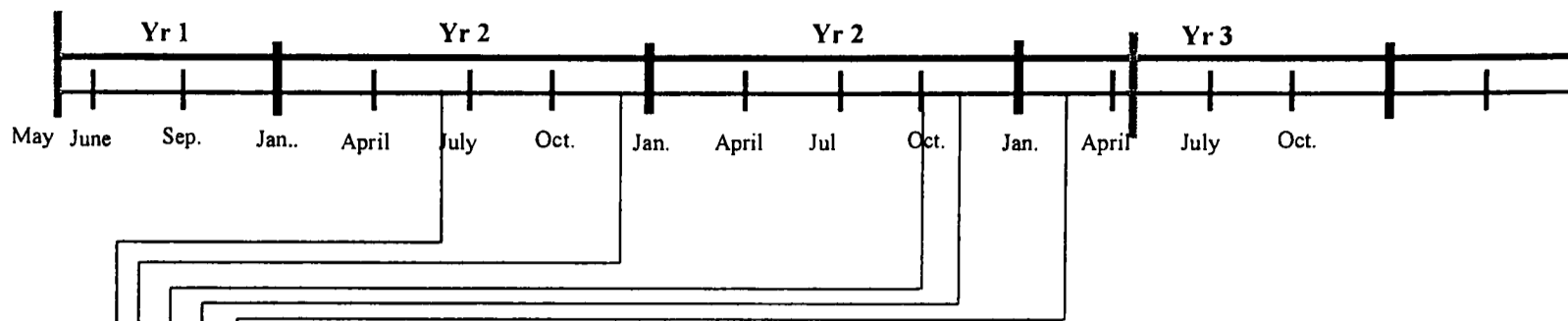
29 Aug 07 The variations were issued

5 May 07 The Contract allowed for a mechanism for issuing late variations. However, since the contractor will incur increase in cost due to these late variations and the contract does not account for inflation it was agreed that the new items resulting from these variations will be assessed based on market rates.





The July war broke in Lebanon



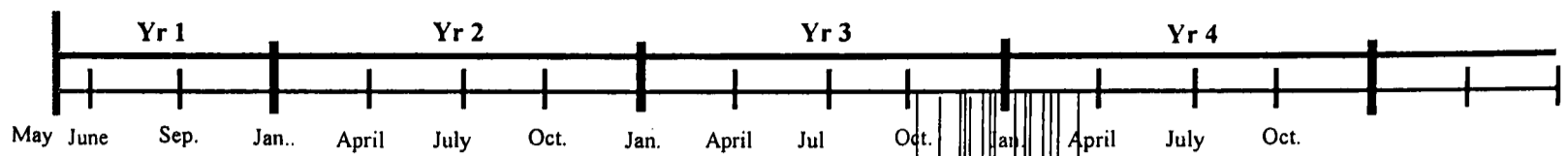
27 Feb 08 The contractor claimed for additional cost of both shop drawings and as-built drawings as the conditions of contract don't state that the contractor will prepare the corresponding shop drawings at no additional cost. At the time of adding this item no changes to the original offer were made to account for such extra cost. The time effect was considered only. The matter was disputed

1 Nov 07 The Engineer replied that the contract already accounts for the shop drawings. As for the as-built drawings the fact that the design is modified does not result in any additional cost due to preparing them as the same amount of time will be needed to prepare the as-built drawings of the modified apartments as the classical apartments

2 Oct 07 The contractor claimed for the additional cost of the additional shop drawings necessitated by the varied design. The contractor also claimed for the additional cost of as-built drawings

4 Dec 06 The design of the modified apartments was released.

30 May 06 At contract signature (after one yr from start of the works) it was agreed that some of the apartments will have a varied design each based on its ID
 This was reflected in the contract where the release dates of the design of these apartments was agreed so that it doesn't affect the contractor's progress of work
 The contract agreement stated that the contractor will prepare the corresponding shop drawings.



17 March 08 (after 17 days) The Engineer replies that it is the contractor's responsibility to coordinate with the specialist to achieve the required homogeneous effect.

29 Feb 08 The contractor reiterates that he is unable to proceed with procurement which might lead to increase in rates and thus is requesting urgently the technical design specifications.

25 Feb 08 The contractor stated that the required lighting effect for horizontal rings was not defined by the engineer in terms of technical specifications. The contractor is unable to proceed with the procurement. The contractor proposed reducing the light output in the horizontal elements by 50%. The contractor is requesting the engineer's approval to the same to proceed with the order. The commercial deal proposed by the engineer for the additional fixtures required can not be accepted.

22 Feb 08 The engineer replies to the NPD rejecting it

08 Feb 08 The Engineer sends a letter changing the status of the LED fixture material submittal to AAN.

06 Feb 08 The Engineer replies to the letter:

1. The alternative LED fixtures are ANR as per the material submittal.
 2. the mockup had frit glass other than the approved and was misleading.
 3. The conditional acceptance based on the commercial offer was reiterated.
 4. The more intense lighting referred to in the specs is for the horizontal lighting compared to other floors.
 5. this point is irrelevant. However the coordinating with the supplier to get the intended effect remains the contractor's responsibility
 6. The contractor should expedite in finalizing this matter soon as delay has resulted from late introduction of subcontractor/supplier. Procurement can be made when notes raised to the material are cleared.
 7. If the additional cost of the modified option will not be accepted by the employer better work with the specified option and try to enhance it.
- The engineer reiterates that it is the contractor's responsibility to submit approved samples and as such the contractor will bear any resulting increase in rates.

7 Jan 08 The Contractor replies to the engineer's letter point by point:

1. the alternative has been submitted as an equivalent and not as a substitute.
2. noted
3. the conditional approval based on a commercial offer is not agreed to and is rejected as an approach.
4. the contractor stated that the specifications clearly states that the light should be more intense on certain floors
5. The contractor rejects the statement that 'the specified system achieves lower levels of lighting'.
6. The fact that the vertical and horizontal members are approved as noted until the full lighting of the crown of the building is approved is meaningless as it does not allow the contractor to proceed with the order.
7. the engineer has approved to have the second alternative examined and studied

The contractor reiterated that any cost impact and increase in rates due to delayed approval will be claimed.

13 Dec 07 The contractor comments to the engineer's reply stating that there is a contradiction between the approving the alternative as a valid option, giving the AAN status, and the fact that the final decision will await the crown inspection. As such the contractor can not proceed with ordering the same and the supplier has given notice that the prices will increase. Since the alternative is a valid option the request for the specified system mockup of the crown is not justified. All the additional fixture samples are resulting in additional cost for which the contractor will claim.

13 Dec 07 The engineer replied to the contractor's letter with the following:

1. noted
2. the engineer stated that the frit glass installed is not that of the ring level.
3. the approval of the alternative is conditional to a commercial offer submitted for a requested variation of additional items to be ordered.
4. The engineer stated that the original specification requirements calls for identical vertical and horizontal lighting.
5. The specified system achieves lower levels of lighting. The same should be met by the alternative.
6. The vertical and horizontal members are approved as noted until the full lighting of the building is approved.
7. noted

4 Dec 07 The contractor documented in a letter the discussions held during the inspection and during the technical meeting made

1. The engineer is satisfied with the lighting output of the alternative
2. the engineer requested the glass mockup to be extended to identify the ring effect and confirm that vertical and horizontal light are homogeneous

3. The contractor requested an approval for the alternative to facilitate request of additional samples however the engineer insisted on examining the horizontal mockup first

4. The engineer requested that the horizontal lighting match the vertical lighting. The contractor said this was a variation to the original specification requirements.

5. The engineer expressed his wishes to have the lighting level for the LED lowered not to disturb the tenants. This should be submitted in addition to the specified.

6. The contractor requested that the crown lighting be separated from the vertical and horizontal members and to approve the alternative. The engineer said: "he would look into the matter and give his official reply after consulting all concerned parties"

7. the specialist confirmed that the specified system can not provide the requested effect but the modification will have a cost impact. The engineer requested the specialist to give his recommendation.

1 Dec 07 (after 22 days of the mockup) The engineer replies with ANR commenting as: the mockup should be resubmitted with the approved frit glass.

1 Dec 07 The engineer comments that more lighting fixtures for the test should be provided and approved of – the horizontal lighting shall be provided after the inspection of the mockup – the final decision on the fixture will also depend on the crown – the lighting of the façade is AAN

30 Nov 07 The contractor submitted a field inspection request for the façade lighting system

27 Nov 07 (after 49 days) The engineer replies to the material submittal with ANR requesting: certificates for manufacturing and country of origin, certificate indicating the testing results, certificate of guarantee, mockup sample for the proposed system A and the specified system B (after 49 days).

09 Nov 07 The contractor submitted the proposed layout of LED's on external skin mockup for these light fixtures.

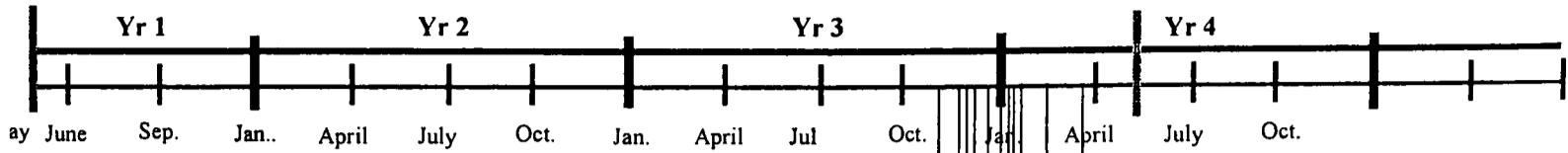
11 Oct 07 The contractor submitted the LED light fixtures

CS no: 8

Subject: Frit Glass

Project: A

Section: Aluminum Facade



22 March 08 The contractor requests an extension of time based on the delay resulting from the new required system that needs more time for production because it is not yet available in the market is undergoing pilot tests and will be made available in April.

23 Feb 08 The contractor will be able to provide the requested fritting from the second supplier. But reinstates that this will be considered as a variation as it was not specified in the contract and this technology was not available at the time of contract signature.

31 Jan 08 The contractor contacts the second supplier and gets a confirmation that the fritting is a new product being experimented with the two referred to glass processors.

23 Jan 08 The engineer contacts the second supplier and confirms that the required fritting is produced by 2 glass processors. And the supplier is willing to give a 10 yr guarantee.

21 Jan 08 The engineer replies to the contractor's letter stating: the glass mockup on face 1 is AAN awaiting lighting. The specifications clearly stipulates a warranty. The issue is being investigated in depth with the specialist consultant.

15 Jan 08 The engineer replies to the submittal as follows. There is a big difference between face 1 and face 2 mockups in terms of aesthetics. The guarantee is needed. Also, both mockups should be examined with the lighting before final decision is made.

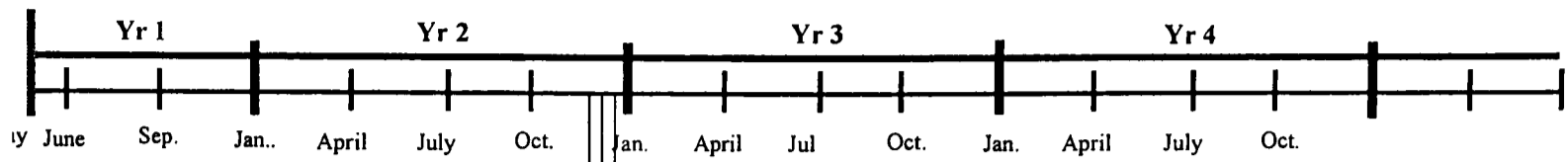
31 Dec 07 Another inspection request is sent

27 Dec 07 Contractor sends a letter states that the face on which frit glass is to be applied is not mentioned in the specifications; and has only been indicated through the engineer's comment on the material submittal. The warranties requested are also not mentioned. The contractor adds that contact has been made with the named suppliers and the first doesn't have it while the second has the product under pilot study. Accordingly, providing a warranty will be considered as a variation with cost and time impact.

3 Dec 07 The engineer stresses on the fact that the frit glass should be on face 1. He specifies suppliers that are using the same on different projects. The engineer adds that if the current supplier can not provide the same he should be replaced.

1 Dec 07 Engineer replies to inspection requesting fritted glass to be on face 1 as requested in the reply to the material submittal in Jan 07 – the alternative of positioning the frit between the glass panes will be examined on the mockup.

28 Nov 07 The contractor requested the engineer to attend a field inspection request for the external glass mockup.



21Dec 06 The contractor disputed the same.

15 Dec 06 The Engineer stated that it is not the war effect but the boom in the Gulf. As such it is not an engineer's risk but a contractor's risk. The Engineer stated that the contractor can pay these employers higher premiums to keep them in the country.

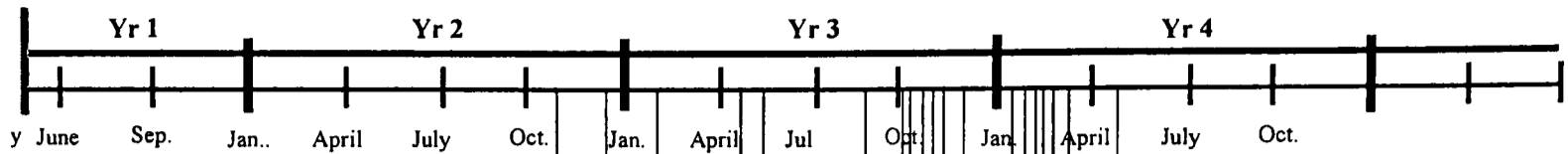
30 Nov 06 After the war in Lebanon and due to the unstable political situation the contractor claimed that country witnessed immigration of engineers and other human resources on site. This resulted in a slow down to the progress of works. This was raised by the Employer as an Employer's risk

CS no: 10

Subject: Safety Film

Project: A

Section: Aluminum Façade



10 April 08 The Contractor reiterates his position regarding the notification of possible delay regarding this matter and request the engineer to reconsider.

14 March 08 The Contractor resubmitted the antivandalism safety film

7 March 08 The contractor replied that with the cancellation of the polycarbonate system he will resubmit the 12mm tempered glass

28 Feb 08 The Engineer requests the contractor to disregard the option of polycarbonate.

27 Feb 08 Engineer replies to material submittal with ANR security performance and available warranty period of the proposed films

27 Feb 08 The Contractor replies to engineer's letter: polycarbonate performance data is not available, tempered glass meeting specifications can not be achieved, a test can alternatively be made to determine glass specification/performance but this testing will be time consuming and subject to a VO.

13 Feb 08 The Contractor resubmits the material submittal with the film option and technical attachments of 3 options

29 Jan 08 The Engineer rejected the NPD as this matter is not delaying the progress of works

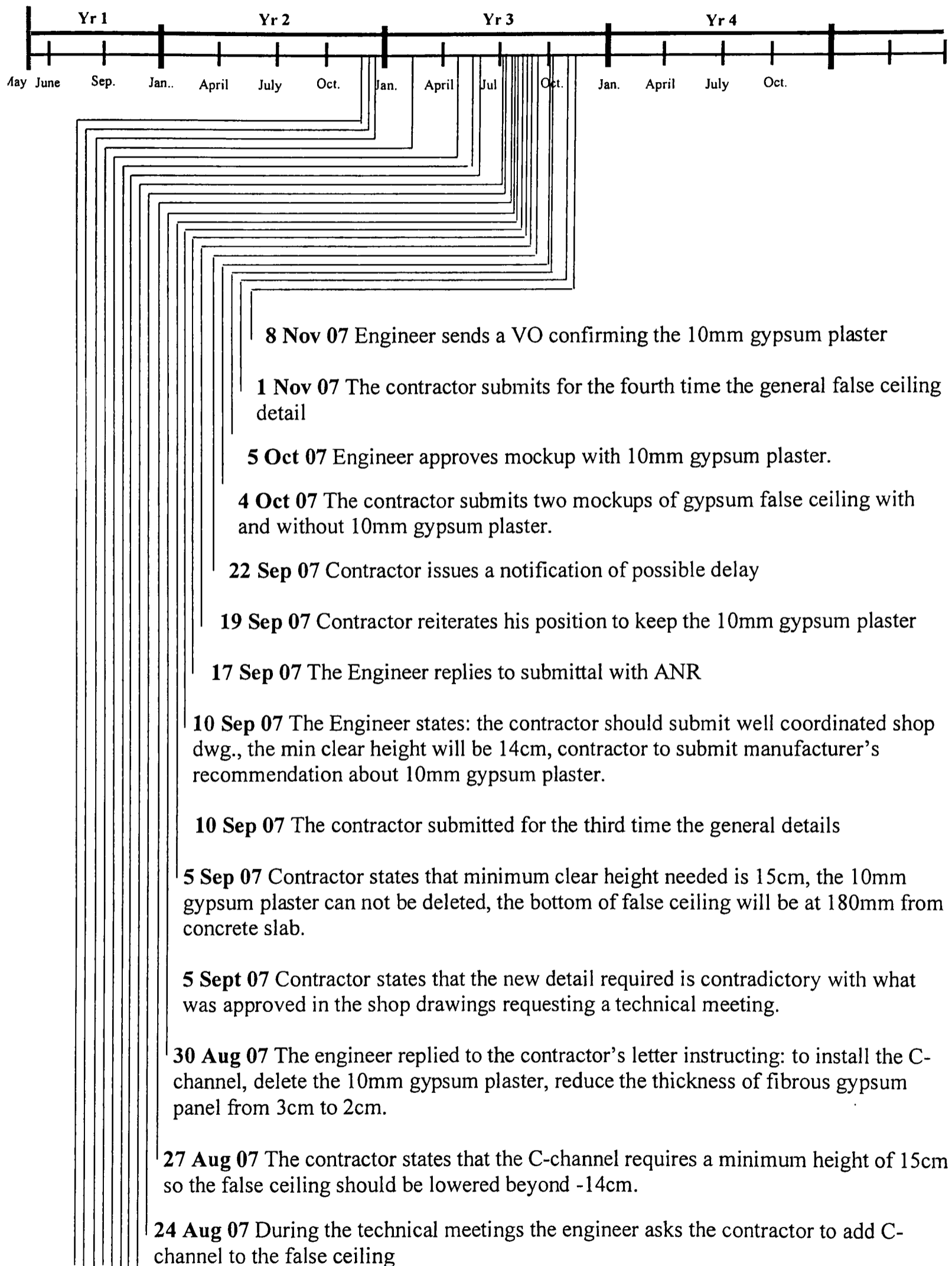
23 Jan 08 The Engineer replied that polycarbonate clad should be investigated further and proposal for PVB should be fully documented

12 Jan 08 The Contractor replied to the engineer's suggestions as follows: heat toughened glass can not be specified as antivandalism, the behavior of combination of tempered glass with polycarbonate is not well known, glass supplier is proposing relying on bolt and sealant around the panel to hold the panel in place, PVB can be an alternative expensive option

8 Jan 08 Contractor issues a notification of possible delay

13 Dec 07 Contractor submitted shop drawing (4th submittal) and antivandalism material submittal

- 19 Nov 07** The Engineer suggested that the Contractor investigates: heat strengthened instead of annealed or glass clad polycarbonate.
- 17 Nov 07** The Contractor states that following the Engineer's proposal in a technical meeting he has investigated the option of having a film applied on the glass but the two suppliers contacted were not able to provide full technical backup documents that meet specs.
- 25 Oct 07** The Engineer replies that the Contractor should investigate possible solutions. The consultant will do the same in parallel.
- 16 Oct 07** The Contractor comments to the engineer's reply stating that the Engineer is requesting the glass to be anti-vandalism although this glass is to be drilled so it has to be tempered instead of annealed and can not perform as antivandalism.
- 5 Oct 07** The engineer replied with ANR and AAN
- 24 Aug 07** The contractor resubmitted the shop drawing
- 19 May 07** The engineer replied with ANR (after 26 days)
- 23 April 07** The contractor resubmitted the shop drawings
- 31 Jan 07** The engineer replies with ANR and NA (41 days later)
- 21 Dec 06** The contractor submitted the shop drawings for the spider glass façade
- 9 Nov 06** Engineer issues a variation order in shop fronts to cancel roller shutters and upgrade the spider glass into antivandalism



17 Aug 07 The contractor submitted the modified shop drawings as per new comments.

21 July 07 the engineer replies that there is no objection to the proposal to modify heights all -10cm inverts should be modified to -14cm.

18 July 07 the contractor states that the minimum clear height of 10cm is required above fibrous gypsum false ceiling panels otherwise it could not be installed.

6 Jun 07 the Engineer (after 22 days) replied with AAN changing the clear height in AC grille area from 19cm to 17cm and modified the cornice head and height in areas of electrical fixtures from 13cm to 12cm. Along with a list of general comments that were not mentioned in previous submittals.

1 June 07 the engineer replied to the RFI commenting to the proposed detail and requesting the contractor to resubmit.

21 May 07 the Contractor submitted a request for information regarding shifting the position of the grille from the lower drop to the upper drop.

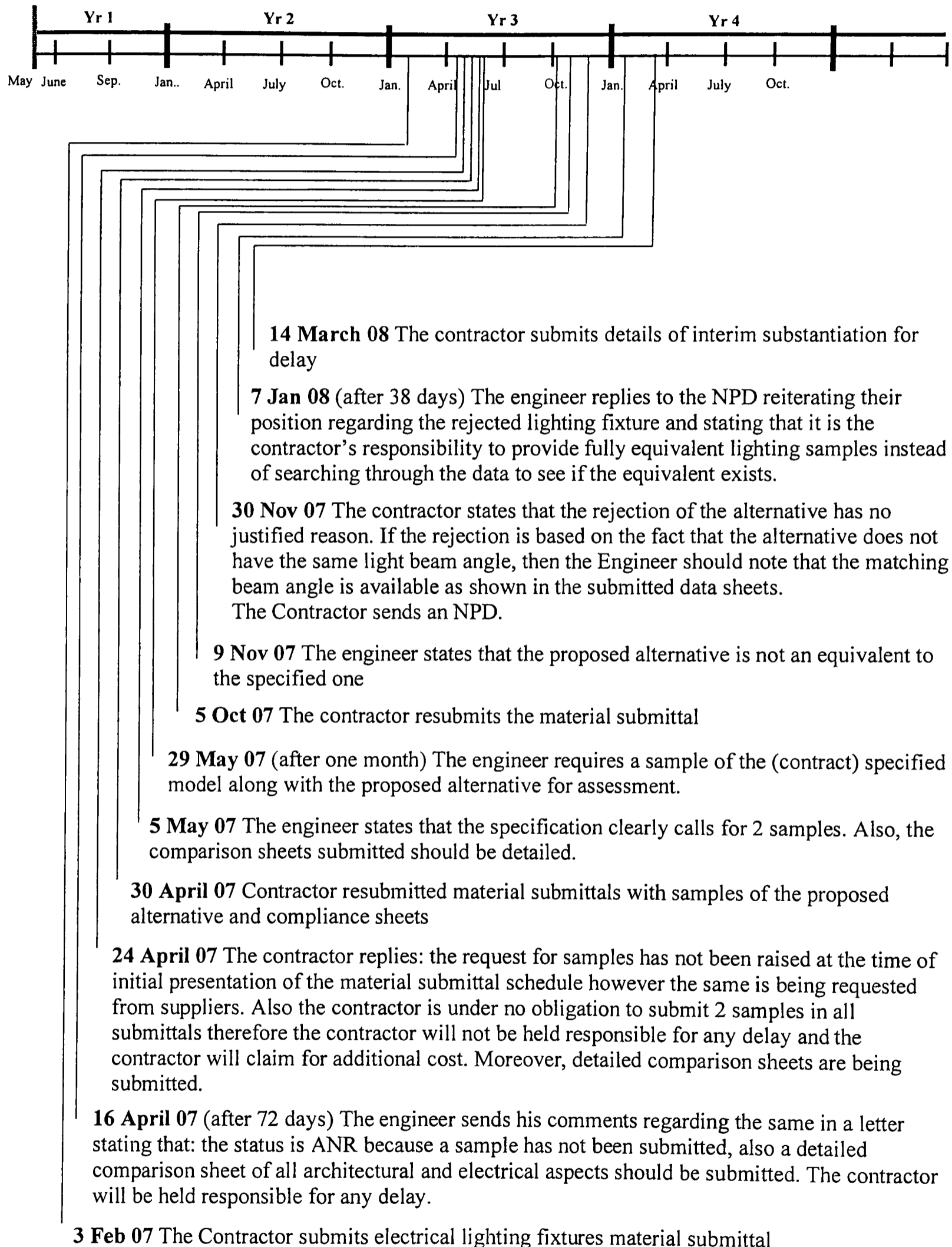
15 May 07 the contractor resubmitted the details incorporating the engineer's comments.

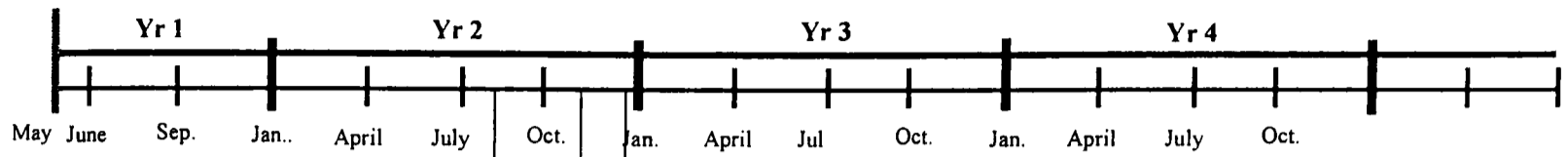
After several technical meetings with the engineer regarding the AC grille opening and the electrical fixtures location it was agreed that AC grill opening will have clear height of 19cm and 13cm clear width where electrical fixtures are located.

28 Dec 06 the Engineer replies to the second submittal with AAN changing the height of the cornice where the AC grille is located from 23cm (coordinated with MEP) to 20cm including the gypsum thickness

26 Dec 06 the Engineer replies to the first submittal changing the height of the cornice where the AC grille is located from 22cm to 16cm

22 Dec 06 Contractor submits the general details for the false ceiling (classic and modern details) via 2 submittals





15 Dec 06 The contractor disputed the same.

2 Nov 06 The Engineer stated that the war effect is only limited to laborers increase in rate directly after the war and for that period only. Increase of wages is result of escalation for which the contract does not account.

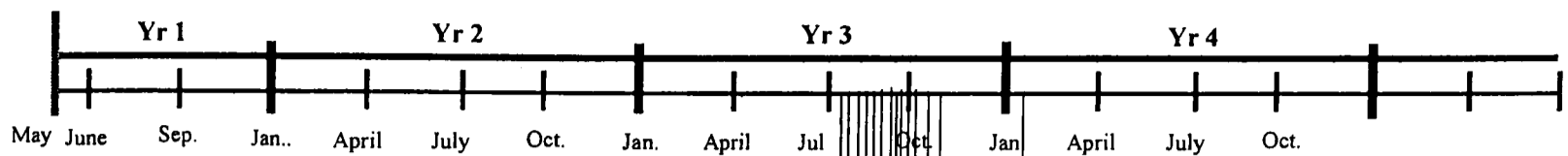
5 June 06 After the war in Lebanon and due to the unstable political situation the contractor claimed that there has been an increase in the labor rates which is also an Employer's risk. As such the contractor claimed the increase in cost in the labor rate from the war period till the completion of the project including subcontractor's laborers.

