

# UNDERSTANDING THE ENGINEER'S ROLE IN ADMINISTERING THE CONSTRUCTION CONTRACT

MOHAMED-ASEM U. ABDUL-MALAK<sup>1</sup> and FARAH Y. EL MASRI<sup>2</sup>

<sup>1</sup>*Civil and Environmental Engineering, American University of Beirut, Beirut, Lebanon*

<sup>2</sup>*Civil and Environmental Engineering, University of Alberta, Edmonton, Canada*

The role of the Engineer has been carried out by the design consulting firm, traditionally in charge of not just designing and providing technical supervision for the construction work, but also of administering the construction contract and further assisting in adjudication and arbitration processes in the case of disputes arising along the way. However, due to the increase of the projects' size and complexity, employers nowadays tend to assign other entities for handling the managerial and administrative tasks normally required of the Engineer. Using the FIDIC's 1999 Red Book as a platform, the Engineer's roles have been systematically identified on a clause-by-clause basis, and various statistics as to the roles' frequency are offered. A method has been devised to properly classify these identified roles. The proposed classification is based on parameters and attributes which include: the exact deduced role; the role's timing and frequency of application; the time-barring stipulated for its application; the role's nature, being reactive, proactive, or passive; the role fulfillment capacity; and the role fulfillment exclusivity. The outcome of this work offers employers with a profound understanding of the roles expected of the Engineer in administering the construction contract, particularly assisting in the apportionment of these roles between or among multiple employer-appointed entities, when such a split in role-assignment is deemed desirable by employers.

*Keywords:* Administration, Engineer, Contract, Classification, Roles, Project, FIDIC.

## 1 INTRODUCTION

Traditionally, employers assign the design consulting engineers to undertake the responsibilities of the "Engineer" for administering the construction contract. Under such an appointment, the Engineer's services during the construction phase include the technical (quality) supervision of the works as well as the administration of the commercial and scheduling issues related to the contract. As such, the Engineer can also be referred to as a decision-maker, a function that requires a certain degree of impartiality and fairness from him. In common law, the role of the Engineer can be understood to involve, on the one hand, actions to be taken as the employer's agent and, on the other hand, actions warranting the rendering of a professional opinion" (Jaeger and Hök 2010). On projects of certain complexity, the ability of managing, predicting and innovating in the contract administration process can present a great challenge (Reynolds 2008). Nowadays, the owners of construction projects are

becoming increasingly oriented towards a more value-based and operational management process (Ryd 2003). There is a need for professionals that can act as the owner's connection between business development and technical design and supervise the execution process in a less traditional way (Lindahl and Ryd 2007). As such, the design consulting engineers are no longer the owners' first choice of advisers (Nicol and Pilling 2000), and there is a simple suggestion of changing the profession's tradition of "protectionism" and "exclusivism" in order to deliver a higher quality in the construction project (Siva and London 2011). The question remains: is there a good understanding on the part of the concerned parties as to what the Engineer's traditional roles exactly entail before judging whether any such roles can be the subject of change or not?

## **2 RESEARCH SCOPE**

The objective of the research work reported on in this paper is to examine and highlight the major roles expected of the Engineer, and to investigate a method that can help more rigorously classify them. The desired classification method shall allow practitioners a better chance to differentiate between the two general classes of technical versus administrative and managerial roles and to be able to judge the instances where the Engineer is expected to act as the Employer's agent versus an independent decision maker. The work consisted of scrutinizing all the roles given to the Engineer through a clause-by-clause reading of the 1999 FIDIC Red Book's conditions of the contract. Suitable criteria were then conceptually explored to help better understand and classify each role. Finally, a classification matrix was proposed which differentiates the roles that can be exclusively assigned to the design consulting entity from those other roles that can alternatively be assigned to other equally or better qualified entities.

## **3 SCREENING OF THE ENGINEER'S ROLES**

### **3.1 Deduction of Roles**

The 1999 FIDIC Red Book's conditions are structured under 20 headings summarizing all possible duties, roles and authorities of the three main participants in the project. The word "Engineer" is cited in 99 out of 163 sub-clauses, representing 61% of these conditions. It is to be noted that the scanning of the Engineer's different roles was limited to clauses uniquely citing the word "Engineer" and did not include the roles assigned to the Employer's Personnel.

