The Islamic University
Of Gaza - Palestine
Deanery of Graduate studies

Faculty of Engineering
Construction Management
Master Program



Investigation of FIDIC Clauses Dealing with Construction Project Performance

بحث بنود عقد FIDIC التي تتعامل مع أداء مشروع الإنشاء

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A Thesis Submitted in Partial Fulfillment of the Requirements for Degree of Master of Science in Construction Management

2007

بسم الله الرحمن الرحيم

﴿ يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا قِيلَ لَكُمْ تَفَسَّحُوا فِي الْمَجَالِسِ فَافْسَحُوا يَفْسَحِ اللَّهُ لَكُمْ وَإِذَا قِيلَ انْشُزُوا فَانْشُزُوا يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خبير ﴾

{المجادلة 11}

Dedication

I would like to dedicate this work to my wife, children and family for their unlimited and generous support.

Abdullah K. Murtaja

ACKNOWLEDGEMENTS

- *I would like to express my deep appreciation to my direct supervisor Professor Adnan Enshassi for his professional guidance, useful advice, continuous encouragement, and motivate support to make this research possible.*

- *Special thanks to the staff of construction management program for their keen academic supervision during my study at The Islamic University-Gaza.*

- *My best wishes to the paneled Experts: Dr. Kamalain Sha'at, Dr. Muhammad Ziara, Eng. Waleed Abu-Shaaban, Eng. Rafeek Hassuna, Eng. Nasr Khdair, Eng. Ali Abu-zommar, Eng. Saadi Ali, Eng. Ahmad Hussein, Advocate Muhammad Touman and Dr. Nafez Barakat.*

- *Many thanks to Eng. Daifullah El-Akhras for his kind support and assistance.*

- *Special thanks to all my colleagues, the engineers of the Ministry of Public Works and Housing.*

- *Kind gratitude and sincere acknowledgement to all the construction companies, the Palestinian ministries and the NGO's in Gaza Strip who participated in filling out the study questionnaires and provided valuable information for this study.*

ABSTRACT

Construction contract types and general conditions clauses have a major influence on the likelihood and degree of project success. In Palestine, the FIDIC contract is widely used in the construction projects. The main aim of this study is to investigate the impact of selected FIDIC clauses on the construction project performance to disclose its impacts on six measures of project performance: cost, schedule, quality, safety, and owner and contractor satisfaction. This study aims to identify contractual clauses that tied to project performance and elicit the contract parties' views on FIDIC contract articles to ensure that the contract is satisfactory for its users. In addition, this study aims to evaluate the most important clauses for both of contractors, owners and consultants regarding fundamental views when developing successful contracting relationships.

The objectives of this study have been achieved through studying seventy-nine questionnaires distributed to 38 contractors, 30 owners and 11 consultants. The study findings indicate that the most important contractual articles or (groups) of (FIDIC, fourth edition 1987, reprinted 1992 with further amendments) which tied to/and affect project performance and considered crucial to project success are the engineer and engineer's representative - contract documents - general obligations - suspension- commencement and delays - alterations, additions and omissions - procedure for claims - certificates and payment - special risks - release from performance and settlement of disputes clauses. The study results prove that the previously mentioned FIDIC clauses have significant impact on construction project performance, and are satisfactory to the contract parties. The contract parties consider the text of these clauses clear and treat the clauses' issues properly.

The results of this study recommended contract parties to apply the FIDIC clauses precisely, and in particular, the previous mentioned FIDIC clauses. The engineer's role should mean an authorized neutral engineer by the approval of the employer with the duties specified in the contract. To achieve clear contract documents, there must be common understanding only realized with open and honest communications between the contracting parties prior to contract execution. To avoid misunderstanding where interpretation of these clauses is different, there must be a process that encourages discussion and negotiation of how the risk should be shared under contract.

The results of the study recommended in case of delay, the party who is responsible for a delay must be determined before agreement on any contribution of the delay. Variations should not invalidate the contract or in turn, lead to disputes. Changes in projects must be dealt with seriously as beneficial and valuable lesson. To enhance the chances of a claim success, contractors submitting claims must closely follow the steps stipulated in the contract conditions, provide a breakdown of alleged additional costs and time, and present sufficient documentation.

Since the engineer’s role is not generally perceived as neutral in the contractual relationships between owners and contractors, the study results recommended the contract parties to follow the steps of disputes settlement clauses to settle any possible dispute taking into account the role of engineer as a neutral arbitrator.

ملخص البحث

يؤثر تنوع عقود التشييد و بنود الشروط العامة تأثيرا رئيسيا على احتمالية و درجة نجاح مشروع الإنشاء، و في فلسطين فان عقد الفيديك هو عقد التشييد الأكثر استعمالا. إن الهدف الرئيسي لهذا البحث هو دراسة تأثير أهم بنود عقد فيديك على أداء مشروع الإنشاء لكشف تأثيرها على ستة خصائص لأداء مشروع الإنشاء و هي: الكلفة و الوقت و الجودة و الأمان و رضا المالك و رضا المقاول. إن هذه الدراسة تهدف أيضا إلى تحديد البنود التعاقدية المرتبطة بأداء مشروع الإنشاء و استيضاح وجهات نظر أطراف العقد بخصوص شروط العقد للتأكد من أن العقد قد حاز رضا مستعمليه. أيضا، فان الدراسة تهدف إلى تقييم أهم البنود لكل من: المقاول و المالك و الاستشاري بالنسبة لوجهات النظر عند تطوير علاقات تعاقدية ناجحة.

لقد تحققت أهداف الدراسة باستخدام أسلوب الاستبانة لجمع البيانات المطلوبة و ذلك من خلال تسع و سبعين استبانة مقسمة إلى ثلاث مجموعات: ثمانية و ثلاثين مقاول – ثلاثين مالك – احد عشر استشاري في محافظات غزة. و لقد أوضحت نتائج الدراسة أن أهم البنود التعاقدية للشروط العامة لعقد (الفيديك 1987– الطبعة الرابعة– مع تعديلات اضافية 1992) و التي تؤثر على أداء مشروع الإنشاء وتعتبر حاسمة لنجاح مشروع الإنشاء هي: المهندس و ممثل المهندس – وثائق العقد – الالتزامات العامة – توقيف العمل – المباشرة و تأخر إنجاز الأعمال – التغييرات و الإضافات و الإلغاءات – إجراءات المطالبات – الشهادات و الدفعات – الأخطار الخاصة – الإخلاء من مسئولية الأداء – تسوية الخلافات. و لقد أثبتت نتائج الدراسة أن بنود الفيديك السالفة الذكر لها تأثير كبير على أداء مشروع الإنشاء و تحوز على رضا أطراف العقد، وذلك لان نصوص هذه البنود واضحة و تعالج موضوعات بنود العقد بشكل جيد.

إن أهم التوصيات التي خرج بها هذا البحث هي دعوة أطراف العقد لتطبيق البنود المذكورة أعلاه بدقة، و اعتبار أن دور المهندس حيادي وهو مخول من قبل المالك للقيام بواجباته المنصوص عليها في العقد. ولتجنب سوء فهم أو تفسير البنود، فان الدراسة أوصت بتشجيع أطراف العقد على النقاش و التفاوض بشان كيفية مشاركة الأخطار طبقا للعقد. و في حالة التأخير أوصت الدراسة بتحديد الطرف المسئول عن التأخير قبل الاتفاق على أية مساهمة في التأخير. و بالنسبة للتغييرات في المشاريع، فانه يجب التعامل مع التغيير في مشروع الإنشاء بجدية و على أن يعتبر التغيير درس جيد و مفيد.

ومن اجل نجاح المطالبات، فان الدراسة أوصت المقاولين إتباع شروط العقد المختصة بالمطالبات مع تحليل للمبالغ المالية و التمديد الزمني المطلوب مع تقديم الوثائق اللازمة. و نظرا لأنه و بشكل عام لا ينظر إلى دور المهندس على انه حيادي في العلاقات التعاقدية بين المالك و المقاول، فان الدراسة أوصت أطراف العقد إتباع خطوات بنود حل النزاعات مع الأخذ بالاعتبار الدور الحيادي للمهندس كمحكم.

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List of Abbreviations

FIDIC	Federation Internationale des Ingenieurs Conseils
SPSS	Statistical Package for Social Sciences
ANOVA	Analysis of Variance
UNRWA	United Nations Relief and Works Agency
UNDP	United Nations Development Program
PECDAR	Palestinian Economic Council for Reconstruction and Development
USAID	United States Agency for International development
EU	European Union
SMDM	Support to Municipal Development and Management
PNA	Palestinian National Authority
PT	Palestinian Territories
PCU	Palestinian Contractors Union
GC	General Conditions
CPM	Critical Path Method
NCC	National Classification Committee
CTD	Central Tendering Department

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CHAPTER 1: Introduction

This chapter introduces the thesis by providing a brief discussion of the issues involved in the research. The scope, objectives, and the steps of research methodology are presented with the thesis outline.

1.1 Contract Concept

A Contract is a voluntary agreement between two or more parties. The purpose of a contract is to set out the rights, responsibilities, and liabilities of the parties. The purpose of a contract can be described from a different perspective; it is to allocate risk between the parties (Samuels 1996). Conditions refer to contract documents used to define no technical construction contract terminology and procedures necessary for safe, orderly execution and management of the work. They establish rights, responsibilities, risks, and requirements of owners and contractors in fulfilling contract obligations and must provide fair and equitable levels of protection for both parties. Thus, when owners presenting onerous and poorly written conditions, slanted in their favor; then, they will find it increasingly difficult to attract qualified bidders (Charles 1999).

General conditions are those written to cover conditions that will apply to all of an owner's construction contracts. Supplemental or special conditions modify existing conditions or add new ones to address subjects not covered. The legal aspects of the contract documents are outlined in the general conditions (GC's). There are several types of general conditions available for inclusion in contract documents. A standardized (common) set of GC' are those prepared by the FIDIC contract (Hinze 2001), which are widely used in the Palestinian territories and neighboring countries

The General Conditions are the legal standards that have been established to promote fair and objective contractual stipulations between all parties involved in construction projects. A primary benefit of using *standardized* GC's is that the document has been prepared with the advice of legal counsel and experienced professionals. The articles contained in the general conditions describe the legal rights, responsibilities and contractual requirements of the owner, contractor, and engineer. Technical information pertaining to how the project is to be constructed is not part of the GC's (see Technical Specifications). In order to be valid, all contracts must meet certain criteria. These criteria include an offer and acceptance, a meeting

of minds, consideration, lawful subject matter, and competent parties. Most construction agreements are drawn up between two parties for their mutual benefit (Hinze 2001).

1.2 Research Importance

In Palestine, the FIDIC contract is widely used as a unified formal contract for construction projects. However, local construction industry and local project performance still face several contractual problems such as, delays, litigation, and additional costs which are the consequences of disputes. Contract types and general conditions clauses have a major influence on the likelihood and degree of project success.

To contribute in mitigation this problem, this research is conducted on the most common used contract i.e. (FIDIC 87, 4th edition reprinted in 1992). FIDIC clauses found to have a significant effect on project performance characteristics according to a primary study conducted by the researcher, will be analyzed for impacts on six measures of project performance: cost, schedule, quality, safety, and owner and contractor satisfaction.

At the end of this research, the clauses that impact project performance will be identified, and the key elements of those clauses that are most crucial to project success will be discussed as well in detail. Other contract administration concepts such as risk allocation, claims management, respective views of owners and contractors, and incentive provisions will be factually and thoroughly discussed.

1.3 Research Justification

Construction contract types and general conditions clauses have a major influence on the likelihood and degree of project success. Therefore, the existence of a unified, standardized and fair contract such as FIDIC contract will contribute in improvement the construction industry and in creating successful relations between the contract parties. Usually, there is an adversary relationship between the owners and contractors (the contract parties). Consequently, disputes and its consequences arise and cause losses to all parties. The researcher aims to elicit views on a range of FIDIC contract issues to ensure that the contract is satisfactory for its users. So, it was necessary to analyze the impact of FIDIC contract clauses on project performance by its users themselves on project performance characteristics. These characteristics are: cost, schedule, quality, safety and owner and contractor's satisfaction.

1.4 Research Objectives

The main aim of this research is to study the impact of the FIDIC selected clauses on the construction project performance.

The research objectives may be summarized as follows:

1. To identify contractual clauses which mostly affect the project performance, according to FIDIC general conditions clauses (fourth edition 1987, reprinted 1992 with further amendments);
2. To elicit views from contractors, owners and consultants on the identified FIDIC contract articles concerning its impact on project performance;
3. To test the supposed hypothesis by the respondent's company experience and maximum executed project budget throughout last five years. This is to check out if there are any significant differences in the points of view of the respondents regarding FIDIC clauses and the construction performance characteristics which affected by the respondent's company experience and the maximum project budget throughout last five years that executed by the company of the respondent;
4. To test if there is a significant difference in points of view of contract parties regarding FIDIC groups' clauses;

1.5 Expected Outputs

Expected outputs of this research will identify the clauses that impact project performance, and the key elements of those clauses that are most crucial to project success will be discussed as well in detail. Other contract administration concepts will be identified, such as risk allocation, respective views of owners and contractors regarding developing successful contracting relationships.

1.6 Research Scope and Limitation

The scope of research investigation is the impact of FIDIC general conditions clauses (fourth edition 1987, reprinted 1992 with further amendments) on project performance in the Gaza Strip-Palestine. The limitations that are considered are:

1. The study is addressed to the local experienced owners, first and second class contractors who registered in the Palestinian Contractors Union in Gaza and the consultants.
2. The available information about impact of FIDIC contract clauses is limited to the data collected by questionnaires addressed to local contract parties.
3. The data which are collected cover only the last five years.

1.7 Research Methodology

The objectives of the research are achieved through the following stages:

Stage 1: Literature review

To review literature to focus on the major issues of FIDIC contract clauses in order to recognize the related information regarding those clauses.

Stage 2: the main study

This stage will be structured into three sub stages as follows:

a) Pilot study

A pilot study will take the form of structured interview with experts in the field of contract types and their general conditions. Those experts will include owners, contractors, consultants, and attorneys who have the experience in governmental and non-governmental agencies in the Gaza strip. An interview questionnaire will be used for this pilot study in order to evaluate the appropriateness of the main study questionnaire.

b) Field survey work

The pilot study will pave the way for designing the main study questionnaire. This main questionnaire will be conducted to be answered by the main contract parties; i.e. the owners and contractors. The quantitative data collection approach will be used. The questionnaire will be analyzed in addition to meet contractors, owners, and law experts. Statistical analysis and tests will be conducted by using the statistical program (SPSS).

c) Identifying impact of FIDIC clauses or general conditions on project performance

In this stage, and upon using the collected information in the previous stages, the impact of general conditions of the FIDIC contract used in the Palestinian territories on construction project performance will be found through the results of the field survey questionnaire on six measures of project performance: cost, schedule, quality, safety, and owner and contractor satisfaction., meanwhile, the shortcomings and their causes in claims-managements practice will be identified. Consequently, FIDIC contract clauses will be practically investigated to be a reference for the adoption of the unified construction contract through the questionnaire results analysis which will be followed by conclusion and recommendations.

1.8 Outline Contents of the Thesis

The thesis consists of five chapters as follows:

***Chapter 1**: Introduction*

This chapter has a general introduction to the subject of the thesis. It describes the rationale of the research, research objectives, and the outline of the research methodology. The research scope and outline contents are also stated in Chapter 1.

***Chapter 2**: Literature Review on construction contracts and FIDIC contract clauses*

All the available information that relate to FIDIC clauses and its issues under relevant literature review is discussed in this chapter. The main topics of this chapter are: Construction Contract Types, FIDIC conditions of contract, General and Special Conditions of FIDIC Contract, Engineer and Engineer's Representative, Suspension or Termination of Works, Commencements and Delays, Alterations Additions and Omissions, Certificates and Payments, Risk Allocation between Contracting Parties, Risk Allocation through Disclaimer Clauses, Critical Risks of Construction Projects, Management of Claims, Procedure for Construction Claims Process, Delay Claims, Release from Performance, Settlement of Disputes and General conditions of contract in the Palestinian Territories (PT).

***Chapter 3**: Methodology*

This chapter defines the process of the methodology that will be applied through the questionnaires.

***Chapter 4**: Results and Discussion*

This chapter presents the results of the research and discusses them in detail.

***Chapter 5:** Conclusions and Recommendations*

This chapter states the conclusions and recommendations.

CHAPTER 2: Construction Contracts and FIDIC Contract Clauses

This chapter focuses on subjects that are available in literature review and related to the construction contracts and FIDIC contract clauses. The main topics that are included in the chapter are: Construction Contract Types, FIDIC conditions of contract, General and Special Conditions of FIDIC Contract, Engineer and Engineer's Representative, Suspension or Termination of Works, Commencements and Delays, Alterations Additions and Omissions, Certificates and Payments, Risk Allocation between Contracting Parties, Risk Allocation through Disclaimer Clauses, Critical Risks of Construction Projects, Management of Claims, Procedure for Construction Claims Process, Delay Claims, Release from Performance, Settlement of Disputes, and some of the other current General conditions of contract in the Gaza strip.

2.1 Introduction

It is clear that having a standard form of construction contract will make this standard form applicable everywhere, regardless of the location of the site. In the case of standard form, generally the intention at least is to establish a fair balance between the rights and obligations of the employer and the contractor. For example, as far as the FIDIC contracts are concerned they have traditionally been based on the principle of balanced risk sharing and, as such, have been widely accepted on the employer's and the contractor's side as a reasonable compromise (Osinski 2002).

2.2 Construction Contract

A construction contract sets forth the intentions and procedures to be employed in any building effort. Ideally, it should be an easily understandable, mutually agreed-upon document that provides the answer to every project contingency. More realistically, these intentions and procedures often represent the owner's interests to which the business-hungry contractor agrees, with the hope that enough ambiguity resides in the document to permit multiple interpretations. The purpose of a contract is to set out the rights, responsibilities, and liabilities, of the parties. Meanwhile, the purpose of a contract can be described as a means to allocate risk between parties (Samuels 1996).

A contract is an agreement, usually between two parties, that is enforceable by law. In some instances there may be a third-party agreement in which the benefit of the contract goes to a third party. An example would be an insurance policy, particularly a life insurance policy, in which a third party is named as the beneficiary. In order to be valid, all contracts must meet certain criteria. These criteria include an offer and acceptance, a meeting of minds (agreement on contract basic aim and its related legal issues), consideration, lawful subject matter, and competent parties. Most construction agreements are drawn up between two parties for their mutual benefit (Hinze 2001).

2.3 Construction Contract Types

Contracts between the owner and the contractor are frequently divided into several categories. Each of these categories has several variations, usually determined by the type of fee the contractor is to be paid (Samuels 1996). These categories are:

1. Lump sum contract;
2. Unit price contract;
3. Cost plus contract;
4. Design build contract;
5. Management-oriented contract;
6. Two stage selective tendering;
7. Negotiated contracting;
8. Continuity contracting;
9. Serial contract;
10. Turnkey contract.

2.3.1. Fixed price (*lump sum*) contracts

A fixed price contract means that the contractor is to receive a lump sum amount, which compensates the contractor for the cost of performing the work (Samuels 1996). A fixed price contracts quote a single, guaranteed price as compensation for all the labor, materials, equipments, and services stipulated to complete the facility described in the construction contract. Fixed price contracts provide owners with an exact sum (barring exceptions and changes) to budget for their construction project. Owners still believe it is the most cost-effective means to deliver their completed construction projects (Charles 1999).

2.3.2. Unit price contracts

Unit price contracts are used for those less-complicated projects that are based on readily identifiable units. Paving for example, can be accurately quantified in units of area and thickness. Piling can be quantified in linear feet or number of piles, and mass concrete in cubic yards and pounds of reinforcing materials. Unit price contracts also require careful preparation to prevent disputes. Well-estimated guide quantities for each unit price item as well as clear instructions for their measurements are the key to successful unit price contracts. Actual quantity variances greater than 15% may cause legitimate claims for added or deductible costs. Clauses are usually included in unit price contracts that address this issue. They are expected to be fair and equitable to both owners and contractors (Charles, 1999). Although unit price contracts do not guarantee the final cost, they may be advantageous for different reasons. Where the quantity of work may vary, requiring a contractor to bid on a lump sum basis often results in a contingency within the price to protect against the risk of a quantity different from that estimated. Thus, under a fixed price contract, the owner ends up paying a premium (Samuels 1996).

2.3.3. Cost plus contracts

Cost plus agreement usually requires that the contractor be compensated by the owner for the actual costs of construction, plus a fee that may be fixed or may vary with cost of construction (Samuels 1996). Cost plus contracts may be the best choice in emergencies, since ready owner access to the daily labor, materials, equipment, and services records written into the contract helps prevent disputes. Also, cost plus contracts may be the best choice when the additional time and cost to scope and specify a project accurately are unacceptable. Variations of cost plus contracts may or may not include a fee, which can be negotiated or fixed, and a "not to exceed price". The intent is to stipulate a fair cost for the contractor's fees, expenses, and profit. Cost plus contracts, too, require precise wording to prevent spending overruns and claims. "Fixed" or "percentage" fees, markups, profit, services, and work limits must be clearly defined in the contract. (Charles 1999).

2.3.4. Design-build contracts

Under a design-build contract, the owner retains a single party to perform both design and construction services. There is one great advantage to the owner: If any thing goes wrong, the contractor cannot point to any other party as being at fault. One difficulty associated with design-build contracts is that the owner must determine in advance the design parameters. The contractor must be given guidelines; otherwise, the owner might end up with a finished

product that does not meet its needs. This is done by specifying the performance criteria (Samuels 1996).

Owners took the next step and assigned one firm the complete design-build responsibility. Proponents believe that design-build construction eliminates conflicts among the designer, contractor, and owner over poor design, specifications, and drawings. Owners with little or no design-build experience should know that the design-build construction is not a panacea, nor appropriate for every project. Before selecting this option, owners should discuss design-build results with others who have completed design-build projects. This method is sometimes, referred to as" competitive bids" (Charles 1999).

2.3.5 Management-oriented contracts

Management contracting is a process whereby an organization, normally construction based, is appointed to the professional team during the initial stages of a project to provide construction-management expertise under the direction of the contract administrator. The management contractor employs and manages works contractors who carry out the actual construction of the project and he/she is reimbursed by means of a fee for his/her management services and payment of the actual prime cost of the construction (Masterman 2002).

2.3.6 Two stage selective tendering

In this approach, tenders are invited on the basis of limited project documentation, and the successful first-stage bidder(s) is/are asked during the second stage to collaborate with the client to produce a definitive design and agree a final tender figure. Where more than one tenderer is involved in the second stage, the most appropriate bid is accepted and all of the involved organizations are usually reimbursed their second-stage costs. Two stage selective tendering is a process whereby the client can be vulnerable to any change in the level of the contractor's pricing from that contained within the first-stage tender. In this process, the overruns are shorter than in any other conventional method. Saving time can be achieved when using this approach, since the average time overrun incurred is usually shorter than when using other contracting methods (Masterman 2002). The client may need to appoint additional site supervision to ensure achieving the quality standard. The two stages are:

Stage 1: selecting a contractor on a competitive basis,
Stage 2: negotiation to reach a fixed price and program.

2.3.7 Negotiated contracting

It is possible when using this approach to appoint a contractor by assessing the experience, management expertise and competitiveness of a small number of appropriate organizations. More commonly, an appointment of a single contractor is made on the basis of past performance and competitiveness on an identical, similar or geographically adjacent project, preferably carried out for the same client. Negotiated contracting is a process of contracting whereby the project cost is nearly always higher than other contracting processes. A cost premium is paid by the client, but saving time can be achieved (Masterman 2002). With mutual trust and a commitment to excellence from both parties, this method is simpler, faster, and builds teamwork. In today's hurried markets, this method is quickly becoming the most prevalent (http://www.abuck.com/general/negotiated.htm).

2.3.8 Continuity contracting

When using this approach, contractors bidding for a project on the basis of single-stage selective tendering are advised that the successful tenderer, subject to satisfactory performance, will be awarded a similar project to follow on from the completion of the first. The price for this subsequent project will be negotiated using, as a basis, the tendered rates included in the bill of quantities, or some other form of financial schedule, for the original project. It is therefore a prerequisite for the use of this system that there are at least two similar projects available within a defined geographical area that can be carried out sequentially and that are capable of being able to accommodate flexibility in the timing of the commencement and completion of the second project.

Opt-out clauses for both the contractor and the client are often included, even if all the criteria for success are met. Also, the criteria for measuring the success of the first project must be agreed by both parties to the contract, and procedures for negotiating the second contract must be established before the initial project is let. Continuity contracting has advantages, of having time overruns that are shorter than average, cost overruns are more predictable than average, very competitive rates can be obtained at tender stage, the value of variations is likely to be low in comparison with other methods and few variations were needed on the second or succeeding projects (Masterman 2002).

2.3.9 Turnkey

When the contractor is involved in the site selection process, and sometimes even the financing arrangements, and the owner prefers a design and builds delivery method, the

contract is properly referred to as "turnkey". Literally, the owner is looking to the contractor to provide all services, down to turning over the key to the building. This method is the ultimate in trust and commitment; the owner and contractor are pursuing a common goal of a quality project, taking into account that "design and build" method is already included in "turnkey" contract.

The turnkey method was pioneered in the USA in the early 1900s, where it has been extensively used since that time, by the private sector, for the construction of process plants, oil refineries, power stations and other complex production facilities (Seale 2001).

In a fixed price contract, by comparison, the contract sum is adjusted throughout the contract period. A true turnkey contract, therefore, is more akin to a purchase contract than to a construction contract. It has the principal that is said to: simply hand over the cheque, turn the key and commence operation. The cost to the client of using the turnkey method can be higher than when using other more conventional procurement systems (Masterman 2002).

2.4 FIDIC Conditions of Contract

2.4.1 FIDIC – the Organization

FIDIC is the international federation of national associations of independent consulting engineers, or *Federation Internationale des Ingenieurs Conseils* (FIDIC). FIDIC was founded in 1913 by the national associations of three European countries, now with membership from over 60 countries. Most growth outside Europe has taken place since the Second World War, with developing countries particularly being encouraged to join. FIDIC now represents most of the private practice consulting engineers in the world; the members comply with a code of ethics guiding their professional standards (Jenkinson 2002).

Generally speaking, standard contracts are applicable everywhere, regardless of the location of the site. In case of standard forms, generally the intention is to establish a fair balance between the rights and obligations of the employer and the contractor.

The FIDIC contracts have traditionally been based on the principle of balanced risk sharing and, as such, have been widely accepted on the employer's and the contractor's side as a reasonable compromise. A further advantage of standard forms is the availability of commentaries and literature for less experienced users, as well as arbitration awards providing specific legal interpretations. Commentaries can be useful in reducing the incidence of

disputes after the signing of the contract, because they will let the parties know how a certain contract clause would be interpreted by a reasonable, independent person. Finally, as a result of the allocation of risks being standard, the contractor will be able to evaluate what risks he needs to include in his price and optimize his calculations at the tender stage (Osinski 2002).

2.4.2 The Traditional FIDIC Forms of Contract

General and Special Conditions of Contract for Works of Civil Engineering Construction are widely considered fair and balanced to both of owner and contractor, where risk is allocated to the party that is best able to bear and control that risk (Khalaf 2002).

In 1999, FIDIC along with the global development, paraphrased the previous editions of the contract I.e. (first edition in 1957, second edition in 1969, third edition in 1977, and the fourth edition in 1987) into 4 books as follows:

1. "The Red Book" – Conditions of contract for Construction.
2. "The Yellow Book" – Conditions of Contract for Plant and Design Build.
3. "The Silver Book" – Conditions of Contract for EPC Turnkey Projects.
4. "The Green Book" – Short Form of Contract.

2.5 General and Special Conditions of FIDIC Contract for Works of Civil Engineering Construction

Part I - General Conditions

One of the critical elements in a construction contract is the conditions of contract dealing with the legal aspects of construction work while the engineering documents such as plans and specifications take care of the technical side of the works. Practically, general contract conditions are the most important and also the most controversial part of all contract documents. If written without recognizing the contractor's perspectives, contract conditions could easily be biased and focus too much on the owner's interest. For example, the contract conditions transfer some risks not under the contractors' control to them such as site access and necessary right-of-way, changes initiated by the owner, and unforeseeable and undisclosed conditions. These are the potential sources of claims and disputes in many construction projects. In order to avoid problems of this nature, several independent organizations have prepared a set of standard general conditions which take care of the contractor's as well as the owner's interest (Charoenngam et al 1999).

The general conditions of FIDIC contract (Fourth Edition 1987, Reprinted 1992 with further amendments) consist of 25 groups or articles, these articles include 72 sub articles or clauses (attached at annex 3) as follows:

1. Definitions and Interpretation. (التعاريف و التفسير)
2. Engineer and Engineer's Representative. (المهندس وممثله)
3. Assignment and Subcontracting. (التنازل و التعاقد الفرعي)
4. Contract Documents. (وثائق العقد)
5. General Obligations. (الالتزامات العامة)
6. Labor. (اليد العاملة)
7. Materials, Plant and Workmanship. (المواد و التجهيزات و المصنعية)
8. Suspension. (توقيف العمل)
9. Commencements and Delays. (المباشرة و تاخر انجاز الاعمال)
10. Defects Liability. (الصيانة و اصلاح العيوب)
11. Alterations, Additions and Omissions. (التغييرات و الاضافات و الالغاءات)
12. Procedure for Claims. (اجراءات المطالبات)
13. Contractor's Equipment, Temporary Works and Materials. (معدات المقاول و الاشغال المؤقتة والمواد)
14. Measurement. (كيل الاشغال)
15. Provisional Sums. (المبالغ الاحتياطية)
16. Nominated Subcontractors. (المقاولون الفرعيون المسمون)
17. Certificates and Payment. (الشهادات و الدفعات)
18. Remedies. (وضع اليد على المشروع)
19. Special Risks. (الاخطار الخاصة)
20. Release from Performance. (الاخلاء من مسئولية الاداء)
21. Settlement of Disputes. (تسوية الخلافات)
22. Notices. (الاشعارات)
23. Default of Employer. (الاخلال بالعقد من قبل صاحب العمل)
24. Changes in Cost and Legislation. (تغيير الاسعار و تعديل التشريعات)
25. Currency and Rates of Exchange. (العملة و اسعارها التبديلية)

Note: the previous serial numbers are used for the purpose of clarity.

The terms of the Fourth Edition of the conditions of contract for works of civil engineering construction have been prepared by the *Federation Internationale des Ingenieurs Conseil* (FIDIC) and are recommended for general use for the purpose of construction of such works where tenders are invited on an international basis. The conditions, subject to minor modifications, are also suitable for use on domestic contracts.

The General conditions are linked with the conditions of particular application, referred to as part II, by the corresponding numbering of the clauses, so that parts I and II together comprise the conditions governing the rights and obligations of the parties.

Part II - Special Conditions

Special conditions are considered as additions or amendments that interpret, add, or amend some of the clauses of the general conditions.

The clauses of the general conditions that are added to or amended are the following:

1. Contract parties;
2. Subcontracting;
3. Safety, Security and protection of the environment;
4. Insurances;
5. Labor;
6. Materials, Plant and workmanship;
7. Taking-over certificate;
8. Procedure for claims;
9. Contractor's equipment, temporary works and materials;
10. Measurement;
11. Certificates and payment; and
12. Increase or decrease of cost.

2.6 Theoretical Background of the Most Important Groups of the General Conditions

According to the preliminary study done by the researcher among the most experienced owners, contractors, and consultants, it was found that the most important groups of the general conditions that impact the project performance are the following:

2.6.1 Engineer and Engineer's Representative. (المهندس وممثله)

2.6.2 Contract Documents. (وثائق العقد)

2.6.3 General Obligations. (الالتزامات العامة)

2.6.4 Suspension. (توقيف العمل)

2.6.5 Commencements and Delays. (المباشرة و تأخر انجاز الأعمال)

2.6.6 Alterations, Additions and Omissions. (التغييرات و الإضافات و الإلغاءات)

2.6.7 Procedure for Claims. (إجراءات المطالبات)

2.6.8 Certificates and Payment. (الشهادات و الدفعات)

2.6.9 Special Risks. (الأخطار الخاصة)

2.6.10 Release from Performance. (الإخلاء من مسئولية الأداء)

2.6.11 Settlement of Disputes. (تسوية الخلافات)

According to the aforementioned preliminary study, there was a majority of owners, contractors and consultants who assure the high impact of the previous groups on the construction project performance.

2.6.1 Engineer and engineer's representative

An international survey of clients, consultants and contractors produced wide-ranging data on the views of users of the FIDIC form of contract. The purpose of the survey was to elicit views on a range of issues, prior to revising the model form, to ensure that the contract drafters produce a form that is satisfactory for its users. Those questions that focus upon the role of the engineer have been subjected to detailed statistical analysis. The analysis shows that, contrary to popular belief, the views of contract users from common law jurisdictions do not differ from those in civil code jurisdictions. The engineer's role is not generally perceived as neutral in the contractual relationships between clients and contractors. Contractors would prefer someone other than the engineer to be the first-line settler of disputes in contracts (Hughes and Shinoda 1999).

The statistical analysis has indicated how much detail can be inferred from the survey, as well as the danger of taking the numbers of various responses at face value. For example, it seemed that consultants felt more strongly than clients about the impartiality of engineers, but the difference has no statistical significance. Contractors feel that engineers are rarely impartial in administering the contract. All groups feel that engineers' partiality is toward clients. Contractors are against the idea of engineer as first-line settler of disputes, preferring an adjudicator or adjudication board, whereas consultants are in favor of being the first-line settler of disputes.

The general view about the engineer as settler of disputes is neutral, with those in favor exactly balancing those against, and with no significant difference between any groupings of respondents. All parties feel that adjudicators should make decisions rather than recommendations, with such decisions open to appeal, although contractors felt more strongly about the need for appeal than the other groups. The jurisdiction in which respondents usually operate has no impact on their views of the issues reported here, whereas their usual contractual position is significant (Hughes and Shinoda 1999).

2.6.2 Contract Documents

Typically, the phrase Contract Documents is used to describe the entire scope of a construction contract. In fact, the Contract Documents form the Contract and are the sole declaration of agreement between the parties involved. Contract Documents normally consist of the following: 1) Agreement, 2) General Conditions, 3) Supplementary Conditions, 4) Technical Specifications, 5) Drawings, 6) Addenda, 7) Bonds, 8) Insurance, 9) Contractor's Bid or Proposal, 10) Notice of Award, and 11) Notice to Proceed. In some cases supplements such as the invitation to bid, instructions to bidders, shop drawings, written interpretations, or clarifications are part of the Contract Documents. Once all parties have executed the Contract Documents, the only way to amend them is by issuing a Change Order or Work Change Directive. Extreme caution should be utilized when issuing or accepting verbal agreements or modifications without recording the information in the form of a written document that is properly executed (Construction contract basics www.PDHcenter.com (2006).

Becoming a successful Engineer or Architect does not correlate with an ability to apply equations or remember textbook problems. All the work that is afforded design projects of any type is simply a means to an end. That end is the realization of a designer's vision through the construction of the project. Design professionals must learn to describe the legal and technical aspects of a project with Contract Documents. More importantly, the designer must strive to understand the effects of the written documents and what role those documents have in any given construction project. Take time to read through various types of Contract Documents and ask legal counsel or a seasoned design professional for interpretations or opinions. Once you understand the role and importance of Contract Documents the better you will become at preparing them (PDHonline, www.PDHonlione.com (2006).

2.6.3 General Obligations

These general obligations consist of 54 clauses. Out of these clauses the following ones were considered to be the most important clauses that have significant impact on project performance by the most experienced owners and contractors in the primary study done by the searcher. These clauses are:

10.3 Claims under Performance Security.

14.1 Program to be submitted.

14.3 Cash Flow Estimate to be submitted.

19.1 Safety, Security, and Protection of the Environment.

19.2 Employer's Responsibilities.

20.4 Employer's Risks.

21.1 Insurance of Works and Contractor's Equipment.

22.3 Indemnity by Employer.

23.3 Cross Liabilities.

24.1 Accident or Injury to Workmen.

24.2 Insurance against Accident to Workmen.

2.6.4 Suspension or termination of work

The suspension of work provision is the contractual equivalent of a breach of contract action for delays. Suspension clauses are seldom included in private contracts. It might be a good idea for contractors to consider their inclusion or to negotiate for them. Such clauses generally state that if prompt notice of the suspension is not given, the suspension claim will not be valid (Hinze, 2001).

The general conditions provisions in most owners' contracts contain clauses that give them the ability to suspend work. Suspensions may result from an action of the contractor or the owner. The most important components of these provisions concern the general nature of suspensions and the ability of the contractor to recover costs associated with owner suspensions. If the suspension provision does not permit the contractor to recover damages caused by an owner's suspension or project delay, contract contingencies will increase, as demonstrated by increased bids. When addressed in the contract, contractor recovery of damages is typically restricted to instances where the contractor is not at fault.

Articles included in contract documents allow for this action. Directives to suspend or terminate work are originated by site managers. They require a detailed description of the work covered, an effective date, and for suspensions, the expected duration. Suspension of construction refers to contract work that is stopped temporarily with the intention of resuming later. Termination refers to contract work that will be ended or concluded with no intention of resuming in the foreseeable future. Either action requires written procedures to protect the interests of the owner and the contractor. To be fair, procedures must make provision for the contractor to recover actual direct costs for work completed, material purchased but not installed, additional work required by the suspension or termination directives, and overhead and profit for such expenses (Charles 1999).

2.6.5 Commencement and delays

Time is the essence of a construction contract. Typically, a time period is specified as the contract duration. The contractor is obliged under the contract to achieve substantial completion within the specified period. Unfortunately, unexpected events can happen during the life of the construction project and can affect the construction time necessary for the completion of the work. When a contractor fails to complete the project within the contract period, delay becomes the reality of the project. The contractual remedy for the owner is to deduct liquidated damages. Obtaining an extension is the contractual release for the contractor against liquidated damages. Based on the responsibility, delays are generally categorized as excusable compensable, excusable no compensable, and inexcusable.

In such situations, contract law provides no mechanism for adjustment of the terms of the contract unless specific provisions are included in the contract. The design of a mechanism to deal with such changes and the associated time and cost adjustments for situations where certain events occurred during the course of the construction is therefore an integral part of contract planning (Shi, et al 2001).

2.6.6 Alterations, additions, and omissions

Changes and conflicts in projects, at work, and even in our daily lives are very common. Any additions, deletions, or other revision to project goals and scope are considered to be changes, whether they increase or decrease the project cost or schedule. Most commonly, lack of timely and effective communication, lack of integration, uncertainty, a changing environment, and increasing project complexity are the drivers of project change.

In addition, these changes may affect other aspects of the performing organization that may have program management implications. In project management, changes in projects can cause substantial adjustment to the contract duration time, total direct and indirect cost, or both. Therefore, project management teams must have the ability to respond to change effectively in order to minimize the impact to the project. Because changes are common to projects, it is critical to understand that managers confront, embrace, adapt, and use changes to impact positively the situations they face and to recognize changes as growth (Huntoon 1998).

Kartam (1996) has suggested that conflict will be minimized when a problem has been studied as early as possible, since the problems can be identified and beneficial changes can be made. Common project planning tools such as risk analysis can be used to reduce the

destructive consequences of change, because they give insights and predictions to identify possible conflicts. Pinto (1995) has suggested that good communication can lead to changes that have a positive effect on the project, as managers can learn valuable lessons from the conflict episode. Before the project is started, one other strategy that can be considered is to think through the project and to use the tools previously described and their output from the study to prevent conflict. Development and implementation of a project change management system *before* the project commences is a good, proactive step toward constructively managing change (Ibbs, et al 2001).

2.6.7 Procedure for claims

A. Management of claims

There is high incidence of disputes arising from construction contract claims. Even with the most expert understanding of construction contract clauses and the most equitable risk-allocation regime, claims will continue to present problems if they are poorly managed in practice (Vidogah and Ndekugri 1997).

