

AMERICAN UNIVERSITY OF BEIRUT

INTERVENTION OF THE EMPLOYER AND EMPLOYER'S  
APPOINTED PARTICIPANTS IN THE ENGINEER'S ROLE  
UNDER THE CONSTRUCTION CONTRACT

by

LAYAL GHASSAN NAEEM

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Approved by:



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Dr. M. Asem Abdul-Malak, Professor  
Engineering Management



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Dr. Issam Srour, Assistant Professor  
Engineering Management



---

Dr. Farook Hamzeh, Assistant Professor  
Civil and Environmental Engineering

Date of thesis defense: April 8, 2013

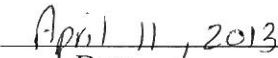
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# AN ABSTRACT OF THE THESIS OF

Loyal Ghassan Naeem for Master of Engineering Management  
Major: Engineering Management

Title: Intervention of the Employer and Employer's Appointed Participants in the Engineer's Role under the Construction Contract

Construction projects are becoming very complex and large, which has led to multiple parties representing the interests of employers (clients), including an employer's representative, a design consultant, a project manager, a cost consultant, etc., to be now involved in the organizational structures for projects.

However, only one of these participants shall normally be appointed as the "Engineer", whose role will be to carry out the administration of the construction contract on behalf of the Employer and to be the lead participant responsible for corresponding with the contracting company on most contractual issues.

This research is aimed at addressing two questions of: who is best to take the lead in performing contract administration functions and be named as the Engineer? To this end, the research presents a brief categorization of the roles and functions expected to be fulfilled by the Engineer and a study of the pros and cons of assigning the hat of the Engineer to the project manager as opposed to assigning it – the traditional way – to the design consultant. The offered analysis can be viewed as an eye-opener for projects' employers as to the considerations that could potentially be accounted for in figuring out how best to plan for having the roles of the Engineer fulfilled. The second question of how the authority of the Engineer, regardless of who is given the title of the Engineer, can be expected to get interfered by the presence of other possible participants on the project, including the Employer himself? This research examines a theoretical analysis that highlights the conditions that are likely to be modified or transferred by the Employer in a way of limiting the Engineer's authority under the construction contract as a result of the possible interplay among participants including the Employer and others engaged to act on his behalf.

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# CHAPTER 1

## INTRODUCTION

### **1.1. Background**

The construction industry market has been on the rise throughout the decades, and projects are becoming very complex and large, thereby requiring considerable capital outlays and more integration of many disciplines and across organizational boundaries.

The construction industry is perceived to be adversarial in attitude [49]. The competition is taking a huge place in the industry among employers because of their high expectations and desires. Advancements in the industry are taking place in an accelerating rate. This has led to multiple parties representing the interests of employers to be now involved in the organizational structures for projects, in a manner different from the traditional involvement of only the employer and the design consultant. One such primary party is a project management (PM) company to whom major coordination-type work is assigned by the employer. The need for such an appointment can be attributed to the fact that construction projects require the coordinated effort of a temporary assembled team comprised of professionals of different disciplines [11].

Project management is defined, according to Huston [26], as “a general purpose management tool that can bring projects to successful completion and to the satisfaction of the project stakeholders, given the traditional constraints of defined scope, desired

quality, budgeted cost, and a schedule of deadlines”. To this end, PM is the achievement of project’s objectives through people, and – as such – it involves the organizing, planning, and control of the resources assigned to the project under a constructive human-relations environment. In addition, PM is not only a set of tools that can be implemented at any time into an organization system; it is rather a whole culture [38].

Project management methodologies can be applied during all phases of a project’s life cycle [45]. However, in the construction industry, such an application is more significantly critical during the construction phase, where the bulk of a project’s expenditures are expected to incur. In this phase, project management is exercised, on one hand, by the contracting company, and, on the other hand, by the employer, or on his behalf, by an entity or more appointed by the employer to administer the construction contract. Contract administration is, in nature, largely aimed at making sure that a proper application of project management principles, as called for by the contract [19], is closely observed by the contractor.

The party responsible for carrying out contract administration on behalf of the employer is expected to differ depending on the project organizational structure (OS) adopted from the possible different scenarios. Where in the first scenario, each organization acts as a separate entity. In the second scenario, the client representative and project manager functions are entrusted with the same entity. In the third case, the consultant would be expected to have the lead role in administrating the construction contract, over and on top of providing technical supervision during the construction phase. In the fourth scenario, the client is having an in-house client representation entity. In the fifth scenario, the client is having an in-house client representative team, while the

project manager and consultant firms are separate. In the sixth structure, the employer has an in-house team that could play a combined client representative and project manager role.

In all such scenarios, it is expected that those participants representing the employer's interests or acting on his behalf in administering the construction contract, including the Engineer, are to possess such high levels of maturity in their understanding an application of project management principles and tools as those comparable to levels 4 and 5 of the maturity scale presented by Ibbs [27].

Traditionally, the role of the Engineer is assigned to the design consultant despite the argument that the design consultant may not preserve objectivity when dealing with claims or disputes that are tracked back to design issues. This contract-administration-type assignment may continue to be a preferred option to projects' employers particularly in view of the possibility of also appointing a dispute adjudication board to whom disputes can be referred by either of the parties to the contract [41]. At stake is whether the Engineer, under certain OS circumstances, will be afforded the chance to play its role in a manner consistent with what is expected of him, thereby rendering such a role in all good faith and while maintaining objectivity, professionalism, and impartiality [52]. What is also relevant here is the legal liability carried by the Engineer for his acts that he renders under the capacity of a client representative [18].

## **1.2. Problem Statement**

The construction contract is established between the employer and the contracting firm. Since the employer can be represented in a number of ways depending on the

project's organization structure decided on by the employer, it is not clear how the role of these participants may or may not feed into the fulfillment of the role of the Engineer.

Ideally, there shall be a lead participant responsible for corresponding with the contracting company. In the case where the project manager is given the lead to act as the Engineer, some questions surface as to the possible liability that gets picked up by the project management firm for being responsible for relaying to the contractor decisions and opinions rendered by the design consultant on technical issues and submittals? Is this role limited to administering the transmittal of such information (e.g., maintaining logs and monitoring submittals' review periods), or does it extend to exercising a higher level of authority, including reviewing the consultant's replies for any possible irregularities, anomalies, inconsistency, and indiscretions? With the assignment of additional participants by the employer, such as a client representative, a cost consultant, etc., the orchestration of the interventions of all involved participants can at best be described as fuzzy.

### **1.3. Research Objectives and Significance of the Work**

This thesis work is aimed at answering two significant questions concerned with how the employer's appointed participants in different organizational structures are expected to individually or collectively contribute to observing the project management functions as are explicitly or implicitly addressed in the construction contract conditions.

The first question is conceptual, and it is addressed in the context of having these multiple participants representing the employer's interest. That is, who is the participant to best take the lead in performing contract administration functions and be named as the



Engineer? The second question revolves around how the authority of the Engineer, regardless of who is given the title of the Engineer, can be expected to get affected by the presence of other possible participants on the project, including the employer himself.

The outcome of this work is expected to be an eye-opener for employers, engineers, and other concerned project participants as to the implications and ramifications that could potentially result from radically altering or mingling with the roles the Engineer is called for to play under standard forms of contract conditions. As such, this research work will pave the road for a better understanding of the Engineer's role and the critical importance of allowing this role to be exercised in an impartial, unbiased, and objective manner.

#### **1.4. Methodology of the Document**

The research objectives were been achieved through several steps as the following:

- First, the first question has been answered in a descriptive and qualitative analysis:
  1. In chapter 2, it provided a general descriptive review of the literature on project management including definitions and benefits of project management office. It gives a review about construction contracts and contract administration functions typically exercised throughout the project's construction phase. Moreover, it has a full examination about the contract's participants, the way they interact with each other and the roles played by each.

2. While in chapter 3, there was a classification of the roles of the Engineer in a qualitative way by visiting the FIDIC 1999's General Conditions for the Construction Contract to study the contract formation processes, with the aim of filtering the major project/contract management functions that the Engineer is normally entrusted with under such a standard form of conditions.  
  
Furthermore, the mode of achieving these levels is through the classification of the Engineer's roles to be either technical or administrative and which party between the A/E and the PM will handle them.
3. In addition, chapter 4 studied the argument on the assignment of the Engineer's title through a full descriptive of his roles and obtained the pros and cons of assigning the hat of the Engineer to the project management firm as opposed to assigning it the traditional way to the design consultant by examining different factors.
  - On the other, the second question has been addressed:
    1. In chapter 5 by presenting a theoretical analysis through highlighting the conditions that are likely to be amended by the Employer by way of limiting the Engineer's authority under the contract. It examined the stipulated role of the Employer and investigated ways through which the Employer may fulfill the contract administration roles wherein the Engineer's authority may have become limited and further interfere, whether individually or through others, in the rendering of decisions, determinations, judgments, opinions by the Engineer.

2. Furthermore, in chapter 6 there was a description of the outcomes from chapters “3”, “4”, and “5” above, through validating a major case study on a project executed with multiple participants representing the interests of the employer and given active roles in administrating the construction contract.
  - Finally, chapter 7 offered a general conclusion. In addition, it addresses the challenges and limitations that would face the acceptance of this theoretical analysis, and recommends the future work that might be initiated based on the theory in hand.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1. Preamble

The construction industry is growing very fast throughout the decades and it is becoming very complex and large. There are several literatures highlighting the development of the construction industry across the whole world and showing the importance of the development of this industry at the economic growth. According to Ye et al. (2009), “the construction industry is one of the most significant industrial contributors to the economy in terms of gross product and employment. As a result, the success of a construction project is a fundamental issue to most governments, users and communities” [63].

Successful projects are the reason behind the huge development of the construction industry. This success comes from several factors affecting each project; there are many lists and reasons through the literature behind the success of any project. Traditionally, it is known that the most important and conventional factor is the iron triangle, as Toor and Ogunlana (2010) explained, “ the conventional measures or the so-called iron triangle of time, cost, and quality has been the dominating performance indicator in construction projects” [60].

Recently, studies showed that there are many things affecting the development of the construction industry starting from the construction contract and its administration processes, the attributes and roles of parties and participants in the contract, the

construction delivery methods, the project goals and expectations, the complexity of the design, and overall the project management processes handled during the project. This research through the literature review will highlight the effects of each factor on the construction industry and concentrate on the ways the construction contract being administrated by studying the roles played among the contractual parties.

## **2.2. Project Management**

Project management practice has been used widely in the construction industry due to the complexities of the projects and the sophisticated owners. In most of the construction projects “the ‘iron triangle’: schedule, cost and quality have been accepted as the most commonly used criteria to define the success” [55]. They are the major goals “though there are other more specific objectives, such as safety consideration, stakeholder’s satisfaction and so on depending on the nature of the project, participants and the company” [55].

Thus, project management practice is essential for the success of a project in terms of these criteria. The effectiveness of using this process was well defined in the literature review and it was studied in several ways. In construction projects to “ensuring successful outcome which has always been the aim for construction project manager and project management is used as the tool to achieve this goal” [55].

### ***2.2.1. Definitions***

Project management a process that was defined in several ways to explain the effectiveness from using it as a tool in any project. The Project Management Institution PMI defined it as “the application of knowledge, skills, tools, and techniques to project activities to meet project requirements” [1]. Project management is considered a discipline of work that requires specific knowledge and that has a set of rules governing the work conducted.

In addition, others described project management as “an essentially straightforward concept that recognizes there are sets of coordinated human activities aimed at a defined objective, which we call projects. They tend to be one-off non-routine undertakings with discreet time, financial and technical goals” [6].

Moreover, several studies came up to conclusions that “project management requires planning with a commitment to complete the project and they have further observed that the commitment and support of a parent organization is a vital requirement to project success. Project management can be very difficult unless the parent organization is willing to commit company resources and provide any necessary administrative support” [40].

### ***2.2.2. Benefits of Project Management***

The use of project management is considered a very effective process in the success of any project. There are different benefits from using project management and hiring a project manager as a participant in the project. Since some researches presented that project management, “quantify value commensurate with cost, optimize the use of

organizational resources, reduced schedules, put strategic plans into practice, reduced risk and consistent tracking and reporting” [5].

Moreover, another point of view regarding the benefits of project management “ it provides a special and distinct role due to the organizational form of traditional structures” [34]. As well as, organizations are recognizing the benefits of project management to their business by segmenting their work into defined and bounded projects. They all relay that “the success to their business not only requires to be broken into projects, but also each project is well managed” [25].

According to Huston (1997), “the need for project management and the benefits that are possible from implementing project management methodologies are well documented and in many industries project management has already become both a central activity and the third element of organizational management systems that is bringing balance, harmony and success in global organizations” [26].

Very strategic components to be considered in project management, which are, project descriptions and project organizations. Through the years, it was well proved that the project descriptions are important particularly for construction projects. According to Bennett (1983), “projects differ from each other in many ways but for strategic management purposes some factors are more important than others. The classification of projects in current organization’s theory concentrates on differences in size, production technology and predictability” [6]. This might be used by the project manager as the basis for making strategic decisions. The other component Bennett mentioned was the project organizations where “project management requires that projects are seen as being subdivided into separate tasks each of which can be made the responsibility of a separate

team. The role of the project organization is to co-ordinate and integrates the separate teams into an effective unit” [6].

### **2.3. Construction Contracts**

The FIDIC Contract Guide 1999, published four different forms of contract, one of them is the “CONS” Conditions of Construction Contracts. According to the FIDIC, Contract is defined as “the Contract Agreement, the Letter of Acceptance, the Letter of Tender, these Conditions, the Specifications, the Drawings, the Schedules, and the further documents (if any) which are listed in the Contract Agreement or in the Letter of Acceptance”.

Contracts have standard forms that are used between participants in any construction project. Through several researches, construction contracts play a major role and “the standard form plays a significant role in this process as it communicates the procedures to be adopted in executing the project including the determination of the rights and obligations of contracting parties” [42]. Through the last decades some standard forms of contract is used in the construction industry, according to Ibbs and Ashley (1987), “ there are many internationally recognized standard forms of contract developed for the construction industry by a number of independent professional organizations and these are intended to be used in different contractual arrangements” [7&28].



### ***2.3.1. Benefits of Standard Forms***

There are several benefits from using the standard forms of contract in the industry. Many were introduced by researchers as “they represent a degree of fairness in contracting between the two parties, the conditions having been drafted by experts beforehand and away from the heat of the particular project, with the balanced representation of all relevant industry participants, and representing a fair allocation of risk between the contractor and the employer” [36]. While, according to Perry (1995), “the use of standard forms of contract also helps to manage and mitigate project risks” [44]. Moreover, the use of standard forms of contract helps “to reduce the inefficiencies associated with the repeated drafting and reviewing of contracts, and to facilitate a greater sense of partnership between contractors and employers” [31].

There are more than one standard forms of contract are used in the industry but the most familiar one is the FIDIC (1987, 1999) “ International Federation of National Associations of Consulting Engineers”. It has been recognized that “most of the countries around the world use the conditions of contract promulgated by FIDIC for use in international construction contracts” [39].

Where, the contract general conditions are considered one of the most important parts in the construction contract. According to the FIDIC 1999, it is “the recommended conditions for building or engineering works designed by the Employer or his representative, the Engineer”. In addition, “the Contractor constructs the works in accordance with a design provided by the Employer. However, the works may include some elements of Contractor designed civil, mechanical, electrical and/or construction works” [19].

### ***2.3.2. Aspects of the Contract General Conditions***

The use of general conditions considers several aspects that are relatively related to the complex nature of construction projects, which dictates the use of lengthy and carefully written contracts in order to describe precisely the legal, financial, and technical aspects of the project [15]. According to several researchers, general conditions are important because “this document stems from its role in defining the relationships (rights and responsibilities) of the contracting parties in all the projects within an agency or a country. The document spells out the general project rules and relevant commercial terms” [10]. Furthermore, “one of the main advantages is the potential for improvement by using the same standardized conditions over a long period of time and the familiarity of the contracting parties with the relevant provisions of the contract” [10].

Contract general conditions have many aspects regarding the role it plays in the relationship between the contracting parties. These aspects were examined in different researches and common results came up, for example, it was said, “the general conditions should be fair to the contracting parties and the responsibilities should be assigned to the party that can perform most efficiently and least expensively”. The best principle for allocating responsibility is that controllable risks should lie with the party who is in control, and that a risk which cannot be controlled should be allocated to the party best able to protect against or absorb the risk [22&54]. For example, it was described that “those conditions should anticipate the potential trouble spots of the relationship between the contracting parties” [10], and they can aid in ensuring a smoother completion of the construction process [16].

In addition, “the pivotal role of the general conditions has important ramifications for the likelihood and degree of project success in terms of cost, time, quality, and the satisfaction of the contracting parties” [42]. Consequently, “the general conditions, whether standard or not, need to be viewed by both the project owner and the contractor as a source of project risk that needs to be assessed” [42]. Moreover, they “should promote the achievement of the more tangible dimensions of project success in terms of cost, time, quality and safety” [10].

As a result, it was found that “the above aspects of the general conditions can be broken down into the following eleven elements (attributes): clarity, conciseness, completeness, internal consistency, external consistency, practicality, fairness, effect on quality, effect on cost, effect on schedule and effect on safety” [10].

#### **2.4. Contract Administration**

Construction contracts are the main issue during any project; they are considered the legal relationship among the contractual parties. All contracts are administrated through several contract administration processes. Thus, the contract administration is one of the major roles played throughout the project and many researches and studies were done to understand the concepts of contract administration, the way these administrating processes work and the project risks considered in every contract administration.

### ***2.4.1. Contract Administration Concept***

The contract administration consists of having a contract's administrator or, in other words, a contract's manager to be able to deal with all issues and duties related to administrative or managerial works taking into consideration project's parameters related to time, payment and sometimes quality. Moreover, the contract administrator has the role in assisting the employer and the contractor in taking major decisions during the project.

According to Axelson (2007), “one of the multiple duties of a contract administrator under conventional construction contracts is to make validating decisions, from an independent perspective about various aspects the contractor's performance in order to determine the payment and other entitlements due to it under the contract” [4]. Axelson added a fundamental and essential question about “how much decision-making freedom or discretion should the contracts ascribe to contract administrator?” [4]. This question leads one of this study's objectives to achieve, of how much the employer can interfere in the decisions taken by the contract's administrator regarding the freedom the contract itself gives to him/her.

Furthermore, contract administration processes are examined in different contract conditions but the Conditions of Contract for Construction that is published by the FIDIC is the most commonly used in the industry and we are relating to during this study. According to the FIDIC (1999), “the Employer appoints the Engineer to administrate the contract throughout the project” [19] and the contract administration is handled by three main processes that will be examined further in this research.

#### ***2.4.2. Project Risks under Contract Administration***

One of the main concerns about contract administration is the project risks. Since many researches showed the increase of project risks because of the decision taken by contract's administrators. For example, Wearne (1992) stated in his paper that “ the increasing risks of entering into external contracts for engineering works, procurement, construction and other services for projects are affecting the internal practice in employers' and contractors' organizations in the delegation of responsibilities for contract administration”[61]. This means that most of the decisions are taken by the contract's administrator, which makes him/her take all the responsibilities for every choice and this would increase the risks in every project.

Moreover, Wearne mentioned that in any employer's or contractor's organization, the person who makes the decision to purchase or to sell needs the authority to accept the risk of choosing who to buy from and who to offer to do the work at certain price, time and quality [61]. In addition, the responsibility for managing the contractual relationships and communication between the employer and contractor will be by the contract's administrator from the employer's and contractor's organizations [61]. On the other hand, Wearne explained in his paper, “even though the contract may include a procedure for the contract's manager to operate for changes in the scope of work, timing and costs and give him the authority to take major decisions but he is not authorized to renegotiate or terminate the contract” [61].

As a summary, Wearne believes that “the relationships within an organization are usually very complex than descriptions and there can be much formal and informal consultation between various levels of managers and advisers before decisions are taken”

[61]. Thus, “the role of the manager described as having the authority to make a contract may be more that of a leader of discussions and the decision-making process” [61].

## **2.5. The Contract’s Participants**

Construction contracts include main participants who are the employer, the architect/designer, the contractor and other participants such as (project manager, cost consultant, legal team...etc). Through many researches, it has been apparent that the success of project concerns the satisfaction and cooperation of project’s participants. It was clearly described in the literature review the authority of the contract’s participants and their effect on the success of projects. “The completion of a project requires input from a variety of groups including the client, the project team, the parent organization, the producer and the end user. Each party has a role in defining and determining success. They all have specific tasks and responsibilities that they must fulfill in order to achieve success”[35]. A number of critical success factors affecting schedule and cost performance have been identified for the construction industry [29& 30]. “Project participants are the key players for making the project a success”[13]. According to Chan (2001), assert inter-organizational teamwork as a major factor in ensuring project success [14].

In addition, satisfaction of the construction project participants is considered a major aspect for any project success and this was supported by different researches. Leung thought that “the satisfaction of the construction project’s stakeholders could directly influence the performance of subsequent projects. Thus, to improve project success the critical satisfaction factors pertinent to the construction management process

should be identified” [37]. Moreover, Leung believes “there is a significantly positive relationship between commitment and satisfaction in construction project management, while high level of conflict is stimulated in the goal setting process amongst the participants. Satisfaction is an affective state reached by the individual through attainment of certain goals (success) which gives rise to rewards. It is more important to project success than meeting any particular project objectives” [37].

Furthermore, several studies showed that “the attributes, coordinating ability, commitment and competency of project participants are being given the importance due to the fact that most of the times their contribution can have far reaching implications on project success” [55]. As well, “Cooperation/ participation, task/team conflict and goal commitment are the critical factors influencing the final outcome (satisfaction) in the complicated management process” [37].

### ***2.5.1. The Employer***

The Employer, the Client, or the Owner many terms used to describe the person or the party who owns the project in the construction contract. According to the FIDIC definition, the “Employer means the person named as employer in the Appendix to Tender and the legal successors in the title to this person” [19]. The Employer plays several roles throughout the project and the contract gives the Employer the authority in practicing and taking the lead to make several decisions.

Moreover, Employers have many expectations and they are very sophisticated regarding the project works and values. Most of the time, employers are not satisfied with the works that are done and this causes a lot of time extensions and extra costs of the

works. As it is known, “if client values are not fully understood in a construction project it is likely to result in either low fulfillment of client expectations or multiple design alterations during the project process which lead to additional costs and frustration among the project participants” [59]. According to Chinyio et al, he considers that “the problem is that clients’ needs may not remain constant over time but may, instead, vary according to circumstances, with different procurement preferences for different projects or different preferences for similar projects at different times” [12].

There are several studies done regarding the issue of satisfying the employer’s needs and expectations during the project’s works. As an example, a study regarding the employer’s values and his perspectives; first they asked very simple questions which there are different interpretations and answers for, as “what is the nature of value and who is the employer?” [59]. This was a good way to show that “differentiation is often made between experienced, inexperienced, public and private, short-term (developers) and long-term clients (owners) which all represent different perspectives regarding the construction process” [59].

As a summary, we can tell that the employer is considered a complex party with different values and perspectives [59]. In addition, the employer during the project will involve different participants to play several roles from his side. Thus, it is important to identify the employer and create a good communication from the beginning of the contract to have a good relationship between the contractual parties and thereby enhance understanding of the joint situation in the view of different parties [59].



