

# Comparing Suitability of NEC and FIDIC Contracts in Managing Construction Project in Egypt

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**Abstract**— New Engineering Contracts (NEC) is a standard form of construction contracts developed by Institution of Civil Engineers of United Kingdom since 1993. NEC is widely used in several countries such as United Kingdom, New Zealand, Australia, Hong Kong and South Africa. The main advantages of NEC is the good management of the relationship between the parties involved, also it has a clear and simple form that can be used widely. The common standard form used in Egypt is the FIDIC form of contract and it is found that it cannot be used in all types of projects and all scope of works. So in this Thesis, an evaluation of suitability of NEC contracts will be studied. And a comparison between NEC & FIDIC will be done to know which one will be more suitable to work in Egypt.

**Keywords**—Standard forms of contracts, NEC, FIDIC, variations, Dispute resolution mechanisms, Force majeure, NEC vs. FIDIC, Partnering, Early warning System.

## I. INTRODUCTION

The construction industry is fragmented into large number of diverse activities to deliver any project efficiently. One of the most important activities in any construction project is to manage the contract that obliges the parties to do specified work. The objective of contract management is to ensure all parties of the contract meet their respective obligations efficiently and effectively and to protect the rights of the parties. Also construction contract management makes sure that the Construction phase commences and runs smoothly through to the Delivery and Commissioning phase.

Standard forms of contracts are type of contracts where they contains terms and conditions that can be used for all projects and gives the employers chance to amend some conditions to make the contract suit his/her project specifically.(Murdoch, J., & Hughes, W. 2002).

Standard forms of contracts developed through history by experienced construction professions, principally by Royal Institution of British Architects (RIBA) and the Institution of Civil Engineers (ICE). Now, wide variety of standard forms and a large number of organizations produce standard forms. The forms have become more diversified dealing not only with employer contractor relationships, but also at the same time more specific, dealing with for example, sub-contractors, suppliers, facilities managers, works contractors and the professions.(Murdoch, J., & Hughes, W. 2002).

These standard forms of contracts proved their success worldwide as they have positive impact on managing the time and the cost of construction projects. Also they give the employers references of the possible situation and scenarios of what could happen during the project and how to deal with it.

There are a lot of standard forms of construction contracts that are used worldwide which are:

1. Fédération Internationale des Ingénieurs - Conseils (FIDIC)
2. Institution of Civil Engineers (ICE)
3. The New Engineering Contract (the NEC)<sup>3</sup>
4. The Joint Contracts Tribunal (JCT)

In Egypt, according to it is not very common to use standard forms, the FIDIC conditions are employed in a great number of the most important construction and industrial projects carried out in the sector of public-works contracts. For instance, Greater Cairo waste water project, Cairo Metro Project and Cairo International Airport Terminal 2 Renovation. (Sarie-Eldin, 1994). Also the FIDIC conditions are used in all projects that are financed by the World Bank and by USAID (United States Aid for International Development) that finance a number of major infra-structure projects in Egypt. (El-Hoteiby, 2016).

## II. METHODOLOGY

### A. Research Strategy

Research strategy is the way in which the research objectives can be questioned. It can be done using either "Quantitative research" or "Qualitative research". According to the purpose of the study and the type and availability of the information which is required, the type is selected (Naoum, 2012).

In this research, the both techniques are used; quantitative and qualitative methods; quantitative method that includes a survey, through a postal questionnaire, will be used (Naoum, 2012). The other type of research "qualitative research" is done through semi-structured interviews to probe the opinions of construction stakeholders in Egypt about the role of the construction contracts in controlling the construction projects and their experience in using FIDIC.

### III. DATA COLLECTION

#### A. Postal Questionnaire

The questionnaire in this study derived mainly from a comparison between the NEC and FIDIC forms of contracts. The objective of this questionnaire is to know if the new techniques and terms of NEC will be effective or not and to know the impact of these techniques on the cost and time of the project.