B. Claim definition

A claim can be defined as a right given to the party who deserves a request for compensation for damages incurred by the other party (Simon 1979). A construction claim can also be defined as ‘‘a request by a construction contractor for compensation over and above the agreed-upon contract amount for additional work or damages supposedly resulting from events that were not included in the initial contract’’ (Adrian 1993).

However, the existence of a right is very subjective because of the complexity of the construction contract and process. Furthermore, the amount of money involved in a construction project is usually so large that a small discrepancy in the contract interpretation will cause significant impact on the project profit. Thus, Adrian (1993) and Levin (1998) argue that the increased complexity and scale of the building process is one of the major reasons for increasing the number of claims (Ping and Liang 2004).

C. Claims burden on construction projects

Construction projects are becoming more and more complex due to new standards, advanced technologies, and owner-desired additions and changes. While the successful completion of projects has been thought to depend mainly on cooperation between the contractor, consultant, and owner, problems and disputes have always erupted due to conflicting opinions as to the various aspects of design and construction. With the introduction and widespread

application of contemporaneous period analysis (CPM) scheduling, it became easier to point out where the delays are occurring and how delays in one activity affect others, and possibly the project as a whole, thus allowing objective judgments as to whether contractors should be entitled to time extensions.

On the other hand, the increased complexity of construction processes, documents, and conditions of contracts has been contributing to higher possibilities of disputes, conflicting interpretations, and adversarial attitudes. The exhausting and expensive process of litigation has not been making things easier, as unsettled claims that have developed into disputes can take a very long time to be resolved. All the above factors have made ‘‘claims’’ an inevitable burden in implementing today’s construction projects (Abdul-Malak et al 2002).

D. Difficulties with claims

In the construction industry, where contract documents define rights, obligations, and procedures, a claim is a request by the contractor for an extension of time and/or additional cost and can evolve into a disagreement that may not be amicably resolved by the parties concerned. In any construction project, significant additional costs can be experienced by the contractor, the owner, or both, due to the actions of the other party or parties involved. Disputes over the right to compensation as well as over the amount of time and/or money to be given often necessitate a resort to litigation, arbitration, or other forms of dispute resolution methods for settlement (Muller 1990).

Claims and disputes arise from a number of cases, namely defective specifications (Thomas et al. 1994, 1995), differing site conditions (Thomas et al. 1992), (1) increase in scope of work, (2) restricted access to site, (3) owner-caused disruptions or delays, (4) disagreement as to what constitutes a substantial completion, (5) interpretation of site instructions, and (6) enforcement of liquidated damages, among others.

It is important for the owner, when analyzing a claim presented by the contractor, to ask the following questions: Were the contract requirements met (Thomas et al. 1990), Did the contractor refer to the proper clauses in the contract?, Does the owner or consultant bear part of the responsibility?, Was the situation predictable at the time the contract was signed?, Were the specifications defective?, Was the contract misinterpreted? And, if so, which competing interpretation will rule? (Abdul-Malak et al 2002).

E. Procedure for construction claim process

A construction claim arises when one party to the contract has suffered a detriment for which that party should be compensated by the other party. Therefore, a construction claim is an assertion of and a demand for compensation by way of evidence produced and arguments advanced by a party in support of its case. Construction claims originate from a variety of causes both direct and indirect. A number of major disputes can be largely traced to for basic sources: (1) the contract documents due to errors, defects, and omissions; (2) failure to appreciate the real cost of a project in the beginning; (3) changed conditions; (4) stakeholders involved in a project (Kulunanga et al. 2001).

E.1 Construction claim process

Based on a literature review, the researchers developed the construction claim process based on the following variables (Easton 1989 and Kartam 1999):

- Claim identification;
- Claim notification;
- Claim examination;
- Claim documentation;
- Claim presentation;
- Claim negotiation; and
- Use of total quality management tools to prevent claims.

E.2 Construction claim identification

Claims are becoming a way of life. They are natural, and according to Bradley and Langford (1987), inevitable, and indeed indispensable part of modern contract systems. As a result of this realization, courses and publications on various aspects of claims management are now so popular that they are almost an industry in their own right (Vidogah and Ndekugri 1997). Construction claim identification involves "timely" and "accurate" decision of construction claim. This is the first and critically important ingredient of the claim process. For example, some construction claims of excellent merit are lost solely due to failure of identifying them. Thus, an awareness of job factors, which give rise to construction claims, is a skill that generally has to be specially acquired. Such learning not only sensitizes construction managers to potential construction claims, but also exposes company-wide problems contract management (Kulunanga et al 2001).

E.3 Construction claim notification

Construction claim notification involves alerting the other party of a potential problem in a manner that is no adversarial. Time limit requirement are very crucial and critical. For example, a typical contract provision such as "shall be confirmed in writing as soon as practicable and no later than twenty eight days" means exactly that an initial letter of a claim notice to the other party should be short, clear, simple, conciliatory, and cooperative. It should indicate the problem and alert the other party of the potential increase in time or cost. It is very hard to argue with someone who appears polite and sincere, helpful, and cooperative (Kulunanga et al 2001).

E.4 Construction claim examination

Claim examination involves establishing the legal and factual grounds on which the claim is to be based. This should also involve the estimate of the potential recovery. Such issues may have to be investigated by interviewing staff who worked on the project. The primary sources for claim examination could deal with project files, video footage, memos, etc., that must be used to prove the time and cost elements of the claim (Kulunanga et al 2001).

The consequence is very often a breakdown in communication, polarization of views, and the inevitable recourse to arbitration or litigation with their attendant delays and expense. An attempt to redress this situation, two main strands of research and commentary has evolved. The first examines in detail the legal implications of common construction contract clauses, and the second has focused on the allocation of risk under construction contracts, suggesting that the way risk is allocated determines the likely occurrence of claims and disputes on project (Vidogah and Ndekugri 1997).

E.5 Construction claim documentation

Claim documentation is the collection of the hard facts that give the actual history of a construction claim. A well-prepared defendant quickly demolishes evidence and claim costs that are not supported by accurate records. For example, minute inaccuracies can be seized upon to cast doubt on the entire claim. The documented facts are the glue that holds the legal framework together. If these are insufficient the claim will not stick (Kulunanga et al. 2001).

Commentary by Brewer (1993), a director of a leading U.K. construction contract consulting firm, puts the claims-management issue into its proper perspective. In the view of that writer, the essence of good claims management is not to lodge a heavy document at the end of a

project and call it "request for additional expenses" while scrupulously avoiding the term "claim". Instead, it should always be ensured that the claimant's fullest entitlements are identified on a regular basis, with adequate detail to ensure that appropriate sums are paid through interim payment mechanisms. This approach to claims-management practice is the exception and not the rule. The implication is that there has to be an adequate management setup to deal with claims, irrespective of the contract terms or the balance of risk allocation in order to avoid disputes (Vidogah and Ndekugri 1997).

E.6 Construction claim presentation

A claim presentation should be logically built up, well organized, and factually convincing. Thus, a claim should be written in a format that emphasizes the fact that a contract requirement was breached. A contractor must then demonstrate the resulting harm was caused by the owner's acts. Atkinson (1985) has fittingly said that presentation is best prepared into two, the entitlement and the quantum. The former section should have the legal and factual basis while the latter should provide the estimated recovery of the claim (Kulunanga et al. 2001).

The premise is if the contractor has the proper management setup to justify, quantify, and present claims for events under the control of the owner or his agents then chances of protracted disputes are reduced. Virtually all the standard forms of contract recognize the contractor to monetary compensation and time extension.

The term "claim" in the proper context therefore needs not carry any pejorative overtones. What should be discouraged is the attitude to claims management described by Zack (1993) where it becomes the art or practice of making and winning claims by questionable expedients without actually violating the rules or, even worse, an attempt to turn a marginally profitable project into a more profitable one. The realty is that events the owner or his agents are responsible for will always cause construction delays and extra costs. The challenge under these circumstances is to find efficient ways of preparing, evaluating, and settling claims. This should begin with an investigation of aspects of the claims-management process that hinder their preparation and evaluation in an expeditious manner (Vidogah and Ndekugri 1997).

E.7 Construction claim negotiation

According to Easton (1989) a structured and proper negotiation preparation includes (1) ascertaining that all information is current and complete; (2) minimizing the scope of

negotiation beforehand so that insignificant points should not precipitate a violent argument and disrupt progress; (3) knowing one's weakness and trying to utilize weak points by conceding them in return from the other party; (4) foreseeing problems; (5) anticipating the opposition's next move. To benefit from this stage, a construction contractor needs experts that have skills for negotiation. There is a saying that "it is more important to be prepared than it is to be right". For example, in construction disputes, "right" is often difficult to determine and it is preparation for negotiation that really counts (Kulunanga et al 2001).

A major contributory factor to poor claims management is that many of the popular standard forms of contract fail to specify adequately scheduling requirements. This is complicated further by an apparent culture of parties contracting with information up their sleeves (Vidogah and Ndekugri 1997).

E.8 Use total quality management tools to prevent construction claims

The factors that lead to loss of time, cost increases, and other determinants of underperformance can be linked to specific management weakness. Such factors are often associated with lack of application of total quality management tools. By implication of the natural use of total quality management tools at every stage of a construction project should result in substantial time and cost reduction of a construction project. For example, the European Construction Institute (European 1996) and the Construction Round Table have noted that "improvement teams" within construction organization on project reviews, project knowledge capture, construction process, project planning, project communication, benchmarking, reengineering, relationship with internal and external stakeholders, project quality control and circles; and project measurement and feedback positively contribute to project performance (Kulunanga et al. 2001).

F. Delay claims

Finishing a project on schedule is a difficult task to accomplish in the uncertain, complex, multiparty, and dynamic environment of construction. Thus, it has been common for a construction project to encounter delays (Alkass et al. 1995) states that ‘‘delays on a construction site are normally inevitable and, as a result, many claims arise with few of them ending up in litigation. There are several reasons that can contribute to delaying a project. Analyzing the various causes that contribute to the delay encountered in a construction project is an important task to resolving this delay problem. Determining, in a scientific manner, the impact, timing, and contributing effect of each cause to the overall delay should assist the

parties to clearly identify the responsibility of each. This scientific identification of each party's responsibility to the delay should be a good foundation to a successful negotiation effort. It should result in the parties being able to settle this delay (Kartam 1999). If the parties were not able to settle through negotiations, then the claim case will go to court, where the delay claim will be analyzed, and that analysis will be crucial for either party to prove its case.

F.1 Project delays' classification

Project delays classification (PDC) can be classified according to their origin and timing as well as their compensability as shown in Fig. (1), the following will describe the various types of delays included in each of those categories:

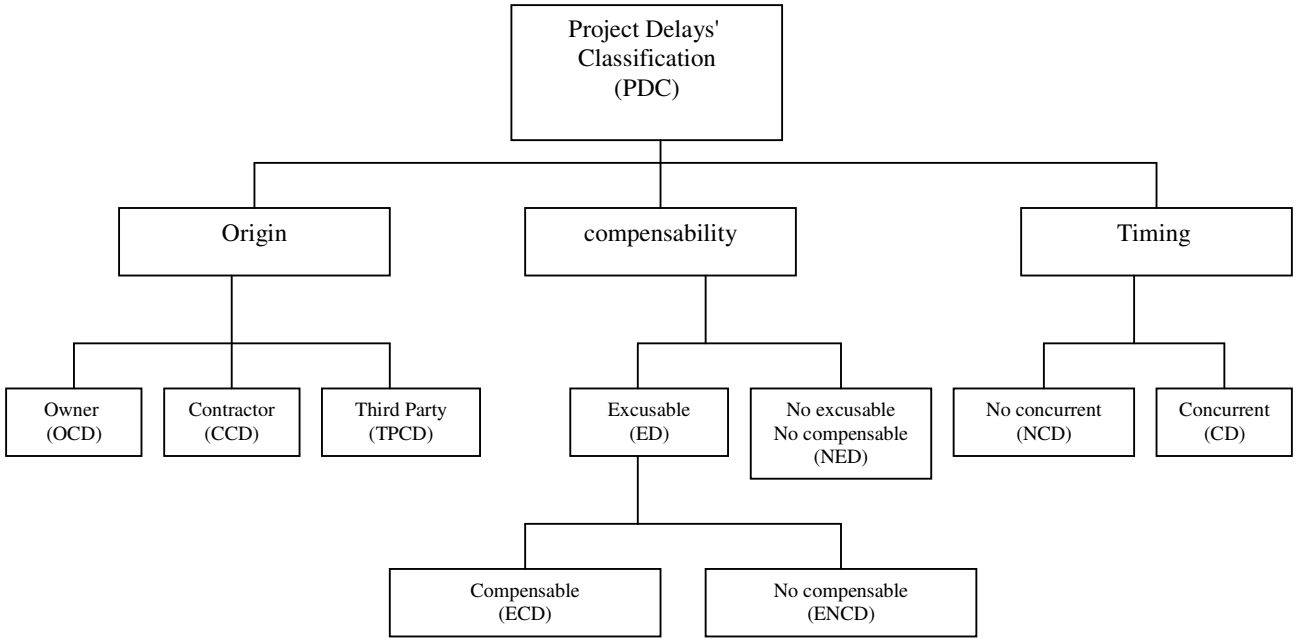


Figure 1 Project Delay Classification

(Kartam 1999)

F.1.1 Delays classified by their origin

Project delays can be generated by various causes. Some of those causes are the owner's responsibility, which results in owner caused delays (OCD); some are the contractor's responsibility, which results in contractor caused delays (CCD), and some are neither party's sole responsibility, which results in the third party caused delays (TPCD) (Kartam 1999).

F.1.2 Delays classified by their timing

The timing of a delay is crucial to determining whether the delay is compensable or not. Delays can either occur concurrently or no concurrently. Concurrent delays (CD) are those

delays that occur when more than one delay that is caused by different parties coincide. For example, CD occurs when OCD and CCD coincide in time. On the other hand, nonconcurring delays (NCD) are those delays that occur alone at the time in which the delay took place.

F.1.3 Delays classified by their compensability

Excusable delays

Excusable delays (Ed) are those delays in which the contractor is excused from their sole responsibility. Thus, the owner grants a time extension equal to the magnitude of the delay impact for the contractor to perform the work. These delays can be categorized into two types in terms of their compensability:

1 Excusable compensable delays (ECD): ECD are those delays in which the contractor is excused from the responsibility of the delay and is compensated for its impact.

OCD represents this category of ECD.

2 Excusable no compensable delays (ENCD): ENCD are those delays in which the contractor is excused in terms of the time impact, but is not compensated for the cost of the delay impact. This category includes CD and TPCD (Kartam 1999).

No excusable delays (NED)

No excusable delays (NED) are those delays in which the contractor is not excused and is thus not compensated. This category includes CCD, in which the contractor is the sole responsible party for the delay.

F.2 Delays' impact classification

The impact of delays can be classified into two categories. One is direct impact while the other is indirect or ripples impact. The direct impact of a delay is the exact number of time units that the delay issue affected the project operations directly. The indirect impact of a delay is a consequential ripple effect that is claimed to be an indirect result of the delay issue. Unlike the direct impact of a delay, the ripple effect of a delay is usually difficult to quantify (Kartam 1999).

2.6.8 Certificates and payment

The construction industry is unique in regard to payments. While most payments for purchases in other industries are made at the time of delivery, in the construction industry periodic payments are typical. These payments are generally made on a monthly basis. In practice, the application for payment is usually submitted at the end of the month or by the

tenth of the month after the month when work was performed. This application is reviewed by the owner's representative to determine whether the payment request bears a fair resemblance to the work actually performed (Hinze 2001).

A portion (usually 10%) of each progress payment is retained or kept by the owner until the contractor has met all contractual obligations. An owner releases the final progress payment and retainage to the contractor only when three conditions are met: (1) the owner's certificate of completion and acceptance has been issued and the entire work is complete and accepted by the site manager, (2) the contractor has issued a general release and waiver of lien for claims against the owner, and (3) no unsettled owner claims exist against the contractor. None of these three conditions can be met until the entire contract is complete, thus providing an incentive for contractors to complete the work as scheduled (Charles, 1999).

2.6.9 Special Risks

2.6.9.1 Risk allocation between contracting parties

Ineffective risk appointment or the misunderstanding of risk appointment between contracting parties generally leads to a dispute after the occurrence of a risk event. Contract disputes usually increase project costs and lead to an adversarial contract relationship (Hartman and Snelgrove 1996). Construction activities are uncertain and dynamic, and associated risks are often permanent and complex in construction projects. In order to prevent unexpected risks and thus disputes during construction, international contractors should pay close attention to local project characteristics and contract practices (Charoenngam and Yeh 1998).

2.6.9.1 Importance of understanding risk allocation

One measure of a contract's efficiency and effectiveness is its ability to clearly assign risks between contracting parties. Clear risk assignment means that both contracting parties have the same understanding of risk appointment and risk management accountability. Contracting parties who do not have an identical understanding of risk accountability may mismanage a risk event by assuming the event or its consequences are not their responsibility. Mismanaged events cause project inefficiencies and make contract relationships adversarial. The resulting impacts on project execution ultimately increase project costs (Hartman 1993).

2.6.9.2 Risks in construction projects

Many researchers have tried to tackle the problems of risk allocation in construction projects. Tao suggested that risks should be allocated to the party best able to control them and if they

are beyond both parties' control, they should be assigned to the owner (Tao 1994). In traditional construction contract practice, the owner as a government agency tries to allocate almost all risks to contractors who then transfer some risks to subcontractors or suppliers. For example, engineers design physical elements of construction projects normally with functional and cost objectives. Even if they know about potential construction problems, they are careful not to express any opinions on these matters in the contract documents in order to avoid liability. As a result, the subject of appropriate or fair construction risk allocation is rarely mentioned before the contract conditions are written (Charoenngam and Yeh 1999).

Casey categorized construction risks into six groups: (1) physical; (2) capability; (3) economic; (4) political and societal; (5) construction related; and (6) contractual and legal (Casey 1979). Each individual category of risk may be attached to particular types of construction activities to be executed by a specified party. Risks are naturally allocated based on the types of work to be performed and the party responsible for that work.

2.6.9.3 Risk allocation through disclaimer clauses

In general, any construction project involves risk and there is no possibility to eliminate all the risks associated with a specific project, all that can be done is to regulate the risk allocated to different parties and then to properly manage the risk. This can be done through the language of the construction contract. The decisions regarding risk sharing or risk shifting are made within the context of an owner's contracting policy (Kozek and Hebberd 1998). One of the objectives of the contract is to serve as a framework between the parties to establish which one has assumed which risk (Zaghloul and Hartman 2003).

One way in which the contracting parties attempt to address the right and responsibilities for risk is through dealing directly with the issue of legal liability by including provisions that exclude liability arising from certain causes. Disclaimer (exculpatory) clauses are examples of such provisions. Such clauses attempt to transfer one party's risk (which may be a legal liability) to another by contractual terms (Hartman 2000). In other words, these clauses are intended to exclude an owner's liability in contract and often in tort for cost incurred by a contractor (Goldsmith and Heintzman 1995).

Using disclaimer clauses to allocate risk has been identified by recent studies and industry–practice as a main reason to increase the overall cost of a project. When a risk is shifted to the contractor and the contractor has no means by which to control the occurrence or outcome of

the risk, the contractor must either insure against it or add a contingency to the bid price (Jergeas and Hartman 1994). One recent study which is (Zaghloul and Hartman 2003) indicates that using disclaimer clauses in Canadian contracts carries a premium of between 8 and 20%, depending on whether business conditions were favorable (low need for work, low technical complexity, fair contract administration, negotiated and suitable contract type, and complete design work) or adverse (high need for work, high technical complexity, unfair contract administration, un negotiated and un suitable contract type, and un complete design work) (Khan 1998). Contractors add these risk premiums to each disclaimer clause in their contract with the owner based on some main criteria.

The most important of these criteria are their business relationship with the owner, work conditions, and contract type and fairness. On multimillion-dollar projects, such an increase to the project cost can obviously be very significant. An additional but less visible, cost of shifting risk to the contractor through disclaimer clauses presents a number of hidden costs including restricted bid competition, increased potential for claims and disputes and above all, more adversely owner–contractor relationships. *Figure* 2 illustrates the general outcomes for using exculpatory clauses in contracts.

There is a significant amount of literature that discusses possible options for improved contracting methods and better risk allocation processes. These studies present new ways for doing business such as partnering/ alliances, risk sharing/reward systems, incentive-based contracts and others. However, these new contracting strategies between owners and contractors are still founded largely on the self-interest of each participant. Motivation for performance under these strategies has focused largely on retribution for non-performance.

In most cases, the relationships of the contracting parties are still defensive and, in some cases, adversarial. The atmosphere spawned by these relationships has not been conducive to innovation or cooperation between parties. With all of these solutions, owners are generally unwilling to carry project risks and where possible, transfer them contractually to contractors through disclaimer clauses in order to have a control system over these risks in what we call contract documents (Zaghloul and Hartman 2003).

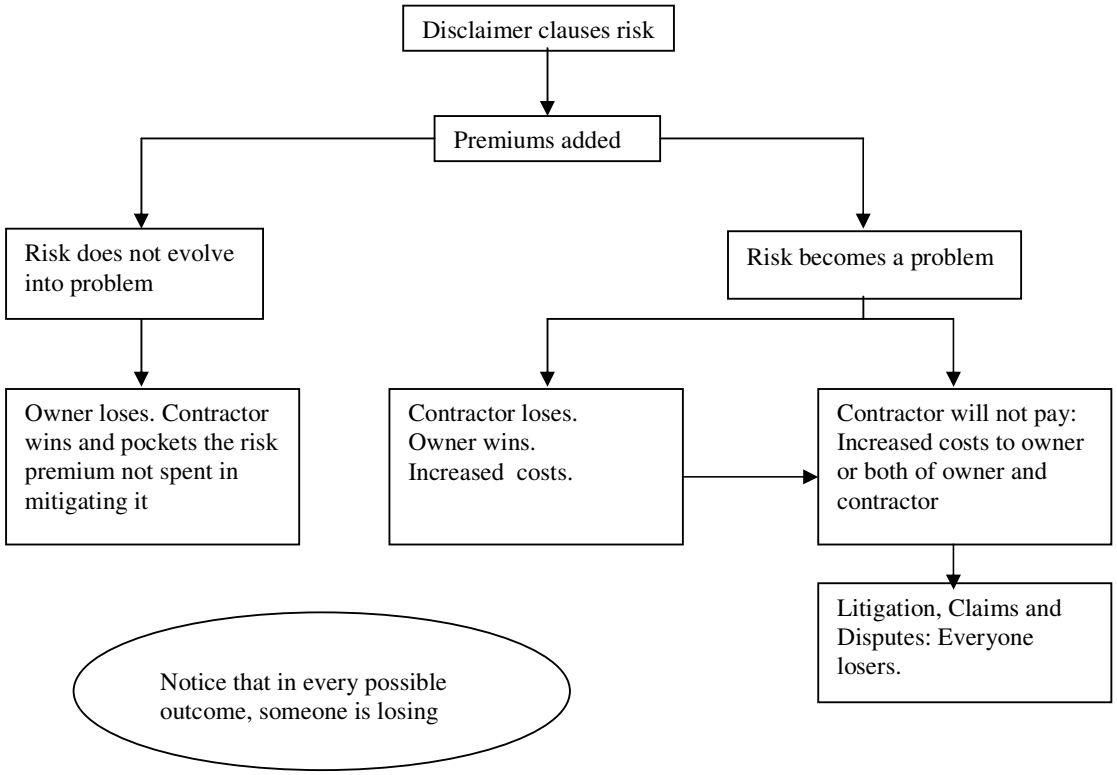


Figure 2. General outcomes of risk allocation through disclaimer clauses

Cited from: (Zaghloul and Hartman 2003).

2.6.9.4 Critical risks of construction projects

These risks are categorized into two groups, risks 1 to 5 is grouped under political and force majeure risks and risks 6 to 9 are under foreign exchange and revenue risks (Wang, et al 1999), as follows:

1. Change in law;
2. Corruption;
3. Delay in approval;
4. Expropriation;
5. Force majeure;
6. Exchange rate and convertibility;
7. Financial closing;
8. Dispatch and transmission constraint;
9. Tariff adjustment.

A. Change in law risk

Change in law risk includes changes in government policies with respect to laws and regulations, methods to address inflation, currency conversion, rates and methods of taxation, or the method by which electricity tariffs are set and approved. It includes (1) the adoption, promulgation, modification, or reinterpretation by any government authority of any laws of the host country; or (2) the imposition by a government authority of any material condition in connection with the issuance, renewal, or modification of any approval that in either case establishes requirements for the construction, operation, or maintenance of the project that render the performance by the project developer according to its terms illegal (Wang et al 1999).

B. Corruption risk

Corruption is based on using political, legal, or regulatory leverage to extract additional costs for which no one will ever admit and the project developer can never recoup. It means that the government's officials or representatives solicit or receive an unlawful consideration or commission or exert or utilize any unlawful influence in connection with awarding and agreement to the project developer. Corruption is regarded by many companies as an unavoidable fact of life on projects in developing countries including China. This presents risks of spending either too much money on corrupt officials, or spending money in the wrong places, or at the wrong times, all at the risk of having a government agency turn against the project developer and the project (Macdonald 1997).

C. Delay in approval risk

Delay in approval risk means that the central or local government authority does not approve the project-related issues in time or even cancels the ones already approved. Obtaining approvals for a project from a complex web of government agencies and departments, from municipal to provincial to central government levels, can be an extremely time-consuming process, delaying entire projects and hurting their financial viability (Wang et al 1999).

D. Expropriation risk

Expropriation risk means that the government expropriates the project without giving reasonable compensation to the project developer and investor. The expropriation can take the form of nationalization of a facility wholesale (rare) or ‘‘creeping’’ expropriation whereby the government changes regulations, taxes, or tariffs after a project is complete to gradually take over the facility and its operating profits (common) (Wang et al 1999).

E. Force majeure risk

Force majeure is French term which, loosely translated, and means "major intervening force." In most contractual settings it is used to describe situations where one party is unable to perform its obligations to the other due to external factors which inhibit or eliminate its ability to perform and for which the non-performing party is not responsible. A common force majeure event is an "act of God," which is commonly thought to be a natural disaster of such magnitude that a parties' performance is rendered physically impossible (Bremen 2004). Force Majeure Risk describes the circumstances beyond a project developer's or government's control such as natural disasters, war, hostilities, embargo, import, or export restrictions (Wang et al 1999).

In modern contracting, parties have made considerable use of the force majeure provision to provide for situations where a party is able to suspend their obligations of performance under an agreement without penalty from the other until such time as the force majeure event has abated. A common example is industry-wide industrial action. Ordinarily, when the force majeure event persists, either party may then have the right to terminate the contract as performance is rendered impossible/impractical (Bremen 2004).

When approaching the drafting of a force majeure clause owners should give careful consideration as to the way in which the clause will be defined. Loose definitions, such as "acts of God"' leave open ample scope for contracting parties to claim that they are unable to perform due to such an event and, particularly where various inter-related agreements are governed by different legal systems, the legal definition of what constitutes an act of God may vary widely and the unwary owner may fall between the gaps in definitions (Bremen 2004).

In general, owners are best served by identifying the potential risks for a project and crafting a relatively proscriptive force majeure clause which carefully identifies those events which will constitute force majeure events. Under most contract mining agreements, for example, it is not the owner who will wish to avail itself of the protection of the force majeure clause, but the contractor. Under sales agreements, it will be the owner who will wish the protection of the clause. There are three potential ways of marrying up the off take/sales agreements with the mining contract(s) in this regard:

- Negotiate a wide force majeure clause under the off take/sales agreement, but a narrower one under the contract mining agreement;
- draft purely "back to back" clauses; or

• make the force majeure event under the contract mining agreement constitute such an event under the off take/sales agreement. Of the three options above, lucky owners will achieve the first. Where the owner's force majeure rights under the off take/sales agreements are wider than those under the underlying contract mining agreement, the owner may have the luxury of being in a position where it is entitled to suspend supply and its contract miner is not (in such situations it may be that, despite not having a power to suspend the contract miner is unable to perform to the required contractual standard in any event).

Owners should beware of clauses which at first appear broader where different legal systems govern the agreements and ought to check the meaning of each definition under the relevant jurisdictions should such a situation present itself. If however this is the case, then the owner ought not need to negotiate the force majeure clause in the off take/sales agreement as its position is already protected (Bremen 2004).

As mentioned above, force majeure events are the circumstances beyond the project developer's or government's control such as natural disasters or accidents (e.g., fires, flood, storms, or earthquakes), war, hostilities, embargo, import, or export restrictions. However, the project developer shall not consider the following circumstances to be an event of force majeure: (1) delay in performance by the construction contractor, the operation and maintenance contractor or any subcontractor to either of them; (2) any delay in the delivery of, or any latent or patent defects in, any materials, equipment machinery or parts for the power plant; or (3) breakdown or ordinary wear and tear of materials, equipment, machinery.

In addition, the government shall not consider any of the following circumstances to be an event of force majeure: (1) the expropriation, requisition, confiscation, or nationalization of the project by government authority; (2) the imposition of any blockade, embargo, import restrictions, rationing, or allocation by government authority; (3) the cancellation of any approval not caused by a breach of the contract agreement or of any project contracts by project developer; and (4) change in law. As described above, Circumstance 1 is already defined as expropriation risk; Circumstances 2 and 4 as change in law risk, and Circumstance 3 as delay in approval risk (Wang et al 1999).

2.6.10 Release from performance

While consistency in meaning of "force majeure event" within the project documents is an important first step for owners, ensuring consistency in terms of the consequences of such events, three key issues to be managed in this respect that are:

• Period of suspension;

• Termination rights; and

• Payment rights.

2.6.10.1 Period of suspension

Owners must ensure that the contractor's suspension rights are consistent with their rights under the off take/ supply arrangements, in particular to ensure that they are not obligated to continue supply after the contractor's obligations have ceased (in addition to this owners are best advised to endeavor to keep production ahead of their supply obligations so that stockpiles may be utilized to meet any gap in this respect). It is important to ensure that both the right to suspend and the obligations cast on the party suspending to work to overcome the force majeure event are (at least) consistent and it is preferable that the contractor's obligations to restore supply are broader than the owner's under the off take/sales agreements (Bremen 2004).

2.6.10.2 Termination rights

A second key issue here is the period of time for which the force majeure event can continue before the right of termination crystallizes. An owner does not want to be in a position where its contractor terminates but it is obligated to keep its off take/sales obligations on foot {admittedly suspended but with the possibility that the force majeure event may abate without the owner being in a position to perform). Ideally, the agreements will be consistent in this respect, with the termination rights arising under all key agreements at the same time. In the event that the owner cannot persuade the off taker or contract miner to accept the same time periods, another option is to agree to separate time periods but, in addition to those time periods, provide that a termination for force majeure by the counterparty to a nominated co-dependent agreement entitles either party to terminate for force majeure (Bremen 2004).

2.6.10.3 Payment rights

Finally, owners should consider payment rights under the project documents for force majeure events and ensure that any payments due to the owner are paid to it prior to it being obliged to make payments to the demobilizing contractor (Bremen 2004).

2.6.11 Settlement of disputes

2.6.11.1 Engineer's decision

If a dispute of any kind whatsoever arises between the employer and the contractor in connection with, or arising out of, the contract or the execution of the works, whether during the execution of the works or after their completion and whether before or after repudiation or other termination of the contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the engineer, the matter in dispute shall, in the first place, be referred in writing to the engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this clause. No later than the eighty-fourth day after the day on which he received such reference the engineer shall give notice of his decision to the employer and the contractor. Such decision shall state that it is made pursuant to this clause.

If the engineer has given notice of his decision as to a matter in dispute to the employer and the contractor and no notice of intention to commence arbitration as to such dispute has been given by either the employer or the contractor on or before the seventieth day after the day on which the parties received notice as to such decision from the engineer, the said decision shall become final and binding upon the employer and the contractor (sub-clause 67.1 of FIDIC 1987).

2.6.11.2 Amicable settlement

Where notice of intention to commence arbitration as to a dispute has been given in accordance with the engineer's decision sub-clause 67.1 (the previous section), the parties shall attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless the parties otherwise agree, arbitration may be recommended on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made (sub-clause 67.2 of FIDIC 1987).

2.6.11.3 Arbitration

Any dispute in respect of which:

(a) The decision, if any, of the engineer has not become final and binding pursuant to sub-clause 67.1, and

(b) Amicable settlement has not been reached within the period stated in sub-clause 67.2,

shall be finally settled, unless otherwise specified in the contract, under the rules of conciliation and arbitration of the international chamber of commerce by one or more

arbitrators appointed under such rules. The said arbitrator/s shall have full power to open up, review and revise any decision, opinion, instruction, certificate or valuation of the engineer related to the dispute. Arbitration may be commenced prior to or after completion of the works, provided that the obligations of the employer, the engineer, and the contractor shall not be altered by reason of the arbitration being conducted during the progress of the works (sub-clause 67.3 of FIDIC 1987).

2.6.11.4 Failure to comply with engineer's decision

Where neither the employer nor the contractor has given notice of intention to commence arbitration of a dispute within the period stated in sub-clause 67.1 and the related decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration in accordance with sub-clause 67.3. The provisions of sub-clauses 67.1 and 67.2 shall not apply to any such reference.

2.7 Contract General Conditions used in the Palestinian territories (PT)

Before the year 1994, the used general conditions were very concise and consist of a technical, financial and administrative condition. There were three types of general conditions in Gaza strip:

(a) General conditions that were used in the municipalities, in Arabic. These conditions were originally quoted from Israeli contracting systems.
(b) General conditions that were used in the public works department which were originally quoted from Israeli contracting systems (technical, legal and financial items) and;
(c) General conditions that were used in the UNRWA in English.

After the year 1994, there were many large scale projects which had been funded by Arab and international donors. Other types of general conditions had been introduced by international donors' conditions. This variety of general conditions creates a challenge and source of problems that face the local construction industry since, these types of general conditions of contract, do not frequently suit the special local circumstances of the Palestinian Territories (PT).

These problems are such as:

- Because of different sources of these conditions, many of the contractors were improperly pricing and tendering. This produces problems between the supervision and contractor during execution that lead to loss and delay in the project.

- Donors usually impose their own contract for a certain project, which frequently lead to increase in cost estimates, and misinterpretation of the contract clauses during execution.

In the Palestinian Territories still, there are many general conditions (GC) of construction contract used by the different institutions. Table 2.1 summarizes some of the various general conditions of construction contract used in the Palestinian Territories which are:

2.7.1 Contract General Conditions used by the Palestinian Central Tendering Department

General conditions of contract that are used by the Palestinian Central Tendering Department (PCTD) were a collection of clauses that are mainly quoted from FIDIC 87 contract general conditions, since FIDIC is an international and comprehensive contract. These conditions consisted of 41 clauses that deal with technical, legal and financial issues. However, there were no clauses that deal with important issues such as: engineer, claims, force majeure, payments delay, dispute settlements, safety, subcontracting, special risks, contract abandonment, breach of contract, and termination of contract (Palestinian Central Tendering Department).

After the Palestinian government had adopted FIDIC 99 (the general and special conditions) formally on 27-2-2007 to be the unified official construction contract in Palestine, all the Palestinian ministries, municipalities, authorities and the Palestinian Central Tendering Department (PCTD) would use formally the FIDIC 99 contract general conditions.

2.7.2 Contract General conditions used by the United Nations Relief and Works Agency

General conditions of contract that are used by United Nations Relief and Works Agency (UNRWA) consist of 23 articles based mainly on (FIDIC items), that cover wide range of important issues: (1) documents and supervision, (2) security deposit, (3) commencement and completion of work, (4) provisional and final acceptance of works, (5) damages for delay, abandonment and cessation of work by contractor, (6) abandonment of work by the agency, (7) variation, (8) provision of tools and materials, (9) rejection of materials and works, (10) conditions of employment of labor, (11) measurements, (12) payments, (13) subcontracting, (14) adherence by contractor to laws and regulations, (15) insurance to be maintained by contractor, (16) removal of rubbish, (17) gifts and commissions, (18) agency's right to terminate contract, (19) notices, (20) war and special risks, (21) disputes – arbitration, (22) officials not to be benefit, and (23) contractor's representation and warranty.

2.7.3 Contract General Conditions used by the United Nations for Development Program

General conditions of contract that are used by the United Nations Development Program (UNDP) consist of 72 clauses (with new numbering order) that cover most of the FIDIC contract clauses, including the force majeure clause. The claim issue is included in the clause of settlement of disputes (UNDP office). These General conditions of contract that are also used by the German projects in Gaza strip that financed by the German government through the (KFW) and supervised by the (UNDP).

2.7.4 Contract General Conditions used by the Palestinian Economic Council for Reconstruction and Development

The General conditions of contract that are used by the Palestinian Economic Council for Reconstruction and Development (PECDAR) consist of 25 groups (same as in FIDIC 87) in addition to another article (other provisions) that totally include 80 clauses, basically quoted from the FIDIC 1987 general conditions, in addition to some other clauses quoted from: the world bank general conditions and unified Jordanian contract for construction projects.

2.7.5 Contract General Conditions used by the United States Agency for International Development

The General conditions of contract that are used by the United States Agency for International development (USAID) consist of 72 clauses that cover most of the FIDIC contract articles. In addition to the 72 general conditions clauses, there are 36 additional (supplemented) clauses that cover and clarify the tendering procedure, bonds and retentions, payments procedure, insurances, liquidated damages, handing over and maintenance period.

2.7.6 Contract General Conditions used by the World Bank

The General Conditions of Contract that are used by the World Bank contract consist of 63 clauses that cover most of the FIDIC contract clauses. These general conditions are divided into 5 groups: (A) General, (B) Time control, (C) Quality control, (D) Cost control, and (E) Finishing the contract.

2.7.7 Contract General Conditions used by the European Union

The General Conditions of Contract of the European Union (EU) consist of 69 clauses cover most of FIDIC contract general conditions. The previous (EU) general conditions of contract include the force majeure and the ethics clauses that are clarified in more details.

2.7.8 Contract General Conditions used by the Danish Project "Support to Municipal Development and Management" in the Gaza Middle Area (SMDM)

The General conditions of contract that are used by the Danish project (SMDM) consist of 68 clauses that cover most of the FIDIC contract clauses. In addition to the 68 general conditions clauses, there are 38 additional (supplemented) clauses that cover and clarify the tendering procedure, bonds and retentions, payments procedure, insurances, liquidated damages, handing over and maintenance period. That contract general conditions were used in municipalities of Gaza strip and the ministry of local government as well before adoption of the unified Palestinian contract

Table 2.1: Comparison between general conditions used in the Palestinian Territories with general conditions of FIDIC 87

Contract general conditions	**Number of articles (clauses)**	**Notes**
FIDIC 87 reprinted in 1992	25 (72)	Consist of 25 articles or groups that include (72) clauses.
(Unified Palestinian contract) FIDIC 99	20 (161)	Consist of 20 chapters (161 clauses) with new arrangement that improve and add new clauses to the previous editions
UNRWA Contract	23	Consist of 23 articles that cover wide range of (FIDIC clauses) in another arrangement.
UNDP Contract	(72)	Consist of 72 clauses (same as FIDIC) in another arrangement without groupings (articles)
PECDAR Contract	26 (80)	Consist of 25 articles (same as FIDIC 87) in addition to another article together include (80 clauses).
USAID Contract	(72) in addition to (36)	Consist of (72 clauses) that cover most of (FIDIC clauses) in another arrangement, in addition to (36 supplemented) clauses).
World Bank Contract	(63)	Consist of (63 clauses) in 5 groups that include most of (FIDIC clauses) in another arrangement.
European Contract	(69)	Consist of (69 clauses) that cover most of (FIDIC clauses) in another arrangement.