### ***2.5.2. The A/E or Designer***

The Architecture/Engineer or Designer are terms of the party responsible to deal with the technical and design issues during the project. The A/E is a main party in the construction contract and has a direct relation with the employer. The main role of the A/E is to do the design, prepare all the drawings and specifications and do the technical inspections of the constructed works. As the traditional construction delivery method, the A/E usually takes the lead to act as the Engineer and has the right to take decisions and make judgments. While, throughout the years and the integrations of the delivery methods and having several participants most of the time the A/E is authorized only to deal with the technical tasks.

Furthermore, it is very important for the A/E to have construction knowledge. There were several studies to investigate whether designers and architects have the knowledge to deal with construction because of the importance of this knowledge for the success or failure of a project [62]. Studies' investigations showed different results and how important for designers to know about construction methods, though designers should be required to obtain field experience and this would reduce the amount of claims against design errors and omissions [62].

In addition, the researches came up with the results that supports the theory of the necessity for designers to have construction field experience prior to their design careers, also supported the idea of both the architecture/engineer firms and educational institutions to provide more opportunities for designers to obtain additional knowledge of construction methods and gain construction field experience [62].

### ***2.5.3. The Contractor***

The Contractor as defined under the FIDIC (1999), “means the person named as contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person” [19]. The contractor may have a representative as it is named under the FIDIC the “Contractor’s Personnel” who is “ the Contractors’ Representative and all personnel whom the Contractor utilizes on site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works” [19]. Throughout the decades, to be a successful contractor and achieve project success, there are several attributes must have and certain criteria must meet. There is literature that highlight the attributes the contractors shall have and their roles in project success [3].

Thereby, most of the studies refer to contractor’s success from tendering, prequalification and long-term perspective. While recently, some studies such as (Alzahrani & Emsley, 2012) “they aim in studying the impact of contractors’ attributes on project success from a post construction evaluation perspective to identify what critical success factors that greatly impact the success of project” [3].

According to several researches and practices in the construction industry, there is a strong relation between the success of construction projects and contractors attributes. For example, it was stated “construction projects and their success are closely related to contractors. They start their main duties when the project reaches the construction or execution stage where the actual work of the project is accomplished” [3].

Thus, it is a main issue to understand contractors’ performance to enhance existing knowledge of construction project success. This means to study the factors and criteria

that might affect on contractors success further on project success. As an example, the study that was done by (Alzahrani & Emsley, 2012) revealed several factors such as: “(i) safety and quality; (ii) past performance; (iii) environment; (iv) management and technical aspects; (v) resource; (vi) organization; (vii) experience; (viii) size/type of pervious projects; and (ix) finance” [3]. Moreover, there are many different studies and results regarding the criteria of successful contractors. Hatush and Skitmore (1997) found that “ the criteria that were highlighted to be commonly important for all three project success factors were financial status, financial stability, credit rating, experience, ability, management personnel and management knowledge” [23]. While, Sing and Tiong (2006) in the Singaporean construction industry, “ reported that a contractor's experience in similar projects is one of the most important factors for ensuring a contractor's success in projects. Qualification and experience level of project managers and other management staff and their track records of working capital were reported to be significant in assessing the capabilities of the candidate contractors” [51]. Whereas, Doloi (2009) in Australia, “the result of his model showed that technical planning and controlling expertise of contractor is key in achieving success on projects” [17].

Therefore, after looking at different studies and taking several examples, the summary that can be reached is that the rising of new criteria such as safety, environment and experience are becoming major factors of project success in addition to the traditional iron triangle time, cost and quality [3]. Taking into consideration that “if project success is repeatable, these findings provide a clear understanding of contractors’ performance and could potentially enhance existing knowledge of construction project success” [3].

#### **2.5.4. Others**

The increasing of complexities in the projects recently requires the involvement of new participants such as the Project Manager, Cost Consultant, Quantity Surveyors, Technical Controller and Legal Team...etc. There are many researches and studies in the literature define the need for involving new participants during the project and explain their attributes. For example, this study will discuss the involvement of the Project Manager and the Legal Team throughout the contract.

##### 2.5.4.1. The Project Manager

The project manager has many attributes and roles to fulfill his/her position. According to literature definitions, “the project manager major functions are to integrate all elements of the project system and provide leadership to the project team; moreover, the effectiveness of the project manager will depend on conceptual, human, and negotiating skills as well as, to a lesser extent, on technical skills” [50]. The project manager’s situation is characterized by a high degree of dependence on individuals and organizations over whom the manager has either limited or no managerial authority [50].

A project manager should have several personal competencies for the chance of completing a project like “achievement and action, helping and human service, impact and influence, managerial, cognitive and personal effectiveness” [47]. In addition, to have an effective project management system, through researches it was found that “it requires several attributes from the project manager such as familiarity with the project management body of knowledge, application area knowledge, standards and regulations,

understanding the project environment, general management knowledge and skills and human relations skills” [47].

According to Bennett, the project manager’s task is to “identify and clearly define the set of tasks needed to complete the project within a strategic framework formed by the objectives, the project description and the organizational arrangements” [6].

In the opinion of several researchers, “the diversity and complexity of the project management system makes project integration one of the key functions of the project manager” [50]. Struckenbruck (1988) “defines project integration as the process of ensuring that all elements of the project tasks, subsystems, components, parts, organizational units, and people fit together as an integrated whole that functions according to plan” [53].

Furthermore, researchers believe that “the project manager typically works through a multidisciplinary project team, and his or her ability to get the team working at maximum effectiveness is fundamental to the success of the project” [50]. Thamhain and Wilemon (1977) concluded, “the effectiveness of project managers depends primarily on their leadership style and work environment” [56]. While Brown and Eisenhardt (1995) found, “the project leader critically affects both process performance and product effectiveness” [9].

In addition, Handy (1985) came up with three theories about leading project team; “the trait theories seek to establish the distinguishing characteristics of successful leaders, while style theories are based on the assumption that certain leadership styles are more effective than others. Contingency theories, on the other hand, take account of the variables involved in the leadership situation such as the particular task, the nature of the

work group, and the position of the leader within the group” [23].

While, the effectiveness of the project manager will depend on essential skills. According to Katz (1974), he found that “effective administrators possess three skills: technical, human and conceptual” [33]. While Fryer (1979), examined the construction industry and identified five attributes of successful project managers; “these included managing change, recognizing opportunities, handling problems, decision-making and social skill” [20]. Posner (1987), empirically “studied successful project managers and identified communication, organizational resources, team building, leadership, coping and technological as categories of interconnected skills” [46]. Thamhain (1991), proposed that “project management skills could be categorized into leadership, technical, and administrative” [57].

#### 2.5.4.2. The Role of Lawyers in the Engineering and Construction Industry

Recently, the legal team in the construction industry is becoming very important because “projects are becoming ever more complex, project owners are becoming more sophisticated and demanding, the societal role of lawyers is expanding in general, and there are increasing regulatory requirements from the government” [43]. It is shown in most of the studies that “lawyers in the engineering and construction industry represent all the participants of the industry; the project owner, designer, constructor, and supplier” [43]. Usually, “lawyers are playing a significant role in the industry, their role is expanding from a litigation-based advocate to both an advocate and a counselor”, moreover, they are asked to “work beyond their traditional role as lawyers by being consulted regarding the new and dynamic issues, whether law related or not, faced by

engineering and construction professionals” [43].

Many papers discussed the role of lawyers in the construction industry and the main issues that were found addressed: “what is the role of lawyers in the industry, how did they get here and is the current role of lawyers in the industry healthy?” [43].

As a result, it was established that “the role of lawyers in the engineering and construction industry has increased; in a word, the industry has been “lawyerized” [43]. Thus, “lawyerization has become more and more prevalent in the engineering and construction industry, therefore, it is important to understand the pros and cons of lawyerization as viewed by the contract’s participants” [43].

It is known in the industry that there are several contracts being used to define the basic relationships between the participants, for example, “there are typically contracts between the owner and designer, the owner and constructor, and the designer and constructor and their respective sub-consultants and subcontractors or suppliers”[43]. The reason for assigning these contracts is “to spell out the scope of services or goods for which each participant is responsible, and defines the legal relationship between the parties” [43]. The role of lawyers often to help in drafting and negotiating these contracts and any subsequent changes to those agreements and are usually called upon for advice in disputes related to them [43].

There is an argument about the increased role of lawyers in the industry and many researches showed the positive and negative sides from lawyerization of the industry. For example, according to Owers (2007) “lawyerization has led to some positive changes such as improved safety and quality awareness and a more nuanced approach toward risk management”, however, “it might be a problematic if the lawyer substitutes his or her

decision making on non-legal decisions for that belonging to the client. Note that many in-house legal counsels are also trained as engineers and provide counsel “wearing both hats” [43].

## **2.6. The Engineer**

“The Engineer” is the person appointed by the Employer to act as the Engineer for the purposes of the Contract, a consulting engineer or other professional whom the Contract requires the Employer to appoint”. [FIDIC 1999].

Several definitions and descriptions are expressed for the term “Engineer” and the roles he/she plays. For example, “the Engineer works on behalf of the client and may provide ‘hands-on’ technical services but typically, engineering services are focused on planning and implementation of large-scale projects” [21]. The Engineer plays several roles to serve the Employer and the project itself. As, “the Engineer works with the management of the client’s company to identify operational objectives, technical requirements, and expected costs to construct” [21]. “The role of the Engineer shifts to a combination of Project Management, Contract Management and Inspector” and “the Engineer either has in-house resources to address regulatory and financial implications, rules and requirements, or obtains these services from third parties” [21].

### ***2.6.1. The Role of the Engineer Under the FIDIC***

The FIDIC has standard forms of contracts that state the tasks played by the contractual parties and the matters each party must consider. The Engineer is a main



party during any contract and the FIDIC concerns the duality in the traditional role of the Engineer as the Employer's personnel, therefore, the contractor may treat any default by the Engineer in the performance of such duties as provision of drawings and issue of payment certificate as a default by the Employer. While, in other duties the Engineer is an independent third party holding the balance fairly between the Employer and the Contractor [41].

An examination done by Ndekugri and Smith (2007) where they identified three major changes in the duties of the Engineer:

“ 1) the duty to act impartially has been replaced by a duty to make fair determination of certain matters; 2) it is open to parties to allow greater control of the Engineer by the Employer by stating in the appropriate part of the contract powers the Engineer must not exercise without the Employer's approval; 3) there is provision for a dispute adjudication board (DAB) to which disputes may be referred” [41]. Moreover, at the same examination they mentioned that “the duties of the Engineer under the contract fall into five categories: design, quality control, communication of information to the parties, certification and determinations.

### ***2.6.2. The Engineer's Determinations***

According to the contract general conditions, “whenever the Engineer carries out the duties or exercising authority, specified or implied by the Contractor, he shall be deemed to act for the Employer”[41]. On the other hand, in the study of Ndekugri and Smith (2007), they stated “ there is one area of decision making where it is clear that the Engineer does not act as the Employer's agent is where the Engineer is required to

proceed in accordance with sub-clause 3.5” [41]. Most of the matters under sub-clause 3.5 are determination procedures and it states “ whenever these Conditions provide that the Engineer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Engineer shall consult with each Party in an endeavor to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances. The Engineer shall give notice to both Parties of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination unless and until revised under Clause 20 [Claims, Disputes and Arbitration]” [41 &19].

The Engineer’s duty is to consult with other parties but it could be interpreted in one way or another according to the actions required of the Engineer [41]. The interpretation could be that “the Engineer is to make provisional determination, present it to the parties and implement the outcome agreed to by both parties. While in failing for agreement, the Engineer makes and implements a final determination taking into account the parties’ comments on their merits” [41]. Another interpretation could be that “the Engineer acts as a mediator but with two main distinctions from the understanding of a third party resolution method: if mediators are usually neutral parties; the Engineer can hardly be said be that; while if mediators make non-binding recommendations, then the Engineer’s determination is binding pending the decision of a DAB” [41].

### ***2.6.3. The Engineer Acts as a Judge***

As it was mentioned earlier, the Engineer during the construction project performs different duties and regularly “the Engineer is forced into the role of a judge of project

disputes between the Employer and the Contractor where he is taking the quasi-judicial role. These disputes generally involve substantial claims for extra compensation or extra time and have significant impact on the owner and contractor 's financial position on the project" [52].

According to Stein and Hiss (2003) "the duty of the design professional to determine disputes is a creature of contract, and the Engineer's determination of disputes is final and binding only when the contract expressly so provides" [52]. Now, the judging role of the Engineer differs with different standards and general conditions. For example, " under the AIA and EJCDC, the decisions are initial and are appealable to an arbitrator under the dispute resolution provisions set forth in the contract; and if the Employer or Contractor does not timely appeal the decision, it is final and binding on the parties" [52]. While, according to the FIDIC, " to address the conflict of interest objection to the Engineer and provide a wider pool of expertise for effective dispute resolution, the FIDIC provides for a DAB comprising either one or three qualified persons. Where either party is dissatisfied with the determination of the DAB" [41].

Therefore, the Engineer being as a DAB is considered in the guidance to the preparation of particular conditions and presented as part of the FIDIC; where "the contractual parties may opt to retain the traditional concept of the Engineer as contract administrator by appointing the Engineer as a sole-member DAB where he/she is an independent consulting Engineer" [41]. Moreover, the clause in the FIDIC states that the Engineer acts as DAB is required to act "fairly, impartially and at the cost of the Employer" [41 &19].

#### ***2.6.4. The Employer's Authority over the Engineer***

As it was discussed earlier, the traditional role of the Engineer consist of being the Employer's personnel and the new FIDIC opened the way for parties to have greater control over the Engineer's authority such as by the Employer. There is sub-clause 3.1 in the FIDIC states that “ the Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. The Employer undertakes not to impose further constraints on the Engineer's authority, except as agreed with the Contractor” [41 &19].

Moreover, the new FIDIC gives the authority for the Employer to replace the Engineer, it stated “ the Employer has express authority to replace the Engineer for any reason whatsoever, subject only to two procedural requirements stated in clause 3.1” [41]. “First, the Employer must notify the Contractor the name, address and relevant experience of the intended replacement not less than 42 days before the intended date of replacement. Second, the replacement must not be a person against whom the Contractor has raised reasonable objections” [41 &19].

## CHAPTER 3

### THE ROLES OF THE ENGINEER

#### **3.1. Preamble**

Construction contracts are assigned between the employer and the contracting firm in order to set all the rights, obligations, responsibilities and duties of each party. In addition, they set all the methods and procedures to be followed throughout the project concerning project management related issues.

The construction contract is administrated through what is called contract administration processes that are handled at three major milestones of contract formation, facility taking over, and contract close-out. In addition, throughout the contract duration there is a cyclic contract administration process exercised and extended into the defects notification period, and it could go beyond in the case of unresolved claims.

Furthermore, there are questions throughout the construction contract that are not answerable by the Employer to the Contractor; so the Employer appoints the Engineer to play certain contract administration roles during the construction period. The examination of these roles will show the classification aspects of technical versus administrative/managerial tasks taking into consideration the main elements of construction contract compatibility that are related to time, workmanship and price.

### 3.2. General Breakdown of Contract Administration Tasks

Assigning the roles of the Engineer expected to fulfill through the construction period require certain classifications. Where these roles will lead to the decision concerning the assignment of the Engineer's title either to the Architect/Engineer (A/E) or the Project Manager (PM). The identified roles are found to take a number of forms in making determinations, giving opinions about design-related information, issuing approvals, making assessments and judgments by splitting the tasks into technical versus administrative taking into consideration the three major project parameters of time, payment and quality.

As summarized in table 3.1 below, in the absence of the PM, the A/E will undertake all the tasks listed in the table, under the hat of the "Engineer". When the PM is appointed during the construction phase, the A/E shall normally continue to be responsible for the tasks listed under his technical supervision role, while the PM will naturally handle the roles listed under the administrative/managerial section.

Table 3.1: Breakdown of Contract Administration Tasks

		Determinations, certifications, opinions, assessments, or judgments by:	
		A/E	A/E or PM
Role		Technical supervision tasks	Administrative/ Managerial tasks
Project Parameters	Time	Approval of submittals schedule	Approval of the overall construction schedule  Approval of the construction schedule updates/revisions Determinations of extensions of time
		Approval of testing & commissioning schedule	
		Approval of major installation & inspection milestones	
	Payment	Quality-related withholdings for unacceptable executed works	Certification of payments
		Input on claims related to design and products' specifications	Administration of claims
	Quality	Approval of products selected by contractor	Maintaining a log of and follow up on all submittals
		Approval of contractor's shop drawings	
		Approval of contractor's calculation notes pertaining to specialty engineered systems	
		Inspection and approval of executed works, clarifications on design documents	

### 3.3. Contract Administration Processes

As it was mentioned earlier, the contract administration processes are handled through three main targets as shown in figure 3.1. All the processes have been closely examined using the standard conditions for the construction contract published by the International Federation of Consulting Engineers, better known as the FIDIC (FIDIC 1999).

Moreover, the contract administration roles expected to be played by the Engineer during the construction phase have also been studied. These roles helped in classifying whether they go under technical or administrative roles. In particular, they helped to path the road for assigning the title of the Engineer either to the A/E or the PM.

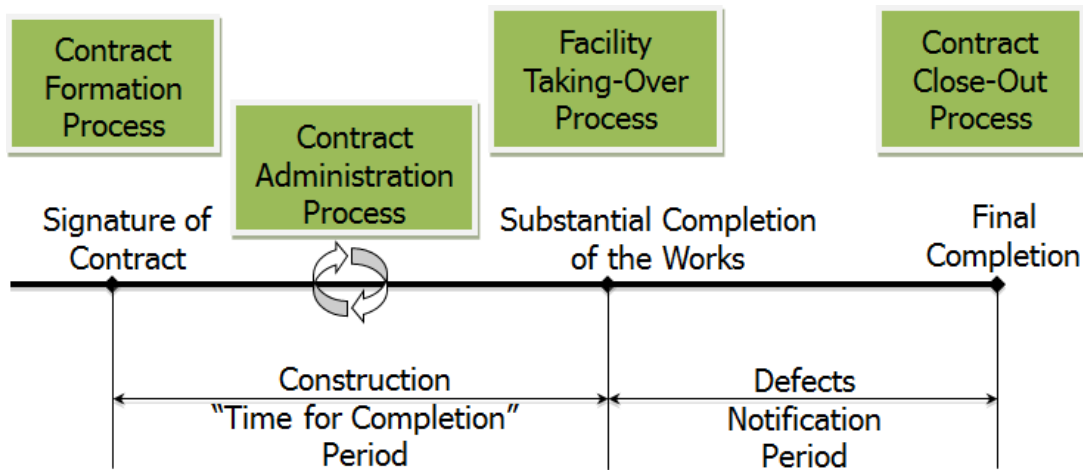


Figure 3.1: Contract Administration Processes

### 3.3.1. Contract Formation Process

The contract formation process follows directly the selection of the winning contractor, as per the FIDIC 1999 it is administrated by a series of events, for which the Engineer, the Employer and the Contractor shall fulfill.

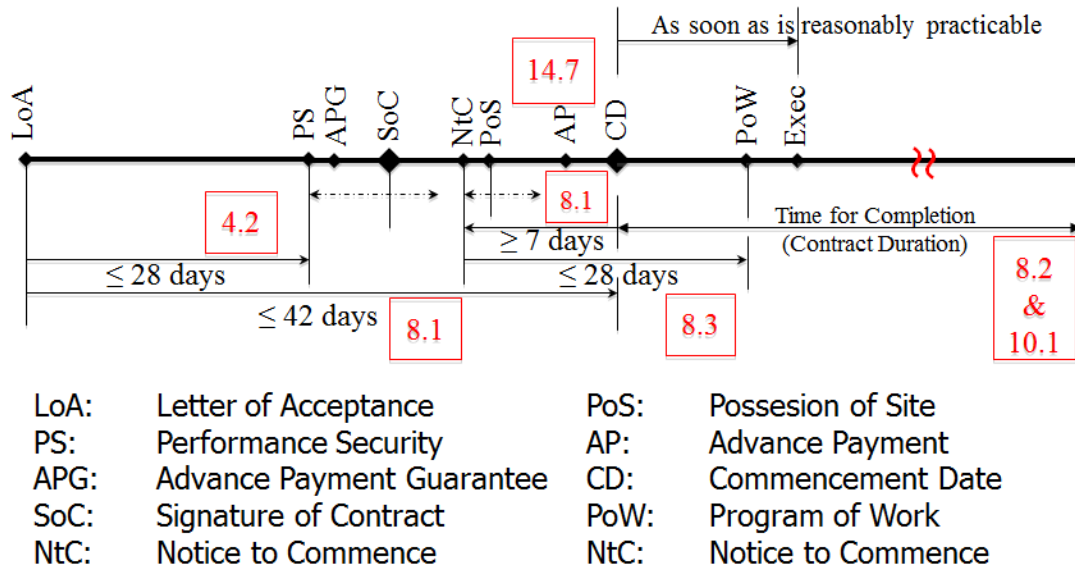


Figure 3.2: Contract Formation Timeline

#### 3.3.1.1. The Contract Formation Timeline

The timeline in figure 3.2 above presents the flow of issues among the contractual parties during the contract formation process and particularly it presents part of which is handled by the Engineer.

According to the FIDIC 1999 clauses, the process flows through main milestones. As a first step, the Employer shall issue the “Letter of Acceptance” and the Engineer will be part of the preparation of it. Then, within 28 days from the date of issuing the LOA the Contractor shall submit to the Employer the Performance Security and directly after that



he shall submit the “Advanced Payment Guarantee” in accordance to sub-clause [4.2]. During that time, the Engineer shall be copied with the PS and APG documents to give verifications and to issue the “Interim Payment Certificate”. In addition, the Engineer shall certify the Advanced Payment and the Employer shall ensure that the performance security and the guarantee are valid and enforceable until the Advanced Payment has been repaid and the Contractor has executed the Works as stated under sub-clause [14.2].

After submitting the PS and the APG, the “Signature of the Contract” between the Employer and the Contractor shall take a place and shall be followed by the issuance of the Commencement Date. At this stage, the Engineer will be part of the compilation of all contract documents where the Employer will be copied with them and therefore the Engineer shall issue the “Notice to Commence” to the Contractor not less than 7 days before the Commencement Date of the works according to sub-clause [8.1]. Whereas, the Commencement Date shall be within 42 days after the Contractor receives the LOA, then the Contractor shall commence with the execution of the Works as soon as is reasonably practicable.

Hence, the notice of the Commencement Date must have included information regarding the arrangements for giving the Contractor “Possession of Site” which means the Possession of Site is expected to take place following the issuance of the notice in accordance with sub-clauses [2.1] and [8.1]. By this time, the Employer shall make the Advanced Payment because according to sub-clause [14.7] “it states that the payment shall be done within 42 days after issuing the Letter of Acceptance or within 21 days after receiving the performance security and APG”.

Furthermore, according to sub-clause [8.3], the Contractor shall submit the detailed Program of Work to the Engineer within 28 days after receiving the notice of the Commencement Date. Unless the Engineer, within 21 days after receiving a program, gives compliance notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the program, subject to his other obligations under the Contract.

Finally the Contractor shall “proceed with the Works with due expedition and without delays” [sub-clause 8.1] and shall complete the whole of the Works within the Time of Completion for the Works or Section [sub-clause 8.2].