CS no: 14

Subject: Façade Alum. Color

Project: A

Section: Façade



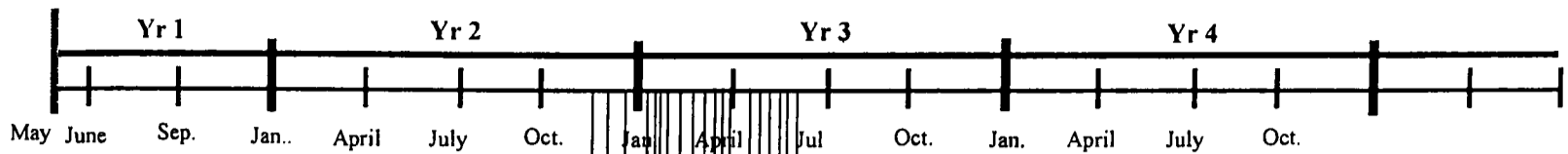
- 15 Jan 08** The contractor submits substantiation of delay as the RAL color was approved on 17 Oct 07 although it was on site since 4 Jul 07 (105 days)
- 24 Oct 07** The Engineer rejects the NPD stating that it can not be validated
- 17 Oct 07** The engineer replied the RAL color for panel labeled 3 is approved.
- 9 Oct 07** The contractor resubmitted the material form adding the color reference numbers.
- 8 Oct 07** (after 21 days of the submittal) The sample colors are not approved. "the contractor should resubmit indicating the reference of the color approved on site during the joint inspection".
- 17 Sep 07** After a verbal instruction from the Engineer, the contractor submitted another material submittal for the samples fixed on the mockup
- 15 Sep 07** The Engineer replied to the FIR with the ANR
- 7 Sep 07** The Engineer carries out the field inspection
- 6 Sep 07** The Contractor submits a new FIR
- 23 Aug 07** The Engineer confirmed the request to relocate the spandrel panel and stated that the delay in approving the lab tests outweighs delay in approval of FIR.
- 22 Aug 07** The contractor sent an NPD
- 22 Aug 07** (after 3 days) The Contractor send a letter stating that relocation requires 10 to 12 days. As such delay will be the engineer's responsibility as there was no timely reply to the mockup.
- 18 Aug 07** The engineer requested the contractor to change the mockup location
- 3 Aug 07** (after 21 days) The contractor replied to engineer's comments noting that the two major issues were not commented: color spandrel and color of the handrails.
- 13 July 07** The engineer replied to the FIR which excludes two major items: the color of the panel although 6 samples of different colors were presented, the final approval for the color of the handles
- 5 July 07** The contractor requested from the engineer to inspect the mockup on site

CS no: 15

Subject: Steel Structure Design

Project: A

Section: Steel Structure



22 Jun 07 Alternative is accepted based on cost savings inuring to the employer's benefit and NPD is rejected.

15 Jun 07 Letter is sent for alternative paint that would reduce time for shipping out of the country for dip galvanizing

04 Jun 07 Material submittal is sent for hot dip galvanizing option

14 April 07 The Engineer returned with the status of ANR

11 April 07 Reminder is sent for delay by Contractor

4 April 07 Reminder is sent for delay by Contractor

28 March 07 Reminder is sent for delay by Contractor

21 March 07 Reminder is sent for delay by Contractor

14 March 07 Reminder is sent for delay by Contractor

14 March 07 Substantiation of the criticality of this submittal as the time needed to provide material on site after approval is 20 weeks

07 March 07 Contractor sends reminder for the delay

28 Feb 07 Contractor resubmits roof steel structure plan and details

03 Feb 07 Engineer replies to submittal with ANR

31 Jan 07 Notification of possible delay is sent

24 Jan 07 Reminder is sent for delay

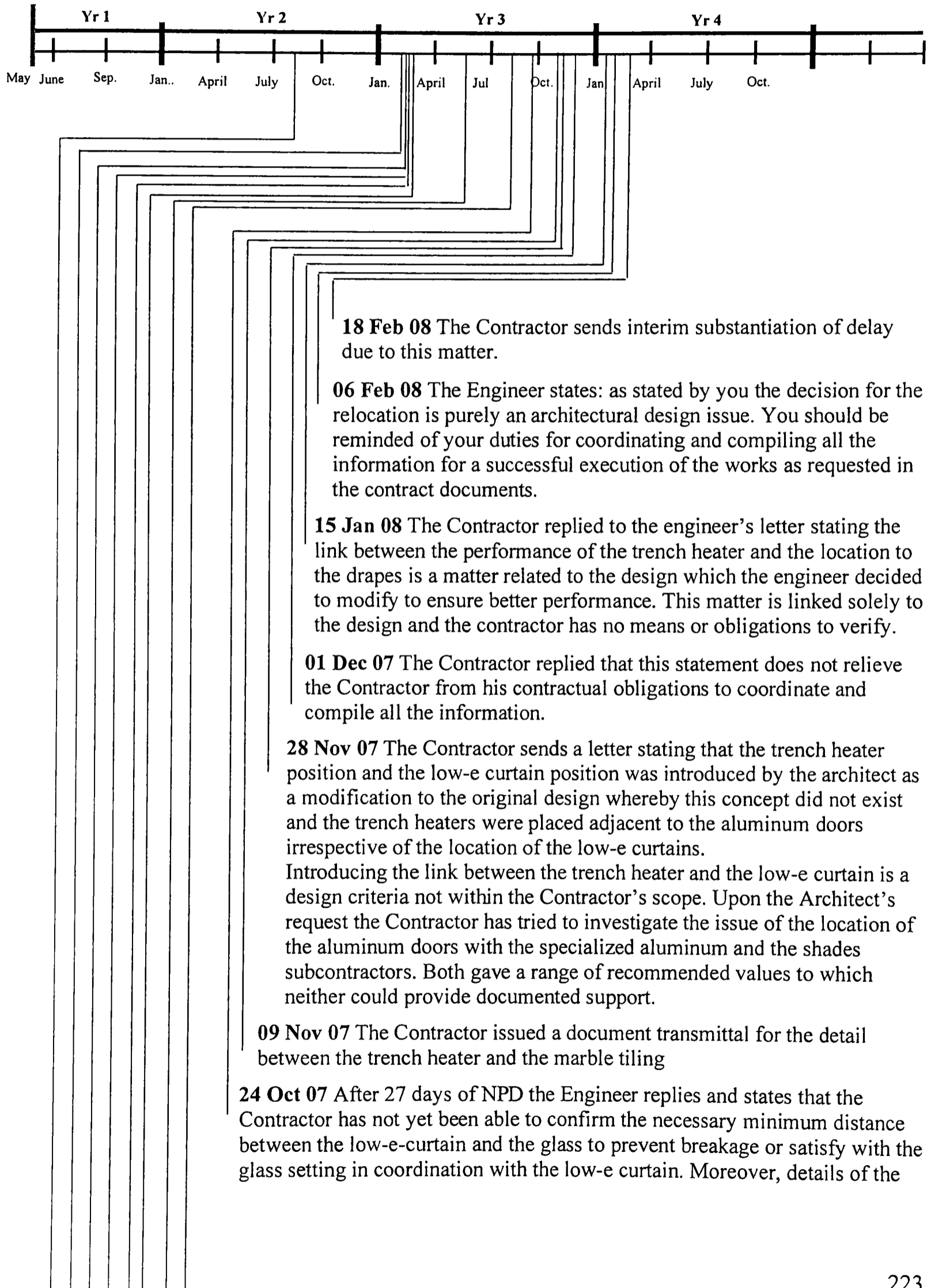
17 Jan 07 Reminder is sent for delay

10 Jan 07 Reminder is sent for delay

20 Dec 06 Reminder is sent for delay

6 Dec 06 Reminder is sent for delay

24 Nov 06 Submittal of roof steel structure



trench heaters intercepting with the stone tile are not yet submitted. The dummy grills are not yet determined and samples are not yet provided.

27 Sep 07 The Contractor issued a notice of possible delay due to the abortive engineering works and time delay in tiling works

04 Aug 07 The Engineer replied to the document transmittal stating that proposed solution is approved and confirmed the 77cm distance between trench heaters and the window. Shop drawings are submitted and the marble tiling proceeds in all areas accordingly.

01 Aug 07 After several joint technical meetings, the Engineer's comment to the tiling shop drawings regarding the trench heater locations, the contractor submitted a typical detail via document transmittal

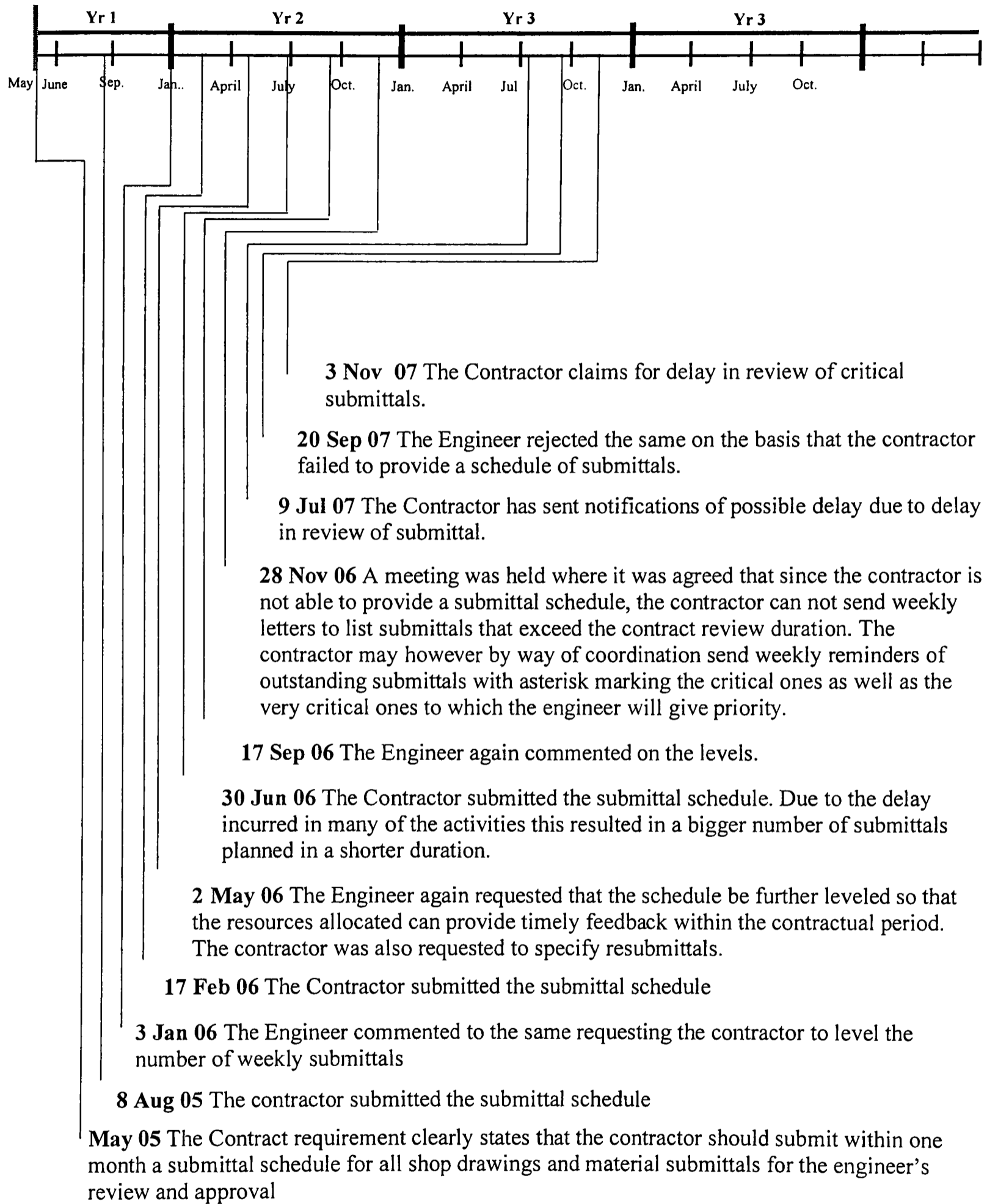
06 June 07 The Engineer replies with ANR (75 days later) requesting contractor to move the trench heater 35cm from the edge of the aluminum panels and stating that the trench heater width should be confirmed and coordinated with mechanical material and shop drawings.

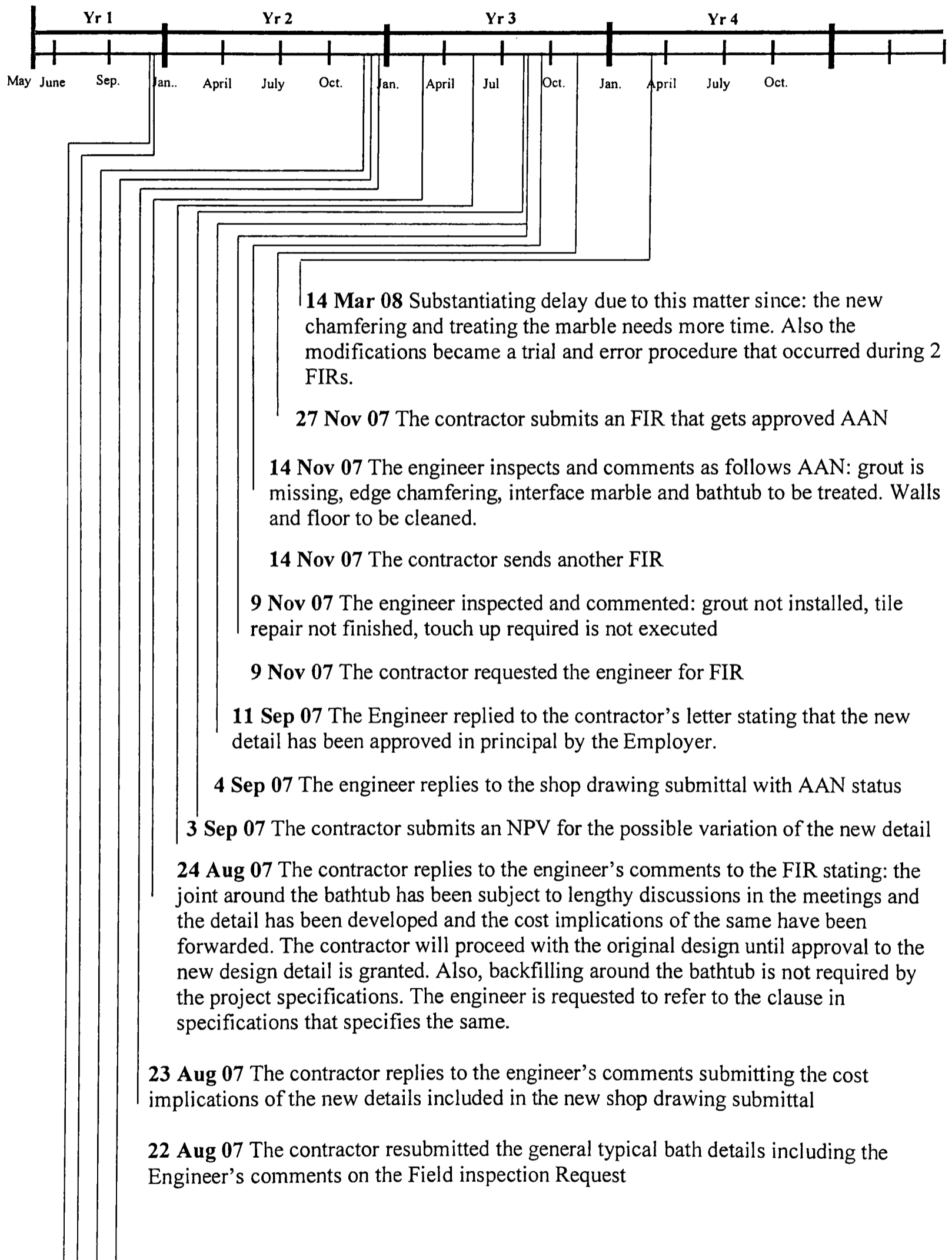
23 March 07 The Contractor submitted shop drawing for further areas/apartments.

19 March 07 The Engineer replied to the following: The location of the trench heating radiator as shown on the attached installation detail is acceptable thus approved.

15 March 07 The Contractor sends an RFI regarding the detailing of the trench heater showing the trench heater jamming with the aluminum window as per the design drawings.

2 Sept 06 The Contractor proceeds with submitting and resubmitting shop drawings for marble flooring in several areas/apartments that are approved and starts execution of the electrical embedment accordingly.



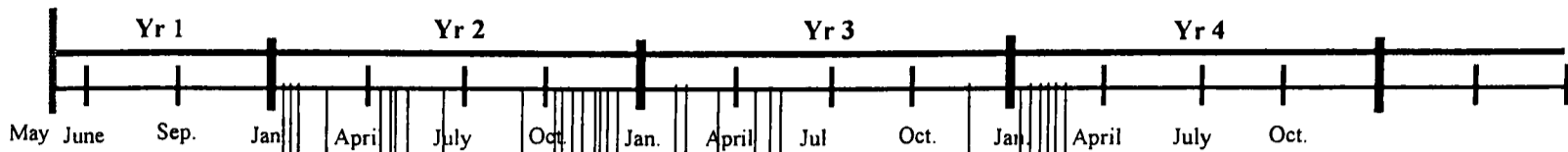


10 Aug 07 The engineer replied to the FIR with ANR requesting the contractor to change the corner details which caused the contractor to resubmit the shop drawing for typical bathroom detail

9 Aug 07 The contractor requested the engineer for an FIR

20 Feb 07 (after 23 days) the shop drawing is replied as "AAN"

19 Jan 07 The contractor submits typical bathroom tiling shop drawings



12 March 08 another coordination meeting is held with EDL and unofficial acceptance is received from EDL

5 March 08 a joint coordination meeting is held with EDL

3 March 08 the Engineer issued the final KWH meters and requested the Contractor to arrange for another EDL visit

13 Feb 08 a joint meeting was conducted with EDL to discuss the pending items

24 Jan 08 the Engineer replied with a revised layout proposal and requested the contractor to schedule a meeting with EDL the soonest.

10 Jan 08 the contractor requests the engineer to provide the revised transformer room layout and proposes a joint visit to EDL to finalize the above requirements and states that the construction of the transformer room will be kept on hold.

10 Dec 07 the contractor conducted a visit to EDL for follow up to find up that: no action has been taken regarding the EDL regarding the request for power. Several further documents were requested among them the final KWH Meter and Power Capacities and the revised transformer room layout

30 May 07 the contractor informed the engineer that he has issued to EDL the request for substation signed by the Employer

26 May 07 the Contractor transmitted the request for power to EDL signed by the Employer

8 May 07 the Engineer (after 50 days) comments to the letter to be sent to EDL and provides further necessary documentation and details

19 March 07 the Contractor sends a draft of the letter to be sent to EDL for the Engineer's approval

- 20 Feb 07** the Engineer issued the revised LV metering configuration
- 8 Feb 07** the Engineer replies that in case of no reply the contractor is requested to proceed with what is commonly used regarding bus ducts. The final LV metering configuration was promised to be issued soon.
- 26 Dec 06** the contractor replies that EDL is not responding in providing written confirmation. As for the LV metering configuration, the Contractor questions how it relates to the MV mechanical equipment load. Also, the contractor pointed out discrepancies in the LV metering configuration have been submitted.
- 9 Dec 06** the Engineer requests a written confirmation regarding the Bus ducts being not permitted. The Engineer also provides the metering configuration but states that since the contractor has not yet submitted the power rating of the final mechanical equipment the metering configuration can not be finalized.
- 6 Dec 06** the EDL informs the contractor that the permit file is not complete and can not be processed. Thus further documents are necessary. Also, EDL points out that the sizes of the transformer capacities have been changed. The big transformers necessitate having spare transformers.
- 05 Dec 06** the Contractor visits the EDL to pursue the permit file and is informed that the permit drawings are automatically processed by the EDL engineering department
- 17 Nov 06** The contractor conducted a visit to EDL to followup on the pending letters that were not responded. The EDL coordinator reiterates that the bus ducts are not permitted, as for the approval to the new permit file it has not yet been approved as the Engineer has been requested to issue the EDL meter configuration to be adopted.
- 10 Nov 06** the contractor replied that since this VO is issued after 18 months and includes radical modifications that will result in delay in engineering, procurement and execution. Thus giving a notice of delay
- 1 Nov 06** the Engineer revise the LV distribution to the apartment with revised panel board distribution vide a new Variation Order
- 19 Oct 06** the Contractor starts coordination with EDL and requests Engineer to issue further drawings for the transformer and metering room
- 15 Sep 06** the Engineer issued a Variation Order modifying the metering for panels serving service areas.
- 23 Jun 06** the Contractor requesting EDL to advise in writing about the use of bus ducts inside the EDL room

15 May 06 the Engineer issues revised architectural drawings based on these comments

6 May 06 the Contractor transforms this information in writing to the Engineer

5 May 06 a joint visit to EDL is carried out where the EDL coordinator comments to the modifications on the shop drawings

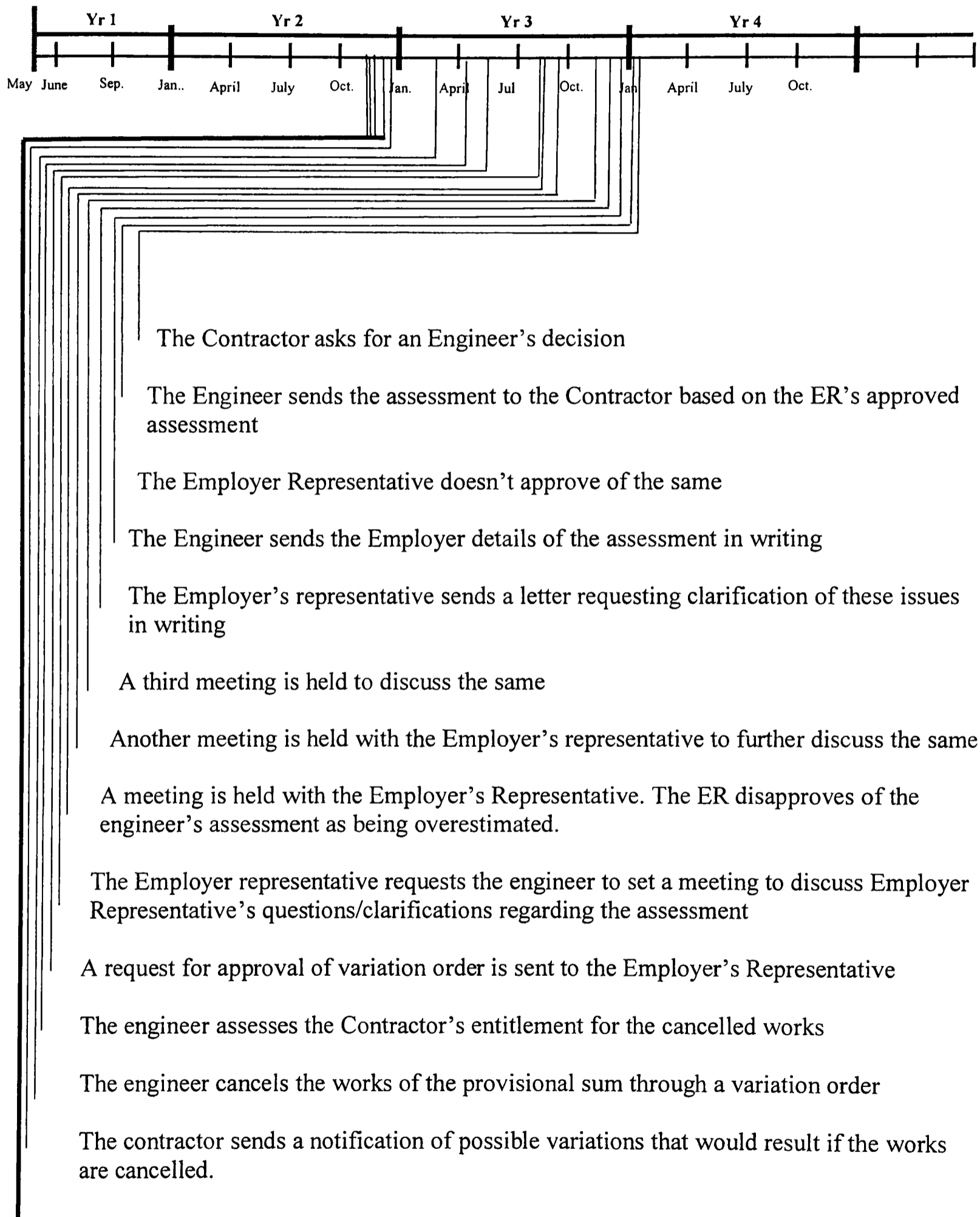
28 April 06 the Engineer issue EDL shop drawings to be executed by the Contractor to the satisfaction of EDL attaching list of technical modifications to be carried out

25 Feb 06 the Engineer prepares the revised permit file and transmits it to EDL with a copy to the Contractor and asks the contractor to follow up with the coordination.

17 Jan 06 upon the Employer's request the Contractor summarizes the outcome of the follow up of the permit file and confirms that the official request of the Employer for the new configuration of transformers needs to be filled and signed by the Employer.

12 Jan 06 the Contractor transmits the EDL request to the Employer

7 Jan 06 the EDL informs the Contractor that the original substation as set in the contract was approved in principal but the modified substation (resulting from the value engineering done) necessitates submitting a full set of documentation for EDL study and approval before EDL Engineering department can commence drafting the EDL room.

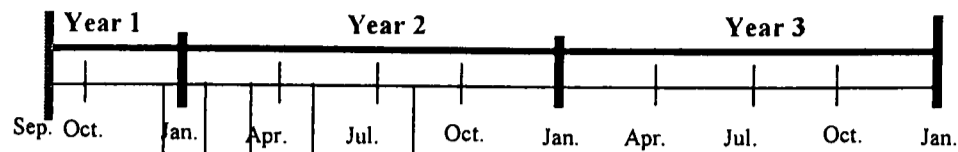


The Contractor is requested to put the works in the provisional sum on hold

The Contractor prices the BOQ

A variation order is issued modifying the released design of the provisional sum

A Provisional sum is released for a section of the works and the Contractor is requested to price the corresponding BOQ



In the Engineer's Decision the Contractor found no grounds for accepting the rejected NPVs

29 Apr 06 The Contractor did not agree with the Engineer's reply / interpretation "that the Contract Drawings issued during the Tender Phase are not valid for execution (where is this expressly stated in the Contract?)". Also, The Contractor raised the additional queries:

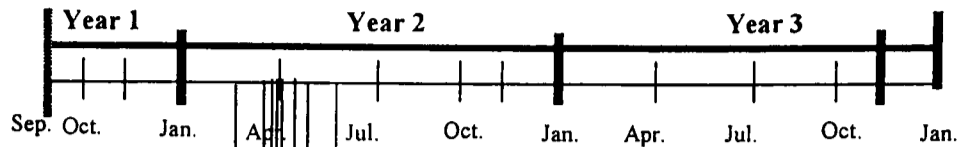
- "Are you stating that the Employer issued during the Tender Phase unnecessary contract drawings that are neither proper nor adequate for execution and completion of this project?"
- "Why it is written within the text of Clause 7.1.2 quote "the Engineer shall be responsible for the drawings and information supplied in writing by the Engineer" unquote?"

Finally, the Contractor requested an "Engineer's Decision" pursuant to Clause 67.1 "on the disputed subject of Clause 7.1.1.A and 12.1.

13 Feb 06 The Engineer reminded the Contractor of his duty to develop and prepare Construction Drawings which are valid for execution unlike the drawings issued during the Tender Phase. The Contractor had ample time during the Tender phase to study, review and inquire about the Tender Documents and familiarize himself with such documents and subsequently arrived to his own Lump Sum price which accounted for carrying out the works in accordance with his own developed Construction Drawings. Moreover, the Engineer explained that the Contractor is deemed to have satisfied himself as to the correctness and sufficiency of the Tender Documents, studied the Contract Documents and, by his own independent observations and inquiry, acquainted himself fully with local conditions, the accessibility of the Site (including Temporary Works Areas) and proper execution of the Contract, acknowledging that the Contractor will develop Construction Drawings to execute the Contract.