Danish Project Contract (SMDM)	(68) in addition to (38)	Consist of (68 clauses) that cover most of (FIDIC clauses) in another arrangement, in addition to (38 supplemented) clauses).

2.8 New Developments in FIDIC 1999 construction contract

In this section, the researcher briefs an introduction of FIDIC 99 general conditions, which consist of 20 chapters with new and different arrangement compared with FIDIC 87 general conditions which consist of 25 articles (72 clauses). FIDIC 99 is a paraphrasing of the pervious edition with new additions such as employer's claims, Disputes Adjudication Board (DAB), and force majeure. The following subsections clarify the new additions or (developments) in respect previous FIDIC 87 briefly.

2.8.1 Chapter 1 - General provisions

Definitions are broadened with new concepts such as: Tables, Appendix to Tender, Dispute Adjudication Board (DAB), Base date, Tests on Completion, Goods, Contractors Documents, Employer's Equipment.

2.8.2 Chapter 2 - The Employer

This chapter determines the employer's duties in handing over the site and its consequences to the contractor. The employer is committed (with confirmation and evidence) to provide the contractor with the financial arrangements that guarantee easiness in payments. The employer's claims are added in a new clause that deals with the extension of the defects notification period due to the contractor's failure to remedy defects.

2.8.3 Chapter 3 - The Engineer

The "engineer decisions" expression has disappeared from contract conditions and replaced by: "agreements, acceptance, instructions, notices, auditing, cost estimate, payments certificates, and estimations" and thus, the engineer only determines but not decides. In addition, "the engineer's representative" has been replaced by "the engineer's assistant" and may be a resident engineer or inspector. Another development is: the engineer has the authority in issuing instructions to the contractor if necessary for works execution, but if these instructions form a change order, then rules of variation order will rule.

2.8.4 Chapter 4 – The Contractor

This article stipulates the contractor before start any tests on completion to introduce "as built drawings" and evidence of maintenance and operation. Submitting these documents is a condition for primary handover. This chapter contains also, performance security, cooperation, quality assurance, unforeseeable physical conditions, employer's equipment and free-materials, progress report and fossils.

2.8.5 Chapter 5 – Nominated Subcontractors

The nominated subcontractor is the so-described with this description in the contract or the subcontractor that will be employed by the contractor as subcontractor according to the engineer's instructions for implementing variation orders or works of provisional sums.

2.8.6 Chapter 6 – Staff and Labor

In this chapter, the contractor shall nor recruit, or attempt to recruit, staff and labor from amongst the employer's personnel. According to this chapter, it is not allowed for any of contractor's staff to use or stay at any part of permanent works place.

2.8.7 Chapter 7 – Plant, Materials and Workmanship

Clauses of this chapter states the conditions of procedure of tests as in contract including "tests on completion", but these conditions do not work for "tests after completion".

According to this article, the employer becomes the owner of plant and materials introduced by contractor at the earlier of: date of its site arrival, or; when contractor is entitled to receive prices of these plant and materials.

2.8.8 Chapter 8 – Commencement, Delays, and Suspension

In this chapter, it seems that it is important to determine a commencement day either in the special conditions or in the contract agreement, since the commencement statement is still vague as in the previous FIDIC 87. There are details for work program that introduced by contractor where, there is 21 days for revision by engineer for acceptance or rejection of the program. In this chapter, the engineer has the authority to instruct the contractor to suspend progress of part or all of the works with notifying the cause for the suspension.

2.8.9 Chapter 9 - Tests on Completion

In this chapter, there are clauses that treat the failure to pass tests on completion. There is an addition to the FIDIC 87 conditions states that: employer is the decision-maker to accept or

reject any parts of works unless conform to acceptance conditions, where the employer can receive it with discount in its cost as a result of failure.

2.8.10 Chapter 10 - Employer's Taking Over

This chapter devotes the engineer's authority alone to judge the readiness of works for taking over, receiving it, listing any deficiencies and issuing a taking over certificate.

2.8.11 Chapter 11 – Defects Liability

Completion of outstanding work and remedying defects is determined, which means the rest of works as mentioned in the primary handing over certificate and remedying defects during the maintenance period. When the engineer issues the "Performance certificate" at final hand over, this is considered acceptance of works according to the contract.

2.8.12 Chapter 12 – Measurement and Evaluation

Clauses of this chapter states that "works to be measured" precisely to each item of works according to bill of quantities or any other applicable tables. In case of omissions of any part of works through variation orders, the engineer then should evaluate the effect of omission in regard of the contractor's loss that supposed to be covered from contract value.

2.8.13 Chapter 13 – Variations and Adjustments

Clauses of this chapter has modified the context of variation orders and obligate the contractor to execute each variation order, unless he claims immediately to the engineer the unavailability of required goods for execution the works. The contractor must prove his claim. This shows minimizing variation orders after works handing over. Value engineering clause permits to contractor at any time to offer in writing to the engineer that opting some alternative may accelerate works progress, reduce cost, improve performance or give another benefit to employer. Upon such an offer, the engineer will study it and issue a variation order with calculating savings of this order for sake of employer.

2.8.14 Chapter 14 – Contract Price and Payments

Clauses of this chapter states that the contractor shall submit an "application for interim payment certificate" to the engineer after the end of payment certificates each month. No amounts will be certified or paid until the employer has received and approved the "performance security". The engineer shall within 28 days after receiving a statement and supporting documents, issue to the contractor an interim payment certificate. The engineer

may in any payment certificate make any correction or modification that should properly be made to any previous payment certificate. A payment certificate shall not be deemed to indicate the engineer's acceptance, approval, consent or satisfaction. In this chapter finally, "Statement at Completion" which is (primary hand over) is distinguished from "Application for Final Payment Certificate" which is (final hand over).

2.8.15 Chapter 15 – Termination by Employer

Employer shall be entitled to terminate the contract through a 14 days "notice" if the contractor: fails submit performance security, abandons the works, without reasonable excuse fails to proceed with works or without a notice if the contractor becomes bankrupt or commits bribery. The employer shall be entitled to terminate the contract at any time for the employer's convenience, by giving notice of such termination to the contractor.

2.8.16 Chapter 16 – Suspension and Termination by Contractor

If the engineer fails to issue interim payment certificates or the employer fails to comply with the employer's financial arrangements, the contractor may, after giving not less than 21 days' notice to the employer, suspend work unless and until the contractor has received the payment certificate. The contractor shall be entitled to terminate the contract if the employer substantially fails to perform his obligations under the contract, or the employer becomes bankrupt.

2.8.17 Chapter 17 – Risks and Responsibility

In the clause of "Limitation of Liability", two rules are added: (1) neither party shall be liable to the other party for loss of use of any works, loss of profit, loss of any contract or for any indirect or consequential loss damage which may be suffered by the other party; (2) the total liability of the contractor to the employer, under or in connection with the contract, shall not exceed the sum stated in the particular conditions or the accepted contract amount.

2.8.18 Chapter 18 - Insurance

This chapter is paraphrased totally in respect to insurance methodology, where the expression of "Insuring party" is accredited. This party may be the employer or the contractor according to the contract documents. Insuring party is the responsible party for affecting and maintaining the specified insurance for any of the "items" of this chapter. In this chapter; there are clauses for: insurance for works and contractor's equipment, insurance against injury to persons and damage to property and insurance for contractor's personnel.

2.8.19 Chapter 19 - Force Majeure

Force majeure is redefined as "any exceptional event or circumstance which is beyond of a party's control, and such party could not reasonably avoid its occurrence. Force majeure cases include: war, military coup, riots, nuclear radiations and natural catastrophes. Clause of "Optional termination, payment and release from performance" shows that if the execution of substantially all the works is prevented for a continuous period of 84 days by reason of force majeure, or for multiple periods which total more than 140 days due to the same notified force majeure, then either party may give to the other party a notice of termination of the contract with all resulted consequences.

2.8.20 Chapter 20 – Claims, Disputes and Arbitration

Clause of "Appointment of the Dispute Adjudication Board (DAB)" is created and added to this chapter to adjudicate disputes. Contract parties should nominate this board members within the date determined in the appendix to tender.

2.9 Conclusion

It is clear that having a standard form of construction contract is very important for upgrade and progress of construction industry everywhere, regardless of the location of the site. In the case of standard form, generally the intention at least is to establish a fair balance between the rights and obligations of the employer and the contractor. For example, as far as the FIDIC contracts are concerned they have traditionally been based on the principle of balanced risk sharing and, as such, have been widely accepted on the employer's and the contractor's side as a reasonable compromise (Osinski 2002).

According to the pilot study conducted by the researcher among the most experienced owners, contractors, and consultants, it was found that the majority of them consider that the most important and troublesome groups of the general conditions of FIDIC contract that have impact on project performance are the following : Engineer and Engineer's Representative; Contract Documents; General Obligations; Suspension; Commencements and Delays; Alterations, Additions and Omissions; Procedure for Claims; Certificates and Payment; Special Risks; Release from Performance; and Settlement of Disputes.

The previous literature review has shown that consultants feel more strongly than clients about the impartiality of engineers, but the difference has no statistical significance. Contractors feel that engineers are rarely impartial in administering the contract. All groups feel that engineers' partiality is toward clients. Contractors are against the idea of engineer as

first-line settler of disputes, preferring an adjudicator or adjudication board, whereas consultants are in favor of being the first-line settler of disputes.

Claims are becoming a way of life. They are natural, inevitable, and indeed indispensable part of modern contract systems. As a result of this realization, courses and publications on various aspects of claims management are now so popular that they are almost an industry in their own right. Construction claim identification involves "timely" and "accurate" decision of construction claim. An awareness of job factors, which give rise to construction claims, is a skill that generally has to be specially acquired. Such learning not only sensitizes construction managers to potential construction claims, but also exposes company-wide problems contract management.

Vidogah and Ndekugri (1997) concluded how far there is high incidence of disputes arising from construction contract claims. Even with the most expert understanding of construction contract clauses and the most equitable risk-allocation regime, claims will continue to present problems if they are poorly managed in practice. Therefore, and based on the previous literature review, the researchers developed the construction claim process based on the following variables: Claim identification; Claim notification; Claim examination; Claim documentation; Claim presentation; Claim negotiation; and Use of total quality management tools to prevent claims.

One measure of a contract's efficiency and effectiveness is its ability to clearly assign risks between contracting parties. Clear risk assignment means that both contracting parties have the same understanding of risk appointment and risk management accountability. Contracting parties who do not have an identical understanding of risk accountability may mismanage a risk event by assuming the event or its consequences are not their responsibility. Mismanaged events cause project inefficiencies and make contract relationships adversarial. The resulting impacts on project execution ultimately increase project costs (Hartman 1993).

In the light of this literature review, the researcher has deeply believed that construction contract types and general conditions clauses have a major influence on the likelihood and degree of project success. Therefore, the existence of a unified, standardized and fair contract such as FIDIC contract will contribute in improvement the construction industry and in creating a successful relation between the contract parties.

Since local construction industry and local project performance still face several contractual problems such as, delays, litigation, and additional costs which are the consequences of disputes, the researcher conducted this research to contribute in mitigation this problem. This research is conducted on the most common used contract i.e. (FIDIC 87, 4th edition reprinted in 1992). FIDIC clauses found to have a significant effect on project performance according to a primary study conducted by the researcher, will be analyzed for impacts on six measures of project performance: cost, schedule, quality, safety, and owner and contractor satisfaction.

CHAPTER 3: Research Methodology

This chapter introduces the research strategy, design, population, sample size and the pilot study of the research questionnaire. The questionnaires were processed using the statistical package for social sciences (SPSS). The questionnaire validity and reliability, statistical manipulation and limitations of the research survey are presented.

3.1 Research Study

The first step of the research includes a summary of a comprehensive literature review in order to support the survey methodology. Literature reviews on issues of FIDIC general conditions clauses have been reviewed. The second step of the research focuses on preparation of the questionnaire which is used to collect the required data to achieve the research objectives.

The third step of the research is the pilot study that was performed to determine the most important clauses of FIDIC contract general conditions that impact the construction project performance on a variety of performance criteria: cost, schedule, quality, safety, and owner and contractor satisfaction from the point of view of the most experienced local owners, contractors, and consultants in Gaza Strip by a structured interview, (the interview is attached at annex 1).

The fourth step of the research is data collection. The fifth step of the research is the data analysis. Statistical software program (SPSS) was used to perform the required analysis. Figure 3.1 shows the methodology flowchart that leads to achieve the research objectives.

3.2 Research Strategy

Research strategy can be defined as the way in which the research objectives can be questioned. There are two types of research strategies namely, quantitative research and qualitative research (Naoum 1998). Quantitative approach seeks to gather factual data and to study relationships between facts and how such facts and relationships accord with theories and the findings of any research executed previously (Fellows and Liu 1997). In this research, the quantitative approach was selected to disclose the impact of FIDIC contract general conditions on construction project performance for the following project characteristics: (cost, timetable, quality, safety, and owner and contractor's satisfaction).

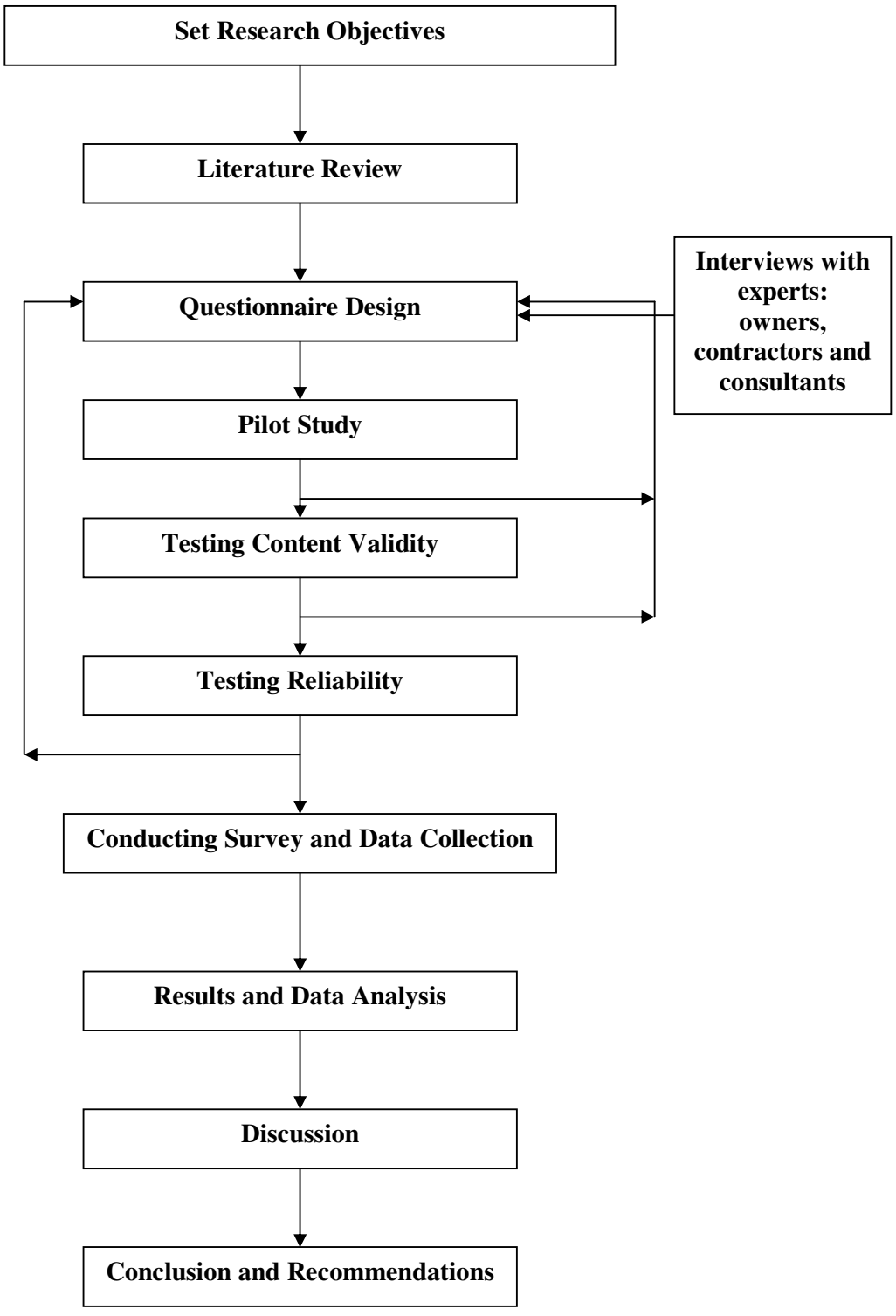


Figure 3.1: Methodology Flow Chart

3.3 Primary Study

In order to focus on the most important clauses of the FIDIC general conditions, a structured interview was used to determine the most important clauses that impact the project performance. A sample of the most-experienced qualified owners, contractors, and consultants in Gaza strip were questioned, where: 4 owners, 4 contractors, and 4 consultants were the targeted experts.

The respondents (owners, contractors, and consultants) were requested to determine the most important clauses of FIDIC contract general conditions that impact the construction project performance. This was done by an interview (annex 3) that was used to determine the most important clauses by the most-experienced qualified owners, contractors, and consultants in Gaza strip. The general conditions of FIDIC contract (Fourth Edition 1987, Reprinted 1992 with further amendments consist of 25 groups or articles as follows:

1. Definitions and Interpretation. (التعاريف و التفسير)
2. Engineer and Engineer's Representative. (المهندس وممثله)
3. Assignment and Subcontracting. (التنازل و التعاقد الفرعي)
4. Contract Documents. (وثائق العقد)
5. General Obligations. (الالتزامات العامة)
6. Labor. (اليد العاملة)
7. Materials, Plant and Workmanship. (المواد و التجهيزات و المصنعية)
8. Suspension. (توقيف العمل)
9. Commencements and Delays. (المباشرة و تاخر انجاز الاعمال)
10. Defects Liability. (الصيانة و اصلاح العيوب)
11. Alterations, Additions and Omissions. (التغييرات و الاضافات و الالغاءات)
12. Procedure for Claims. (اجراءات المطالبات)
13. Contractor's Equipment, Temporary Works and Materials. (معدات المقاول و الاشغال المؤقتة و المواد)
14. Measurement. (كيل الاشغال)
15. Provisional Sums. (المبالغ الاحتياطية)
16. Nominated Subcontractors. (المقاولون الفرعيون المسمون)
17. Certificates and Payment. (الشهادات و الدفعات)
18. Remedies. (وضع اليد على المشروع)
19. Special Risks. (الاخطار الخاصة)
20. Release from Performance. (الاخلاء من مسئولية الاداء)
21. Settlement of Disputes. (تسوية الخلافات)
22. Notices. (الاشعارات)
23. Default of Employer. (الإخلال بالعقد من قبل صاحب العمل)
24. Changes in Cost and Legislation. (تغيير الأسعار و تعديل التشريعات)
25. Currency and Rates of Exchange. (العملة و أسعارها التبديلية)

After consulting the 3 groups of the most-experienced local parties of construction contract; Owners, Contractors, and Consultants, regarding the most important groups or (articles) of the FIDIC contract conditions that affect the construction project performance, it has been discovered that at least 3 experts of each party have selected the following groups as shown in Table 3.1:

Table 3.1: FIDIC groups that mainly impact project performance according to the contract parties

Contractors	Owners	Consultants
Engineer and Engineer's Representative	General Obligations	Engineer and Engineer's Representative
Contract Documents	Suspension	Contract Documents
General Obligations	Commencements and Delays	Materials, Plant and Workmanship
Suspension	Alterations, Additions and Omissions	Suspension
Alterations, Additions and Omissions	Procedure for Claims	Commencements and Delays
Procedure for Claims	Remedies	Alterations, Additions and Omissions
Certificates and Payment	Settlement of Disputes	Procedure for Claims
Special Risks	Changes in Cost and Legislation	Certificates and Payment
Release from Performance	Currency and Rates of Exchange	Special Risks
Settlement of Disputes		Release from Performance
Default of Employer		Settlement of Disputes

According to the previous table, each FIDIC group that at least selected by two parties is considered as a very important group that impacts the project performance as follows:

- Engineer and Engineer's Representative. (المهندس وممثله)
- Contract Documents. (وثائق العقد)
- General Obligations. (الالتزامات العامة)
- Suspension. (توقيف العمل)
- Commencements and Delays. (المباشرة و تأخر إنجاز الأعمال)
- Alterations, Additions and Omissions. (التغييرات و الإضافات و الإلغاءات)

- Procedure for Claims. (إجراءات المطالبات)
- Certificates and Payment. (الشهادات و الدفعات)
- Special Risks. (الأخطار الخاصة)
- Release from Performance. (الإخلاء من مسئولية الأداء)
- Settlement of Disputes. (تسوية الخلافات)

The 3 groups of the most-experienced local parties of construction contract, I.e., Owners, Contractors, and Consultants have chosen the previous eleven FIDIC contracts general conditions groups as the most important articles that impact the construction project performance. The other fourteen groups are considered as having a secondary impact on the project performance. Therefore, the owners, consultants and contractors have chosen the following sub-groups or (clauses), (with their original numbering as numbered in FIDIC general conditions 1987 Reprinted in 1992 with further amendments) as the most important clauses:

Engineer and Engineer's Representative

2.1 Engineer's Duties and Authority.
2.2 Engineer's Representative.
2.3 Engineer's Authority to Delegate.

Contract Documents

5.2 Priority of Contract Documents
6.3 Disruption of Progress.
6.4 Delays and Cost of Delay of Drawings.
6.5 Failure by Contractor to Submit Drawings.

General Obligations

10.4 Claims under Performance Security.
14.2 Program to be submitted.
14.4 Cash Flow Estimate to be submitted.

19.3 Safety, Security, and Protection of the Environment.
19.4 Employer's Responsibilities.
20.5 Employer's Risks.
21.2 Insurance of Works and Contractor's Equipment.
22.4 Indemnity by Employer.
23.4 Cross Liabilities.
24.3 Accident or Injury to Workmen.
24.4 Insurance against Accident to Workmen.

Suspension

40.1 Suspension of Work.
40.2 Engineer's Determination following Suspension.
40.3 Suspension lasting more than 84 Days.

Commencement and Delays

44.1 Extension of Time for Completion.
46.1 Rate of Progress.
47.1 Liquidated Damages for Delay.

Alterations, Additions, and Omissions

51.1 Variations.
52.1 Valuation of Variations.
52.2 Power of Engineer to Fix Rates.

Procedure for Claims

53.1 Notice of Claims.
53.2 Contemporary Records.
53.3 Substantiation of Claims.
53.4 Failure to Comply.
53.5 Payment of Claims

Certificates and Payment

60.2 Monthly Payments.
60.5 Statement at Completion.
60.6 Final Statement.
60.7 Discharge.
60.8 Final Payment Certificate.
60.10 Time for Payment.
61.1 Approval only by Defects Liability Certificate.
62.1 Defects Liability Certificate.

Special Risks

65.1 No Liability for Special Risks.
65.2 Special Risks.
65.3 Damage to Works by Special Risks.
65.5 Increased Costs arising from Special Risks.
65.7 Removal of Contractor's Equipment on Termination.
65.8 Payment if Contract Terminated.

Release from Performance

66.1 Payment in Event of Release from Performance.

Settlement of Disputes

67.1 Engineer's Decision.
67.2 Amicable Settlement.
67.3 Arbitration.
67.4 Failure to Comply with Engineer's Decision.

3.4 Research Population

A population consists of the totality of the observations with which it must be concerned. This research aimed, as studied population, the contract parties: contractors, owners and consultants. The targeted contractors are those of Gaza Strip who classified under the first and second class in the various types of work fields by the Palestinian Contractors Union (PCU).

The targeted owners are represented by the following: ministries, municipalities, United Nations Relief and works Agency (UNRWA), United Nations Development Program (UNDP) and Palestinian Water Authority (PWA). The targeted consultants are corporations for engineering consultations, according to the Palestinian Engineers Syndicate.

According to the National Classification Committee in Gaza Strip (NCC), which consists of: the Palestinian Contractors Union (PCU), the Central Tendering Department (CTD), and the Palestinian Engineers Syndicate, the total number of the first class, (A and B) and second class registered contractors in the year 2006 until 5th of Dec., 2006 was 45 contractors. The studied population targeted the 45 contractors, 11 consultants and 40 owners.

3.5 Sample Size

Wood and Haber (1998) defined the sampling as the process of selecting representative units of a population for the study in a research investigation. The objective of sampling is to provide practical means of enabling the data collection and possessing the components of the research to be carried out whilst ensuring that the sample provides a good representation of the population (Fellows and Liu, 1997).

Forty five contractors of first and second class registered in the PCU in 2006 (updated to 5th Dec. 2006), forty owners, and eleven consultants were targeted to response the questionnaires, as the most-experienced professionals. The population is therefore 96 anticipated participants. Out of the previous population, only 38 contractors or (39.58%) of population, 30 owners or (31.25%) of population, and 11 consultants or (11.46%) of population fully completed the questionnaires properly and accordingly. The sample size percent of the whole population is therefore (82.29%).

Categorical random sampling was used to represent the total sample size, since it is the most basic of the probability plans. Table 3.2 shows that 38.0% from the sample are Owners and 48.1% from the sample are Contractors and 13.9% from the sample are Consultants.

Table 3.2 Participants' category

Participant category	Frequency	Percentage
Owner	30	38.0
Contractor	38	48.1
Consultant	11	13.9
total	79	100.0

Table 3.3 shows job position of questionnaires' participants. According to this table, 19 participants are the company chairman or (24.1%) of the sample size, 38 participants are project managers or (48.1%) of sample size and 22 participants are site engineers or (27.8%) of sample size.

Table 3.3 Job Position

Job Position	Frequency	percentage
Company Chairman	19	24.1
Project Manager	38	48.1
Site Engineer	22	27.8
total	79	100.0

Participant experience is shown in Table 3.4, only 4 of participants (5.1%) of sample has less than 5 years experience. Ten of the sample (12.7%) has 5-10 years experience, 38 of participants (48.1%) of sample has 11-20 years experience and 27 of participants (34.2%) of sample has more than 20 years experience.

Table 3.4 Participant Experience

Participant Experience	Frequency	percentage
Less than 5 years	4	5.1
5-10 years	10	12.7
11-20 years	38	48.1
more than 20 years	27	34.2
total	79	100.0

Table 3.5 shows type of projects implemented by all the participants. Buildings and utilities projects represent 35.2% of the totality of projects, roads and infrastructure projects represent 32.7%, water and sewerage represent 26.5% and industrial establishments represent 5.6% of projects.

Table 3.5 Type of Projects

Type of Projects	Frequency	percentage
Buildings and Utilities	69	35.2
Roads and infrastructure	64	32.7
Water and Sewerage	52	26.5
Industrial establishments	11	5.6
total	196	100.0

Table 3.6 below shows that 67 projects throughout the last five years had a budget more than 1 million US$ of (84.8%) of total projects implemented by participants, 5 projects or (6.3%) from total projects with budget of 750 thousand-1$ million, 3 projects or (3.8%) from total of 510-750 thousand $, 3 projects or (3.8%) from total of 250-500 thousand $ and only 1 project or (1.3%) of total had budget less than 1$ million.

Table 3.6 Maximum project budget throughout last five years (Thousand US$)

Maximum project budget throughout last five years (Thousand US$)	Frequency	percentage
Less than $250	1	1.3
250-500	3	3.8
510-750	3	3.8
760- 1 million	5	6.3
More than one million US$	67	84.8
total	79	100.0

Table 3.7 below shows that (24.1%) of implemented projects throughout last five years were less than 10 projects, (30.4%) were between 10-20 projects, (19%) were between 21-30 projects, (6.3%) were between 31-40 projects and (20.3%) were more than 40 projects.

Table 3.7 Number of implemented projects throughout last five years

Number of implemented projects throughout last five years	Frequency	percentage
Less than 10	19	24.1
10-20	24	30.4
21-30	15	19.0
31- 40	5	6.3
more than 40	16	20.3
total	79	100.0

Table 3.8 below clarifies that (3.8%) of volume of works throughout last five years was less than 1 million US$, (7.4%) was 1-2 MUS$, (11.4%) was 2.1-3 MUS$, (10.1%) was 3.1-4 MUS$ and (67.1%) was more than 4 MUS$ which was the major volume of works.

Table 3.8 Volume of work throughout last five years (MUS$)

Volume of work throughout last five years (MUS$)	Frequency	percentage
Less than 1	3	3.8
1-2	6	7.6
2.1-3	9	11.4
3.1-4	8	10.1
more than 4	53	67.1
total	79	100.0

3.6 Research Location

The research was carried out in Gaza Strip, which is the southern governorate of the Palestinian territories.

3.7 Questionnaire Design and Contents

The questionnaire was designed mainly according to the previous literature review and a previous studies related to the subject of this research as Ibbs and Ashley (1987), Hughes and Shinoda (1999) and Hartman and Snelgrove (1996). And after interviewing experts who were dealing with the subject at different levels, all the information that could help in achieving the study objectives were collected, reviewed and formalized to be suitable for the study survey and after many stages of brain storming, consulting, amending, and reviewing executed by the researcher with the supervisor, a close-ended questionnaire was developed.

The questionnaire was designed in the Arabic language (see annex No.1), as most members of the target population were unfamiliar with the English language and to be more understandable. An English version was attached in (see annex No.2). Unnecessary personal data, complex and duplicated questions were avoided. The questionnaire design was composed of two sections to accomplish the aim of the research as follows:

1. The first section contained the participant profile.
2. The second section contained the FIDIC clauses that have the utmost impact on construction project performance as follows:
    - Engineer and Engineer's Representative
    - Contract Documents
    - General Obligation
    - Suspension
    - Commencement and Delays
    - Alterations, Additions, and Omissions
    - Procedure for Claims
    - Certificates and Payment
    - Special Risks
    - Release from Performance
    - Settlement of Disputes

The survey questionnaire was conducted to determine the point of view and evaluation of the study population sample regarding the impact of FIDIC clauses on project performance in

respect of the following project characteristics: (cost, timetable, quality, safety, satisfaction of owner and contractor).

The questionnaire consists of four pages and accompanied with a covering letter which explained the purpose of the study, the way of responding and the aim of the research. The security of the participant's personal information was assured in order to encourage high response.

The covering letter clarified that the results of the questionnaire would be used to improve the construction industry in Palestine through the contribution in evaluating the existing risks of contractual relations between contract parties in the general conditions of FIDIC. Meanwhile, the study aimed to elicit the point of views and evaluation of contractors, owners and consultants in respect of the general conditions of FIDIC contract. The closed-ended questionnaire was used for its advantages. These advantages are such as it is easy to ask and quick to answer, so in this type of questionnaires, neither respondents nor interviewees need to write.

3.7.1 Data Measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is an appropriate methods that can be applied and not others. In this research, interval scales were used. Based on Likert scale we have the following:

Degree of importance	scale	Meaning
Strongly agree	5	Strongly agree that this clause positively impacts project performance
Agree	4	Agree that this clause positively impacts project performance
Neutral	3	No idea if that this clause positively impacts project performance
Disagree	2	Disagree that this clause positively impacts project performance
Strongly disagree	1	Strongly Disagree that this clause positively impacts project performan

The researcher used likert quintuple criterion to measure and examine the answers of questionnaire questions. The answers were limited to the following classifications: Ordinal

scale is a ranking or rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement or degree of influence (1, 2, 3, 4, 5) don't indicate the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels (Naoum 1998).

3.7.2 1-Sample Kolmogorov-Smirnov Test

Kolmogorove- Smirnov test or (K-S) test will be used to identify if the data follow normal distribution or not, this test is considered necessary in case of testing hypotheses as the most parametric test which stipulate data to be normally distributed. Results of the K-S test is as shown in Table 3.9, which clarifies that the significant level calculated are greater than 0.05 (sig. > 0.05), this in turn denotes that the data follows normal distribution, and so parametric tests must be used

Table 3.9 One-Sample Kolmogorov-Smirnov Test

Characteristics of Project Performance	Kolmogorov-Smirnov Z	p- value
Cost	1.145	0.146
Time Schedule	1.277	0.076
Quality	0.889	0.408
Safety	0.703	0.706
Satisfaction of Contract Parties	0.911	0.378

3.8 Pilot Study

In order to enforce the research, the used survey instrument was piloted to measure its validity and reliability and test the collected data; and after the preliminary testing, a pilot study was conducted to evaluate the questionnaire. The researcher distributed the questionnaire to a panel of experts-having experience in the field of the research. Sample of 12 experts consists of three panels was conducted to evaluate the questionnaire validity and reliability was asked to evaluate the questionnaire.

The first panel, consisted of eight experts (academies, arbitrators, contractors and consultants), were asked to verify the validity of the questionnaire topics and its relevance to the research objectives. The second panel consisted of an expert in statistics, was asked to identify that the instrument used was statistically valid and the questionnaire was designed well enough to provide relations and tests among variables. One specialist advocate represented the third panel; he reviewed the questionnaire to put his comments on the validity of the questionnaire.

Generally speaking, it appeared that respondents had no difficulty in understanding the items or the instructions to complete the questionnaire. The researcher has tested internal consistency of the questionnaires by calculating the correlation coefficients between each clause and the related clauses article.

All the experts' suggestions and comments were discussed with the supervisor before taking into consideration. These modifications were evaluated upon the following criteria: acceptance and adding to the questionnaire all expert' notices which got more than 80% of experts' voting, amendment for questionnaire parts according to experts' notices that got 60-80%, and neglecting those parts that got less than 60% of experts' voting. Upon ending this step, the questionnaire was finalized and became ready for distribution and appeared so in its shape, see appendixes No. 1.

3.9 Questionnaire Statistical Validity

Validity refers to whether the questionnaire or survey measures what it intends to measure (Pilot and Hungler 1985). While there are very detailed and technical ways of proving validity, there are some concepts that are useful to keep in mind. The overriding principle of validity is that it focuses on how a questionnaire or assessment process is used. Reliability is a characteristic of the instrument itself, but validity comes from the way the instrument is employed.

In statistics a valid measure is one which is measuring what it is supposed to measure. Validity implies reliability (consistency). A valid measure must be reliable, but a reliable measure need not be valid. Validity refers to getting results that accurately reflect the concept being measured.

The researcher assessed the statistical validity of the questionnaire by Pearson correlation coefficients. The following tables (from Table 3.9 to Table 3.21) show the correlation (Pearson) coefficient and p-value for each clause and the average of the related article. If significance level (p-value) for an article is found to be between (0.01-0.05), this means that the correlation coefficient is significant at $\alpha = 0.05$ and the article is consistent and valid to measure what it was set for. On the other hand, if p-value is less than or equals 0.01, this means that the correlation coefficient is significant at $\alpha = 0.01$ and the article is valid to measure its target.

Group 1: (Engineer and Engineer's Representative)

As shown in Table 3.9*, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at α = 0.01 or at α = 0.05, so it can be said that the paragraphs of this field (article) are consistent and valid to measure what it was for.

Table 3.9 * Correlation coefficients of FIDIC group (Engineer and engineer's representative)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (1): Engineer and Engineer's Representative										
1	Engineer's Duties and Authority	0.610	0.000	0.604	0.000	0.470	0.000	0.247	0.069	0.656	0.000
2	Engineer's Representative	0.823	0.000	0.626	0.000	0.432	0.001	0.417	0.002	0.716	0.000
3	Engineer's Authority to Delegate	0.789	0.000	0.708	0.000	0.408	0.002	0.292	0.030	0.743	0.000

Group 2: (Contract Documents)

As shown in Table 3.10, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (article) are significant at α = 0.01 or at α = 0.05, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.10 Correlation coefficients of FIDIC group (Contract documents)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (2): Contract Documents										
1	Priority of Contract Documents	0.657	0.000	0.745	0.000	0.614	0.000	0.751	0.0000	0.765	0.000
2	Disruption of Progress	0.709	0.000	0.464	0.000	0.370	0.005	0.338	0.012	0.644	0.000
3	Delays and Cost of Delay of Drawings	0.779	0.000	0.442	0.001	0.763	0.000	0.782	0.000	0.708	0.000
4	Failure by Contractor to Submit Drawings	0.575	0.000	0.563	0.000	0.729	0.000	0.579	0.000	0.476	0.000

Group 3: (General Obligations)

As shown in Table 3.11, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at α = 0.01 or at α = 0.05, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.11 Correlation coefficients of FIDIC group (General obligations)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (3): General Obligations										
1	Claims under Performance Security	0.448	0.001	0.649	0.000	0.361	0.007	0.695	0.000	0.448	0.01
2	Program to be Submitted	0.638	0.000	0.329	0.014	0.416	0.002	0.475	0.000	0.324	0.016
3	Cash Flow Estimate to be Submitted	0.360	0.007	0.402	0.002	0.499	0.000	0.456	0.000	0.312	0.021
4	Safety, Security, and Protection of the Environment	0.534	0.000	0.702	0.000	0.492	0.000	0.079	0.568	0.513	0.000
5	Employer's Responsibilities	0.595	0.000	0.721	0.000	0.437	0.001	0.587	0.000	0.722	0.000
6	Employer's Risks	0.654	0.000	0.705	0.000	0.398	0.003	0.069	0.618	0.560	0.000
7	Insurance of Works and Contractor's Equipment	0.607	0.000	0.625	0.000	0.483	0.000	0.135	0.327	0.556	0.000
8	Indemnity by Employer	0.752	0.000	0.654	0.000	0.580	0.000	0.401	0.003	0.321	0.021
9	Cross Liabilities	0.627	0.000	0.340	0.011	0.522	0.000	0.666	0.000	0.339	0.013
10	Accident or Injury to Workmen	0.455	0.000	0.658	0.000	0.313	0.020	0.546	0.000	0.311	0.021
11	Insurance Against Accident to Workmen	0.524	0.000	0.600	0.000	0.341	0.011	0.591	0.000	0.310	0.021

Group 4: (Suspension)

As shown in Table 3.12, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at α = 0.01 or at α = 0.05, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.12 Correlation coefficients of FIDIC group (Suspension)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (4): Suspension										
1	Suspension of Work	0.932	0.000	0.918	0.000	0.321	0.014	0.523	0.000	0.680	0.000
2	Engineer's Determination following Suspension	0.866	0.000	0.725	0.000	0.382	0.004	0.579	0.000	0.329	0.014
3	Suspension lasting more than 84 Days	0.895	0.000	0.841	0.000	0.381	0.004	0.485	0.000	0.639	0.000

Group 5: (Commencement and Delays)

As shown in Table 3.13, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.13 Correlation coefficients of FIDIC group (Commencement and delays)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (5): Commencement and Delays										
1	Extension of Time for Completion	0.767	0.000	0.810	0.000	0.374	0.005	0.424	0.001	0.363	0.006
2	Rate of Progress	0.695	0.000	0.655	0.000	0.678	0.000	0.544	0.000	0.550	0.000
3	Liquidated Damages for Delay	0.428	0.001	0.574	0.000	0.278	0.040	0.577	0.000	0.365	0.006

Group 6: (Alterations, Additions, and Omissions)

As shown in Table 3.14, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.14 Correlation coefficients of FIDIC group (Alterations, additions, and omissions)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (6): Alterations, Additions, and Omissions										
1	Variations	0.821	0.000	0.843	0.000	0.525	0.000	0.459	0.000	0.690	0.000
2	Valuation of Variations	0.841	0.000	0.685	0.000	0.569	0.000	0.358	0.007	0.770	0.000
3	Power of Engineer to Fix Rates	0.762	0.000	0.647	0.000	0.750	0.000	0.570	0.000	0.722	0.000

Group 7: (Procedure for Claims)

As shown in Table 3.15, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.15 Correlation coefficients of FIDIC group (Procedure for claims)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (7): Procedure for Claims										
1	Notice of Claims	0.827	0.000	0.626	0.000	0.634	0.000	0.546	0.000	0.524	0.000
2	Contemporary Records	0.406	0.002	0.614	0.000	0.558	0.000	0.511	0.000	0.472	0.000
3	Substantiation of Claims	0.525	0.000	0.717	0.000	0.625	0.000	0.558	0.000	0.349	0.009
4	Failure to Comply	0.456	0.000	0.688	0.000	0.513	0.000	0.388	0.003	0.368	0.006
5	Payment of Claims	0.488	0.000	0.659	0.000	0.749	0.000	0.566	0.000	0.505	0.000

Group 8: (Certificates and Payments)

As shown in Table 3.16, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.16 Correlation coefficients of FIDIC group (Certificates and payments)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (8): Certificates and Payment										
1	Monthly Payments	0.706	0.000	0.680	0.000	0.764	0.000	0.782	0.000	0.623	0.000
2	Statement at Completion	0.664	0.000	0.624	0.000	0.753	0.000	0.745	0.000	0.441	0.001
3	Final Statement	0.808	0.000	0.774	0.000	0.692	0.000	0.597	0.000	0.526	0.000
4	Discharge	0.614	0.000	0.658	0.000	0.719	0.000	0.687	0.000	0.562	0.000
5	Final Payment Certificate	0.786	0.000	0.703	0.000	0.719	0.000	0.700	0.000	0.575	0.000
6	Time for Payment	0.757	0.000	0.799	0.000	0.789	0.000	0.703	0.000	0.528	0.000
7	Approval only by Defects Liability Certificate	0.572	0.000	0.680	0.000	0.489	0.000	0.645	0.000	0.459	0.000
8	Defects Liability Certificate	0.468	0.000	0.689	0.000	0.506	0.000	0.573	0.000	0.529	0.000

Group 9: (Special Risks)

As shown in Table 3.17, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.17 Correlation coefficients of FIDIC group (Special risks)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (9): Special Risks										
1	No Liability for Special Risks	0.721	0.000	0.525	0.000	0.732	0.000	0.752	0.000	0.481	0.000
2	Special Risks	0.805	0.000	0.642	0.000	0.751	0.000	0.745	0.000	0.749	0.000
3	Damage to Works by Special Risks	0.823	0.000	0.652	0.000	0.833	0.000	0.772	0.000	0.792	0.000
4	Increased Costs arising from Special Risks	0.684	0.000	0.536	0.000	0.608	0.000	0.350	0.009	0.716	0.000
5	Removal of Contractor's Equipment on Termination	0.738	0.000	0.647	0.000	0.544	0.000	0.741	0.000	0.742	0.000
6	Payment if Contract Terminated	0.729	0.000	0.368	0.006	0.566	0.000	0.629	0.000	0.738	0.000

Group 10: (Release from Performance)

As shown in Table 3.18, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.18 Correlation coefficients of FIDIC group (Release from performance)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (10): Release from Performance										
1	Payment in Event of Release from Performance	0.866	0.000	0.805	0.000	0.929	0.000	0.852	0.000	0.803	0.000

Group 11: (Settlement of Disputes)

As shown in Table 3.19, the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field (group) are significant at $\alpha = 0.01$ or at $\alpha = 0.05$, so it can be said that the paragraphs of this field (group) are consistent and valid to measure what it was for.