##### a. Questionnaire Construction

At the beginning of the questionnaire, a brief overview on the topic of the thesis has been inserted. Then a part was allocated for the personal information about the respondents, such as name, profession, position and name of the company. After that part, several questions regarding the main difference of the NEC and FIDIC forms of contract were asked to know if these differences can affect the construction project regarding the time and the cost of the project or not and if yes, to rate this impact accordingly. These differences include:

- Language of Contract
- Experience needed to work in the contracts field
- Applying Risk Management Plan and its impact
- Effect of Early Warning system
- Programme clauses
- Dealing with Compensation Events
- Disputes reasons

Finally the respondents were asked to write down any comments or additional suggestions.

##### b. Questionnaire Sample

###### i. Sample selection

According to the objective of this questionnaire which is comparing two types of contract to know which is better to minimize the problems raised during the project, it was necessary to involve different construction companies, project management firms and law offices specialized in construction to gather different points of views and opinions from different key parties. The sample of this questionnaire is not limited to collecting data within Egypt but also from outside as it includes type of contract that is used commonly outside Egypt and the results must be supported by some users to ensure them.

The practical procedures implemented to obtain results were as follows:

- Select people working in the construction companies, construction law firms, the project management firms, and project management experts through information collected from previous experience, colleagues, and professors.
- Many versions of the questionnaire were piloted out to some project management experts, followed by some modifications and brainstorming for ideas to test the questionnaire before the final version was dispatched.
- The questionnaire is then posted on the internet and sent to selected professionals and relevant people.
- The data was extracted from the responses given to be analyzed.

###### ii. Sample Size Population

The total population was obtained the Egyptian Federation for Construction and Building Contractors (EFCBC) that reported the number of construction companies or law firms specialized in construction contracts or have a specific department for procurement and construction contracts is 300.

###### Sample Size Determination

Statistical equations were used in order to calculate the sample size for the companies, the sample size of the unlimited population could be taken as (Godden, 2004):

$$SS = Z^2 * P * (1 - P) / C^2$$

Where SS = Sample size

Z = Z value (e.g. 1.96 for 95% confidence level)

P = percentage picking a choice, expressed as a decimal (0.50 used for sample size needed)

C = margin of error (8%)

Substituting these values in equation leads to

$$SS = 150$$

For finite population

$$New\ SS = SS / (1 + ((SS-1)/Pop))$$

By substituting in the above equation

$$New\ SS = 100$$

The sample consists of one hundred Egyptian engineers who work in different companies and sectors, and in different positions.

#### B. Semi-Structured Interview

Semi-structured interviews lie in the middle between Structured and Unstructured interviews where participants have the opportunity to explore more issues in as much depth as they please.

##### a. Interview Construction

The interviews mainly divided into 2 main parts. The first part involves knowing general information about the interviewee; their position, years of experience and what is the most common standard forms of contract they use. The second part asks about more detailed issues about the construction contracts, their opinion and experience regarding these issues and how these issues can help in managing the construction projects.

##### b. Interview Sample

Studies show that satisfaction and saturation are reached from the first 12 interviews. Some mathematical model based on results of six interviews and demonstrated that six interviews can make 80% saturation and after about 12 interviews, saturation percent can reach to 90%. (Guest, G., Bunce, A., & Johnson, L. 2006). The interviews target experienced contract managers, contract administrators and project managers. But the interviews were limited to those in Egypt to get more relevant results.

The following procedure was used to obtain information from the twelve interviewees (Naoum, 2012):

- Choosing a list of names and addresses of participants from certain construction companies and construction law firms.
- Names of persons who were suitable to participate in the research were identified through telephone conversations.
- The twelve interviewees selected were homogenous and have similar characteristics. They were all from large to medium companies, were very experienced with the construction process and also, they all executed different types of work under different contractual arrangements. Moreover, some belong to private companies and others belong to public ones.
- During the interviews, interviewees provided some freedom to raise specific queries and to go deep in certain areas and topics as they needed.
- After making the interviews the given data are analyzed.

#### IV. RESULTS AND DISCUSIONS

The following section is covering the results of the questionnaire distributed to collect information in analyzed, tabulated and summarize form and results of the interviews that held.