#### 3.3.1.2. The Role of the Engineer through the Contract Formation Process

Based on the reading of the previous timeline and understanding the contract formation process, the primary roles played by the Engineer during this process can be summarized in the following list:

- first, the Engineer becomes part of the preparation of the LOA; after that
- he complies verifications regarding the PS and APG; later
- he certifies the Advanced Payment and be part of compiling all the contract documents for the signature of the contract; and finally
- the Engineer issues the NTC and receives the POW from the contractor.

This summary concludes that the Engineer during the contract formation process most of the time is playing administrative/managerial roles. According to table 3.1, most of the tasks done by the Engineer are classified under the administrative/managerial tasks that deal with issuing payment certifications, making decisions, maintaining a log of and

following up on all submittals. Thus, in the case of hiring the PM as a participant through the contract, then he/she is the one to be responsible to play the roles of the Engineer through the contract formation process.

### ***3.3.2. Selected Cyclic Contract Administration Process***

Previously it was mentioned that throughout the contract duration there is a cyclic contract administration process consists of administrating several aspects related to time, payment and quality. The process is exercised and extended into the defects notification periods, and it might go beyond in the case of unresolved claims. It examines the roles played among the contractual parties and particularly the administrative roles played by the Engineer.

This process deals with issues related to payments, claims, disputes and variation orders. At the same time, it deals with technical inputs that need to be administrated such as submittals, request for information (RFI), request for clarification (RFC), inspection, and testing.

#### **3.3.2.1. Interim Payment Certificate Process**

At this stage of the contract administration process, the Engineer is the party to be aware of most of the tasks, which apparently are considered as administrative roles. As shown in the timeline below, it is established that the process of issuing the Interim Payment Certificate is triggered after the Employer has received and approved the Performance Security in accordance to sub-clause [14.6]. Thereafter, the Engineer takes the lead role, as he/she revises the Contractor's submitted statement and the progress

report, examines the Works to be measured and issues a notice to the Contractor's representative to attend the measurement who shall promptly attend or send another representative to assist the Engineer in making the measurement as sub-clause [12.1]. While if the Contractor fails to attend, then the measurements made by the Engineer shall be accepted, or whenever there are Permanent Works to be measured the Engineer shall prepare them and the Contractor has to attend to examine and agree or disagree the records with the Engineer [sub-clause 12.1]. After the measurements is done and agreed on them, the Engineer will compile all the documents and administrate the process for issuance of the Interim Payment Certificate to the Employer stating the amount which the Engineer fairly determine to be due. Hence, according to sub-clause [14.6] the IPC has to be within 28 days after receiving a Statement and supporting documents.

The final step will be the Final Payment to the Contractor that has to be within 56 days after the Employer receives the Payment Certificate as stated under sub-clause [14.7].

From the above discussion of the timeline, the roles expected the Engineer to fulfill are summarized as the following:

- the Engineer will review the Contractor's submitted statements and progress reports;
- will examine the Works to be measured;
- issue the notice to the Contractor's representative to attend the measurements; then
- will compile all the documents;
- administrate the process to issue the IPC; and

- determine the amount that shall fairly be due.

Therefore, since this process deals with certification of payments and giving decisions regarding the measurements of the Works, it could be concluded that the roles played by the Engineer through the issuance of the Interim Payment Certificate and according to the listing of the tasks in table 3.1, are considered as administrative roles. Thus, if the PM will be the appointed as a participant during the process, he/she might be the one to handle these roles.

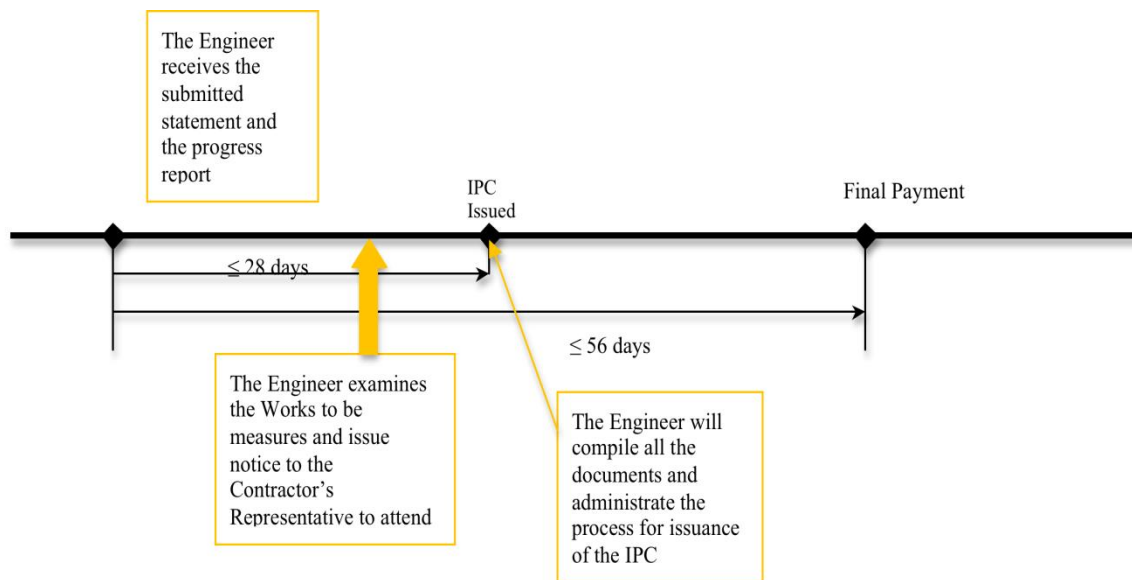


Figure 3.3: Interim Payment Certificate Timeline

### 3.3.2.2. Claims/ Disputes Administration Process

This process deals with claims, disputes and arbitration when there is an issue related to extension of the time of completion or any additional payment.

According to the FIDIC 1999, “if the contractor considers himself to be entitled to either extension of the time of completion or additional payment, then the contractor shall

become aware of the event of giving rise to the claim and decide on whether to pursue matter under the appropriate claim resolution clause”.

It is clearly shown in the following timeline in figure 3.4, that the contractor has to notify the Engineer by describing the event and give notice as soon as practicable, and not later than 28 days after the contractor became aware of the circumstance.

Furthermore, within 42 days after the contractor become aware of the event giving rise to the claim, he shall send to the Engineer a fully detailed claim with full supporting particulars in accordance to sub-clause [20.1].

Therefore, the Engineer has to consult with the Employer and Contractor to make determination concerning the submitted claim. Within 42 days after receiving a claim and any further supporting particulates, the Engineer shall respond with approval or disapproval and detailed comments and might request any necessary particulates. This goes through a claim negotiation process which will include a cycles of submittals and responses, and this might lead to the possibility to seek a Dispute Adjudication Board (DAB) opinion, if the DAB is on a full-term basis. At this stage, “if a dispute arises between the parties in connection with the contract or the execution of the Works including any disputes, determination, instruction, opinion or valuation of the Engineer; then either the Employer or the Contractor may refer the disputes in writing to the DAB for a decision while copying the other party and the Engineer” [sub-clause 20.4]. Thus, within 84 days after receiving such reference, the DAB shall give their decision and the Contractor and Employer will be informed of the DAB decision and study this decision to decide whether to issue a notice of dissatisfaction with DAB decision or not in accordance to sub-clause [20.4].

At the end, if either party is dissatisfied with the DAB's decision, then within 28 days after receiving the decision shall give notice to the other party with dissatisfaction and an amicable settlement may be attempted before the commencement of arbitration. However, arbitration may be commenced on or after 56 days from the day notice of dissatisfaction was given.

Particularly, the main roles the Engineer is handling through the rise of claim consist of:

- being notified about the circumstances;
- receiving a detailed claim with full supporting particulars;
- consulting with the Employer and Contractor;
- making determination regarding the submitted claim; then
- responding with approval or disapproval on the received claim with detailed comments;

As a result, from the discussion and in accordance to table 3.1, it could be concluded that dealing with issues related to claims, disputes and arbitration consists of having a wide knowledge in administrative works. Through the contract, most of the time the Engineer is the party to play this role by giving opinions, determinations and taking decisions; so this means, the Engineer has to be with a strong knowledge and experience to take the lead in fulfilling such a role.

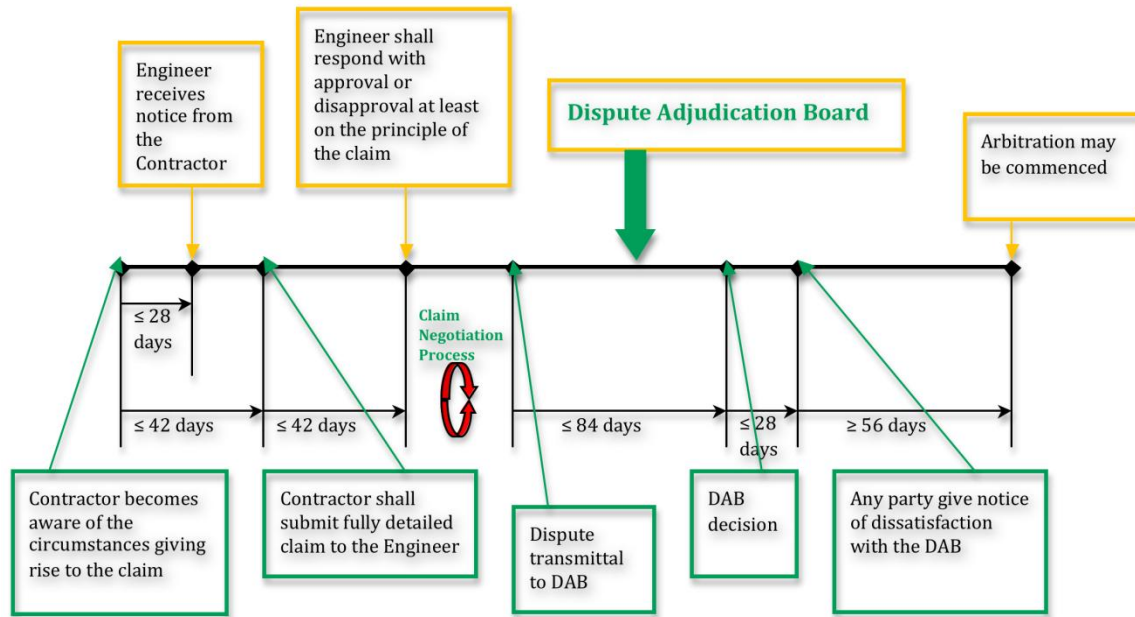


Figure 3.4: Claims/Disputes Administration Timeline

### 3.3.2.3. Variation Order Administration Process

It is the process where the Engineer may initiate a variation at any time prior to issuing the Taking-Over Certificate for the Works and the procedure of the process as shown in the following timeline in figure 3.5. According to sub-clause [13.1], the Engineer will issue a request for a proposal and the Employer will approve the request. Hence, the Contractor shall execute and be bound by each variation, and shall response as soon as practicable, either by submitting a proposal that includes a description of the proposed work, modifications to the project schedule and Time for Completion and a proposed price evaluation of the variation as stated in sub-clause [13.1 & 13.3]. Therefore, the Engineer shall as soon as practicable after receiving the proposal to respond with approval, disapproval or comments where the Employer will be consulted on the response's preparation. There might be a proposal negotiation between the parties and if



the Employer approves the variation to be instructed, then the Engineer will instruct a variation.

Unless the contractor provide a reasoned explanation to the Engineer of inability to comply or by promptly gives notice with supporting particulars stating that he cannot readily obtain the goods required for the Variation (materials, equipments, plants...etc). Then the Engineer may cancel, confirm or vary the instruction, and address the issues raised in the Contractor's notice where he will execute and be bound by variation.

Consequently, if confirmed by the Engineer, then the instruction includes a requirement for the recording of costs and the Engineer has to derive the instructed variation rates from any relevant rates in the contract in accordance to sub-clause [12.3]. However, the Contractor issues the acknowledgement where he has to "submit quotations before ordering goods and submit daily statement of used resources" as stated under sub-clause [13.6]. While, in the case if no rates are deemed relevant by the Engineer, according to sub-clause [12.3] at that time, the Contractor shall "derive new rates from the reasonable costs of executing the work plus a reasonable profit and submit the request for time extension".

Finally, the process goes to the price and time extension negotiation and the Engineer shall "determine provisional rates for the purpose of Interim Payment Certificate" sub-clause [12.3]. This may end up as residual disagreement and lead to the claims administration process.

As it is recognized, the variation order is a change in the design or drawings which might be requested by the A/E. Thus, this process consists of administrating a technical change, which means the technical changes that are done by the A/E consist of

several managerial roles to be played by the contractual parties to achieve their goals. The Engineer is the party to fulfill the critical roles during this process. In this process, it was significant to establish the participant to take the lead role as the Engineer because if the A/E will request for a variation order, will he be able to administrate the process as it should? Alternatively, if the PM was hired, will he take the role of the Engineer and take into consideration the need of A/E for technical supervision?

Based on the readings for the variation order administration and the tasks listed in table 3.1, if the PM was during the process then he/she would handle the managerial roles of the Engineer after the A/E requests for a variation change since it is a technical change and must be done by the designer.

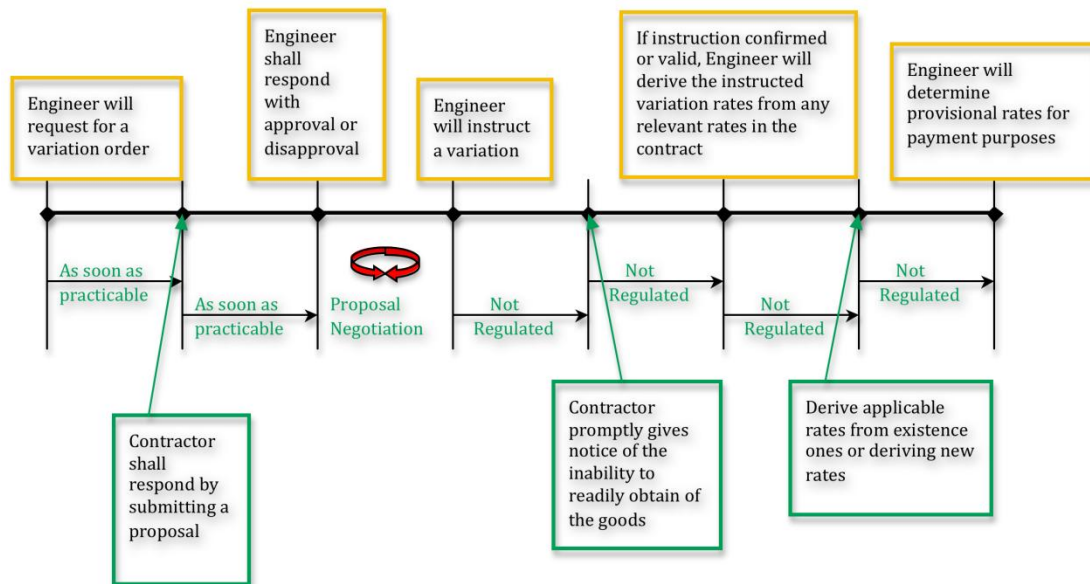


Figure 3.5: Variation Order Timeline

### 3.3.4. Facility Taking-Over Process

The facility taking-over process means determining that substantial completion with the Works has been achieved by the Engineer at the core of allowing the taking-over of the built facility by the Employer. This determination indicates that the Time for Completion for executing the Works has actually been fulfilled/expired. This process is overtaken by the opinions of the Engineer and the Contractor as to what each of them considers as critical in respect of fulfilling substantial completion. Furthermore, the substantial completion date stated in the taking-over certificate is significant for the recover by the Employer of Liquidated Damages.

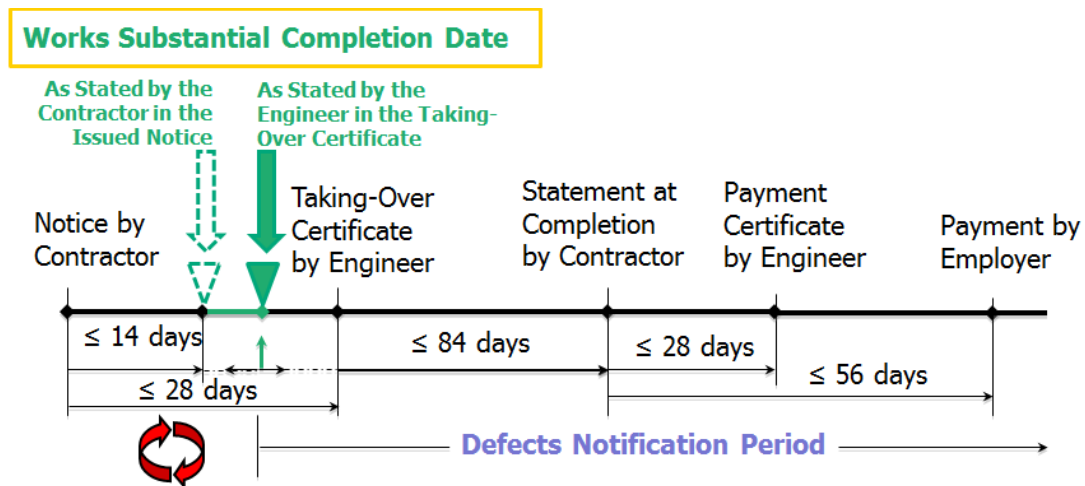


Figure 3.6: Facility Taking-Over Timeline

#### 3.3.4.1. Facility Taking-Over Timeline

The substantial completion process as shown in figure 3.6 presents the main role of the Engineer throughout the process and how the contractual parties interact with each other.

This is the stage during the contract where the Works have been completed and the Works shall be taken-over by the Employer as stated by sub-clause [10.1]. During this process, the first thing, the contractor has to apply the notice to the Engineer for a Taking-Over certificate not earlier than 14 days before the Works, in the contractor's opinion, be complete and ready for taking-over [10.1]. While, the Engineer is the responsible party to issue the taking-over certificate within 28 days after receiving the Contractor's notice, stating the date on which the Works, in the opinion of the Engineer, have been substantially completed except for any minor outstanding work and defects. On the other hand, the Engineer might reject the Contractor's application giving reasons and specify the works to be done by the Contractor to enable the Taking-Over certificate to be issued in accordance to sub-clause [10.1]. Although "if the Engineer fails to issue the Taking-Over certificate or reject the Contractor's notice within 28 days, and the Works are substantially in accordance with the contract, then the Taking-Over certificate shall be deemed to have been issued on the last day of that period" as stated by sub-clause [10.1]. At this point, the substantial completion date, whether as stated in the taking-over certificate, or as the last day in the 28 days period following the receipt of the contractor's notice, it is significant as it triggers the Defects Notification Period. Whereas, the DNP starts regardless of when the Employer may actually start occupying or using the build facility.

After that comes the issuance of the "Statement at Completion", where the Contractor within 84 days after receiving the Taking-Over Certificate shall submit the statement to the Engineer with all supporting documents in accordance to sub-clause [14.10]. From there, within 28 days after receiving the "Statement at Completion" the

Engineer shall issue to the Employer the “Payment Certificate” according to sub-clause [14.6]. Finally the Employer shall pay the Contractor the amount certified in each Interim Payment Certificate within 56 days after the Engineer receives the statement at completion as sub-clause [14.7].

#### 3.3.4.2. The Role of the Engineer through the Substantial Completion Process

According to the analysis of the timeline above, the substantial completion process takes the role of issuing the taking-over of the Works by the Employer and the Engineer is the one responsible in handling these roles, where the Engineer shall:

- be notified for a Taking-Over certificate by the Contractor;
- state the date of the Works to be substantially completed;
- accept or reject the Contractor’s application for a Taking-over certificate; then
- issue the Taking-over certificate; and
- issue the Payment Certificate

Accordingly, the Engineer is the one to reject or approve the contractor’s application regarding the issuance of the taking-over certificate. He/she is the party to deal with all documents submitted by the contractor and give opinions, assessments and decisions for taking-over the Works. However, the decisions given by the Engineer about the completion of the Works depends on technical perspectives and some managerial works because it deals with the approval on the finished Works that have to be as expected, and at the same time with issues that deal with payments and needs to follow up with. Therefore, this means that the role played by the Engineer through the substantial completion process is managerial but with technical inputs. Therefore,

according to the circumstances and as it was mentioned earlier in section 3.2; “ in the absence of the PM, the A/E will undertake all the tasks listed in table 3.1. While if the PM was appointed during the contract, then the A/E shall normally continue to be responsible for the tasks listed under his technical supervision role, and the PM will handle the roles listed under the administrative/managerial section under the hat of the Engineer”.

### 3.3.5. Contract Close-Out Process

The contract close-out process is presented in the following timeline as figure 3.7, it is triggered by the expiry of the last of the defects notifications periods. It is characterized by the balance of Retention Money to the Contractor.

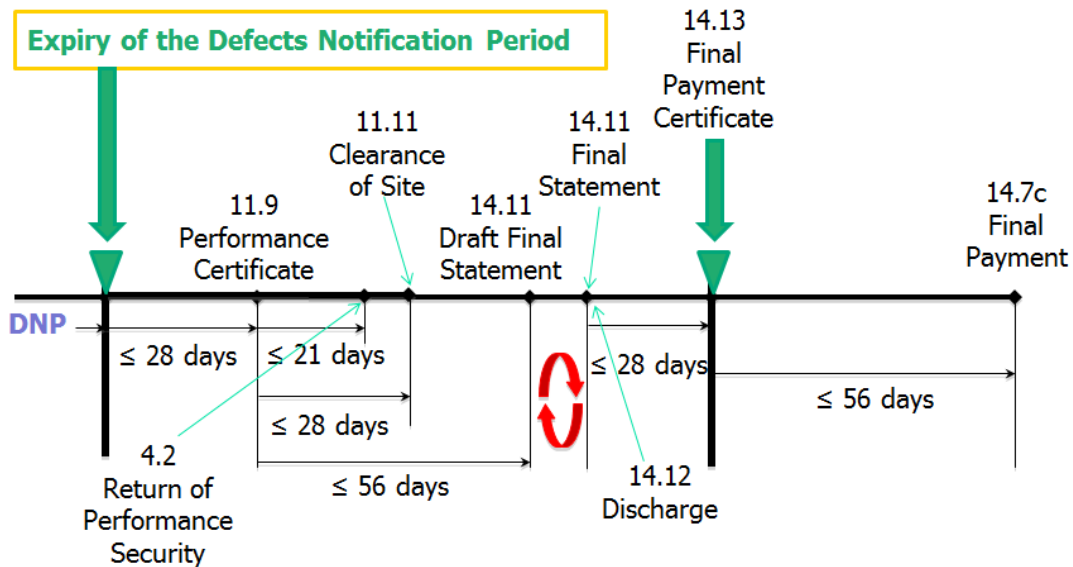


Figure 3.7: Contract Close-Out Timeline

#### 3.3.5.1. Contract Close-out Timeline

In general, the contract close-out process is to show the ability of the Contractor and the Engineer to agree without undue delay to the final total amount representing the full and final agreement due to the contractor. Whereas, the Engineer deals with the main issues through the process and he is under obligation to issue the performance certificate and the final payment certificate, despite the possible lack of an application and the submittal of a discharge on the part of the Contractor.