Table 3.19 Correlation coefficients of FIDIC group (Settlement of disputes)

		Characteristics of Project Performance									
		Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
No.	Clause	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
	Group (11): Settlement of Disputes										
1	Engineer's Decision	0.693	0.000	0.556	0.000	0.394	0.003	0.227	0.095	0.445	0.001
2	Amicable Settlement	0.652	0.000	0.410	0.002	0.628	0.000	0.385	0.004	0.359	0.007
3	Arbitration	0.819	0.000	0.699	0.000	0.422	0.001	0.292	0.030	0.692	0.000
4	Failure to Comply with Engineer's Decision	0.452	0.001	0.384	0.004	0.694	0.000	0.498	0.000	0.667	0.000

3.10 Questionnaire Reliability

Reliability test is used to test the stability of answers for a scouting sample of respondents by filling the questionnaire two times with a time lag from 2 to 4 weeks. Reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to be measured or/and, it is a property of the measuring instrument (Polit and Hungler, 1985). Period of two weeks to a month is recommended between two tests (Burns and Grove 1987). The reliability of a questionnaire is the ability of the questionnaire to give the same results when like-minded people in similar circumstances fill it out.

It is difficult to return the scouting sample of the questionnaire that is used to measure the questionnaire validity to the same respondents due to the unstable circumstances in Gaza strip. It is difficult to achieve the same results after two weeks. So, two tests could be applied to the scouting sample in order to measure the consistency of the questionnaire. The researcher conducted two reliability tests on the pilot study sample; the two tests are: Split-Half Coefficient, and Alpha- Cronbach's Method.

3.10.1 Split-Half Coefficient method

This method depends on finding Pearson correlation coefficient between the means of odd questions and even questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman Braun correlation coefficient of correction. The corrected correlation coefficient (consistency coefficient) is computed according to the following equation:

Consistency coefficient = $\frac{2r}{1+r}$ where r is the Pearson correlation coefficient.

The normal range of corrected correlation coefficient $\frac{2r}{1+r}$ is between 0.0 and + 1.0 As shown in Table 3.20, all the corrected correlation coefficients values are between 0.0 and +1.0 and the significant (α) is less than 0.05 so all the corrected correlation coefficients are significant at α = 0.05. It can be said that according to the Half Split method, all fields of (FIDIC articles) groups are reliable.

3.10.2 Cronbach's Coefficient Alpha

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflect a higher degree of internal consistency. As shown in Table 3.20, the Cronbach's coefficient alpha was calculated for eleven fields of (FIDIC articles) and the results were in the range from 0.8007 and 0.9667. This range is considered high and these results ensure the reliability of the questionnaire.

Thereby, it could be said that the researcher proved that the questionnaire was valid, reliable and ready for distribution for the population sample.

Table 3.20 Split-Half coefficient and Alpha-Cronbach's method

No.	FIDIC Groups	Split-Half method			Alpha-Cronbach method
		Pearson correlation	Spearman-Braun Coefficient	Sig. (2-(Tailed	Alpha-Cronbach Coefficients
1	Engineer and Engineer's Representative	0.5495	0.709261	0.000	0.8588
2	Contract Documents	0.6628	0.79721	0.000	0.8502
3	General Obligation	0.6892	0.816008	0.000	0.8906
4	Suspension	0.6695	0.802037	0.000	0.8851
5	Commencement and Delays	0.5172	0.681782	0.000	0.8007
6	Alterations, Additions, and Omissions	0.8496	0.918685	0.000	0.9155
7	Procedure for Claims	0.6839	0.812281	0.000	0.8985
8	Certificates and Payment	0.7333	0.846132	0.000	0.9667
9	Special Risks	0.8565	0.922704	0.000	0.9585
10	Release from Performance	0.8577	0.9234	0.000	0.8993
11	Settlement of Disputes	0.7404	0.850839	0.000	0.8475

Correlation coefficient is significant at $\alpha = 0.05$

3.11 Relative Importance Index

The interviewees were asked to provide their opinions on the impact of FIDIC clauses on construction project performance in Gaza Strip by scores 1 to 5, where "1" represent the least important and "5" most important. To determine the relative ranking of the factors, these scores were then transformed to importance indices based on the next formula (Tam et. al 2000, and Dousman, 2002).

$$\textbf{Relative Importance Index (RII)} = \frac{\sum w}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$

Where W is the weighting given to each factor by the respondent, ranging from 1 to 5, (n_1 = number of respondents for Strongly disagree, n_2 = number of respondents for disagree, n_3 = number of respondents for neutral , n_4 = number of respondents for agree , n_5 = number of

respondents for strongly agree). A is the highest weight (i.e. 5 in the study) and N is the total number of samples. The relative importance index ranges from zero to one.

3.12 Statistical Manipulation

To achieve the research goal, researcher used the statistical package for the Social Science (SPSS) for Manipulating and analyzing the data.

Statistical methods are as follows

1- Frequencies and Percentile.

2- 1- sample K-S test is used to check normality of the distribution of data.

3- Pearson correlation coefficients for measuring validity of the items of the questionnaire.

4- Spearman–Braun correlation coefficient of correction.

5- Half-split coefficient and Alpha-Cronbach Tests for measuring reliability of the items of the questionnaire.

6- Relative Importance Index.

7- One Way ONOVA test is used to check if there is any significant difference in points of view of the respondents regarding the impact of each article clauses on project performance characteristics. This test is checked by analysis of variance (ANOVA).

3.13 Study Limitations

The study had the following limitations:

1. The research was conducted to determine the point of view and evaluation of the construction contract parties regarding the impact of FIDIC clauses on project performance in respect of the following project characteristics: (cost, timetable, quality, safety, satisfaction of owner and contractor).
2. Study population was limited to first and second class contractors as registered in the PCU, high-experienced owners, and consultants.
3. This study was limited to the construction industry practitioners in Gaza strip in the last five years.
4. This research was conducted in Gaza Strip and didn't take into account the West-Bank.

CHAPTER 4: Results and Discussion

This chapter describes results that have been deduced from a field survey of seventy-nine questionnaires, thirty-eight contractors, thirty owners and eleven consultants. The questionnaires were processed using the statistical package for social sciences SPSS. The survey results illustrated in this chapter are as follows: Relative Importance Index and One Way ANOVA test which used to check if there is any significant difference in points of view of the respondents regarding the FIDIC clauses. In this chapter, the results and findings of this research are discussed in detail, and then compared to the results and findings of the available similar studies.

4.1 Relative importance index and ranking from contractors' perspective

This section shows the relative importance index (RII) and ranking from contractors' perspective regarding the FIDIC contract general conditions clauses that have the utmost impact on the construction project performance. These clauses form the study questionnaire items, and consist of the following eleven articles or (groups):

Group (1): Engineer and engineer's representative: includes three clauses,

Group (2): Contract documents: includes four clauses,

Group (3): General obligations: includes eleven clauses,

Group (4): Suspension: includes three clauses,

Group (5): Commencement and delays: includes three clauses,

Group (6): Alterations, additions, and omissions: includes three clauses,

Group (7): Procedure for claims: includes five clauses,

Group (8): Certificates and payment: includes eight clauses,

Group (9): Special risks: includes six clauses,

Group (10): Release from performance: includes one clause, and

Group (11): settlement of disputes: includes four clauses.

4.1.1 Group (1): Engineer and engineer's representative clauses

This group contains three clauses, which clarify and determine the engineer and engineer's representative role. Table 4.1 shows that the surveyed contractors ranked the clause "engineer's duties and authority" at the 1st rank regarding its impact on the project cost, time, quality and satisfaction with RII = 0.779, 0.842, 0.926 and 0.842 respectively. This clause

was ranked at the 2nd rank regarding safety with RII =0.758. This clarifies that the surveyed contractors believe that this clause affect the project performance significantly. The engineer's role is certainly means an authorized engineer by the approval of the employer with the duties specified in the contract. The duties include control of works quantities and its quality within the contract time and budget.

The surveyed contractors ranked the clause "Engineer's representative" at the 1st rank with RII = 0.763 with regard to safety, and at the 2nd rank with RII = 0.747, 0.816, 0.874 and 0.779 regarding cost, time, quality and satisfaction respectively. This illustrates that the surveyed contractors believe that this clause impact the project performance significantly and particularly when the engineer's representative is delegated to carry out such duties and exercise such authority as delegated to him by the engineer according to the contract.

The surveyed contractors ranked the clause "engineer's authority to delegate" at the 2nd rank with RII = 0.816 in respect to time factor. This clause was ranked at the 3rd rank with RII = 0.711, 0.832, 0.700 and 0.758 respectively regarding cost, quality, safety and satisfaction.

This shows that the surveyed contractors believe that the engineer may delegate to the engineer's representative any of the duties and authorities vested in the engineer and he may revoke at any time such delegation. According to this clause, if the contractor questions any communication of the engineer's representative, then the contractor may refer the matter to the engineer who will confirm, reverse or vary the contents of such communication.

Table 4.1 Relative importance index and ranking for engineer and engineer's representative clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer's Duties and Authority	0.779	1	0.842	1	0.926	1	0.758	2	0.842	1
Engineer's Representative	0.747	2	0.816	2	0.874	2	0.763	1	0.779	2
Engineer's Authority to Delegate	0.711	3	0.816	2	0.832	3	0.700	3	0.758	3

4.1.2 Group (2): Contract documents clauses

This group contains four clauses that explain the clauses of contract documents. Table 4.2 clarifies that the surveyed contractors ranked the clause of "Priority of contract documents" at the 1st rank regarding quality and safety with RII = 0.763 and 0.684 respectively, and at the 2nd rank regarding cost and satisfaction with RII = 0.805 and 0.774 respectively. However, contractors ranked it at the 4th rank in respect to time with RII = 0.732. This illustrates that the surveyed contractors do believe that the several documents forming the contract should be taken as mutually explanatory of one another.

Relative importance index of this clause was 0.805 regarding cost. This illustrates the serious impact of this clause on cost of the project. Nevertheless, in case of any ambiguities of contract documents, the engineer shall explain and adjust any ambiguous documents in writing and issue to the contractor instructions thereon.

Table 4.2 shows that the surveyed contractors ranked the clause "Disruption of progress" at the 1st rank regarding satisfaction with RII = 0.779. This clause was ranked at the 2nd rank regarding quality and safety with RII = 0.0.758 and 0.621 respectively, and ranked at the 3rd rank regarding time and cost with RII = 0.811 and 0.800 respectively. This result shows the interest of contractor in achieving a good progress. The contractor will give notice to the engineer, whenever planning or execution of the works is likely to be delayed or disrupted, unless the engineer issues any further drawing or instruction within a reasonable time. RII were 0.811 and 0.800 regarding time and cost. This means a high impact on both of time and cost.

The results shown in Table 4.2 indicate that the surveyed contractors ranked the clause "Delays and cost of delay of drawings" at the 1st rank regarding time and cost with RII = 0.889 and 0.842 respectively. This clause was ranked at 3rd rank regarding quality and safety with RII = 0.700 and 0.600 respectively, and was ranked at the 4th rank with RII = 0.737 regarding satisfaction. These results illustrate a serious impact on project performance. According to this clause: if the engineer fails to issue any drawing or instruction for which notice has been given by the contractor and the contractor suffers delay or incurs costs, then the engineer shall determine any extension of time to which the contractor is entitled and the amount of such costs which shall be added to the contract price.

The clause of "Failure by contractor to submit drawings" was ranked by the surveyed contractors at the 2nd rank regarding time with RII = 0.863, and was ranked at the 3rd rank regarding satisfaction factor with RII =0.747. This clause had the 4th rank regarding cost, quality and safety factors with RII = 0.758, 0.689 and 0.595 respectively. This clause determines the consequences of the inability of the engineer to issue any drawings if caused by the failure of the contractor to submit required drawings under the contract. The engineer then will take such failure by contractor into account when making his determination regarding extension of time and the amount of such costs, which will be added to the contract price.

Table 4.2 Relative importance index and ranking for contract documents clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Priority of Contract Documents	0.805	2	0.732	4	0.763	1	0.684	1	0.774	2
Disruption of Progress	0.800	3	0.811	3	0.758	2	0.621	2	0.779	1
Delays and Cost of Delay of Drawings	0.842	1	0.889	1	0.700	3	0.600	3	0.737	4
Failure by Contractor to Submit Drawings	0.758	4	0.863	2	0.689	4	0.595	4	0.747	3

4.1.3 Group (3): General obligations clauses

This group contains eleven clauses, which explains and determines general obligations of the contract parties. As shown in Table 4.3, the surveyed contractors ranked the clause "Program to be submitted" at the 1st rank regarding time and quality with RII = 0.968 and 0.821 respectively. This clarifies that contractors believe deeply in the importance of time program and its impact on project period and execution.

This clause was ranked at the 7th rank regarding satisfaction, 8th rank regarding cost and 9th rank regarding safety with RII = 0.816, 0.816 and 0.668 respectively. These results indicate the high importance and impact of the program regarding the cost and time. The contractor will provide the engineer with a general description of the arrangements and methods that the contractor proposes to adopt for execution the works.

Table 4.3 Relative importance index and ranking for general obligations clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Claims under Performance Security	0.858	4	0.805	4	0.689	7	0.563	10	0.837	5
Program to be Submitted	0.816	8	0.968	1	0.821	1	0.668	9	0.816	7
Cash Flow Estimate to be Submitted	0.826	7	0.847	2	0.679	9	0.547	11	0.805	8
Safety, Security, and Protection of the Environment	0.805	9	0.716	7	0.774	3	0.911	1	0.858	1
Employer's Responsibilities	0.889	2	0.837	3	0.784	2	0.747	6	0.842	3
Employer's Risks	0.795	10	0.795	5	0.726	5	0.742	7	0.853	2
Insurance of Works and Contractor's Equipment	0.868	3	0.684	8	0.689	8	0.858	3	0.837	4
Indemnity by Employer	0.916	1	0.674	9	0.726	6	0.763	5	0.789	10
Cross Liabilities	0.742	11	0.621	11	0.737	4	0.705	8	0.784	11
Accident or Injury to Workmen	0.832	6	0.721	6	0.668	10	0.826	4	0.789	9
Insurance Against Accident to Workmen	0.847	5	0.653	10	0.616	11	0.863	2	0.821	6

The "Safety, security, and protection of environment" clause was ranked by surveyed contractors at 1st rank regarding safety and satisfaction factors with RII = 0.911 and 0.858 respectively. This represents an obligation by contractors toward the safety of all persons and maintenance of public assets for the protection of the works and convenience of the public. This clause was ranked at the 3rd rank, 7th rank and 9th rank regarding quality, time and cost, with RII = 0.774, 0.716 and 0.805 respectively. These high RII clarifies that the contractors are committed to keep the site and the works in an orderly state to protect the environment and avoid damage to property of the public resulting from pollution that may arise as consequence of his methods of operation.

The surveyed contractors ranked the "Indemnity by employer" clause at the 1st rank regarding cost factor with RII = 0.916. Contractors believe that this clause impacts the cost factor highly, and the owner shall indemnify the contractor against all claims, costs and charges in respect to the damage to persons or property exceptions as mentioned in FIDIC 87, clause 22.2. This clause was ranked at 5th rank regarding safety, at 6th rank regarding quality, 9th rank regarding time and 10th rank regarding satisfaction with RII = 0.763, 0.726, 0.674 and 0.789 respectively. This supports the principle of risk sharing between the contract parties to guarantee a balanced and fair contract. Hartman and Snelgrove (1996) had concluded, "With few exceptions, owners, contractors, and consultants interpret contract clauses differently".

Table 4.3 shows that surveyed contractors ranked the clause "Claims under performance security" at the 4th rank in respect to cost and time with RII = 0.858 and 0.805 respectively. This clause was ranked at the 5th rank, 7th rank and 10th rank regarding satisfaction, quality and safety respectively with RII = 0.837, 0.689 and 0.563 respectively. Contractors believe that prior to making a claim under the performance security, the employer shall notify the contractor stating the nature of the default in respect of which the claim is to be made. This result illustrates the serious impact of claims on cost and time of the project and the relation between both of the owners and the contractors.

The clause of "Cash flow estimate to be submitted" was ranked at the 2nd in respect to time factor with RII = 0.847. This clause was ranked at the 7th rank, 8th rank, 9th rank and 11th rank regarding cost, satisfaction, quality and safety factors, with RII = 0.826, 0.805, 0.679 and 0.547 respectively. This indicates the high importance of cash flow estimate to be submitted in quarterly periods, of all payments to which contractors will be entitled under the contract. The high RII regarding the time factor and the other factors of project performance indicate to the importance of cash flow in respect to the financial relations between contractors and owners.

Table 4.3 shows that the surveyed contractors ranked the clause "Employer's responsibilities" at the 2nd rank regarding cost and quality with RII = 0.889 and 0.784 respectively. This clause was ranked at 3rd and 6th rank regarding satisfaction, time and safety factors with RII = 0.842, 0.837 and 0.747 respectively. This clause determines that if the employer shall employ other contractors on site he shall require them to have the same regard for safety and avoidance of danger under the employer's responsibilities.

The surveyed contractors ranked the "Employer's risks" clause at 2nd rank regarding their satisfaction toward this clause with RII = 0.853. The contractors believe that this clause determines the employer's risks clearly and the high RII = 0.853 assures this result. This clause represents the "Force majeure" clause. This clause was ranked at the 5th rank regarding time and quality with RII = 0.795 and 0.726 respectively. This clause was ranked at 7th and 10th ranks regarding safety and cost with RII = 0.742 and 0.795 respectively. The employer's risks are determined clearly under this clause to avoid disputes, which may arise due to these risks.

The "Insurance of works and contractor's equipment" clause was ranked at 3rd rank regarding cost and safety with RII = 0.868 and 0.858 respectively. This clause was ranked at 4th rank regarding satisfaction and 8th ranks regarding quality and time with RII = 0.837, 0.689 and 0.684 respectively. This shows the commitment of contractors to insure the works with materials and plant for incorporation therein, and the contractor's equipment, to the full replacement cost (including profit). The high RII clarifies the impact on cost of the project

The "Insurance against accident to workmen" clause was ranked at 2nd rank regarding safety factor with RII = 0.863. This clause was ranked at 5th rank, 6th rank, 10th rank and 11th rank regarding cost, satisfaction, time and quality factors with RII = 0.847, 0.821, 0.653 and 0.616 respectively. This illustrates that contractors believe in the high importance of this clause, so that the contractor will insure against such liability and shall continue such insurance during the whole of the time that any persons are employed by him on the works.

The "Accident or injury to workmen" clause was ranked at 4th rank regarding safety with RII = 0.826. This clause was ranked at 6th rank regarding cost and time with RII = 0.832 and 0.721 respectively, and was ranked at 9th rank and 10th rank regarding satisfaction and quality with RII = 0.789 and 0.668 respectively. This result clarifies that contractors agree by contract that the employer will not be liable for any damages to any workers or other person in the employment of the contractor. The contractor will indemnify and keep indemnified the employer against all such damages and compensation.

Finally, the "Cross liabilities" clause was ranked by the surveyed contractors at 4th rank, 8th rank and 11th rank regarding quality, safety, satisfaction, cost and time with RII = 0.737, 0.705, 0.784, 0.742 and 0.621 respectively. The contractors believe and agree that the

insurance policy will include a cross liability clause such that the insurance will apply to the contractor and to the employer as separate insurers.

4.1.4 Group (4): Suspension clauses

This group contains three clauses that explain and identify the suspension clauses. Table 4.4 below shows that the surveyed contractors ranked the clause of "Suspension lasting more than 84 days" at the 1st rank regarding cost, satisfaction, safety and quality with RII = 0.911, 0.805, 0.674 and 0.674 respectively. This clause was ranked at the 2nd rank regarding time factor with RII = 0.863.

This result shows the high importance of this clause and its impact on project performance factors. The contractors believe and agree that if such a suspension extends more than 84 days and if the engineer does not permit contractor to resume works after another 28 days upon contractor's notice, then the contractor will treat the suspension as an event of default by the employer and terminate his employment under the contract. Frics (2005) concluded that suspension of works may be, or/and may lead to claims and disputes.

The clause of "Suspension of work" was ranked in the 1st rank regarding to time with RII = 0.916. This clause was ranked at the 2nd rank regarding cost and quality with RII = 0.825 and 0.600 respectively, and ranked at 3rd rank regarding satisfaction and safety with R.I.I. = 0.763 and 0.579 respectively. The contractors agree that, upon the instruction of the engineer, the contractor will suspend the progress of the works and properly protect these works during such suspension, as far as it is necessary, in the opinion of the engineer.

The surveyed contractors ranked the clause "Engineer's determination following suspension" at the 2nd rank regarding satisfaction and safety with RII = 0.795 and 0.611 respectively, and at the 3rd rank regarding cost, time and quality with RII = 0.8332, 0.826 and 0.584 respectively. These results assure that the contractors agree that the engineer will determine: (1) any extension of time to which the contractor is entitled; and (2) the amount, which will be added to the contract price regarding the cost incurred by the contractor because of such suspension.

Table 4.4 Relative importance index and ranking for suspension clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Suspension of Work	0.895	2	0.916	1	0.600	2	0.579	3	0.763	3
Engineer's Determination following Suspension	0.832	3	0.826	3	0.584	3	0.611	2	0.795	2
Suspension lasting more than 84 Days	0.911	1	0.863	2	0.674	1	0.674	1	0.805	1

4.1.5 Group (5): Commencement and delays clauses

This group contains three clauses, which explain and clarify the commencement and delays clauses. Table 4.5, shows that the surveyed contractors ranked the clause of "Extension of time for completion" at the 1st rank regarding time and cost with RII = 0.942 and 0.905 respectively, and was ranked at the 3rd rank regarding satisfaction, quality and safety with RII = 0.711, 0.589 and 0.574 respectively. The surveyed contractors agree in the event of extra works, any cause of delay, adverse climatic conditions and any delay by the employer, this clause entitle the contractor to an extension of time for completion of the works by the engineer, who shall determine the amount of such extension.

The clause of "Rate of progress" was ranked at the 1st rank regarding safety and quality with RII = 0.700 and 0.679 respectively. This clause was ranked at the 2nd rank regarding time, cost and satisfaction with RII = 0.932, 0.874 and 0.732 respectively. This result shows that contractors believe that rate of progress has a high impact on time and cost. If for any reason, which does not entitle the contractor to an extension of time, the rate of progress of works is too slow to comply the time for completion, the engineer shall notify the contractor to take steps to expedite progress without any additional payment for taking such steps.

The clause of "Liquidated damages for delay" was ranked at the 1st rank regarding satisfaction with RII = 0.737. This clause was ranked at the 2nd rank regarding quality and safety with RII = 0.637 and 0.600, and was ranked at the 3rd rank regarding cost and time with RII = 0.842 and 0.789 respectively. The result shows that surveyed contractors believe and agree that if the contractor fails to comply with the time for completion, then the contractor will pay to the

employer the relevant sum stated in the appendix to tender as liquidated damages for such default and not as penalty according to the contract.

Table 4.5 Relative importance index and ranking for commencement and delays clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Extension of Time for Completion	0.905	1	0.942	1	0.589	3	0.574	3	0.711	3
Rate of Progress	0.874	2	0.932	2	0.679	1	0.700	1	0.732	2
Liquidated Damages for Delay	0.842	3	0.789	3	0.637	2	0.600	2	0.737	1

These clauses treat a very important issue that frequently forms a cause for claims and disputes. Contractors have shown a high interest in these clauses. Vidogah and Ndekugri (1997) concluded that there is high incidence of disputes arising from construction contract claims. Even with the most expert understanding of contract clauses and the most equitable risk-allocation regime, claims will continue to present problems if they are poorly managed in practice.

4.1.6 Group (6): Alterations, additions, and omissions clauses

This group contains three clauses that clarify the alterations, additions and omissions clauses. Table 4.6 shows that the surveyed contractors ranked the clause "Variations" at the 1st rank regarding cost, time and satisfaction with RII = 0.932, 0.905 and 0.789 respectively, and at the 3rd rank regarding quality and safety with RII = 0.742 and 0.616 respectively.

This result shows the high relative importance of this clause, and that the surveyed contractors believe and agree that any variations are considered causes of substantial adjustment to the contract cost and/or time; and that by this clause; no such variation will in any way invalidate the contract and in turn, may lead to disputes. Ibbs, et al (2001) concluded that variations (changes) in projects are common and may be deleterious or beneficial-whether you see a change as a conflict or a valuable lesson depends only on your prospective.

Table 4.6 Relative importance index and ranking for alterations, additions, and omissions clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Variations	0.932	1	0.905	1	0.742	3	0.616	3	0.789	1
Valuation of Variations	0.895	3	0.816	2	0.763	2	0.621	2	0.779	2
Power of Engineer to Fix Rates	0.900	2	0.753	3	0.784	1	0.653	1	0.774	3

The surveyed contractors ranked the clause "valuation of variations" at the 2nd rank regarding time, satisfaction, quality and safety with RII = 0.816, 0.779, 0.763 and 0.621 respectively. This clause was ranked at 3rd rank regarding cost with RII = 0.895. The surveyed contractors agree that the varied work shall be valued at the rates and prices set out in the contract, but if the contract does not contain any rates or prices applicable to the varied work, the rates and prices in the contract shall be used as the basis for the valuation so far as may be reasonable.

The clause of "Power of engineer to fix rates" was ranked at the 1st rank regarding quality and safety with RII = 0.784 and 0.653 respectively. This clause was ranked at the 2nd rank regarding cost with RII = 0.900 and was ranked at the 3rd rank regarding satisfaction and time with RII = 0.774 and 0.753 respectively. The contractors agree that a suitable rate or price for the varied work will be agreed upon between the engineer and the contractor, and in the event of disagreement, the engineer will fix such other rate or price as is, in his opinion, appropriate. Rates of costs are a major cause for claims and consequently disputes unless to be agreed upon or fixed according to contract.

4.1.7 Group (7): Procedure for claims clauses

This group contains five clauses that explain the procedure for claims. Table 4.7 shows that the surveyed contractors ranked the clause of "Payment of claims" at the 1st rank regarding cost, satisfaction, time, quality and safety with RII = 0.911, 0.874, 0.858, 0.768 and 0.674 respectively. This result shows that the surveyed contractors agree that payment of claims impact all project performance factors highly and the cost in particular, where RII = 0.911.

However, the contractors believe that: since a claim is a request for an extension of time and/or additional costs, it can evolve into a dispute and losses unless amicably resolved by the

parties concerned. Procedure for claims process clauses pave the way to contractor to precede with his claim. Abdul-Malak, et al (2002) concluded that to enhance the chances of success, contractors submitting claims must closely follow the steps stipulated in the contract conditions, provide a breakdown of alleged additional costs and time, and present sufficient documentation.

Table 4.7 Relative importance index and ranking for procedure for claims clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	R I	Rank	RII	Rank	RII	Rank
Notice of Claims	0.842	3	0.789	4	0.653	5	0.621	4	0.774	4
Contemporary Records	0.705	5	0.758	5	0.711	2	0.616	5	0.795	3
Substantiation of Claims	0.874	2	0.816	2	0.689	4	0.647	3	0.826	2
Failure to Comply	0.800	4	0.816	3	0.695	3	0.668	2	0.747	5
Payment of Claims	0.911	1	0.858	1	0.768	1	0.674	1	0.874	1

The surveyed contractors ranked the clause of "Substantiation of claims" in the 2nd rank regarding the cost, satisfaction and time with RII = 0.874, 0.826 and 0.816 respectively. The clause was ranked at 3rd rank and 4th rank regarding safety and quality with RII = 0.647 and 0.689 respectively. The contractors agree that within 28 days of giving notice to claim, the contractor shall send to the engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based.

The surveyed contractors ranked the clause of "Failure to comply" at the 2nd rank regarding safety with RII = 0.668 and at the 3rd rank regarding time and quality with RII = 0.816 and 0.695 respectively. It was ranked at the 4th and 5th ranks regarding cost and satisfaction with RII = 0.800 and 0.747 respectively. The contractors agree that failure by contractor to comply with the procedure for claims has serious impact on his entitlement to payment. This is clear and has impact on cost seriously where RII of this clause regarding cost = 0.800.

The surveyed contractors ranked the clause "Contemporary records" at the 2nd rank and 3rd rank regarding quality and satisfaction with RII = 0.711 and 0.795 respectively. This clause was ranked at the 5th rank regarding time, cost and safety with RII = 0.758, 0.705 and 0.616

respectively. The contractors believe in the high importance of the contemporary records. The contractor upon issuing notice of claims shall keep such records as may reasonably be necessary to support any claim he may subsequently wish to make.

The clause of "Notice of claims" was ranked at the 3rd rank, 4th rank and 5th rank regarding cost, time, satisfaction, safety and quality with RII = 0.842, 0.789, 0.774, 0.621 and 0.653 respectively. This shows that the contractors understand that if the contractor intends to claim any additional payment pursuant to any clause of these conditions or otherwise, he shall give notice of his intention to the engineer within 28 days after the event giving rise to the claim has first arisen.

4.1.8 Group (8): Certificates and payment clauses

This group contains eight clauses that clarify and explain the certificate and payment clauses. Table 4.8 shows that the surveyed contractors ranked the "Monthly payments" clause at the 1st rank regarding time, cost, satisfaction, quality and safety with RII = 0.921, 0.916, 0.884, 0.842 and 0.737 respectively. This result highlights that the contractors deal with this clause carefully. The contractors agree that this clause influences highly all the project performance characteristics and any delay or obstacles toward application of this clause will be a basis to disputes. Monthly payments shall be subject to (1) the retention of the amount calculated by applying the percentage of retention stated in the appendix to tender, and to (2) the deduction of any sums, which have become due and payable by the contractor to the employer.

The "Time for payment" clause was ranked at the 2nd rank regarding cost and time with RII = 0.895 and 0.811 respectively. This clause was ranked at the 3rd regarding satisfaction, quality and safety with RII = 0.853, 0.711 and 0.684 respectively. These results show the contractor's satisfaction toward this clause. The amount due to the contractor under any interim payment certificate issued by the engineer shall be paid by the employer to the contractor within 28 days or, in the case of the final payment certificate within 56 days after such certificates have been delivered to the employer. The provisions of this clause are without prejudice to the contractor's entitlement, in case of default by employer.

Table 4.8 Relative importance index and ranking for certificates and payment clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Monthly Payments	0.916	1	0.921	1	0.842	1	0.737	1	0.884	1
Statement at Completion	0.847	3	0.737	3	0.616	7	0.605	8	0.826	6
Final Statement	0.737	7	0.674	6	0.668	5	0.637	4	0.805	8
Discharge	0.726	8	0.674	7	0.626	6	0.626	6	0.847	4
Final Payment Certificate	0.779	4	0.658	8	0.595	8	0.616	7	0.863	2
Time for Payment	0.895	2	0.811	2	0.711	3	0.684	3	0.853	3
Approval only by Defects Liability Certificate	0.779	5	0.695	5	0.705	4	0.626	5	0.821	7
Defects Liability Certificate	0.774	6	0.711	4	0.768	2	0.705	2	0.837	5

The "Defects liability certificate" clause was ranked at the 2nd rank regarding quality and safety with RII = 0.768 and 0.705 respectively. This clause was ranked at the 4th, 5th and 6th ranks regarding time, satisfaction and cost with RII = 0.711, 0.837 and 0.774 respectively. The surveyed contractors believe in the serious impact of this clause on project performance. They agree that the contract will not be considered as completed until the engineer will have signed a defect liability certificate and delivered to the employer, with a copy to the contractor. This certificate states the date on which the contractor shall have completed his obligations to execute and complete the works and remedy any defects therein to the engineer's satisfaction.

Table 4.8 shows that the surveyed contractors ranked the "Final payment certificate" clause at the 2nd, 4th, 7th and 8th ranks regarding satisfaction, cost, safety, time and quality respectively, with RII = 0.863, 0.779, 0.616, 0.658 and 0.559 respectively. These results show the contractors' care of the final payment certificate. The contractor are interested that the engineer within 28 days after receipt of the final statement, and the written discharge, shall issue a final payment certificate stating the amount which is finally due under the contract; and the balance, if any, due from the employer to the contractor or from the contractor to the employer as the case may be.

As shown in Table 4.8, the surveyed contractors ranked the "Statement at completion" clause at the 3rd , 6th , 7th and 8th rank regarding cost, time, satisfaction, quality and safety respectively with RII = 0.847, 0.737, 0.826, 0.616 and 0.605 respectively. The contractors believe and agree that not later than 84 days after the issue of the taking-over certificate, the contractor shall submit to the engineer a statement at completion. This certificate show: the value of all work done, any further sums that the contractor considers due, and an estimate of amounts, which the contractor considers, will be due to him under contract. The contractors believe that any delay in issuing financial certificate will lead to disputes.

The "Approval only by defects liability certificate" clause was ranked at the 4th, 5th and 7th ranks regarding quality, cost, time, safety and satisfaction respectively with RII = 0.705, 0.779, 0.695, 0.626 and 0.821 respectively. These results show that the contractors agree that only the "Defects liability certificate" will be deemed to constitute approval of the works.
The "Discharge" clause was ranked at 4th, 6th, 7th and 8th ranks regarding satisfaction, safety, quality, time and cost respectively with RII = 0.847, 0.626, 0.626, 0.674 and 0.726 respectively. The contractors believe that, upon submission of the final statement, the contractor will give to the employer, a written discharge confirming that the total of the final statement represents full and final settlement of all monies due to the contractor in respect of the contract.

The "final statement" clause was ranked at the 4th, 5th, 6th, 7th, and 8th ranks regarding safety, quality, time, cost and satisfaction respectively with RII = 0.637, 668, 0.674, 0.737 and 0.805 respectively. The contractors agree that no later than 56 days after the issue of the defects liability certificate, the contractor shall submit to the engineer: the value of all work done and any further sums, which the contractor considers to be due to him under the contract.

4.1.9 Group (9): Special risks clauses

Group (9) contains six clauses that focus on special risks clauses. Table 4.9, clarifies that the surveyed contractors ranked the "Increased costs arising from special risks" clause at 1st rank regarding cost, time and quality with RII = 0.868, 0.774 and 0.737 respectively. This clause was ranked at 3rd and 4th ranks regarding satisfaction and safety with RII = 0.826 and 0.695 respectively. The contractors consider this clause to be of high importance, and agree that the employer shall repay to the contractor any costs of the execution of the works connected with the said special risks subject.

Table 4.9 illustrates that the surveyed contractors ranked the "Special risks" clause at the 1st rank regarding satisfaction with RII = 0.853. This clause was ranked at the 2nd and 3rd ranks regarding cost, safety, time and quality with RII = 0.826, 0.721, 0.716 and 0.668 respectively. These results show that the contractors consider the special risks as a very important issue, which affect project performance characteristics. These special risks are the risks defined in the clause of "Employer's risks", clause 20.4, insofar as these relate to the country in which the works executed. The special risks clause represents the "Force majeure" clause.

Table 4.9 clarifies that the surveyed contractors ranked the "Damage to works by special risks" clause at the 2nd rank toward the satisfaction, time, safety and quality with RII = 0.837, 0.747, 0.742 and 0.695 respectively. This clause was ranked at the 4th rank regarding the cost factor with RII = 0.805. These results reflect the attitude of contractors toward this clause, which has a high relative importance. This determines, if the works or any of the contractor's equipment sustains damage due to any of the said special risks, the contractor shall be entitled to payment for: rectifying any such damage to the works, and replacing or rectifying such contractor's equipment.

Table 4.9 Relative importance index and ranking for special risks clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
No Liability for Special Risks	0.821	3	0.711	4	0.647	4	0.763	1	0.816	4
Special Risks	0.826	2	0.716	3	0.668	3	0.721	3	0.853	1
Damage to Works by Special Risks	0.805	4	0.747	2	0.695	2	0.742	2	0.837	2
Increased Costs arising from Special Risks	0.868	1	0.774	1	0.737	1	0.695	4	0.826	3
Removal of Contractor's Equipment on Termination	0.737	6	0.632	6	0.579	6	0.632	6	0.758	6
Payment if Contract Terminated	0.742	5	0.647	5	0.584	5	0.647	5	0.816	5

The "No liability for special risks" clause was ranked at 1st rank regarding satisfaction factor with RII = 0.853. This clause was ranked at 2nd and 3rd ranks regarding cost, safety, time and

quality respectively with RII = 0.826, 0.721, 0.716 and 0.668 respectively. The contractors agree under this clause that, the contractor shall be under no liability whatsoever in consequence of any of the special risks, whether by way of indemnity or otherwise, for or in respect of: (1) damage to the works; (2) damage to property of the employer or third party; and (3) injury or loss of life.

Table 4.9 shows that the surveyed contractors ranked the "Payment if contract terminated" clause at 5th rank regarding satisfaction, cost, time, safety and quality with RII = 0.816, 0.742, 0.647, 0.647 and 0.584 respectively. Although the contractors ranked this clause at lower ranks, the relative importance index (RII) for all project characteristics still, relatively high and higher than 0.580. This indicates that contractors agree that if the contract is terminated as previously mentioned, the employer should pay the contractor, insofar as such amounts or items have not already been covered by payments on account made to the contractor, for all work executed prior to the date of termination at the rates and prices provided in the contract.

