



REPUBLIC OF TURKEY
ALTINBAŞ UNIVERSITY
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Civil Engineering

**THE ADVANTAGES AND DISADVANTAGES OF
THE PREVALENT CONTRACTS IN THE
CONSTRUCTION INDUSTRY IN IRAQ**

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Master's Thesis

Supervisor

Assoc. Prof. Dr. Sepanta NAİMİ

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I hereby declare that all information/data presented in this graduation project has been obtained in full accordance with academic rules and ethical conduct. I also declare all unoriginal materials and conclusions have been cited in the text and all references mentioned in the Reference List have been cited in the text, and vice versa as required by the abovementioned rules and conduct.

Shahad Ali ABDULHAMZA

Signature

DEDICATION

I dedicate my thesis to my father and mother. The light in my life, from them, I learned steadfastness and love of life, no matter the difficulties to my dear sisters, without their words and encouragement to me. I would not have reached here one day Thank you to all my inspiring professors, I mastered proper pronunciation and sentence structure Thank you, best buddy (TAMARAA), for always being there for me Thank you to everyone who has helped me along the way with either encouraging words or constructive criticism I am honored to deliver my master's thesis to the distinguished members of the thesis committee, and I look forward to their enthusiastic approval.

PREFACE

This research was inspired by my desire to establish better methodologies and new contract kinds in Iraq. It is my ambition to not only discover, but also to create tools that will help future generations overcome access restrictions.

I could not have attained my current level of accomplishment without the help of a robust support network. First and foremost, I want to thank my parents for their love and understanding. Second, my supervisor, who has given me advise and direction throughout the study process.

Thank you for your never-ending support.

ABSTRACT

THE ADVANTAGES AND DISADVANTAGES OF THE PREVALENT CONTRACTS IN THE CONSTRUCTION INDUSTRY IN IRAQ

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Contracting parties in engineering are responsible for managing both the contracts and the requirements. The language used in legal documents like contracts and specifications is quite clear. In order to ensure that a project will be profitable over its entire lifespan, engineering contracts and material specifications need to be drafted with the assistance of relevant information and audits. Building contracts are intended to foster industry expansion by recognizing that all businesses contribute to the generation of income and output. These processes are peppered throughout with a plethora of other treatments and technologies that are pertinent to the requirements of that sector. A construction contract's primary purpose is to ensure that the work will be carried out in a timely and efficient manner. Every organization, in order to be successful, needs to grow and get better at what it does. One way to accomplish this goal is by acknowledging the benefits and downsides of the contracts for the Iraqi construction sector. Another approach is to provide answers to implementation challenges, particularly those that the sector has experienced in more recent times. There is a possibility that construction contracts in Iraq will be of a poor quality. Accountability on the part of employees is required.

in order to move the project forward and guarantee that work will continue, while causing the least amount of harm that is practically possible.

Keywords: Contract, Cost Estimation, Conflicts, Risk, Claims.



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ABBREVIATIONS

ADR	:	Alternative Dispute Resolution
ALI	:	Automotive Lift Institute
BCA	:	Benefit-Cost Analysis
CBR	:	Case-Based Reasoning
CPA	:	Contract Price Adjustment
CPM	:	Critical Path Method
FIDIC	:	International Federation of Consulting Engineers
GA	:	Genetic Algorithms
ICE	:	Institution of Civil Engineering
KPI	:	Key Performance Indicators
LCCA	:	Life-Cycle Cost Analysis
RFI	:	Requests For Information
SPSS	:	Statistical Package for The Social Sciences

1. INTRODUCTION

1.1. OVERVIEW

When it comes to engineering projects, contracts and specifications are among the most significant concerns that contractual parties are concerned with, and they are also among the most difficult to negotiate. This is because contracts and specifications are often written in very specific terms. On top of that, the construction contract is the most significant pillar in the project's life cycle, so it is essential to assist in the development of the correct knowledge and audit in the production of engineering contracts and specifications of materials in construction projects [1]. Because of this task, not only in the field of law, but also in the fields of engineering, financial, and administrative administration, with this understanding, the construction contract must create an industry, through the world's realization that every industry has income and output, between which comes the processes of treatments and various technologies that are commensurate with the requirements of that industry [2].