19 Jan 06 The Contractor noted that the Engineer's reference to Clauses 7.1.1.A and 12.1 is not in order since Construction Drawings are being prepared using the drawings which were provided by the Engineer and these NPVs are a result of errors in the Drawings provided by the Engineer to the Contractor or changes of design marked on the Contractor Construction Drawings and the Contractor should not be responsible for incomplete designed works.

The Engineer rejected several Notifications of Possible Variations (NPVs) as they are part of the original Contract Scope of Work and referred, without limitation, to Clauses 7.1.1.A and 12.1.



07 June 06 The Engineer did agree with the Contractor's comment that the tree is disfigured. The Engineer disagreed with the Contractor's assessment that this specific branch of the tree should have been removed before transplantation. The Engineer clarified that although the Contract applies the same penalties for "major damage" and/or "death of tree", he confirmed that these two categories are different and the preposition "and/or" is used accordingly.

11 May 06 Further to the deduction the sum of US \$8,504.00 from Contractor interim payment No.4. The Contractor agreed that the tree was disfigured by losing one main branch and the incident did not affect the life of the tree. The Contractor added that "to transplant this "damaged tree" from its temporary location to its permanent location, this branch should have been removed before transplanting similar to the 2nd branch that was removed.... There is no definition of "major damage" in Clause 3.5 of Specification Section 02231 but it is very understood that "major damage" equal to "death of trees" Since the tree is not dead and we don't consider the damage that occurred equals to death of tree, and as stated in the preceding paragraph that the broken branch would have been subject to removal before transplanting, we disagree with the Engineer's interpretation of Clause 3.5.D.4".

14 Apr 06 The Engineer noted that detaching and breaking the largest branch is considered as "major damage" to the tree and subsequently resulting in disfiguration. The "major damage" occurred prior to transplantation. The Engineer disagreed with the Contractor's "understanding" of "major damage" in defining it as total death of the tree.

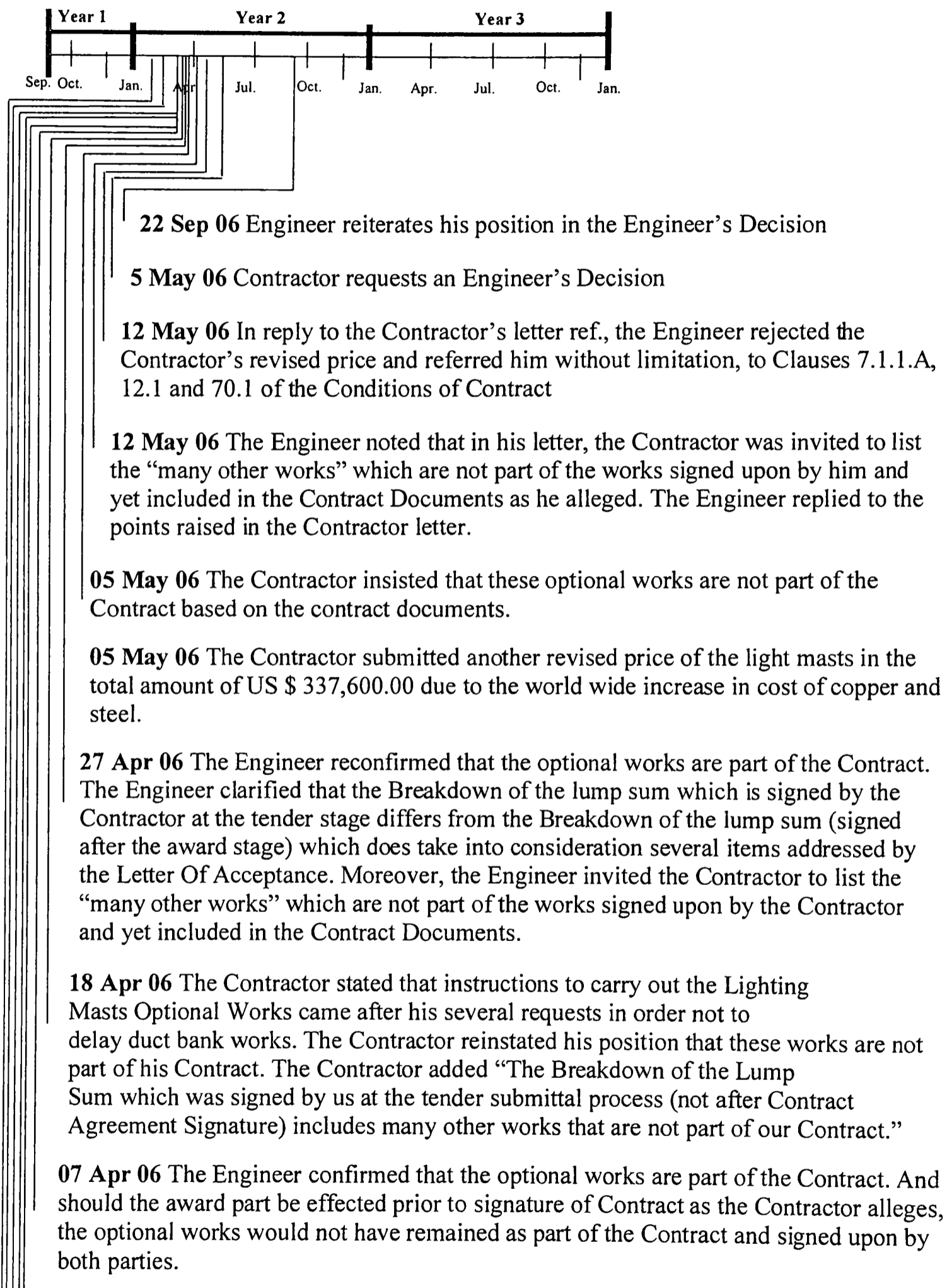
13 Apr 06 The Contractor noted that disfiguration does not mean "major" damage and/or total death and that "transplantation of any plant can sometimes lead to its death". The Contractor also added that the Engineer's categorization of the damage as "major" is incorrect since there is no definition of "major damage" in the Specifications to compare with. The Contractor stated "Our understanding of "major" is that when the tree becomes totally dead".

11 Apr 06 The Engineer clarified that the subject tree is permanently disfigured and the broken branch (located at the lowest part of the tree) is the largest branch and supports other ascending branches. The Engineer also reminded that the transplantation process was scheduled by the Employer prior to the Contractor's damages. The Engineer clarified that he previously categorized the damage as "major" and did not receive any objection from the Contractor until the latter was notified of the costs associated with such "major" damages.

07 Apr 06 The Contractor replied claiming that the damages are minor and affected only one branch and cannot in any way be considered as “major” or “dead” and noted that he shall supply the Employer with the method of repairing the tree. The Contractor also noted that the tree was still living after the accident before it was transplanted directly by the Employer. The Contractor also rejected the decision to deduct the advised amount from his due monies.

04 Apr 06 The Engineer notified the Contractor that the Employer will be compensated for a total sum of \$8,504.00 calculated in accordance with item 3.5.D.4 of Section 02231 in the Contract Specifications. The Engineer also noted that the above sum will be deducted from any due monies in the next payment.

14 Mar 06 The Engineer noted that after an accident by the Contractor the Delonix tree is permanently disfigured and categorized the damage as “Major Damage” and noted that it will be dealt with in accordance with item 3.5 of Section 02231 of the Contract Specifications.



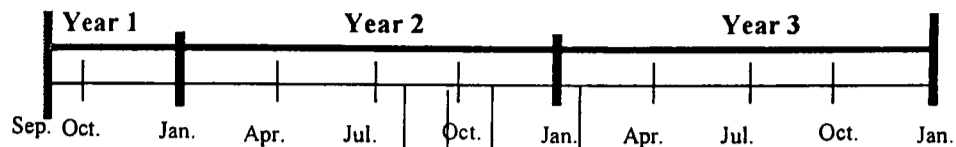
22 Mar 06 The Contractor submitted a new price for supplying and installing the lighting masts of \$US 38,740.00 for each item and amounting to \$US 309,920.00 for all lighting masts (8 No.).

24 Mar 06 The Engineer referred the Contractor, without limitation, to drawing EL117 and Section 16510 "Exterior Luminaires" which show all necessary information. The Engineer added that the instructions, are within the Contract requirements and allow for reasonable time limitations to carry out these optional works. The Engineer instructed the Contractor to abide by Contract Price and rejected the Contractor's revised price.

25 Mar 06 The Contractor noted that the lighting masts are part of the Optional works and not part of the Contract price. The Contractor concluded that the decision to award part of the Optional works should have been decided prior to signature of Contract and not within the Contract duration.

28 Feb 06 The Contractor noted that he is unable to perform these works at the same price inserted in the Optional Works summary due to the absence of any clear specification and since the instruction is issued after more than seven months of Site Possession and Commencement date. The Contractor stated that two alternative materials will be submitted along with relevant costs.

11 Feb 06 The Engineer instructed the Contractor to carry out the optional works for lighting masts as called for in the Contract Documents.

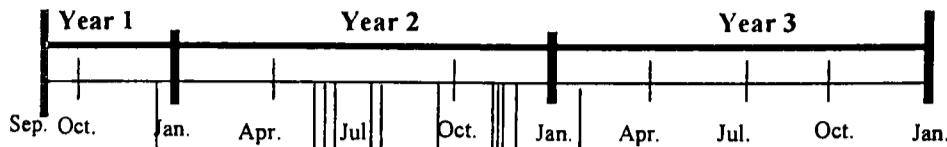


22 Jan 07 The Engineer reiterated his position in the Engineer's Decision

31 Oct 06 The Contractor noted that his responsibility is limited to obtaining goods and to carry out the installation in accordance with design drawings. The Contractor concluded that the National Plumbing Code is of interest to those engaged in design and "adding additional items not provided for on the design drawings is the Employer's responsibility and not the Contractor". Pursuant to Contract Condition Clause 67.1, the Contractor notified the Engineer to issue an "Engineer's Decision" on the disputed subject of the Cleanouts

12 Sep 06 The Engineer rejected the Contractor's request for additional monies which are considered part of his scope and referred him without limitation, to the contract conditions mainly the specifications and the National Plumbing Code.

15 Aug 06 Further to the Technical Person's comments made on submitted Construction Drainage Drawings, the Contractor requested an additional amount of US \$ 14,771.85.



22 Jan 07 The Engineer reiterated his position in the Engineer's Decision

31 Oct 06 Pursuant to Contract Condition Clause 67.1, the Contractor notified the Engineer to issue an "Engineer's Decision" on the disputed subject of the Fire Alarm System.

26 Oct 06 The Engineer reconfirmed his position as stated earlier and noted that "The Contractor's duties are, but not limited to, the following: Preparation of Construction Drawings, Preparation of Shop Drawings, Compliance with Division I of the Contract Specifications, Compliance with the requirements of Section 13852 (Fire Alarm System Equipment) and other related Sections, All other Contract Document related to above works. The Engineer requested full compliance with the Contract Documents.

20 Oct 06 The Contractor stated that he does not accept the Engineer interpretation and "it is the duty of the designer to design the fire alarm system to meet the NFPA requirements; the Contractor's job is to install the fire alarm system in accordance with NFPA requirements". The Contractor added that design is not part of his Contract and re-iterated his position.

17 Oct 06 The Engineer rejected the Notification of Possible Variation (NPV-067) submitted by the Contractor claiming extra monies for "increased number of fire alarm devices". The Engineer referred the Contractor to Clauses 7.1.1.A and 12.1 of the Conditions of Contract and Division I of the Contract Specifications.

29 Aug 06 The Engineer reiterated his previous position and confirmed the Contractor's obligation to prepare Construction Drawings as per Clause 7.1.1.A and use such approved Construction Drawings to prepare his Shop Drawings.

29 Jun 06 The Contractor reiterated that his responsibility is limited to supply and install the Fire Alarm System as designed in the Tender Drawings (which are deemed to have been prepared to comply with NFPA 70, 72 and any other applicable codes), after doing the necessary coordination and shop drawings required. The Contractor also confirmed that coverage, sufficiency / No. of detectors, emergency lights and the like, are the responsibility of the designer.

23 June 06 The Engineer reiterated his previous position and noted it is the Contractor's responsibility to verify the Contract Drawings and make sure that the coverage and the installation of the approved fire alarm system complies with the applicable codes and functions as required in the Contract Documents. The Engineer also rejected the

Contractor's statement concerning item 3.01 as being "*general statement*" and stressed it is the Contractor's obligation to confirm and execute the installation of this system in accordance with Section 13852.

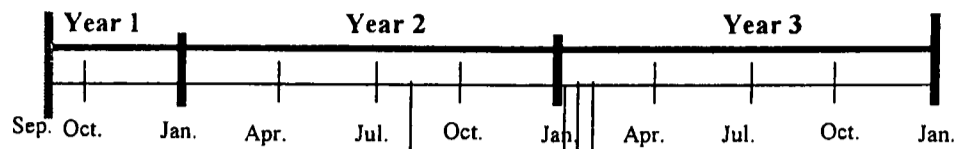
27 May 06 The Contractor noted that Specification Clause 3.01 A states: "Install in accordance with requirements of NEC, NFPA 70, NFPA 72 and applicable codes, as shown on the drawings, and as recommended by the major equipment manufacturer". This statement is a general statement and does not imply any design responsibilities on the Contractor. It relates to installation methods and details such as height and location of devices, coordination with other disciplines or trades, etc... The Contractor added that Construction drawings / Shop Drawings relate to coordination requirements between trades but not to general design issues, such as coverage of areas, number of emergency lights and the like, the responsibilities for which is vested in the Designer and not the Contractor.

10 May 06 The Engineer rejected the Contractor's statement and reminded him that Fire Alarm System shall be installed and executed according to the NEC, NFPA 70 and NFPA 72 requirements. The accuracy of all such information is the responsibility of the Contractor. The Engineer also reminded the Contractor that he shall check the Contract drawings for discrepancies with the above codes that may occur. If any, the Contractor shall notify the Engineer and shall make all the necessary modifications in order to assure a complete system that complies with all applicable codes listed in the Contract Specifications.

04 May 06 Further to the Engineer's comments on the returned Shop Drawings, the Contractor stated that the onus for the adequacy of the design rests with the Engineer.

29 Dec 05 The Engineer reviewed and issued his comments on the submitted Shop Drawings re Fire Alarm System:

- a. Detection coverage shall be provided throughout the buildings.
- b. Automatic smoke / heat detectors in all areas with smooth ceilings shall be spaced not more than 9m apart and not more than 4.5m from adjacent walls or beams with depth exceeding 30cm.
- c. Dual action manual call points shall be installed not more than 1.5 m away from all exiting doors and 1.1 to 1.5 m above finished floor level at center. One or two manual call points shall be sufficient when having multiple exit doors for the same exit. No one should walk for more than 60 m to reach a manual call point. Clear plastic covers with built-in local alarm shall be provided for all manual call points.



31 Jan 07 The Contractor stated in part that the Engineer's letter dated 22/01/07 is *"totally unacceptable and unjustified"*. The Contractor further stated *"Since it seems that you are willing to take position with respect to the interpretation of the law, We hereby request, pursuant to Contract Condition Clause 67.1, an Engineer Decision with respect to the application of the Law named in order to refer the matter to arbitration."*

22 Jan 07 The Engineer stated in part that:

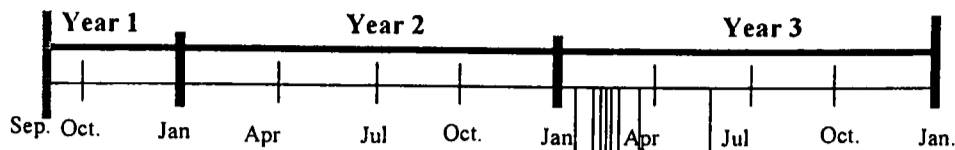
1. *"We have assessed the extension of time entitled to you under the Terms of the Contract noting the following:*
- b. *The Law dated 8/12/06 is not applicable to your performance of your obligations under the Contract. You have submitted your assessment on the encountered delays and after giving you the benefit of the doubt and used your own data and your schedule based on your submitted substantiation, the extension of time was granted to you accordingly based on goodwill."*

12 Jan 07 The Contractor stated in part that *"we tried hard to mitigate the damages and the delays pursuing the works under hard circumstances and difficulties"*.

The Contractor also stated that the Engineer seems to:

1. *"Deliberately ignore the Law dated December 8, 2006 which clearly provided for an extension of all contractual time periods by more than 5 (Five) months."*

13 Jul 06 The Contractor stated in part that *"further to Clause 65 of the Contract Conditions, although we shall do our best endeavors to continue execution of the Works, we expect and until further notice, that site construction works will suffer major delays."*



29 May 07 The Engineer reiterates his position in the Engineer's Decision

20 Mar 07 The Engineer clarified:

The Contractor prepared his own assessment and evaluation to derive the agreed upon amounts. The Engineer did not mislead the Contractor as proclaimed by him since the Engineer is not responsible for preparing and carrying out the Contractor's duties.

The Contractor's submission was agreed upon by the Employer due to the urgency in finalizing this issue as the Contractor informed the Engineer that the supplier intends to travel abroad to purchase these trees and accordingly the submission was finalized as is. After more than a month of reaching the said agreement, the Contractor requested to revisit this issue noting that the Contractor has verbally informed the Engineer that most of the materials are already delivered. The Engineer rejected and expressed reservation re Contractor's statement "*this is a kind of fraudulent action which render our agreement null and void unless you reconsider your position and approve the additional amount of US.\$ 8,907.66 that was unlawfully deducted*" noting that the Engineer took the Contractor's own assessment as is with no modifications and confirmed the agreement reached with the Contractor in writing after consulting with the Contractor with respect to the terms of the agreement as noted in the above mentioned letter.

07 Mar 07 The Contractor replied as follows:

"We do not accept your answer and your rejection of our NPV-145.B. Our disagreement is based on how you apply the omissions and in particular BOQ item P: 2/13-W. The Employer requires only 19 Citrus Fortunella trees instead of the specified Pyrus Syraca trees whereby the drawings show 19Nr while the Breakdown of the Lump Sum shows 101 Nr. During negotiation the new plantation prices, we requested that you issue new drawings showing the new distribution of trees after the deleting 82 Pyrus Syraca trees and the locations where the 19 Citrus Fortunella are to be planted.

Since on the Original Drawings only 19 trees are shown to be provided, you cannot omit the total quantity of 101 that exists in the Breakdown of the Lump Sum. Your rejected comments proves that you have mislead us into errors by hiding these facts and ignoring the basic principle of the lump sum Contract that BQs are only used for payment and variations purposes and any quantity to be added or deducted has to be ascertained from contract drawings and not from the BQ and this is a kind of fraudulent action which render our agreement null and void unless you reconsider your position and approve the additional amount of US\$ 8,907.66 that was unlawfully deducted. Should you fail to accept, and insist on rejecting our NPV-145.B, then kindly issue an Engineer's Decision pursuant to Clause 67.1 of our contract conditions."

06 Mar 07 The Engineer rejected the Contractor's claim and referred him to Engineer's letter issued which reflects the agreement reached with respect to this subject.

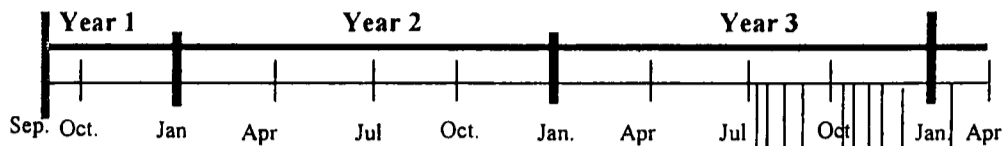
03 Mar 07 The Contractor submitted a revised notification of possible variation requesting an additional amount of US \$25,640.25 instead of the US\$ 16,733.00 agreed upon.

27 Feb 07 The Engineer accepted the variation and noted that the requested amount for varied works has been agreed to via the Engineer's letter.

27 Feb 07 The Contractor submitted a notification of possible variation requesting an additional amount of US\$ 16,733.00.

25 Jan 07 The Employer and the Contractor agreed to provide, furnish and install the revised scope of Planting Works and the irrigation for the terrace surrounding areas as per the Contract based on the following:

- 1. The Employer will pay the lump sum amount of \$16,733.00*
- 2. The above works do not entail any time implications on the Contract.*



22 Jan 08 The Engineer replied:

The Engineer's reply noted your obligations as included in the Contract. Such obligations are highlighted to protect the interest of every party under the Contract. Despite your objection and disagreement with such Clauses, we reiterate our stand on the applicability of such Contract Documents and subsequently your full compliance is required.

For example, item 1 of your letter is referring to interpretation of Contract Clauses 7.1.1.A and 12.1. It is the Engineer's duty to interpret such Clauses and our stand has been conveyed to you via several correspondences.

We also attach the Technical Person's reply which states "duct access doors" dated 18/01/08 for your implementation stating:

"What the contractor is stating does not relief him from all his obligations to provide what is deemed necessary by the technical person, and what is required from him through the Contract document. Moreover, the contractor's deduction that the technical person agrees that no access doors are required is totally not in place and hence not accepted"

14 Dec 07 The Contractor accused the Engineer of acting partially and breaching Clause 2.6 of the Conditions of Contract.

The Contractor added:

"Your reference to the Engineer's letter dated November 27, 2007 has no relevance. The Provisions of Clause 7.1.2 has nothing to do whether or not a duct access door is required for combined fire and smoke damper when its operator is located outside the duct.

a) The Technical person completely disregarded the fact that he did not request any access door neither on site during inspection of the MSFD mockup nor on the returned Field Inspection request. In addition in his fax message dated 31/07/2006, he instructed us to provide an access door where deemed necessary meaning that he agrees that no access door are required. This being true, then he cannot forget to inform the contractor that the installed mockup (done back in Nov. 2006) is missing access doors unless he is very sure that such access doors are really not required

The Technical Person completely disregarded what was mentioned in point (a) of our letter and his justification after 11 ½ month from the remarks issued on the approved as noted FIR 332 dated November 18, 2006 and hence his new stand is completely non understandable and rejected.

27 Nov 07 The Engineer reiterated his position and referred the Contractor, without limitation, to Clauses 7.1.1.A, 7.1.2, 7.3, 12.1 of the Conditions of Contract, Question No.11 in addendum No.2, Division I and Section 15820 of the Contract Specifications and NFPA 90A.

The Engineer added “the contractor’s interpretation of our letter dated 31/07/2006 is not accurate, the requirement of installing access doors is clearly indicated in the contract document. Moreover the contractor contradicts where the contractor was asked clearly in point 13 to submit the access doors for approval. Figure 4-6 from SMACNA attached to the contractor’s letter is typically for smoke dampers and not for combination fire smoke dampers where the access door is necessary for cleaning, testing and maintenance. The Contractor’s offered justification to avoid compliance with Contract requirements is not valid. The MFSD shall be installed as called for under the Contract Documents.”

15 Nov 07 The Contractor noted “we are rejecting your interpretation of Clauses 7.1.1.A and 12.1. Mistakes, errors or omissions in Tender Documents and Tender Drawings are the Employer’s responsibility and not ours. MFSD were installed in accordance with SMACNA provisions and standards in accordance with Specification 15820 Clause 3.02A. Figure 4-6 of SMACNA clearly state that “if the damper operator is located within the duct, an access door must be provided.” All dampers operators are located outside the ducts, hence according to SMACNA no access panel is needed. This is in line with the design intent where no panels are shown or detailed on the design drawings.”

The Contractor continued

a. The technical person remarks did not ask for any access door in the submitted field inspection request FIR 332 dated November 10, 2006 as a mock-up for MFSD installation.

b. Hundreds of MFSD were inspected during the course of work with out even the slightest remark of requesting an access door, while remarks are made on NCRs for minor issues of works such as paint patching or support leveling (such an important item should have not been overlooked by the technical person to the end of the job). We are being asked for an access door installation after 11 ½ month from the approved as noted FIR332 dated November 18, 2006.

The Contractor also requested to issue an Engineer’s Decision

26 Oct 07 The Engineer reminded the contractor to submit the necessary material submittal / data sheet for duct’s access doors that are required to be installed next to MFSD, as noted in NCR24 dated on Aug. 27/2007, on urgent basis.

23 Oct 07 The Contractor replied:

The mechanical fire smoke dampers are with external motors and external auxiliary switches, these not requiring access doors as per SMACNA installation standards and manufacturer installation.

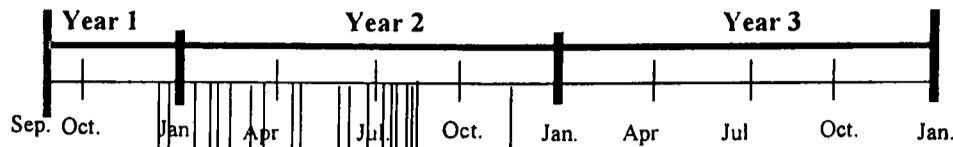
27 Aug 07 The Engineer issued a Non Conformance Report noting that “*Material Submittal (Technical Data Sheets) for access doors next to motorized fire & smoke dampers is not available. Refer to Specification 15820 section 2.04.*”

02 Aug 07 The Engineer noted that access doors should be used whenever deemed necessary.

25 Jul 07 The Contractor replied:

Duct access doors are not required as all fire smoke dampers do not require these doors as all FSD components are on the outside of the duct.

12 Jul 07 The Engineer noted that several major and important items are not submitted yet while works are progressing on site including, without limitation, Duct accessories (Canvas, access doors, etc...).



24 Nov 06 The Contractor notified the Engineer to issue an "Engineer's Decision" pursuant to Clause 67.1.

25 Jul 06 The Contractor noted that the submittals highlighted in his letter ref. 1322 were returned on 07/07/06 i.e. after 62 & 72 days of the receipt date.

22 Jul 06 The Contractor commented on the 22 remarks made by the Technical Person on the fire fighting Drawings and reserved his right to claim for all cost, time and abortive engineering cause by compliance with the "*revised fire fighting design*".

12 Jul 06 The Engineer noted that the submittals highlighted in the Contractor's letter were returned on 07/07/06.

10 Jul 06 The Engineer replied that:

The Contractor failed to comply with the Technical Person's instructions in not submitting credentials for the Professional Fire Protection Engineer whereas the Contractor's responsibility for designing the "Fire Suppression System" is clearly indicated in the *design drawings except for the two floor control valves*".

05 Jul 06 The Contractor noted that after several requests to expedite the reply on the submitted composite drawings for the basement level in order not to stop the E/M works, he did not receive the relevant submittals.

04 Jul 06 The Contractor stated that there is no need to submit any credentials for a professional Fire Protection Engineer and reminded that he is not responsible for the design of the fire fighting system and the hydraulic calculations. The Contractor also reserved his right on the capacity and performance of the fire pump since the Technical Person carried out the Hydraulic Calculations and determined the required flow of fire pump is 500gpm at 80m head whereas the Contractor has done the same calculation keeping the same pipe sizes unchanged and need a fire pump that is a lot greater than 500gpm.

The Contractor reserved his right to claim at least six months extension of time and related cost.

30 Jun 06 In order to mitigate the Contractor's delays and due to the fact that the Contractor also failed to abide by the Technical Person's request to submit credentials for the Professional Fire Protection Engineer prior to resubmitting any further documentation, the Technical Person carried out the Hydraulic Calculations and determined the required fire pump shall be: Flow = 500 gpm and Head = 80m. Accordingly, the Contractor was instructed to submit a fire pump which will meet the above criteria and in accordance with Section 13920 of the Contract Specifications.