### **3.2 Interpretations and Analysis**

Out of the 99 sub-clauses mentioning the word "Engineer", 93 sub-clauses express 33 distinct roles for the Engineer. The roles cited in definitions, listings or carrying the same name as their sub-clause remained hidden from this screening to avoid redundancy. It can be seen from Figure 1, that 13 out of the 93 sub-clauses of relevance (14%) are heavy, in terms of their numerous instances (four or more) of making a reference to a role expected of the Engineer. The selected threshold of four has no basis except that which is deduced visually from the scatter.

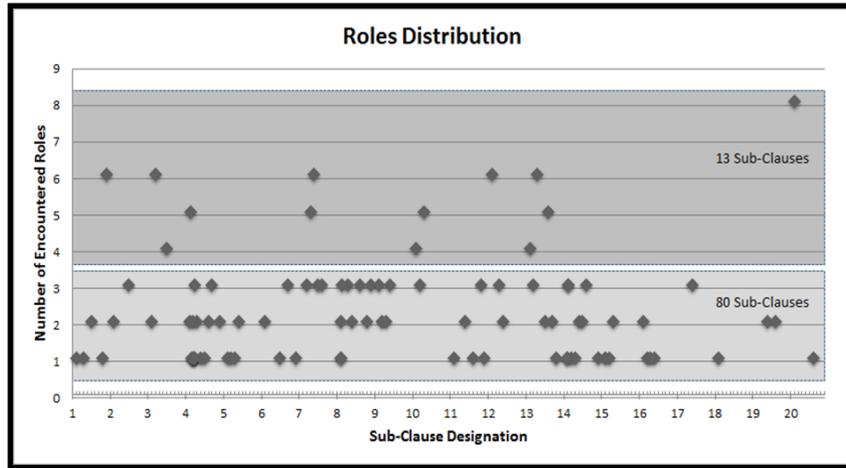


Figure 1. Number and distribution of encountered roles.

Sub-Clause 20.1, concerned with contractor’s claims, is ranked with the highest number of roles of eight, as shown in Figure 2. Related sub-clauses, which deal with matters that can be the cause for time and price increases, include variations, work measurement, delayed drawings, differing site conditions, among others. Quality-related sub-clauses include testing, inspection, and tests on completion.

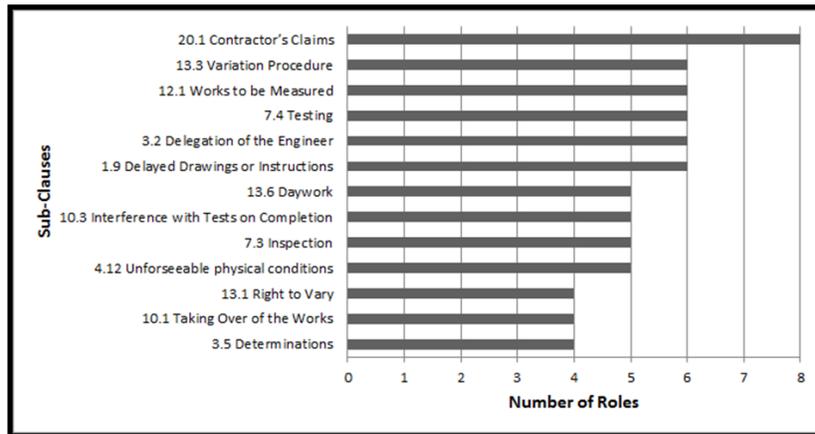


Figure 2. Sub-clauses with role frequencies of four or more.

From another perspective, Figure 3 shows the frequency of all the 33 identified roles, in an attempt to discern the important ones. The most frequent role is that of “making determination”, which appears in 33 sub-clauses excluding Sub-Clause 3.5 Determinations. It can be argued that this particular role, of determining an extension of time and/or an additional compensation, is indeed of great importance since it requires of the Engineer to act as a decision-maker at 33 different situations, under which the Engineer is required to defend his identity of an independent professional.