The timeline in figure 3.7 explains the roles between the parties and specifically describes the roles of the Engineer. At the end of the latest of the expiry dates of the Defects Notification Periods, the Engineer shall issue the Performance Certificate within 28 days, or as soon thereafter as the contractor has supplied all the Contractor's Documents and completed all Works in accordance to sub-clause [11.9]. Therefore, the Employer shall return the Performance Security to the contractor within 21 days after receiving a copy of the Performance Certificate, under sub-clause [4.2]. Moreover, according to sub-clause [14.9], the Engineer promptly after the latest of the expiry dates of the DNP has to certify the outstanding balance of the Retention Money for payment to the Contractor.

On the other hand, the Contractor upon receiving the Performance Certificate shall clear the site by removing any remaining contractor's equipment. Along within 28 days from the receipt of a copy of the Performance Certificate by the Employer, if the Contractor's equipment, surplus materials, etc. have not been removed, then the Employer has the right to may sell or otherwise dispose of any remaining items. Furthermore, the Contractor shall submit a draft final statement to the Engineer within 56

days after receiving the Performance Certificate according to sub-clause [14.11]. While, in the case of a disagreement with the Engineer on any part of the draft final statement, the Contractor shall submit a revised statement reflecting what has been agreed with the Engineer. This agreed statement is referred to as the “Final Statement” as stated by sub-clause [14.11].

In addition, it is mentioned under sub-clause [14.12], when submitting the Final statement; the contractor shall submit a discharge which confirms that the total of the Final Statement represents full and final settlement. Hence, “this discharge may states that it becomes effective on the later of the dates after the contractor receives the Performance Security and the outstanding amount”.

Afterward, at the point where the Engineer receives the Final Statement and the written discharge, the Engineer within 28 days shall issue to the Employer the Final Payment Certificate in accordance with sub-clause [14.13]. However, in the case of “the Contractor has not applied for a Final Payment Certificate, the Engineer shall request the contractor to do so. If the contractor fails to submit an application within a period of 28 days, the Engineer shall issue the Final Payment Certificate for such amount as he fairly determines to be due” sub-clause [14.13].

At the last stage, the Employer shall pay the Contractor the amount certified in the Final Payment Certificate within 56 days after the Employer receives the Payment Certificate according to sub-clause [14.7].



### 3.3.5.2. The Role of the Engineer through the Contract Close-Out Process

It is established from the previous discussion that the roles expected from the Engineer to fulfill are mostly considered as administrative or managerial roles, since it consists of approving on all the documents submitted by the contractor and issuance of payment certificates and statements. The role of the Engineer during the close-out process consists of:

- issuing the Performance Certificate;
- certifying the outstanding balance of Retention Money to the Contractor;
- receiving from the contractor supporting documents and statements that show in detail the value of all work done and if there any further sums which the contractor considers to be due to him under the contract, in accordance to sub-clause [14.11], and agrees or disagree on the submitted statement;
- receiving the revised program of Works which shall include the order in which the contractor intends to carry out, including the anticipated timing of each stage, contractor's documents, delivery to site, testing, the nominated subcontractor for each stage of work and the sequence and timing of inspections; and finally
- issuing the Final Payment Certificate to the Employer.

Thus, based on the detailed description of the roles during the contract close-out process, it is shown that these roles are under the administrative or managerial tasks in table 3.1, and the Engineer is maintaining the roles of the PM by giving the approval for schedule updates, revisions and issuing payment certifications.

### **3.4. Summary and Conclusion**

To conclude, the purpose from this study was to highlight the roles played among the contractual parties and specifically the roles played by the Engineer. After having a detailed, specific and close study at the contract administration processes and a general breakdown of the contract administration tasks. The conclusion at each process classified the roles handled by the Engineer to be either technical or administrative/managerial tasks and how these classifications helped in assigning the title of the Engineer to either the A/E or the PM.

The judgment concerning the fulfillment of the Engineer's roles given in table 3.1 below revealed that only a few of these roles require the specific attention of the A/E in particular; whereas, the majority of these roles are believed to be of their nature that allows additional participants such as PM to take the lead as roles fulfillment. The table below presents the roles of the Engineer and describes the type of each role to be either technical role which deals with design and quality related issues, or administrative/managerial role which deals with contract administrating issues and taking decisions. Moreover, the table shows three different categories for the roles fulfillment which are as the following:

- Participants Excluding the A/E, this category will be able to deal with issues related to contract administrating and the PM might handle most of the tasks.
- Participants including the A/E, this category will handle administrative roles but with technical inputs which require the presence of A/E and PM to deal with them.

- Exclusively the A/E, this category will handle the design-quality related issues which means the A/E is the only participant to deal with them.

Table 3.2: Classifications of the Roles of the Engineer

Seq. #	Sub-clause	Engineer's Role	Role Type		Role Fulfillment		
			Technical	Administrative	Excluding the A/E	Including the A/E	Exclusively the A/E
<b>Contract Formation Process</b>							
1	1.1.1.3	Preparation of the Letter of Acceptance		<input type="checkbox"/>		<input type="checkbox"/>	
2	1.5	Compile all contract documents for the Signature of Contract	<input type="checkbox"/>			<input type="checkbox"/>	
3	4.2	Compliance verifications regarding the Performance Security and Advanced Payment Guarantee		<input type="checkbox"/>		<input type="checkbox"/>	
4	8.1	Issue the Notice to Commence		<input type="checkbox"/>		<input type="checkbox"/>	
5	8.3	Receive and consent the Program of Works		<input type="checkbox"/>		<input type="checkbox"/>	
6	14.2	Certify the Advanced Payment		<input type="checkbox"/>		<input type="checkbox"/>	
<b>Selected Cyclic Contract Administration Process</b>							
7	3.5	Make determinations for extension of times and additional costs		<input type="checkbox"/>		<input type="checkbox"/>	
8	4.21	Review the Contractor's submitted statements and progress report		<input type="checkbox"/>		<input type="checkbox"/>	
9	12.1	Examine the Works to be measured	<input type="checkbox"/>				<input type="checkbox"/>
10	12.1	Issue notice to the Contractor's representative to attend the measurements		<input type="checkbox"/>		<input type="checkbox"/>	
11	12.3	Derive the instructed variation rates from existing ones or negotiate proposed new rates		<input type="checkbox"/>		<input type="checkbox"/>	
12	12.3	Determine the provisional rates for payment purposes		<input type="checkbox"/>		<input type="checkbox"/>	
13	13.1	Request for proposal from the Contractor describing the variation	<input type="checkbox"/>			<input type="checkbox"/> *	
14	13.1	Instruct a Variation Order	<input type="checkbox"/>			<input type="checkbox"/>	
15	13.3	Respond to the proposal with approval or disapproval	<input type="checkbox"/>			<input type="checkbox"/>	

16	14.6	Issue the Interim Payment Certificate		<input type="checkbox"/>		<input type="checkbox"/>	
17	20.1	Receive a notice on intent to claim		<input type="checkbox"/>		<input type="checkbox"/>	
18	20.1	Receive the detailed claim with supporting documents		<input type="checkbox"/>		<input type="checkbox"/>	
19	20.1	Take the decision with approval or disapproval on the received claim	<input type="checkbox"/>			<input type="checkbox"/> **	
20	20.1	Make determination regarding the submitted claim	<input type="checkbox"/>			<input type="checkbox"/> **	
<b>Facility Taking-Over Process</b>							
21	7	Examine, inspect and test all the materials, workmanship and performance of the work	<input type="checkbox"/>				<input type="checkbox"/>
22	10.1	Determine the date of when the Works are deemed to have been substantially completed		<input type="checkbox"/>		<input type="checkbox"/>	
23	10.1	Issue the Taking-Over Certificate		<input type="checkbox"/>			<input type="checkbox"/>
24	14.6	Issue the Payment Certificate		<input type="checkbox"/>		<input type="checkbox"/>	
<b>Contract Close-Out Process</b>							
25	11.9	Issue the Performance Certificate	<input type="checkbox"/>				<input type="checkbox"/>
26	14.9	Certify the outstanding balance of Retention Money to the Contractor		<input type="checkbox"/>		<input type="checkbox"/>	
27	14.11	Agree or Disagree on draft final statement submitted by the Contractor	<input type="checkbox"/>			<input type="checkbox"/>	
28	14.13	Issue the Final Payment Certificate to the Employer		<input type="checkbox"/>		<input type="checkbox"/>	

\* Variation may actually be initiated by the A/E for design-related reasons

\*\* Except when the claim is design-related, it will be excluding the A/E

Based on the distribution in table 3.1 above, there were more roles considered as administrative than as technical because most of the roles consist of issuance of certificates, giving judgments, taking decision and making determinations. Furthermore, the distribution of the roles regarding the roles fulfillment showed that the category of participants including the A/E has most of the roles because these roles are administrative with technical inputs and it is necessary to have the PM and A/E handling them together. The second comes the roles handled exclusively by the A/E which means there are less

decisions to take regarding the design-quality issues but still for liability issues there are roles the A/E is the only party to take the decision in them. While the least is the category with participants excluding the A/E and this explains that most of the administrative roles are not entirely handled by the PM and they need the presence of other participants.

In other words, it could be concluded that the contract administration processes are considered administrative processes but the inputs are technical that need inspections to make sure everything meets the design, drawings and specifications. Therefore, if the project manager was on board, then he/she might be better prepared participant to handle most of the tasks and take the lead role as the Engineer whereas the need for the A/E as a technical party is necessary to give opinions, assessments and decisions related to technical issues.

## CHAPTER 4

### ASSIGNING THE TITLE OF THE ENGINEER

#### 4.1. Preamble

From the previous discussion, the roles handled by the Engineer were classified as their type and the fulfillment of each role. To make the decision of the assignment of the Engineer's title when having project organization as shown in figure 4.1; it will require shedding the light on the reasons for assigning the title of the Engineer to either the A/E or the PM by listing the pros and cons of each participant to support the decision. Those reasons are split in accordance to the project's design, quality, time, payment, claims management and variation orders.

The Engineer acts as the Employer's representative for the project by inspecting the works performed, certifying the payments and supervising the project. In figure 4.1 below, the organization structure involves the appointment of the PM along with the traditional presence of the A/E. There are questions that surface under this project organization to be examined to reach the final conclusion. The first question is how the contract administrative roles are split, in aboard manner, it is answered by the breaking down of the tasks in table 3.1, and by the examination of each contract administration process to establish the roles played by the Engineer in (chapter 3). Moreover, the assignment of the title of the Engineer to either party requires different factors and it is supported by several reasons that are highlighted in the following analyses.

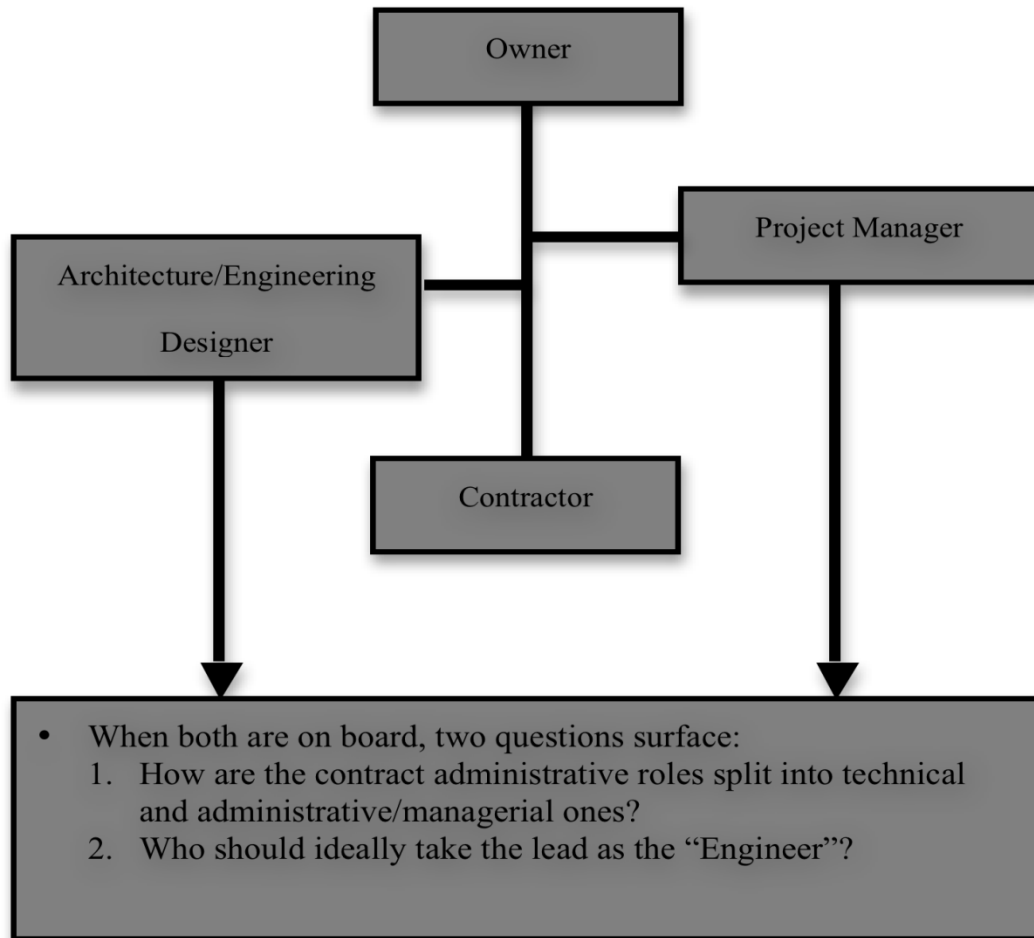


Figure 4.1: The Presence of the A/E and PM

#### 4.2. Arguing the Assignment of the Engineer’s Title: A/E versus PM

From the conceptual explanation, the one can assume that there are factors or parameters that allow and help the Employer on deciding to whether the title of the Engineer assigned to the A/E or the PM. Traditionally, the A/E office took the full

responsibilities during the construction contract and was able to handle all the roles.

While, through the decades the complexities and diversities of projects are growing very fast, so this required additional participants to deal with these particular issues such as project manager, technical controller, quantity surveyor, cost consultant...etc. The major question revolved from this diversity is who will take the lead as the Engineer? The underlying criteria for inferring the indicated pros and cons revolve around such factors as:

- familiarity with design-related matters. It means the Engineer's office with new participants shall be familiar to deal with all matters that concern a good knowledge about design. For example, the office will be responsible to do the inspections and check on testing to give approval or disapproval on executed works, so the party responsible to take the lead shall be able to understand the design drawings and specifications to give the decision;
- size of organization and the in-house capabilities for dealing with matters that are outside design-related competencies. This requires the office to be able to deal with a third party about several issues. As an example, the office needs to handle payment, guarantee, insurance and retention issues and be qualified to deal with a third parties as bank institutions and insurance companies;
- core competencies for handling large and complex claims, and over a period extending beyond the construction contract. The Engineer's office shall have the ability to deal with claims, VO's and take decisions regarding extension of time or additional costs;



- ability to make judgments and determinations in an objective manner, when these pertain to design-related issues. The Engineer's office needs to act impartially and in a good faith. There must be no bias or favoritism on making determinations and judgments about design-related matters; finally
- introduction of an additional layer of control that could allow a follow-up on how closely procedural and administrative requirements are observed. It means the Engineer's office shall be better to maintain a log of and follow up on schedules, payment schedules, and submittals.

These are the major variables required from the Engineer's office and it will facilitate the points of strength and weakness of each participant. Therefore, the list of pros and cons are summarized in table 4.1 below and it represents the tasks that can be handled by the A/E and the PM and the ability of each party in them. The detailed analysis throughout this stage and in accordance to the previous results will lead the Employer to make the decision who shall handle the title of the Engineer.

#### ***4.2.1. The A/E being the Engineer***

The Architect/Engineer is a major party in the contractual document and most of the time to play the technical role by doing the design and preparing all the drawings and specifications. The A/E is the responsible party to make sure the project meets all the technical performance specifications. As it was mentioned in section 2.5.3, in the traditional construction delivery method the A/E is the party to take the role of the Engineer and take all the decision. Furthermore, it is very important for the architect to have construction knowledge in addition to design background for the success of each

project [62]. Thus, to assign the role of the Engineer to the A/E requires looking at the pros and cons that shows the abilities and capabilities of the A/E to deal with project's design, quality, payments, time, claims and variation orders under the factors discussed earlier.

Previously, the roles of the Engineer during construction contracts were examined and clarified very clearly in chapter 3. This clarification managed to make it easier for the Employer to assign the tasks between the A/E and PM if both are hired during the contract. According to the analysis at the end of chapter 3, the roles that the A/E might handle are listed as the following:

- Examinations, testing, inspections and clarifications;
- Acceptance and rejection on the executed Works;
- Works measurements and omissions;
- Deal with withholdings and extra costs for quality-related issues; and
- Request for Variations.

Furthermore, the listing in table 4.1 is to split the strength and weakness of the A/E and how the factors would be more efficient when they are supported by technical and administrative tasks that can be done by him/her.

#### 4.2.1.1. Familiarity with Design-Related Matters

The A/E is the one responsible through the project design process, A/E is the master mind of the project since he/she prepares the design drawings and specifications for the project and has the familiarity with it more than any other party in the contract. Moreover, throughout the contract administration processes the A/E will have several

roles to fulfill. For example, as mentioned in section 3.3.4 that the Taking-Over certificate shall be issued by the Engineer after receiving the notice from the Contractor and state that the Works have been substantially completed except for any outstanding work or defects [sub-clause 10.1]. Thus, for the Engineer to take this decision, he/she has to be with good knowledge about the design to be able to do the inspections and approve that the Works are as expected. From this perspective, the A/E might have the complete liability for the full spectrum of Engineer's services.

#### 4.2.1.2. Size of Organization

The size of the organization and the capability to deal with matters that are outside design-related competencies and the need to follow up with third parties. For example, one of the Engineer's roles is to certify the payment that should be paid or not depending on the approval of the executed work. In view of the fact that, the Engineer deals with the evaluation of Works measurements, and the examinations of any plant, materials or workmanship, so he is the one to accept or reject the Works in accordance to the contract. While the A/E has the main concern about quality issues, it would be an advantage for the Employer to have the A/E responsible for any withholdings regarding any unaccepted executed work because it might reduce the risk of any overpayment on these rejected executed work.

On the other hand, the Engineer deals with other financial management issues such as:

- payments (advanced payment, interim payment, substantial completion payment and final payment),

- retention,
- guarantees and
- insurances.

These commercial management issues require a lot of follow up process with third parties such as banking institutions and insurance companies; the A/E does not have the capability and the capacity to deal with them. In other words, except for the case of large A/E offices they need to stretch and do an extra work to be able to manage these issues.

#### 4.2.1.3. Core Competencies in Handling Complex Claims and Variation Orders

The role to determine disputes by the Engineer is not an obligation and should be defined in the terms of the contract, but if the Engineer was asked to decide disputes then the A/E might not have the capabilities for dealing with claim managements.

On the other hand, as it was mentioned in section 3.3.2.3, the Variation Orders are a change in the design or the drawings and must be requested by the Engineer where most probably will be the A/E since he is the party responsible about the technical tasks during the project. But it consists of many administrative works and the A/E office might not be able to follow up and deal with complex Variation Orders.

#### 4.2.1.4. Make Judgments and Determinations on Design-Related Issues

The Engineer is responsible and entitled in procedures of reviewing submittals, examining, inspecting and testing all the materials, workmanship, checking on the performance of the work and the approval on the executed work. In accordance to the

A/E being more familiar with the project's design, he/she will make determinations and judgments in an objective manner when these pertain to design-related issues and he/she will have better emphasis/concern on quality. Thus, it might guarantee that quality will not be compromised.

Moreover, as it was mentioned earlier the A/E would create the nature, volume and frequency of technically-related interventions, including: the furnishing of design information and clarifications, reviewing of submittals, making inspections and witnessing testing activities all in accordance to the contract. This means that the A/E being the Engineer would have more dominant on a day-to-day basis relation and communication between him and contractor about technical issues that considers quality and safety.

#### 4.2.1.5. Follow up on Administrative Requirements

A major role of the Engineer is to balance the technical capabilities of the system with schedule and costs. Thus, it should be taken into consideration the factor of having an additional layer of control that could allow a follow-up on how closely procedural and administrative requirements are observed. Therefore, assigning this role to the A/E might have a disadvantage regarding schedule management. It may not be core competency to deal with planning issues and daily schedule submittals, except for the case of large A/E offices. In addition, working with scheduling and time extension analyses is likely to be outsourced.

#### ***4.2.2. The Project Manager being the Engineer***

Several theories, studies and analysis were conducted about the effect of involvement of project management in the success of construction projects. From the researches in section 2.5.2, Thamhain and Wilemon (1977) stated that “the effectiveness of project managers depends primarily on their leadership style and work environment”[56].

In addition, it was found that “the project leader critically affects both process performance and product effectiveness” [2]. Researches through years came up with attributes and skills the PM should have to become a successful one. For example, Thamhain (1991) “proposed that project management skills could be categorized into leadership, technical, and administrative”[57] and Fryer (1979) “examined the construction industry and identified five attributes of successful project managers; these included managing changes, recognizing opportunities, handling problems, decision-making and social skill” [20].

Every PM has points of strengthens and weakness that need to be considered and studied to ensure taking the decision of handling the role of the Engineer to the project manager on the project. The PM should have certain abilities and capabilities to deal with claims, variation orders, payment, time, project’s design and quality.

According to the classifications of the Engineer’s roles in chapter 3, if the PM was hired during the contract, he/she might be the party to handle several roles throughout the contract administration processes which are considered as administrative or managerial, as summarized below:

- maintain a log of;

- follow up on submittals;
- check on the construction schedule and any updates on it;
- issuance of payment certifications;
- receive documents and statements to give verifications;
- compile all the received documents and particulars;
- do determinations and take decisions;
- deal with claims and give approvals or disapprovals; and
- follow up on variation orders requests;

The reasons mentioned in table 4.1 with the roles listed above would help in achieving the conclusion if the PM would be the capable party to take the lead as the Engineer.

#### 4.2.2.1. Familiarity with Design-Related Matters

The project manager might not have the enough knowledge to deal with the project's design because of the less familiarity to deal with design-related issues. Even when it comes to issuing the Taking-Over Certificate and request for variation order, the A/E is the party to handle these tasks because he has the technical and design knowledge. While the PM will deal with the rest administrative work and will extent of authority allowing the critique of the A/E's performed reviews, for pinpointing any irregularities or anomalies. Hence, this causes splitting of liabilities towards the total role of the Engineer.

#### 4.2.2.2. Size of the Organization

Payments are considered one of the major issues to deal with during the contract and require strong knowledge in financial management. The Engineer is the party to handle and certify most of the payment certifications which consist that he has the capabilities for them. Based on the processes timelines, during each process there are certain tasks related to payments and shall be fulfilled by the Engineer such as:

- giving verifications regarding the Advanced Payment Guarantee;
- making the Works measurements and proceed to agree or determine the Contract Price by evaluating each item of work;
- issuing the Interim Payment Certificate stating the amount he fairly determines to be due after the Employer receives the Performance Security from the Contactor;
- determining and certifying any additional costs;
- certifying the outstanding balance of the Retention Money for payment to the Contractor;
- issuing the Final Payment Certificate to the Employer for such amount as he determines to be due.