27 Jun 06 The Contractor noted that he is unable to place the order for the fire fighting system although he has approved material submittals yet he doesn't have approved shop drawings. And he requested the Engineer's advice if he should delay the order until the fire fighting system's design is finalized by the Engineer or should he proceed with order based on his shop drawing.

07 Jun 06 The Contractor replied to the technical comments made by the Technical Person's on MAR and noted that the *"issue of professional engineer credential is not our concern, as the professional engineer is requested in the quality assurance to implement the designed fire sprinklers system that is already designed on behalf and paid for by the Employer and this is certainly not part of our contract scope."*

22 Apr 06 The Engineer replied that:

1) *"Upon receiving the first set of your drawings, we issued our letter instructing you to submit Hydraulic Calculations as you failed to comply with the Contract requirements in providing such calculations.*

2) *The Fire Fighting submittals referred to in your above referenced letter did not even include the basement part which is the only location that is going to be available for implementation of such related works on site. Moreover, the composite drawings (which included Fire Fighting) for the basement were forwarded for the first time in March 2006. Accordingly, the Contractor shall be solely responsible for related delays.*

Accordingly, the Contractor is responsible for initiating delays related to submittals.

4) *You shall note your failure to abide by your own schedule of submittals which was never respected and subsequently affected the organization and resource allocation of all involved parties in dealing with your unorganized approach in forwarding related submittals.*

5) *In spite of the fact that many of your submittals lacked the Contractual period as assigned in the Contract, we highlight the fact that several submittals were actioned in a very short period in order not to delay the works because of your failure to submit according to the Contract.*

6) *After the expiry period of the 126 days allocated in the Contract by an additional period of 150 days, we are still receiving submittals forwarded for the first time which again reflect your failure to comply with the Contract requirements.*

12 Apr 06 The Contractor provided the Engineer with a list of submitted construction drawings that were all returned as "revise and resubmit" status after 57-98 days. The Contractor reiterated his stand that although he is a willing to perform the calculation needed once he receives the requested information he holds the Employer responsible for *"unreasonably withholding / delaying issuance of your actions on our submitted construction drawings and for all extra quantities that are required but not indicated on the Tender Drawings."*

24 Mar 06 The Engineer noted that:

1) *" Our letter issued on 23/12/05 clearly instructed you to submit Hydraulic Calculations. Accordingly, our letter issued on 21/02/06 does in fact infer that it is the second time where instructions to submit Hydraulic Calculations are issued to you where up to date you failed to comply.*

The Contractor was referred to the sections of the specs that require him to provide the Hydraulic Calculations

Based on the above, the design requirements as expressed in Section 13925 (without limitation) of the Contract Specifications are part of the Contractor's Scope of Contract. Accordingly, the Contractor is solely held responsible for not complying with the Contract requirements as stated here above and all resultant delays (if any) which may have an impact on the Project completion date will be attributed to the Contractor.

In order to mitigate your noncompliance and as expressed in the Management Meeting held on 20/03/06, the Employer decided to provide the Contractor with attached soft and hard copies of the Hydraulic Calculations for guidance and information.

The Employer's action in providing the attached documents shall in no way relieve the Contractor of any of his liabilities and obligations under the Contract. ”

16 Mar 06 The Contractor informed the Engineer that the preparation of working drawing for the fire fighting system were stopped due to hydraulic calculation issue since management meeting No.6 held on 13 January 2006 and also have an impact on other mechanical works.

23 Feb 06 The Contractor stated that during management meeting No.6, the fire fighting hydraulic calculations issue was discussed and his interpretation of Specifications Section 13925 item 1.04.C *“does not mean that we have to submit hydraulic design calculations but to indicate on the Shop Drawings the hydraulic calculations done by the designer at the stage of the design”*. The Contractor also added the Engineer's quote *“again instructed us to submit the sprinkler flow calculations within 14 days”*, inferring that this is the 2nd time the Contractor is being instructed, is not true.

The Contractor concluded that since instruction were given to redesign the fire suppression system hydraulically he is ready to perform this design within a period of at least 6 weeks at a design fee of US\$15,000.00.

21 Feb 06 The Engineer noted that even though the Contractor stated that *“Hydraulic Calculations are not part of his scope of work”*, he is again instructed to submit the sprinkler flow calculations within 14 days.

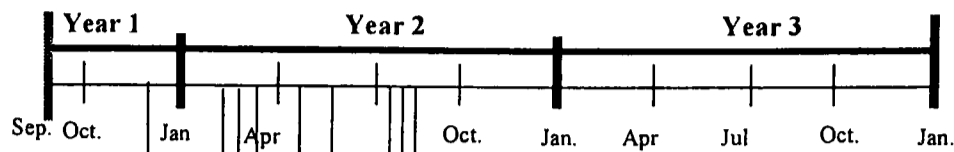
17 Feb 06 The Contractor noted that hydraulic calculations are not part of his contract and the act of withholding approval based on non submittal of hydraulic calculations is not in order.

10 Feb 06 The Contractor reserved his rights on the delay caused by the approval of Material submittals that are linked to the hydraulic calculations which are *“obviously not part of our contract and should be done by others”*.

13 Jan 06 It was agreed in the Management Meeting No.6 that the Engineer will further review this issue with the Consultant team and Employer, and conclude by next meeting.

30 Dec 05 The Contractor noted that there are no specific requirements or prerequisites for shop drawings or calculation of any kind for submittals. And once the shop drawings are completed pressure drop calculation will be done to check pump head value as requested by the tender documents. The Contractor added that *“only fire pump head is to be checked for actual head based on the approved submitted components mentioned above, and to be used in the system, and on layout changes if any, and as such these hydraulic calculations for the pump can not be done if the components are not approved or commented.”* The Contractor concluded *“Based on approval of system components, pressure drop calculation for pump will be done at a later stage and the pump will not be ordered unless head calculations are approved by the Engineer.”*

23 Dec 05 The Engineer instructed the Contractor to submit Hydraulic Calculations along with comprehensive and detailed shop drawings prior to issuing comments on fire fighting submittals.



19 Jul 07 The Contractor disputed the same requesting an engineer's decision..

19 Jul 07 Engineer fixed unit rates of 8 Nos. BOQ items affected by this VO according to the offer from the supplier and limited the main contractor OH&P to a 7% only applicable to the original rates of towel dryers instead of the new rates based on Employer's confirmation that agreement has been reached through higher management meeting.

06 Jul 07 Variation formalized via Engineer letter.

03 Jul 07 Modified specifications (white or chrome) are distributed between different bathrooms.

11 Jun 07 The chrome plated towel dryer Solea model by Acova is not approved for aesthetic reasons. As such, Engineer instructed Contractor not to proceed with procurement of this item until further notice whenever another model (white or chrome) is selected.

11 Apr 07 Variation formalized for the new requirements of chrome plating finish to towel dryers.

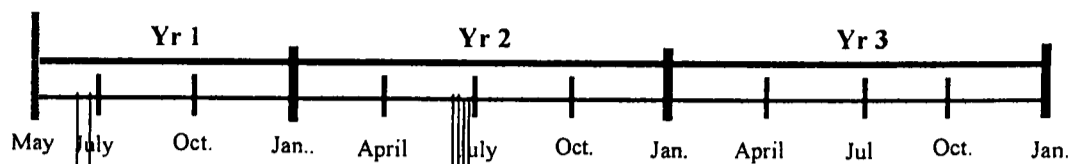
23 Mar 07 Engineer requested from Contractor to submit for approval, chrome plated towel dryers with certified combined heating systems along with the new rates.

27 Feb 07 The Employer decided to revert back to "Chrome Plating Finish" for the Acova Neptune towel dryers and suppliers confirmed the model is still being manufactured in the UK and can be procured accordingly.

08 Feb 07 Considering the heating capacity limitation of the chrome plated towel dryers, Engineer asked for material submittals of towel dryers with standard colors.

08 Feb 07 Supplier confirmed that Neptune chrome plated towel dryer is no longer manufactured by Acova. Contractor presented quotations for proposed alternatives but noted that the heating capacities required cannot be achieved by the range of chrome plated towel dryers.

26 Nov 06 Technicorp Towel Dryers were not approved as an alternative, Contractor was requested to resubmit using Neptune by Acova – chrome plated for Engineer's approval.



21 Mar 07 The Engineer refuses the request for approval of variation order stating that payment will be certified based on remeasured basis of final dimensions. However no request for cost implications regarding variation in type of louvers is accepted as the Engineer selected louvers on behalf of the Contractor as he failed to do the same. All delay implications will be held by the Contractor.

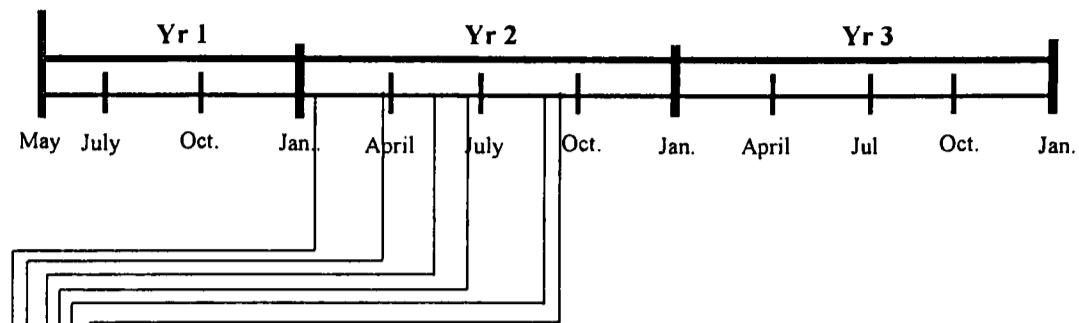
19 Mar 07 The Contractor sends a request for approval of variation order

16 Mar 07 The Contractor gives notice of possible variation stating their intention to claim for extra payment or a varied rate or price in respect of varied works pertaining to louvers at pitched roof

03 Mar 07 The Engineer sends a letter stating that after an unwarranted submittal time by the Contractor the Employer has instructed the engineer to instruct the contractor on how to proceed. Therefore the Engineer specified the appropriate type of louver that fits the intended location at the pitched roof

21 Mar 06 The Engineer rejects these louvers as they do not account for the special requirements of a pitched roof.

8 Mar 06 The Contractor submits a material submittal for louvers at roof



24 Sep 06 The Contractor disputes the same

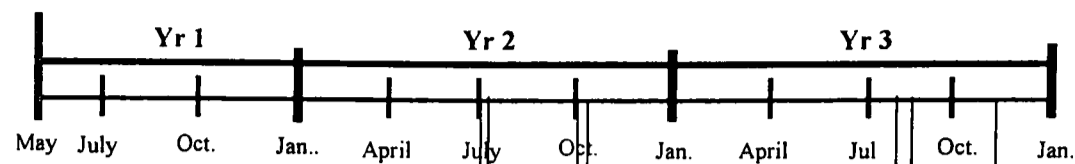
12 Sep 06 The Engineer assesses the additional cost at US\$ 555,805 based on prorate of contract unit rates

24 Jun 06 The Contractor sends a revised request for approval of variation order accounting for these additional changes and amounting to US\$ 1,163, 657.73

15 May 06 Further increase in capacities of chillers is introduced by the Engineer

24 Mar 06 The Engineer disagrees with the Contractor's reading of the specs. The Contractor sends a request for approval of variation order regarding the same

13 Jan 06 The Contractor sends a letter giving notice for an intention to claim extra payment and varied rate or price for the change in character of chillers from reciprocating type to screw type



06 Nov 07 The Contractor explained that during demolition of the building unforeseen conditions of the existing structure that included structural cracks to slabs, columns and beams. This necessitated the use of a new bracing system and the change in the nature of the works renders the contract unit rate set for demolition works inapplicable. The Contractor asked the Engineer to reconsider his position regarding the above subject matter.

28 Aug 07 The Engineer reiterates his position stating that this is not a cost plus contract where the contractor is entitled to claim for additional incurred cost.

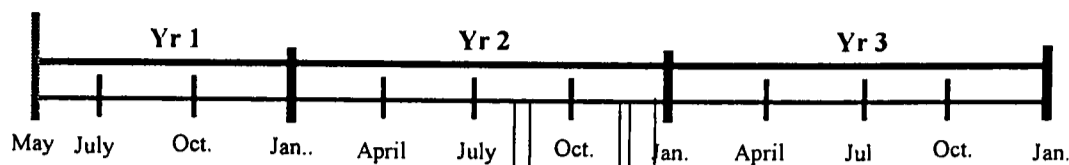
16 Aug 07 Revised request for approval of variation is sent revised RAVO sent

11 Oct 06 The Engineer states that the restoration of the existing building is the contractor's responsibility and included in the scope of contract works. Thus this request for variation order is not justified.

9 Oct 06 Request for approval of variation is sent

12 Jul 06 The Contractor sends a notice that he intends to claim extra payment due to these varied works.

06 Jul 06 The engineer sends revised structural shop drawings for building W. The facade of building W is to be strengthened and maintained.



The Contractor reiterates that he is in dispute

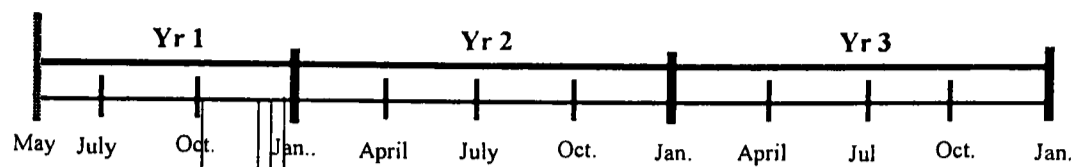
16 Nov 07 the Engineer states that the railing system in the specifications is stainless steel. And since the specifications have priority of drawings that specify these rails as steel, there is no variation order in the reply to the RFI. The Request for variation order is rejected.

06 Nov 07 the Contractor send a request for approval for variation order

06 Nov 07 the Contractor sends a letter of intention to claim extra payment for varied works

12 Sep 07 The Engineer replies that the same shall be in stainless steel as required by the specifications.

06 Sep 07 RFI is sent by the Contractor to clarify the type of material to be used for the supports of the required glass balustrades.



Till date an agreement has not been reached regarding the financial compensation since the employer is considering paying only a certain percentage of some of the war resulting delayed days.

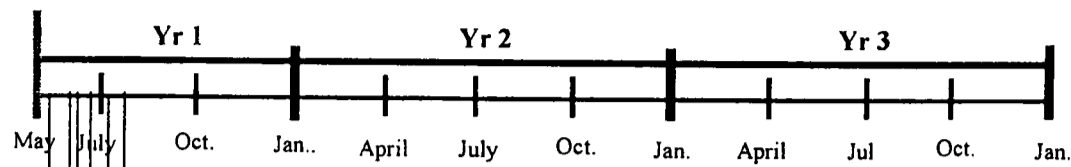
The time implication was resolved based on the window analysis that was agreed to be used by both parties. Regarding the cost implication, the engineer offered a fixed figure of US\$8500 per day for compensation.

Inspite of the fact that there is no insurance cover during the war period, the Contractor's engineering team began attending on site since 25 Jul 06 as indicated in the daily reports however:

- Working hours were reduced from 10 hrs per day to 6 hrs per day and in some days even less
- Working days per weeks were reduced from 6 days to 5 days and sometimes even less.
- The Risk taken by the Contractor's staff which put them in perpetual alarmed state.
- Disruption Working Environment
- Absence of some staff members who are living outside Beirut or in dangerous areas.
- The non-attendance and non-availability of subcontractors
- Some staff members left the country

The Contractor accordingly claimed for his entitlement to extension of time and cost implications.

The Contractor submitted notice for the stoppage of the Works due to Israeli War on the Republic of Lebanon. Although the Ceasefire was declared on Aug 14, 2006, the consequential disruption to Contractor's work continued including loss of productivity and shifting of external activities to the winter season. Due to the outbreak of war, all of the Foreign Labour determined to terminate their employment.



12 Jul 06 The contractor advised the Engineer that the reply to RFI 184 (replied after 55 days of enquiring the information) is delaying the related drainage works (ordering of material, external works, etc...). This was confirmed via contractor's letter.

7 Jul 06 The contractor stated that the engineer in his letter ref e provided the needed developed drawings for only a portion of the external works. The information contained within engineer's letter ref e introduced additional design changes to building interiors whereby, internal levels within shop areas were increased or decreased in excess of 12 cm in certain instances and increased road level by 15cm in certain areas. Once more, the Contractor re-requested the Engineer to issue complete developed design drawings for the whole of the external works to the same level of drawings and information included in drawings issues via ref e the Contractor further requested the Engineer to finalize his selection of the road pattern to be adopted noting that the Engineer's selection might have impact on location of floor drains and slopes.

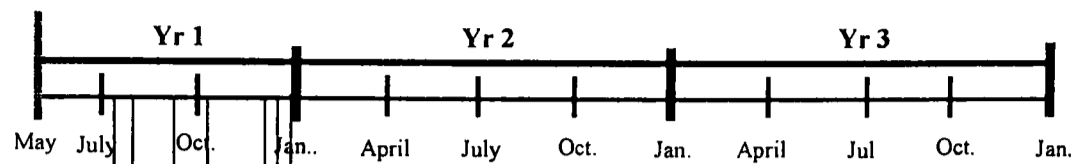
28 Jun 06 The engineer issued missing design information in regard of the external works.

28 Jun 06 The contractor stated that despite several reminders the Engineer's inaction of not issuing the requested design is causing disruptions and delays accordingly additional costs in regard of the external works, drainage layouts.

24 Jun 06 The Contractor requested a complete developed and coordinated workable general layout design drawings for the external works that can be used for the production of shop drawings. In addition the Contractor requested that he Engineer urgently issues a complete set of comprehensive coordinated developed drawings (even within the same trade) thoroughly checked by the Engineer inclusive all levels at drainage points and shop entries in order to mitigate any further delay to the engineering, procurement and construction of the works.

1 Jun 06 The Contractor confirmed that his ref a was stating pure facts

24 May 06 The Contractor summarized the delays and disruption encountered for the external works/drainage layouts since 05 Sep 05 and that the Contractor does not have in his possession from the Engineer developed and coordinated design drawings for the external works that be used for the production of shop drawings and would therefore request that the Engineer issue a complete set of comprehensive coordinated developed drawings in order to mitigate any further delay to the engineering, procurement and construction of the works.



It is worth mentioning that the above subject has been dragging from the early stages of the Project and still is subject to changes of material design.

30 Oct 06 The Contractor clarified that the Contractor is raising his concerns related to Engineer's issuance of incomplete design information, finalization of the design during the Progress of the Works and the continuous issuance of design changes.

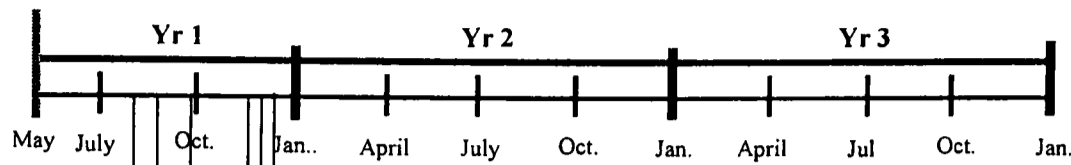
10 Oct 06 The Engineer approved the finishing, however requested the Contractor after 60 days from his instruction of specifying the granite stone as Nero Africa to submit the same finishing in polished Grisio Scuro stone.

07 Sep 06 The sample submitted was amended by the Contractor according to Engineer's comments and resubmitted.

07 Sep 06 The Contractor based on the above instruction of the engineer, submitted the MAR upon which the Engineer approved the material and commented the finishing of the sample submitted.

09 Aug 06 The Contractor in order to proceed with the works, requested the engineer, via RFI M to determine the relevant missing information. The Engineer via his reply to the same, specified the granite stone to be Nero Africa 3cm thick.

23 Jun 06 The Engineer instructed the Contractor to replace the yellow grey granite stone type Patmas, noted to be the same via letter ref. a with black granite stone upon which the surface finish nor the thickness were specified.



The Contractor claimed that the engineer coordination team was unable to provide timely reviewed comments on the contractor's submissions including a large number of drawings reflecting the modifications of the detailed design. Consequently Contractor claimed that this inaction from the part of the engineer caused:

- Delayed orders for long lead items
- Delayed orders for other materials
- Delayed mobilization and procurement
- Increased cost of raw material
- Prolonged equipment duration on site

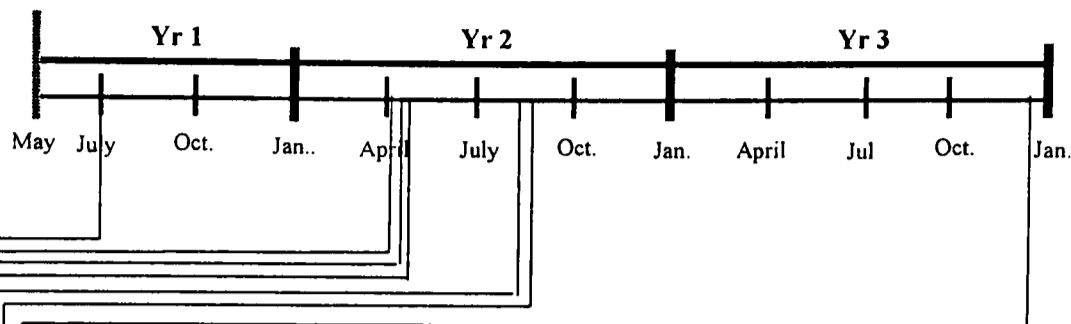
The Contractor claimed that the engineer failed to reply within the consented period allowing ample time for review or holding back its replies in anticipation of forthcoming changes/variations or revision to the Works.

The Engineer stated that the Contractor has failed to abide by the schedule of submittals in the programme.

The contractor claimed that the Engineer has given consent on the program of Sep 30, 2005 a period of 12 working days as reasonable for reply of electromechanical submittals and 6 working days for remaining submittals.

The contractor has been weekly issuing to the engineer logs of outstanding submittal for engineer's review clearance and lists of priority submittal request.

Specification states that the Civil and Architectural shop drawings submittals shall be replied in a reasonable time, and the Electrical and Mechanical shop drawings shall be replied in a period of 2-3 weeks.



17 Dec 06 The contractor through his global claim claimed that the above has caused disruption delays to the fabrication and execution of the scope to the above item, accordingly the Contractor requested the Engineer to issue an updated aluminum schedule showing the exact location of each material in order to be able to proceed with the submittal process and to adequately assess the cost impact keeping in mind that this is the third time that this item has been changed

29 Aug 06 The engineer via his reply to MAR again changed the aluminum composite panel to silver anodized aluminum sheets except for Blocks A & B.

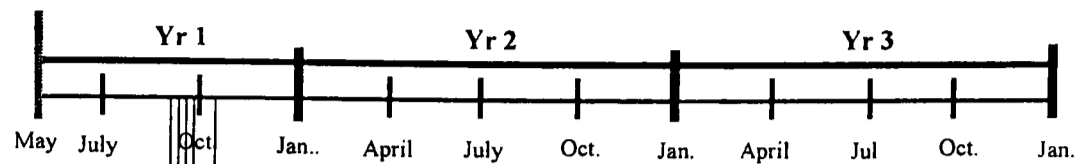
16 Aug 06 The Engineer deleted the aluminum composite panels at Block A & B.

12 Apr 06 The Engineer corrected the reply to MAR dated 9/12/05 16/12/05 (after 154 days from the date of submittal) to read "approved as noted" and requested a fixation system to be submitted.

5 Apr 06 The Contractor after reviewing the latest revision of Architectural Design Drawings received via several references on different dates, advised that there is no change to many locations of aluminum panels at Blocks A, B, & C as indicated on design drawings. Consequently the Contractor requested the Engineer to specify whether the aluminum panels are deleted and replaced by paint only in Blocks D & F and if they are to be maintained in specific locations determined by the Engineer.

18 Apr 06 The Engineer via his reply to MAR dated 20/12/05 (after 119 from the date of requesting the information) stated that the aluminum composite panel was replaced by paint and plaster according to the new issued drawings.

16 Dec 05 The Engineer replies to MAR dated 9/12/05 and deleted totally the aluminum composite panels.



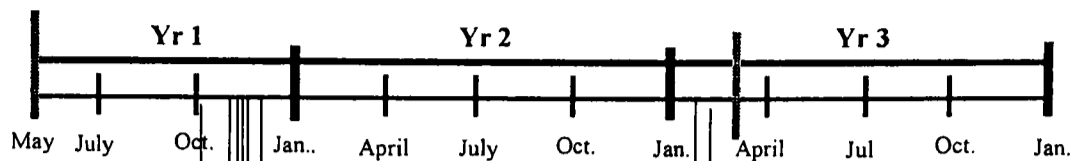
10 Oct 06 A notification of possible delay was sent

29 Sep 06 A notification of possible variation was sent

28 Sep 06 The contractor disagreed with the Engineer's contents of his letter of 25/9/06 and further advised that it is Engineer's responsibility to ensure coordination and resolution of all design deficiencies raised by the Contractor through RFIs. Accordingly, the Engineer should have coordinated his design prior to issuing the floor drains location, which have been dragging since the early stages of the Project.

25 Sep 06 The Engineer noted that the drain relocation is due to the existence of the expansion joint which could have been easily detected by the Contractor should the latter proceeded with the coordinated shop drawings.

21 Sep 06 The Contractor advised that he is to re-check the slopes, reservation, routing, etc... of the newly instructed drains locations and then to proceed with the tiling and drainage layouts accordingly. Again the Contractor requested that the Engineer is to issue a complete developed coordinated design-resolution, particularly with the drainage related requirements (such as but not limited to FD locations, types, reservations, routing, etc...) in order not to delay further the execution of the works.



10 Mar 08 The Contractor confirms that further delay and disruption to the program of works occurred by virtue of the ID Designer's verbal instruction to delete waterproofing treatment to the lobby of 28th Floor.

2 Mar 08 The ID designer issued verbal instruction that the deleted marble flooring to 28th Floor was to be replaced with ceramic tiles that were to cover the majority of the 28th Floor Restaurant area. This verbal instruction was confirmed by the Contractor who issued an NPV.

3 Mar 08 the Contractor received verbal instruction from ID Designer to construct a 200mm thick block wall (plastered both sides) on the 28th Floor perimeter. The Contractor confirmed this verbal instruction by the issuance of an NPV. The Engineer did not refute this verbal instruction.

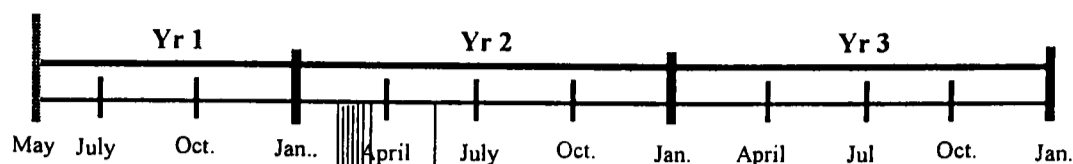
7 Mar 08 Following the instruction to relocate panel boards on the 28th Floor the Contractor confirmed this instruction by the issuance of an NPV.

3 Mar 08 The Engineer requested the Nominated Subcontractor to submit installation detail shop-drawings that would obviate the Engineer's duty and responsibility to issue a design. The relocation of the electrical panel boards required demolition and addition of block walls, an operation that was to cause delay and disruption to this partially completed area.

1 Mar 08 it was found that the electrical panel boards to the 28th Floor were causing an obstruction in the new proposed corridors and therefore the MEP Subcontractor suggested that these be relocated in order to remove such obstruction. A Request for Information was sent requiring the Engineer's urgent decision regarding the Subcontractor's proposal.