It is for this reason that all institutions must be driven to improve and develop their performance in order to reach higher performance. This can be accomplished by identifying the negatives and positives in the construction industry contracts in Iraq and developing solutions to errors in the implementation contract [3], particularly the challenges that the construction industry in Iraq has faced during this period of time. Identifying the negatives and positives in the construction industry contracts in Iraq can be accomplished [4]. Because of this, it is essential that the employees take the jobs that they have seriously. In order to keep the wheel of progress moving and ensure that the work process continues as it should, uninterrupted, right up until the point where the project is finished while causing the least amount of damage that is humanly possible.

It is common knowledge in this field that every entity, regardless of whether it operates in the public or private sector, is subject to its own individual set of conditions that govern any and all types of contracts that must be utilized in order to successfully complete the projects that are necessary [5]. The formation of a conscientious administration that would supervise the

planning process and control the implementation of these initiatives is therefore an absolute necessity.

The following are some of the reasons why this research is important:

- a) For institutions to avoid a plethora of difficulties and controversies, the preparation of contracts needs to be modified and carefully examined.
- b) Engineering contracts are designed to safeguard and maintain the interests of all parties involved, and the goal of our research is to develop a culture that values balanced contracts as well as enhance understanding of the importance of these arrangements.
- c) Be familiar with the process of drafting contract terms in a proper legal manner, which will prevent the project from being bogged down in complications and make an effort to establish balanced legal connections between the numerous participants in the project. Preparing recommendations based on the study's findings that will aid in the elimination or reduction of some of the harmful practices that exist in engineering contracts in Iraq.

1.2. THESIS LAYOUT

Chapter One: The fundamental characteristics of the thesis' main elements are emphasized. It describes the problem statement interface, the classification introductions, and a few groupings of factor aspects. Additionally, it describes the significant contributions made by use cases in terms of the applications and services that are anticipated to be supported in classification through performance characteristics like throughput or latency requirements.

Chapter Two: Issues related to the work developed in the thesis from academic theses, industry reports, and research standards are presented together with a thorough assessment of the literature and background studies and the state of the art.

Chapter Three: The third chapter, which is devoted to methods, presents the activities and techniques that will be used. These activities and techniques will be covered by the data gathered using the methods provided in this chapter and will be worked on in the fourth chapter.

Chapter Four: In this chapter, the conditions to be looked at in the model's reference parameters will be described in terms of metrics relevant to detection, identification, and classification.

Chapter Five: Concluding remarks and upcoming projects.

1.3. THE ENGINEERING CONTRACT'S DEFINITION AND CONTENTS

1.3.1 Contracting Contract Definition

A contract is an agreement that regulates the technical, financial, and legal connection between multiple parties to execute labour in exchange for a set wage, provided that the job is legal. As long as the job is legal, the parties involved in the contract are required to follow the terms of the contract. In order for the terms of the contract to be legally binding, they must be consistent with the requirements of common law [6].

1.3.2 Contracting is Defined as the Act of Entering into an Agreement

According to the Arabic Language Academy, it is a contract between two parties in which one of them undertakes to perform a specific activity for the other for a particular fee over the course of a set period of time [7][8]. The fee and the time frame are both specified in the contract. The formula for the contract, which is required to include all of the financial and technical criteria, must include all that is required to organize the procedure for the contract's implementation. The obligations and rights of the parties to a contract, whether they be international or local organizations such as:

Contractual parties are described in contracts or even laws that are made by the government [9].

- a) Institution of Civil Engineering (ICE).
- b) Federation international dis Engineers Consulting. (FIDIC).
- c) In Iraq, we make use of the standard formula that is provided by the Ministry of Planning (the General Conditions for Construction Management Contracting in its first and second sections) [10], which includes all of the general conditions that are necessary for almost any engineering contract, as well as the instructions for implementing government grants, which are controls that are both effective and binding for institutions and all state departments.

1.4. ENGINEERING CONTRACT TYPES

It was acceptable to illustrate what is needed from the contractual agreement and to identify its parties and the obligations of the parties to limit the beginnings of claims around them that could lead to a dispute. Because the contracting agreement is valid with its terms and conditions as well as what it contains from of the parties of the project's main element, it was acceptable to illustrate what is needed from the contractual agreement. Different kinds of construction contracts may be used for a given project based on the category of construction project that it falls under. Contracts are different from contracts for projects (heavy construction projects) (building projects) and contracts for construction projects [11], (industrial projects), and contracts for projects of one collective are also behind each other in, contracts for projects of one collective are also behind each other in (construction projects), Contracts for projects within a single branch of the group (such as airports) are comparable to one another from one project to the next; however, contracts for projects within a single branch of the group (such as hospitals) vary from one project to the next area based on the conditions that existed at the time the contract was signed. There is a difference between contracts awarded by the government and contracts awarded by private businesses. If there is a compelling reason to reject his bid and award the contract to Jealous instead, then government contracts are those in which one of the government's agencies or organizations is a party. [12], and they must be awarded through a competitive tendering process. Typically, the competitors with the lowest prices win government contracts. There is no requirement for open competition in private engineering contracts, and one of the applicants is typically selected without regard to the primary worth of his proposal. This is despite the fact that the total bid value is an important consideration in any engineering contract [13], regardless of whether the contract is for public or private work. It's not the same as getting a contract with the government.