Table 4.9 illustrates that the surveyed contractors ranked the "Removal of contractor's equipment on termination" clause at the 6th rank regarding satisfaction, cost, time, safety and quality respectively with RII = 0.758, 0.737, 0.632, 0.632 and 0.579 respectively. The contractors ranked this clause at lower ranks, but high relative importance index (RII) regarding the project characteristics. The contractors agree: if the contract is terminated, the contractor shall, with all reasonable dispatch, remove from the site all contractors' equipment and shall give similar facilities to his subcontractors to do so.

4.1.10 Group (G), Release from performance clauses

This group contains one clause. Table 4.10 shows that the surveyed contractors ranked the "Payment in event of release from performance" clause at the 1st rank regarding satisfaction, cost, quality, time and safety respectively, with RII = 0.805, 0.768, 0.658, 0.653 and 0.647 respectively. The contractors agree that if any circumstances outside the control of both parties arise after the issue of the letter of acceptance that renders it impossible for either or both parties to fulfill his obligations, or under the law governing the contract, the parties released from further performance, and then the parties will discharge from the contract.

Table 4.10 Relative importance index and ranking for release from performance clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Payment in Event of Release from Performance	0.768	1	0.653	1	0.658	1	0.647	1	0.805	1

4.1.11 Group (11): Settlement of disputes clauses

This group contains four clauses that explain the settlement of disputes clauses. Table 4.11, clarifies that the surveyed contractors ranked the "Failure to comply with engineer's decision" clause at the 1st rank regarding satisfaction, time, quality and safety respectively with RII = 0.868, 0.847, 0.821 and 0.816 respectively. This clause was ranked at 2nd rank regarding cost with RII = 0.884. These results represent the attitude of the contractors regarding this clause and its impact on cost and time of any project.

The high relative importance index shows that the contractors believe deeply that where neither the employer nor the contractor has given notice of intention to commence arbitration of a dispute within the 84 days. Meanwhile, when the related engineer's decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration.

The surveyed contractors ranked the "Engineer's decision" at the 1st rank regarding cost with RII = 0.889. This clause was ranked at the 2nd and 4th ranks regarding time, quality, safety and satisfaction respectively with RII = 0.768, 0.753, 0.679 and 0.853 respectively. These results show the significant impact of this clause on project performance characteristics. The contractors agree that if the engineer has given notice of his decision as to a matter in dispute to the employer and the contractor and no notice of intention to commence arbitration as to such dispute has been given by either the employer or the contractor. Upon or before the seventieth day after the day on which the parties received notice as to such decision from the engineer, the said decision shall become final and binding upon the employer and the contractor.

Table 4.11 Relative importance index and ranking for settlement of disputes clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer's Decision	0.889	1	0.768	2	0.753	2	0.679	2	0.853	4
Amicable Settlement	0.811	4	0.742	4	0.716	4	0.647	4	0.863	2
Arbitration	0.879	3	0.768	3	0.742	3	0.653	3	0.858	3
Failure to Comply with Engineer's Decision	0.884	2	0.847	1	0.821	1	0.716	1	0.868	1

Table 4.11 shows that the surveyed contractors ranked the "Arbitration" clause at the 3rd rank regarding cost, satisfaction, time, quality and safety respectively with RII = 0.879, 0.858, 0.768**,** 0.742 and 0.653 respectively. These high relative importance indices refer to the belief of contractor that arbitration comes in the third rank between the ways of disputes settlement. The contractors agree that any dispute in respect of which: (a) the decision, if any, of the engineer has not become final and binding, or (b) Amicable settlement has not been reached within the specified 87 days. The dispute will be finally settled, unless otherwise specified in the contract, under the rules of conciliation and arbitration of the international chamber of commerce by one or more arbitrators appointed under such rules.

Table 4.11 finally, illustrates that the surveyed contractors ranked the "Amicable settlement" at the 2nd and the 4th ranks regarding satisfaction, cost, time, quality and safety respectively with RII = 0.863, 0.811, 0.742, 0.716 and 0.647 respectively. These results conclude the attitude of contractors toward the amicable settlement of disputes. The surveyed contractors agree that where notice of intention to commence arbitration as to a dispute has been given, the parties shall attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless the parties otherwise agree, arbitration may be recommended on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made.

4.1.12 Relative importance index and ranking for FIDIC articles or (groups) from contractors' perspective

The surveyed contractors ranked the group of "Engineer and engineer's representative" clauses at the 1st , 2nd , 4th , 7th and 11th ranks regarding quality, safety, time, satisfaction and cost factors with RII = 0.877, 0.740, 0.825, 0.793 and 0.746 respectively as shown in Table 4.12 . These results represent the contractors' belief in the engineer's role in respect to the project performance and first of all the impact on the quality of construction project. This represents a good indication of the contractors' perception regarding this group. This group is satisfactory to the contractor with RII = 0.793, because the surveyed contractors consider the text of this group clear and treats the subject of the group clauses properly.

The "Contract documents" group was ranked by the surveyed contractors at the 4th, 5th, 8th and 10th ranks regarding quality, time, cost, satisfaction and safety with RII = 0.728, 0.824, 0.801, 0.759 and 0.625 respectively as shown in Table 4.12. The surveyed contractors consider the contract documents group as a significant group regarding the project time and cost in particular. This group is satisfactory to contractors with RII = 0.759. The "General obligations" group was ranked by the surveyed contractors at the 1st, 3rd, 5th and 8th ranks regarding safety, satisfaction, cost, quality and time with RII = 0.745, 0.821, 0.836, 0.719 and 0.756 respectively, as shown in Table 4.12. The surveyed contractors believe that the general obligation group comes in the 1st rank with RII = 0.745 regarding impact on the quality of construction project. This group of clauses is satisfactory to contractors with RII = 0.821, because the surveyed contractors consider the text of this group clear and treats the subject of the group clauses properly.

The "Suspension" group was ranked at the 2nd, 8th and 11th ranks regarding cost, time, satisfaction, safety and quality with RII = 0.879, 0.868, 0.788, 0.621 and 0.619 respectively as shown in Table 4.12. These results illustrate that the contractors believe that this group has a high impact on both time and cost highly with RII = 0.879 and 0.868, meanwhile this group is highly satisfactory to the contractors with RII = 0.788. Therefore, the contractors believe that suspension may lead to claims and disputes.

The surveyed contractors ranked the group of "Commencement and delays" clauses at the 1st, 3rd, 9th and 11th ranks regarding time, cost, quality, safety and satisfaction with RII = 0.888, 0.874, 0.635, 0.625 and 0.726 respectively as shown in Table 4.12 . This result refers that contractors believe that this group comes in the 1st rank toward the project time with RII =

0.888. This assures the high impact of this group clauses on the time characteristic for the construction project, meanwhile, this group is satisfactory to contractors with RII = 0.726, because the surveyed contractors consider the text of this group clear and treats the subject of the group clauses properly.

Table 4.12 Relative importance index and ranking for FIDIC groups from contractors' perspective

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer and Engineer's Representative	0.746	11	0.825	4	0.877	1	0.740	2	0.793	7
Contract Documents	0.801	8	0.824	5	0.728	4	0.625	10	0.759	10
General Obligations	0.836	5	0.756	8	0.719	5	0.745	1	0.821	3
Suspension	0.879	2	0.868	2	0.619	11	0.621	11	0.788	8
Commencement and Delays	0.874	3	0.888	1	0.635	9	0.625	9	0.726	11
Alterations, Additions, and Omissions	0.909	1	0.825	3	0.763	2	0.630	8	0.781	9
Procedure for Claims	0.826	6	0.807	6	0.703	6	0.645	7	0.803	6
Certificates and Payment	0.807	7	0.735	9	0.691	8	0.655	5	0.842	2
Special Risks	0.800	9	0.704	10	0.652	10	0.700	3	0.818	4
Release from Performance	0.768	10	0.653	11	0.658	9	0.647	6	0.805	5
Settlement of Disputes	0.866	4	0.782	7	0.758	3	0.674	4	0.861	1

As shown in Table 4.12, the surveyed contractors ranked the group of "Alterations, additions and omissions" clauses at the 1st , 2nd, 3rd, 8th, and 9th ranks regarding cost, quality, time, safety and satisfaction with RII = 0.909, 0.763, 0.825, 0.630 and 0.781 respectively. This result illustrates the high impact of the clauses of this group on the cost in particular with RII = 0.909, and show that this group is satisfactory to contractors with RII = 0.781. This also, interprets the high importance of cost characteristic of any construction project that in turn, influences the likelihood of the project success.

The "Procedure for claims" group was ranked at the 6th and 7th ranks regarding time, cost, satisfaction, quality and safety with RII = 0.826, 0.807, 0.803, 0.703 and 0.645 respectively as shown in Table 4.12. These results illustrate that the contractors believe that this clauses have a significant impact on the time and cost of the project. This group is satisfactory to the contractors with RII = 0.803. The contractors therefore, agree to follow the steps stipulated in the contract conditions and present sufficient documentation to enhance the chances of success for their claims.

The "Certificates and payment" group was ranked at the 2nd, 5th, 7th, 8th and 9th ranks regarding satisfaction, safety, cost, quality and time with RII = 0.842, 0.655, 0.807, 0.691 and 0.735 respectively as shown in Table 4.12. These results illustrate that this group is highly satisfactory to the contractors with RII = 0.842, meanwhile the certificates and payment group have a high impact on both cost and time factors with RII = 0.807 and 0.735 respectively.
The surveyed contractors ranked the "Special risks" group at the 3rd, 4th, 9th and 10th regarding safety, satisfaction, cost, time and quality with RII = 0.700, 0.818, 800, 0.704 and 0.652 respectively as shown in Table 4.12 . This result clarifies how much the surveyed contractors believe that the special risks clauses affect highly project cost and time. The special risks clauses are highly satisfactory to the contractors with RII = 0.818, because the surveyed contractors consider the text of this group clear and treats the subject of the group clauses properly.

The "Release from performance" group was ranked at the 5th, 6th, 9th, 10th and 11th ranks regarding satisfaction, safety, quality, cost and time with RII = 0.805, 0.645, 0.658, 0.768 and 0.653 respectively as shown in Table 4.12. This group is satisfactory to the contractors with RII = 0.805, because the surveyed contractors consider the text of this group clear and treats the subject of the group clauses properly.

The "Settlement of disputes" group was ranked at the 1st , 3rd , 4th and 7th ranks regarding satisfaction, quality, cost, safety and time with RII = 0.861, 0.758, 0.866, 0.674 and 0.782 respectively as shown in Table 4.12. These results show that this group of clauses is highly satisfactory to the surveyed contractors with RII = 0.861. The "Settlement of disputes" group has a high RII = 0.866 regarding cost. This clarifies that contractors agree that the clauses of this group have a high impact on the cost and time of the construction project. Therefore, the contractors agree to follow the steps mentioned in this group to settle any dispute if it may occur.

4.2 Relative importance index and ranking from owners' perspective

This section shows the relative importance index (RII) and ranking from owners' perspective regarding the FIDIC contract general conditions clauses that have the utmost impact on the construction project performance. These clauses form the study questionnaire items, and consist of the following eleven articles or (groups):

Group (1): Engineer and engineer's representative: includes three clauses,

Group (2): Contract documents: includes four clauses,

Group (3): General obligations: includes eleven clauses,

Group (4): Suspension: includes three clauses,

Group (5): Commencement and delays: includes three clauses,

Group (6): Alterations, additions, and omissions: includes three clauses,

Group (7): Procedure for claims: includes five clauses,

Group (8): Certificates and payment: includes eight clauses,

Group (9): Special risks: includes six clauses,

Group (10): Release from performance: includes one clause, and

Group (11): settlement of disputes: includes four clauses.

4.2.1 Group (1): Engineer and engineer's representative clauses

This group contains three clauses, which clarify and determine the engineer and engineer's representative role. Table 4.13 illustrates that the surveyed owners ranked the clause "engineer's duties and authority" at the 1st rank regarding quality, time, safety, satisfaction and cost with RII = 0.873, 0.860, 0.853, 0.827 and 0.800 respectively. This clarifies that the surveyed owners believe that this clause has a significant impact on the project performance. The owner considers the engineer as his representative, who is authorized by the owner's approval with the duties specified in the contract. The duties include control of works quantities and its quality within the contract time and budget.

The surveyed owners ranked the clause "Engineer's representative" at the 2nd and 3rd ranks regarding quality, safety, satisfaction time and cost with RII = 0.800, 0.813, 0.740, 0.733 and 0.667 respectively. This illustrates that the surveyed owners believe that this clause impact the project performance significantly and particularly when the engineer's representative is delegated to carry out such duties and exercise such authority as delegated to him by the engineer according to the contract. The owners consider this clause of high importance regarding quality and safety since the engineer and his representative have a serious responsibility towards the project performance characteristics.

The surveyed owners ranked the clause "engineer's authority to delegate" at the 2nd and 3rd ranks regarding safety, time, satisfaction, cost and quality with RII = 0.827, 0.800, 0.773, 0.727 and 0.793 respectively. This shows that the surveyed owners believe that the engineer has the right to delegate to his representative any of the duties and authorities vested in the engineer role, and he may at any time revoke such delegation. According to this clause, if the contractor questions any communication of the engineer's representative, then the contractor may refer the matter to the engineer who will confirm, reverse or vary the contents of such communication.

Table 4.13 Relative importance index and ranking for Engineer and engineer's representative clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer's Duties and Authority	0.800	1	0.860	1	0.873	1	0.853	1	0.827	1
Engineer's Representative	0.667	3	0.733	3	0.800	2	0.813	3	0.740	3
Engineer's Authority to Delegate	0.727	2	0.800	2	0.793	3	0.827	2	0.773	2

4.2.2 Group (2): Contract documents clauses

This group contains four clauses that explain the clauses of contract documents. Table 4.14 clarifies that the surveyed owners ranked the clause of "Priority of contract documents" at the 1st and 2nd ranks regarding cost, quality, satisfaction, safety and time with RII = 0.847, 0.773, 0.767, 0.727 0.713 respectively. This illustrates that the surveyed owners believe that the several documents forming the contract should be taken as mutually explanatory of one another. Relative importance index of this clause was 0.847 regarding cost. This illustrates the serious impact of this clause on cost of the project. Nevertheless, in case of any ambiguities of contract documents, the surveyed owners agree that the engineer shall explain and adjust any ambiguous documents in writing and issue to the contractor instructions thereon.

The results shown in Table 4.14 indicate that the surveyed owners ranked the clause "Delays and cost of delay of drawings" at the 1st, 2nd, 3rd and 4th ranks regarding time, cost, safety, satisfaction and quality with RII = 0.833, 0.667, 0.527, 0680 and 0.560 respectively. These results illustrate a serious impact on project performance. According to this clause: if the engineer fails to issue any drawing or instruction for which notice has been given by the contractor and the contractor suffers delay or incurs costs, then the engineer shall determine

any extension of time to which the contractor is entitled and the amount of such costs which shall be added to the contract price.

Table 4.14 Relative importance index and ranking for Contract documents clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Priority of Contract Documents	0.847	1	0.713	4	0.773	1	0.727	1	0.767	1
Disruption of Progress	0.773	3	0.820	2	0.673	2	0.700	2	0.713	3
Delays and Cost of Delay of Drawings	0.767	2	0.833	1	0.560	4	0.527	3	0.680	4
Failure by Contractor to Submit Drawings	0.773	3	0.780	3	0.567	3	0.520	4	0.753	2

Table 4.14 shows that the surveyed owners ranked the clause "Disruption of progress" at the 2nd and 3rd ranks regarding time, safety, quality, cost and satisfaction with RII = 0.820, 0.700, 0.673, 0.773 and 0.713 respectively. This result illustrates how far the owner is careful for the continuation of works. According to this clause, the contractor will give notice to the engineer, whenever planning or execution of the works is likely to be delayed or disrupted, unless the engineer issues any further drawing or instruction within a reasonable time. RII = 0.820 and 0.773 regarding time and cost. This means a high impact on both of time and cost.

The clause of "Failure by contractor to submit drawings" was ranked by the surveyed owners at the 2nd, 3rd, and 4th ranks regarding satisfaction, time, cost, quality and safety with RII = 0.753, 0.780, 0.773, 0.567 and 0.520 respectively. This clause determines, if the inability of the engineer to issue any drawings is caused by the failure of the contractor to submit required drawings under the contract. Then the engineer will take such failure by contractor into account when making his determination regarding extension of time and the amount of such costs, which will be added to contract price.

4.2.3 Group (3): General obligations clauses

This group contains eleven clauses, which explains and determines general obligations of the contract parties. As shown in Table 4.15, the surveyed owners ranked the clause "Program to be submitted" at the 1st, 3rd, 5th and 7th ranks regarding time, satisfaction, quality, cost and safety with RII = 0.860, 0.833, 0.727, 0.800 0.707 respectively. This clarifies that owners

believe deeply in the importance of time program and its impact on project period and cost. These results indicate the high importance and impact of the program regarding the cost and time. The owners agree that the contractor will provide the engineer a general description of the arrangements and methods that the contractor proposes to adopt for execution the works.

The "Safety, security, and protection of environment" clause was ranked by surveyed owners at the 1st, 2nd, 6th and 7th ranks regarding safety, cost, quality, satisfaction and time factors with RII = 0.853, 0.833, 0.767, 0.773 and 0.627 respectively. This result illustrates that the owners believe that contractors are obligated toward the safety of all persons and maintenance of public assets for the protection of the works and convenience of the public. These high RII clarifies that the owners are very careful to keep the site and the works in an orderly state to protect the environment and avoid any damage to property of the public resulting from pollution of the works' operations.

The "Insurance against accident to workmen" clause was ranked at the 1st, 2nd, 10th and 11th ranks regarding cost, safety, satisfaction, quality and time with RII = 0.860, 0.853, 0.813, 0.627 and 0.567 respectively. This illustrates that owners believe in the high relative importance of this clause. The owners agree that the contractor shall insure against such liability and shall continue such insurance during the whole of the time that any persons are employed by him on the works.

Table 4.15 shows that the surveyed owners ranked the clause "Employer's responsibilities" at the 1st, 3rd, 6th and 8th ranks regarding quality, cost, time, safety and satisfaction with RII = 0.800, 0.813, 0.740, 0.747 and 0.760 respectively. By this clause, the owners agree that if the employer will employ other contractors on site, he will require them to have the same regard for safety and avoidance of danger under the employer's responsibilities. The clause of "Cash flow estimate to be submitted" was ranked at the 2nd, 3rd , 6th, 9th and 10th ranks regarding time, satisfaction, cost, quality and safety with RII = 0.847, 0.813, 0.793, 0.640 and 0.607 respectively. These results clarify that the surveyed owners believe that the contractor should provide to the engineer a detailed cash flow estimate to be submitted in quarterly periods, of all payments to which contractors will be entitled under the contract. The high RII regarding the time factor and the other factors of project performance indicate to the importance of cash flow in respect to the financial relations between contractors and owners.

Table 4.15 Relative importance index and ranking for General obligations clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Claims under Performance Security	0.727	10	0.600	9	0.693	5	0.600	11	0.707	11
Program to be Submitted	0.800	5	0.860	1	0.727	3	0.707	7	0.833	1
Cash Flow Estimate to be Submitted	0.793	6	0.847	2	0.640	9	0.607	10	0.813	3
Safety, Security, and Protection of the Environment	0.833	2	0.627	7	0.767	2	0.853	1	0.773	6
Employer's Responsibilities	0.813	3	0.740	3	0.800	1	0.747	6	0.760	8
Employer's Risks	0.787	7	0.700	4	0.713	4	0.773	5	0.740	9
Insurance of Works and Contractor's Equipment	0.753	9	0.647	6	0.647	7	0.793	4	0.800	5
Indemnity by Employer	0.807	4	0.620	8	0.647	8	0.687	8	0.740	10
Cross Liabilities	0.713	11	0.580	10	0.680	6	0.660	9	0.807	4
Accident or Injury to Workmen	0.767	8	0.680	5	0.607	11	0.820	3	0.760	7
Insurance Against Accident to Workmen	0.860	1	0.567	11	0.627	10	0.853	2	0.813	2

The surveyed owners ranked the "Employer's risks" clause at the 4th, 5th, 7th and 9th ranks regarding quality, time, safety, cost and satisfaction with RII = 0.713, 0.700, 0.773, 0.787 and 0.740 respectively. The owners agree by this clause to determine the employer's risks clearly. This clause represents the "Force majeure" clause. This clause was ranked at the 5th and 7th ranks regarding time and cost with RII = 0.700 and 0.773 respectively. The employer's risks are determined clearly under this clause to avoid disputes, which may arise due to these risks.

The "Insurance of works and contractor's equipment" clause was ranked at the 4th, 5th, 6th, 7th and 9th ranks regarding safety, satisfaction, time, quality and cost with RII = 0.793 and 0.800, o647, 0.647 and 0.753 respectively. The owners agree that the contractors will be obligated to insure the works with materials and plant for incorporation therein, and the contractor's

equipment, to the full replacement cost (including profit). The high RII clarifies the impact of this clause on the project performance characteristics.

The "Accident or injury to workmen" clause was ranked at 3rd, 5th, 7th, 8th, 11th ranks regarding safety, time, satisfaction, cost and quality with RII = 0.820, 0.680, 0.760, 0.767 and 0.607 respectively. This result illustrates that the surveyed owners agree by contract that they as the (employer) will not be liable for any damages to any workers or other person in the employment of the contractor. The contractor will indemnify and keep indemnified the employer against all such damages and compensation.

The surveyed owners ranked the "Indemnity by employer" clause at the 4th, 8th and 10th ranks regarding cost, safety, quality, time and satisfaction with RII = 0.807, 0.687, 0.660, 0.580 and 0.740 respectively. The owners agree by this clause to indemnify the contractor against all claims, costs and charges in respect to the damage to persons or property exceptions as mentioned in FIDIC 87 clause 22.2). This assures the principle of risk sharing between the contract parties to guarantee a balanced and fair contract.

The "Cross liabilities" clause was ranked by the surveyed owners at the 4th, 6th, 9th, 10th and 11th ranks regarding quality, safety, satisfaction, cost and time with RII = 0.807, 0.680, 0.784, 0.742 and 0.713 respectively. The owners believe and agree that the insurance policy shall include a cross liability clause such that the insurance shall apply to the contractor and to the employer as separate insurers.

Finally, Table 4.15 shows that surveyed owners ranked the clause "Claims under performance security" at the 5th, 9th, 10th and 11th ranks in respect to cost and time with RII = 0.693, 0.600, 0.727, 0.707 and 0.600 respectively. The surveyed owners believe that prior to making a claim under the performance security, the employer (owner) will notify the contractor stating the nature of the default in respect of which the claim is to be made. This result illustrates the serious impact of claims on cost and time of the project and the relation between both of the owners and the contractors.

4.2.4 Group (4): Suspension clauses

This group contains three clauses that explain and identify the suspension clauses. Table 4.16 shows that the surveyed owners ranked the "Engineer's determination following suspension" clause at the 1st and 2nd ranks regarding time, cost, satisfaction, safety and quality with RII =

0.853, 0.840, 0.800, 0.627 and 0.607 respectively. These results clarify that the owners agree that the engineer will determine: (1) any extension of time to which the contractor is entitled; and (2) the amount, which will be added to the contract price regarding the cost incurred by the contractor due to such suspension.

Table 4.16 shows that the surveyed owners ranked the clause of "Suspension lasting more than 84 days" at the 1st, 2nd, and 3rd ranks regarding safety, quality, satisfaction, time and cost with RII = 0.647, 0.613, 0.733, 0.800 and 0.800 respectively. This result shows the high importance of this clause and its impact on project performance factors. The owners believe and agree that if such a suspension extends more than 84 days and if the engineer does not permit contractor to resume works after another 28 days upon contractor's notice, then the contractor will treat the suspension as an event of default by the employer and terminate his employment under the contract. Suspension of works may lead to claims and disputes unless dealt with seriously.

The clause of "Suspension of work" was ranked at the 2nd and 3rd ranks regarding time, cost, satisfaction, safety and quality with RII = 0.833, 0.827, 0.720, 0.600 and 0.593 respectively. The owners agree that, upon the instruction of the engineer, the contractor will suspend the progress of the works and properly protect these works during such suspension, so far as it is necessary, in the opinion of the engineer.

Table 4.16 Relative importance index and ranking for Suspension clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Suspension of Work	0.827	2	0.833	2	0.593	3	0.600	3	0.720	3
Engineer's Determination following Suspension	0.840	1	0.853	1	0.607	2	0.627	2	0.800	1
Suspension lasting more than 84 Days	0.800	3	0.800	3	0.613	1	0.647	1	0.733	2

4.2.5 Group (5): Commencement and delays clauses

This group contains three clauses, which explain and clarify the commencement and delays clauses. Table 4.17, shows that the surveyed owners ranked the clause of "Rate of progress" at

the 1st, 2nd and 3rd ranks regarding time, satisfaction, safety, quality and cost with RII = 0.867, 0.780, 0.633, 0620 and 0.820 respectively. This result shows that owners agree and believe that rate of progress has a high impact on time and cost. If for any reason, which does not entitle the contractor to an extension of time, the rate of progress of works is too slow to comply the time for completion, the engineer will notify the contractor to take steps to expedite progress without any additional payment for taking such steps.

The clause of "Liquidated damages for delay" was ranked at the 1st, 2nd and 3rd ranks regarding quality, cost, satisfaction, safety and time with RII = 0.647, 0.833, 0.760, 593 and 0.667 respectively. The result shows that surveyed owners believe and agree that if the contractor fails to comply with the time for completion, then the contractor shall pay to the employer the relevant sum stated in the appendix to tender as liquidated damages for such default and not as penalty according to the contract.

The clause of "Extension of time for completion" was ranked at the 1st, 2nd and 3rd ranks regarding cost, time, safety, satisfaction and quality with RII = 0.847, 0.833, 0.593, 0.727 and 0.607 respectively. The surveyed owners agree in the event of extra works, any cause of delay, adverse climatic conditions and any delay by the employer, this clause entitle the contractor to an extension of time for completion of the works by the engineer, who will determine the amount of such extension.

Table 4.17 Relative importance index and ranking for Commencement and delays clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Extension of Time for Completion	0.847	1	0.833	2	0.607	3	0.593	2	0.727	3
Rate of Progress	0.820	3	0.867	1	0.620	2	0.633	1	0.780	1
Liquidated Damages for Delay	0.833	2	0.667	3	0.647	1	0.593	2	0.760	2

4.2.6 Group (6): Alterations, additions, and omissions clauses

This group contains three clauses that clarify the alterations, additions and omissions clauses. Table 4.18 shows that the surveyed owners ranked the clause "Variations" at the 1st and 2nd ranks regarding time, quality, safety, cost and satisfaction with RII = 0.827, 0.673, 0.600,

0.820 and 0.680 respectively. This result shows the high relative importance of this clause. The surveyed owners believe and agree that any variations are considered causes of substantial adjustment to the contract cost and/or time; and that by this clause; no such variation shall in any way invalidate the contract and in turn, may lead to disputes. This result illustrates that variations (changes) in projects are common and may be deleterious or beneficial-whether the change is considered either a conflict or a valuable lesson.

Table 4.18 Relative importance index and ranking for Alterations, additions, and omissions clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Variations	0.820	2	0.827	1	0.673	1	0.600	1	0.680	2
Valuation of Variations	0.853	1	0.787	2	0.653	3	0.580	2	0.720	1
Power of Engineer to Fix Rates	0.800	3	0.600	3	0.667	2	0.560	3	0.660	3

The surveyed owners ranked the clause "valuation of variations" at the 1st, 2nd and 3rd ranks regarding cost, satisfaction, time, safety and quality with RII = 0.853, 0.720, 0.787, 0.580 and 0.653 respectively. The surveyed owners agree that the varied work will be valued at the rates and prices set out in the contract, but if the contract does not contain any rates or prices applicable to the varied work, the rates and prices in the contract will be used as the basis for the valuation so far as may be reasonable.

The clause of "Power of engineer to fix rates" was ranked at the 2nd and 3rd ranks regarding quality, cost, satisfaction, time and safety with RII = 0.667, 0.800, 0.660, 0.600 and 0.560 respectively. The owners agree that a suitable rate or price for the varied work will be agreed upon between the engineer and the contractor, and in the event of disagreement, the engineer shall fix such other rate or price as is, in his opinion, appropriate. Rates of costs are a major cause for claims and consequently disputes unless to be agreed upon or fixed according to contract.

4.2.7 Group (7): Procedure for claims clauses

This group contains five clauses that explain the procedure for claims. Table 4.19 shows that the surveyed owners ranked the clause of "Payment of claims" at the 1st and 4th ranks regarding cost, satisfaction, quality, safety and time with RII = 0.840, 0.800, 0.680, 0.660 and

0.673 respectively. This result shows that the surveyed owners agree that payment of claims impact all project performance factors highly and the cost in particular, where RII = 0.840. However; the owners agree and believe that: since a claim is a request for an extension of time and/or additional costs, it can evolve into a dispute and losses unless amicably resolved by the parties concerned. Procedure for claims process clauses pave the way to contractor to precede with his claim.

The surveyed owners ranked the clause of "Failure to comply" at the 1st, 2nd, 3rd and 4th ranks regarding time, quality, safety, satisfaction and cost with RII = 0.713, 0.673, 0.640, 0.767 and 0.760 respectively. The owners agree that failure by contractor to comply with the procedure for claims has serious impact on his entitlement to payment. This is clear and has impact on cost seriously where RII of this clause regarding cost = 0.760.

Table 4.19 Relative importance index and ranking for Procedure for claims clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Notice of Claims	0.787	3	0.693	2	0.647	4	0.607	5	0.753	5
Contemporary Records	0.647	5	0.633	5	0.633	5	0.647	2	0.767	3
Substantiation of Claims	0.813	2	0.680	3	0.673	3	0.620	4	0.780	2
Failure to Comply	0.760	4	0.713	1	0.673	2	0.640	3	0.767	4
Payment of Claims	0.840	1	0.673	4	0.680	1	0.660	1	0.800	1

The surveyed owners ranked the clause of "Substantiation of claims" in the 2nd, 3rd and 4th ranks regarding the cost, satisfaction, time, quality and safety with RII = 0.813, 0.780, 0.680, 0.673 and 0.620 respectively. The owners agree that within 28 days of giving notice to claim, the contractor will send to the engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based.

The clause of "Notice of claims" was ranked at the 2nd, 3rd, 4th and 5th ranks regarding time, cost, quality, satisfaction and safety with RII = 0.693, 0.787, 0.647, 0.753 and 0.607 respectively. This shows that the owners understand that if the contractor intends to claim any additional payment pursuant to any clause of these conditions or otherwise, he will give

notice of his intention to the engineer within 28 days after the event giving rise to the claim has first arisen.

The surveyed owners ranked the clause "Contemporary records" at the 2nd, 3rd and 5th ranks regarding safety, satisfaction, cost, time and quality with RII = 0.647, 0.667, 0.647, 0.633 and 0.633 respectively. The owners believe in the high importance of the contemporary records. The owners think that upon issuing notice of claims, the contractor will keep such records as may reasonably be necessary to support any claim he may subsequently wish to make.

4.2.8 Group (8): Certificates and payment clauses

This group contains eight clauses that clarify and explain the certificate and payment clauses. Table 4.20 shows that the surveyed owners ranked the "Monthly payments" clause at the 1st, 2nd and 3rd ranks regarding time, safety, cost, satisfaction, and quality with RII = 0.767, 0.640, 0.740, 0.787 and 0.700 respectively. This result clarifies that the owners deal with this clause carefully. The owners agree that this clause affects highly all the project performance characteristics and any delay or obstacles toward application of this clause will be a basis for disputes. Monthly payments will be subject to (1) the retention of the amount calculated by applying the percentage of retention stated in the appendix to tender, and to (2) the deduction of any sums, which have become due and payable by the contractor to the employer.

The "Defects liability certificate" clause was ranked at the 1st, 3rd, 6th and 8th ranks regarding cost, quality, safety, satisfaction and time with RII = 0.773, 0.740, 0.633, 0.670 and 0.573 respectively as shown in Table 4.20. The surveyed owners believe in the serious impact of this clause on project performance. The owners agree that the contract will not be considered as completed until the engineer will have signed a defect liability certificate and delivered to the employer, with a copy to the contractor. This certificate will state the date on which the contractor will have completed his obligations to execute and complete the works and remedy any defects therein to the engineer's satisfaction.

The "Time for payment" clause was ranked at the 1st, 2nd and 4th ranks regarding satisfaction, time, safety, cost and time with RII = 0.895 and 0.811 respectively. This clause was ranked at the 3rd regarding satisfaction, quality and safety with RII = 0.807, 0.720, 0.640, 0.727 and 0.613 respectively. These results show the owners' high satisfaction toward this clause. The owners agree that any amount due to the contractor under any interim payment certificate issued by the engineer will be paid by the employer to the contractor within 28 days or, in the case of the final payment certificate within 56 days after such certificates have been delivered

to the employer. The provisions of this clause are without prejudice to the contractor's entitlement, in case of default by employer.

Table 4.20 Relative importance index and ranking for Certificates and payment clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Monthly Payments	0.740	2	0.767	1	0.700	3	0.640	1	0.787	3
Statement at Completion	0.700	6	0.680	3	0.587	5	0.580	6	0.773	5
Final Statement	0.700	7	0.640	6	0.580	6	0.587	5	0.747	8
Discharge	0.687	8	0.647	5	0.573	7	0.553	7	0.780	4
Final Payment Certificate	0.740	3	0.653	4	0.560	8	0.553	8	0.807	2
Time for Payment	0.727	4	0.720	2	0.613	4	0.640	2	0.807	1
Approval only by Defects Liability Certificate	0.727	5	0.633	7	0.713	2	0.627	4	0.760	7
Defects Liability Certificate	0.773	1	0.573	8	0.740	1	0.633	3	0.760	6

Table 4.20 shows that the surveyed owners ranked the "Final payment certificate" clause at the 2nd, 3rd, 4th and 8th ranks regarding satisfaction, cost, time, quality and safety respectively with RII = 0.807, 0.740, 0.653, 0.560 and 0.553 respectively. These results show the owners' care of the final payment certificate. The owners agree that the engineer within 28 days after receipt of the final statement, and the written discharge, shall issue a final payment certificate stating the amount which is finally due under the contract; and the balance, if any, due from the employer to the contractor or from the contractor to the employer as the case may be.

The "Approval only by defects liability certificate" clause was ranked at the 2nd, 4th, 5th and 7th ranks regarding quality, safety, cost, satisfaction and time with RII = 0.713, 0.627, 0.727, 0.760 and 0.633 respectively. These results show that the owners agree that only the "Defects liability certificate" will be deemed to constitute approval of the works.

As shown in Table 4.20, the surveyed owners ranked the "Statement at completion" clause at the 3rd , 5th and 6th ranks regarding time, satisfaction, quality, cost and safety with RII = 0.680,

0.773, 0.573, 0.553 and 0.687 respectively. The owners believe and agree that no later than 84 days after the issue of the taking-over certificate, the contractor will submit to the engineer a statement at completion. This certificate show: the value of all work done, any further sums that the contractor considers due, and an estimate of amounts, which the contractor considers, will be due to him under contract. The owners believe that any delay in issuing financial certificate will lead to disputes.

The "Discharge" clause was ranked at 4th, 5th, 7th and 8th ranks regarding satisfaction, time, quality, safety and cost respectively with RII = 0.780, 0.647, 0.573, 0.553 and 0.687 respectively. The owners believe that, upon submission of the final statement, the contractor will give to the employer, a written discharge confirming that the total of the final statement represents full and final settlement of all monies due to the contractor in respect of the contract.

As shown in Table 4.20, the surveyed owners ranked the "final statement" clause at the 5th, 6th, 7th and 8th ranks regarding safety, quality, time, cost and satisfaction respectively with RII = 0.587, 580, 0.640, 0.700 and 0.747 respectively. The owners agree that no later than 56 days after the issue of the defects liability certificate, the contractor will submit to the engineer: the value of all work done and any further sums, which the contractor considers to be due to him under the contract.

4.2.9 Group (9): Special risks clauses

Group (9) contains six clauses, which focus on special risks clauses. Table 4.21 clarifies that the surveyed owners ranked the "Increased costs arising from special risks" clause at 1st, 2nd, 4th and 12th ranks regarding cost, quality, time satisfaction and safety with RII = 0.767, 0.653, 0.640, 0.667 and 0.720 respectively. The owners consider this clause to be of high importance, and agree that the employer will repay to the contractor any costs of the execution of the works connected with the said special risks subject.

Table 4.21 illustrates that the surveyed owners ranked the "Special risks" clause at the 1st, 2nd and 3rd ranks regarding satisfaction, cost, safety, quality and time with RII = 0.693, 0.747, 0687, 0.620 and 0.633 respectively. These results show that the owners consider the special risks as a very important issue, which influence project performance characteristics. These special risks are the risks defined in the clause of "Employer's risks", clause 20.4, insofar as

these relate to the country in which the works will be executed. The special risks clause represents the "Force majeure" clause.

Table 4.21 clarifies that the surveyed owners ranked the "Damage to works by special risks" clause at the 1st, 2nd and 3rd ranks toward time, satisfaction, cost, safety and quality with RII = 0.653, 0.673, 0.720, 0.660 and 0.573 respectively. These results reflect the attitude of owners regarding this clause, which has a high relative importance. The owners agree that if the works or any of the contractor's equipment sustains damage due to any of the said special risks, the contractor shall be entitled to payment for: rectifying any such damage to the works, and replacing or rectifying such contractor's equipment.

Table 4.21 Relative importance index and ranking for Special risks clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
No Liability for Special Risks	0.707	5	0.627	4	0.553	4	0.633	4	0.673	3
Special Risks	0.747	2	0.633	3	0.620	2	0.687	2	0.693	1
Damage to Works by Special Risks	0.720	3	0.653	1	0.573	3	0.660	3	0.673	2
Increased Costs arising from Special Risks	0.767	1	0.640	2	0.653	1	0.720	12	0.667	4
Removal of Contractor's Equipment on Termination	0.673	6	0.620	6	0.520	6	0.567	5	0.620	6
Payment if Contract Terminated	0.720	4	0.620	5	0.540	5	0.547	6	0.667	5

The "No liability for special risks" clause was ranked at 3rd, 4th and 5th ranks regarding satisfaction, safety, time, quality and cost with RII = 0.673, 0.633, 0.627, 0.553 and 0.707 respectively. The owners agree under this clause that, the contractor will be under no liability whatsoever in consequence of any of the special risks, whether by way of indemnity or otherwise, for or in respect of: (1) damage to the works; (2) damage to property of the employer or third party; and (3) injury or loss of life.

Table 4.21 shows that the surveyed owners ranked the "Payment if contract terminated" clause at the 4th, 5th, 6th ranks regarding cost, satisfaction, quality, time and safety with RII = 0.720, 0.667, 0.620, 0.540 and 0.547 respectively. This indicates that the owners agree that if the contract is terminated as previously mentioned. Then, the employer will pay the contractor, insofar as such amounts or items have not already been covered by payments on account made to the contractor made to the contractor, for all work executed prior to the date of termination at the rates and prices provided in the contract.

Table 4.21 illustrates that the surveyed owners ranked the "Removal of contractor's equipment on termination" clause at the 5th and 6th ranks regarding safety, cost, time, satisfaction, and quality with RII = 0.567, 0.673, 0.620, 0.620 and 0.520 respectively. The owners agree: if the contract is terminated, the contractor will, with all reasonable dispatch, remove from the site all contractors' equipment and will give similar facilities to his subcontractors to do so.