As it was established from the roles the Engineer plays regarding payment issues, that the mega size of the projects justifies giving the lead to participants with more experience in financial/commercial management and be able to deal with third parties as bank institutions and insurance companies. The PM usually will have large office and will have the capability and enough experience to deal with several financial issues and be able to follow up with third parties.



#### 4.2.2.3. Core Competencies in Handling Complex Claims and Variation Orders

When it comes to deal with claims during the contract, the Engineer is the party to be notified in the event of rise of claim and he is the one to do the determinations.

Furthermore, having the PM in the contract provides a buffer in conjunction with the adversarial relation between the A/E and contractor on design-related conflicts/claims.

Hence, to avoid the exercise of bias by the A/E while making determinations on claims and giving opinions on design clarifications and priority of documents. The presence of

the PM would give a space for negotiation and not allowing for favoritism to the design.

In addition, the complex claims related to extra costs and extensions of time would require the expertise of specialized professionals such as: project managers, quantity surveyors, cost consultants and schedule analysis professionals.

As it was mentioned earlier, the A/E most of the time will be the party to request for a variation but he/she might not have the capability to handle the administrative tasks and make decisions. According to the understanding of the Engineer's role through the Variation Orders process in section 3.3.2.3, after the Engineer request for a variation there are certain matters to maintain as the following:

- the Engineer shall receive a proposal from the Contractor; then
- he shall respond with approval or disapproval on the proposal;
- if confirmed, then the Engineer shall derive the instructed variation rates; and finally
- the process goes to the price and time extension negotiation and the Engineer has to determine the provisional rates for the IPC.

Considering the tasks done by the Engineer during a variation order process, they consist having abilities to make determinations, make judgments and take decisions. These require expertise in project management so it is a point of strength for the PM to handle the roles related to variation orders.

#### 4.2.2.4. Make Judgments and Determinations on Design-related Issues

According to what was discussed earlier, the Engineer is in charge of reviewing submittals, inspecting, testing all the materials and checking on the performance of the executed work. Thus, quality is an important issue to consider it, while the PM cannot consider it one of his major concerns, so quality might be compromised if the PM were assigned to take the lead. The PM might not necessarily have the capability for judging technical reviews beyond the administrative follow-up role.

#### 4.2.2.5. Follow up on Administrative Requirements

From the analysis of the timelines previously, it showed how the Engineer was the party to follow up on schedules and submittals during most of the processes. For example, during the contract formation process in section 3.3.1.1 the Engineer has to issue the “Notice to Commence” of the Works and he shall receive from the Contractor the detailed time program and make sure it complies with the contract. This requires a wide knowledge in administration, schedule management and planning to deal with these issues and would be a core concern to the PM to have the ability to handle these roles.

### 4.2.3. Summary

After looking and determining the roles played by the A/E and PM, they helped in defining the points of strength and weakness in the assignment of the Engineer’s title.

The analysis figured out that the PM has the strength and capabilities to deal with administrative related tasks such as: claims, payments, time, variation orders and has less knowledge and familiarity about project’s design and quality. While, the A/E would have the strength to deal with the tasks related to design, quality and sometimes with payments. This states that the A/E handle the technical roles throughout the contract and might give opinions and decisions regarding administrative tasks with technical related issues. Thus, the PM will handle the administrative roles during the contract and might take into consideration the opinion of the A/E regarding technical related issues.

In attempt to shed light on the question dealing with the party to ideally take the lead as the “Engineer” of the construction contract, Table 4.1 summarizes high-level reasons that support the assignment of the Engineer’s title either to the A/E or the PM.

Table 4.1: Pros and Cons for the Assignment of the Engineer’s Title

	<b>Scenario A Engineer: A/E</b>	<b>Scenario B Engineer: PM</b>
<b>(+)</b>	<ul style="list-style-type: none"> <li>- More familiarity with project design.</li> <li>- Better emphasis/concern with quality issues.</li> <li>- Give opinions that deal with withholdings about the unapproved executed works (Reduced risk of overpayment).</li> <li>- Nature/volume/ frequency of</li> </ul>	<ul style="list-style-type: none"> <li>- Providing a buffer in conjunction with the adversarial relation between the A/E and contractor on design-related conflicts/claims (thereby avoiding the exercise of bias by the A/E while making determinations and giving opinions on design clarifications, priority of documents, etc.).</li> </ul>

	<p>technically-related interventions, including: the furnishing of design information and clarifications, reviewing of submittals, making inspections, witnessing testing activities, etc. (more dominant on a day-to-day basis).</p> <ul style="list-style-type: none"> <li>- Complete liability for the full spectrum of Engineer's services.</li> </ul>	<ul style="list-style-type: none"> <li>- Ability to follow-up on all submittals (representing an added control layer).</li> <li>- Size of projects (e.g., mega-sized projects) warranting giving the lead to participants with more experience in financial/commercial management.</li> <li>- Complex claims related to extra costs and extensions of time requiring the expertise of more specialized professionals (project management ones, quantity surveyors, cost consultants).</li> </ul>
<p>(-)</p>	<ul style="list-style-type: none"> <li>- Schedule management may not be core competency, except for the case of large A/E offices.</li> <li>- Work dealing with scheduling and time extension analysis is likely to be outsourced.</li> <li>- Limited capacity for dealing with commercial management issues including: <ul style="list-style-type: none"> <li>• Payments: advanced payment, interim payments, substantial completion payment, and final payment;</li> <li>• retention, withholdings and set-offs;</li> <li>• guarantees/bonds; and</li> <li>• insurances.</li> </ul> </li> <li>- Not necessarily having the capability for dealing with complex variation orders and claims management.</li> </ul>	<ul style="list-style-type: none"> <li>- Not necessarily having the capability for judging technical reviews beyond the administrative follow-up role.</li> <li>- Extent of authority allowing the critique of the A/E's performed reviews, for pinpointing any irregularities or anomalies.</li> <li>- Split liabilities towards the total role of the Engineer.</li> </ul>

### 4.3. Deciding the Assignment of the Engineer's Title

Based on the argument through chapters 3 and 4 about splitting the tasks into administrative versus technical and setting the pros and cons for assigning the title of the Engineer either to the A/E or the PM; the analysis is justifying for us the idea of who should take the lead to act as the Engineer.

The main objective of table 4.2 below is to present the roles of the Engineer during the contract administration processes and to consider which tasks are better to be handled by the PM or the A/E. The distribution of roles in table 4.2 was supported with different reasons based on the outcome of table 3.2 and the comparison list of pros and cons between the PM and the A/E in table 4.1.

Table 4.2: The Fulfillment of the Engineer's Roles

Seq. #	Sub-clause	The Engineer's Roles	The Fulfillment of the Engineer's Roles	
			PM	A/E
<b>Contract Formation Process</b>				
1	1.1.1.3	Preparation of the Letter of Acceptance	+	
2	1.5	Compile all contract documents for the Signature of Contract	+	
3	4.2	Compliance verifications regarding the Performance Security and Advanced Payment Guarantee	+	
4	8.1	Issue the Notice to Commence	+	
5	8.3	Receive and consent the Program of Works	+	
6	14.2	Certify the Advanced Payment	+	

<b>Selected Cyclic Contract Administration Process</b>				
7	3.5	Make determination any additional costs	+	
8	4.21	Review the Contractor's submitted statements and progress report	+	
9	12.1	Examine the Works to be measured		+
10	12.1	Issue notice to the Contractor's representative to attend the measurements	+	
11	12.3	Derive the instructed variation rates from existing ones or negotiate proposed new rates	+	
12	12.3	Determine the provisional rates for payment purposes	+	
13	13.1	Request for proposal from the Contractor describing the variation		+
14	13.1	Instruct a Variation Order		+
15	13.3	Respond to the proposal with approval or disapproval	+	
16	14.6	Issue the Interim Payment Certificate	+	
17	20.1	Receive a notice on intent to claim	+	
18	20.1	Receive the detailed claim with supporting documents	+	
19	20.1	Take the decision with approval or disapproval on the received claim	+	
20	20.1	Make determination regarding the submitted claim	+	
<b>Facility Taking-Over Process</b>				
21	7	Examine, inspect and test all the materials, workmanship and performance of the work		+
22	10.1	Determine the date of when the Works to be substantially completed	+	
23	10.1	Issue the Taking-Over Certificate		+
24	14.6	Issue the Payment Certificate	+	
<b>Contract Close-Out Process</b>				
25	11.9	Issue the Performance Certificate		+
26	14.9	Certify the outstanding balance of Retention Money to the Contractor	+	
27	14.11	Agree or Disagree on draft final statement submitted by the Contractor	+	
28	14.13	Issue the Final Payment Certificate to the Employer	+	

The conceptual study reached to a conclusion where most of the roles are classified as administrative roles with technical inputs and they are handled with the category of the PM and A/E together. Moreover, the PM is better prepared to deal with administrative roles; it means the PM is more proficient to deal with schedule, cost and complex claims and VO's. On the other hand, the A/E has the opinions and decisions from technical perspective to deal with design-related judgments in connection with the selection of materials and products, workmanship of these products installation and the performance of the installed products. Hence, this would path the road for the Employer to take the decision of assigning the title of the Engineer.

According to the previous discussions in chapter 3 and 4, the PM can be able to take the lead as the Engineer in all responsibility except for inputs from the A/E. These inputs consists of technical constraints such as modifications on drawings and specifications, instructing a variation order that can deal with (quality, quantity, levels...etc) which they are all design-related matters. In some cases, the Employer might be involved either in consulting and his approval is needed to make judgments or only he will be informed with the decision or the matter.

The following table 4.3 summarizes all the roles among the PM, A/E and employer to be considered as one of the following:

- R = Responsible, which means the party will be fully responsible and qualified to handle the role.
- Con = Consulted, the party will be consulted and his opinion will be taken into consideration to take a decision or make a judgment about an issue.

- Con/App = Approved, the party will be consulted and he has to give his approval before taking a decision or making judgment about an issue.
- Inp = Input, there will be a technical inputs required to several administrative roles.
- Inf = Informed, several parties will be informed about different matters during the tasks.

Table 4.3: The Assignment of the Engineer's Title

Seq. #	Sub-clause	The Engineer's Roles	The Assignment of the Engineer's Title		
			PM	A/E	Employer
<b>Contract Formation Process</b>					
1	1.1.1.3	Preparation of the Letter of Acceptance	R	Con	Con
2	1.5	Compile all contract documents for the Signature of Contract	R	Inp	Con
3	4.2	Compliance verifications regarding the Performance Security and Advanced Payment Guarantee	R	Inf	Inf
4	8.1	Issue the Notice to Commence	R	Inf	Con
5	8.3	Receive and consent the Program of Works	R	Con	Con
6	14.2	Certify the Advanced Payment	R	Inf	Con
<b>Selected Cyclic Contract Administration Process</b>					
7	3.5	Make determinations for extension of times and additional costs	R	Inf	Con
8	4.21	Review the Contractor's submitted statements and progress report	R	Inp	Inf
9	12.1	Examine the Works to be measured	Con	R	Inf
10	12.1	Issue notice to the Contractor's representative to attend the measurements	R	Con	Inf
11	12.3	Derive the instructed variation rates from existing ones or negotiate proposed new rates	R	Inp	Inf



12	12.3	Determine the provisional rates for payment purposes	R	Inp	Inf
13	13.1	Request for proposal from the Contractor describing the variation	R	Inp	Con
14	13.1	Instruct a Variation Order	R	Inp	Con/App*
15	13.3	Respond to the proposal with approval or disapproval	R	Inp	Con/App*
16	14.6	Issue the Interim Payment Certificate	R	Inf	Con
17	20.1	Receive a notice on intent to claim	R	Inf	Inf
18	20.1	Receive the detailed claim with supporting documents	R	Inf	Inf
19	20.1	Take the decision with approval or disapproval on the received claim	R	Con	Con
20	20.1	Make determination regarding the submitted claim	R	Con	Con
<b>Facility Taking-Over Process</b>					
21	7	Examine, inspect and test all the materials, workmanship and performance of the work	Inp	R	Inf/Con
22	10.1	Determine the date of when the Works are deemed to have been substantially completed	R	Con	Con
23	10.1	Issue the Taking-Over Certificate	Con	R	Con
24	14.6	Issue the Payment Certificate	R	Inf	Con
<b>Contract Close-Out Process</b>					
25	11.9	Issue the Performance Certificate	Con	R	Con
26	14.9	Certify the outstanding balance of Retention Money to the Contractor	R	Inf	Con
27	14.11	Agree or Disagree on draft final statement submitted by the Contractor	R	Con	Con
28	14.13	Issue the Final Payment Certificate to the Employer	R	Inf	Inf

From the table it could be concluded, that the majority of the roles are under the responsibility of the PM while there are few roles that need technical inputs from the A/E. In addition, there are different roles require the consultation of the A/E and the

Employer to take the final decision about them. While, the rest of the roles consist only of informing the Employer about the matter.

For example, the preparation of the Letter of Acceptance is the PM responsibility but the Employer will be consulted during that matter, another issue is when the Engineer receives a notice on intent to claim and the PM will take all the responsibility and inform the Employer with the issue. Furthermore, the instruction of a Variation Order will be handled by the PM with input from the A/E who will be consulted in coordination with the Employer and the PM needs the Employer's approval during this role since it deals with adding new quantities or changing in the design. On the other hand, the issuance of Taking-Over Certificate can only be under the responsibility of the A/E while the PM and the Employer's opinions will be taken into consideration and consulted through the task. Based on this examination the PM is better participant to take the lead and assign the title of the Engineer. The A/E will have a consulting role and the Employer could be consulted in few matters and this might give him the purpose to interfere in different roles of the Engineer.

## CHAPTER 5

### FULFILLMENT OF THE ENGINEER'S ROLES- THEORETICAL ANALYSIS

#### 5.1. Preamble

The previous sections were able to obtain the roles of the Engineer and classify them into technical versus administrative; furthermore, they were able to find the reasonable participant between the PM and A/E to take the lead as the Engineer.

According to the FIDIC 1999, the contract stipulates the rights for each party which are the Employer and the Contractor; while, the Engineer is the intermediary to facilitate the interactions between these two parties on matters that the Employer is not qualified to judge.

On the other hand, the Employer might interfere in the role of the Engineer. Our main objective is to have a theoretical analysis about the fulfillment of the Engineer's roles and how the authority of the Engineer, regardless of who is given the title of the Engineer, can be expected to be affected by the presence of other possible participants on the project, including the Employer himself. Moreover, the analysis will specify the ways the Employer can meddle in the roles of the Engineer by presenting different possibilities of project organizational structures, examining the roles of the Engineer throughout the construction contract, stating the reasons why the Employer wants to interfere in the Engineer's roles and showing the different ways he can obtain these interventions.

## 5.2. Organizational Structures

Based on chapter 3, there are contract administration processes going through every contract and the party responsible for carrying out this contract administration on behalf of the Employer is expected to differ depending on the project organizational structure (OS) adopted from the possible scenarios as follows:

Participant \ OS	OS1	OS2	OS3	OS4	OS5	OS6
Owner/Client	•	•	•	•	•	•
Client Representative	•	•	•	•	•	•
Project Manager	•	•	•	•	•	•
Consultant	•	•	•	•	•	•

Figure 5.1: Project Organizational Structure Scenarios

In the first scenario, each organization acts as a separate entity, and it could be the project manager or the consultant who would be expected to have the lead role in administering the construction contract. In the second scenario, the client representative and project manager functions are entrusted with the same entity. In the third case, the consultant would be expected to have the lead role in administering the construction contract, over and on top of providing technical supervision during the construction phase. In the fourth scenario, the client is having an in-house client representation entity, while the consultant would also be expected to have the lead role in administering the construction contract. In the fifth scenario, the client is having an in-house client representative team, while the project manager and consultant firms are separate, where it

could be either the project manager or the consultant who would be expected to have the lead role in administrating the construction contract. In the sixth structure, the owner has an in-house team that could play a combined client representative and project manager role.

The purpose from the examination of different organizational structures is to shed the light on the roles of the Engineer who can be any of the previous participants such as project management company, client representative...etc to act on behalf of the Employer and give him the possibility to meddle in some of these roles.

### **5.3. The Employer's Stipulated Roles**

The Employer is the main party during any construction contract and he has several roles to fulfill. In addition, the Employer has a high authority throughout the project and table 5.1 below presents examples of the roles fulfilled by the Employer and his authority.

Table 5.1: The Employer's Stipulated Roles

Number	Employer	Sub-clause
1	Sign the Letter of Acceptance	1.1.1
2	Obtain Permission for Permanent Works	1.13
3	Give the Right of Access and Possession of Site	2.1
4	Give the POS of any foundations, structure...etc	2.1
5	Provide the Contractor with Permits, Licenses or approvals	2.2
6	Provide evidence of the financial arrangements and pay the Contract Price	2.4
7	Appoint the Engineer	3.1
8	Give the Engineer approval before exercising a specified authority	3.1
9	Approve the Performance Security	4.2
10	Make available to the Contractor relevant data such as possession on sub-surface and hydrological conditions at the site including environmental aspects	4.10
11	May be able to provide basic provisions such as goods and materials (long run materials)	4.20
12	<p>Employer is to employ, the Employer can carry out the works himself or by others in different cases such as:</p> <ul style="list-style-type: none"> <li>• Pay third party to carry out the works if the Contractor fails to employ with the instructions,</li> <li>• Contractor fails to remedy defects the Employer may carry out the work himself or by others,</li> <li>• After termination the Employer may complete the works and/or arrange for other entities to do so</li> </ul>	<p>7.6</p> <p>11.4</p> <p>15.2</p>
13	Seek agreement to reduction in the contract price if the Contractor can't carry out the remedial work	9.4
14	Take over the works completed in accordance to the contract	10.1
15	Grant right of access for the Contractor to remedy defects and damage	11.7
16	May sell or otherwise dispose of any remaining items such as surplus material, wreckage, rubbish and temporary works from the site	11.11
17	Decide on the non adjustable coefficient for changes in cost	13.8
18	Shall make an Advanced Payment and approves the entities issuing guaranties	14.2

<b>19</b>	Entitled to terminate the contract	15.2
<b>20</b>	May elect to obtain insurances for all the contracts for a particular project	18.1

Therefore, as was explained above the contract general conditions sets the major matters handled by the Employer throughout the contract, the roles where the Employer evidently has authority over the Engineer's roles and the roles that entirely for the Engineer. One of the roles under sub-clause [3.1], the Employer is the one to appoint the Engineer throughout the project who shall carry out the duties assigned to him in the contract. However, "the Engineer doesn't represent the Employer for all purposes" such as "is not authorized to amend the Contract but he is deemed to act for the Employer". This would give the Employer the reason to interfere in some of the roles handled by the Engineer and there are those instances where it is clear that the general conditions of the contract on their own have given the Employer ways of interfering.

Previously in chapter 3, there were detailed explanations and examinations for the contract administration processes and the roles played by the Employer and the Contractor and particularly the intimidator role of the Engineer between them. Theoretically, we are studying the relation between these roles and the way the Employer might limit the authority of the Engineer's roles. There are several sub-clauses clearly stated in the general conditions and they specify some matters to be handled by the Engineer only with the Employer's approval.

For example, in sub-clause [4.7] the Engineer has to "notify the contractor of reference points, which the Employer shall be responsible for any errors therein". Moreover, in sub-clause [5] the Engineer can be part of "instructing the contractor of the nominated subcontractors, where the Employer may have to indemnify the contractor

against and from the consequences of the matter subject of contractor's objection". As well as in sub-clause [9.4] the case of "issuing a taking over certificate if so requested by the Employer in view of a case where the works failed to pass the Test on Completion". Based on this analysis, it could be visible at some point in that the Engineer will be playing the liaison role between the Employer and the Contractor.

#### **5.4. The Engineer's Engagement Under the Construction Contract**

As it was discussed earlier, the Engineer is appointed by the Employer to act on his behalf and carry out the duties assigned to him in the contract. At this point, we are studying the clauses to maintain the roles of the Engineer and where the Employer can interfere in them. Thus, clause 3 in the general conditions has to be understood very well because it describes the authority of the Engineer throughout the contract.

Particularly, in table 5.2 below, there are full descriptions and clarification of the matters handled by the Engineer under clause 3 to highlight the statements that will give the Employer the reasons to interfere in these roles. For example, sub-clause [3.1] states that "if the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the particular conditions", and "whenever the Engineer exercises a specified authority for which the Employer's approval is required, then the Employer shall be deemed to have given approval". This shows a stipulated limitation of authority by the Employer and could be a reason for him to interfere in specific roles handled by the Engineer. In addition, the Employer's ways of interfering would be through setting constraints on the Engineer's authority but the Contractor should agree them. As described in sub-clause [3.1] that "the Employer



wishes to impose constraints on the Engineer’s authority, these constraints must be listed in the Particular Conditions, so as to avoid having to seek the Contractor’s agreement to further constraints”

Moreover, the Engineer has a major role in the administration of the contract particularly with respect to issuing Variations, Payment Certificates and reviewing any Contractor’s Documents. The Engineer has to determine and agree on these matters according to sub-clause 3.5. He shall consult with each party to reach agreements which might be a cause for the Employer to limit the rights of the Engineer in some issues by hiring participants to act on his behalf to take decisions and make judgments.

Table 5.2: The Engineer’s Engagement under the Construction Contract

Roles Attributes	Described Roles	Reference		Further Roles’ Clarification by the FIDIC Guide
		Sub-clause	Paragraph	
Appointment of the Engineer	The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract	3.1	1	However, “the Engineer doesn’t represent the Employer for all purposes” such as “is not authorized to amend the Contract but he is deemed to act for the Employer”
Description of Stipulated Authority	The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract	3.1	3	
Stipulated Limitation of Authority by Employer	If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the particular conditions	3.1	3	

Further Limitation of Authority requiring Contractor's Agreement	The Employer undertakes not to impose further constraints on the Engineer's authority except as agreed with the Contractor	3.1	3	If the Employer wishes to impose constraints on the Engineer's authority, these constraints must be listed in the Particular Conditions, so as to avoid having to seek the Contractor's agreement to further constraints
	Whenever the Engineer exercises a specified authority for which the Employer's approval is required, then the Employer shall be deemed to have given approval	3.1	4	"The Employer's approval shall be in writing and shall not be unreasonably withheld or delayed"
Engineer's Capacity	Whenever carrying out duties or exercising authority specified or implied by the Contract, the Engineer shall be deemed to act for the Employer	3.1	5(a)	The role of the Engineer is thus not stated to be that of a wholly impartial intermediary unless such a role is specified in the Particular Conditions
	The Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract	3.1	5(b)	"Except as otherwise stated in the Contract and the main exception is the authority to instruct Variations because they include omission of any work"
Delegation by the Engineer	"The Engineer may from time to time assign duties and delegate authority to assistants and may also revoke such assignment or delegation" and these assistants "shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority"	3.2	1 & 2	Many assistants need to be appointed, including resident engineers and other professional staff on the Site. These persons may need to have authority delegated to them so they can be fully effective. Thus, the Employer should ensure that there are sufficient assistants and that they comply with the criteria.
Authority by the Employer to Replace the Engineer	The Employer may decide to replace the Engineer	3.4	1	Employers understandably consider that there should be no restriction imposed on replacing the Engineer whom the Employer has appointed to administer the Contract
Contractors' Authority to ask for good reason of	The Employer shall not replace the Engineer with a person against whom the Contractor raises	3.4	1	In order to prevent the Employer appointing an unsuitable replacement Engineer, the Contractor should notify the Employer of the "reasonable

replacement of the Engineer	reasonable objection by notice to the Employer with supporting particulars			objection”
Determination by the Engineer	“Whenever these conditions provide that the Engineer shall proceed in accordance with sub-clause 3.5 to agree or determine any matter, the Engineer shall consult with each party in an endeavor to reach agreement”	3.5	1	“Determination shall be in writing and shall not be unreasonably withheld or delayed”  “Unless otherwise agreed by both the Employer and the Contractor, the Engineer shall not delegate the authority to determine any matter in accordance with sub-clause 3.5”
	If the agreement of both Parties cannot be achieved within a reasonable time, the Engineer is then required to make a “fair determination” in accordance with the Contract taking due regard of all relevant circumstances.	3.5	1	The Engineer first consults with each Party separately and/or jointly and endeavors to achieve the agreement of both Parties. The Engineer determination is not required to be made impartially unless such a requirement is stated in the Particular Conditions
	“The Engineer shall give notice to both Parties of each agreement or determination with supporting particulars”	3.5	2	Each party shall give effect to each agreement or determination unless and until revised under Clause 20

### 5.5. Ways of Meddling with the Engineer’s Roles

The Employer hires the Engineer to act for him on matters he is not qualified to judge but at the same time, the Employer gives himself the right to intervene in several matters and not allow the Engineer to take decisions without his approval.