There is a distinction between contracts awarded by the government and those awarded by private companies [14], which is mirrored in the rise, fall, or other variation in the amount of business. The owner of the private contract has the option of modifying the agreement by either increasing or decreasing the bid's value. On the other hand, the government contract stipulates a percentage of the total value of the original bid, and any increase, decrease, or change in the

terms of the agreement must comply with those limitations. The nature of the work to be performed and the parameters of the contract determine the format that will be used for the engineering contract. These contracts range in complexity from an easy agreement in which they are offered and accepted to an extremely lengthy contract that contains a significant number of documents outlining the legal, financial, and technological aspects of the contractual connection. A simple agreement in which they are offered and accepted is an example of a contract in this category. The contract, its terms, specifications, drawings, and the rest of its documents are clearer and more accurate in defining the duties, responsibilities, and rights of the contracting parties when there are fewer options for differences in points of view concerning the interpretation of those documents, and therefore there are fewer chances of any disputes arising during the implementation of the contract.

1.5. CONDITIONS FOR THE ENGINEERING CONTRACT'S VALIDITY

In order for the engineering contract to have any value, it must be in compliance with the laws of both the nation and the world. If this is not the case, the contract loses all of its value and cannot be implemented, nor can it be used as evidence or a judgement in legal proceedings. In order for the contract to be legally enforceable [15], the following important factors need to be included in it.

- i. Offer and Acceptance: There must be a genuine offer made by one of the parties, made with full authorization and freedom, and that offer must be accepted by the other party, or parties. Offer and Acceptance: It is customary for the offer to be made in writing and to be signed by the authority in order for it to become legal. In addition, the acceptance, on the other hand, must be unambiguous, clear, and unconditional. The contract is not considered legally binding until the offer is accepted [16].

An offer may become void for a variety of reasons, including:

- a) Expiration: The offer was not accepted within the time frame indicated.
- b) The death of the presenter.
- c) The offer comes to an end when the refusal is issued.

- ii. **The Existence Agreement** In order for a legally binding contract to be in place, all parties involved need to have complete and shared comprehension of the stipulations of the deal. Because of this, the wording of the contract is quite important, since it needs to be drafted in a way that is both clear and accurate on what the two parties, or concerned parties, have agreed upon. It is normal practise for both parties, or all parties, to sign the agreement in order to demonstrate that they have read it, understood it, and agree with its contents. If it can be demonstrated that there was no agreement in the conventional sense, the contract can be declared null and void [17].
- iii. **The Agreement Does Not Violate Any Laws** If a contract is guaranteed in a way that is contrary to common law or the norms that are now in effect, the contract may be ruled null and invalid. Invalid contracts include those that involve an illegal act, fraudulent activity, or forged signatures [18].
- iv. **The qualifications required of interested parties in order to engage in an agreement:** People who are either chronically or temporarily immature or mentally ill are not entitled to enter into contracts, and the signature of a contract between such a person and another person renders the contract non-binding on either party to the contract or on any other parties involved. Even if the official signed the contract in good faith, it will not bind the company or institution if it is later discovered that the official was not authorised to sign the contract or that he exceeded the scope of his authority to do so. This holds true regardless of whether the organisation in question is a private or public one [19].
- v. **Agreement Language:** In light of the fact that the language and wording of the contract are of the utmost importance, the formula in question must be in accordance with the law. Furthermore, in the case of government contracts (i.e., contracts to which one of the government departments is a party), there must be a guarantee for the correct transfer of state funds. Writing may be used in the formation of private contracts. You, the parties to the contract, have complete control over the structure and contents of the contract, and it can be written in any language that is legally permissible [20].