4.2.10 Group (10): Release from performance clauses

This group contains one clause. Table 4.22 shows that the surveyed owners ranked the "Payment in event of release from performance" clause at the 1st rank regarding cost, satisfaction, time, quality and safety with RII = 0.707, 0.680, 0.593, 0.573 and 0.567 respectively. The owners agree that if any circumstances outside the control of both parties arise after the issue of the letter of acceptance that renders it impossible for either or both parties to fulfill his obligations, or under the law governing the contract, the parties are release from further performance, and then the parties will be discharged from the contract.

Table 4.22 Relative importance index and ranking for Release from performance clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Payment in Event of Release from Performance	0.707	1	0.593	1	0.573	1	0.567	1	0.680	1

4.2.11 Group (11): Settlement of disputes clauses

This group contains four clauses that explain the settlement of disputes clauses. Table 4.23 clarifies that the surveyed owners ranked the "Engineer's decision" at the 1st and 3rd ranks regarding cost, time, quality, safety and satisfaction with RII = 0.853, 0.807, 0.780, 0.733 and

0.807 respectively. These results show the significant impact of this clause on project performance characteristics.

These results illustrate that the owners prefer the engineer decision to be the 1st way in disputes settlement. The owners agree that: if the engineer has given notice of his decision as to a matter in dispute to the employer and the contractor and no notice of intention to commence arbitration as to such dispute has been given by either the employer or the contractor. Then upon or before the seventieth day after the day on which the parties received notice as to such decision from the engineer, the said decision will become final and binding upon the employer and the contractor.

Table 4.23 shows that the surveyed owners ranked the "Arbitration" clause at the 1st, 2nd and 3rd ranks regarding satisfaction, cost, time, quality and safety with RII = 0.827, 0.833, 0.740**,** 0.707 and 0.693 respectively. These high relative importance indices refer to the belief of owners that arbitration comes in the 2nd rank between the ways of disputes settlement. The owners agree that any dispute in respect of which: (a) the decision, if any, of the engineer has not become final and binding, or (b) amicable settlement has not been reached within the specified 87 days. The dispute will be finally settled, unless otherwise specified in the contract, under the rules of conciliation and arbitration of the international chamber of commerce by one or more arbitrators appointed under such rules.

Table 4.23 Relative importance index and ranking for Settlement of disputes clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer's Decision	0.853	1	0.807	1	0.780	1	0.733	1	0.807	3
Amicable Settlement	0.760	4	0.720	3	0.660	4	0.620	4	0.813	2
Arbitration	0.833	2	0.740	2	0.707	3	0.693	3	0.827	1
Failure to Comply with Engineer's Decision	0.767	3	0.720	3	0.720	2	0.707	2	0.753	4

The "Failure to comply with engineer's decision" clause was ranked at the 2nd, 3rd and 4th ranks regarding quality, safety, cost, time, and satisfaction with RII = 0.720, 0.707, 0.767 and

0.720 and 0.753 respectively. These results represent the attitude of the owners regarding this clause and its impact on the project performance characteristics. The high relative importance indices show that the owners believe that where neither the employer nor the contractor has given notice of intention to commence arbitration of a dispute within the 84 days. Meanwhile, the related engineer's decision has become final and binding; either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration.

Table 4.23 finally, illustrates that the surveyed owners ranked the "Amicable settlement" at the 2nd, 3rd and 4th ranks regarding satisfaction, time, cost, quality and safety with RII = 0.863, 0.813, 0.720, 0.760, 0.660 and 0.620 respectively. These results conclude the attitude of owners toward the amicable settlement of disputes. The surveyed owners agree that where notice of intention to commence arbitration as to a dispute has been given, the parties will attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless the parties otherwise agree, arbitration may be recommended on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made.

4.2.12 Relative importance index and ranking for FIDIC articles or (groups) from owners' perspective

The surveyed owners ranked the group of "Engineer and engineer's representative" clauses at the 1st, 2nd and 8th ranks regarding safety, quality, time, satisfaction and cost with RII = 0.831, 0.822, 0.798, 0.780 and 0.731 respectively as shown in Table 4.24. These results represent the owners' attitude towards the engineer's role in respect to the project performance and first of all its impact on safety and quality of the construction project. This illustrates that the owners deeply trust the engineer and his role according to this group. This group is satisfactory to the owners with RII = 0.780, because the surveyed owners consider the text of this group clear and treats the subject of the group clauses properly .

The "Contract documents" group was ranked by the surveyed owners at the 4th, 5th, 6th, 7th and 8th ranks regarding time, cost, quality, safety and satisfaction with RII = 0.787, 0.790, 0.643, 0.618 and 0.728 respectively as shown in Table 4.24. The surveyed owners believe in the high significance of the contract documents group regarding the project performance factors and in particular, time and cost. This group is satisfactory to owners with RII = 0.728,

because the surveyed owners consider the text of this group clear and treats the subject of the group clauses properly.

The "General obligations" group was ranked by the surveyed owners at the 2nd, 3rd, 4th, 6th and 8th ranks regarding safety, quality, satisfaction, cost and time with RII = 0.736, 0.686, 0.777, 0.787 and 0.679 respectively, as shown in Table 4.24. The surveyed owners believe that the general obligation clauses are very important and must be respected thoroughly by the contractors. This group of clauses is satisfactory to owners with RII = 0.777, because the surveyed owners consider the text of this group clear and treats the subject of the group clauses properly.

The "Suspension" group was ranked at the 1st, 3rd, 6th, 7th and 9th ranks regarding time, cost, safety, satisfaction and quality with RII = 0.829, 0.822, 0.624, 0.751 and 0.604 respectively as shown in Table 4.12. These results illustrate that the owners believe that this group has a high impact on both time and cost highly with RII = 0.829 and 0.822, meanwhile this group is highly satisfactory to the owners with RII = 0.751. Therefore, the owners believe that suspension of works may be a cause to claims and disputes.

The surveyed owners ranked the group of "Commencement and delays" clauses at the 1st, 3rd, 6th and 8th ranks regarding cost, time, satisfaction, quality and safety with RII = 0.833, 0.789, 0.756, 0.624 and 0.604 respectively as shown in Table 4.24 . This result refers that owners believe that this group influence the project cost highly with RII = 0.833. The owners consider the delays as a major cause for losses that may lead to failure of the construction project. This assures the high impact of these group clauses on the construction project. This group is satisfactory to the surveyed owners with RII = 0.726, because the surveyed owners consider the text of this group clear and treats the subject of the group clauses properly.

Table 4.24 Relative importance index and ranking for FIDIC groups from owners' perspective

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer and Engineer's Representative	0.731	8	0.798	2	0.822	1	0.831	1	0.780	2
Contract Documents	0.790	5	0.787	4	0.643	6	0.618	7	0.728	8
General Obligations	0.787	6	0.679	8	0.686	3	0.736	2	0.777	4
Suspension	0.822	3	0.829	1	0.604	9	0.624	6	0.751	7
Commencement and Delays	0.833	1	0.789	3	0.624	8	0.607	8	0.756	6
Alterations, Additions, and Omissions	0.824	2	0.738	6	0.664	4	0.580	10	0.687	9
Procedure for Claims	0.769	7	0.679	7	0.661	5	0.635	5	0.773	5
Certificates and Payment	0.724	9	0.664	9	0.633	7	0.602	9	0.778	3
Special Risks	0.722	10	0.632	10	0.577	10	0.636	4	0.666	11
Release from Performance	0.707	11	0.593	11	0.573	11	0.567	11	0.680	10
Settlement of Disputes	0.803	4	0.747	5	0.717	2	0.688	3	0.800	1

As shown in Table 4.24, the surveyed owners ranked the group of "Alterations, additions and omissions" clauses at the 2^{nd}, 4^{th} , 6^{th}, 9^{th} and 10^{th} ranks regarding cost, quality, time, satisfaction and safety with RII = 0.824, 0.664, 0.738, 0.687 and 0.580 respectively. This result illustrates the high impact of the clauses of this group on the cost in particular with RII = 0.824 and shows that this group is satisfactory to owners with RII = 0.687. This also, interprets the high importance of cost characteristic of any construction project, which in turn, influences the likelihood of the project success. Variations (changes) in projects are common and may be deleterious or beneficial whether the change is considered a conflict or a valuable lesson depending on the personal prospective.

The "Procedure for claims" group was ranked at the 5^{th} and 7^{th} ranks regarding time, cost, satisfaction, quality, safety, cost and time with RII = 0.773, 0.661, 0.635, 0.769 and 0.679 respectively as shown in Table 4.24. These results illustrate that the owners believe that this

clauses have a significant impact on the time and cost of the project. This group is satisfactory to the owners with RII = 0.635. The owners believe that the contractors should follow the steps stipulated in the contract conditions and present sufficient documentation to enhance the chances of success for their claims.

The "Certificates and payment" group was ranked at the 3rd, 7th, and 9th ranks regarding satisfaction, quality, cost, time and safety with RII = 0.778, 0.633, 0.724, 0.664 and 0.602 respectively as shown in Table 4.24. These results illustrate that this group is highly satisfactory to the owners with RII = 0.778, meanwhile the certificates and payment group have a high impact on both cost and time factors with RII = 0.724 and 0.664 respectively. The owners agree that any delays toward application of these clauses will a basis to disputes.

The surveyed owners ranked the "Special risks" group at the 4th, 10th and 11th ranks regarding safety, cost, time, quality and satisfaction with RII = 0.636, 0.722, 632, 0.577 and 0.666 respectively as shown in Table 4.24 . This result clarifies how far the surveyed owners believe that the special risks clauses influence highly the project performance characteristics. The special risks clauses are highly satisfactory to the owners with RII = 0.666, because the surveyed owners consider the text of this group clear and treats the subject of the group clauses properly .

The "Release from performance" group was ranked at the 10th and 11th ranks regarding satisfaction, cost, time, quality and safety with RII = 0.680, 0.707, 0.593, 0.573 and 0.567 respectively as shown in Table 4.24. The owners believe in the importance of this group. This group is satisfactory to the owners with RII = 0.680.

The "Settlement of disputes" group was ranked at the 1st , 2nd, 3rd , 4th and 5th ranks regarding satisfaction, quality, safety, cost and time with RII = 0.800, 0.717, 0.688, 0.803 and 0.747 respectively as shown in Table 4.24. These results show that this group of clauses is highly satisfactory to the surveyed owners with RII = 0.800. The "Settlement of disputes" group has a high RII = 0.803 regarding cost. This proves that owners agree that the clauses of this group have a high impact on the cost and time of the construction project. Therefore, the owners agree to follow the steps mentioned in this group to settle any dispute if it may occur.

4.3 Relative importance index and ranking from consultants' perspective

This section shows the relative importance index (RII) and ranking from consultants' perspective regarding the FIDIC contract general conditions clauses that have the utmost impact on the construction project performance. These clauses form the study questionnaire items, and consist of the following eleven articles or (groups):

Group (1): Engineer and engineer's representative: includes three clauses,

Group (2): Contract documents: includes four clauses,

Group (3): General obligations: includes eleven clauses,

Group (4): Suspension: includes three clauses,

Group (5): Commencement and delays: includes three clauses,

Group (6): Alterations, additions, and omissions: includes three clauses,

Group (7): Procedure for claims: includes five clauses,

Group (8): Certificates and payment: includes eight clauses,

Group (9): Special risks: includes six clauses;

Group (10): Release from performance: includes one clause, and

Group (11): Settlement of disputes: includes four clauses.

4.3.1 Group (1): Engineer and engineer's representative clauses

This group contains three clauses, which clarify and determine the engineer and engineer's representative role. Table 4.25 illustrates that the surveyed consultants ranked the clause of "engineer's duties and authority" at the 1st rank regarding safety, quality, satisfaction, time and cost with RII = 0.855, 0.782, 0.782, 0.764 and 0.636 respectively. This clarifies that the surveyed consultants believe that this clause has a significant impact on the project performance. The consultants agree and believe in the serious role of the engineer as the owner's representative, who is authorized by the owner's approval with the duties specified in the contract. The duties include control of works quantities and its quality within the contract time and budget.

The surveyed consultants ranked the clause "engineer's authority to delegate" at the 2nd rank regarding safety, quality, satisfaction, time and cost with RII = 0.818, 0.764, 0.745, 0.745 and 0.618 respectively as shown in Table 4.25. This shows that the surveyed consultants believe that the engineer has the right to delegate to his representative any of the duties and authorities vested in the engineer role, and he may at any time revoke such delegation. According to this clause, if the contractor questions any communication of the engineer's

representative, then the contractor may refer the matter to the engineer who will confirm, reverse or vary the contents of such communication.

The surveyed consultants ranked the clause of "Engineer's representative" at the 3rd rank regarding safety, quality, satisfaction, time and cost with RII = 0.818, 0.764, 0.745, 0.745 and 0.618 respectively. This illustrates that the surveyed consultants believe that this clause has a significant impact on the project performance particularly when the engineer's representative is delegated to carry out such duties and exercise such authority as delegated to him by the engineer according to the contract. The consultants evaluate this clause with high importance regarding quality and safety since the engineer and his representative have a serious responsibility towards the project performance characteristics.

Table 4.25 Relative importance index and ranking for engineer and engineer's representative clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer's Duties and Authority	0.636	1	0.764	1	0.782	1	0.855	1	0.782	1
Engineer's Representative	0.545	3	0.709	3	0.745	3	0.800	3	0.709	3
Engineer's Authority to Delegate	0.618	2	0.745	2	0.764	2	0.818	2	0.745	2

4.3.2 Group (2): Contract documents clauses

This group contains four clauses that explain the clauses of contract documents. Table 4.26 clarifies that the surveyed consultants ranked the clause of "Priority of contract documents" at the 1st and 4th ranks regarding cost, quality, satisfaction, safety and time with RII = 0.818, 0.727, 0.727, 0.727 and 0.636 respectively. This illustrates that the surveyed consultants believe that the several documents forming the contract should be taken as mutually explanatory of one another. Relative importance index of this clause was 0.818 regarding cost. This illustrates the serious impact of this clause on cost of the project. However, in case of any ambiguities of contract documents, the surveyed consultants agree that the engineer will explain and adjust any ambiguous documents in writing and issue to the contractor instructions thereon.

Table 4.26 shows that the surveyed consultants ranked the clause "Disruption of progress" at the 1st, 2nd and 3rd ranks regarding time, safety, quality, cost and satisfaction with RII = 0.764, 0.702, 0.655, 0.691 and 0.655 respectively. These results show that the consultants agree according to this clause, that the contractor will give notice to the engineer, whenever planning or execution of the works is likely to be delayed or disrupted, unless the engineer issues any further drawing or instruction within a reasonable time. RII = 0.764 and 0.691 regarding time and cost. This assures the high impact of both factors on time and cost.

Table 4.26 Relative importance index and ranking for contract documents clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Priority of Contract Documents	0.818	1	0.636	4	0.727	1	0.727	1	0.727	1
Disruption of Progress	0.691	3	0.764	1	0.655	2	0.709	2	0.655	3
Delays and Cost of Delay of Drawings	0.673	4	0.764	2	0.545	4	0.564	4	0.636	4
Failure by Contractor to Submit Drawings	0.709	2	0.691	3	0.582	3	0.600	3	0.709	2

The clause of "Failure by contractor to submit drawings" was ranked by the surveyed consultants at the 2nd, and 3rd ranks regarding cost, satisfaction, time, safety and quality with RII = 0.709, 0.709, 0.691, 0.600 and 0.582 respectively. The surveyed consultants agree that, if the inability of the engineer to issue any drawings is caused by the failure of the contractor to submit required drawings under the contract. Then the engineer will take such failure by contractor into account when making his determination regarding extension of time and the amount of such costs that will be added to the contract price.

The results shown in Table 4.26 indicate that the surveyed consultants ranked the clause "Delays and cost of delay of drawings" at the 2nd and 4th ranks regarding cost, satisfaction, time, safety and quality with RII = 0.709, 0.709, 0.691, 0.600 and 0.582 respectively. These results illustrate the serious impact on project performance. The surveyed consultants agree, if the engineer fails to issue the contractor has given any drawing or instruction for which notice and the contractor suffers delay or incurs costs, then the engineer will determine any extension of time to which the contractor is entitled and the amount of such costs, which will be added to the contract price.

4.3.3 Group (3): General obligations clauses

This group contains eleven clauses, which explains and determines general obligations of the contract parties. Table 4.27 shows that the surveyed consultants ranked the "Safety, security, and protection of environment" clause at the 1st, 2nd, 4th and 10th ranks regarding safety, quality, cost, satisfaction and time factors with RII = 0.855, 0.782, 0.836, 0.764 and 0.582 respectively. This result illustrates that the consultants believe that contractors are obligated toward the safety of all persons and maintenance of public assets for the protection of the works and convenience of the public. The high RII clarifies that the consultants believe in the high importance of keeping the site and the works in an orderly state to protect the environment and avoid any damage to property of the public resulting from pollution of the works' operations.

The clause of "Cash flow estimate to be submitted" was ranked at the 1st, 2nd, 3rd , 9th and 11th ranks regarding cost, time, satisfaction, quality and safety with RII = 0.836, 0.873, 0.800, 0.636 and 0.618 respectively. These results clarify that the surveyed consultants believe that the contractor should provide the engineer a detailed cash flow estimate to be submitted in quarterly periods, of all payments to which contractors will be entitled under the contract. The high RII regarding the cost, time and other factors of project performance indicate to the importance of cash flow in respect to the financial relations between contractors and owners

As shown in Table 4.27, the surveyed consultants ranked the clause "Program to be submitted" at the 1st, 3rd, 5th, 7th and 9th ranks regarding time, quality, satisfaction, cost and safety with RII = 0.891, 0.745, 0.764, 0.764 and 0.655 respectively. This clarifies that consultants believe in the importance of time program and its impact on project period and cost. These results indicate the high importance and impact of the program regarding the cost and time. The consultants agree that the contractor will provide the engineer a general description of the arrangements and methods that the contractor proposes to adopt for execution the works.

The "Cross liabilities" clause was ranked by the surveyed consultants at the 1st, 3rd, 4th, 7th and 9th, ranks regarding satisfaction, time, quality, safety and cost with RII = 0.873, 0.673, 0.745, 0.709 and 0.745 respectively. The consultants agree that the insurance policy shall include a cross liability clause such that the insurance will apply to the contractor and to the employer as separate insurers.

The "Insurance against accident to workmen" clause was ranked at the 2nd, 5th, 7th and 8th ranks regarding safety, satisfaction, cost, quality and time with RII = 0.855, 0.800, 0.818, 0.709 and 0.600 respectively. This result illustrates that consultants believe in the high relative importance of this clause. The consultants agree that the contractor will insure against such liability and will continue such insurance during the whole of the time that any persons are employed by him on the works.

Table 4.27 Relative importance index and ranking for general obligations clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Claims under Performance Security	0.691	10	0.636	4	0.727	5	0.691	8	0.655	11
Program to be Submitted	0.764	7	0.891	1	0.745	3	0.655	9	0.764	5
Cash Flow Estimate to be Submitted	0.836	1	0.873	2	0.636	9	0.618	11	0.800	3
Safety, Security, and Protection of the Environment	0.836	2	0.582	10	0.782	1	0.855	1	0.764	4
Employer's Responsibilities	0.818	4	0.618	6	0.764	2	0.709	6	0.691	9
Employer's Risks	0.764	8	0.600	9	0.727	6	0.764	4	0.745	6
Insurance of Works and Contractor's Equipment	0.800	6	0.564	11	0.691	8	0.818	3	0.709	8
Indemnity by Employer	0.836	3	0.600	7	0.618	11	0.636	10	0.745	7
Cross Liabilities	0.745	9	0.673	3	0.745	4	0.709	7	0.873	1
Accident or Injury to Workmen	0.691	11	0.636	5	0.636	10	0.745	5	0.673	11
Insurance Against Accident to Workmen	0.818	5	0.600	8	0.709	7	0.855	2	0.800	2

Table 4.27 shows that the surveyed consultants ranked the clause "Employer's responsibilities" at the 2nd, 4th, 6th and 9th ranks regarding quality, cost, safety, time and satisfaction with RII = 0.764, 0.818, 0.709, 0.618 and 0.691 respectively. The consultants

agree that if the employer will employ other contractors on site, he will require them to have the same regard for safety and avoidance of danger under the employer's responsibilities.

The surveyed consultants ranked the "Indemnity by employer" clause at the 3rd 7th, 10th and 11th ranks regarding cost, satisfaction, time, safety and quality with RII = 0.836, 0.745, 0.600, 0.636 and 0.618 respectively. The consultants believe and agree that the owner will indemnify the contractor against all claims, costs and charges in respect to the damage to persons or property exceptions as mentioned in (FIDIC 87 clause 22.2). This assures the principle of risk sharing between the contract parties to guarantee a balanced and fair contract.

Table 4.27 shows that surveyed consultants ranked the clause "Claims under performance security" at the 4th, 5th, 8th, 10th and 11th ranks regarding time, quality, safety, cost and satisfaction with RII = 0.636, 0.727, 0.691, 0.691 and 0.655 respectively. The surveyed consultants believe that prior to making a claim under the performance security, the employer (owner) will notify the contractor stating the nature of the default in respect of which the claim is to be made. This result illustrates the serious impact of claims on cost and time of the project and the relation between both of the owners and the contractors.

The "Insurance of works and contractor's equipment" clause was ranked at the 3rd, 6th, 8th and 11th ranks regarding safety, cost, satisfaction, quality and time with RII = 0.818 and 0.800, 0.709, 0.691 and 0.564 respectively. The consultants agree that the contractors will be obligated to insure the works with materials and plant for incorporation therein, and the contractor's equipment, to the full replacement cost (including profit). The high RII clarifies the impact of this clause on the project performance characteristics.

Table 4.27 shows that surveyed consultants ranked the clause "Claims under performance security" at the 4th, 5th, 8th, 10th and 11th ranks in respect to time, quality, safety, cost and satisfaction with RII = 0.636, 0.727, 0.691, 0.691 and 0.655 respectively. The surveyed consultants believe that prior to making a claim under the performance security, the employer (owner) will notify the contractor stating the nature of the default in respect of which the claim is to be made. This result illustrates the serious impact of claims on cost and time of the project and the relation between both of the owners and the contractors.

The "Accident or injury to workmen" clause was ranked at 5th, 10th and 11th ranks regarding safety, time, quality, cost and satisfaction with RII = 0.745, 0.636, 0.636, 0.691 and 0.673

respectively as shown in Table 4.27. This result illustrates that the surveyed consultants agree that the owner as the (employer) will not be liable for any damages to any workers or other person in the employment of the contractor. The consultants agree that the contractor will indemnify and keep indemnified the employer against all such damages and compensation.

4.3.4 Group (4): Suspension clauses

This group contains three clauses that explain and identify the suspension clauses. Table 4.28 shows that the surveyed consultants ranked the clause of "Suspension of work" at the 1st and 2nd ranks regarding safety, quality, time, satisfaction and cost with RII = 0.636, 0.618, 0.655, 0.636 and 0.600 respectively. The consultants agree that, upon the instruction of the engineer, the contractor will suspend the progress of the works and properly protect these works during such suspension, as far as it is necessary, in the opinion of the engineer.

Table 4.28 clarifies that the surveyed consultants ranked the "Engineer's determination following suspension" clause at the 1st and 2nd and 3rd ranks regarding satisfaction, cost, time, safety and quality with RII = 0.727, 0.655, 0.655, 0.582 and 0.545 respectively. These results clarify that the consultants agree that the engineer will determine: (1) any extension of time to which the contractor is entitled; and (2) the amount, which will be added to the contract price regarding the cost incurred by the contractor due to such suspension.

The surveyed consultants ranked the clause of "Suspension lasting more than 84 days" at the 1st, 2nd, and 3rd ranks regarding safety, quality, satisfaction, time and cost with RII = 0.564, 0.600, 0.564, 0.618 and 0.582 respectively. This result shows the high importance of this clause and its impact on project performance factors. The consultants believe and agree that if such a suspension extends more than 84 days and if the engineer does not permit contractor to resume works after another 28 days upon contractor's notice, then the contractor will treat the suspension as an event of default by the employer and terminate his employment under the contract. Suspension of works may lead to claims and disputes unless dealt with seriously.

Table 4.28 Relative importance index and ranking for suspension clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Suspension of Work	0.600	2	0.655	1	0.618	1	0.636	1	0.636	2
Engineer's Determination following Suspension	0.655	1	0.655	1	0.545	3	0.582	3	0.727	1
Suspension lasting more than 84 Days	0.582	3	0.564	3	0.564	2	0.600	2	0.618	3

4.3.5 Group (5): Commencement and delays clauses

This group contains three clauses, which explain and clarify the commencement and delays clauses. Table 4.29 shows that the surveyed consultants ranked the clause of "Liquidated damages for delay" at the 1st, 2nd and 3rd ranks regarding cost, satisfaction, safety time and quality with RII = 0.800, 0.764, 0.709, 691 and 0.691 respectively. The result shows that surveyed consultants believe and agree that if the contractor fails to comply with the time for completion, then the contractor will pay to the employer the relevant sum stated in the appendix to tender as liquidated damages for such default and not as penalty according to the contract.

The clause of "Extension of time for completion" was ranked at the 2nd and 3rd ranks regarding cost, satisfaction, safety, quality and time with RII = 0.673, 0.636, 0.600, 0.600 and 0.618 respectively. The surveyed consultants agree in the event of extra works, any cause of delay, adverse climatic conditions and any delay by the employer, this clause entitle the contractor to an extension of time for completion of the works by the engineer, who will determine the amount of such extension.

The clause of "Rate of progress" was ranked at the 2nd and 3rd ranks regarding time, cost, satisfaction, and quality with RII = 0.673, 0.600, 0.618, 0618 and 0.564 respectively. This result shows that the consultants agree and believe that rate of progress has a high impact on time and cost. The consultants agree that if for any reason, which does not entitle the contractor to an extension of time, the rate of progress of works is too slow to comply the time for completion, the engineer will notify the contractor to take steps to expedite progress without any additional payment for taking such steps.

Table 4.29 Relative importance index and ranking for commencement and delays clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Extension of Time for Completion	0.673	2	0.618	3	0.600	2	0.600	2	0.636	2
Rate of Progress	0.618	3	0.673	2	0.564	3	0.600	2	0.618	3
Liquidated Damages for Delay	0.800	1	0.691	1	0.691	1	0.709	1	0.764	1

4.3.6 Group (6): Alterations, additions, and omissions clauses

This group contains three clauses that clarify the alterations, additions and omissions clauses. Table 4.30 shows that the surveyed consultants ranked the clause "Variations" at the 1st and 2nd ranks regarding time, satisfaction, quality, safety and cost with RII = 0.655, 0.655, 0.636, 0.600 and 0.691 respectively. This result shows the high relative importance of this clause. The surveyed consultants believe and agree that any variations are considered causes of substantial adjustment to the contract cost and/or time; and that by this clause; no such variation shall in any way invalidate the contract and in turn, may lead to disputes. This result illustrates that variations (changes) in projects are common and may be deleterious or beneficial-whether the change considered either a conflict or a valuable lesson.

Table 4.30 Relative importance index and ranking for alterations, additions, and omissions clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Variations	0.691	2	0.655	1	0.636	1	0.600	1	0.655	1
Valuation of Variations	0.673	1	0.582	2	0.618	2	0.600	1	0.636	2
Power of Engineer to Fix Rates	0.618	3	0.527	3	0.618	2	0.527	3	0.564	3

The surveyed consultants ranked the clause "valuation of variations" at the 1st and 2nd ranks regarding cost, safety, satisfaction, quality and time with RII = 0.673, 0.600, 0.636, 0.618 and 0.582 respectively as shown in Table 4.30. The surveyed consultants agree that the varied work will be valued at the rates and prices set out in the contract, but if the contract does not

contain any rates or prices applicable to the varied work, the rates and prices in the contract will be used as the basis for the valuation so far as may be reasonable.

The clause of "Power of engineer to fix rates" was ranked at the 1st, 2nd and 3rd ranks regarding time, quality, safety, cost and satisfaction with RII = 0.527, 0.618, 0.527, 0.618 and 0.564 respectively as shown in Table 4.30. The consultants agree that a suitable rate or price for the varied work will be agreed upon between the engineer and the contractor, and in the event of disagreement, the engineer shall fix such other rate or price as is, in his opinion, appropriate. Rates of costs are a major cause for claims and consequently disputes unless to be agreed upon or fixed according to contract.

4.3.7 Group (7): Procedure for claims clauses

This group contains five clauses that explain the procedure for claims. Table 4.31 clarifies that the surveyed consultants ranked the clause of "Substantiation of claims" at the 1st, 2nd and 3rd ranks regarding satisfaction, cost, quality, time and safety with RII = 0.818, 0.800, 0.727, 0.673 and 0.673 respectively. The consultants agree that within 28 days of giving notice to claim, the contractor will send to the engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based.

Table 4.31 shows that the surveyed consultants ranked the clause of "Notice of claims" at the 1st, 2nd and 3rd, ranks regarding time, cost, safety, quality and satisfaction with RII = 0.745, 0.782, 0.709, 0.691 and 0.673 respectively. This shows that the consultants agree that if the contractor intends to claim any additional payment pursuant to any clause of these conditions or otherwise, he will give notice of his intention to the engineer within 28 days after the event giving rise to the claim has first arisen.

The surveyed consultants ranked the clause "Contemporary records" at the 1st, 2nd and 4th ranks regarding safety, satisfaction, time, cost and quality with RII = 0.727, 0.800, 0.673, 0.727 and 0.655 respectively as shown in Table 4.31. The consultants believe in the high importance of the contemporary records. The consultants agree that upon issuing notice of claims, the contractor will keep such records as may reasonably be necessary to support any claim he may subsequently wish to make.

Table 4.31 Relative importance index and ranking for procedure for claims clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Notice of Claims	0.782	2	0.745	1	0.691	3	0.709	2	0.673	4
Contemporary Records	0.727	4	0.673	2	0.655	4	0.727	1	0.800	2
Substantiation of Claims	0.800	1	0.673	2	0.727	2	0.673	3	0.818	1
Failure to Comply	0.582	5	0.618	5	0.618	5	0.582	4	0.618	5
Payment of Claims	0.782	3	0.636	4	0.745	1	0.673	3	0.800	2

The clause of "Payment of claims" was ranked at the 1st, 2nd and 3rd ranks regarding quality, satisfaction, cost, safety and time with RII = 0.745, 0.800, 0.782, 0.673 and 0.636 respectively. This result shows that the surveyed consultants agree that payment of claims impact all project performance factors highly and the cost in particular, where RII = 0.782. However; the consultants agree and believe that: since a claim is a request for an extension of time and/or additional costs, it can evolve into a dispute and losses unless amicably resolved by the parties concerned. Procedure for claims process clauses pave the way to contractor to precede with his claim.

The surveyed consultants ranked the clause of "Failure to comply" at the 2nd, 4th and 5th ranks regarding cost, time, satisfaction, safety and quality with RII = 0.582, 0.618, 0.618, 0.582 and 0.618 respectively as shown in Table 4.31. The consultants agree that failure by contractor to comply with the procedure for claims has serious impact on his entitlement to payment. This clause has impact on cost seriously where RII of this clause regarding cost = 0.582.

4.3.8 Group (8): Certificates and payment clauses

This group contains eight clauses that clarify and explain the certificate and payment clauses. Table 4.32 shows that the surveyed consultants ranked the "Monthly payments" clause at the 1st, 2nd and 4th ranks regarding cost, time, quality, safety and satisfaction with RII = 0.873, 0.836, 0.836, 0.727 and 0.873 respectively. This result clarifies that the consultants consider this clause as a very serious clause. The consultants agree that this clause affects highly all the project performance characteristics and any delay or obstacles toward application of this

clause will be a basis for disputes. Monthly payments will be subject to (1) the retention of the amount calculated by applying the percentage of retention stated in the appendix to tender, and to (2) the deduction of any sums, which have become due and payable by the contractor to the employer.

The "Discharge" clause was ranked at 1st, 4th, 5th and 8th ranks regarding satisfaction, time, safety, cost and quality respectively with RII = 0.909, 0.836, 0.691, 0.782 and 0.655 respectively. The consultants agree that, upon submission of the final statement, the contractor will give to the employer, a written discharge confirming that the total of the final statement represents full and final settlement of all monies due to the contractor in respect of the contract.

The "Time for payment" clause was ranked at the 1st, 2nd and 4th ranks regarding safety, satisfaction, time, cost and quality with RII = 0.782, 0.891, 0.818, 0.800 and 0.782 respectively. The consultants agree that any amount due to the contractor under any interim payment certificate issued by the engineer will be paid by the employer to the contractor within 28 days or, in the case of the final payment certificate within 56 days after such certificates have been delivered to the employer. The provisions of this clause are without prejudice to the contractor's entitlement, in case of default by employer.

The "Defects liability certificate" clause was ranked at the 1st, 3rd, 6th and 8th ranks regarding quality, cost, safety, time and satisfaction with RII = 0.873, 0.836, 0.709, 0.709 and 0.782 respectively as shown in Table 4.32. The surveyed consultants believe in the serious impact of this clause on project performance. The consultants agree that the contract will not be considered completed until the engineer signs a defect liability certificate and delivers to the employer, with a copy to the contractor. This certificate will state the date on which the contractor will have completed his obligations to execute and complete the works and remedy any defects therein to the engineer's satisfaction.

Table 4.32 Relative importance index and ranking for certificates and payment clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Monthly Payments	0.873	1	0.836	1	0.836	2	0.727	2	0.873	4
Statement at Completion	0.764	6	0.745	4	0.691	7	0.691	4	0.836	6
Final Statement	0.800	4	0.800	3	0.709	6	0.691	4	0.855	5
Discharge	0.782	5	0.836	1	0.655	8	0.691	4	0.909	1
Final Payment Certificate	0.855	2	0.818	2	0.727	5	0.691	4	0.891	3
Time for Payment	0.800	4	0.818	2	0.782	4	0.782	1	0.891	2
Approval only by Defects Liability Certificate	0.764	6	0.727	5	0.800	3	0.709	3	0.818	7
Defects Liability Certificate	0.836	3	0.709	6	0.873	1	0.709	3	0.782	8

Table 4.32 shows that the surveyed consultants ranked the "Final payment certificate" clause at the 2nd, 3rd, 4th and 5th ranks regarding satisfaction, cost, time, satisfaction, safety and quality with RII = 0.855, 0.818, 0.891, 0.691 and 0.727 respectively. The consultants agree that the engineer within 28 days after receipt of the final statement, and the written discharge, will issue a final payment certificate stating the amount which is finally due under the contract; and the balance, if any, due from the employer to the contractor or from the contractor to the employer as the case may be.

The "Approval only by defects liability certificate" clause was ranked at the 3rd, 5th, 6th and 7th ranks regarding quality, safety, time, cost and satisfaction and time with RII = 0.800, 0.709, 0.727, 0.764 and 0.818 respectively as shown in Table 4.32. These results show that the consultants agree that only the "Defects liability certificate" will be deemed to constitute approval of the works.

The surveyed consultants ranked the "final statement" clause at the 3rd, 4th, 5th, 6th, ranks regarding time, cost, safety, satisfaction and quality with RII = 0.800, 800, 0.691, 0.855 and 0.709 respectively. The consultants agree that no later than 56 days after the issue of the defects liability certificate, the contractor will submit to the engineer: the value of all work

done and any further sums, which the contractor considers to be due to him under the contract.

As shown in Table 4.32, the surveyed consultants ranked the "Statement at completion" clause at the 4th, 6th and 7th ranks regarding time, safety, satisfaction, cost and quality with RII = 0.745, 0.691, 0.836, 0.764 and 0.691 respectively. The consultants agree that no later than 84 days after the issue of the taking-over certificate, the contractor will submit to the engineer a statement at completion showing: the value of all work done, any further sums that the contractor considers to be due, and an estimate of amounts which the contractor considers will be due to him under contract. The consultants believe that any delay in issuing financial certificate will lead to disputes.

4.3.9 Group (9): Special risks clauses

Group (9) contains six clauses, which focus on special risks clauses. Table 4.33 clarifies that the surveyed consultants ranked the "Special risks" clause at the 1st, and 2nd ranks regarding cost, quality, time, satisfaction and safety with RII = 0.691, 0.655, 0655, 0.618 and 0.600 respectively. These results show that the consultants consider the special risks as a very important issue, which affect project performance characteristics. These special risks are; the risks defined in the clause of "Employer's risks", clause 20.4, insofar as these relate to the country, in which the works are to be executed. The special risks clause represents the "Force majeure" clause.

The "Increased costs arising from special risks" clause at 1st, 2nd and 3rd ranks regarding time, safety, quality, satisfaction and cost with RII = 0.673, 0.636, 0.636, 0.618 and 0.636 respectively. The consultants agree that the employer will repay to the contractor any costs of the execution of the works connected with the said special risks subject.

Table 4.33 shows that the surveyed consultants ranked the "Payment if contract terminated" clause at the 1st, 2nd, 3rd and 5th ranks regarding satisfaction, time, quality, safety and cost with RII = 0.655, 0.655, 0.564, 0.600 and 0.509 respectively. This indicates that the consultants agree that if the contract is terminated as previously mentioned, the employer would pay the contractor. Insofar as such amounts or items have not already been covered by payments on account made to the contractor, for all work executed prior to the date of termination at the rates and prices provided in the contract.

Table 4.33 Relative importance index and ranking for special risks clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
No Liability for Special Risks	0.673	2	0.655	2	0.564	3	0.600	2	0.600	3
Special Risks	0.691	1	0.655	2	0.655	1	0.600	2	0.618	2
Damage to Works by Special Risks	0.618	4	0.655	2	0.545	4	0.545	4	0.600	3
Increased Costs arising from Special Risks	0.636	3	0.673	1	0.636	2	0.636	1	0.618	2
Removal of Contractor's Equipment on Termination	0.564	6	0.636	6	0.655	1	0.582	3	0.582	4
Payment if Contract Terminated	0.600	5	0.655	2	0.564	3	0.509	5	0.655	1

Table 4.33 illustrates that the surveyed consultants ranked the "Removal of contractor's equipment on termination" clause at the 1st, 6th, 4th and 6th ranks regarding quality, time, safety, satisfaction and cost with RII = 0.655, 0.636, 0.582, 0.582 and 0.564 respectively. The consultants agree: if the contract is terminated, the contractor will with all reasonable dispatch, remove from the site all contractors' equipment and give similar facilities to his subcontractors to do so.

The "No liability for special risks" clause was ranked at the 2nd and 3rd ranks regarding cost, time, safety, satisfaction and quality with RII = 0.673, 0.655, 0.600, 0.600 and 0.564 respectively. The consultants agree under this clause that, the contractor will be under no liability whatsoever in consequence of any of the special risks, whether by way of indemnity or otherwise, for or in respect of: (1) damage to the works; (2) damage to property of the employer or third party; and (3) injury or loss of life.

Table 4.33 clarifies that the surveyed consultants ranked the "Damage to works by special risks" clause at the 2nd, 3rd and 4th ranks regarding time, satisfaction, cost, quality and safety with RII = 0.655, 0.600, 0.618, 0.545 and 0.545 respectively. The consultants agree that if the works or any of the contractor's equipment sustains damage due to any of the said special risks, the contractor shall be entitled to payment for: rectifying any such damage to the works, and replacing or rectifying such contractor's equipment.

4.3.10 Group (10): Release from performance clauses

This group contains one clause. Table 4.34 shows that the surveyed consultants ranked the "Payment in event of release from performance" clause at the 1st rank regarding cost, satisfaction, time, quality and safety with RII = 0.691, 0.691, 0.618, 0.600 and 0.545 respectively. The consultants agree that if any circumstances outside the control of both parties arise after the issue of the letter of acceptance, which renders it impossible for either or both parties to fulfill his obligations, or under the law governing the contract, the parties are released from further performance, and then the parties will be discharged from the contract.