##### A. Questionnaire Analysis

###### a. Respondants Data

The respondents were asked about their professions, to know if those who work in the field of construction contracts are only engineers, only lawyers or engineers with the background of law; where 73% of the respondents are Construction Engineers with the background of law, 16% are Construction Engineers and 11% only are Lawyers.

In terms of years of experience, it was found that 11% of the respondents have from 0 to 3 years of experience, 26% have 4 to 10 years, 41% have 11 to 20 years and 22% have more than 20 years of experience.

It was found that 83% of the respondent's companies have projects in Egypt and in the Middle East, 11% in the United Kingdom and 6% have projects worldwide.

Regarding their companies role during construction project, it was found that 47% of the respondents represent the consultant part, 38% are contractors, 13% are owners and 2% only are sub-contractors.

###### b. Data Analysis

The respondents were asked about the most standard form of contract their company use where 59% of the respondents use FIDIC as standard form of contract, 17% use NEC, 14% in house contract, 5% use JCT and 5% use other standard forms of contract.

###### i. Language of Contract

72% of the respondents see difficulty in interpretation the language of the contract. Where 64% rated the problem of the discrepancy as medium problem, 69% rated the problem of

ambiguity as medium while more than 75% rated the problem of following a lot of references as a high-rated problem.

###### ii. Experience needed to work in the contracts field

98% of the respondents see that those who work in contracts should have special training in contracts before working on it where 50% of the respondents see that their experience should range from 4 – 10 years.

###### iii. Applying Risk Management Plan and its impact

35% of the respondents see that implementing Risk Management Plan has very high impact on the development of the time and cost of the project, 37% see that it has high effect. And in a scale of 1 (less) to 5 (high), 45% of the respondents give 3 to show to how extent their company can follow the Risk Management Plan.

Regarding the effect of making Risk Reduction Meetings on the development of the time and the cost of the project, 45% see that these meetings have high effect on time and 13% have very high effect. While 40% see that these meetings have high effect on cost and 23% have very high effect.

###### iv. Effect of Early Warning system

More than 75% of the respondents give rate from 3 to 5 (1 is lowest and 5 is the highest) regarding foreseeing events that are possible to occur and solve them first hand.

Regarding the impact of the early warning of risks or any event during the construction project on the development of time and cost, 30% see that they have high effect on time and 43% see that they have very high effect. While 38% see that they have high effect on cost and 40% see that they have very high effect.

###### v. Programme clauses

75% of the respondents see that the time schedule should be from the contract documents.

Regarding the impact that the updated time schedule every period of time during the project according to the contract became one of the contract documents on the development of time and cost of the project, more than 60% see that this has high and very high impact on the time and more than 50% see that this has high and very high impact on the cost of the project.

###### vi. Disputes Reasons

The respondents were asked about the main reasons of disputes during any construction project and their answers were as shown in table

Reason	Low	Medium	High
Termination of Contracts	74%	20%	6%
Measurement & Payment	16%	48%	6%
Acceleration	50%	42%	8%
Suspension of works	49%	31%	20%
Commencement date and handing over	36%	40%	24%
Force majeure	68%	24%	8%
Delays	5%	38%	57%
Errors & omissions	8%	43%	49%
Variations	2%	32%	65%
Differing in site conditions	41%	35%	24%

## B. Interview Analysis

The interviews mainly divided into 2 main parts. The first part involves knowing general information about the interviewee; their position, years of experience and what is the most common standard forms of contract they use. The second part asks about more detailed issues about the construction contracts, their opinion and experience regarding these issues and how these issues can help in managing the construction projects.

### a. Part 1

The interviews target experienced contract managers, contract administrators and project managers. But the interviews were limited to those in Egypt to get more relevant results.

Also in this part, the interviewees were asked about the most common form of the contract their company uses or used in their projects and the main reasons behind using this type.

According to the respondents, it was found that not all companies or projects in Egypt can use standard forms of contracts and this depends on the need of the Employer/Owner/client. And when they use standard form of contract, they use either FIDIC 1987 4<sup>th</sup> edition or FIDIC 1999 1<sup>st</sup> edition

### b. Part 2

In this part, the interviewer asked the respondents about some major problems that can cause dispute and their impression about them and how these affect the construction project.