22 Feb 08 The Engineer confirmed that the required information had been supplied by an annotated note on Submittal 500-SD-20.

10 Jan 08 The Contractor issued a Request for Information in which he requested details of the means of access to the upper Roof Level of the Tower.



22 Jun 08 The Contractor presented a claim stating that the Engineer has yet to respond to the rates and prices submitted. The significance of this additional work is not only the lateness of the instruction and the time necessary to execute the varied work but also the disruptive affect it has on completion of work to other Floors. The Raised Flooring requires the transportation of approximately 150m³ of 'wet trade' materials via the 'back of house' access and thereafter vertically by means of Elevator No.8. Clearly the back of house works could not be completed whilst this additional works were under construction. Likewise all finishing works to 27th and 28th Floors were suspended during the Raised Flooring operations as the dust, dirt and other deleterious material so generated would undoubtedly affect such final trade works.

22 Mar 08 In response to the Engineer's allegations that the HOURDI Blocks were readily available on the local market, the Contractor inquired of all local suppliers and found that indeed blocks of the sizes specified were not available locally. Accordingly the Contractor confirmed that the HOURDI Blocks of the size required by the Engineer were not available. The Contractor proposed alternative sizes that were the subject of a further quotation which had been issued in a separate NPV. In order to expedite matters the Contractor proposed proceeding with these works on Site in anticipation of the Employer's acceptance of this quotation.

23 Mar 08 The Contractor forwarded further revised rates and prices for the raised flooring that was required on the 2nd, 27th and 28th Floor levels. These rate and prices including additional mortar bedding and dry mix sand and cement topping.

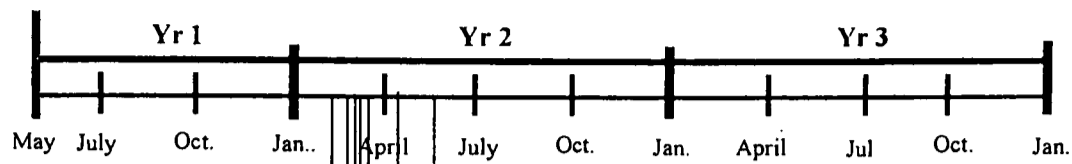
17 Mar 08 The Engineer subsequently confirmed the requirement for Raised Flooring to 27th and 28th Floors.

16 Mar 08 Although the Engineer's letter referred to both 27th and 28th Floors, there was some confusion as to the actual requirements of the Employer. So the Contractor requested clarification that the 40cm raised flooring was required for the 28th Floor only.

16 Mar 08 The Engineer instructed the Contractor to proceed immediately and in so doing refuted the 20 days delivery period as he was of the opinion the blocks were readily available.

15 Mar 08 The Contractor responded where he provided said breakdown and in so doing made note that mosaic tiling did not form a part of the submitted price. The letter concluded by the Contractor confirming that there would be a delivery period of 20 days for the HOURDI Blocks, this commencing from the date of instruction to proceed.

7 Mar 08 the Engineer requested quotation for varied works for raising the floor by using Hourdi Blocks, the Contractor was requested to provide a detailed price breakdown for the Employer's consideration.



22 Jun 08 the Contractor submits a claim stating that he is still unaware as to the Employer's requirements regarding the fireplaces. Accordingly, the Contractor is unable to coordinate the finishes in the location of the open fireplaces to the extent he considers this work to be suspended.

4 Apr 08 the Engineer gave verbal instruction to replace the previously instructed 150mm stainless steel exhausts for the fireplaces with 250mm diameter black steel exhausts pipes. The Contractor confirmed the same in a letter. As a result of this late instruction the Contractor would require significant additional time in which to procure the black steel flue pipes and thereafter fabricate, deliver and install same to the design he was still awaited as at the date of this submission. The letter also confirmed that the previously instructed stainless steel pipes had already been delivered to Site and thus instruction was requested as to where the Employer wished to take delivery of said pipes as the supplier refused to accept return of this specialist material.

23 Mar 08 the Contractor received the ID subcontractor's confirmation of the verbal instruction they had received directly from the ID designer to the effects that fireplaces at 25th and 26th Floors had been removed from their scope of work. The Contractor forwarded the ID subcontractor's letter to the Engineer and requested confirmation of the instruction. In so doing the Contractor again issued a request as to whether or not he should proceed with structural openings for flue pipes, the material for which had previously been delivered to Site by the MEP Nominated Subcontractor.

23 Mar 08 the Contractor confirmed the Engineer's verbal instruction that the coring was to proceed and the openings were to be changed to 350 mm in diameter in order to allow sufficient insulation between the stack and the concrete edge of the floor slab.

22 Mar 08 The Contractor repeated the request for instruction regarding the coring as the ID Designer had advised the ID subcontractor that the Employer was contemplating removing the fireplaces from the ID subcontractor's scope of work. The letter concluded by requesting the Engineer's instruction regarding the requirement for the fireplaces and the coring of the slabs for the exhausts.

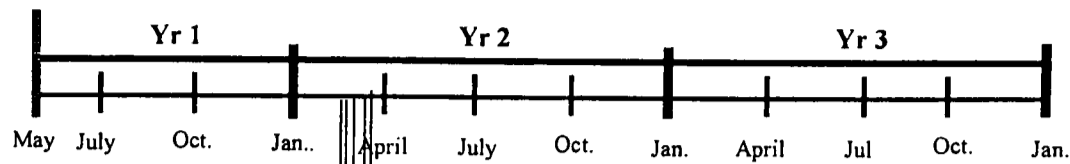
18 Mar 08 The requirement for live fireplaces necessitated the coring of the reinforced concrete floor slabs in order to facilitate the flue stack system that passed smoke out of the suites. The Contractor provided information from his Subcontractor regarding the coring of the slab and the subsequent integrity of the slab should the coring take place.

The letter concluded by requesting from the Engineer further instruction whether or not to proceed with the coring.

8 Mar 08 A variation order was issued for changing from false fireplaces to real/live fireplaces which confirmed that the ID Nominated Subcontractor would require 20 days additional time from the date of approval of their commercial offer and 'shop / working drawings'.

18 Feb 08 This point was confirmed by the Engineer again.

18 Feb 08 The Contractor was informed that the ID Nominated Subcontractor would execute the construction and installation of fireplaces with the hoods and exhaust pipes being provided and installed by the MEP Nominated Subcontractor.



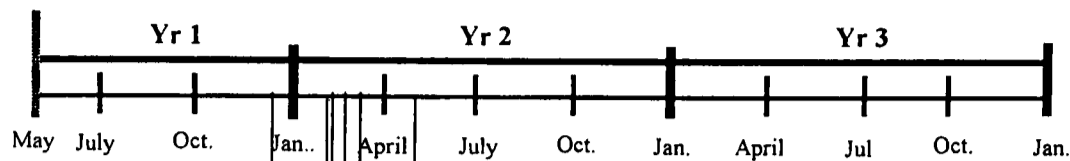
19 Mar 08 The Engineer responded and confirmed that the Employer was prepared to pay only US Dollars 25,000.00 as against the US 33,536.00 which the MEP Subcontractor had quoted.

10 Mar 08 The Contractor forwarded a copy of the MEP Subcontractor letter of 7th March 2005 that contained a quotation for this additional works.

27 Feb 08 The Contractor did not agree with the Engineer's position as the instruction to carry out this additional work clearly constituted a Variation as per the Conditions of Contract.

22 Feb 08 Considering the new Kitchen and Bar to be a late variation the Contractor sent an NPV regarding the method of payment for this additional/varied work. The Engineer confirmed that the additional works were to be treated as remeasurement and thus he did not consider his instruction to constitute varied work.

21 Feb 08 The instruction to proceed with the kitchen required various modifications to the previous design as confirmed by the Contractor's letter that pointed out design deficiencies and requested information as to how to proceed with these varied works.



22 Apr 08 the Contractor submitted the claim that he has not yet received such formal approval but none-the-less he has proceeded with the works in anticipation of same. A review of the documentation on this issue gives clear indication that this variation had been contemplated as long ago as November 2004, this point being deduced from the Engineer's rejection (unreasonably) of the façade subcontractor's shop drawings for the Restaurant and façade under the pretext such detail did not confirm with the Contract requirements. This rejection was seen to be an attempted camouflage of the pending variation and an attempt to make the shop drawing the cause of the delay when in reality it would be the variation.

15 Mar 08 Further information was provided by the Aluminum subcontractor in respect of the works in the restaurant they gave a date 15th April 2005 for glass installation, this on the understanding that the glass would be received from the supplier by 10th April 2008.

5 Mar 08 the Contractor had not received formal approval to proceed and thus wrote to the Engineer requesting his formal approval to proceed in the manner agreed at the meeting of 18th February 2008.

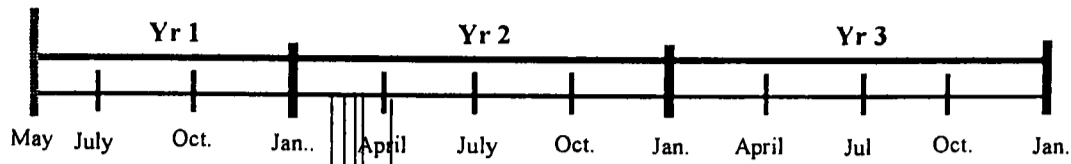
23 Feb 08 The Contractor confirmed that the requisite instructions had been received and that fabrication of the façade to the Restaurant was proceeding.

22 Feb 08 Having been criticized for not expediting the façade works, the Contractor responded to the Engineer explaining the cause of delay to be:

- The modifications of the facade first from doors, to concave glass then subsequently to convex curtain walling.
- The instruction of 30th December 2007 to change the façade to "lift and slide doors"
- The instruction issued on 9th February 2008 that 'fixed panels' were to be changed in to "sliding"
- Requirement to change the connections between the steel structure, a change that required a more elaborate detail

The Contractor concluded this letter by confirming that all outstanding issues and requirements as to outstanding information had not been received until 18th February 2008, this at a meeting between the Employer's ID Designer and the specialist Nominated Façade Subcontractor.

24 Dec 08 The Engineer gives an instruction to incorporate the previously designed terrace into the Restaurant such that it formed part of the Restaurant itself.



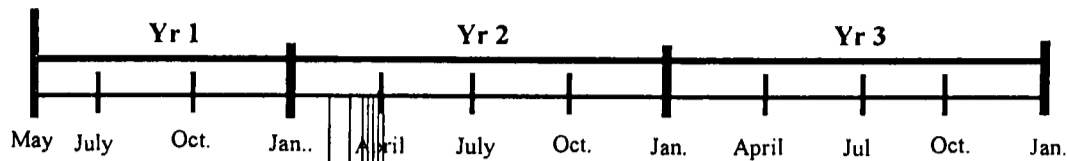
2 Apr 08 The Contractor confirmed that this further late information constituted a failure and / or inability of the Engineer to provide information within a reasonable time. Furthermore, the letter confirmed that at that time the wall outlet modification were still not known and thus the Subcontractor could not proceed without a comprehensive layout being issued by the Engineer.

25 Mar 08 The Nominated Subcontractor's letter was forwarded to the Engineer by the Contractor requesting the review and the approval of the costs in order to allow the works to proceed. Accordingly the Contractor considers this to be an event that fairly entitled him to an extension of time. The letter concluded by requesting the Engineer take this matter into consideration when determining the additional time to which the Contractor was clearly entitled.

22 Mar 2008 the Contractor forwarded a copy of the MEP Subcontractor's letter that confirmed the variation to lighting works were minor, but that those in respect of the Audio Visual works requested by the supplier were completely new and would require openings in the false ceiling and chasing walls for installation of new conduits for speakers and volume control stations.

1 Mar 08 Notwithstanding the fact the Contractor had given earlier notice of delays for the additional lighting works requested, the ID Nominated Subcontractor raised, NPV that confirmed not only his price for carrying out the modified works but also stated the delay would be 25 days commencing from the date of approval of the price

20 Feb 08 The Engineer provided an A3 size sketch upon which there were manuscript annotations indicating the Employer's requirements.



2 Apr 08 The shortage of labour has had a significant effect on the critical finishing trades as recorded by the Contractor in respect of Tent construction and also in respect of interior decoration specialist works.

1 Apr 08 The point was further confirmed in the Contractor's letter under cover of which the Contractor forwarded four letters from various Subcontractors each of which explaining the difficulties they were encountering with regard to shortage labour and in particular, the effect this was having on their programme of works and consequential delays due lack of productivity.

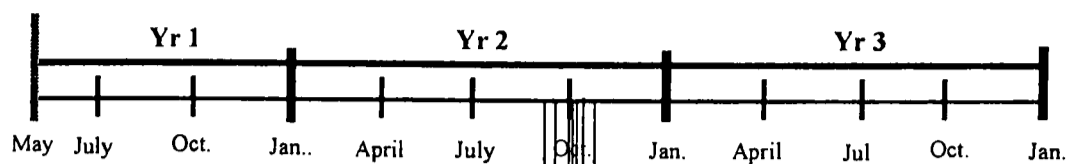
25 Mar 08 An example of such unrest took place when there was fighting between Syrian and Lebanese labour. This problem worsened the next day when around 50 site labours were involved in similar clashes. As a result of these events the Contractor lost at least a further 100 site operatives that afternoon and more during the days that followed.

24 Mar 08 This tension has led to civil unrest throughout the country and it has been experienced first hand on the Project Site. The Contractor's has been endeavoring to secure additional labour by means of offering incentive payments. Whilst having initial success, the end result was that it has not proved an effective solution to the problem, particularly as differentials in payment between Lebanese and Syrians exacerbates the political tension that already exists in the country.

23 Mar 08 The Contractor endeavored to supplement the workforce from Syria with those from third world countries, an action introduced in order to mitigate the inevitable delays from shortage of workforce. The efforts to recruit Indian labour workforce were prohibited by Lebanese labour laws.

15 Mar 08 In addition to the fluctuations in level of labour, there was the special circumstance where the people of Lebanon were called to a rally / demonstration in Beirut on 14 March 2005. Although the record showed that there were over 700 workers on Site that day, the truth of the matter was that the majority merely reported for work and thereafter departed to attend the rally. As a result there was no productive work on the 14th March 2005.

March 08 From the Report for March 2008 it can be seen that the average manpower for the month was 874 as opposed to 1646 on the day of the assassination. This represents a drop of 47%, the slight improvement being the result of efforts and incentives offered by the Contractor to secure additional manpower to replace those who departed. The Contractor also claimed that the numbers of manpower fluctuated from day to day with the result that the productivity that would normally be expected from such a level of manpower, was further reduced owing to the disruptive nature and the uncertainty of manpower availability, both in terms of numbers and quality.



21 Oct 08 the Contractor submitted a copy of electrical subcontractor quotation concerning the cost for the required Medium Voltage cable between the EDL and transformer rooms for Engineer's approval.

10 Feb 08 the Contractor informed the Engineer that the unloading & placing of the EDL cells inside the EDL room is not part of his scope of work and thus proposed the amount to be charged to carry out this work.

7 Feb 08 the Letter of Credit was issued with an Expiry dated 18th June 2008.

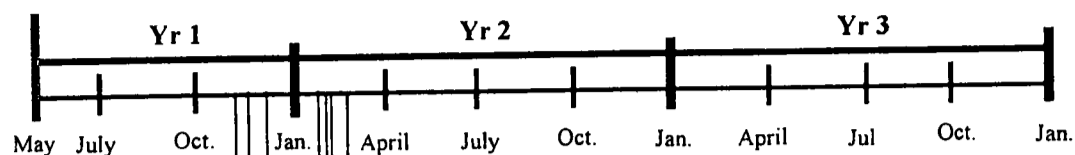
3 Feb 08 the Engineer confirmed the scope of works for each activity requested by the Contractor.

3 Feb 08 the Contractor recorded all the events related to this issue and stated that the transformer specialist refused to submit the shop drawings on grounds that they were not stated nor required by their offer and that in the absence of the requested confirmation concerning their scope of work, the Contractor instructed electrical subcontractor to carry out the remaining works based on the Engineer's verbal confirmation. In addition, the Contractor stated that there were still some other conditions unclear from the Employer (i.e. insurance during transportation), and asked the Engineer to advise him about the date by which power will be available from EDL.

2 Feb 08 the Contractor informed the Engineer that he was proceeding in opening the LC for the transformer specialist, noting that the delivery date will be after 16 weeks from the LC notification. Therefore, the completion date for the EDL Room would extend to June 2005.

22 Jan 08 the Contractor confirmed that he was preparing the agreement with the transformer specialist and asked the Engineer to confirm the scope of works for each activity.

17 Sep 08 the Engineer instructed the Contractor to proceed with EDL room cells as per transformers specialist attached offer.



3 Mar 08 the Engineer instructed the Contractor to proceed with the installation of the fire rated glazed door in Zone 2 of basement 3 according to the issued drawings.

28 Jan 08 the Contractor asked the Engineer to advise him if the fire rated doors in basement 3, Zone 2 are still required.

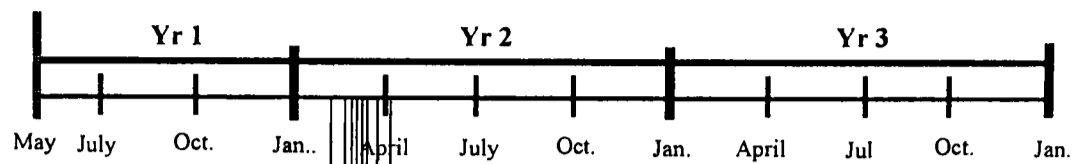
27 Jan 08 the Engineer replied that these items were no longer required and requested the Contractor to proceed with the original design.

19 Jan 08 the Contractor informed the Engineer that this area was 'on-hold' waiting for his instruction to proceed, whether with the previous design or with the newly introduced fire rated items, since he did not reply regarding Façade subcontractor & door subcontractor's offers.

4 Dec 07 the Contractor submitted a copy of Façade subcontractor offer for Engineer's review & Approval, noting that the Delivery and installation Period for these items is 10 to 12 weeks after confirmation of offer & shop drawings approval.

18 Nov 07 the Contractor submitted a copy of door subcontractor offer for Engineer's review & Approval.

1 Nov 07 Upon the Contractor's request, the Engineer issued 5 A3 drawings showing the requirements of 2 hours fire resistant system in basement 4



2 Apr 08 The Contractor acknowledged this instruction and confirmed the lateness of the additional information constituted an event which fairly entitled him to an extension of time.

31 Mar 08 The Engineer's forwarded all agreed setting out dimensions to which ID subcontractor were required to work.

21 Mar 08 The Contractor considered the Engineer's response inadequate and requested a comprehensive response to his previous requests for information/instruction. In so doing the Contractor reminded the Engineer that all communications ought to be through the Main Contractor in order to avoid confusion and problems with communication and coordination. This practice of the Employer and the Engineer giving unconfirmed instruction directly to Subcontractor's had been prevalent throughout the currency of the Works and had caused many problems with coordination and rights to payment.

20 Mar 08 The Engineer responded to the aforementioned two letters where he confirmed that the requisite information had been passed directly to the ID subcontractor during various meetings, the dates of which he conveniently omitted to mention as this would have demonstrated delayed release of information necessary for the proper performance of the Works.

10 Mar 08 the Contractor confirmed the suspended gypsum ceiling to the 26th Floor was effectively "on hold" as the furniture Contractor had not provided information regarding the wall paneling thicknesses.

7 Mar 08 there was confusion regarding the lack of detail in respect of the relationship and finishing between ceiling and the wall claddings. The Contractor requested clear instruction as to how he was to proceed. In the aforementioned letter the Contractor also confirmed that similar information in respect of the 26th Floor was at that time outstanding and that this information was required as a matter of urgency if further delays were to be minimized.

5 Mar 08 This request for information was followed by a meeting held in the Employer's Interior Designer's office at which ID subcontractor were presented with a key plan of the 25th Floor that showed locations of wall panels for differing thicknesses and to which the ID nominated Subcontractor was required to accommodate when installing the suspended ceilings.

25 Feb 08 The Contractor requested the Engineer to instruct the furniture Contractor to complete installation of bulkheads above cupboards, the lack of which was preventing closure of the false ceiling by ID nominated subcontractor.

Appendix H: Analysis of Dispute Cases

CASE ANALYSIS		Project: A
Case No.: 1	Subject: Lift Overhead	Section: Mechanical-Lifts
<p>Synthesis:</p> <p>The designer specified the exact type of lift machine that will be installed at the top of the high-rise building given the fact that the building height has been approved by a presidential decree and is as such a very critical issue:</p> <ol style="list-style-type: none"> 1. there is no tolerance for exceeding building height 2. as a lift in a high-rise building with a high speed reaching the last floor, lift is known to required an overhead clearance especially if the lift machine is to be above the room that will required even more machine height <p>In spite of the above and the fact that the lift in this case can not be possibly executed, <u>it was specified clearly stating the type of machine, its capacity and its speed which can not be met given the building height limit.</u></p> <p>The Contractor upon signing the Contract is deemed to have checked the contract documents including <u>the permit file.</u> As such the Contractor should have checked the lift overhead issue on such a critical subject. Moreover, <u>the lift subcontractor should give special attention to this lift that is reaching the last floor of the high rise building.</u></p> <p>The Contractor did propose an alternative machine above for this lift. The Contractor should have raised the concern/warning clearly stating that the original <u>specifications can not be executed.</u></p> <p>The Engineer upon inspecting the RFI that dealt with all the lifts together made a general statement at the cover of the RFI that Contract should adhere to specs requirement.</p> <p><u>No comment was made to the machine side above proposal and as such:</u></p> <ul style="list-style-type: none"> - the Engineer did not invest time checking details of RFI and accordingly did not notice the problem - the Engineer did not speculate why an alternative was being proposed. - The Engineer did not inquire the Contractor for an explanation <p>By providing such a general comment as a reply the Engineer did not feel the need for proactive attitude and vigilance as the execution of the works falls under the Contractor's liability.</p>		<p>General Observations:</p> <p>Design error</p> <p>Permits regulations</p> <p>Late intervention by subcontractor</p> <p>Not achievable requirements</p> <p>Failure to notice technical problem</p>

<p>Contractor proceeds with submitting shop drawings 1 year from the RFI reply. At this point the Contractor does not raise concern regarding the overhead issue for which he had previously proposed an alternative solution. <u>This 1 year lag between sending RFI and submitting shop drawing is not justified. Coordination on this subject was put on hold for a long period which shows bad internal management on the Contractor's side.</u> The shop drawing has <u>mistakes in calculating heights and as such indicated wrong levels.</u></p> <p>The Engineer approves the same not noticing overhead problem or mistake in calculating levels.</p> <p>Contractor resubmits roof drawings due to modification in structure.</p> <p>Contractor sends another RFI stating that the building height will change.</p> <p>From the time the RFI highlighting the problem is sent 5 months are spent till the solution is reached among the parties. During this period each party looks for contractual readings to put the blame on other party.</p> <p><u>Instead of having a workshop to resolve the matter as it was finally done different unachievable /impractical solutions are proposed.</u></p> <p>The Employer representative accepts the alternative solution where it is the technical Engineer's duty to find and advise on such decisions. The Contractor submits an NPV with the details of the additional cost incurred. The Engineer rejects the same.</p>	<p>Lack of proper management/monitoring by the Engineer</p> <p>Human error/negligence</p> <p>Lack of cooperation Lack of experience</p> <p>valuation of variation</p>
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Areas of risk (as categorized by Zack, 1996) identified in this case analysis:

<p>Impracticality/impossibility Subcontractor or supplier failure Delay and Disruption untimely responses Coordination Permits and Licenses</p>	<p>The contract design wan not achievable The Subcontract failed to identify the problem The lift problem delayed the pouring of concrete at roof The subject problem dragged for a long period The drawings were not well coordinated between trades The building permit did not allow for additional building height</p>
<p>Changes</p>	<p>The Contractor considered the new solution reached as a variation</p>
<p>Defective Contract Documents</p>	<p>The original design did not satisfy permit regulations</p>

Behavioral Observations:

- There was a tendency to evade responsibility by blaming the other
- Both parties were negligent in their behavior

CASE ANALYSIS		Project: A
Case No.: 2	Subject: Façade False Ceiling	Section: Finishes
<p>Synthesis:</p> <p>The Brazilian cherry wood was used as the basis in the cost savings exercise so it was clearly the option that the Contractor priced and still <u>the addendum as drafted by the Engineer was not clear</u> in this respect specifying 3 different options when it was the cheapest one i.e. "the Brazilian cherry wood" that was priced.</p> <p>The Contractor argued that even where the Contract specifies 3 options, the Contractor would be meeting the requirements by providing any one of the 3 options as long as the material submitted is to the Engineer's approval.</p> <p>The Engineer's reading of the contract was biased toward's the Employer's choice of wood on the premises that the Engineer could choose any of the three options and approve it accordingly.</p> <p>The Engineer rejects the NPV on the basis that the Contractor is not allowed to any variation in this respect and even reiterates his position.</p> <p>From the time the NPV is raised, 5 months are spent until the cost implication aspect is resolved through direct contact between the Contractor and <u>the Employer who accepts to</u> consider it as a variation order.</p>		<p>General Observations:</p> <p>Contract Document unclear</p> <p>Influence by the employer</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Cost Escalation</p> <p>Defective contract documents</p> <p>Interpretation of requirements</p> <p>Changes</p>	<p>Cost escalation increased the problem in this case</p> <p>The Contract documents should have specified the type of wood that was priced during the value engineering</p> <p>Notwithstanding the defective contract drafting the interpretations of the 3 options set was disputed</p> <p>The Contractor considered the Engineer's request as a variation</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer reiterates his position although this matter is not clear in the Contract. - The Employer accepts what the Engineer has rejected. 		

CASE ANALYSIS		Project: A
Case No.: 3	Subject: Procurement of new material	Section: General Reqmts
<p>Synthesis:</p> <p>The agreement reached for the mechanism of issuing late variations that are to be assessed on market rates clearly shows that there was a positive coordination attitude among parties.</p> <p>The Contractor accepted to have the late variations on the basis that it will not result in incurring loss.</p> <p>The Engineer considered that the Contractor should do due diligence in proceeding with buying the material specified in these variation. <u>Late procurement will result in incurring extra cost</u> for which the Engineer will have no control if the Contractor delays buying them. However, the Engineer <u>didn't explicitly state the Contractor's procurement time</u> allowed at the time original agreement was reached but in assessing new market rates allowed for 1 month. As such the variation was calculated at the <u>market rate one month after the issuance of the VO</u>. The Contractor's claim that some items are difficult to <u>procure in a month</u> time might be a valid reason and should be examined by the Engineer.</p>		<p>General Observations:</p> <p>Price escalation</p> <p>Contract Document unclear</p> <p>validity/ Assessment of variation</p> <p>Submittal Schedule</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Cost escalation	Again due to the continuous cost escalation and the change in exchange Euro rate for most of the items procured from Europe led to increasing the effect.	
Changes	There was a large number of variations because the ID was requesting new design material for each apartment separately.	
Defective Contract Documents	The Contract Documents didn't state the period.	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - An agreement was reached. However, the Contractor didn't accept to incur the losses resulting from late issuance of variations. - The Engineer insisted on the one month period as a reasonable time to make the coordination necessary and place the order. 		