It was established earlier in section 5.3 that there are clear instances on their own in the general conditions of the contract gave the Employer ways of interfering. Moreover, there are some clauses in the contract opened the door to the Employer to go to the particular

conditions and he/she can put constraints to limit the authority of some roles required by the Engineer throughout having other participants to handle them. On the other hand, the Employer might give himself the authority to meddle in issues not clearly mentioned in the contract or the particular conditions and force the Engineer not to take decisions without his approval.

The analysis in this research will highlight two main points regarding the intervention of the Employer in the role of the Engineer. First, it will specify and identify the windows through which the Employer is clearly given the right to interfere in the role of the Engineer as stated either in the general conditions or in the particular conditions. Second, it will state the intervention of the Employer in some roles that he is not supposed to meddle in them but rather than that he forces the Engineer not to make any decision or judgment without his approval.

#### ***5.5.1. Extent and Exercise of Engineer's Authority***


The Employer from the beginning will define his authority and the authority required from the Engineer. The Engineer will be asked to act for the Employer in different ways, he will be asked to deal with certain roles impartially and with full authority. While the Employer might give to himself different authorities and put some constraints to be stated in the particular conditions on particular tasks not to be handled by the Engineer and transferred to him while he will have his own participants to act on his behalf.

Based on the detailed reading of clause 3 in table 5.2 above, there were sub-clauses discussed and examined to be the reasons for the Employer to meddle in the

Engineer’s authority. The table 5.3 below will show the classification of authorities with the extent and exercise of these authorities. Moreover, the analysis will give examples for susceptible areas that will allow the Employer to interfere in some of the Engineer’s roles and classify these roles.

It was established that there are four categories of the Engineer’s authority, which are transferred authority, limited authority, challenged authority and impartial authority. The Employer would meddle in the roles of the Engineer through making determinations; if the Engineer consults with each party and did not reach to agreement, then the Engineer has to make determinations in respect of certain aspects conditional of written approval of the Employer as explained in the following table 5.3.

Table 5.3: Classification of Authority

Classification of Authority	Extent and Exercise of Engineer’s Authority	Degree of Meddling with Engineer’s Authority
<b>Transferred Authority</b>	The Engineer acts in an advisory capacity to the Employer who has maintained to himself through the explicit contract language the right to decide on final determinations in respect of certain aspects of the contract and to instruct the same to the Contractor.	<div style="display: flex; align-items: center; justify-content: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small; margin-right: 10px;">Increased degree of reducing, or meddling with, Engineer’s authority</div>  </div>
<b>Limited Authority</b>	The Engineer’s determinations and instructions of the same to the Contractor in respect of certain aspects of the contract, are made conditional to obtaining the prior explicit approval of the Employer.	
<b>Challenged Authority</b>	The Engineer’s authority in respect of making determinations, giving opinions, rendering judgments, etc. is	

	exercised under the indirect influence of the Employer.	
<b>Impartial Authority</b>	The Engineer is afforded freedom in exercising his authority in an unbiased manner.	

In some cases, the Employer meddles in particular roles of the Engineer that are not mentioned under the particular conditions and usually they are supposed to be handled only by the Engineer. However, the Employer would ask the Engineer to consult with him about different issues and will force him not to take any decision or make judgment without his approval. The Employer would put pressure on the Engineer to accept his intervention by warning him of not being a party on future projects, so this would force the Engineer to mingle with the situation.

It could be argued that the roles the Employer might clearly intervene in and state them in the particular conditions most probably would be administrative roles because the Employer can have his in-house team to deal with these matters such as cost consultant, cost controller, quantity analyst; or hire a project management company as a third party.

Therefore, the main concern in this analysis is to be able theoretically to choose which roles the Employer might give himself the right to meddle in and take them from the Engineer. First, the analysis shall specify the possibilities of the organizational structure that the Employer has during the project and if he has the in-house capabilities or the need to hire a third party. Second, the analysis needs to give examples and clauses' statements to support the argument of giving the Employer these particular rights.

It was recognized in table 5.3, the Engineer has his full authority on many roles to be handled and act impartially on making judgments. On the other hand, the Employer might interfere and limit the Engineer's authority in some administrative roles. He can

hire a project manager as third party that would help him to handle these roles because the PM will have the required knowledge to deal with issues as making determinations about the extension of time or additional payment and taking decisions regarding the approval or disapproval of the principle of claims. Moreover, the Employer can oblige the Engineer for his approval on roles supposed to be judged only by the Engineer as issuance of the Taking-Over Certificate or the issuance of the Notice of the Commencement Date. Otherwise, the Employer might request to have a full authority over certain roles from the beginning of the project such as instructing a variation order or accepting a value engineering proposal.

To understand how these roles would be interfered by the Employer and what is the reason behind this intervention, taking as example the issuance of the Taking-Over Certificate. As it was clearly explained in section 3.3.4.1, the Engineer is the responsible party to issue the Taking-Over Certificate within 28 days after receiving the Contractor's notice, stating the date on which the Works, in the opinion of the Engineer, have been substantially completed except for any minor outstanding work and defects. But, in the situation of the need for the Employer's approval to issue this certificate; the Employer might delay the issuance of the TOC which would cause a delay for the Contractor. Thus, the Employer can ask for liquidated damages in accordance to sub-clause [8.7] "if the Contractor fails to comply with Time for Completion, the Contractor shall pay delay damages to the Employer for this default. These liquidated damages shall be the sum stated in the Appendix to Tender, which shall be paid for every day which shall elapse between the relevant time for Completion and the date stated in the Taking-Over Certificate".

### ***5.5.2. Participants Interplay vis-à-vis Engineer's Authority***

The previous sections were able to clarify the roles handled by each party during the contract administration processes, classify the roles of the Engineer to technical versus administrative and be able to assign the role of the Engineer to either the PM or A/E. Furthermore, regardless of who takes the lead, there was a theoretical perspective on the ways the Employer can meddle in the Engineer's roles and limit from his authority.

Traditionally, the organizational structure shows the relation between the main parties of the contract, which are the Employer, the Contractor, and the Engineer. While, there are different scenarios of organizational structures as it was discussed before with several participants hired by the Employer. According to the analysis of this chapter, the Employer will intervene in certain roles and will hire these participants to act for him instead of the Engineer and handle these roles.

Moreover, the theoretical perspective proved that the Employer can obviously limit some of the Engineer's authorities in taking decisions and making determinations regarding claims, extension of time, additional payment and variation orders. Besides, the Employer can interfere in technical related issues and he will not have the qualified knowledge to deal with these tasks, so for that he would have the Engineer or the client representative.

The following organizational structure in figure 5.2 presents the different types of relation between the parties involved such as the contractual relationship between the Employer, the A/E, the third party team of PM, QS...etc and the Contractor. Moreover, it shows a typical required consultation between the Engineer and the Employer, and



between the Contractor and the Employer regarding different issues and decisions. There is also an internal coordination among the Employer with his in-house team and with the involved third parties to act on his behalf as the PM, QS, TC...etc. The final thing, it shows a contractual correspondences between the Employer and Contractor and between the Engineer and Contractor.

The model shows the relation between the main parties and the way the Employer will fulfill the contract administration roles by interfering in the Engineer's roles. It shows the intervention of the Employer on matters naturally he is not the one to handle them and forces the Engineer not to take any decision without his opinion and approval. It requires from him to have a strong in-house team to have such authority over the Engineer and deal with these matters and make judgments. Therefore, it illustrates that the Employer will have the authority to deduct from the Engineer's roles and add them to himself and be handled by his in-house team through engaging new participants such as project manager, cost consultant, quantity surveyor and technical controller...etc.

The Employer will have fewer roles transferred to himself and take the final decision about them. Moreover, the Employer will limit more of the Engineer's authority through stating constraints on several matters that must have his approval before the Engineer's makes the judgments. As well, the Employer will give himself the right to interfere in various non-essential roles in a challenged way through consultation, which means the Engineer has to consult with the Employer regarding different matters and he will meddle in the Engineer's authority and oblige him not to take any decision without his approval.

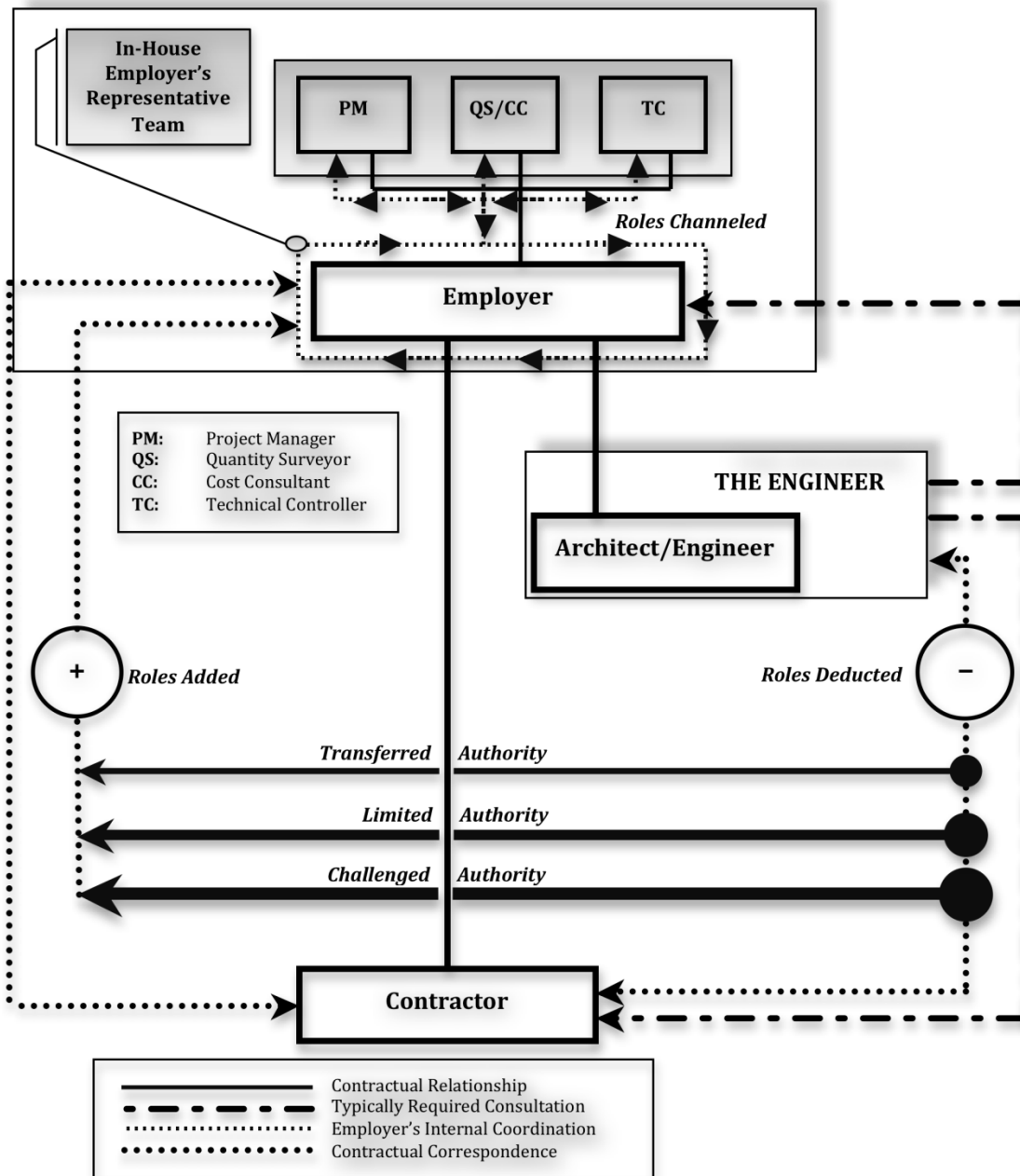


Figure 5.2: Participants Interplay vis-à-vis Engineer's Authority

## CHAPTER 6

### FULFILLMENT OF THE ENGINEER'S ROLES- IN PRACTICE

#### 6.1. Preamble

At this stage from the research, it studies the conceptualization of the interplay among involved participants. It is a case used by a way of validating the theoretical analysis regarding the interferences of Employer and his engaged participants to act on his behalf. Moreover, regarding the participants interplay and the way the roles are being handled among all of them.

The main objective from validating this real case is to present a good example of practicing the concept this thesis work is trying to achieve. In addition, it is a good case to show the different ways of meddling by the Employer in the Engineer's roles. On the other hand, the case was not able to examine in all ways the analysis being studied through this research but tried to maintain addressing in general the two main questions this research is trying to answer.

The case based is considered an interesting, large and complex case regarding the way of interplay among contractual participants and the way the Employer is reducing the Engineer's authorities in different ways. However, most of the time through stating a full transfer of authority to himself and he is the party to take the full decision or by a way of diffusing authorities where the roles of his engaged participants and the Engineer are not defied under the contract itself. Furthermore, throughout the case, there are roles

to see the presence of the Employer acting instead of other involved participants where it is not considered as an option for him to take the decision.

The outline of describing this case will consist of having a general description without any details for confidentiality reasons. It will describe the traditional organizational structure this project being approached and will concentrate only about the issue of claim/ dispute process which will state some of the project's contract clauses and statements might be used during this process. Finally, there will be a detailed examinations and description of the claim/dispute process that took place during this project but it will be summarized in a way that validate the objectives of this research in a masked way to conceive confidentiality as it was mentioned.

## **6.2. Project Description**

This is a project in the Middle East and Africa (MENA) area with a budget of \$250,000,000 approximately. It consists of 300 blocks of medium rise buildings with luxurious facilities. The time schedule for this project was for two years but it faced different issues. There were two main additions to the original contract, through Memorandum of Understanding and an Addendum signed between the Employer and the Contractor agreeing on new payment schedule and new Time of Completion. The project went through several claims and reached to amicable resolution phase.

## **6.3. Project Organizational Structure**

The project consist of different participants such as the main parties in the contract are the Employer, the Contractor and the Engineer. While the Employer has an

in-house team to act on his behalf, consist of Cost Consultant and Project Coordinator/Manager.

The Condition of Contract stated the definitions and roles handled by each party. For example, it stated who is the party considered as the Employer and the participants he hired to act for his behalf. It is mentioned that the “Engineer or other appointed from time to time by the Employer and notified in writing to the Contractor to act as the Engineer so designated. The project manager shall act on behalf of the Employer; details of their role shall be defined by the Employer”.

Moreover, through the analysis of this project and studying the claim’s issues, there were validation for the interplay between participants and ways of meddling in the Engineer’s authority by the Employer in several roles.

#### **6.4. Project’s Contract**

The Agreement of this project consists of the Employer appointing the Engineer, the Project Manager and sign with the Contractor. The Contract itself stated many clauses as general conditions and particular conditions. The Conditions covered most of the issues that might face the contractual parties throughout the project. In this section, there will be few examples on statements that support the argument and could be effective to the analysis. As example, the statements that might be used are as the following:

- Termination, default of the Employer “ if the Employer has failed to pay to the Contractor the amount shown by any Interim Payment Certificate or Final Payment Certificate within 30 days after expiry of the period 14 days and such failure is not due to the making by the Employer of any deduction or recovery

from the Contractor which the Employer may be entitled to make under the Contract or otherwise. Then subject to the Contractor giving 14 days prior written notice to the Employer with a copy to the Engineer and the Event concerned not having been remedied before expiry of the notice, the Contractor may within 14 days after such expiry give a further notice to the Employer which shall be effective to terminate the Contract immediately”.

- Dispute Resolution, Amicable settlement “ if a dispute arises between the Employer and the Contractor whether during the carrying out of the Works or after their completion and whether before or after any termination of the Contract, including any dispute to any decision, opinion, instruction, order, certificate, determination or valuation of the Engineer or the Employer. It shall first be referred to a director of each party and those directors shall endeavor to settle the Dispute amicably. If the Dispute cannot be settled within 12 weeks of the Dispute being referred to the respective directors then either the Employer or the Contractor may give notice to other party of his intention to commence arbitration”.
- Time for Completion, Extension of Time “ after due consultation with the Engineer and the Contractor, the Employer shall grant and notify to the Contractor and the Engineer such extension. If any of the Time for Completion of the whole of the Works as may in his opinion be reasonable in respect of such part of any delay in completing the whole of the Works is caused solely by the following events”:

- any variation of the Works made pursuant to a Variation Order as defined under the Variation Order clause,
  - any Suspension Order as defined under Suspension Order clause,
  - any of the expected risks as defined under the Risk and Care clause.
- Variation Orders, “ after receiving any Variation Order, the Contractor shall proceed with the carrying out thereof and shall within the period required by the Engineer notify the Engineer in writing whether in the Contractor’s opinion the Variation Order will result in any need to revise the Program. If in the Contractor’s opinion there is such a need the notification shall accompanied by a proposed revised Program for approval of the Engineer”.
- Suspension Order, “ the Contractor shall on the written order of the Engineer stating the date of suspension and bearing the written consent of the Employer. The Contractor shall not be entitled to claim recovery of any such extra Cost unless, within 28 days after receipt of the Suspension Order, it gives the Engineer written notice of its intention to make such claim”.
- Claims, Notice to Claims “ if the Contractor intends to make a claim against the Employer for any additional payment, the Contractor shall give notice in writing thereof to the Engineer, with a copy to the Employer, as soon as possible and in any event within 28 days after the event or circumstances giving the rise to the claim has first occurred. The notice shall contain full and detailed particulars”.

These clauses will show the interaction between the parties during the claim and dispute process and the interventions from the Employer in different roles.

## **6.5. Claim/Dispute Description**

According to chapter 3, the study was able to examine several processes. For the following discussion, the claims/disputes administration process will be the case for examining the roles of contractual participants and particularly the fulfillment of Engineer's roles. The reason for choosing claims and disputes process from this project is because it validates the theoretical analysis we are studying and presents the interplay between participants and how the intervention of the Employer occur through transferring, limiting or diffusing the Engineer's authority.

Based on the FIDIC 1999 and as it was discussed earlier, the timeline for the claims/disputes administration process intersect with the project's contract in several milestones but at the same time, there are roles not presented in the project's contract. The following timeline in figure 6.1 illustrates the comparison between the project's contract and the general conditions of contract. The top timeline shows the roles of the Engineer through the general conditions where it was all described in section 3.3.2.2. While the bottom timeline represents the case, it shows the roles of the Engineer as the following:

- first, the Engineer shall receive the notes and particulars from the Contractor within 28 days after the event raised;
- then as it is shown, there will be no time limitations for the Engineer to give determinations and there is no mention of who the party the Contractor to interact with;



- after that, if there was in dispute in the opinion of the Employer or the Engineer, the case will go to the top management judgments;
- within 84 days the top management shall give a decision;
- finally, if the decision didn't get the approval of the parties, the case will go to arbitration after the issuance of the Taking-Over Certificate.

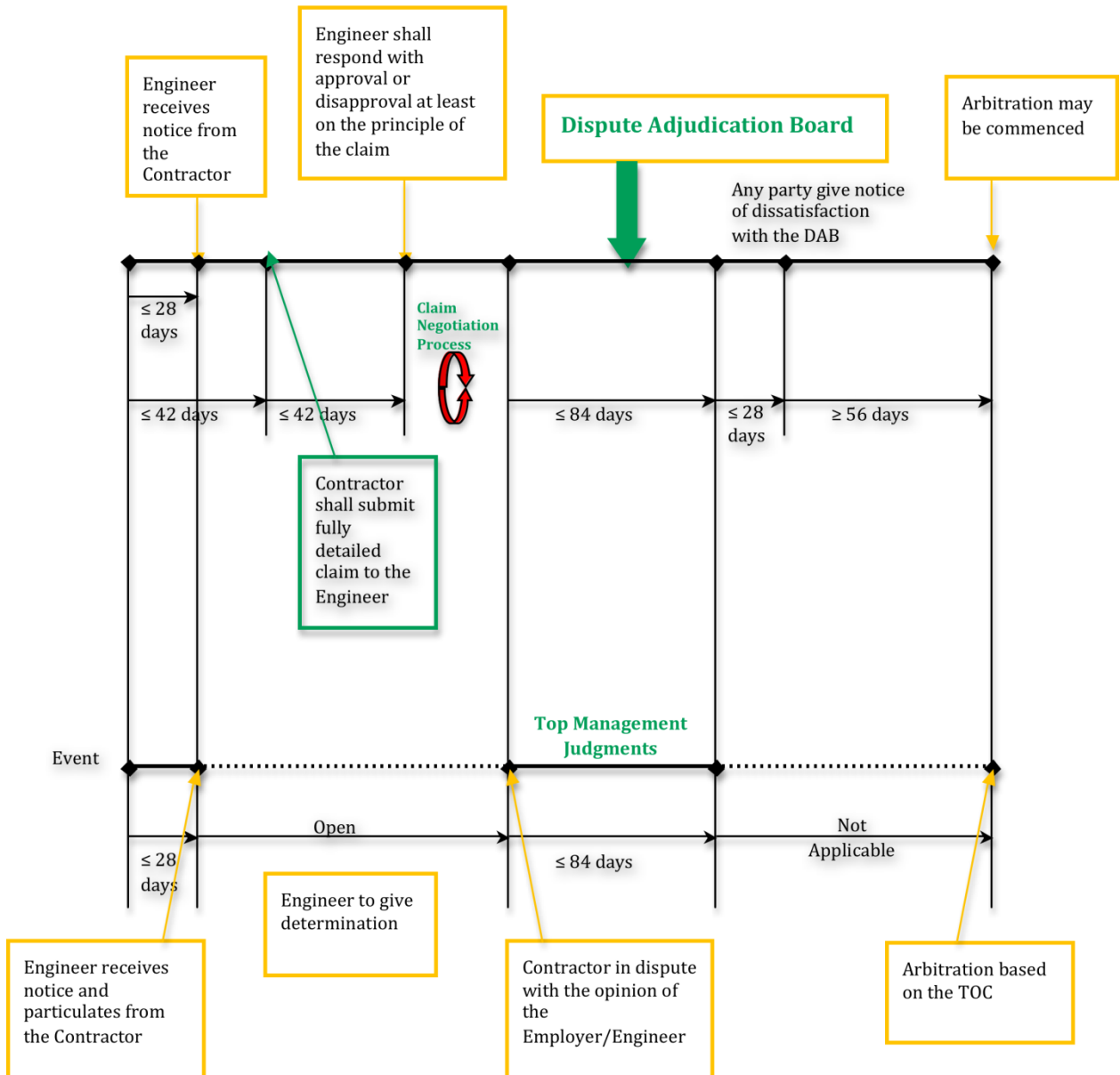

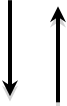




Figure 6.1: Comparison on Disputes Timeline

Moreover, there were many reasons for the Contractor to raise a claim but the main issue started after the parties signed the Addendum and set a new completion time, the event of rising the claim occurred when the Employer started to delay due payments

to the Contractor on time and the event is not considered as one time event. It is an event that consists of successive defaults or failures, which mean the Employer was at fault/default through the whole process. There was a very detailed analysis and examination of the communications, letters, meeting and notifications between the Contractor and the Employer and his participants to study the process and causes of this claim. The analysis consists of studying more than 150 entries among involved participants and they were summarized and masked in a way to reach this final listing under table 6.1 below. The chosen entries were to achieve the main objective of studying the interplay between parties and the ways of intervention in Engineer's authorities. It shows examples and summary of the detailed analysis that was established and presents the case's chronological listing of important events through the events giving rise to the claim, the issue of notice by Contractor, the submittal of claim's particulars, and the issue of response by the Employer until reaching the Dispute phase.