#### i. Language

The interviewees were asked about the language of the FIDIC standard form of contract and if they find any problem understanding or translating the clauses of the contract. And it was found that:

- FIDIC is not easily readable for the new users. As there are a lot of cross references and very long sentences separated by commas and this increase the possibility of misunderstanding of its clauses.
- FIDIC contains some words that cause confusion to reader as it does not have certain meaning like “experienced contractor, contractor's opinion, force majeure ....etc”.
- FIDIC not only needs engineers to make the ambiguity clear but also lawyer beside them to understand its clauses to avoid having any problem and this is because it is originally drafted by lawyers not engineers.

#### ii. Variations

The respondents were asked if variations can be a reason why a dispute may arise and how this affect the project. And it was found that:

- Conflicts not only arise from valuing the variation but also from agreeing whether this will be considered as a variation or not.

- FIDIC obliges the contractor to commence the work even if the price of this work has not been agreed upon yet.

#### iii. Roles and Responsibilities

Regarding this part of the interviews, the interviewees were asked about their opinion of the role of the engineer in the contract. And what they see more efficient during administrating the contract; either the engineer should have the full power of the employer to the extent that the employer's approval is not always needed, or the engineer should have the power but with their continuous approval of the employer.

The responses of this question differs according to the respondents either they are contractors, engineers or employers as follows:

- Contractors see that the engineer should act under the supervision of the employer. As they claimed that the role of the engineer is different in the Egyptian culture from other countries. This is because engineers act as the employer agent although he should administrate the contract so this result in biased decisions as engineers always think that the contractors do not want to finish the work as specified and they want to take money from employers.
- Employers see that the role of the engineer is very important in Egypt as to be able to commence a work, there are more than 18 permissions and licenses should be issued and this cannot be completed without the co-operation of the employer and a party that is aware of these procedures which is the engineer, also during the construction the employer approval is needed in many situations to avoid any problem.
- For Engineers, they see that the engineer who will work without the employer continuous approval must be fair and professional enough to do this job to avoid any problem after that with the employer himself.

#### iv. Dispute Resolution

The interviewees were asked about dispute resolution mechanism they used before and their opinion. And it was found that:

- All interviewees said that they prefer amicable settlement and negotiations at the beginning to avoid any escalation of the problems'
- Contractors avoid making any disputes especially if the owner is a public sector.
- Mediation is the most preferable way after amicable settlement and negotiations.
- Dispute resolution technique depends on the monetary value of the dispute itself.

- Most of the interviewees have not reached the use of arbitration and adjudication so they also did not differentiate between the differences between both techniques

#### V. CONCLUSION

The main objective of this thesis was to identify which standard form of contract among NEC and FIDIC is suitable to use in Egypt regarding managing the construction project efficiently.

So after comparing both standard forms of contract, a questionnaire was developed then interviews were conducted to know their opinion regarding the main differences between NEC and FIDIC and the impact of these differences on the cost and time of the project.

Then the results are collected and analyzed to be concluded as follows:

- Both NEC and FIDIC standard forms of contracts are well-designed and proved their success in a lot of construction projects.
- NEC3 has more advantages over FIDIC.
- NEC3 provides a forward-looking proactive environment to manage project Time and cost.
- NEC3 is a clear and easy understandable contract compared to FIDIC as 72% of the FIDIC users see problems in understanding its language as it contains a lot of legal terminology and a lot of references to follow when reading any clause.
- NEC3 is a flexible contract where users first have many options for payment and risk allocation, then dispute resolution options after that list of secondary options and then they have

the Z clauses unlike the FIDIC that only contains the particular conditions that make limited changes on the general conditions where 58% of the users of the FIDIC see that they do not have variety of options.

- One advantage also of using NEC3 contract that it handles the programme of the work for completion. And this enables the project management team to control the project's timely completion in a collaborative way.
- The Early warning system in NEC that encourages the identification of problems so parties have to work together in order to establish an early resolution.

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