CASE ANALYSIS		Project: A
Case No.: 4	Subject: Façade glass	Section: Façade
<p>Synthesis:</p> <p>Façade details were raised in a <u>workshop meeting held after 14 months</u> in a 30 months contract, this issue given its criticality and that it is not clearly specified in terms of frit design should have been initiated earlier on. Also, both parties did not account for the time period required to receive each sample. The Contractor had clearly underestimated the time needed to provide samples in the programme. This item was described as design build in the BOQ. There was <u>misunderstanding</u> regarding the description as the Contractor considered the internal skin as a design build system to meet specified load whereas the Contractor considered the fritting on the external skin as an aesthetic item to be chosen by the Engineer and not a design build system. It was the Engineer's understanding that both the internal skin and external skin are design-build. The Engineer did not <u>request full range of samples</u> at the first submission to save time. Moreover the notification of possible delay was <u>rejected</u> although this issue had become critical to the project and was delaying the works and an extension of time was later granted for this delay.</p>		<p>General Observations:</p> <p>Late intervention of subcontractor</p> <p>Clear risk allocation and highlighting</p> <p>Lack of experience Trial and error attempts Assessment of delay effect</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delay and Disruption Untimely responses Interpretation of requirements</p>	<p>The process of providing the 4 samples took time The Engineer was late in replying to the submittals The responsibility of designing the frit glass pattern was not allocated clearly</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer insisted on the fact that the delay was the Contractor's responsibility. - Both parties were late in attending to this subject. 		

CASE ANALYSIS		Project: A
Case No.: 5	Subject: war Effect	Section: General Reqmts.
<p>Synthesis:</p> <p>The Contractor the timely notification to the Employer's risk event occurrence and submitted the necessary interim substantiation to the ongoing effect thereafter. The Engineer assessed the EOT of time that occurred in July 06 and, which had ongoing effects in labor loss till end of 2006, in Nov. 07. The Contractor submitted the cost implications 1 year late with the justification that subcontractor cost implications were delayed. The Engineer made his assessment of the cost implications 2 months after the revised cost implication submittal. However, the Employer took 8 months in reviewing the same before he would grant his approval with comments. At this point the Contractor requested an Engineer's Decision.</p>		<p>General Observations:</p> <p>Assessment of Delay Engineer understaffed Late submission of cost implication Assessment of war claim Employer's Interference</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Force Majeur	The war that occurred in Lebanon was a Force Majeur under the contract	
Labor forces	There was a problem in maintaining the required levels of labor	
Delays and disruptions	Delays and disruptions occurred from war and this led to delay dispute.	
Suspension of work	Suspension of works occurred for 40 days during the war.	
Site Safety	Site Safety was jeopardized during the war	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - Engineer was late in assessment - Contractor was late in submitting cost implications - Employer delayed the assessment of this variation as his approval was contractually required in assessment of claims. 		

CASE ANALYSIS		Project: A
Case No.: 6	Subject: Add. Shop dwgs. for variations	Section: Preambles
<p>Synthesis:</p> <p>An agreement regarding the milestone for releasing revised design for every apartment was introduced after commencement of the works and after the project programme was submitted and consented. The Contractor <u>claimed for this additional cost 10 months</u> after the modified design was released. As such proper notice was not given. And <u>no consideration was made</u> for the additional effort/cost of preparing shop drawings for the revised design as no addition to the Contract rate was made following this agreement. One possible explanation could be that where the Contractor was examining his running cost, he realized the additional cost resulting from the revised design and claimed for it accordingly. Although there was no contractual agreement regarding the cost, the Employer could still examine the validity of the Contractor's request in good will gesture to maintain a positive relationship.</p>		<p>General Observations:</p> <p>validity /Assessment of variation</p> <p>Contract Document unclear</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Quantity variations</p> <p>Defective contract documents</p> <p>Changes</p>	<p>There was a variation in the quantity of shop drawings</p> <p>The Contract didn't clearly mention the cost impact of having the additional shop drawings</p> <p>There was a clear deviation from the standard design</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor was avoiding monetary losses - The Engineer in this case did not certify any variation as it was not set in the contract. - As mentioned above the Employer could reconsider the validity of the request to maintain positive attitude with the Contractor. 		

CASE ANALYSIS		Project: A
Case No.: 7	Subject: Façade Lighting	Section: Electrical
<p>Synthesis:</p> <p>The Contractor submits the façade lighting that needs a lead time of 7 months in procurement and 2 months in installation in Oct 07 ie <u>29 months after commencement of the works and 1 month prior to the original contract completion date.</u> The Engineer takes <u>22 days after the field inspection was requested</u> to state that the mockup should be submitted with the approved frit glass and that more lighting fixtures are needed. This could have been replied in 1 day. The Engineer requested that the horizontal lighting match the vertical lighting which the Contractor considered as a variation as this was not specified in the Contract.</p> <p>The Contractor requested the approval to the alternative solution for two reasons: to put the order and avoid increase in rates, and to facilitate/expedite getting more samples. However the <u>Engineer ties his approval to the commercial offer requested by the Employer for cost savings.</u> Also, the Engineer requested the horizontal lighting be made homogenous with the vertical lighting and the crown should be examined with the façade lighting. The Engineer gives his approved as noted status to the alternative <u>2 months after it was submitted.</u> However, this AAN status still doesn't allow him to place the order. <u>Further specification data is required by the Contractor but the Engineer insists that it is the Contractor's responsibility to get the required homogeneous effect in coordination with the specialist.</u> The specialist <u>explains that this can not be achieved technically.</u></p>		<p>General Observations:</p> <p>Late assignment of subcontractor Lack of Proper Management/Monitoring by Engineer Late approval of submittals by Engineer</p> <p>Employer Interference</p> <p>Lack of experience</p> <p>Not achievable requirements</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Subcontractor, supplier failure Delays and disruptions	The façade subcontractor failed to provide requirements There was a major delay due to late submittal, late approval and complexity.	
Untimely responses Interpretation of requirements	The Engineer takes too much time to reply. Whether it is the Engineer's obligation to specify or the Contractor's responsibility to design the system.	
Change	The Contractor considered the request for homogeneous lighting as a variation	
Coordination	There was poor coordination	
Defective Contract Documents	The Specifications were not clear in specifying lighting color	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The technical submittal approved is being tied to a commercial offer. - The Engineer is requesting modifications without being able to clearly detail technical specifications of the variation. - The Contractor starts with his submittals late. 		

CASE ANALYSIS		Project: A
Case No.: 8	Subject: Frit Glass	Section: Aluminum Facade
<p>Synthesis:</p> <p>This matter drags from end of Nov. 07 to end of March 08. The Engineer insists that the requested product is available in the market and lists supplier contacts that would provide the same. The Contractor through the same contacts proves that the product is not yet in the market with the requested 10 yrs guarantee. If the Contractor's statement is true, then the Engineer has meant to <u>specify a system with a 10 yrs warranty that is not yet available in the market.</u> Moreover, by not specifying clearly that it is on face 1, the Contractor <u>interpretation that the specification calls for face 2 that can meet the 10 yrs warranty is valid.</u> <u>The Contractor failed to notice the comments made by the Engineer in the first submittal that requested fritting on Face 1.</u> This was further confirmed after <u>several mockups were inspected.</u> The valuation of variation is critical since it is difficult to determine whether the Contractor is entitled to such a variation and <u>obtaining the market of such variation is also difficult because limited specialists price such item.</u></p>		<p>General Observations:</p> <p>Lack of experience</p> <p>Contract Document unclear</p> <p>Human error/negligence</p> <p>Contractor late in submittals</p> <p>Trial and error attempts</p> <p>valuation of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>untimely responses</p> <p>Defective contract documents</p> <p>Interpretation of requirements</p>	<p>Delay due to unclear requirements</p> <p>Delay in reply to submittals</p> <p>Not clear specifications</p> <p>Interpretation of the fritting set in the specifications</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - Each party was putting the blame on the other party to avoid monetary losses. - The Contractor out of negligence lost 8 months in initiating procurement of requested fritting. - Engineer firm although contract is grey. - There is lack of management/monitoring of Engineer to the delay in initiating procurement. 		

CASE ANALYSIS		Project: A
Case No.: 9	Subject: Employee Turnover	Section: General Reqmts
<p>Synthesis:</p> <p>The Contractor is attributing the raise in salaries to the political situation in the country that is encouraging Engineers to leave. The Engineer from his point considered that the move of Engineers towards neighboring Arab countries is due to the high demand in the construction field.</p>		<p>General Observations:</p> <p>Assessment of War Claim Contract Document unclear</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Force Majeur Labor forces Delays and disruptions Productivity</p>	<p>The war is the influencing factor identified in this claim. The ongoing political situation in the country affected the availability of human resources. The loss of human resources in the country and the employee turnover led to disruption of the work. Due to Employer turnover, learning causes loss of productivity.</p>	
<p>Behavioral Observations:</p> <p>The Engineer was firm in considering the Employee turnover as not related to the internal political situation. The Contractor claims to compensate his losses from market inflation by attributing it to the war (Employer's risk)</p>		

CASE ANALYSIS		Project: A
Case No.: 10	Subject: safety Film	Section: Aluminum Façade
<p>Synthesis:</p> <p>The Engineer issued a variation order canceling the roller shutters; however, the variation order requested that the glass in the shop fronts become antivandalism and the Contractor was requested to provide different options that could satisfy this requirement. The Engineer referred to the options such as <u>polycarbonate clad or PVB options</u> along with the safety film system proposed by the Contractor. The Engineer clearly <u>was not technically knowledgeable</u> in the area and was relying on the Contractor's investigation. The Contractor preserved his contractual right and sent an NPD, although this issue was not delaying the whole project completion. The variation was raised and debated <u>beyond the original completion period</u> of the project and it <u>spanned for 4 months</u>.</p>		<p>General Observations:</p> <p>Not achievable requirements Trial and error attempts</p> <p>Lack of experience</p> <p>Late issuance of missing design/variation Slow attendance to responsibilities</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>untimely responses Changes Interpretation of requirement</p>	<p>The response rate was slow The Change requested was to remove the roller shutters The Contractor's obligation to provide options for systems instructed by the Engineer were debated.</p>	
<p>Behavioral Observations:</p> <p>The Engineer was not knowledgeable enough. He was requesting systems that were not achievable. Both were evading responsibility by blaming the other party.</p>		

CASE ANALYSIS		Project: A
Case No.: 11	Subject: False ceiling	Section: Finishes
<p>Synthesis:</p> <p>The issue is raised in December 2006, however the Contractor reissued the drawings in May 2007 (ie after <u>5 months</u>). The gypsum detail was submitted and changed 4 times. 40 days after the second submittal reply the contractor raises the issue of the 10cm min clear height. After the 3rd submittal the Engineer requests to add C-channels. 2 months in discussion is spent until the Engineer is <u>convinced of the need for the 10mm plaster</u>. The Engineer had requested a negative variation in previously removing this 10mm plaster. The whole process takes <u>10 months of discussions which delays the works because false ceiling was a critical predecessor to many internal finishes</u></p>		<p>General Observations:</p> <p>Contractor late/missing submittals</p> <p>Lack of experience</p> <p>Assessment of Delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>untimely responses</p> <p>Changes</p> <p>Work Quality</p>	<p>The process spanned for 10 months until a final decision was reached</p> <p>The responses by both parties are late</p> <p>The Engineer modifies the detail several times</p> <p>The aesthetics of the work quality is raised and discussed</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was having a series of trial and error attempts to reach the required results - The Contractor was failing to notify of missing details in a timely manner - The process dragged for long due to late submittals and responses to submittals 		

CASE ANALYSIS		Project: A
Case No.: 12	Subject: Lighting Fixtures	Section: Electrical
<p>Synthesis:</p> <p>The Engineer replies in 72 days to the first submittal to request samples. Upon the request of <u>2 samples as per specification requirements</u> the Contractor claims for the resulting additional cost as the Contractor considers that there is no obligation to submit 2 samples in all submittals. The Engineer replies after one month to the second submittal requesting a sample of the specified model. It takes the Contractor 5 months to provide the specified model although the specification requires the Contractor to provide samples of both the specified model and the alternative. The Engineer rejects the third submittal after one month stating that the alternative is not equivalent to the specified model. The Contractor objects to the same stating that if the rejection is due to the light beam angle this can be modified in the alternative. The Engineer <u>sends an NPD accordingly</u>. The Engineer reiterates his position and rejects the NPD on the basis that it's the Contractor's responsibility to provide an equivalent alternative. This issue drags for 13 months.</p>		<p>General Observations:</p> <p>Contractor failure to satisfy requirements</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions untimely responses interpretation of requirements</p>	<p>The issue drags for 13 months Both parties are late in providing response There is a disagreement regarding that classifies as an alternative</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer could have raised his comments to submittals in a shorter period - The issue dragged for long due to late response attendance by both parties. - Engineer is firm although the contract is grey regarding the equivalent alternative. 		

CASE ANALYSIS		Project: A
Case No.: 13	Subject: Increase Labor Rate	Section: Reqrmts
<p>Synthesis:</p> <p>The Contractor submits the <u>increase in labor rate</u> for all trades claiming that it results from the war effect. The Engineer rejects the same arguing that there has been a <u>global fluctuation of rates</u> in the whole region and it is not due to the war in Lebanon. <u>Only increase in labor rate</u> during the war after effects that is compensated:</p>		<p>General Observations:</p> <p>clear risk allocation and highlighting</p> <p>Price escalation</p> <p>Assessment of war claim</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Labor forces</p> <p>Cost Escalation</p> <p>Productivity</p> <p>Force Majeur</p>	<p>There was a problem of scarcity of labor forces after the war</p> <p>Rates had increased due to the war situation and regional economic growth</p> <p>The scarcity caused loss of productivity</p> <p>The war effects fall under Force Majeur</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor was claiming for labor increase on all trades under the pretense that it was an ongoing Employer's risk event to avoid monetary losses. 		

CASE ANALYSIS		Project: A
Case No.: 14	Subject: Façade Alum. Color	Section: Façade
<p>Synthesis:</p> <p>It takes the Engineer 40 days to request that the Contractor to relocate the sample. <u>The Contractor sent a notification of possible delay</u> although the Engineer stated that there was a parallel delay in the tests being conducted. In 17 Sep 07 the Contractor submits the material submittals, (after 21 days) and requests the Contractor to indicate the material reference numbers on the submittals. The Contractor provides the same the second day. The Engineer replies that the panel labeled 3 is approved. The Engineer could have inspected the material, requested a clarification on the reference during the inspection and approved it. This would have saved one month in the process. Moreover, <u>it took the Engineer more than 4 months</u> to approve a material that was submitted from the start of the process. The Engineer requested to inspect different colors before the final decision was made.</p>		<p>General Observations:</p> <p>Assessment of delay</p> <p>Late approval of submittals by Engineer</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions Untimely responses Interpretation of requirements</p>	<p>The late approval of the inspection of the material delayed the work The Engineer was late in giving response The requirements regarding the Contractor's duties in submittal and details of the submittal requested is disputed.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was having a series of trial and error to reach the aesthetic result - The Engineer could have been more proactive and reduced the reply period. 		

CASE ANALYSIS		Project: A
Case No.: 15	Subject: Steel Structure Design	Section: Steel Structure
<p>Synthesis:</p> <p>The material submittal is sent in Nov 06 the Engineer replies to the same in Feb 07 as ANR. The Contractor resubmits in 25 days. The Contractor replies to the second submittal in April 07 (<u>2 months later</u>) again as ANR. 2 months later the Contractor submits the requested details of the option for hot dip galvanizing. However, 2 weeks after the Contractor submits the alternative paint option that could reduce the delivery period. The Engineer accepts the same on condition that the <u>cost savings should inure to the Employer's benefit</u> and based on the <u>time savings</u> and actual progress of the works the NPD is rejected.</p>		<p>General Observations:</p> <p>Late approval of submittals by Engineer</p> <p>Assessment of delay validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>untimely responses</p> <p>Changes</p> <p>Means and methods of construction</p>	<p>Delay occurred due to late submittal and approval but was reduced by the introduced alternative</p> <p>Both sides were late in submitting and approving respectively</p> <p>An alternative was proposed by the Contractor</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor should have submitted alternative earlier. - The Engineer could have been more proactive in providing timely replies 		

CASE ANALYSIS		Project: A
Case No.: 16	Subject: Trench Heaters	Section: Mechanical/Finishes
<p>Synthesis: The shop drawings for tiling was submitted by the Contractor and approved by the Engineer <u>as per the Contract Design</u> for several areas. Both parties failed to notice the problem of having the trench heater jamming with the aluminum façade. The Engineer notices the problem on shop drawings 9 months after first shop drawing approval and requests the Contractor to move the trench heater away from the façade requesting the Contractor to confirm and coordinate the same with the mechanical system details. At this point the problem is raised but there is no decision reached regarding the final acceptable distance since:</p> <ol style="list-style-type: none"> 1. The Engineer regards the matter <u>as a coordination issue with the aluminum and the low-e curtain specialists</u> i.e. part of the Contractor's scope 2. The Contractor considers this to be a <u>modification of the design issue to be determined by the Engineer.</u> <p>The Contractor coordinates with the specialists who recommend a range to the minimum clear distance required but fail to provide technical substantiation. The Engineer is the one who takes the final decision based on the data available 11 months after the first submittal of tiling drawings made. However, the <u>allocation of responsibility in the delay incurred is disputed.</u> This matter would have had a bigger impact had they proceeded with the original design and breakage of the façade glass occurred. Although it was technically resolved in 11 months the dispute regarding allocation of responsibility continues for another 11 months.</p>		<p>General Observations:</p> <p>design error</p> <p>Contractor poor coordination between trades</p> <p>valuation of variation</p> <p>Contract Document unclear</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Delays and disruptions	The delay occurs because execution of work as per approved shop drawing is stopped	
Untimely responses	The issue dragged for 11 months	
Coordination	There is a coordination problem between trades	
Defective contract documents	The document is not clear there is a discrepancy	
Interpretation of requirements	Each party is allocating responsibility to the other party because this issue is not clearly specified.	
Changes	The Contractor considers the Engineer's request to relocate the trench heater as a variation	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - Both parties failed to notice the problem and each was allocating it to the other party to avoid responsibility for the delay incurred. - Also, each party wanted to evade responsibility for the executed system. 		

CASE ANALYSIS		Project: A
Case No.: 17	Subject: Submittal schedule	Section: General Reqmts.
<p>Synthesis: The Contractor submitted the submittal schedule as per the Contract requirements. However, the process of submitting and commenting the schedule dragged for more than 18 months and a submittal schedule was never approved. Accordingly an alternative for marking the critical ones in the weekly updates (and not all the submittals that have exceeded the review period) was proposed to go around the problem. However, this did not resolve problem as the Contractor did not waive his right to claim for extension of time where the delay in review of submittals is delaying the progress of works. Also, the Engineer did not have an approved submittal to allocate staff for review accordingly or to monitor the proper progress of submittals. Both parties were late in submitting and reviewing these schedules. Also, the parties did not agree to the number of submittals allowed per week. This could have been resolved if the weekly figure had it been included in the Contract. Also, it is evident from the disagreement on the number of submittals allowed per week that the Engineer could not carry on the big number of submittals which could be due to the fact that he/she is understaffed or due to the fact that the Contractor did not proceed with submitting in a leveled timely manner as he is expected to. There was also a problem in the high number of resubmittals as well which the contractor attributed to the Engineer not including all comments on the first submittal. The Engineer on the other hand claimed that the Contractor is not coordinating the submittals well and including all necessary details which is leading to an increased number of resubmittals.</p>		<p>General Observations:</p> <p>Submittal Schedule</p> <p>Late approval of submittals by Engineer</p> <p>Contract Document unclear</p> <p>Contractor late/missing submittals</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Untimely responses Coordination</p>	<p>Both parties were late in submitting and approving The Contractor needs to coordinate his submittals among different trades to avoid delay</p>	
<p>Defective contract documents</p>	<p>The Contract document should set some levels in this respect</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - Both parties could not reach an agreement regarding the submittal schedule. - Each party was blaming the other party for not having an approved schedule - Lack of proper management/monitoring where the Engineer failed to impose a reasonable weekly no. of submittals. 		

CASE ANALYSIS		Project: A
Case No.: 18	Subject: Marble Works	Section: Finishes
<p>Synthesis:</p> <p>The Engineer during the field inspection request decides to <u>change the corner detail which was approved in a shop drawing, 6 months ago</u> requesting the Engineer to resubmit the related shop drawing. The Contractor resubmitted the general detail in 12 days. The Engineer replies to the same AAN in 12 days as well. The Contractor sends an NPV due to the requested change. The Contractor submits the first FIR 1 month after the shop drawing is approved. <u>4 FIRs are submitted for this item.</u> At the first submittal a review of the shop drawings is required. The Engineer replies in the second and third FIR as follows:</p> <p>grout not installed, tile repair not finished, touch up required is not executed</p> <p>- grout is missing, edge chamfering, interface marble and bathtub to be treated. walls and floor to be cleaned.</p> <p>The comments show that the Contractor in the second FIR had not accounted for all the Engineer's remarks raised in the first FIR. However, the Engineer raises comments such as edge chamfering and interface to be treated which were not made at the first FIR and not attended to. The Contractor claimed for <u>an extension of time</u> for the delay stating that the modifications took the form of trial and error attempts during the FIR. 3 months span between the submittal of the first FIR and the approval of the fourth one.</p>		<p>General Observations:</p> <p>validity/assessment of variation Late issue of missing design</p> <p>Late approval of submittals by Engineer</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>untimely responses Changes Coordination Interpretation of requirements Delay and Disruption</p>	<p>The responses from both sides were late Engineer changes corner detail Coordination is needed with sanitary fixture Specs requirements for grout on sides is argued The process caused delay to the works in the wet areas</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was having trial and errors to reach the requested aesthetical model. - The Engineer was adding requirements through the FIR comments - The Contractor was not satisfying the comments raised in the FIRs in due diligence - Each was evading responsibility by blaming the other party 		

CASE ANALYSIS		Project: A
Case No.: 19	Subject: EDL	Section: Electrical
<p>Synthesis: The original design was approved in principal but <u>missing</u> due to the value engineering that only stated ideas without details. The EDL (Electricity of Lebanon) requested that a revised file be submitted with an official request from the Employer for the bigger substation. The Engineer provides the revised <u>permit file</u> however the process takes several months since the EDL <u>requests further details</u> during the follow up visits which are to be provided by the Engineer in a specific format. Also the value engineering requests larger transformers (nonstandard ones) which necessitate an undertaking by the Employer for the spare transformer. <u>EDL does not provide any confirmations or replies in writing</u>; The Contractor representative who is responsible for coordination with EDL to execute the <u>substation room</u> is late in following up on the EDL file between May 07 and Dec 07 beyond which further details are still requested by EDL. And the substation room becomes a critical activity delaying the project completion date as it is a predecessor to the testing and commissioning of electrical and mechanical systems. The Engineer blames the Contractor for not performing due diligence in following up the file with the EDL. The Contractor states that this delay is due to the value engineering that was initiated by the Engineer after contract award and which necessitated a revised permit file and several additional official paperwork that were not required by the original design. The Contractor requests an <u>extension of time for the same</u>.</p>		<p>General Observations:</p> <p>design error</p> <p>Permit regulations</p> <p>Lack of proper Management/Monitoring by Engineer</p> <p>Lack of experience</p> <p>Contractor poor coordination between trades</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>Defective Contract Documents</p> <p>Coordination</p> <p>Interpretation of requirements</p> <p>Permits and licenses</p>	<p>The activity becomes critical and delays the work</p> <p>The first file is submitted by Engineer is wrong</p> <p>The Contractor does not follow up promptly</p> <p>Duties of EDL coordination following the VE were not clear at contract signature</p> <p>The value engineering required a revised permit file</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer made a change that necessitated a longer process that the Contractor had not accounted for - The Contractor did not follow up on the file in a timely manner. 		

CASE ANALYSIS		Project: A
Case No.: 20	Subject: cancellation of PS	Section: General Reqmnts.
<p>Synthesis:</p> <p>The Engineer makes an assessment of the Contractor's entitlement following the cancellation of the provisional sum works. The Engineer sends the same to the Employer for his approval as per the Contract requirements since all variations assessed by the Engineer are to be approved by the Employer. The Employer representative does not approve the same which results in a case of conflict. Also, this leads to the <u>assessment being delayed</u> until the Employer approves the same. The assessment is to be made by the Engineer who is supposed to be impartial to both parties. Where the Employer does not approve of the same the Contract doesn't state how to proceed. The Engineer can not certify such variation since the Employer didn't approve it and if it is influenced by Employer's assessment then it would be in contradiction with the spirit of the FIDIC.</p>		<p>General Observations:</p> <p>influence by the employer validity/Assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>untimely responses</p> <p>Changes</p>	<p>The Engineer was late in assessing this variation because he could not receive an approval from the Employer</p> <p>The cancellation led to a dispute in valuation of this variation</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Employer through his authority to give approval was delaying the assessment. - Slow attendance to responsibilities by both parties is witnessed. 		

CASE ANALYSIS		Project: B
Case No.: 1	Subject: Rejected NPVs	Section: General Requir.
<p>Synthesis:</p> <p>The Contractor held the Engineer liable for <u>issuing incomplete design</u> that necessitated these <u>changes resulting in cost implications</u>. He sent NPV accordingly to cover these modifications. Both parties are making reference to contractual clauses to defend their stand. The Engineer made it clear that the Contractor has a <u>Contractual obligation to develop and prepare</u> Construction drawings which are valid for execution. Including this statement in the Contract stresses on the fact that the Engineer had noticed that the <u>Tender Documents needed further development</u>. The Contractor is disputing the same since this development of construction drawings is causing a running cost that exceeds reasonable level accounted for by the Contractor. The Engineer is clear about his contractual position in this regard. The Engineer was aware of the fact that the Tender Documents need further development but whether this was clarified at the Tender stage is not clear.</p>		<p>General Observations:</p> <p>design error</p> <p>validity/assessment of variation</p> <p>Clear risk allocation and highlighting</p> <p>Contract documents not clear</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Changes	The Contractor considered the additional modifications as a variation	
untimely responses	The development of construction drawings and their correction thereto was taking considerable time	
Defective contract documents	The Tender documents needed further development and although the contract included a statement to develop and prepare drawings the extent of further design needed was not clear.	
Interpretation of requirements	Both parties were disputing their responsibility in development of design.	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the levels of design development required at the tendering stage and as such is trying to avoid monetary losses. - The Engineer having included a statement regarding the design development in the contract considered that this risk was clearly allocated to the Contractor. Whether the level of missing design was clearly explained/clarified to the Contractor at the tender stage is not known. - Both parties are evading responsibility by blaming the other 		

CASE ANALYSIS		Project: B
Case No.: 2	Subject: Site Works	Section: Division 2
<p>Synthesis:</p> <p>The issue disputed is related to a tree that was disfigured because the <u>main branch was broken</u>. The major disagreement is due to the <u>meaning of the word 'major damage'</u>. Where the Engineer considers major damage to be the case of breaking the main branch, the Contractor considers main damage to be equivalent to death of tree. <u>The value of this dispute that was raised to arbitration is \$8,504</u> which is very small compared to the contract value. The Contractor by reiterating his stand regarding the tree damage and the amount that will be deducted is clearly not in the 'avoiding dispute' spirit. The Engineer is firm about his stand and his reading of the contract wording. By changing his argument and he admits that the tree is disfigured but that it was inevitable during the expected transplantation of the tree the Contractor proves that he was trying to escape any liability in this regard and thus corresponding penalty.</p>		<p>General Observations:</p> <p>Human error/negligence Contract Document unclear</p> <p>validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Interpretation of requirements	The transplantation process of the tree is requested in the Contract but it is not clear whether this transplantation involved cutting of certain branches.	
Defective Work	The Engineer is applying penalty or the Contractor's default in carrying out his duties.	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The value of this dispute is \$8,504 and it is clear from the dispute that took lengthy correspondence that both parties are not showing any willingness to compromise and resolve this matter. - The Contractor was evading responsibility for the damaged tree to avoid monetary losses. At a later stage the Contractor admitted that the tree was disfigured but considered that to be an inevitable consequence to the requested tree transplantation. 		