When it comes to determining any matter, the engineer is expected to consult with each of the parties. Even if consultation is hindered, the engineer is obliged to issue the determination out of professional ethics (Bunni 2005).

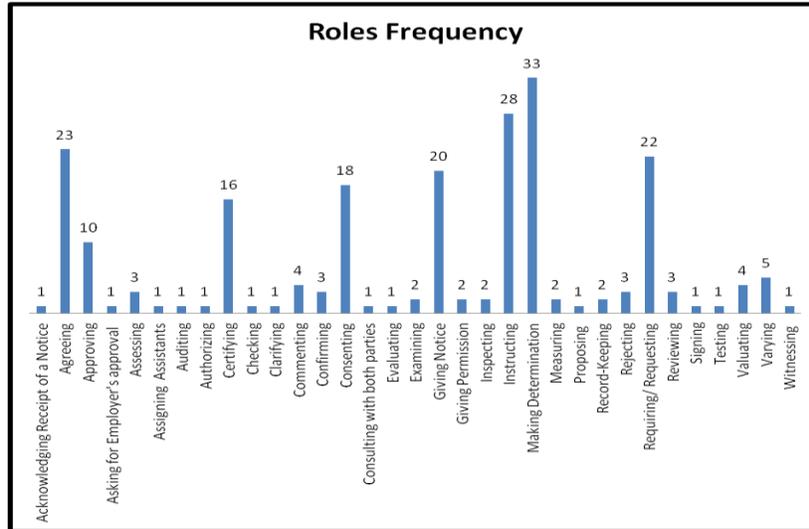


Figure 3. Frequencies of the deduced roles.

It can be further deduced that a number of other roles have a high frequency of occurrence. Figure 4 shows the basket of those roles whose frequencies are equal or greater than five percent, with “instructing” being ranked second to “making determination” followed by “agreeing”, a role that is intimately referred to in conjunction with that of “making determination”. Two other roles related to “instructing” are also found to be highly ranked; these are “requiring/requesting” and “giving notice”. As also shown, “consenting”, “certifying”, and “approving” are to be regarded as key roles expected to be fulfilled by the Engineer with remarkable frequencies.

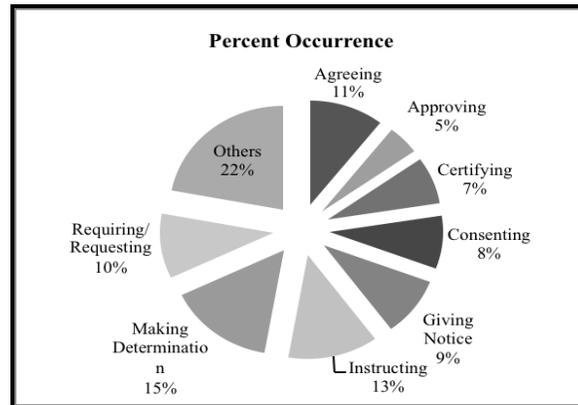


Figure 4. Engineer's roles with 5% occurrence or more.

## 4 CLASSIFICATION OF ROLES

### 4.1 Parameters and Attributes

All along the screening of the encountered Engineer's roles, a number of observations were being recorded, according to which six parameters (in addition to the concerned role itself) and their corresponding attributes were selected to help design a system of classification of these roles, as summarized in Figure 5. At the end of the scrutiny process, a total of 218 roles (resulting from the repetitions of the 33 distinct roles that were identified throughout) filled a similar number of rows for building the intended classification matrix.