Table 6.1: The Case's Chronological Listing of Important Events



The Case's Chronological Listing of Important Events						
EMP = Employer / ENG = Engineer / PM =Project Manager / CONT = Contractor						
CLAIM PHASE						
Event(s) Giving Rise to the Claim – Prior to the Issue of Formal Notice						
Entry	Meter (days)	Timeline	From	To	Description	Comment
01	0	Event for 1 <sup>st</sup> delayed payment	EMP	CONT	Employer did not pay Contractor (1 <sup>st</sup> delayed payment) within period stipulated in the Contract.	Milestone
02	11	 Within 20 days	CONT		Communication between Contractor and Employer presenting the issues of promised partial payment to be honored by Employer that was made in respect of 1 <sup>st</sup> delayed payment and concerning about workforce strike on site, clarified in a way that payments to	Letters
	15		 EMP			
	17					
	19					

					vendors and manpower suppliers would be affected due to Employer's delay in making payment.	
03	30	After 30 days of delay for the 1 <sup>st</sup> payment	CONT	EMP	Contractor was entitled to consider Employer to have become in default under the Contract (30 days of delay – 1 <sup>st</sup> delayed payment).	Milestone, justifying notice in respect of contract termination
04	31	Event for 2 <sup>nd</sup> delayed payment	EMP	CONT	Employer did not pay Contractor (2 <sup>nd</sup> consecutive delayed payment) within period stipulated in the Contract.	Milestone
05	42	 Within 15 days	CONT		Negotiation regarding the delayed payments referring to several agreements and letters between the Employer and Contractor to reach for a due time for Employer to settle the balance for delayed payments within 7 working days from Contractor's last letter.	Letters
	44		 EMP			
	46					
06	50	4 days from the request by Contractor under Entry 5	EMP	CONT	Employer settled balance of 1st delayed payment	Payment
Issue of Notice by the Contractor						
Entry	Meter (days)	Timeline	From	To	Description	Comment
07	60	Notice to raise a claim, after 30 days of being in default for 1 <sup>st</sup> payment and one day before being in default for 2 <sup>nd</sup> payment	CONT	EMP	Contractor wrote Employer notifying him that: <ul style="list-style-type: none"> <li>• He has not received any response or payments.</li> <li>• Progress rate of all operational works on site will be slowed down, which could lead to ceasing all work until delayed payments are settled.</li> <li>• He is not exercising his right to terminate the Contract, in order to maintain a cordial relation with Employer.</li> <li>• Letters of Credit (LoC) for the supply of materials will be cancelled if payments are not made within 5 days.</li> <li>• LoCs and adjoining expenses related to their issuance shall be paid by Employer.</li> <li>• Future fluctuation in market</li> </ul>	Letter, viewed by Contractor as final notice

					<p>prices shall be borne by Employer.</p> <ul style="list-style-type: none"> <li>• If payments are not made by the end of the current month, Contractor will terminate existing workforce contracts, and any arising consequential liability and time lost in the completion of the works shall be carried by Employer.</li> <li>• Employer shall be liable for any compensations or rights due to Contractor as established by law or by Contract.</li> </ul>	
08	61	After 30 days of delay for the 2 <sup>nd</sup> payment	CONT	EMP	Contractor was entitled to consider Employer to have become in default under the Contract (30 days of delay for the 2 <sup>nd</sup> payment – two consecutive delayed payments).	Milestone, justifying notice in respect of contract termination
09	63	Event for 3 <sup>rd</sup> delayed payment	EMP	CONT	Employer did not pay Contractor (3 <sup>rd</sup> consecutive delayed payment) within period stipulated in the Contract.	Milestone
10	93	After 30 days of delay for the 3 <sup>rd</sup> payment	CONT	EMP	Contractor was entitled to consider Employer to have become in default under the Contract (30 days of delay for the 3 <sup>rd</sup> payment – three consecutive delayed payments).	Milestone, justifying notice in respect of contract termination
11	93	Event for 4 <sup>th</sup> delayed payment	EMP	CONT	Employer did not pay Contractor (fourth consecutive delayed payment) within period stipulated in the Contract.	Milestone
12	106	After 13 days of being in default for 3 <sup>rd</sup> payment	EMP	CONT	Employer made a partial payment (\$1.5M), in respect of 3 <sup>rd</sup> delayed payment.	Partial Payment
13	109	Due to pay 5 <sup>th</sup> payment	ENG	EMP	Engineer certified amount due to Contractor under 5 <sup>th</sup> consecutive payment	Certificate
14	114	8 days from the partial payment under Entry 12	CONT	EMP	<p>Contractor informed Employer that:</p> <ul style="list-style-type: none"> <li>• Partial payment made in respect of amount due under 3<sup>rd</sup> delayed payment is far less from cumulative amount due under 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> delayed payment and 5<sup>th</sup> payment.</li> <li>• Progress rate of all operational works on site will be slowed down, which could lead to ceasing all work until delayed</li> </ul>	Letter

					payments are settled (reiteration).	
Submittal of Claim's Particulars by the Contractor						
Entry	Meter (days)	Timeline	From	To	Description	Comment
15	114	21 days of Employer being in default for 3 <sup>rd</sup> payment and being in delay for 4 <sup>th</sup> payment	CONT	EMP	By making reference to the relevant amended contract provisions, Contractor submitted notice/particulars (a tabulated breakdown) of the amount of his claimed entitlement for what Contractor considered to be a partial period of 10 elapsed months out of the 13-month time extension.	Letter, with attachment
Issue of Response by the Employer or on his Behalf						
Entry	Meter (days)	Timeline	From	To	Description	Comment
16	121	61 days from Contractor's notice and 7 days from the submission of particulars	PM	CONT	Project Manager responded by making his own interpretation of: <ul style="list-style-type: none"> <li>The relevant amended contract provisions, based on which Contractor considered that his right for the extra cost entitlement had been reinstated, thereby denying the Contractor the right for the claim, and</li> <li>What, in his opinion, constitutes failure of the Employer, stating that for Employer to fail, Employer shall have refused to make payments or rejected Contractor's payments.</li> </ul>	Letter
17	123	After 30 days of delay for 4 <sup>th</sup> payment and 14 days of delay from the certified amount of 5 <sup>th</sup> payment	CONT ↑ ↓ EMP		<ul style="list-style-type: none"> <li>Contractor was entitled to consider Employer to have become in default under the Contract (30 days of delay for the 4<sup>th</sup> payment – three consecutive delayed payments).</li> <li>Employer did not pay Contractor (5<sup>th</sup> consecutive delayed payment) within period stipulated in the Contract.</li> </ul>	Milestone, justifying notice in respect of contract termination
18	135	After 12 days from being in default for 4 <sup>th</sup> payment	EMP	CONT	Employer settled 4 <sup>th</sup> delayed payment	Payment
19	136	15 days from	CONT		Negotiation where the Contractor reiterated the reinstatement of his right	Letters





	142	response by PM under Entry 16			to claim; expressed his surprise that response was issued by PM and not Employer and proposed the scheduling of a meeting with Employer, where he concurred to meet with Contractor within two weeks.	
20	144	27 days before the expiry of the Performance Bond	PM----- →CONT		Instruction to renew Performance Bond by PM and negotiation between Employer and Contractor regarding the issue of Employer notified Bank to extend the validity of Performance Bond without consulting Contractor.  Employer severely objected to the content, language, and tone of Contractor's letter.	Letters
	144		EMP-----→Bank			
	149		CONT			
	150					
21	153	After 30 days of delay for 5 <sup>th</sup> payment	CONT	EMP	Contractor was entitled to consider Employer to have become in default under the Contract (30 days of delay for the 5 <sup>th</sup> payment – three consecutive delayed payments).	Milestone, justifying notice in respect of contract termination
22	157	96 days from being in default for 2 <sup>nd</sup> payment, 94 days from being in default for 3 <sup>rd</sup> payment	EMP	CONT	Employer settled 2 <sup>nd</sup> delayed payment and the balance of 3 <sup>rd</sup> delayed payment	Payment
23	166	A month after the Contractor asked for a meeting under Entry 19	EMP	CONT	According to Contractor's own version of the minutes of the meeting, Employer: <ul style="list-style-type: none"> <li>• negated Contractor's stand concerning the reinstatement of his right to claim and</li> <li>• proposed to have an independent party examine Contractor's claim.</li> </ul>	Meeting
24	174	21 days after being in default for 5 <sup>th</sup> payment	EMP	CONT	Employer settled 5 <sup>th</sup> delayed payment.	Payment
25	176		CONT		According to Employer's own version of the minutes of the meeting: <ul style="list-style-type: none"> <li>• Contractor's claim was shown</li> </ul>	Letter, Transmittal and Meeting (With EMP


	177			<p>as item 4 on the meeting agenda.</p> <ul style="list-style-type: none"> <li>Meeting was held in an informal manner.</li> <li>Contractor assured Employer of Contractor's commitment to carry on with the works, irrespective of Employer's reply to the raised issues.</li> <li>Employer assured Contractor of making good all delayed payments by the date of this letter subject to renewal of Performance Bond as per Employer's notification to concerned Bank.</li> <li>Contractor shall submit a draft completion schedule for discussion with Employer.</li> </ul> <p>Contractor submitted new completion schedule to the Engineer.</p> <p>Engineer instructed Contractor to amend and resubmit the proposed completion schedule in accordance with Engineer/PM review comments.</p> <p>According to Contractor's own version of the minutes of the meeting, Employer communicated that a meeting will be scheduled to discuss the Contractor's claim in detail.</p> <p>Contractor referred to the agreement to hold working sessions according to the meeting held, and requested a meeting with Employer Management within 6 days from this letter to discuss Contractor's claim.</p>	and QS)
	187				
	205				
	213				
		Within 40 days			

**DISPUTE PHASE**



Entry	Meter (days)	Timeline	From	To	Description	Comment
26	215	2 days after Contractor's letter to Employer under Entry 25	CONT	EMP	Contractor, in view of the opinion given by the PM on behalf of the Employer, referred the claim to Employer Management under the relevant dispute resolution clause, in order for an amicable settlement to be attempted under the direction of the parties' Management within the stipulated period of 12 weeks, starting from the date of this communication.	Letter
27	218				Negotiation back and forth between the	Letters,



	219	Within 25 days		<p>CONT</p>  <p>EMP</p>	<p>Employer and Contractor about:</p> <ul style="list-style-type: none"> <li>• authority of PM; and has merely provided his own opinion, PM does not have authority to provide decisions or determination on behalf of Employer. While Contractor argued that PM is listed in the Contract as one of the participants concerned with giving or issuing consent, approval, certificate, determination or request to be given or issued pursuant to the provisions of the Contract. He reiterated that he construes PM's opinion to have been made on behalf of the Employer, if not on behalf both Employer and Engineer.</li> <li>• Employer has not provided his decision or determination on the issue, and he is willing to meet on the date requested by Contractor (Entry 25) to achieve a constructive dialogue for resolving the matter at the earliest. Contractor offered, for consideration by Employer, a simple 4-step mechanism for carrying out the dispute negotiation process.</li> </ul>	Meeting (With EMP and QS)
	222					
	225					
	243					
28	248	After 5 days, from the negotiation under Entry 27		<p>CONT</p>  <p>EMP</p>	<ul style="list-style-type: none"> <li>• Employer mentioned that Contractor's insistence as to his right to claim for the amended contract duration, along with other Contractor's expectations and demands in connection with experienced payment delays, do not form the basis for an amicable resolution.</li> <li>• Employer expressed willingness to meet with Contractor to resolve any disputes amicably, but the meeting must be held in an open and constructive manner.</li> <li>• Contractor confirmed readiness to meet, provided that meetings are held under management's direction and with a proper documentation mechanism.</li> <li>• Contractor clarified what he</li> </ul>	Letters
	253					

					viewed to have been Employer's major misconception about what amicable settlement entails.	
29	256	After 3 days from Entry 28	PM	CONT	PM provided a recap of discussions of a meeting held on 21 days ago, noting the condition for Contractor to withdraw his claim in return to proposed resolutions for other concurrent issues.	Email
30	274	18 days from Entry 29	EMP	CONT	Employer, in consultation with Engineer, extended the time for completion by 199 calendar days, but without noting the reasons for extension and the clause pursuant to which the extension was granted.	Letter
31	304	After 12 weeks from Contractor's letter under Entry 26   Within 117 days	CONT ↓ ↑ EMP		Negotiation regarding the amicable settlement between the Employer and Contractor within the 12-week period, and  Contractor offered the convening of a round of meetings between parties' top management and their chosen delegates to agree to a mechanism for handling such a dispute, as opposed to always resorting to informal discussions.	Letters
	320					
	375					
	421					
32	459	Approximately after 40 days of negotiation	EMP	CONT	Minutes of meeting reported that Employer informally offered Contractor to grant an additional advance payment in return of Contractor's acceptance to drop his claims	Meeting
33	485	After 26 days of the meeting under Entry 32	CONT ↓ ↑ EMP		Negotiation regarding dropping the claim,  <ul style="list-style-type: none"> <li>• Contractor considered the reasoning adopted by Employer to be perverted, tarnished and illogical.</li> <li>• Contractor confirmed his unwillingness to drop its claims.</li> <li>• Contractor questioned Employer's tactics and distribution of roles among Employer, Engineer, and Project Manager.</li> </ul>	Letter
	486					
34	488	2 days later	ENG	CONT	Engineer rejected Contractor's claim, as part of general statements issued in connection with this claim and another	Letter

					Contractor's submitted claim.	
35	493	After 5 days from Engineer's rejection	CONT		Negotiation about Engineer's rejection of Contractor's claim, where	Letters
	499		↓	↑		
			ENG		<ul style="list-style-type: none"> <li>Contractor expressed his astonishment that after a lengthy and unjustifiable delay in releasing his opinion, Engineer opted to give a brief on-the-surface combined examination of Contractor's claims.</li> <li>Contractor described the outright rejection of his rightful claims by Engineer to be devastating, groundless, unjustified, and unfair.</li> <li>Engineer defended his rendered opinion and indicated that Contractor should have given notice and particulars within 28 days from the date of Event under Entry 1, for his claim to be valid.</li> <li>Engineer expressed willingness to meet with Employer and Contractor, as per the relevant dispute resolution clause, if required, to provide a detailed explanation of his findings.</li> </ul>	
36	504	More than 200 days Engineer's letter regarding to meet with Employer and Contractor	CONT		<ul style="list-style-type: none"> <li>Employer agreed to record minutes of meeting, by PM.</li> <li>Employer agreed that Contractor has the right to claim for the defaulted payments, but not in connection with the amended Contract duration.</li> </ul>	Meeting (with EMP and PM), Letter
	581		↓	↑		
			EMP		Contractor requested that the negotiation process, which started under this Entry, be resumed.	
37	707	After 2 years approximately from the Event under Entry 1	ENG	CONT	Taking-Over Certificate was issued by Engineer.	Letter
38	752	45 days from the TOC			Contractor issued an open letter to Employer, requesting that a general meeting among all project participants be held by way of a final attempt for reaching amicable resolutions on all pending claims.	Letters
	764					
	765					
	765					
			↓ CONT		Employer accepted to hold such a meeting and named his representative at the project level as Employer's delegate.	

		 Within 10 days	EMP 	Contractor requested agreement to hold the meeting 3 days from the date of this letter  Contractor pointed out that the meeting be held with the objective of establishing a constructive dialogue that is conducive of reaching amicable settlement, which will be to the benefits of both Employer and Contractor.	
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### 6.6. Ways of Meddling with the Engineer’s Roles – Revisited

Based on the language of the project’s contract and some of the clauses that was mentioned earlier. It could be established that the roles of participants acting for the Employer are being interfered by the Employer in different ways and several times. In this study, only the claims and dispute issue was examined and showed the way of communication back and forth between the Contractor and the Employer and there is no intervention from the Engineer or PM. While the contract itself stated roles and issues to be handled by them; and they are the parties to act for and take a decision.

According to the analysis under section 5.5, the authority of the Engineer would be meddled by the Employer in different ways and in several roles as it was listed in table 5.3. Moreover, the section explained the theory of participants interplay in respect of the Engineer’s authority. Thus, the purpose from chapter 6 is to validate the theoretical analysis through a real project case. The claim/ dispute event during this project shed the light on some authorities that were transferred to the Employer to handle them and take the final decision and other diffused authority that was interfered by the Employer in different roles that supposed to be handled by the Engineer or other participants to give decisions but their roles were not clarified under the contract.

Thus, there was a direct communication between the Contractor and the Employer through sending letters and notices. Most of the communication did not incorporate formally the Engineer or PM, and the Employer took the lead to handle most of the issues and taking decisions. While the contract itself did not state his authority to mingle in these roles. Therefore, the first milestone in giving rise to claim in this case was when the Employer did not pay the Contractor the 1<sup>st</sup> delayed payment within period stipulated in the contract. Some Tele-communications was done between the Contractor and Employer and it continued until time where the Contractor was entitled to consider him to become in default under the contract for the 1<sup>st</sup> delayed payment and in delay for the 2<sup>nd</sup> delayed payment.

The second stage the Contractor issued the notice to the Employer instead of the Engineer where as we mentioned in the previous section 6.3 under the Claims clause that the Engineer is the one to receive the notice within 28 days from the rising of the claim. While the Employer received the notice 60 days after the event of giving rise to claim has first occurred, and the Employer was 30 days of being in default for the 1<sup>st</sup> payment and one day before being in default for the 2<sup>nd</sup> payment. Furthermore, the Employer became in default for the 2<sup>nd</sup>, and 3<sup>rd</sup> payments and in delay for the 4<sup>th</sup> and 5<sup>th</sup> payment before any of the Employer or his participants response to the Contractor's notice. After certain time of being in default for the 3<sup>rd</sup> delayed payment, the first reaction was by the Employer through making a partial payment in respect of it but it was far less from the cumulative amount due under the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> delayed payments.

Therefore, the Contractor submitted the claim's particulars to the Employer 21 days from the date of being in default vis-à-vis the 3<sup>rd</sup> consecutive payment and of being

in delay in respect of the 4<sup>th</sup> consecutive payment with a tabulated breakdown of the amount the Contractor is considered to be entitled for. While according to the contract the particulars shall be submitted to the Engineer, so this shows that the role of the Engineer being interfered by the Employer. On the other hand, the PM is the one who responded to the Contractor's notice even though it was not stated under any clause in the contract the responsible participant to response to notice to claim. In addition, the Contractor expressed his surprise of the PM being the party to response to him, yet the PM again instructed the Contractor to renew his Performance Bond while Employer wrote directly to the bank without referring to the Contractor. At this stage, the Employer has already settled the balance of the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> delayed payments, while he settled the 5<sup>th</sup> delayed payment after the meeting with the Contractor.

Based on the meeting between the Employer/ QS and the Contractor there was agreement on new completion schedule to be submitted to the Engineer and reviewed by him and the PM. Hence, it shows here that the Engineer took the lead at this stage in accordance to the comments submitted from the PM. Furthermore, according to Contractor's minutes of meeting there will be a meeting scheduled to discuss Contractor's claim in detail. Therefore, this lead to the Dispute phase where in view of the opinion of the PM on behalf of the Employer to refer the claim to Employer's management under the relevant dispute resolution clause in order for amicable settlement to attempted under the direction of the parties' Management within the stipulated period of 12 weeks. Hence, this defines that the PM has a role to act on behalf of the Employer and in his opinion. On the other hand, the Employer negotiated that the PM does not have the authority to decision or determination on behalf of the Employer and that was merely

the PM's opinion. While, the one can argue that the Agreement stated that PM shall act on behalf of EMP; and details of his role shall be defined by EMP. Moreover, the claim clause mention earlier in section 6.3 does not state who should respond to Contractor, and within what period of time.

At this time, the Employer expressed his willingness to meet with the Contractor to resolve any disputes amicably, but the meeting must be held in an open and constructive manner. Thus, the Contractor confirmed readiness to meet and provided that meetings are held under management's direction and with a proper documentation mechanism. In addition, the PM again handled act on behalf of the Employer by providing a recap of discussions of the meeting that was held noting the condition for Contractor to withdraw his claim in return to proposed resolutions for other concurrent issues. During that time the Employer, in consultation with Engineer, extended the time for completion by 199 calendar days, but without noting the reasons for extension and the clause pursuant to which the extension was granted because according to the clause for Time Extension, this claim does not state under the conditions for the Employer to give Extension of Time.

Furthermore, this reached to negotiation regarding the amicable settlement between the Employer and Contractor within the 12-week period, and Contractor offered the convening of a round of meetings between parties' top management and their chosen delegates to agree to a mechanism for handling such a dispute, as opposed to always resorting to informal discussions. Despite the fact that, through a meeting the Employer informally proposed to the Contractor to grant an additional advanced payment in return of Contractor's acceptance to drop the claim. Whereas, the Contractor considered the

reasoning adopted by Employer to be perverted, tarnished and illogical and he confirmed his unwillingness to drop its claims.

From there, the Contractor considered the Employer and the Engineer to have broken a critical cycle of the stipulated claim/dispute resolution process which resulted in a deadlock and leaving him with the only option of presenting his case before the appropriate dispute resolution authorities, as per the governing laws. Therefore, the Engineer rejected the Contractor's claim, as part of general statements issued in connection with this claim and another Contractor's submitted claim. This went through another cycle of negotiation between the Contractor and the Employer, first, by questioning the Employer's tactics and distribution of roles among Employer, Engineer, and Project Manager. Since, it not clearly mentioned in the Contract and if so, the Employer is meddling in most of the roles and either transferring them to himself or his opinion and approval must be before taking a decision. Second, by arguing and expressing his astonishment that after a lengthy and unjustifiable delay in releasing his opinion, the Engineer opted to give a brief on-the-surface combined examination of Contractor's claims and described the outright rejection of his rightful claims by Engineer to be devastating, groundless, unjustified, and unfair. On the contrary, the Engineer defended his rendered opinion and indicated that Contractor should have given notice and particulars within 28 days from the date of first occurrence of the Event giving rise to the claim, for his claim to be valid.