CASE ANALYSIS		Project: B
Case No.: 3	Subject: Optional Works	Section: General Requirements
<p>Synthesis:</p> <p>These optional works were included part of the contract BOQ but there was <u>no clear reference</u> to them in the Contract Conditions. The optional works that were instructed by the Engineer were <u>repriced by the Contractor as a variation on the basis</u> that these optional works are no more valid as these should have been triggered before contract signature. However, the Engineer made it clear that the tender documents were different than the contract documents signed and as such these works were intentionally left in the Contract because the Engineer is given the option of instructing them later on during the execution of the works. The Contractor stated that these optional works were among other works that were removed from the scope of works. <u>These should have been cleared and documented at contract award</u>. The Engineer invited the Contractor to list examples of such work that have been removed twice. However, the Contractor who was avoiding cost implications resulting from <u>fluctuation of rates</u> failed to do so.</p>		<p>General Observations:</p> <p>Contract Document unclear</p> <p>validity/assessment of variation</p> <p>Clear allocation and highlighting of responsibility</p> <p>Price escalation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Defective contract documents	Whether these optional works were deemed to be triggered at award on anytime during the execution of the works is not clear from the wording.	
Interpretation of requirements		
Cost escalation	Cost implications are augmented by the cost escalation.	
	The interpretation of Contract regarding the optional works was disputed.	
Changes	Contractor considered the optional work released as a variation.	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor was relieving himself from the obligation to carry out the works at the set rate to avoid monetary losses. - The Contractor was trying to evade responsibility but was unable to prove the arguments raised - The Engineer was firm in his interpretation of those works 		

CASE ANALYSIS		Project: B
Case No.: 4	Subject: cleanouts	Section: Mechanical
<p>Synthesis:</p> <p>The <u>additional cleanouts disputed are requested by the code set in the specifications</u>. The Contractor's argument that the code is of interest to the designer only is irrelevant as that does not justify the inclusion of this code in the specifications as the Contractor is the party <u>expected to meet the specifications</u>. The Engineer reiterates his position in the Engineer's Decision that Contractor is <u>not entitled to the cost of additional cleanouts</u>.</p>		<p>General Observations:</p> <p>Clear risk allocation and highlighting</p> <p>Contractor failure to satisfy requirements</p> <p>validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Interpretation of requirements</p> <p>untimely response</p> <p>Changes</p>	<p>The main Engineer and the Contractor are in disagreement regarding the reading of the specifications</p> <p>The issue dragged for more than 5 months</p> <p>The Contractor considered the request for additional cleanouts as a variation.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the level for design development required at the tendering stage. - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. - The Engineer was firm in his interpretation of those requirements. 		

CASE ANALYSIS		Project: B
Case No.: 5	Subject: Fire Alarm System	Section: Electromechanical
<p>Synthesis:</p> <p>In reviewing the fire alarm system shop drawing the Engineer made modifications requesting additional detector. The Contractor replied to these modifications on the shop drawings stating that 'the design onus remains with the Engineer'. The Contractor seems to be concerned with the adequacy of the fire alarm system. The Engineer states it is the Contractor's responsibility to check the adequacy of design with the specified code. The Engineer stated that it is <u>part of the Contractor's responsibility of preparing construction drawings</u>. The Contractor even considered the additional detectors and other items added by the Engineer on the shop drawings to be a <u>variation</u>. The Engineer rejected the same since it is the <u>Contractor's responsibility to provide the additional items requested by code</u>. The Engineer reiterates his position in the Engineer's Decision. The process spanned for over 12 months due to delay of more than 2 months at each reply.</p>		<p>General Observations:</p> <p>Clear risk allocation and highlighting</p> <p>validity/Assessment of variation</p> <p>Contractor failure to satisfy requirements</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
untimely responses	Both parties were as evident in the chronology of events late in attending to the matter.	
interpretation of requirements	Both parties were disputing their responsibility in development of design.	
Changes	The Contractor considered the additional requirements as a variation.	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the level of design development required at the tendering stage. - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. - The Engineer was firm in his interpretation of those works - Each party was allocating responsibility to the second party. 		

CASE ANALYSIS		Project: B
Case No.: 6	Subject: War Delay	Section: General Requirts.
<p>Synthesis:</p> <p>The Contractor gave timely notice of <u>the war effect</u> delay. The Contractor disagreed with the assessment made by the Engineer based on the substantiation submitted. The Contractor <u>considered this extension to be unjust</u> and considered that the Engineer 'deliberately ignored' the extension of time granted by Law. The Engineer replied that the law the contractor is referring to is not applicable to this type of contract. The Contractor further disagreed and considered that the Engineer is 'taking position with respect to the interpretation of the law'. The Engineer reiterated his position in the Engineer's Decision.</p>		<p>General Observations:</p> <p>Assessment of war impact</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Force Majeur	The war that occurred in Lebanon was a Force Majeur under the contract	
Labor forces	There was a problem in maintaining the required levels of labor	
Delays and disruptions	Delays and disruptions occurred from war and this led to delay dispute.	
Suspension of work	Suspension of works occurred for 40 days during the war.	
Productivity	During war period productivity is affected	
Site Safety	Site safety is jeopardized	
<p>Behavioral Observations:</p> <p>The Contractor was in disagreement with the assessment of the Engineer and it is clear from the use of terms such as 'deliberately ignored' and 'taking position' that the Contractor was accusing the Engineer of being partial.</p>		

CASE ANALYSIS		Project: B
Case No.: 7	Subject: Soft Landscaping	Section: Soft Landscaping
<p>Synthesis:</p> <p>A revised scope of planting works was agreed and the Contractor was requested to price the same. The Contractor made his own assessment and the rate was agreed accordingly. Few days after the Engineer's acceptance of the <u>variation cost which was based on the agreement mentioned</u> above between the Employer and the Contractor, the Contractor submits a revised rate. The Engineer rejects it. Although the Contractor tries to explain the error in calculation method made, the Engineer considers the Contractor liable for the rate he submitted at the beginning. At this point the Engineer could have reconsidered the revised rate and check the same with the Employer but instead reiterated his position. The amount of disagreed value is only \$8,900. However, the Contractor accuses the Engineer to be 'Fraudulent' and the amount to be 'unlawfully deducted'. The Engineer reiterates his position in the Engineer's assessment.</p>		<p>General Observations:</p> <p>validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Changes</p> <p>Defective contract documents</p> <p>Interpretation of requirements</p>	<p>There was a revised landscaping works.</p> <p>The Contractor did not allow a mechanism for assessment of variations</p> <p>The interpretation of agreement reached was disputed.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - Was it clear to the Engineer at the time the Contractor submitted the first price that there was a mistake in the method of calculation and did the Engineer accept the total figure in spite of that - The value of this dispute is \$8,900 and it is clear from the dispute that took lengthy correspondence that both parties are not showing any willingness to compromise and resolve this matter. - Although the Contract does not clearly specify the method of valuating and although the Engineer accepted the Contractor's offer, the price could be reconsidered on the basis of an error in calculation. - The Contractor used terms such as "Fraudulent" and "unlawfully deducted" accusing the Engineer of being partial. - The Engineer refrains from such language in his replies. 		

CASE ANALYSIS		Project: B
Case No.: 8	Subject: Fire Smoke Dampers	Section: Mechanical
<p>Synthesis:</p> <p>The Engineer is requesting the Contractor to provide duct access doors and requesting technical data sheets for the same. The Contractor insists that the system provided meets SMACNA standards. There is <u>a clear disagreement whether a damper located within the duct requires an access door</u>. The Engineer reiterates his position that it is the <u>Contractor's duty to meet the contractual obligations</u> and the Contractor has failed to do so. The Contractor on the other hand is disputed the Engineer's unjustified rejected of variation is not <u>approving the access doors as a variation</u>. Also, the Engineer's technical assistant who was approving submittals and inspecting the works on site failed to raise the problem of the missing access doors during the past 11 1/2 months.</p>		<p>General Observations:</p> <p>Contract Document unclear Clear allocation/highlighting or responsibility Contractor failure to satisfy requirements</p> <p>Validity/Assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>Interpretation of requirements</p> <p>Defective work</p> <p>Untimely response</p> <p>Changes</p>	<p>The ongoing disagreement regarding the system requirements are delaying the works that had been ongoing for the past 11 1/2 months.</p> <p>There is a clear disagreement regarding the Contract requirements regarding the Code specified in the Specs.</p> <p>The Engineer is considering the work as submitted by the Contractor as defective.</p> <p>This issue drags for 6 months</p> <p>The Contractor submits it as a variation and the Engineer rejects the same</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the level for design development required at the tendering stage. - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. - The Engineer was firm in his interpretation of those works - Each party was evading responsibility by allocating it to the second party. 		

CASE ANALYSIS		Project: B
Case No.: 9	Subject: Fire Fighting System	Section: Mechanical
<p>Synthesis:</p> <p>The Engineer requested the Contractor to provide details of the hydraulic calculations along with comprehensive and detailed shop drawings. The Contractor insisted that this was <u>not part of his responsibility to provide the same</u>. The Contractor also reserved his rights for the resulting delay. The Contractor stated that he is willing to do the design at a fixed fee. The Engineer then decided to design the hydraulic calculations in an attempt to mitigate the <u>contractor's noncompliance with the contract requirements</u>. The design responsibility was unclear in the contract documents and was the main cause of dispute in this case. Also, it is noticed that the delay of the <u>Engineer's approval was raised</u> by the Contractor. The Engineer replied that the Contractor failed to abide by the presented schedule of submittals.</p>		<p>General Observations:</p> <p>Contract Document unclear</p> <p>Validity/Assessment of variation</p> <p>Contractor failure to satisfy requirements</p> <p>Late approval of submittal by the Engineer</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>Untimely responses</p> <p>Defective contract documents</p> <p>Interpretation of requirements</p> <p>Changes</p>	<p>The ongoing disagreement regarding the system requirements are delaying the works that had been ongoing for the past 11½ months.</p> <p>The process took more than 7 months</p> <p>There is a clear disagreement regarding the Contract requirements relating to the Code specified in the Specs.</p> <p>The Contractor considered the request for hydraulic calculation as a variation.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the level of design development required at the tendering stage. - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. - The Engineer was firm in his interpretation of those works - Each party was allocating responsibility to the second party. 		

CASE ANALYSIS		Project: B
Case No.: 10	Subject: Towel Dryer	Section: Mechanical
<p>Synthesis:</p> <p>The towel dryers are <u>modified several times</u> and put on hold until the final decision is issued in a <u>variation order</u>. An agreement is discussed <u>between the Employer and the Contractor</u> which the Contractor later on rejects since it cuts down on the Contractor's overhead and profit. As such the agreement allows for the fluctuation in material rate only.</p>		<p>General Observations:</p> <p>Late approval of submittals by Engineer validity/Assessment of Influence by the employer Fluctuation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
untimely response	<p>The several modifications made led to a delay in the procurement. The Engineer was changing the specifications and was not clear about the requested model.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Employer is interfering in an assessment of a variation 		

CASE ANALYSIS		Project: C
Case No.: 1	Subject: Louvers at Roof	Section: Architectural Finishes
<p>Synthesis:</p> <p>The Contractor failed to submit the requested louvers <u>for a full year</u>. The Employer interfered to ask the Engineer to instruct the Contractor on how to proceed. The <u>Engineer didn't take this initiative himself</u> before being so instructed by the Employer although it is his obligation under the Contract to monitor the Contractor's progress and proper submittal of shop drawings and materials and as such give proper instruction where necessary. The Contractor not only <u>failed to provide the specified louver</u>, he also sent a notification of possible <u>variation</u> for the instructed louvers. The Engineer rejects the same on the basis that the louvers instructed are those requested by the specifications. Contractor is requesting a variation Order to cover the additional cost of the <u>special pitched louvers</u>.</p>		<p>General Observations:</p> <p>Contractor late/missing submittal</p> <p>Lack of proper management</p> <p>Contract Document unclear Lack of experience validity/assessment of variation</p> <p>Contractor failure to satisfy requirements</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Delays and disruptions	The failure to provide the required louvers was delaying the works.	
Defective contract documents	The Contract document did not clearly detail those louvers.	
Interpretation of requirements	Due to the unavailability of clear louver specs, the interpretation was disputed.	
Changes	The Contractor considered the special pitched louvers as a variation	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the special pitched roof. - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. - The Engineer was firm in his interpretation of those works - The Engineer having included a statement regarding the design development in the contract considered that this risk was clearly allocated to the Contractor. Whether the level of missing design was clearly explained/clarified to the Contractor at the tender stage is not known. 		

CASE ANALYSIS		Project: C
Case No.: 2	Subject: chillers	Section: Mechanical
<p>Synthesis:</p> <p>The type of the Chillers was changed and as such the Contractor sent a notification of a possible variation. The Engineer disagrees with the Contractor's reading of the specs and doesn't agree to the change between the reciprocating type and the screw type to be a variation. A further change is made to the chiller sizes. The Contractor submits the <u>new market rates of these chillers</u>. The Engineer goes for <u>prorated rates based on the Contract rates</u>. If the Contractor has placed an order based on the previous rates and needs to make a new order for the new sizes, then the Contractor will be incurring a loss due to this variation.</p>		<p>General Observations:</p> <p>Price escalation validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Changes Defective contract documents Interpretation of requirements Cost escalation</p>	<p>The size of chillers is changed The Contract doesn't clearly specify these chiller types Due to the fact that the type is not clear a disagreement is reached regarding the requirements. The market rate has increased beyond contract rates.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor is trying to avoid monetary losses due to prorated rates in the variation since the Contract does not allow for fluctuation. - The Engineer uses prorated rates although this is not a clear statement in the Contract. - There is a slow attendance to responsibilities by both parties 		

CASE ANALYSIS		Project: C
Case No.: 3	Subject: Restoration	Section: Site Works
<p>Synthesis:</p> <p>The Contractor is deemed to have satisfied himself with the site conditions. At pricing the demolition work as an experienced contractor he <u>should have accounted for the associated risk of cracks</u>. However, the Engineer <u>did not explicitly include details of strengthening and maintaining the façade in the construction drawings or in the BOQ for the Contractor to account for the same and price accordingly</u>. The Contractor gives a notification by sending a request for <u>approval of variation order</u>. The Engineer rejects the same.</p>		<p>General Observations:</p> <p>Slow attendance to responsibilities</p> <p>Contract documents unclear Clear risk allocation pricing</p> <p>validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Latent site conditions</p> <p>Interpretation of requirements</p> <p>Change</p>	<p>Cracks appeared later on</p> <p>The Contractor is considering the strengthening as a new requirement. The Engineer is considering that the Contractor should have accounted for the same.</p> <p>The Contractor considering the strengthening as a variation.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the additional cost - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. - Each party was allocating responsibility to the second party. 		

CASE ANALYSIS		Project: C
Case No.: 4	Subject: Glass Balustrade	Section: Facade
<p>Synthesis:</p> <p>The Contractor sends a request of information for the specification of balustrade. The Engineer should have referred the Contractor to the section of the specification that specifies the railing system as stainless steel. The Contractor sends a request of <u>approval of variation order</u> but when rejected the Contractor has little argument in defense.</p>		<p>General Observations:</p> <p>validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Interpretation of requirements Changes</p>	<p>The Contractor is disputing the Contract requirements regarding the specifications of the railing system. The Contractor was considering the stainless steel requirement as a variation.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor had not accounted for the stainless steel requirement. - The Contractor was relieving himself from the obligation to carry out the additional works to avoid monetary losses. 		

CASE ANALYSIS		Project: C
Case No.: 5	Subject: War Effect Delay	Section: General Requirements
<p>Synthesis:</p> <p>The Contractor submitted the notice on time for the ongoing war effect. The Contractor made his best endeavors to attend the site in spite of the risk taken in the absence of insurance cover. The time impact was resolved because both parties agreed to the delay analysis technique to be used. However, <u>the cost implications were disputed</u> because the Employer decided to pay the Contractor in parts in spite of the extra effort that was made by the Contractor during the war period.</p>		<p>General Observations:</p> <p>Assessment of war claim</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Force Majeur	The war that occurred in Lebanon was a Force Majeur under the contract	
Labor forces	There was a problem in maintaining the required levels of labor	
Delays and disruptions	Delays and disruptions occurred from war and this led to delay dispute.	
Suspension of work	Suspension of works occurred for 40 days during the war.	
Productivity	During war period productivity is affected	
Site Safety	Site safety is jeopardized	
<p>Behavioral Observations:</p> <p>Had the Contractor decided to abide by his contractual right not to attend while there is risk to the safety of his employees, the Contractor would have been automatically entitled for more extension of time and as such the Project would have incurred more delay and the Employer would have paid higher premiums. The Contractor's positive attitude was not rewarded by the Employer.</p>		

CASE ANALYSIS		Project: C
Case No.: 6	Subject: External Works	Section: Site Works
<p>Synthesis:</p> <p>The Engineer was late in providing the Contractor with the <u>missing drawings that were necessary for him to carry out the works</u>. The Engineer then provided <u>drainage drawings</u> that were again missing and not well coordinated as they differed from the contract floor levels on the contract drawings. The Contractor stated that he has not received a reply to the <u>RFI in 55 days</u> and this was <u>delaying the works</u>.</p>		<p>General Observations:</p> <p>Design error</p> <p>Late issue of missing design</p> <p>Late approval of submittals by Engineer</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>Untimely responses</p> <p>Defective contract documents</p>	<p>The missing drainage design was delaying the works.</p> <p>The RFI was replied to 55 days.</p> <p>The Contract documents were missing drainage details.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was late in providing the missing details. - The Contractor was giving timely notice to raise the criticality of these details 		

CASE ANALYSIS		Project: C
Case No.: 7	Subject: Stone Flooring	Section: Architectural Finishes
<p>Synthesis:</p> <p>The Engineer was late in providing the Contractor with details of the stone finishing. The type of stone was <u>specified in 2 months</u>. And then two months after that the type was changed again. ie <u>4 months later</u>. Engineer's issuance of incomplete design information, finalization of the design during the Progress of the Works and the continuous issuance of design changes was <u>causing delay</u>.</p>		<p>General Observations:</p> <p>Late issue of missing design Assessment of delay</p> <p>validity/assessment of variation effect</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions Untimely responses Defective contract documents</p>	<p>The missing drainage design was delaying the works. The MAR ref. e was responded in 1 month. The Contract documents were missing.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was late in providing the missing details. - The Contractor was giving timely notice to raise the criticality of these details 		

CASE ANALYSIS		Project: C
Case No.: 8	Subject: Submittal schedule	Section: General Requirements
<p>Synthesis:</p> <p>The Engineer was not attending to the Contractor's <u>submittal in a timely manner</u> as specified and agreed to in the Contract. Each of the two parties was blaming the other party for not meeting specification requirements and the schedule of submittal in the programme. The Contractor even <u>accused the Engineer of intentionally delaying the replies</u> to allow time to include 'forthcoming changes/variations' in these submittal replies. The Contractor prepared a claim of the all the delay that occurred due to the <u>delayed reply to submittals</u>.</p>		<p>General Observations:</p> <p>Late approval of submittals by Engineer</p> <p>Assessment of delay</p> <p>Submittal schedule</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Untimely responses</p> <p>Delay and Disruptions</p> <p>Defective Contract</p> <p>Documents</p>	<p>The Engineer was unable to meet the specification requirements regarding the reply period.</p> <p>The lat review of submittals was causing delay</p> <p>The Contract should have specified an achievable/realistic schedule.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor was accusing the Engineer of intentionally delaying these replies. - The Contractor is using language accusing the Engineer of including 'forthcoming changes/variations.' - Each party was evading responsibility by blaming the other party. 		

CASE ANALYSIS		Project: C
Case No.: 9	Subject: Alum. Composite Panel	Section: Façade
<p>Synthesis:</p> <p>This issue dragged for more than a year where the Contractor was <u>still requesting clarification confirmation</u> to the exact details of the aluminum composite panel. From the time the Contractor submitted his material approval request in Dec 05, the Engineer changed his decision in <u>April 06</u>, then in <u>May 06</u> then in <u>August 06</u>.</p>		<p>General Observations:</p> <p>Slow attendance to responsibilities</p> <p>Late approval of submittals</p> <p>Late issue of variation</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Delays and disruptions untimely responses	<p>The ongoing changes caused delay</p> <p>The engineer replied to the first MAR in 119 days, the Contractor after 4 months requested details of aluminum</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was late in issuing modifications that were causing further delay. - The Contractor raised a claim regarding the missing details requested. 		

CASE ANALYSIS		Project: C
Case No.: 10	Subject: Points of Drainage	Section: Mechanical
<p>Synthesis:</p> <p>The Engineer was rejecting responsibility for <u>the discrepancy of drain around the construction joint</u> considering it to be part of the <u>Contractor's responsibility in coordination among trades</u>. The Contractor on the other hand was again rejecting this responsibility <u>considering it to be the Engineer's responsibility</u> to clear such discrepancies raised by the Contractor through RFI or even to <u>have a better coordinated design drawings</u>.</p>		<p>General Observations:</p> <p>Design error</p> <p>Contractor failure to satisfy requirements</p> <p>Clear allocation of responsibility</p> <p>Contract documents unclear</p> <p>Contractor poor coordination between trades</p> <p>Validity/Assessment of variation</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>untimely response</p> <p>Changes</p> <p>Defective Contract Documents</p>	<p>Delay was incurred due to the ongoing dispute regarding responsibility</p> <p>The matter was disputed without providing the necessary developed design</p> <p>The Contractor considered the missing details as a variation</p> <p>The Contract document did not account for well coordinated points of drainage</p>	
<p>Behavioral Observations:</p> <p>- Each party is blaming the other party</p>		

CASE ANALYSIS		Project: D
Case No.: 1	Subject: Access to Roof Area	Section: Architectural
<p>Synthesis:</p> <p>The Design is <u>defective</u> as it does not allow for proper access to the roof from the 28th floor. The Contractor sent an RFI in this regard. The reply to the RFI by the Engineer stated that the Engineer had solved the roof area access issue to his reply to a shop drawing submittal at the 28th floor. <u>The corridors introduced at this floor created a problem with the panel boards. This necessitated an instruction to relocate the panel boards.</u> This was followed by <u>a modification to the block wall perimeter at the 28th floor, deletion of marble tiling and the deletion of the waterproofing at that floor.</u> These continuous modifications resulted in a <u>disruption to the works.</u></p>		<p>General Observations:</p> <p>design error Design Discrepancy</p> <p>Late issue of missing design/variation</p> <p>validity/Assessment of variation</p> <p>Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions Changes Defective contract documents</p>	<p>The discrepancy in the roof access was delaying these works The defective design necessitated this change The Contract drawings did not show any access.</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer could have provided all the information in a timely manner - The Contractor could have noticed this problem earlier. 		

CASE ANALYSIS		Project: D
Case No.: 2	Subject: Raised Flooring	Section: Architectural
<p>Synthesis:</p> <p>The Engineer had <u>instructed raising the floor at the two highest floor which necessitated moving wet trade material to those floors through elevators.</u> However, the instruction given was not clear and where the Contractor stated that the Hourdi blocks requested are not readily available in the market, the Engineer <u>refuted the same</u> without checking the validity of the Contractor's statement. The Contractor presented an alternative for available Hourdi sizes along with their unit rates. <u>The Engineer was late in attending to the same</u> although this became a critical activity as it led to suspending the finishing works at floor 27. The Engineer was also late in assessing <u>the variation.</u></p>		<p>General Observations:</p> <p>Late issue of missing design/variation</p> <p>Lack of proper Management/Monitoring by Engineer</p> <p>Late approval of submittals Slow attendance to responsibilities</p> <p>Validity/assessment of Variation Assessment of Delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions</p> <p>Untimely responses</p> <p>Defective contract documents</p> <p>Interpretation of requirements</p> <p>Change</p>	<p>Because the Hourdi specified was not readily available this led to delay</p> <p>The Engineer was late in providing feedback on the critical activity</p> <p>The Engineer was late in his reply</p> <p>The floors should have been raised in original design</p> <p>The Engineer issued different changes that led to the dispute</p>	
<p>Behavioral Observations:</p> <p>- The Engineer disregarded the Contractor's comment regarding the unavailability of the Hourdi Blocks instead of taking a proactive approach of finding an alternative.</p>		

CASE ANALYSIS		Project: D
Case No.: 3	Subject: Additional Fireplaces	Section: Architectural
<p>Synthesis:</p> <p>The Engineer made the decision several months after the start of the works <u>to change the false fireplaces to real/live ones</u>. 2 weeks after issuing the variation, the Engineer confirmed that Contractor should proceed with coring (350mm) to allow for proper insulation. After another week the Engineer changed the diameter and type of exhaust stacks. This also led to the <u>additional cost of surplus material</u> since the originally specified stainless steel exhausts were already specified and the contractor had to procure the newly specified black steel exhaust pipes. <u>The Engineer did not reply to the same in a month period</u> which delayed the finishing in the area of the fireplaces and thus caused a suspension of the works.</p>		<p>General Observations:</p> <p>Late issue of missing design variation Lack of proper Management/Monitoring by Engineer??</p> <p>valuation of variation</p> <p>Assessment of Delay Slow attendance to responsibilities</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delay and Disruption Changes Interpretation of requirements</p>	<p>The variation was late It was not specified clearly The Contractor needed more details to be able to execute</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer issued the variation late and missing. It was further changed several times. - The Engineer's feedback was late 		

CASE ANALYSIS		Project: D
Case No.: 4	Subject: New Kitchen	Section: Architectural
<p>Synthesis:</p> <p>The Engineer had <u>modified the kitchen design</u> and expected the variation to be assessed as remeasured works. The Contractor sent an NPV regarding the same and sent the quotation for carrying out these works received from the MEP subcontractor. By negotiating the price the <u>Employer was accepting the fact that the additional work was a variation</u> and that the Contract rates and prices would not apply. There was on average a one week reply period in the correspondence carried out regarding this variation which proves that there was no negligence/delay by any of the parties to reply on time.</p>		<p>General Observations:</p> <p>Late issue of missing design/variation</p> <p>Influence by the Employer Validity/assessment of variation Assessment of delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Changes Delay and disruption Interpretation of requirements</p>	<p>Engineer issued modified kitchen design Modified design caused delay to the works There was a disagreement regarding the method of assessment of this variation which was not clear from the contract</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer rejected an NPV that the Employer accepted. - The Engineer was unable to make a fair assessment. - Engineer firm although contract is grey 		

CASE ANALYSIS		Project: D
Case No.: 5	Subject: Aluminum Works	Section: Façade
<p>Synthesis:</p> <p>The Engineer issues a variation related to the façade in the restaurant area and then accuses the Contractor of being late in executing the façade works. At this point the Contractor lists all modifications related to the façade that have been requested. The Contractor then requests formal approval of modifications related to the façade. The Engineer is late in giving the approval to proceed with this section of the works which has become critical. The Contractor in his claim expressed his intent on minimizing the delays to this aspect of the works and so pressed the Nominated Subcontractor for Aluminum works to give his best possible dates for completion. A meeting is held to resolve this issue but the meeting is not followed up with the requested written approval.</p>		<p>General Observations:</p> <p>Late issue of missing design Lack of cooperation</p> <p>Late approval of submittals by Engineer</p> <p>Slow attendance to responsibilities Lack of proper management/monitoring by Engineer</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions Changes Untimely response</p>	<p>A late variation is issued which delays the work The variation affects the façade area of the restaurant The Engineer did not attend to the matter in a timely manner</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor proved due diligence in proceeding with the works in delayed areas to minimize the effect. - Although matter is cleared in a meeting the Engineer is hesitant to give written approval. - Language expressing ill perception of the other party is expressed where the Contractor accuses the Engineer of intentionally delayed approval of shop drawings to allow time for contemplated modifications. 		