Table 4.34 Relative importance index and ranking for release from performance clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Payment in Event of Release from Performance	0.691	1	0.618	1	0.600	1	0.545	1	0.691	1

4.3.11 Group (11): Settlement of disputes clauses

This group contains four clauses that explain the settlement of disputes clauses. Table 4.35 clarifies that the surveyed consultants ranked the "Engineer's decision" at the 1st and 2nd ranks regarding cost, quality, time, safety and satisfaction with RII = 0.891, 0.836, 0.836, 0.782 and 0.818 respectively. These results show the significant impact of this clause on project performance characteristics. These results illustrate that the consultants believe that the engineer decision should be the 1st way in disputes settlement.

The consultants agree that: if the engineer has given notice of his decision as to a matter in dispute to the employer and the contractor. Meanwhile, no notice of intention to commence arbitration as to such dispute has been given by either the employer or the contractor on or before the seventieth day after the day on which the parties received notice as to such decision from the engineer. Then the engineer's decision will become final and binding upon the employer and the contractor.

Table 4.35 illustrates that the surveyed consultants ranked the "Amicable settlement" at the 1st, 2nd and 4th ranks regarding satisfaction, cost, quality, time and safety with RII = 0.909, 0.800, 0.782, 0.745 and 0.709 respectively. These results conclude the attitude of consultants towards the amicable settlement of disputes that has the second option between disputes settlement ways. The surveyed consultants agree that where notice of intention to commence

arbitration as to a dispute has been given, the parties will attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless the parties otherwise agree, arbitration may be recommended on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made.

Table 4.35 Relative importance index and ranking for settlement of disputes clauses

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer's Decision	0.891	1	0.836	1	0.836	1	0.782	1	0.818	2
Amicable Settlement	0.800	2	0.745	2	0.782	2	0.709	4	0.909	1
Arbitration	0.727	3	0.709	3	0.745	3	0.745	3	0.764	3
Failure to Comply with Engineer's Decision	0.691	4	0.600	4	0.727	4	0.764	2	0.709	4

Table 4.35 shows that the surveyed consultants ranked the "Arbitration" clause at the 3rd rank regarding satisfaction, quality, safety, cost and time with RII = 0.764, 0.745, 0.745**,** 0.727 and 0.709 respectively. These high relative importance indices refer to the belief of consultants that arbitration comes in the 3rd rank between the ways of disputes settlement. The consultants agree that any dispute in respect of which: (a) the decision, if any, of the engineer has not become final and binding. On the other hand, (b) amicable settlement has not been reached within the specified 87 days. Then the dispute will be finally settled, unless otherwise specified in the contract, under the rules of conciliation and arbitration of the international chamber of commerce by one or more arbitrators appointed under such rules.

The "Failure to comply with engineer's decision" clause was ranked at the 2nd, and 4th ranks regarding safety, quality, satisfaction, cost and time, with RII = 0.764, 0.727, 0.709 and 0.691 and 0.600 respectively. These results represent the attitude of the consultants regarding this clause and its impact on the project performance characteristics. The high relative importance indices show that the consultants believe that, where neither the employer nor the contractor has given notice of intention to commence arbitration of a dispute within the 84 days and the related engineer's decision has become final and binding. Then, either party may, if the other

party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration.

4.3.12 Relative importance index and ranking for FIDIC articles or (groups) from consultants' perspective

The surveyed consultants ranked the group of "Engineer and engineer's representative" clauses at the 1st, 2nd, 4th and 11th ranks regarding safety, quality, time, satisfaction and cost with RII = 0.824, 0.764, 0.739, 0.745 and 0.600 respectively as shown in Table 4.36. These results represent the consultants' attitude towards the engineer's role in respect to the project performance and first of all its impact on safety and quality of the construction project. This illustrates that the consultants deal with the engineer role in the construction project with a high importance. This group is satisfactory to the consultants with RII = 0.739, because the surveyed consultants consider the text of this group clear and treats the subject of the group clauses properly.

The "Contract documents" group was ranked by the surveyed consultants at the 4th, 5th, 6th and 7th ranks regarding time, cost, safety, quality and satisfaction with RII = 0.714, 0.723, 0.650, 0.627 and 0.682 respectively as shown in Table 4.36. The surveyed consultants believe in the high significance of the contract documents group regarding the project performance factors and in particular, time and cost. This group is satisfactory to consultants with RII = 0.682, because the surveyed consultants consider the text of this group clear and treats the subject of the group clauses properly.

The "General obligations" group was ranked by the surveyed consultants at the 2nd, 3rd, 4th and 6th ranks regarding cost, satisfaction, safety, quality and time with RII = 0.782, 0.747, 0.732, 0.707 and 0.661 respectively, as shown in Table 4.36. The surveyed consultants believe that the general obligation clauses are very important and must be respected thoroughly by the contract parties. This group of clauses is satisfactory to consultants with RII = 0.747, because the surveyed consultants consider the text of this group clear and treats the subject of the group clauses properly.

The "Suspension" group was ranked at the 8th, 9th, 10th and 11th ranks regarding safety, satisfaction, time, cost and quality with RII = 0.606, 0.661, 0.624, 0.612 and 0.576 respectively as shown in Table 4.36. These results illustrate that the consultants believe that this group has a high impact on both time and cost highly with RII = 0.624 and 0.612,

meanwhile this group is highly satisfactory to the consultants with RII = 0.661. Therefore, the consultants believe that suspension of works may be a cause to claims and disputes.

The surveyed consultants ranked the group of "Commencement and delays" clauses at the 6th, 7th and 8th ranks regarding cost, time, safety, satisfaction and quality with RII = 0.697, 0.661, 0.636, 0.673 and 0.618 respectively as shown in Table 4.36 . This result refers that consultants believe that this group influence the project cost highly with RII = 0.697. The consultants consider the delays as a major cause for losses that may lead to failure of the construction project. This assures the high impact of these group clauses on the construction project. This group is satisfactory to the surveyed consultants with RII = 0.673.

Table 4.36 Relative importance index and ranking for FIDIC groups from consultants' perspective

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Engineer and Engineer's Representative	0.600	11	0.739	2	0.764	2	0.824	1	0.745	4
Contract Documents	0.723	5	0.714	4	0.627	6	0.650	6	0.682	7
General Obligations	0.782	2	0.661	6	0.707	4	0.732	3	0.747	3
Suspension	0.612	10	0.624	9	0.576	11	0.606	8	0.661	9
Commencement and Delays	0.697	6	0.661	7	0.618	8	0.636	7	0.673	8
Alterations, Additions, and Omissions	0.661	8	0.588	11	0.624	7	0.576	10	0.618	10
Procedure for Claims	0.735	4	0.669	5	0.687	5	0.673	5	0.742	5
Certificates and Payment	0.809	1	0.786	1	0.759	3	0.711	4	0.857	1
Special Risks	0.630	9	0.655	8	0.603	9	0.579	9	0.612	11
Release from Performance	0.691	7	0.618	10	0.600	10	0.545	11	0.691	6
Settlement of Disputes	0.777	3	0.723	3	0.773	1	0.750	2	0.800	2

As shown in Table 4.36, the surveyed consultants ranked the group of "Alterations, additions and omissions" clauses at the 7th, 8th, 10th and 11th ranks regarding quality, cost, satisfaction, safety and time with RII = 0.624, 0.661, 0.618, 0.576 and 0.588 respectively. This result illustrates the high impact of the clauses of this group on the cost in particular with RII = 0.661 and shows that this group is satisfactory to consultants with RII = 0.618. This also, interprets the high importance of cost characteristic of any construction project, which in turn, influences the likelihood of the project success. Variations (changes) in projects are common and may be deleterious or beneficial whether the change is considered a conflict or a valuable lesson depending on the personal prospective.

The "Procedure for claims" group was ranked at the 4th and 5th ranks regarding cost, satisfaction, quality, safety, and time with RII = 0.735, 0.742, 0.687, 0.673 and 0.679 respectively as shown in Table 4.36. These results illustrate that the consultants believe that this group have a significant impact on the time and cost of the project. This group is satisfactory to the consultants with RII = 0.742. The consultants believe that both of the contractors and owners should follow the steps stipulated in the contract conditions and present sufficient documentation to enhance the chances of success for their claims.

The "Certificates and payment" group was ranked at the 1st, 3rd and 4th ranks regarding satisfaction, cost, time, quality and safety with RII = 0.857, 0.809, 0.786, 0.759 and 0.711 respectively as shown in Table 4.36. These results illustrate that this group is highly satisfactory to the consultants with RII = 0.857, meanwhile the certificates and payment group have a high impact on both cost and time factors with RII = 0.809 and 0.786 respectively. The consultants agree that any delays toward application of these clauses will be a basis to disputes. The consultants ranked this group at the 1st rank between all other groups.

The surveyed consultants ranked the "Special risks" group at the 8th, 9th and 11th ranks regarding time, cost, quality, safety and satisfaction with RII = 0.655, 0.630, 603, 0.579 and 0.612 respectively as shown in Table 4.36. This result clarifies how far the surveyed consultants believe that the special risks clauses affect highly the project performance characteristics. The special risks clauses are satisfactory to the consultants with RII = 0.612, because the surveyed consultants consider the text of this group clear and treats the subject of the group clauses properly.

The "Release from performance" group was ranked at the 6th, 7th, 10th and 11th ranks regarding satisfaction, cost, time, quality and safety with RII = 0.691, 0.691, 0.618, 0.600 and 0.545 respectively as shown in Table 4.36. The consultants believe in the importance of this group. This group is satisfactory to the consultants with RII = 0.691, because the surveyed consultants consider the text of this group clear and treats the subject of the group clauses properly. The "Settlement of disputes" group was ranked at the 1st, 2nd and 3rd ranks regarding quality, satisfaction, safety, cost and time with RII = 0.773, 0.800, 0.750, 0.777 and 0.723 respectively as shown in Table 4.36. These results show that this group of clauses is highly satisfactory to the surveyed consultants with RII = 0.800. The "Settlement of disputes" group has a high RII = 0.777 regarding cost. This proves that consultants agree that the clauses of this group have a high influence on the cost and time of the construction project. Therefore, the consultants agree to follow the steps mentioned in this group to settle any dispute if it may occur.

4.4 Testing the supposed hypothesis

In order to check the internal consistency of results among construction project characteristics and within FIDIC clauses, it is necessary to compare according to an independent variable by using the one-way ANOVA test. The one-way ANOVA test is a one-way analysis of variance for a quantitative dependent variable by a single factor (independent variable). This test checks out if there are any significant differences in the points of view of the respondents regarding FIDIC clauses and the construction performance characteristics which affected by the respondent's company experience and the maximum project budget throughout last five years that executed by the company of the respondent. The company experience and maximum project budget through last five years were selected for this test due to their high influence on the behavior, classification and knowledge of the respondents' companies concerning construction contracts including FIDIC contract.

4.4.1 Company experience and cost characteristic

The null hypothesis stated that there is no significant difference in points of view of the surveyed respondents (contractors, owners and consultants) regarding FIDIC selected clauses and project performance characteristics could be ascribed to the company experience. The importance of using "company experience" is that, high experience means large knowledge concerning construction contracts including FIDIC contract. According to the one-way ANOVA test, there is no significant difference regarding an evaluation ascribed to an

independent variable, if the tabulated F value is more than the calculated F value and the sig. p-value is more than 0.05.

Table 4.37 clarifies the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the company experience regarding cost characteristic in the field of special risks clauses. This is because the P-value = 0.033 which is less than 0.05, and the calculated F value = 3.055 greater than tabulated F value = 2.75. This result proves that the contractors, owners and consultants have different interpretation for cost and the special risks clauses depending on the company experience. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to company experience, since the P-value for each field is greater than 0.05.

Table 4.37 One-way ANOVA according to company experience for cost characteristic

FIDIC Contract Clauses	Company Experience				F	P-Value
	Less than 5 years	5-10 years	11-20 years	More than 20 years		
Engineer and Engineer's Representative	2.91	3.83	3.61	3.59	0.784	0.507
Contract Documents	3.25	4.20	3.98	3.85	1.820	0.151
General Obligation	3.6818	3.9636	4.0478	4.13	1.191	0.319
Suspension	3.50	4.46	4.07	4.08	885	0.453
Commencement and Delays	3.66	4.36	4.16	4.17	0.858.	0.467
Alterations, Additions, and Omissions	4.41	4.23	4.12	4.29	0.242	0.866
Procedure for Claims	3.70	3.66	4.04	3.98	1.287	0.285
Certificates and Payment	3.65	3.47	4.04	3.82	2.457	0.069
Special Risks	2.50	3.81	3.67	3.96	3.055	0.033
Release from Performance	4.22	3.20	3.55	3.96	2.213	0.094
Settlement of Disputes	3.37	4.27	4.19	4.15	1.663	0.182
TOTAL	3.51	3.95	3.95	4.00	0.925	0.433

Tabulated F value = 2.75, at degree of freedom = (3, 75) and sig. level $\alpha = 0.05$

4.4.2 Company experience and time schedule characteristic

Table 4.38 clarifies the one-way ANOVA test, which illustrates that there is a significant difference in points of view of the respondents ascribed to the company experience regarding time schedule characteristic in the fields of certificates and payment and special risks clauses. This is because the P-value = 0.034 and 0.029 for certificates and payment and special risks respectively, which is less than 0.05, and the calculated F value = 3.038 and 3.181 respectively, greater than tabulated F value. This result proves that the contractors, owners

and consultants have different interpretation for time factor and the clauses of both of certificates and payment and special risks in respect to the company experience.

Nevertheless, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to company experience, since the P-value for each field is greater than 0.05.

Table 4.38 One-way ANOVA according to company experience for time schedule characteristic

FIDIC Contract Clauses	Company Experience				F	P-Value
	Less than 5 years	5-10 years	11-20 years	More than 20 years		
Engineer and Engineer's Representative	3.58	4.06	4.14	3.87	1.862	0.143
Contract Documents	3.93	4.17	3.87	4.03	0.656	0.582
General Obligation	2.88	3.33	3.60	3.70	2.626	0.057
Suspension	3.83	4.16	4.09	4.11	0.110	0.95
Commencement and Delays	4.00	4.23	3.93	4.27	1.278	0.288
Alterations, Additions, and Omissions	3.41	3.80	3.77	3.87	0.372	0.774
Procedure for Claims	3.40	3.26	3.82	3.72	1.673	0.180
Certificates and Payment	3.15	3.18	3.80	3.45	3.038	0.034
Special Risks	2.50	3.00	3.41	3.51	3.181	0.029
Release from Performance	2.75	2.60	3.18	3.30	1.505	0.220
Settlement of Disputes	3.43	3.57	3.85	3.86	0.894	0.448
TOTAL	3.35	3.58	3.77	3.79	1.634	0.189

Tabulated F value = 2.75, at degree of freedom = (3, 75) and sig. level $\alpha = 0.05$

4.4.3 Company experience and quality characteristic

Table 4.39 clarifies the one-way ANOVA test, which illustrates that there is a significant difference in points of view of the respondents ascribed to the company experience regarding quality characteristic in the fields of procedure for claims, certificates and payment and special risks clauses groups. This is because the P-value = 0.007 and 0.046 and 0.016 for procedure for claims, certificates and payment and special risks respectively, which is less than 0.05, and the calculated F value = 3.377, 2.799 and 3.679 respectively, greater than tabulated F value. This result illustrates that the contractors, owners and consultants have different interpretation for time factor and the clauses of each of procedure for claims, certificates and payment and special risks in respect to the company experience.

However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to company experience, since the P-value for each field is greater than 0.05.

Table 4.39 One-way ANOVA according to company experience for quality characteristic

FIDIC Contract Clauses	Company Experience				F	P-Value
	Less than 5 years	5-10 years	11-20 years	More than 20 years		
Engineer and Engineer's Representative	4.16	4.40	4.21	4.12	0.701	0.554
Contract Documents	2.93	3.12	3.52	3.41	1.399	0.250
General Obligation	3.43	3.25	3.56	3.58	1.964	0.127
Suspension	2.83	2.90	3.03	3.12	0.407	0.748
Commencement and Delays	2.50	3.10	3.17	3.20	1.371	0.258
Alterations, Additions, and Omissions	3.50	3.56	3.38	3.72	1.072	0.366
Procedure for Claims	2.70	3.08	3.61	3.40	4.377	0.007
Certificates and Payment	2.87	3.06	3.61	3.28	2.799	0.046
Special Risks	2.29	2.73	3.09	3.30	3.679	0.016
Release from Performance	3.00	2.80	3.03	3.30	0.775	0.512
Settlement of Disputes	3.50	3.52	3.909	3.56	2.217	0.093
TOTAL	3.06	3.23	3.46	3.45	1.930	0.132

Tabulated F value = 2.75, at degree of freedom = (3, 75) and sig. level $\alpha = 0.05$

4.4.4 Company experience and safety characteristic

Table 4.40 clarifies the one-way ANOVA test, which illustrates that there is no significant difference in points of view of the respondents can be ascribed to the company experience regarding safety characteristic in all fields of FIDIC clauses. This is because the P-value for each field of clauses is greater than 0.05 and tabulated F value is greater than the calculated F value. This result illustrates that the contractors, owners and consultants have the same interpretation for the clauses of FIDIC in respect to safety factor and the company experience.

Table 4.40 One-way ANOVA according to company experience for safety characteristic

FIDIC Contract Clause	Company Experience				F	P-Value
	Less than 5 years	5-10 years	11-20 years	More than 20 years		
Engineer and Engineer's Representative	4.25	4.06	3.97	3.77	1.115	0.348
Contract Documents	2.75	2.92	3.26	3.07	1.429	0.241
General Obligation	3.59	3.61	3.69	3.75	0.421	0.738
Suspension	3.16	2.83	3.10	3.18	1.050	0.376
Commencement and Delays	3.41	2.96	3.05	3.16	1.18	0.492
Alterations, Additions, and Omissions	2.58	2.83	3.00	3.17	1.092	0.358
Procedure for Claims	2.80	2.90	3.30	3.30	2.068	0.112
Certificates and Payment	3.21	2.98	3.37	3.06	1.176	0.325
Special Risks	2.37	3.30	3.29	3.41	1.943	0.130
Release from Performance	3.25	2.90	2.82	3.30	1.333	0.270
Settlement of Disputes	3.18	3.40	3.53	3.38	0.705	0.552
TOTAL	3.14	3.15	3.31	3.32	0.769	0.515

Tabulated F value = 2.75, at degree of freedom = (3, 75) and sig. level $\alpha = 0.05$

4.4.5 Company experience and satisfaction characteristic

Table 4.41 clarifies the one-way ANOVA test, which illustrates that there is a significant difference in points of view of the respondents ascribed to the company experience regarding satisfaction characteristic in the fields of engineer and engineer's representative and special risks clauses. This is because the P-value = 0.036 and 0.038 for engineer and engineer's representative and special risks respectively, which is less than 0.05, and the calculated F value = 2.988 and 2.954 respectively, greater than tabulated F value. This result proves that the contractors, owners and consultants have different levels of satisfaction towards the clauses of both of engineer and engineer's representative and special risks in respect to the company experience.

Nevertheless, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to company experience, since the P-value for each field is greater than 0.05.

Table 4.41 One-way ANOVA according to company experience for satisfaction characteristic

FIDIC Contract Clauses	Company Experience				F	P-Value
	Less than 5 years	5-10 years	11-20 years	More than 20 years		
Engineer and Engineer's Representative	3.00	4.20	3.99	3.81	2.988	0.036
Contract Documents	3.43	4.05	3.58	3.72	1.587	0.199
General Obligation	3.75	4.03	3.90	4.07	1.280	0.287
Suspension	3.66	4.23	3.60	3.87	1.979	0.124
Commencement and Delays	3.58	3.70	3.70	3.56	0.213	0.887
Alterations, Additions, and Omissions	3.41	3.40	3.56	3.79	0.699	0.556
Procedure for Claims	3.60	3.66	3.95	4.00	1.748	0.164
Certificates and Payment	3.65	3.86	4.16	4.15	1.252	0.297
Special Risks	2.83	3.61	3.53	3.96	2.954	0.038
Release from Performance	3.75	3.30	3.53	4.11	1.885	0.139
Settlement of Disputes	3.37	4.22	4.21	4.12	2.461	0.069
TOTAL	3.46	3.84	3.79	3.92	1.215	0.310

Tabulated F value = 2.75, at degree of freedom = (3, 75) and sig. level $\alpha = 0.05$

4.4.6 Maximum project budget through last five years and cost characteristic

Table 4.42 clarifies the one-way ANOVA test, which illustrates that there is a significant difference in points of view of the respondents ascribed to the maximum project budget through last five years regarding cost characteristic in the fields of contact documents, special risks and settlement of disputes clauses. This is because the P-value = 0.008 and 0.010 and 0.018 for contact documents, special risks and settlement of disputes clauses respectively,

which is less than 0.05, and the calculated F value = 3.709, 3.565 and 3.200 respectively, greater than tabulated F value.

This result illustrates that the contractors, owners and consultants have different interpretation for cost factor and the clauses of each of contact documents, special risks and settlement of disputes clauses in respect to the maximum project budget through last five year. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to the maximum project budget through last five years, since the P-value for each field is greater than 0.05.

Table 4.42 One-way ANOVA according to maximum project budget through last five years for Cost characteristic

FIDIC Contract Clauses	Maximum project budget throughout last five years (Thousand US$)					F	P-Value
	Less than 250	250-500	510-750	760-1 Million $	More than 1 Million $		
Engineer and Engineer's Representative	2.66	3.22	3.44	4.13	3.59	0.673	0.613
Contract Documents	2.25	3.66	3.16	4.60	3.95	3.709	0.008
General Obligation	4.36	3.96	3.72	4.01	4.06	0.477	0.753
Suspension	4.66	4.33	3.22	4.60	4.08	0.963	0.433
Commencement and Delays	4.33	4.33	3.55	4.40	4.16	0.684	0.605
Alterations, Additions, and Omissions	5.00	4.66	4.33	4.86	4.12	1.115	0.356
Procedure for Claims	3.60	4.40	3.53	4.40	3.93	1.511	0.208
Certificates and Payment	3.37	4.08	3.50	4.07	3.87	0.576	0.681
Special Risks	2.66	4.00	1.94	3.83	3.81	3.565	0.010
Release from Performance	4.00	3.33	4.00	3.60	3.67	0.222	0.925
Settlement of Disputes	3.50	4.58	3.00	4.65	4.15	3.200	0.018
TOTAL	3.67	4.05	3.40	4.28	3.94	1.341	0.263

Tabulated F value = 2.51, at degree of freedom= (4, 74) and sig. level $\alpha = 0.05$

4.4.7 Maximum project budget through last five years and time characteristic

Table 4.43 clarifies the one-way ANOVA test, which illustrates that there is no significant difference in points of view of the respondents ascribed to the maximum project budget regarding time characteristic in all fields of FIDIC clauses. This is because the P-value for each field of clauses is greater than 0.05 and the tabulated F value is greater than the calculated F value. This result illustrates that the contractors, owners and consultants have the

same interpretation for time factor and the clauses of FIDIC in respect to the maximum project budget and time schedule.

Table 4.43 One-way ANOVA according to maximum project budget through last five years for Time Schedule characteristic

FIDIC Contract Clauses	Maximum project budget throughout last five years (Thousand US$)					F	P-Value
	Less than 250	250-500	510-750	760-1 Million $	More than 1 Million $		
Engineer and Engineer's Representative	2.66	4.00	3.44	4.20	4.04	2.314	0.065
Contract Documents	3.50	4.00	3.83	4.40	3.95	0.677	0.610
General Obligation	2.45	3.33	2.78	3.45	3.63	2.440	0.054
Suspension	5.00	4.55	3.44	4.86	4.03	1.579	0.189
Commencement and Delays	4.66	4.66	3.77	4.40	4.04	1.052	0.386
Alterations, Additions, and Omissions	2.33	4.33	3.22	4.33	3.77	2.138	0.085
Procedure for Claims	2.60	4.13	3.13	4.24	3.67	1.883	0.122
Certificates and Payment	3.12	3.25	3.25	3.75	3.59	0.450	0.772
Special Risks	2.83	3.66	2.16	3.40	3.39	2.306	0.066
Release from Performance	3.00	3.33	2.33	2.80	3.18	0.707	0.590
Settlement of Disputes	3.50	3.66	3.16	4.00	3.82	0.849	0.499
TOTAL	3.24	3.90	3.14	3.98	3.74	2.248	0.072

Tabulated F value = 2.51, at degree of freedom= (4, 74) and sig. level $\alpha = 0.05$

4.4.8 Maximum project budget through last five years and quality characteristic

Table 4.44 clarifies the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the maximum project budget regarding the quality characteristic in the field of contract documents clauses. This is because the P-value = 0.007 which is less than 0.05, and the calculated F value = 3.807 greater than the tabulated F value. This result proves that the contractors, owners and consultants have different interpretation for quality and the contract documents clauses in respect to maximum project budget.

However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to the maximum project budget through last five years, since the P-value for each field is greater than 0.05.

Table 4.44 One-way ANOVA according to maximum, project budget through last five years for quality characteristic

FIDIC Contract Clauses	Maximum project budget throughout last five years (Thousand US$)					F	P-Value
	Less than 250	250-500	510-750	760-1 Million $	More than 1 Million $		
Engineer and Engineer's Representative	3.66	4.22	3.88	4.53	4.19	1.066	0.379
Contract Documents	2.50	3.50	2.75	4.40	3.37	3.807	0.007
General Obligation	3.63	3.51	3.36	3.63	3.52	0.229	0.922
Suspension	3.00	2.77	3.11	3.33	3.02	0.364	0.834
Commencement and Delays	3.00	2.77	2.66	3.13	3.18	0.660	0.622
Alterations, Additions, and Omissions	3.66	3.88	3.11	3.80	3.51	0.552	0.698
Procedure for Claims	3.20	2.93	2.80	3.88	3.44	1.990	0.105
Certificates and Payment	3.50	3.12	2.87	3.60	3.41	0.569	0.686
Special Risks	2.50	3.16	1.94	3.16	3.13	2.324	0.064
Release from Performance	4.00	3.33	2.67	3.00	3.09	0.414	0.798
Settlement of Disputes	3.50	3.75	3.16	4.00	3.72	0.838	0.505
TOTAL	3.28	3.36	2.94	3.68	3.42	1.545	0.198

Tabulated F value = 2.51, at degree of freedom= (4, 74) and sig. level $\alpha = 0.05$

4.4.9 Maximum project budget through last five years and safety characteristic

Table 4.45 clarifies the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the maximum project budget regarding the safety characteristic in the field of special risks clauses. This is because the P-value = 0.015 which is less than 0.05, and the calculated F value = 3.290 greater than the tabulated F value. This result proves that the contractors, owners and consultants have different interpretation for safety and the special risks clauses in respect to maximum project budget. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to the maximum project budget through last five years, since the P-value for each field is greater than 0.05.

Table 4.45 One-way ANOVA according to maximum project budget through last five years for safety characteristic

FIDIC Contract Clauses	Maximum project budget throughout last five years (Thousand US$)					F	P-Value
	Less than 250	250-500	510-750	760-1 Million $	More than 1 Million $		
Engineer and Engineer's Representative	5.00	3.77	4.33	4.06	3.89	1.220	0.310
Contract Documents	2.50	3.08	2.58	3.80	3.11	2.276	0.069
General Obligation	3.81	3.51	3.51	3.81	3.70	0.495	0.739
Suspension	3.00	3.44	2.88	3.13	3.09	0.418	0.795
Commencement and Delays	3.00	3.44	3.22	2.80	3.09	0.680	0.608
Alterations, Additions, and Omissions	2.66	2.88	2.77	2.93	3.04	0.192	0.942
Procedure for Claims	3.80	2.93	3.06	3.16	3.24	0.470	0.757
Certificates and Payment	3.00	3.79	2.70	2.97	3.22	0.877	0.482
Special Risks	2.16	3.27	1.94	3.76	3.33	3.290	0.015
Release from Performance	4.00	3.670	2.67	2.60	3.01	0.850	0.498
Settlement of Disputes	3.50	3.33	3.16	3.55	3.45	0.264	0.900
TOTAL	3.31	3.37	2.98	3.32	3.29	0.554	0.697

Tabulated F value = 2.51, at degree of freedom= (4, 74) and sig. level $\alpha = 0.05$

4.4.10 Maximum project budget through last five years and satisfaction characteristic

Table 4.46 clarifies the one-way ANOVA test, which illustrates that there is a significant difference in points of view of the respondents ascribed to the maximum project budget through last five years regarding satisfaction characteristic in the fields of engineer and engineer's representative, contract documents, special risks and settlement of disputes clauses. This is because the P-value = 0.002 and 0.030, 0.012 and 0.001 for engineer and engineer's representative, contract documents, special risks and settlement of disputes clauses respectively, which is less than 0.05, and the calculated F value = 4.711, 2.850, 3.453 and 5.359 respectively, greater than tabulated F value.

This result illustrates that the contractors, owners and consultants have different satisfaction levels towards the clauses of each of engineer and engineer's representative, contract documents, special risks and settlement of disputes clauses in respect to the maximum project budget through last five year. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to the maximum project budget through last five years, since the P-value for each field is greater than 0.05.

Table 4.46 One-way ANOVA according to maximum project budget through last five years for satisfaction characteristic

FIDIC Contract Clauses	Maximum project budget throughout last five years (Thousand US$)					F	P-Value
	Less than 250	250-500	510-750	760-1 Million $	More than 1 Million $		
Engineer and Engineer's Representative	2.00	3.77	2.66	4.06	3.98	4.711	0.002
Contract Documents	2.75	3.91	3.16	4.40	3.65	2.850	0.030
General Obligation	3.81	3.78	3.54	4.16	3.98	1.233	0.304
Suspension	3.33	4.55	3.22	4.33	3.73	1.960	0.109
Commencement and Delays	2.33	4.22	3.22	4.06	3.63	2.229	0.074
Alterations, Additions, and Omissions	3.33	4.11	3.22	4.40	3.55	1.627	0.176
Procedure for Claims	4.00	4.13	3.40	4.16	3.91	1.207	0.315
Certificates and Payment	4.37	4.20	3.33	4.47	4.09	1.539	0.200
Special Risks	3.33	4.16	2.27	4.33	3.64	3.453	0.012
Release from Performance	5.00	4.33	3.33	4.80	3.60	1.973	0.107
Settlement of Disputes	3.00	4.50	3.08	4.70	4.15	5.359	0.001
TOTAL	3.38	4.15	3.13	4.35	3.81	4.116	0.005

Tabulated F value = 2.51, at degree of freedom= (4, 74) and sig. level $\alpha = 0.05$

4.5 Testing the significant difference in points of view of contract parties' category regarding FIDIC groups' clauses

In order to check the internal consistency of results among construction project characteristics and within FIDIC clauses, it is necessary to compare according to an independent variable by using the one-way ANOVA test. The one-way ANOVA test is a one-way analysis of variance for a quantitative dependent variable by a single factor (independent variable). This test checks out if there are any significant differences in the points of view of the respondents (contract parties) regarding ranking the FIDIC clauses and the construction performance characteristics which affected by the respondent's category. The respondents' categories are owners, contractors and consultants.

4.5.1 Contract parties and the cost characteristic

The null hypothesis stated that there is no significant difference in points of view of the surveyed respondents (contractors, owners and consultants) regarding ranking FIDIC clauses and project performance characteristics could be ascribed to the contract parties' categories. Owners, contractors and consultants are the contract parties. According to the one-way ANOVA test, there is no significant difference regarding an evaluation ascribed to an

independent variable, if the tabulated F value is more than the calculated F value and the sig. p-value is more than 0.05. Table 4.50 shows the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the respondents' category regarding cost characteristic in the fields of suspension, commencement and delays, alterations, additions, and omissions, procedure for claims, certificates and payment and special risks clauses. This is because the P-values for these fields = 0.000, 0.001, 0.000, 0.042, 0.021 and 0.020 which are less than 0.05, and the calculated F values are greater than tabulated F value. This result proves that the contractors, owners and consultants have different interpretation for cost factor and the previous mentioned clauses depending on the respondent's category. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to respondent's category, since the P-value for each field is greater than 0.05.

Table 4.50 One-way ANOVA according to contract parties and cost characteristic

FIDIC Contract Clause	Respondents' points of view			F	P-Value
	owner	contractor	consultants		
Engineer and Engineer's Representative	3.65	3.72	3.00	2.370	0.100
Contract Documents	3.95	4.00	3.61	1.241	0.295
General Obligations	3.93	4.17	3.90	2.900	0.061
Suspension	4.11	4.39	3.06	8.628	0.000
Commencement and Delays	4.16	4.36	3.48	7.122	0.001
Alterations, Additions, and Omissions	4.12	4.54	3.30	9.194	0.000
Procedure for Claims	3.84	4.13	3.67	3.299	0.042
Certificates and Payment	3.62	4.03	4.04	4.057	0.021
Special Risks	3.61	4.00	3.15	4.100	0.020
Release from Performance	3.53	3.84	3.45	1.279	0.284
Settlement of Disputes	4.01	4.32	3.88	2.416	0.096

Tabulated F value = 3.12, at degrees of freedom (2, 76) and sig. level 0.05

4.5.2 Contract parties and the time characteristic

Table 4.51 clarifies the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the respondents' category regarding time characteristic in the fields of general obligations, suspension, commencement and delays, alterations, additions, and omissions, procedure for claims, and certificates and payment clauses. This is because the P-values for these fields = 0.012, 0.001, 0.000, 0.000, 0.000 and 0.033 which are less than 0.05, and the calculated F values are greater than tabulated F value. This result proves that the contractors, owners and consultants have different interpretation for time factor and the previous mentioned clauses depending on the respondent's category. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to respondent's category, since the P-value for each field is greater than 0.05.

Table 4.51 One-way ANOVA according to contract parties and time characteristic

FIDIC Contract Clause	Respondents' points of view			F	P-Value
	owner	contractor	consultants		
Engineer and Engineer's Representative	3.98	4.12	3.69	2.334	0.104
Contract Documents	3.93	4.11	3.56	3.141	0.049
General Obligations	3.39	3.78	3.30	4.666	0.012
Suspension	4.14	4.34	3.12	7.764	0.001
Commencement and Delays	3.94	4.43	3.30	15.792	0.000
Alterations, Additions, and Omissions	3.68	4.12	2.93	11.773	0.000
Procedure for Claims	3.39	4.03	3.34	8.690	0.000
Certificates and Payment	3.32	3.67	3.93	3.571	0.033
Special Risks	3.16	3.52	3.27	2.044	0.137
Release from Performance	2.97	3.26	3.09	0.773	0.465
Settlement of Disputes	3.73	3.90	3.61	1.033	0.361

Tabulated F value = 3.12, at degrees of freedom (2, 76) and sig. level 0.05

4.5.3 Contract parties and the quality characteristic

Table 4.52 illustrates the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the respondents' category regarding quality characteristic in the fields of engineer and engineer's representative, contract documents, alterations, additions, and omissions, and certificates and payment clauses. This is because the P-values for these fields = 0.002, 0.024, 0.004, and 0.039 which are less than 0.05, and the calculated F values are greater than tabulated F value. This result proves that the contractors, owners and consultants have different interpretation for quality factor and the previous mentioned clauses depending on the respondent's category. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to respondent's category, since the P-value for each field is greater than 0.05.

Table 4.52 One-way ANOVA according to contract parties and quality characteristic

FIDIC Contract Clause	Respondents' points of view			F	P-Value
	owner	contractor	consultants		
Engineer and Engineer's Representative	4.11	4.38	3.81	6.808	0.002
Contract Documents	3.21	3.63	3.13	3.926	0.024
General Obligations	3.43	3.59	3.53	1.446	0.242
Suspension	3.02	3.09	2.87	0.462	0.632
Commencement and Delays	3.12	3.17	3.09	0.089	0.915
Alterations, Additions, and Omissions	3.32	3.81	3.12	6.044	0.004
Procedure for Claims	3.30	3.51	3.43	0.923	0.402
Certificates and Payment	3.16	3.45	3.79	3.376	0.039
Special Risks	2.88	3.25	3.01	2.459	0.092
Release from Performance	2.87	3.29	3.00	1.699	0.190
Settlement of Disputes	3.58	3.78	3.86	1.208	0.304

Tabulated F value = 3.12, at degrees of freedom (2, 76) and sig. level 0.05

4.5.4 Contract parties and the safety characteristic

Table 4.53 shows the one-way ANOVA test, which shows that there is a significant difference in points of view of the respondents ascribed to the respondents' category regarding safety characteristic in the field of "engineer and engineer's representative" clauses. This is because the P-values for this field = 0.005 which is less than 0.05, and the calculated F value = 5.625 is greater than tabulated F value = 3.12. This result proves that the contractors, owners and consultants have different interpretation for safety factor and the engineer and engineer's representative clauses depending on the respondent's category. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to respondent's category, since the P-value for each field is greater than 0.05.

Table 4.53 One-way ANOVA according to contract parties and quality characteristic

FIDIC Contract Clause	Respondents' points of view			F	P-Value
	owner	contractor	consultants		
Engineer and Engineer's Representative	4.15	3.70	4.12	5.625	0.005
Contract Documents	3.09	3.12	3.25	0.239	0.788
General Obligations	3.68	3.72	3.66	0.171	0.843
Suspension	3.12	3.10	3.03	0.115	0.892
Commencement and Delays	3.03	3.12	3.18	0.357	0.701
Alterations, Additions, and Omissions	2.9000	3.1491	2.87	1.199	0.307
Procedure for Claims	3.17	3.22	3.3636	0.396	0.674
Certificates and Payment	3.00	3.27	3.55	2.325	0.105
Special Risks	3.17	3.50	2.89	2.929	0.059
Release from Performance	2.83	3.24	2.73	1.905	0.156
Settlement of Disputes	3.44	3.36	3.75	2.063	0.134

Tabulated F value = 3.12, at degrees of freedom (2, 76) and sig. level 0.05

4.5.5 Contract parties and satisfaction characteristic

Table 4.54 clarifies the one-way ANOVA test, which illustrates that there is a significant difference in points of view of the respondents ascribed to the contract parties' category regarding satisfaction characteristic in the fields of general obligations, alterations, additions, and omissions, and special risks clauses. This is because the P-values for these fields = 0.012 and 0.006 and 0.000 respectively, which is less than 0.05, and the calculated F values = 4.671, 5.448, and 12.784 respectively that are greater than tabulated F value = 3.12.

This result illustrates that the owners, contractors and consultants have different satisfaction levels towards the clauses of each of general obligations, alterations, additions, and omissions, and special risks clauses in respect to the respondent's category. However, there is no significant differences in points of view of the respondents regarding the other fields can be ascribed to the respondent's category, since the P-value for each field is greater than 0.05.

Table 4.54 One-way ANOVA according to contract parties and satisfaction characteristic

FIDIC Contract Clause	Respondents' points of view			F	P-Value
	owner	contractor	consultants		
Engineer and Engineer's Representative	3.90	3.96	3.72	0.427	0.654
Contract Documents	3.64	3.79	3.40	1.619	0.205
General Obligations	3.88	4.10	3.73	4.671	0.012
Suspension	3.75	3.93	3.30	2.969	0.057
Commencement and Delays	3.77	3.63	3.36	1.433	0.245
Alterations, Additions, and Omissions	3.43	3.90	3.09	5.448	0.006
Procedure for Claims	3.86	4.01	3.70	1.802	0.172
Certificates and Payment	3.88	4.21	4.28	2.653	0.077
Special Risks	3.32	4.08	3.06	12.784	0.000
Release from Performance	3.40	4.03	3.45	2.903	0.061
Settlement of Disputes	4.00	4.30	4.00	2.483	0.090

Tabulated F value = 3.12, at degrees of freedom (2, 76) and sig. level 0.05

4.6 Conclusion

The following Tables 4.55, 4.56 and 4.57 conclude the highest relative importance indices and first ranks of the selected FIDIC groups from contractors, owners' and consultants' perspectives. The contractors, owners and consultants classified the following clauses groups as the most important FIDIC clauses, which ranked at the first ranks with the highest relative importance indices regarding construction project performance. According to this result, the FIDIC clauses are tied to project performance and are satisfactory to the contract users. This is because the surveyed contractors, owners and consultants consider the text of FIDIC groups' clauses clear and treats the subjects of contract's clauses properly.