From the previous event, there were not any responses to Contractor's letter more than 25 weeks until the Employer agreed that Contractor has the right to claim for the defaulted payments, but not in connection with the amended Contract duration. In



addition, the issuance of Taking-Over Certificate falls due by the Engineer as stated in the Contract under the Taking-Over clause. From there on, the Contractor issued an open letter to Employer, requesting that a general meeting among all project participants be held by way of a final attempt for reaching amicable resolutions on all pending claims. Where the Contractor pointed out that the meeting to be held with the objective of establishing a constructive dialogue that is conducive of reaching amicable settlement, which will be to the benefits of both Employer and Contractor and the Employer accepted to hold such a meeting and named his representative at the project level as Employer's delegate.

On the other hand, the concept of interplay among involved participants can be validated through this case by referring to the model of participants interplay vis-à-vis Engineer's authority under figure 5,2 that was conducted previously. The model shown below as figure 6.2, represents almost the same relationship among participants as explained previously with two main additional matters that were deduced from the case study. As we described earlier, there is a contractual relationship between the main parties, the Employer, Engineer, third party team and the Contractor. In addition, the typical required consultations, the Employer's internal coordination and the contractual correspondences. The new addition is the Employer's induced consultation relation where the Employer will tempt to force his opinion and decision to the Engineer's authority and be the one to make judgments and take final decision. Therefore, the case showed different ways of the Employer's interference in the Engineer's roles or any of his involved participants through deducing roles from the Engineer and adding them to himself to be the party to handle and take decisions regarding them. There was a

transferred authority through the case, as an example, the time extension issue where the Employer from the beginning of the contract took the decision to deal with issues related to any extension of the time of completion. Furthermore, there was a new appearance of diffused authority which means the Employer did not define the role of such participants and if so, the Employer is being the one to handle the role where he is not supposed to take the decision or give reasons to them. For example, in the case after the Contractor issued notice to raise a claim, he did not get a response after 60 days and it was from the PM while before that there was a full interaction back and forth between the Contractor and the Employer. Moreover, the contract did not mention the roles to be handled by the PM so it is not clear if he is supposed to be the party to respond to such an issue. While, even with the PM's respond the Employer did not accept the argument from the Contractor regarding the PM's respond and he stated that the PM's opinion does not represent the Employer's opinion even though the Employer hired the PM to act on his behalf.

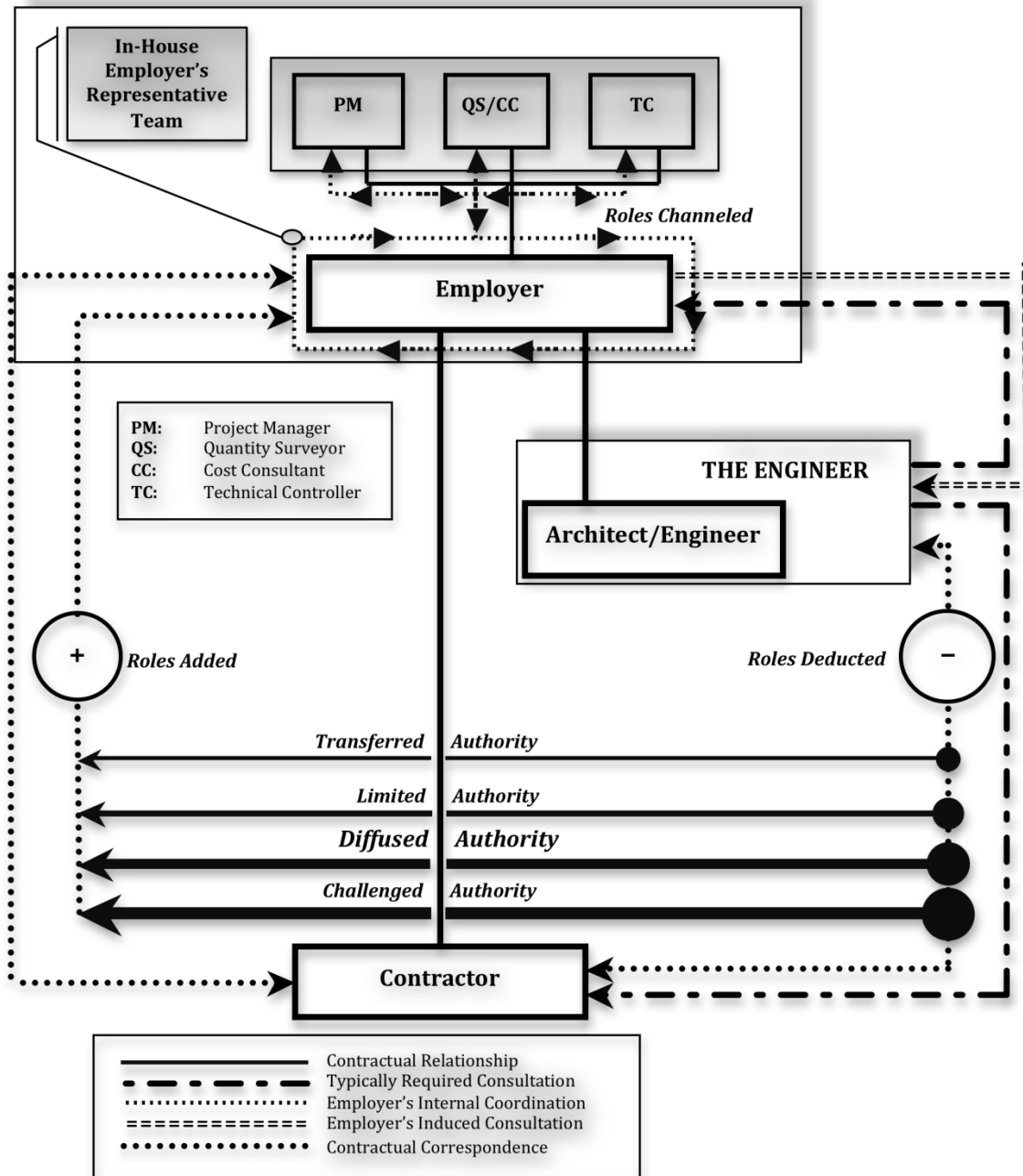


Figure 6.2: Participants Interplay vis-à-vis Engineer's Authority – Revisited-

### 6.7. Conclusion

To conclude, the above case was able to present different problems and issues that faced the Contractor and the Employer and his participants through the claim and dispute

process. It validated the theoretical analysis this research is trying to achieve through giving different examples of the Employer's and his in-house team meddling in the Engineer's roles and his authorities either by transferring some or diffusing others. Moreover, the case was able to examine the interplay between contractual parties and how the interaction takes place among all of them.

The outcome from this exercise consists of the argument of the role of the Employer, the way he is orchestrating the roles of his participants through assigning their roles and who takes the lead, moreover, the reduction in participants roles for his intervene in particular Engineer's roles.

# CHAPTER 7

## CONCLUSION

### **7.1. Preamble**

This chapter summarizes the research that was taking under this thesis work and the conclusion was achieved. It also offers a set of recommendations directed to the professionals involved in the construction contract and it sheds the light on the studies' limitations and proposes ideas for future research.

### **7.2. Summary**

The research presented at addressing the following two questions:

1. Who is the participant to best take the lead in performing contract administration functions and be named as the Engineer?
2. How the authority of the Engineer, regardless of who is give the title of the Engineer, can be expected to get interfered by the presence of other possible participants on the project, including the Employer himself?

The first question has been addressed through an expiration of the suitability of either the A/E or the Project Management company for assuming leadership for various administrative versus technical roles expected of the Engineer in carrying out contract administration functions on behalf of the Employer. While the second question has been addressed through a conceptualization of the interplay that takes place among all project

participants and the validation of this theoretical analysis through a real case study on a multi-used developments under MENA region.

### **7.3. Conclusions**

The following conclusions were deduced from the research. First, the literature review revealed or offered significant statements and findings that were in support of the research aim intended under this research work, including:

- a. Project management practice has been used widely in the construction industry due to the complexities of the projects and the sophisticated owners.
- b. In construction projects to “ensuring successful outcome which has always been the aim for construction, project manager and project management is used as the tool to achieve this goal”. Tabish, S. & Jha, K.(2010).
- c. Axelson (2007), “ one of the multiple duties of a contract administrator under conventional construction contracts is to make validating decisions, from an independent perspective about various aspects on the contractor’s performance in order to determine the payment and other entitlements due to it under the contract”.
- d. Axelson added a fundamental and essential question about “ how much decision-making freedom or discretion should the contracts ascribe to contract administrator?”
- e. It has been apparent that the success of project concerns the satisfaction and cooperation of project’s participants. “Project participants are the key players for making the project a success”. Chua, D., Kog, Y., & Loh, P. (1999).

Second, the limited number of roles lent them selves to be design-related as a pose to an overwhelming majority of technical roles being of the nature that opens roles other than A/E to assume. That is the design consultant type roles are to be related to quality related issues in time accomplished and examinations of related works and judging the acceptance of the works in respect of issuing the Taking-Over Certificate or the Final Payment Certificate. On the other hand, various construction schedule and payment related roles that are also viewed as technical nature were found to be lending themselves to having other key participants involved in their performance depending on the participants the Employer opts assign to play certain roles between, direct or indirect, in relation to construction contract organizational structure.

Third, it can be concluded that the decision by the Employer as to whether the A/E or PM should be the participant to take the lead in carrying out of the role of the Engineer should be based on a systematic examination of a number of criteria including:

1. familiarity with design-related matters;
2. size of organization and the in-house capabilities for dealing with matters that are outside design-related competencies;
3. core competencies for handling large and complex claims, and over a period extending beyond the construction contract;
4. ability to make judgments and determinations in an objective manner, when these pertain to design-related issues; and
5. introduction of an additional layer of control that could allow a follow-up on how closely procedural and administrative requirements are observed.

These criteria were used to offer a pros-and-cons analysis that could assist an Employer in making such a choice.

Fourth, it was deduced that even when the PM is to be given the lead as the Engineer under the construction contract, the fulfillment of the Engineer's roles would still require a matrix of coordination with other key participants including the Employer and design-consultant in the form of being informed or providing inputs or giving approvals.

Finally, the research revealed that the authority of the Engineer may be reduced in more than one way including having the authorities "typically" assigned to the Engineer being transformed, limited, challenged or diffused, as a result of the possible interplay among participants including the Employer and others engaged by the Employer to assist or to act on his behalf.

#### **7.4. Limitations**

1. It should be noted that this tackled the research question from the perspective of the traditional (Design Bid Build) organizational structure as a pose to other potential organizations including Design-Build, Construction Management, BOT...etc used as alternative delivery approaches delivering construction projects.
2. Although identified six possible organizations for a possible grouping the participants under the traditional approach. The case used validating the way of conceptualization interplay among involved participants related only to one of the six identified scenarios. Namely it is the organizational structure where



the Employer had a string in-house client representation capabilities coupled with outsourced quantity surveyors/ cost consulting services and engaged two separate PM and design-consultant firms where the latter act as the Engineer.

3. The validation relied on a major case-based claim case which spanned over a period of more than two years, it is believed that further refinements of the potential participants' interplay can be achieved with more cases being tested in the future.

## **7.5. Recommendations**

This section offers recommendations that are believed to be of benefit to as to how the contract administration process can be handled in the presence of multiple concerned participants.

1. The Employer shall be careful in defining the roles of the various participants he might opt to engage into the contract administration process and clarify these assigned roles under the construction contract.
2. Any modifications or transfer to an authority typically assigned to the Engineer shall be ideally entertained only if it is expected to enhance the contract administration process.
3. Although the Engineer is viewed nowadays to be acting on behalf of Employer, caution shall be exercised that as an independent professional, the Engineer shall be afforded enough space allowing him to apply good judgments and to exercise objectivity when asked to make determinations.

## **7.6. Future Work**

In the process of identifying the Engineer's roles in various contract administration processes, the Variation Orders according to other processes lacks in the specifications of limits for the period within which participants are expected to act in respect of the varied steps of the process. Future research could examine ways of insuring that such a critical process can be completed with a reasonable overall period of time.

Moreover, the PM is to act as the Engineer, the issue of liability might potentially be picked up by the PM with respect to design/ quality-related input provided/channeled by, the design-consultant shall be examined.

Finally, it is believed that further case-based validation of the conceived participants interplay model could help in identifying new ways such interplay may in reality take place.

## BIBLIOGRAPHY

- [1] A Guide to the Project Management Body of Knowledge, 2000 Edition, PMI.
- [2] Alfred E. Thal, Jr. and John D. Bedingfield (2010). “ Successful Project Managers: an exploratory study into the impact of personality” *Technology Analysis and Strategic Management*, Vol. 22, pg. 243-259.
- [3] Alzahrani, J., and Emsley, M. (2012). The Impact of Contractor’s Attributes on Construction Project Success: A Post Construction Evaluation. *International Journal of Project Management*, Vol. 31, pg: 313-322.
- [4] Axelson, Andres. 2007. The Discretion of the Certifier: A Drafting tool Best Left in the Toolshed? *Nielsen-Wurster Communiqué* Vol. 2.10.
- [5] Baldwin, Clifton. “ Project Management and its Relation to Systems Engineering” PMP, ACB-210, System Engineering Division.
- [6] Bennett, John. (1983). “Project Management in Construction” *Construction Management and Economics*, Vol. 1, pg. 183-197.
- [7] Brandon, P., Basden, A., Hibbed, P., Kirkham, J. and Tetlow, S. (1993) Intelligent authoring of construction contracts., Research Paper No.13, Royal Institution of Chartered Surveyors.
- [8] Brown. I.1 “Contract drafting: a risky business” *Consulting specifying Eng.* (1990) pp 29. 30.
- [9] Brown, S.L., and K.M. Eisenhardt. 1995. Product development: Past research, present findings, and future directions. *Academy of Management Review* 20, no. 2: 343–78.
- [10] Bubshait, Abdulaziz. And Almohawis, Soliman. (1994). “ Evaluating the General Conditions of a Construction Contract”. *International Journal of Project Management*. Vol. 12 (3), pg. 133-136.
- [11] Cheung, S., Yiu, T. and Yeung, S. “A Study of Styles and Outcomes in Construction Disputes Negotiation” *Journal of Construction Engineering and Management ASCE* (2006) Vol. 132, 805-814.
- [12] Chinyio, E.A., Olomolaiye, P.O., Kometa, S.T. and Harris, F.C. (1998) A needs based methodology for classifying construction clients and selecting contractors. *Construction Management and Economics*, Vol. 16, no.1: 91-8.

- [13] Chua, D.K.H., Kog, Y.C., and Loh, P.K. (1999). "Critical success factors for different project objectives." *J. Constr. Eng. Manage.*, 125 (3), 142–50.
- [14] Chan, A.P.C., Ho, D.C.K., and Tam, C.M. (2001). "Effect of inter-organizational teamwork on project outcome." *J. Manage. Eng.*, 17(1), 34–40.
- [15] Clough, R *Construction Contracting* (5th Ed.) John Wiley, USA (1986)
- [16] Currle, O A and Dorris, W E 'Understanding construction contracts: a myriad of special clauses' *Arbitration J.* Vol41 No I f 1986) pp 3-16.
- [17] Doloi, H., (2009). Analysis of Pre-qualification Criteria in Contractor Selection and their Impacts on Project Success. *Construction Management and Economics*, Vol.27, pg: 1245–1263.
- [18] Douglas, B. S. (1993). "Reassessing the architect's Role as Arbiter". *U.S.F.L Rev.*, (27) 873, 877-881
- [19] FIDIC (1999) *Conditions of Contract for Construction*, FIDIC, Lausanne.
- [20] Fryer, B. (1979). "Management Development in the Construction Industry". *Building Technology and Management*, Vol. 17, no. 5, pg. 16–18.
- [21] Fulton Engineering, Inc. P.O. Box 1920 Broomfield, CO 80038-1920.
- [22] Groton. J 'A guide to improving construction contracts' *Arbitration J.* Vol 41 No 2 (1986) pp 21-24
- [23] Handy, C. (1985). *Understanding organizations*. Penguin Books, Middlesex, England.
- [24] Hatush, Z., Skitmore, M., (1997). Evaluating Contractor Prequalification Data: Selection Criteria and Project Success Factors. *Construction Management and Economics*, Vol.15, pg: 129–147.
- [25] Holmes, S. J. & Walsh, R. T. (2005). " Conducting Effective Project Management Maturity Assesment Interviews". *IMSI TECH.* pg. 1-12.
- [26] Huston, N. (1997). "What Is Project Management?" *The 28<sup>th</sup> Annual Project Management Institute 1997 Seminars & Symposium*, Chicago: Project Management Institute, pp. 1141-2
- [27] Ibbs, Kwak. "Project Management Process Maturity (PM) Model" *Journal of Management in Engineering* 22 (2002): 150-158.

- [28] Ibbs, W. and Ashley, D.B. (1987) Impact of various construction contract clauses. *Journal of Construction Engineering and Management*, 113(3), 501–21. the Lexile Framework, MetaMetrics Inc., Durham.
- [29] Iyer, K.C., and Jha, K.N. (2005). “Factors affecting cost performance: Evidence from Indian construction projects.” *International Journal of Project Management*, Vol. 23(4), pg. 283–95
- [30] Iyer, K.C., and Jha, K.N. (2006). “Critical factors affecting schedule performance: Evidence from Indian construction projects.” *Journal of Construction Engineering and Management*, Vol 132(8), pg.871–81.
- [31] Jergeas, G. and Hartman, F.T. (1994) Contractors’ construction claim avoidance. *Journal of Construction Engineering and Management*, 120(3), 553–60.
- [32] Jha, K.N., and Iyer, K.C. (2007). “Commitment, coordination, competency and the iron triangle.” *International Journal of Project Management*, Vol. 25(5), pg. 527- 540.
- [33] Katz, R. (1974). "Skills of an effective administrator." *Harvard Business Rev*, Sep.-Oct, 90-102.
- [34] Kerzner, H. (1982). “Project Management for Executives” New York: Van Nostrand Reinhold.
- [35] Kumar, D. (1989). “Developing Strategic and Philosophies early for successful project implementation”. *Project Management Journal*, Vol. 7 (3), pg. 164-171.
- [36] Kwakye, A.A. (2000) *Construction Project Administration in Practice*, Wesley Longman Ltd, London.
- [37] Leung, Mei-Yung., NG, Thomas. and Cheung, Sai-On. (2004). “Measuring Construction Project Participants Satisfaction” *Construction Management and Economics*, Vol. 22, pg. 319-331.
- [38] Loo, R. “Working Towards Best Practices in Project Management: A Canadian Study.” *International Journal of Project Management* 20 (2002): 93-98.
- [39] Meopham, B. (1986) *The FIDIC Conditions of Contract: A Commercial Manual*, Waterlow Publications, London.
- [40] Munns, A.K., and Bjeirmi, B.F. (1996). “The role of project management in achieving project success.” *Int. J. Proj. Manage.*, 14(2), 81-87.
- [41] Ndekugri, I., Smith, N. and Hughes, W. “The Engineer under FIDIC’s Conditions

- of Contract for Construction” *Construction Management and Economics* (2007) 25, 791-799.
- [42] O’Reilly, M. (1966) *Civil Engineering Construction Contracts*, Thomas Telford Publishing Ltd., London.
- [43] Owers, R., Ariaratnam, S. and Armstrong, D. (2007). “ Lawyerzation of the Engineering and Construction Industry”. *Journal of Professional Issues in Engineering Education and Practice*, ASCE. Vol. 133, pg. 134-142.
- [44] Perry, J.G. (1995) The new engineering contract: principles and design of risk allocation. *Engineering, Construction and Architectural Management*, 2(3), 197–208.
- [45] PMI. “A Guide to the Project Management Body of Knowledge” (PMBOK guide) 2000 Edition CD-ROM. Philadelphia: PMI; 2000.
- [46] Posner, B.Z. (1987). “What it takes to be a good project manager”. *Project Management Journal*, Vol. 18, no. 1, pg. 51–54.
- [47] Project Manager Competency Development (PMCD) Framework, 2002, PMI.
- [48] Rameezdeen, R & Rajapakse, C. (2006). “ Contract Interpretation: the impact of readability”. *Construction Management and Economics*. Vol. 25, pg. 729-737.
- [49] Rhys Jones, S. (1994). “How Constructive is Construction Law?” *Constr. Law J.*, 10(1), 28-38.
- [50] Robert S., Goodwin and ASCE (1993). “Skills Required of Effective Project Managers”. *Journal of Management in Engineering*, Vol. 9, pg. 217-226.
- [51] Sing, D., Tiong, R.L.K., (2006). Contractor Selection Criteria: Investigation of Opinions of Singapore Construction Practitioners. *Journal of Construction Engineering and Management*, Vol.132, pg: 998–1008.
- [52] Stein, S. and Hiss, R. (2003). “Here Comes the Judge-Duties and Responsibilities of Design Professionals When Deciding Disputes” *Journal of Professional Issues in Engineering Education and Practice* Vol. 129 No.3, pg.177-183.
- [53] Stuckenbruck, L. (1988). "Integration: The essential function of project management." *Project management handbook*, D. I. Cleland and W. R. King, eds., Van Nostrand Reinhold, New York, N.Y
- [54] Sweet, J ‘The use of standard forms for construction management contracts’ *Real Estate Law, J.* Vol I8 No I (1989) pp 74-89

- [55] Tabish, Sayed. and Jha, Kumar.(2010). “Success Traits for a Construction Project” *Journal of Construction Engineering and Management*, ASCE.
- [56] Thamhain, H., and D. Wilemon. (1977). “Leadership Effectiveness in Project Management”. *IEEE Transactions on Engineering Management*, Vol. 24, no. 3, pg.102–10
- [57] Thamhain, H.J. 1991. Developing project management skills. *Project Management Journal* Vol. 22, no. 3: 39–44.
- [58] Thompson. P A and Perry, J G (Eds.) *Engineering Construction Risks- A Guide to Project Risk Analysis und Risk Management* Thomas Telford, UK (1992)
- [59] Thyseen, M, Emmitt, S, Bonke, S and Krik-Christoffersen, A. (2010). Facilitating Client Value Creation in the Conceptual Design Phase of Construction Projects: A Workshop Approach. *Architectural Engineering and Design Management* Vol. 6, pg. 18-36.
- [60] Toor, S., Ogunlana, S., (2010). Beyond the Iron Triangle: Stakeholder Perception of Key Performance Indicators (KPIs) for Large-Scale Public Sector Development Projects. *International Journal of Project Management*, Vol.28, pg: 228–236.
- [61] Wearne, S.H. (1992). Contract Administration and Project Risks. *International Journal of Project Management* Vol. 10, no. 1: 39-41.
- [62] Yates, J. and Battersby, Leslie. (2003) Master Builder Project Delivery System and Designer Construction Knowledge. *Journal of Construction Engineering and Management* Vol. 129, no. 6: 635-644.
- [63] Ye, J., Hassan, T.M., Carter, C.D., Kemp, L., (2009). Stakeholders Requirements Analysis for a Demand-Driven Construction Industry. Available at <http://www.itcon.org2009>.