CASE ANALYSIS		Project: D
Case No.: 6	Subject: lighting works	Section: Electrical
<p>Synthesis:</p> <p>The Engineer issued the Employer's requirement regarding <u>the revised design for lighting works</u>. The contractor sends a notice for the variation and for the delay. The Engineer does not reply to both notifications. The Contractor sends details of the additional cost as received from the Nominated Subcontractor and requested the Engineer's approval of the same to proceed with the works. The Engineer was late in assessing the <u>value of the variation</u> and confirming his approval for the works to proceed.</p>		<p>General Observations:</p> <p>Late issue of revised design</p> <p>Lack of cooperation Slow attendance to responsibilities validity/assessment of variation Assessment of Delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions Changes</p>	<p>The revised design for lighting works delayed the works The revised design in lighting works results in a notice of variation by the Contractor</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer does not reply to the Contractor's notices and is late in assessing the variations - The Engineer is late in conforming his approval of the works 		

CASE ANALYSIS		Project: D
Case No.: 7	Subject: Labor Decrease	Section: General Requirements
<p>Synthesis:</p> <p>The situation in the country following the unstable political situation led to <u>loss of labor</u> and fights that took place on site among laborers. The Contractor did due diligence to minimize the effect of the loss of labor and made an effort to recruit Indian labor which was prohibited by the Lebanese labor law. The <u>Contract was not clear in this regard</u>. The assessment of this Force Majeur is disputed.</p>		<p>General Observations:</p> <p>Assessment of war claim</p> <p>Contract Document unclear</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Force Majeur Labor forces Delays and disruptions</p>	<p>The unstable political situation was an Employer's risk The shortage of labor forces The loss of labor was causing delay</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Contractor made efforts to minimize the effects of the Employer's risk - The governmental authorities did not help in resolving the labor problem. 		

CASE ANALYSIS		Project: D
Case No.: 8	Subject: EDL room	Section: Electrical
<p>Synthesis:</p> <p>The Engineer requested the Contractor to proceed with the works as per an attached offer by supplier. <u>The scope of activity of each of the Contractor and the supplier in carrying out these works was not clear.</u> The Engineer clarified the same. However, two activities were not accounted for in the definition of the scope and were <u>considered by the Contractor to be a variation:</u></p> <ol style="list-style-type: none"> 1. the unloading and placing of the EDL cells inside the EDL room 2. The cost of required medium voltage between EDL room and the transformer room. <p>The Engineer was late in approving the additional scope.</p>		<p>General Observations:</p> <p>Contract Document unclear</p> <p>validity/assessment of variation</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Delays and disruptions Coordination	<p>The Engineer's delay in reply was delaying procurement Coordination is required between the three parties to meet the full scope of works</p>	
<p>Behavioral Observations:</p>		

CASE ANALYSIS		Project: D
Case No.: 9	Subject: Fire Rated Doors	Section: Architectural
<p>Synthesis:</p> <p>The contract design was missing the fire resistant system in basement 4, the Engineer provides details of the same. The Contractor had sent the <u>subcontractor's offer and was waiting for the Engineer's approval to proceed</u>. Meanwhile the Contractor stated that he was putting this area on hold. <u>79 days after the issuing of the drawings the Engineer states that these items were no more required</u> and requested the Contractor to proceed with the Contract design. The issued drawings included other areas in basement 3 which upon the Contractor's questioning, the Engineer confirmed that fire rated items in basement 3 should proceed as per design. This process delayed the progress of the works.</p>		<p>General Observations:</p> <p>Slow attendance to responsibilities</p> <p>Late issue of missing design/variation validity/assessment of variation Assessment of Delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
Defective contract documents	The original design was missing the fire resistance system.	
Changes	The Engineer provides missing design which he deletes from the scope later.	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was hesitant in his requirements - The Contractor stated that the area was put on hold, but the Engineer did not react promptly. 		

CASE ANALYSIS		Project: D
Case No.: 10	Subject: Late Issue of Drawings	Section: Architectural
<p>Synthesis:</p> <p>The Contractor requested the <u>finishing details between the ceiling and the wall cladding</u> which was preventing him from proceeding with critical activities. This led to putting the gypsum ceiling on hold. The Engineer replied to the Contractor's request stating that the required details had been passed directly to the ID subcontractor. The Contractor resented that this has occurred several times on the project. As such the Engineer had not respected the <u>proper communication channels</u>. Moreover, the referred to details were still missing. The Engineer provided the required details <u>34 days after the Contractor initially requested them</u>. This delayed the progress of the works.</p>		<p>General Observations:</p> <p>Contract Document unclear</p> <p>Improper communication channel</p> <p>Slow attendance to responsibilities Assessment of Delay</p>
<p>Areas of risk (as categorized by Zack, 1996) identified in this case analysis:</p>		
<p>Delays and disruptions Defective contract documents Untimely response</p>	<p>The Contractor was late in providing the details The Contract documents were missing the details The Engineer was late in providing the details</p>	
<p>Behavioral Observations:</p> <ul style="list-style-type: none"> - The Engineer was unable to meet his obligation and provide the details on time. - The Engineer was not respecting the proper communication channel. 		

Appendix I:
Expert Comments to Recommendation

Section 1: Conditions of Contract

The amendments to the Conditions of Contract in the format suggested is likely to result in a reduction of disputes:

Expert A: Yes – Quite Significant

Expert B: Yes – Quite Significant

Expert C: No

Expert D: Yes

Expert E: Yes – Very Significant

Have you experienced disputes on projects related to one or more of the clauses addressed in this section? If yes please specify?

Expert A: These issues are typical heads of claim in most construction contracts and I have experienced many of them. The introduction of the proposed amendments and mechanisms will have an impact of the resolution or even avoidance of claims. However, the proposals will only work if both parties to the contract buy into this philosophy and act professionally throughout. This is from inception to completion. The Employers team must recommend the correct procurement route to provide for greater certainty of risk. The Employer should empower the Engineer to act impartially where necessary. The Contractor must work with the Employer to achieve their joint goal of completing the project. The Employer must recognize the Contractors aim to make money and the Contractor must recognize the Employers aim to achieve value for money. Such a mature approach will help in promoting the perceived success of a project.

Expert B: Yes. Extensions of Time, Valuation of Variations, Price Adjustment, on many occasions.

Expert D: I have experienced disputes related to all of the clauses during my tie of working as a Commercial Manager, Contract Administrator/ claims Consultant & Project Manager on a number of major projects in the Middle East including Bahrain International Airport, Regency Intercontinental Hotel Bahrain, Equestrian Club Riyadh, Qatar Cultural Village, Al Ain University and Churchill Towers Dubai.

1.1. Further detailing of clauses related to time assessment, cost assessment and Employer's risk are prone to reduce disputes on projects:

Expert A: Yes

Expert B: Yes

Expert C: None

Expert D: Yes

Expert E: Yes

1.1.1. An Extension of Time clause in the format described would assist in reducing disputes:

Expert A: Agree- Again, the success of such amendments will require a proper understanding of risk apportionment prior to the appointment of any contractor. This may involve the re-education of an experienced Employer who may expect certain rights. The Contractor must understand the resource required for proper implementation of this Clause.

Certain time limits to the mechanism of such a clause would be required.

Expert B: Agree - Provided the Employer accepts the clause as detailed at pre-contract negotiation stage, and provided the Engineer is genuinely acting not only impartially, but independently, without any undue influence from the Client, then some of these provisions would certainly serve to reduce the scope for dispute in the event of elongation. Particularly, if the level of detail for substantiation was set, this may obviate the tactic of continual referral for 'further and better particulars' sometimes employed by an Engineer under encouragement from a Client.

Expert C: Disagree - More clauses mean more obligations, responsibilities and cost and therefore more disputes.

Expert D: Strongly disagree - I consider that introducing detailed prescriptive requirements into Clause 14 would only increase the risk of further disputes over the Programme as the parties may engage 'experts' to support their positions.

I have experienced, on a significant number of projects, disputes arising at the initial stages of a contract over acceptance/ approval of the Master Programme which has resulted in contracts starting poorly and distorting relationships.

I consider that, in simplistic terms, there are lies, statistics and PROGRAMMES' and the introduction of the proposed amendments would encourage disputes over extremely detailed procedures rather than focus on the project team working together.

Expert E: Agree

1.1.2. A Valuation of Variation clause in the format described would assist in reducing disputes:

Expert A: Agree- *If greater certainty and clarity can be introduced at any point in a Contract, especially regarding cost, then as long as both parties fully understand the risk apportionment, this should be a positive step. However, it should be remembered that any contract requires balance and the drafter must consider a **fair** apportionment of risk*

Expert B: Agree - The Valuation of Variations under the UK JCT 1998 Standard Form of Building Contract is set out under clause 13.5, and prioritizes the methods of valuation in strict order of preference. The general underlying premise is that "no Variation shall vitiate a Contract" and the RICS Definition of Prime Cost of Daywork is utilized in the case of a dissimilar character to those in the Priced Document. Any substitution of the words "appropriate or 'reasonable' for something with pre-defined parameters from FIDIC 1999, would remove any room for interpretation and certainly assist in reducing disputes.

Expert C: Agree

Expert D: Agree - I consider that a clearly worded and detailed VoV Clause should provide transparency in establishing and agreeing rates between the parties and assist in reducing disputes.

I would be concerned over the amendment proposed to 1999 Red Book Clause 12.3 'should the measured quantity of the item be changed by more than 10%' – as this would change and increase the contractual significance of the quantities of items in the BoQ's at

a time when various parties wish to minimize the detailed measurement of numerous items which have little cost significance.

Expert E: Strongly Agree - Whenever the valuation of variation clause is detailed for each item of work, and if a related change in quantity is by more than x %, an assessment is done based on market rates for additional quantities and work executed if a dispute arise the parties are inclined to resolve it.

1.1.3. Adding details for Contractor's entitlement of compensation for Employer's Risk as proposed would assist in reducing disputes:

Expert A: Agree- *As noted under section 1.1.2 above.*

Expert B: Agree - Employer's Risk in areas or times of Political uncertainty or instability in this Lebanese example would firstly have to be defined or classified in terms of whether Acts of War, Civil Commotion, Riot or other such Civil unrest would constitute Force Majeure or not.

Provided that at tender stage there was clear prior knowledge of where the risk of such events might lie, in order that it may be insured against, or even better, accurately priced in advance as a Contingency / Vacation of Contract (and area) plan, then this area of potential dispute could be virtually eradicated.

Expert C: Agree

Expert D: Strongly Agree - I consider that a clearly worded Clause detailing the Contractor's entitlement to compensation for Employer's Risk would significantly assist in reducing disputes.

My view has developed from my experience of working on major projects in Bahrain during the Iraq invasion of Kuwait when the uncertainty arising over the Contractor's entitlement to payment resulted in a major contractual dispute which impacted negatively on the project when it recommenced.

Expert E: Strongly Agree - Adding details for contractors' entitlement of compensation, as a consequence the Lebanese 2006 July War a lot of disputes arose, a specified list of the cost for the contractors' entitlement of compensation is very useful.

What further clarifications to these clauses would you propose?

Expert A: As stated above, greater certainty under any contract should be considered a good thing by either party. If both parties can agree detailed rules to address, measure and value most typical eventualities under a construction contract, this can only be a positive step.

Expert B: Definitions of exactly what Employer's Risks and relevant events would trigger this Contractor's Entitlement' clause. The expansion of sphere of any works to areas such as Afghanistan, Iraq and Kurdistan etc. would no doubt merit some specialist advice from experience in these areas.

Expert C: All the 'damage' is done by the time the contracts are set up. The employer wants a building and the contractor wants money. The procurement process (especially in the Middle East) is set up so that the cheapest tender wins – the contractor that submits the lowest price wins. How the contractor gets to be the lowest is by cutting corners, profit, overheads, the potential effect of risks, etc. When the project is delayed, it costs the contractor money and he will try to recover his losses through whatever means because his minimal margins are being or have been eroded away.

The amended forms of contract used in the Middle East are so heavily in favour of the Employer that the Contractor is carrying an unreasonable and disproportionate amount of risk (in my view) and the contractor that wins the tender will invariably be the one that either is incompetent in assessing the risks or, is hoping all goes well regardless and that he can just muddle through.

Adding in the additional clauses as suggested will increase the burden on the contractor and in a competitive tender, corners will be cut to reduce prices. I would therefore suggest less clauses, not more with possibly an independent body (paid for by the Employer – on the basis that having disputes resolved quickly will save him money and get his building quicker) carrying out the duties you describe in the additional clauses. Otherwise, incorporating a 'Lebanese version' of the SCL Protocol into the contract could work for projects over a certain value.

Expert D - Proposed Clause is reasonable.

1.2. Care is advised to be taken in amending particular conditions listed in section, this should allow for minimizing disputes:

Expert A: Yes

Expert B: Yes

Expert C: Yes

Expert D: Yes

Expert E: Yes

1.2.1. An ‘Employer’s Prior Approval’ clause in the format proposed would assist in reducing disputes:

Expert A: Agree - It is the intention of the 1987 FIDIC Contract that the Engineer should act impartially in administering the Contract. However, under the 1999 form, he generally acts on behalf of the Employer. However under Clause 3.5 he is required to provide “fair determination”. The Employers right to dispute the Engineers decision will always provide for a level of uncertainty. This level of uncertainty may be reduced but not removed by the Employer’s right to agree variations in principle. The proposed mechanism of the variation budget similarly provides the Employer with the right of approval and thus would not provide the Contractor with any greater cost certainty until such approval is received. However, I do recognize the importance of “agreement in principle”.

Expert B: Neither agree nor disagree- An interesting option employed in In the UK under certain tripartite financing arrangements, which can be incorporated in certain forms of Contract, is provision for a "Bank Monitoring Surveyor" typically in Development Projects, usually an RICS Chartered Quantity Surveyor directly employed by, and acting specifically to protect the interests of the Funding Bank. The Engineer or Architect will issue a Payment Certificate to the Contractor, Employer / Developer and Funder, but this will not be paid by the Bank until the "Monitoring Surveyor" approves it. He will attend all Site Meetings, and get involved with the Contractor / PM and Engineer in order to attempt to significantly reduce any risk to the Contract and the Bank of disputes between the Parties. He has power to overturn decisions of the Engineer or Architect.

Expert C: Disagree - Delays in approval from the Employer would cause disputes.

Expert D: Agree - I agree in principle that such a Clause, if implemented in accordance with its intent, may reduce disputes.

I consider however that the proposal to set a budget limit for variations which the Engineer may certify would be of limited practical value as the Engineer should be implementing the procedures proposed as part of his standard 'good practice' reporting of costs to the Employer.

Expert E: Agree

1.2.2. Recommendation to replace the 'Engineer's Decision' in the format described would assist in reducing disputes:

Expert A: Strongly Agree - The use of any form of alternative dispute resolution (ADR) should be encouraged. DAB's provide such a form of ADR and are considerably cheaper and faster than arbitration or litigation. The introduction of Adjudication in the UK has been successful and is now the principle means of dispute resolution in the Construction Industry.

Expert B: Disagree - Engineers decisions are always likely to be the same as the Engineers Determinations, especially if there is Client influence behind them. Mandatory use of the Dispute Arbitration Board or 'DAB' referred should ideally be incorporated into balanced Contracts, the underlying purpose is to provide a vehicle for dispute resolution whilst the work proceeds, much as the Adjudication Procedure which became Mandatory in the UK under the 1996 Construction Act. Anything which avoids protracted Litigation is to be recommended.

Expert C: Agree - The Employer is normally not a technical person/body and may fail to understand the significance of what he is doing and why. Delays would cost the Employer money and give the Contractor reason to delay further – hence more disputes.

Expert D: Strongly Agree - I have never had the experience of an Engineer reversing a previous decision under this Clause. I therefore would support the use of a DAB.

Expert E: Agree - Especially in the Middle East, I witnessed the cancellation of the DAB clause, the number of disputes in these projects increased, the impact of the cancellation of the DAB clause has been aggravated after the financial crises where many construction disputes have been referred to arbitration and are pending

1.2.3. Recommendation regarding ‘Amendments for Lump Sum Contracts’ as described would assist in reducing disputes:

Expert A: Agree - It must be noted that the choice of the correct procurement route and contractual mechanism is a major factor in the success or otherwise of a project. I agree that the form of Contract should be correct for the works in hand, however, it may be that the Lump Sum form is suitable where design is incomplete with correct use of provisional sums.

Expert B: Strongly Agree - Care in selection of the correct Form of Contract suitable for the procurement of the proposed form and nature of Work is always highly recommended.

Expert C: Agree

Expert D: Strongly disagree - I consider that Lump Sum Contracts have been and may continue to be used successfully for the delivery of large complex projects provided that competent consultants are appointed and the time is made available to define the brief and produce a full set of documents on which the lump sum price can be accurately established. There are also adequate provisions under a lump sum contract to adjust the lump sum price to take into consideration the various changes in conditions that may be encountered during the execution of the works.

For an Employer, one of whose critical criteria is ‘certainty of price’, the use of a lump sum contract should offer him confidence that such certainty is achievable.

I consider that a Design-Build Contract for a large complex project may increase the risk to the Employer of him not obtaining the quality of project he expects should the Employer’s Requirements not be fully developed or implemented by a D&B Contractor who may be more focused on buildability & delivery of the project.

Expert E - A lot of disputes arise in Lump Sum Contract and notably claims for delays and disruptions due to error in design, a literature on patent and latent error in design is submitted to evidence.

1.2.4 A 'Price Escalation' clause in the format described would assist in reducing disputes:

Expert A: Agree - Price adjustment formula in a fluid or volatile market place can be seen as vital to the success of any project as if a Contractor is loosing money due to market conditions beyond their control, then this will encourage claims – not necessarily correctly. However, the Employer must fully understand how this risk is apportioned under the contract.

Expert B: Disagree- I assume the Theorie d'imprevision contained in the Civil Code is an underlying principle of balancing or redressing the unfair allocation of risk.

In the case of escalation / compensation / market fluctuations, the British Cost Information Service and Royal Institution of Chartered Surveyors are years ahead of foreign markets in the fair and transparent adjustment of fluctuations via NEDO (National Economic Development Office) published formulae. These simple weightings, published on a monthly basis in times of base price turbulence, were universally accepted by Client / QS / Contractor alike, and should be introduced into FIDIC / international markets to reduce such areas of dispute.

Expert C: Agree

Expert D: Disagree - I fully agree with the use of a price adjustment clause on projects of a medium to long term duration, particularly during periods of high volatility in costs/ prices.

I can certainly appreciate the apparent advantages of using a formula method to calculate fluctuations with its advantages of ease and speed of use with minimal expenditure of resources.

However I do not have confidence in the use of general formula for the calculation of such fluctuations as they may produce anomalies which do not reflect actual market prices and may therefore give rise to disputes.

I consider that implementation of Clause 70.1, fully detailed and resourced and verified may produce a result which will not result in disputes and will be acceptable to both parties. Such a system may be implemented cost effectively through utilization of appropriate cost data bases etc.

Expert E: Strongly Agree - Especially the increase in the rates of materials witnessed last year, the Arab countries witnessed it in the increased number of disputes in this relation.

Please rank them in the order of their impact on dispute minimization

Expert A*	Expert B	Expert C	Expert D	Expert E
Amendments for Lump Sum Contracts	Correct Definition and application of Lump Sum Contracts	Price Fluctuation/ Adjustment	Engineer's Decision	Price Fluctuation/ Adjustment
Employer's approval to Engineer's determination	Engineer's Decision	Engineer's Decision	Employer's approval to Engineer's determination	Employer's approval to Engineer's determination
Engineer's Decision	Employer's approval to Engineer's determination	Amendments for Lump Sum Contracts	Amendments for Lump Sum Contracts	Engineer's Decision
Price Fluctuation/ Adjustment	Price Fluctuation/ Adjustment	Employer's approval to Engineer's determination	Price Fluctuation/ Adjustment	Amendments for Lump Sum Contracts

** The ranking is, in some way, subjective and may be different depending on the individual circumstances surrounding a project, including economic and political climate*

Kindly express any views/comments/additions you may have regarding this section

Expert A: As previously stated a Contract must be balanced in terms of risk apportionment. Any move to provide greater certainty for both parties must be welcomed but may require some education and must be fair.

Expert B: As detailed above

Expert C: Good idea – provided that the independent FIDIC Engineer still gets the final word.

Expert D: I consider that amendments to standard forms of contract should be discouraged as the amending party is frequently motivated to obtain a contractual or commercial advantage which may be unfair or unreasonable to the other party. Such amendments may give rise to suspicion or the feeling of unfairness from the start of a contract which may produce an atmosphere in which disputes may be encouraged.

Section 2: Procurement Practices

The inclusion of Procurement Practices in the format suggested is likely to result in a reduction of disputes:

Expert A: Yes - Very Significant

Expert B: Yes – Of reasonable significance

Expert C: No

Expert D: Yes - Quite significant

Expert E: Yes – Greatly significant

2.1. A pre-bid meeting in the format described would assist in reducing disputes:

Expert A: Strongly Agree

Expert B: Neither agree or disagree

Expert C: Disagree

Expert D: Agree

Expert E: Strongly Agree

2.2. A pre-award conference would assist in reducing disputes:

Expert A: Strongly Agree

Expert B: Agree

Expert C: Disagree

Expert D: Agree

Expert E: Strongly Agree

Have you participated in pre-bid meetings/pre-award conferences similar to those described above:

Expert A: Yes. The use of these processes can greatly reduce the incidences of claims through misinterpretation of the tender and Employers requirements. The meeting should have a detailed agenda and be properly recorded to be effective.

Expert B: I have never attended a 'pre-bid' meeting in the manner described, but have met many potential Clients in the UK in order to assess mutual suitability at a pre- tender interview. Once qualified, and once a successful competitive bid is are submitted, we normally schedule a post-tender or pre-contract meeting to review such matters.

Expert C: No

Expert D: I have been involved in a number of public sector projects which have been conducted on a 2 Stage Competitive Tender basis where there have been meetings/ briefings conducted with all tenderers at 'time of issue' and 'mid-tender'.

I consider that these meetings/ briefings were successful in providing tenderers with a fuller understanding of the project, clarified ambiguities and tenderers queries and resulted in more complaint & comprehensive tenders being submitted.

Would you propose/add any other point to be discussed during those pre-bid and pre-award meetings?

Expert A: The combined result of both meetings should be that the Employer is made fully aware of what he is buying for the proposed Contract price and the Contractor is fully aware of what the Employer is expecting to get for this price.

Expert B: The Term 'Best Practice' is the subject matter of this issue, many volumes an guides about which have been written, and Industry Professionals in the UK normally follow such Practices.

2.3. The MOU of higher management proposed would help maintain a cooperative spirit

Expert A: Agree

Expert B: Strongly Agree

Expert C: Disagree

Expert D: Disagree

Expert E: Strongly Agree

Kindly express any views/comments/additions you may have regarding this section

Expert A: These practices should also be used by the Contractor with their suppliers.

Expert B: Best Practice Protocol is always recommended, many standard procedure manuals are available.

Expert D: I consider that procurement procedures that provide tenderers with the opportunity to engage more fully in the tendering process are most beneficial to the success of a project in that they encourage the tenderers to devote the resources required to understanding more fully the project for which they are tendering.

I consider that an MOU between the parties is a positive step and may be reinforced through the introduction of a clause, such as that included in the NEC suite of contracts which states that the parties shall act in a spirit of mutual trust and co-operation.

Section 3: Regulating the Industry

The implementation of regulation to the industry in the format suggested is likely to result in a reduction of disputes:

Expert A: Yes - Quite Significant - *Depending on how the industry is regulated it may result in quicker settlement of those claims that do arise.*

Expert B: Yes - Quite Significant

Expert C: Yes - Very Significant

Expert D: Yes - Quite Significant

Expert E: Yes - Very Significant

The Government should contribute in cultivating a healthy construction industry:

Expert A: Strongly Agree

Expert B: Agree

Expert C: Agree

Expert D: Strongly Agree

Expert E: Strongly Agree

3.6.1. Enforcing regulations/restrictions to Drafting of Construction Contracts would reduce disputes:

Expert A: Agree

Expert B: Agree

Expert C: Agree

Expert D: Agree

Expert E: Agree

3.6.2. Enforcing regulations to Procurement Practices would reduce disputes:

Expert A: Strongly Agree

Expert B: Agree

Expert C: Agree

Expert D: Strongly Agree

Expert E: Agree

3.6.3. Enforcing regulations to Professional Skill Requirement would reduce disputes:

Expert A: Agree

Expert B: Agree

Expert C: Agree

Expert D: Agree

Expert E: Strongly Agree

3.6.4. Regulations to safety code should be better enforced:

Expert A: Strongly Agree

Expert B: Agree

Expert C: Agree

Expert D: Strongly Agree

Expert E: Strongly Agree

Kindly express any views/comments/additions regarding your agreement/disagreement to the points raised above

Expert A: Regulation of the industry in the UK has a mostly positive effect particularly in terms of dispute resolution and health and safety and should be encouraged.

Contractors and Employers should also have joint representation to encourage discussion between both parties and the regulators.

Expert B: Most of the statements and assertions made are fairly obvious – Best Practice implemented by experienced and Qualified Industry Professionals, imposing balanced and reasonable steering criteria upon a developing market will always be preferable.

Expert E: regulations to safety code is a recommended to be enforced especially in the Arab countries where there are not adequate laws or no laws at all

General

Which of the three sections/recommendations above you rate as the most significant in achieving the goal of minimizing disputes? Why?

Which of the three sections/recommendations above you consider as the least significant in achieving the goal of minimizing disputes? Why?

Expert A: I believe that all three sections are important and combined correctly will reflect the increasing maturity of the Construction Industry.

As I stated under the first section, all the proposals within the report abstract must be accepted by both parties to a construction contract in order for them to be effective.

An industry with greater certainty in terms of cost, risk apportionment, fairness and safety should be welcomed by all.

Expert B: The Construction Process is a holistic entity, and the isolation or ranking of one individual area above the other in this context is probably not conducive, as they are not mutually exclusive.

The section on Conditions of Contract is most relevant in Dispute Resolution, and perhaps the other two, Procurement Practices and Regulation could both be construed as an equally important 'follow on' from the basis of Contract.

Expert C: Most significant is Section 3. Fixing something before it breaks completely is always preferable to waiting until everything collapses around you and then doing something!!

Least Significant is Section 2. It is too late to make meaningful changes by this stage.

Expert D: Most significant is Section 2 –Procurement Practices - because implementation of ‘best practice’ in the procurement of a contractor should result in him fully understanding and allowing for the requirements of the contract, including risks, in his contract price. The Contractor will therefore not be under pressure to attempt to maximize the opportunities of recovering costs not fully identified and allowed for and which are frequently the sources of disputes.

The Contractor’s senior management should also have made a formal commitment to deliver the project in a cooperative and non-adversarial approach.

Least significant is Section 1 – Regulating the Industry – It would be extremely difficult to minimize disputes within the construction industry by regulation (except possibly in a command economy) due to this being a long term process requiring a significant change in culture; while there are so many parties involved in each project most of whom have short term goals – many of which are conflicting. Also from my experience it is frequently the case that regulatory authorities develop into self serving bureaucracies who have little interest in developing solutions but become part of the problem through their strict adherence to the process or overly bureaucratic procedures.

Expert E: Most significant are Sections 1, 2, 3