Tables 4.55, 4.56, 4.57 shows a comparison between the contract's parties perspectives, regarding FIDIC groups clauses. These results give the contract parties an indication of the relative importance of the FIDIC groups clauses so that they make sure that they have a good understanding of those contractual and troublesome clauses.

Table 4.55 the highest relative importance index and first rank of FIDIC groups from contractors' perspective

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	rank	RII	rank	RII	rank	RII	rank	RII	rank
Engineer and Engineer's Representative					0.877	1				
General Obligations							0.745	1		
Commencement and Delays			0.888	1						
Alterations, Additions, and Omissions	0.909	1								
Settlement of Disputes									0.861	1

Table 4.56 the highest relative importance index and first rank of FIDIC groups from owners' perspective

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	rank	RII	rank	RII	rank	RII	rank	RII	rank
Engineer and Engineer's Representative					0.822	1	0.831	1		
Suspension			0.829	1						
Commencement and Delays	0.833	1								
Settlement of Disputes									0.800	1

Table 4.57 the highest relative importance index and first rank of FIDIC groups from consultants' perspective

Clause	Cost		Time Schedule		Quality		Safety		Satisfaction of Contract Parties	
	RII	rank	RII	rank	RII	rank	RII	rank	RII	rank
Engineer and Engineer's Representative							0.824	1		
Certificates and Payment	0.809	1	0.786	1					0.857	1
Settlement of Disputes					0.773	1				

CHAPTER 5: Conclusion and Recommendations

The main aim of this study is to investigate the impact of selected FIDIC clauses on the construction project performance. The study results prove that FIDIC clauses have significant impact on construction project performance, and are satisfactory to the contract parties. This is because the surveyed contractors, owners and consultants consider the text of FIDIC groups' clauses clear and treats the subjects of contract's clauses properly. The researcher offers practical recommendations to support and develop a successful contracting strategy with proposed additional studies in this subject.

5.1 Introduction

This study has successfully demonstrated the importance of FIDIC contract as a standard form to achieve improved project performance. Owners and contractors alike will benefit by taking a more discerning approach to the contractual arrangements of their projects, although the perfectly balanced contract, in which the interests of contract parties are treated equally, does not yet seem to exist

In Palestine, the FIDIC 87 contract is still widely used in the construction projects. The Palestinian National Authority (PNA) has recently adopted FIDIC 99 contact to be a unified formal contract for construction projects. However, local project performance still face several contractual problems such as, delays, litigation, and additional costs, which are the consequences of disputes.

To contribute in mitigation this problem, this research is conducted on the most common used contract i.e. (FIDIC 87, 4th edition reprinted in 1992). In this research, the FIDIC clauses found to have a significant effect on project performance were analyzed to disclose its impact on six measures of project performance: cost, schedule, quality, safety, and satisfaction of contract parties.

The findings of this research indicate that there are very few studies in the past that tackled the main aim of this research. The study findings indicate that the most important contractual articles or (groups) of (FIDIC general conditions 1987 Reprinted in 1992 with further amendments) that tied to/and influence project performance significantly and considered crucial to project success, are the following:

- Engineer and Engineer's Representative.
- Contract Documents.
- General Obligations.
- Suspension.
- Commencement and Delays.
- Alterations, Additions and Omissions.
- Procedure for Claims.
- Certificates and Payment.
- Special Risks.
- Release from Performance.
- Settlement of Disputes.

The results of analyzing the previous mentioned FIDIC groups' clauses conclude:

5.2 Conclusion regarding contractors' perspective

The surveyed contractors consider the FIDIC contract clauses satisfactory with relative importance indices (RII) ranges from 0.861 to 0.726 regarding contract parties' satisfaction. This is because the surveyed contractors consider the text of FIDIC groups' clauses clear and treats the subjects of contract's clauses properly.

The surveyed contractors consider the "Alterations, Additions, and Omissions" clauses have the highest impact on the project cost with the highest relative importance index (RII) = 0.909, at the first rank as the most important group regarding the other clauses groups. This result shows that the surveyed contractors believe that variations are considered causes of substantial adjustment to the contract cost and/or time; and that by these clauses; no such variation will in any way invalidate the contract and in turn, may lead to disputes. Ibbs, et al (2001) concluded that variations (changes) in projects are common and may be deleterious or beneficial-whether you see a change as a conflict or a valuable lesson depends only on your prospective.

The surveyed contractors believe that the "Commencement and Delays" clauses have the highest impact on the project period with the highest relative importance index (RII) = 0.888, at the first rank as the most important group regarding the other clauses groups. These clauses treat a very important issue that frequently forms a cause for claims and disputes. Contractors have shown a high interest in these clauses. Vidogah and Ndekugri (1997) concluded that

there is high incidence of disputes arising from construction contract claims. Even with the most expert understanding of contract clauses and the most equitable risk-allocation regime, claims will continue to present problems if they are poorly managed in practice.

The surveyed contractors consider the "Engineer and Engineer's Representative" clauses have the highest impact on the project quality with the highest relative importance index (RII) = 0.877, at the first rank as the most important group regarding the other groups. This clarifies that the surveyed contractors believe that this group affect the project performance significantly. The engineer's role is certainly means an authorized engineer by the approval of the employer with the duties specified in the contract. The duties include control of works quantities and its quality within the contract time and budget.

The surveyed contractors consider the "General Obligations" clauses have the highest impact on the project safety with the highest relative importance index (RII) = 0.754, at the first rank as the most important group regarding the other groups. This conclusion illustrates the high interest of contractors in perception and interpretation of these clauses. This supports the principle of risk sharing between the contract parties to guarantee a balanced and fair contract. Hartman and Snelgrove (1996) had concluded, "With few exceptions, owners, contractors, and consultants interpret contract clauses differently".

The surveyed contractors consider the "Settlements of Disputes" clauses have the highest impact regarding contract parties satisfaction with the highest relative importance (RII) = 0.861, at the first rank as the most important group regarding the other groups. This conclusion shows the high interest of contractors in settlement of disputes to save time and money. Therefore, the contractors agree to follow the steps mentioned in this group to settle any dispute taking into account the role of engineer as an arbitrator. Hughes and Shinoda (1999) concluded that the engineer’s role is not generally perceived as neutral in the contractual relationships between clients and contractors. Contractors would prefer someone other than the engineer to be the first-line settler of disputes in contracts.

5.3 Conclusion regarding owners' perspective

The surveyed owners consider the FIDIC contract is satisfactory with relative importance indices (RII) ranges from 0.800 to 0.666 regarding contract parties' satisfaction. This is because the surveyed owners consider the text of FIDIC groups' clauses clear and treats the subjects of contract's clauses properly.

The owners consider the "Commencement and Delays" clauses have the highest impact on the project cost with the highest relative importance index (RII) = 0.833, at the first rank as the most important group regarding the other clauses groups. This result shows that owners believe that rate of progress and time schedule have a high impact on time and cost. The owners believe that it is difficult to avoid delays. Kartam (1999) concluded that finishing a project on schedule is a difficult task to accomplish in the uncertain, complex, multiparty, and dynamic environment of construction. Thus, it has been common for a construction project to encounter delays.

The surveyed owners believe that the "Suspension" clauses have the highest impact on the project period with the highest relative importance index (RII) = 0.829, at the first rank as the most important group regarding the other clauses groups. The owners agree that, upon the instruction of the engineer, the contractor will suspend the progress of the works and properly protect these works during such suspension, as far as it is necessary, in the opinion of the engineer.

The surveyed owners consider the "Engineer and Engineer's Representative" group clauses have the highest impact on the project safety and quality with the highest relative importance index (RII) = 0.831 and 0.822 respectively at the first rank as the most important group regarding the other groups. This clarifies that the surveyed owners believe that this group has a significant impact on the project performance. The owner considers the engineer as his representative, who is authorized by the owner's approval with the duties specified in the contract. The duties include control of works quantities and its quality within the contract time and budget.

The surveyed owners consider the "Settlements of Disputes" clauses have the highest impact regarding contract parties satisfaction with the highest relative importance (RII) = 0.800, at the first rank as the most important group regarding the other groups. This conclusion shows the high interest of owners in settlement of disputes to save money and time. Therefore, the owners agree to follow the steps mentioned in this group to settle any dispute taking into account the role of engineer as an arbitrator. Hughes and Shinoda (1999) concluded that the engineer’s role is not generally perceived as neutral in the contractual relationships between owners and contractors. Contractors would prefer someone other than the engineer to be the first-line settler of disputes in contracts.

5.4 Conclusion regarding consultants' perspective

The surveyed consultants consider the FIDIC contract is satisfactory for them with relative importance indices (RII) ranges from 0.857 to 0.612 regarding contract parties' satisfaction. This is because the surveyed consultants consider the text of FIDIC groups' clauses clear and treats the subjects of contract's clauses properly.

The surveyed consultants believe that the "Certificates and Payment" clauses have the highest influence on the project cost and time period with the highest relative importance index (RII) = 0.809 and 0.786 respectively, at the first rank as the most important group regarding the other clauses groups. The consultants believe that any delays toward application of these clauses will be a basis to disputes. Meanwhile, the consultants consider this group to have the highest impact regarding contract parties satisfaction with the highest relative importance (RII) = 0.857, at the first rank as the most important group regarding the other groups

The surveyed consultants consider the "Engineer and Engineer's Representative" clauses have the highest impact on the project safety with the highest relative importance index (RII) = 0.824, at the first rank as the most important group regarding the other groups. This clarifies that the surveyed consultants believe that this group clauses affect the project performance significantly. The engineer's role is undoubtedly means an authorized engineer by the approval of the employer with the duties specified in the contract. The duties include control of works quantities and its quality within the contract time and budget.

The surveyed consultants consider the "Settlement of Disputes" clauses have the highest impact on the project quality with the highest relative importance index (RII) = 0.773, at the first rank as the most important group regarding the other groups. This conclusion shows the high interest of consultants in settlement of disputes to save time and money. Meanwhile, settlement of disputes according to surveyed consultants, keep having good relations between contract parties and achieving good quality. Therefore, the consultants believe in applying the steps mentioned in this group to settle any dispute taking into account the role of engineer as an arbitrator. Hughes and Shinoda (1999) concluded that the engineer’s role is not generally perceived as neutral in the contractual relationships between clients and contractors. Contractors would prefer someone other than the engineer to be the first-line settler of disputes in contracts.

5.5 Conclusion of testing the supposed hypothesis

The results prove that there is a significant difference in points of view and interpretation of the respondents ascribed to the company experience regarding the following project performance characteristics:

- *Cost factor*: in the field of special risks clauses;
- *Time factor*: in the fields of certificates and payment and special risks clauses**;**
- *Quality factor*: in the fields of procedure for claims, certificates and payment and special risks clauses groups**;**
- *Satisfaction level* of respondents towards FIDIC clauses: in the fields of engineer and engineer's, representative and special risks clauses.

The results prove also, that there is a significant difference in points of view and interpretation of the respondents ascribed to the maximum project budget implemented throughout last five years regarding the following project performance characteristics:

- *Cost factor*: in the fields of contact documents, special risks and settlement of disputes clauses;
- *Quality factor*: in the field of contract documents clauses;
- *Safety factor*: in the field of special risks clauses;
- *Satisfaction level* of respondents towards FIDIC clauses: in the fields of engineer and engineer's representative, contract documents, special risks and settlement of disputes clauses.

Nevertheless, there is no significant differences in points of view nor interpretation of the respondents regarding the other fields of FIDIC clauses can be ascribed to neither the company experience nor maximum project budget throughout last five years**.**

5.6 Conclusion of testing the significant difference in points of view of contract parties' category regarding FIDIC groups' clauses

The results prove that there is a significant difference in points of view and interpretation of the respondents can be ascribed to the category of contract parties regarding the following project performance characteristics:

- *Cost factor*: in the fields of suspension, commencement and delays, alterations, additions, and omissions, procedure for claims, certificates and payment and special risks clauses;
- *Time factor*: in the fields of general obligations, suspension, commencement and delays, alterations, additions, and omissions, procedure for claims, and certificates and payment clauses;

- *Quality factor*: in the fields of engineer and engineer's representative, contract documents, alterations, additions, and omissions, and certificates and payment clauses;
- *Safety factor*: in the field of the "engineer and engineer's representative" clauses;
- *Satisfaction level* of respondents towards FIDIC clauses, in the fields of general obligations, alterations, additions, and omissions, and special risks clauses.

However, there is no significant difference in points of view nor interpretation of respondents regarding the other fields of FIDIC clauses can be ascribed to the contract parties' category.

5.7 Recommendations

As a result of this research, practical recommendations pertaining to contract parties in respect to the most important and troublesome FIDIC groups clauses, were generated as follows:

Group (1): Engineer and engineer's representative clauses

The engineer's role should mean an authorized neutral engineer by the approval of the employer with the duties specified in the contract.

Group (2): Contract documents clauses

To achieve clear contract documents, there must be common understanding only realized with open and honest communications between the contracting parties prior to contract execution.

Group (3): General obligations clauses

To avoid misunderstanding where interpretation of these clauses is different, there must be a process that encourages discussion and negotiation of how the risk should be shared under contract.

Group (4): Suspension clauses

Suspension of works may be, or/and may lead to claims and disputes. To avoid such disputes, the engineer should determine any extension of time to which the contractor is entitled; and the amount, which will be added to the contract price regarding the cost incurred by the contractor due to such suspension.

Group (5): Commencement and delays clauses

In case of delay, the party who is responsible for a delay must be determined before agreement on any contribution of the delay. If for any reason, which does not entitle the contractor to an extension of time, and the rate of progress of works is too slow to comply the time for completion, the engineer should notify the contractor to take steps to expedite progress.

Group (6): Alterations, additions and omissions clauses

Any variations are considered causes of substantial adjustment to the contract cost and/or time. No such variation should invalidate the contract or in turn, may lead to disputes. Changes in projects must be dealt with seriously as beneficial and valuable lesson.

Group (7): Procedure for claims clauses

To enhance the chances of a claim success, contractors submitting claims must closely follow the steps stipulated in the contract conditions, provide a breakdown of alleged additional costs and time, and present sufficient documentation.

Group (8): Certificates and payment clauses

To avoid delays and disputes, monthly payments must be subject to the retention of the amount calculated by applying the percentage of retention stated in the appendix to tender, and to the deduction of any sums, which have become due and payable by the contractor to the employer.

Group (9): Special risks clauses

In case of special risks or the "force majeure event", these clauses must look at three key issues to be managed in this respect:

- Period of suspension;
- Termination rights; and
- Payment rights.

Group (10): Release from performance clauses

If any circumstances outside the control of both parties arise after the issue of the letter of acceptance that renders it impossible for either or both parties to fulfill his obligations, or under the law governing the contract, the parties should release from further performance, and then the parties will discharge from the contract.

Group (11): Settlement of disputes clauses

Since the engineer’s role is not generally perceived as neutral in the contractual relationships between owners and contractors, the contract parties must follow the steps mentioned in this group to settle any dispute taking into account the role of engineer as a neutral arbitrator.

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List of Annexes

Annex one	**Questionnaire (Arabic)**
Annex two	**Questionnaires (English)**
Annex three	**Special interview including Contents of FIDIC 87 Contract General Conditions**

Annex 1: Questionnaire (Arabic)

الجامعة الإسلامية – غزة
عمادة الدراسات العليا
كلية الهندسة – قسم ادارة المشاريع الهندسية

استبيان حول دراسة و تقييم
بنود عقد FIDIC التي تتعامل مع أداء مشروع الانشاء

الباحث : م. عبد الله مرتجى
جوال / 9352605

المشرف : البروفيسور / عدنان انشاصي
استاذ ادارة المشاريع الهندسية

بسم الله الرحمن الرحيم

استبيان حول دراسة و بحث بنود عقد FIDIC التي تتعامل مع أداء مشروع الانشاء

السادة الكرام /

نشكركم على مساهمتكم ببعض من وقتكم و جهدكم للمشاركة في ملء هذا الاستبيان و الذي يهدف إلى دراسة و تقييم مدى تأثير بنود عقد FIDIC (1987) على أداء مشروع الانشاء و ذلك من وجهة نظر المقاول و المالك و الاستشاري.

ونوجه عنايتكم الى الملاحظات التالية:

1. يعتبر هذا الاستبيان جزءا من دراسة و تقييم تأثير بنود عقد FIDIC على أداء مشاريع الانشاء التي تقومون بتنفيذها و الاشراف عليها.
2. الدراسة هي البحث التكميلي لنيل شهادة الماجستير في ادارة المشاريع الهندسية في الجامعة الاسلامية بغزة.
3. يعمل الباحث على أن تسهم هذه الدراسة في تقييم مواطن الخطر القائمة في العلاقات التعاقدية الموجودة في الشروط العامة لعقد FIDIC بين اطراف العقد.
4. ايضا، تهدف الدراسة الى استبيان وجهات نظركم و تقييمكم لبنود عقد FIDIC و تاثيرها على اداء مشروع الانشاء من حيث: (الكلفة، الجدول الزمني ،الجودة ،الامان ،رضا اطراف العقد) للتاكد من رضاكم عنها.
5. المعلومات التي ستساهمون بها هي لغرض البحث العلمي فقط، و نتائج الدراسة ستسهم في خدمة قطاع التشييد في فلسطين.
6. **مكونات الاستبيان:**

- **الجزء الأول:** و يشتمل على بيانات عامة.
- **الجزء الثاني:** بنود عقد FIDIC الأكثر تأثيرا على أداء مشروع الانشاء.

مع فائق الاحترام ،،،

م. عبدالله مرتجى

الجزء الأول : معلومات عامة

بيانات عامة عن المشارك في تعبئة الاستبيان:

1. تصنيف المشارك و درجته ☐ مالك ☐ مقاول ☐ استشاري

2. الموقع الوظيفي ☐ مدير الشركة ☐ مدير المشاريع ☐ مهندس موقع

3. سنوات الخبرة: ☐ اقل من 5 سنوات ☐ 5 – 10 ☐ 11 – 20

☐ اكثر من 20 سنة.

4. نوع المشاريع: ☐ أبنية و مرافق ☐ طرق و بنية تحتية

☐ مياه و صرف صحي ☐ منشات صناعية

5. قيمة أعلى مشروع قمتم بتنفيذه (بالدولار الأمريكي $):

☐ اقل من 250 الف $ ☐ 250 – 500 الف $ ☐ 510 – 750 الف$

☐ 760 – مليون $ ☐ اكثر من مليون $

6. عدد المشاريع المنفذة خلال الخمس سنوات السابقة:

☐ اقل من 10 ☐ 10–20 ☐ 21–30 ☐ 31–40 ☐ اكثر من 40

7. تكلفة المشاريع المنفذة خلال الخمس سنوات السابقة (مليون دولار):

☐ اقل من 1 ☐ 1–2 ☐ 2.1–3 ☐ 3.1–4 ☐ اكثر من 4

الجزء الثاني:

الجزء الثاني من الاستبيان يحتوي على جدول يتطلب الاختيار من عدة خيارات و لمعرفة هذه الخيارات فقد تم توضيحها في الجدول التالي:

درجة الأهمية	الرمز	المعنى
أوافق بشدة Agree strongly	5	أوافق بشدة بان البند يؤثر ايجابيا على اداء مشروع الانشاء
أوافق Agree	4	أوافق على أن البند يؤثر ايجابيا على اداء مشروع الإنشاء
محايد Neutral	3	لا اعرف إن كان البند يؤثر ايجابيا على اداء مشروع الانشاء
لا أوافق Disagree	2	لا اوافق على ان البند يؤثر ايجابيا على اداء مشروع الإنشاء
لا أوافق بشدة Strongly disagree	1	لا اوافق بشدة على ان البند يؤثر ايجابيا على اداء مشروع الانشاء

البنود التالية هي اهم بنود الشروط العامة لعقد FIDIC التي يتوقع ان تؤثر على اداء مشروع الإنشاء. الرجاء إبداء الرأي تجاه تقييم مدى التاثير الايجابي لكل بند على اداء مشروع الانشاء و ذلك بالاختيار من 5 – 1 و ذلك لكل خاصية من خصائص اداء المشروع، حيث:

(5=أوافق بشدة 4=أوافق 3=محايد 2= اعترض 1=اعترض بشدة).

ملاحظة: ارقام البنود المذكورة ادناه هي الارقام الواردة في الشروط العامة لعقد FIDIC 87

الرقم	البند	خصائص اداء المشروع				
		الكلفة	الجدول الزمني	الجودة	الامان	رضا اطراف العقد
المهندس و ممثل المهندس						
2.1	واجبات و صلاحيات المهندس					
2.2	ممثل المهندس					
2.3	صلاحية المهندس بالتفويض					
وثائق العقد						
5.2	اولوية وثائق العقد					
6.3	تعطيل تقدم العمل					
6.4	التاخير و بدل تاخر المخططات					
6.5	تقصير المقاول في تقديم المخططات					

الرقم	البند	خصائص اداء المشروع				
		الكلفة	الجدول الزمني	الجودة	الامان	رضا اطراف العقد
الالتزامات العامة						
10.3	المطالبات بشان كفالة حسن التنفيذ					
14.1	تقديم برنامج العمل					
14.3	كشف التدفق النقدي					
19.1	السلامة و الامن و حماية البيئة					
19.2	مسئوليات صاحب العمل					
20.4	المخاطر المتعلقة بصاحب العمل					
21.1	التامين على الاشغال و على معدات المقاول					
22.3	مسئولية صاحب العمل في التعويض					
23.3	المسئوليات المتقابلة					
24.1	حوادث او اصابات العمال					
24.2	تامين العمال ضد الحوادث					
توقيف العمل						
40.1	توقيف العمل					
40.2	قرار المهندس بعد توقيف العمل					
40.3	توقيف العمل لمدة تزيد عن 84 يوما					
المباشرة و تاخر انجاز الاعمال						
44.1	تمديد مدة العمل					
46.1	نسبة تقدم العمل					
47.1	التعويض الاتفاقي عن التاخير (غرامة التاخير)					
التغييرات و الاضافات و الالغاءات						
51.1	التغييرات					
52.1	تقدير قيمة التغييرات					
52.2	صلاحية المهندس في تحديد الاسعار					
اجراءات المطالبات						
53.1	الاشعارات بالمطالبات					

الرقم	البند	الكلفة	الجدول الزمني	الجودة	الأمان	رضا أطراف العقد
53.2	السجلات المعاصرة (المحاضر)					
53.3	اثبات المطالبات					
53.4	عدم امتثال المقاول لاحكام هذه المادة					
53.5	الدفع مقابل المطالبات					
الشهادات و الدفعات						
60.2	الدفعات الشهرية					
60.5	الدفعة النهائية بعد التسلم الاولي للاشغال					
60.6	مرفقات الدفعة النهائية					
60.7	اقرار المخالصة					
60.8	شهادة الدفع النهائية					
60.10	مدة تسديد الدفعات					
61.1	حصر الموافقة بشهادة الصيانة					
62.1	شهادة الصيانة او (شهادة اصلاح العيوب)					
الاخطار الخاصة						
65.1	لا مسئولية عن الاخطار الخاصة					
65.2	الاخطار الخاصة					
65.3	الاضرار التي تلحق بالاشغال بسبب الاخطار الخاصة					
65.5	زيادة التكاليف الناشئة عن الاخطار الخاصة					
65.7	اخراج المعدات في حالة انهاء العقد					
65.8	طريقة الدفع في حالة انهاء العقد					
الاخلاء من مسئولية الاداء						
66.1	الدفع في حالة الاخلاء من مسئولية التنفيذ					
تسوية الخلافات						
67.1	قرار المهندس					
67.2	التسوية الودية					
67.3	التحكيم					
67.4	التخلف عن الالتزام بقرار المهندس					

Annex 2: Questionnaire (English)

The Islamic University of Gaza - Palestine
Faculty of Engineering
M.Sc. in Construction Management

Questionnaire for the thesis titled

Investigation of FIDIC Clauses Dealing with Construction Project Performance

Researcher: Abdullah Murtaja

Supervisor: Prof. Dr. Adnan Enshassi

In Partial Fulfillment of the Requirements for Degree of Master of Science in Construction Management

Questionnaire for Contract Parties: Owners, Contractors and Consultants In Gaza Strip

Investigation of FIDIC Clauses Dealing with Construction Project Performance

Dear Participant,

To start, I'd like to present my deep appreciation to you for taking part of your time and effort to complete this questionnaire.

This questionnaire aims to study the impact of FIDIC clauses on construction project performance in Gaza Strip.

This survey study comes in a partial fulfillment of the requirements for degree of master of science in construction management in the Islamic University-Gaza.

All information in the questionnaire will be used for research purposes with sincere commitment for complete secrecy to your information.

Questionnaire contents:

- **Part one**: Company Profile.
- **Part two**: FIDIC clauses that have the utmost dealing with construction project performance.

Researcher: Abdullah Murtaja

Part 1: Company Profile

1. Participant category: ☐ Owner ☐ Contractor ☐ Consultant
2. Job Position: ☐ Company President ☐ Project Manager ☐ Site Engineer
3. Company Experience: ☐ Less than 5 years ☐ 5-10 years ☐ 11-20 years
   ☐ More than 20 years.
4. Type of projects: ☐ Buildings and Utilities ☐ Roads and infrastructure
   ☐ Water and Sewerage ☐ Industrial establishments
5. Maximum project budget throughout last five years (Thousand US$):
   ☐ Less than $250 ☐ 250-500 ☐ 510-750 ☐ 760- 1 million
   ☐ More than one million US$
6. Number of implemented projects throughout last five years:
   ☐ Less than 10 ☐ 10-20 ☐ 21-30 ☐ 31-40 ☐ more than 40
7. Volume of work throughout last five years (MUS$):
   ☐ Less than 1 ☐ 1-2 ☐ 2.1-3 ☐ 3.1-4 ☐ more than 4

Part 2: The FIDIC Clauses Dealing with Construction Project Performance

Part 2 contains a table that requires choosing between many options as follows:

Degree of importance	Symbol	Meaning
Strongly agree	5	Strongly agree that this clause positively impacts project performance
Agree	4	Agree that this clause positively impacts project performance
Neutral	3	No idea if that this clause positively impacts project performan
Disagree	2	Disagree that this clause positively impacts project performanc
Strongly disagree	1	Strongly that this clause positively impacts project performanc

The following items are the most important clauses of FIDIC contract general conditions that expected to impact construction project performance. Please, opt regarding the extent of positive impact of each clause on the project performance characteristics through choice between 1-5 for each characteristic of the project performance characteristics.

Note: The following Clauses numbers are themselves the serial numbers as numbered in FIDIC contract general conditions 1987 Reprinted in 1992 with further amendments).

No.	Clause	Characteristics of Project Performance				
		Cost	Time Schedule	Quality	Safety	Satisfaction of Contract Parties
Engineer and Engineer's Representative						
2.1	Engineer's Duties and Authority					
2.2	Engineer's Representative					
2.3	Engineer's Authority to Delegate					
Contract Documents						
5.2	Priority of Contract Documents					
6.3	Disruption of Progress					
6.4	Delays and Cost of Delay of Drawings					
6.5	Failure by Contractor to Submit Drawings					
General Obligations						
10.3	Claims under Performance Security					
14.1	Program to be Submitted					
14.3	Cash Flow Estimate to be Submitted					
19.1	Safety, Security, and Protection of the Environment					
19.2	Employer's Responsibilities					
20.4	Employer's Risks					
21.1	Insurance of Works and Contractor's Equipment					
22.3	Indemnity by Employer					
23.3	Cross Liabilities					
24.1	Accident or Injury to Workmen					

24.2	Insurance Against Accident to Workmen					
Suspension						
40.1	Suspension of Work					
40.2	Engineer's Determination following Suspension					
40.3	Suspension lasting more than 84 Days					
Commencement and Delays						
44.1	Extension of Time for Completion					
46.1	Rate of Progress					
47.1	Liquidated Damages for Delay					
Alterations, Additions, and Omissions						
51.1	Variations					
52.1	Valuation of Variations					
52.2	Power of Engineer to Fix Rates					
Procedure for Claims						
53.1	Notice of Claims					
53.2	Contemporary Records					
53.3	Substantiation of Claims					
53.4	Failure to Comply					
53.5	Payment of Claims					
Certificates and Payment						
60.2	Monthly Payments					
60.5	Statement at Completion					
60.6	Final Statement					
60.7	Discharge					

60.8	Final Payment Certificate					
60.10	Time for Payment					
61.1	Approval only by Defects Liability Certificate					
62.1	Defects Liability Certificate					
Special Risks						
65.1	No Liability for Special Risks					
65.2	Special Risks					
65.3	Damage to Works by Special Risks					
65.5	Increased Costs arising from Special Risks					
65.7	Removal of Contractor's Equipment on Termination					
65.8	Payment if Contract Terminated					
Release from Performance						
66.1	Payment in Event of Release from Performance					
Settlement of Disputes						
67.1	Engineer's Decision					
67.2	Amicable Settlement					
67.3	Arbitration					
67.4	Failure to Comply with Engineer's Decision					

Annex 3: Special interview

Including Contents of FIDIC 87 Contract General Conditions

بحث بنود عقد FIDIC التي تتعامل مع اداء مشروع الانشاء

- يرجى تحديد أهم مجموعات البنود في الشروط العامة لعقد الفيديك 87 (الطبعة الرابعة (المعدلة)) لسنة 1992 التالية، و التي تؤثر على اداء مشروع الانشاء من وجهة نظر (المقاول – المالك - الاستشاري) من حيث : **كلفة المشروع – مدة المشروع - الجودة – الامان – رضا المالك – رضا المقاول.**

The general conditions of FIDIC contract (Fourth Edition 1987, Reprinted 1992 with further amendments

consist of 25 groups or (articles) as follows:

26. Definitions and Interpretation. (التعاريف و التفسير)
27. Engineer and Engineer's Representative. (المهندس وممثله)
28. Assignment and Subcontracting. (التنازل و التعاقد الفرعي)
29. Contract Documents. (وثائق العقد)
30. General Obligations. (الالتزامات العامة)
31. Labor. (اليد العاملة)
32. Materials, Plant and Workmanship. (المواد و التجهيزات و المصنعية)
33. Suspension. (توقيف العمل)
34. Commencements and Delays. (المباشرة و تاخر انجاز الاعمال)
35. Defects Liability. (الصيانة و اصلاح العيوب)
36. Alterations, Additions and Omissions. (التغييرات و الاضافات و الالغاءات)
37. Procedure for Claims. (اجراءات المطالبات)
38. Contractor's Equipment, Temporary Works and Materials. (معدات المقاول و الاشغال المؤقتة و المواد)
39. Measurement. (كيل الاشغال)
40. Provisional Sums. (المبالغ الاحتياطية)
41. Nominated Subcontractors. (المقاولون الفرعيون المسمون)
42. Certificates and Payment. (الشهادات و الدفعات)
43. Remedies. (وضع اليد على المشروع)
44. Special Risks. (الاخطار الخاصة)
45. Release from Performance. (التوقف القهري)
46. Settlement of Disputes. (تسوية الخلافات)
47. Notices. (الاشعارات)
48. Default of Employer. (الاخلال بالعقد من قبل صاحب العمل)
49. Changes in Cost and Legislation. (تغيير الاسعار و تعديل التشريعات)
50. Currency and Rates of Exchange. (العملة و اسعارها التبديلية)

Note: the previous serial numbers are used for the purpose of clarity.

Contents of FIDIC 87 Contract General Conditions

Definitions and Interpretation.

1.1 Definitions
1.2 Headings and Marginal Notes.
1.3 Interpretation.
1.4 Singular and Plural.
1.5 Notices, Consents, Approvals, Certificates and Determinations.

Engineer and Engineer's Representative

2.4 Engineer's Duties and Authority.
2.5 Engineer's Representative.
2.6 Engineer's Authority to Delegate.
2.7 Appointment of Assistants.
2.8 Instructions in writing.
2.9 Engineer to Act Impartially.

Assignment and Subcontracting

3.1 Assignment of Contract.
4.1 Subcontracting.
4.2 Assignment of Subcontractors' Obligations.

Contract Documents

5.1 Language/s and Law.
5.2 Priority of Contract Documents
6.1 Custody and Supply of drawings and Documents.
6.2 One Copy of Drawings to be Kept on Site.
6.3 Disruption of Progress.
6.4 Delays and Cost of Delay of Drawings.
6.5 Failure by Contractor to Submit Drawings.
7.1 Supplementary Drawings and Instructions.
7.2 Permanent Works Designed by Contractor.
7.3 Responsibility Unaffected by Approval.

General Obligations

8.1 Contractor's General Responsibilities.
8.2 Site Operations and Methods of Construction.
9.1 Contract Agreement.
10.1 Performance Security.
10.2 Period of Validity of Performance Security.
10.3 Claims under Performance Security.
11.1 Inspection of Site.
12.1 Sufficiency of Tender.
12.2 Not Foreseeable Physical Obstructions or Conditions.
13.1 Work to be in Accordance with Contract.
14.3 Program to be Submitted.
14.4 Revised Program.
14.5 Cash Flow Estimate to be Submitted.
14.6 Contractor not Relieved of Duties or Responsibilities
15.1 Contractor's Superintendence.
16.1 Contractor's Employees.
16.2 Engineer at Liberty to Object.

17.1 Setting – out.
18.1 Boreholes and Exploratory Excavation.
19.5 Safety, Security, and Protection of the Environment.
19.6 Employer's Responsibilities.
20.1 Care of Works.
20.2 Responsibility to Rectify Loss or Damage.
20.3 Loss or Damage Due to Employer's Risks.
20.4 Employer's Risks.
21.3 Insurance of Works and Contractor's Equipment.
21.4 Scope of Cover.
21.5 Responsibility for Amounts not Recovered.
21.6 Exclusions.
22.1 Damage to Persons and Property.
22.2 Exceptions.
22.3 Indemnity by Employer.
23.1 Third Party Insurance.
23.2 Minimum Amount of Insurance.
23.3 Cross Liabilities.
24.5 Accident or Injury to Workmen.
24.6 Insurance Against Accident to Workmen.
25.1 Evidence and Terms of Insurances.
25.2 Adequacy of Insurances.
25.3 Remedy on Contractor's Failure to Insure.
25.4 Compliance with Policy Conditions.
26.1 Compliance with Statutes, Regulations.
27.1 Fossils.
28.1 Patent Rights.
28.2 Royalties.
29.1 Interference with Traffic and Adjoining Properties.
30.1 Avoidance of Damage to Roads.
30.2 Transport of Contractor's Equipment or Temporary Works.
30.3 Transport of Materials or Plant.
30.4 Waterborne Traffic.
31.1 Opportunities for other Contractors.
31.2 Facilities for other Contractors.
32.1 Contractor to Keep Site Clear.
33.1 Clearance of Site on Completion.

Labor

34.1 Engagement of Staff.
35.1 Returns of Labor and Contractor's Equipment.

Materials, Plant, and Workmanship

36.1 Quality of Materials, Plant and Workmanship
36.2 Cost of Samples.
36.3 Costs of Tests.
36.4 Cost of Tests not Provided for.
36.5 Engineer's Determination where Tests not Provided for.
37.1 Inspection for Operations.
37.2 Inspection and Testing.
37.3 Dates for Inspection and Testing.
37.4 Rejection.

38.1 Examination of Work before Covering up.
38.2 Uncovering and making Openings.
39.1 Removal of Improper Work, Materials or Plant.
39.2 Default of Contractor in Compliance.

Suspension

40.4 Suspension of Work.
40.5 Engineer's Determination following Suspension.
40.6 Suspension lasting more than 84 Days.

Commencement and Delays

41.1 Commencement of Works.
42.1 Possession of Site and Access Thereto.
42.2 Failure to give Possession.
42.3 Rights of Way and Facilities.
43.1 Time for Completion.
44.2 Extension of Time for Completion.
44.3 Contractor to Provide Notification and Detailed Particulars.
44.4 Interim Determination of Extension.
45.1 Restriction on Working Hours.
46.2 Rate of Progress.
47.2 Liquidated Damages for Delay.
47.3 Reduction of Liquidated Damages.
48.1 Taking-Over Certificate.
48.2 Taking-Over of Sections or Parts
48.3 Substantial Completion of Parts
48.4 Surfaces Requiring Reinstatement

Defects Liability

49.1 Defects Liability Period.
49.2 Completion of Outstanding Work and Remedying Defects.
49.3 Cost of Remedying Defects.
49.4 Contractor's Failure to Carry Out Instructions.
50.1 Contractor to Search.

Alterations, Additions, and Omissions

51.2 Variations.
51.3 Instructions for Variations.
52.3 Valuation of Variations.
52.4 Power of Engineer to Fix Rates.
52.5 Variations Exceeding 15 percent.
52.6 Day work.

Procedure for Claims

53.6 Notice of Claims.
53.7 Contemporary Records.
53.8 Substantiation of Claims.
53.9 Failure to Comply.
53.10 Payment of Claims

Contractor's Equipment, Temporary Works and Materials

54.1 Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works.
54.2 Employer not Liable for Damage.
54.3 Customs Clearance.
54.4 Re-export of Contractor's Equipment.
54.5 Conditions of Contractor's Equipment.
54.6 Costs for the purpose of Clause 63.
54.7 Incorporation of Clause in Subcontracts.
54.8 Approval of Materials not Implied.

Measurement

55.1 Quantities.
56.1 Works to be Measured.
57.1 Method of Measurement.
57.2 Breakdown of Lump Sum Items.

Provisional Sums

58.1 Definition of "Provisional Sum".
58.2 Use of Provisional Sums.
58.3 Production of Vouchers.

Nominated Subcontractors

59.1 Definition of "Nominated Subcontractor".
59.2 Nominated Subcontractors; Objection to Nomination.
59.3 Design Requirements to be Expressly Stated.
59.4 Payments to Nominated Subcontractors.
59.5 Certification of Payments to Nominated Subcontractors.

Certificates and Payment

60.1 Monthly Statements.
60.2 Monthly Payments.
60.3 Payment of Retention Money.
60.4 Correction of Certificates.
60.5 Statement at Completion.
60.6 Final Statement.
60.7 Discharge.
60.8 Final Payment Certificate.
60.9 Cessation of Employer's Liability.
60.10 Time for Payment.
61.2 Approval only by Defects Liability Certificate.
62.2 Defects Liability Certificate.
62.3 Unfulfilled Obligations.

Remedies

63.1 Default of Contractor.
63.2 Valuation at Date of Termination.
63.3 Payment after Termination.
63.4 Assignment of Benefit of Agreement.
64.1 Urgent Remedial Work.

Special Risks

65.4 No Liability for Special Risks.
65.5 Special Risks.
65.6 Damage to Works by Special Risks.
65.7 Projectile, Missile.
65.8 Increased Costs arising from Special Risks.
65.9 Outbreak of War.
65.10 Removal of Contractor's Equipment on Termination.
65.11 Payment if Contract Terminated.

Release from Performance

66.2 Payment in Event of Release from Performance.

Settlement of Disputes

67.5 Engineer's Decision.
67.6 Amicable Settlement.
67.7 Arbitration.
67.8 Failure to Comply with Engineer's Decision.

Notices

68.1 Notice to Contractor.
68.2 Notice to Employer and Engineer.
68.3 Change of Address.

Default of Employer

69.1 Default of Employer.
69.2 Removal of Contractor's Equipment.
69.3 Payment on Termination.
69.4 Contractor's Entitlement to Suspend Work.
69.5 Resumption of Work.

Changes in Cost and Legislation

70.1 Increase or Decrease of Cost.
70.2 Subsequent Legislation.

Currency and Rates of Exchange

71.1 Currency Restrictions.
72.1 Rates of Exchange.
72.2 Currency Proportions.
72.3 Currencies of Payment for Provisional Sums.