Classification Designation	Classification Parameter	Parameter Attributes	Underlying Rationale for Assigning Attribute(s)
CD 1	Deduced Main Roles	Agreeing / Determining / Consenting / Approving / Certifying / Assessing / Evaluating / Valuating / Etc.	Descriptive and adopted from the exact wording used in the examined FIDIC clauses
CD 2	Time Constraint(s)	Time Barring ///versus///	Stipulated period within which the Engineer shall act
		No Stipulation	No period is stipulated for the role in question
CD 3	Timing and Frequency	Timing of Role Fulfillment ///and///	Stage of intervention along the construction contract lifespan
		Role fulfillment frequency	The rate of occurrence of every role over the project lifecycle
CD 4	Role Nature	Proactive	Taking the initiative in the role
		Reactive	The required role is the answer to an act or request by the Others (The Employer and/or the Contractor)
		Passive	The nature of a role where no reaction is necessarily required from the Engineer and where basically the Engineer is only informed in the process
CD 5	Role Type	Administrative	Defines an automated role in a defined process/ paperwork related
		Technical	Requires specialty or expertise in the matter
		Managerial	Includes some decision making within a specific frame of time
CD 6	Role Fulfillment Capacity	Employer's Agent ///versus///	Where the Engineer is supposed to act on behalf of the Employer
		Independent	Where the Engineer is supposed to act in a professional objective manner
CD 7	Role Fulfillment Exclusivity	Candidates excluding the Designer	Due to certain conflict of interest or lack in experience
		Candidates including the Designer Exclusively the Designer	Unrestricted to a specific party Purely technical designer expertise required

Figure 5. System for classifying the encountered roles.

### 4.2 Interpretations and Analysis

In this section, only a very brief summary of general inferences is presented. Following the construction of the classification matrix, it became readily evident that the majority of the roles are:

- Reactive (70%), meaning that the Engineer is largely at the receiving end of submittals, requests, and claims from the contractor;
- Technical (62%), showing that the role of the Engineer does not entail dealing with technical matters at all times, thereby suggesting that someone else other than the design professional could fulfill such roles;
- Intended to be performed by an independent professional (67%), thereby emphasizing the importance of impartiality; and

- Intended for candidates including, but not exclusive to, the design professional (75%), indicating that such roles can also be alternatively assigned to another professional who is equally or better qualified for performing such roles.

Further to the observation stated under the fourth bullet above, it is found that almost 22 percent of the roles should not be assigned to the design professional, whereas the roles that are exclusive to the design professional represent only 4 percent. In reiteration to the observation stated under the second bullet above, the technical roles counted for 62 percent of the total roles, versus 25 percent and 13 percent for the administrative and managerial roles, respectively. Such a deduced distribution of roles could send a misleading message that the designer should take the lead when it comes to administrating the construction contract as opposed to assigning such a lead to a project management professional. Here, it should be noted that the role of making determinations is also considered technical, involving scheduling and cost assessments and valuations, and the majority of these determinations do not suit being handled by the design professional. That alone can revoke the above-hinted misconception.

By way of concluding, the intended classification of the different roles, expected of the Engineer in acting as the administrator of the construction contract, aims at aiding projects' owners/employers in deciding on how best to allocate the contract administration roles among the entities that are lined up to contribute to the process of overseeing the construction phase.

### **Acknowledgments**

The research work reported on in this paper was funded via a graduate assistantship by the Engineering Management Program. The authors are grateful for this support.

### **References**

- Bunni, N. G., *FIDIC forms of contract, 3rd Edition* Blackwell, Oxford, 2005.
- FIDIC, International Federation of Consulting Engineers, *Conditions of Contracts for Construction*, 2007.
- FIDIC Geneva, *The Role of Construction Managers, Notes on the use of FIDIC in the Middle East*, 2008.
- Jaeger, Axel-Volkmar and Hök, Götz-Sebastian, *FIDIC - A Guide for Practitioners*, 2010.
- Lindahl, G. and Ryd, N., "Clients' goals and the construction project management process", *Construction Project Management*, 25(3), 147-15, 2007.
- Nicol, D., Pilling, S., *Changing Architectural Education: Towards a New Professionalism*, E & F Spon, London, 2000.
- Ryd, N., *Exploring construction briefing – from document to process, doctoral thesis*, Chalmers University of Technology, Gothenburg, 2003.
- Siva, J. and London, K., Client learning for successful architect-client relationships, *Engineering, Construction and Architectural Management*, 19 (3), 253 – 268, 2012.