1.6. SELECTING A CONTRACTOR AND EXECUTING THE CONTRACT

Tender business: These bids are announced in the media (newspapers and magazines) sixty days prior to the bid date. In addition, all contractors involved in the project must submit bids within thirty days of withdrawal from consideration and evaluating the project paperwork, as well as making an offer to that effect via sealed envelopes at a specified location and time, and the documents include the following: a description of the work to be performed; a description of the qualifications of the bidders; a description of the qualifications of the bid [21].

- a) The bidder's formal documents and registration with the Engineering Council.
- b) Bank guarantee for the project.
- c) A contract's model.
- d) Illustrations (architectural and construction).
- e) Detailed descriptions of the required works.

Bidding: An interested contractor will provide the project manager with his proposal, along with proof of deployment feasibility, the costs of each individual item, and the total costs of all of the items on the dates specified in separate envelopes. This will occur once the interested contractor has obtained all of the materials that are necessary for the project [22].

Envelops Opening: The bid envelopes typically contain the bid forms that the contractors have submitted. These bid forms are opened on a predetermined date and time (date and hour) in the presence of representatives from all of the companies that are participating in the bidding process in order to determine the exact value of each proposal, in addition to the effective date, payment terms, letter of guarantee, and any other requirements that may be applicable [21].

Evaluation of offers: The confidential evaluation of the unsealed bids is carried out by a special committee whose members have substantial prior experience working with issues of this nature. The prices that have been offered by each of the competitors are recorded by the committee, and they are compared with reference to the lowest price that is compatible with the necessary requirements and the provision of financial guarantees that confirm the contractor's intention to carry out the project in the event that they are awarded the contract. It assesses the contractor's

equipment and other capabilities that contribute to the successful implementation of the project, taking into account the contractor's previous experience and performance in projects that were comparable to the current one [23].

Practice after giving: Before signing the final contract, the two parties may engage in a variety of activities or negotiation methods in order to iron out any differences. These discussions take place between the owner and the nearest contractors in an effort to win the bid and compare the two options. Additionally, these conversations take place between the owner and the nearest contractors in an effort to win the bid and compare the two options [24].

Tender award notification and site handover: It is then communicated with and invited to appear at the site to sign the contract and make payment for the letter of offer; the site is then formally transferred to that company, and the successful implementation begins on the date of site handover to the port or on the date specified in the contract, whichever is later. The site is then formally transferred to that company; the successful implementation begins on the date of site handover to the port or on the date specified in the contract, whichever is later [25].

Signing of the contract: The production of architectural and executive drawings, in addition to annexes to the project plans, marks the beginning of the contracting phase. This is done in preparation for the quantification work and the selection of the appropriate contractor to carry out the project [26].

Contract documents:

Following are the documents that are included in the building contract [27]:

- a) Form of contract (agreement).
- b) The contract's terms.
- c) Technical specifications in general.
- d) The assay elements are described in detail.
- e) Assessment of Business (Bills of Quantities and Prices)
- f) Drawings for the project.
- g) The authorized timetables (provided by the second party)

h) A bank's letter of assurance.

The minutes of the decision committee, the minutes of business, letters between the two parties that contain agreements, and any other documents that the two parties determine are appropriate to be added to the contract at a later time.

1.7. CONSTRUCTION CONTRACT SECTIONS:

The following are the several types of engineering construction contracts:

The first group - types of contracts according to contractual arrangements [28]

- i. A contract in which the contractor agrees to finish the work entrusted to him in full and receives the agreed amount in full and not in instalments, and these costs include all costs associated with project implementation, including the cost of materials, labour, and his employees' fees, as well as any other indirect costs, and the agreed price is subject to change if the scope of the work changes.
- ii. A contract with a one-time, lump-sum payment: A lump sum contract is used for the construction of a building whenever the units that make up the total thing are of a standard kind, are present in a large quantity, and are of a variety of types.
- iii. In addition to the costs: It is a contract in which the contractor makes a commitment to pay for the costs of materials, labour, and subcontractors. Because the contractor determines precise prices in advance to cover overhead and profit charges, this contract is legally binding.
- iv. Cost plus a percentage: It is a contract in which the contractor agrees to pay all of the costs associated with the project, including those of the materials, labour, and subcontractors, as well as a percentage that will be paid up front to cover the contractor's overhead and profits.
- v. A schedule of rates is a place where agreed-upon price tables for various building-related goods can be found. In addition, the tables contain the agreed-upon profit and overhead rates, as well as a classification of the building phases, including material supply,

brickwork, the cost of delivering and installing casting frames (hour/day), supervision and carpentry (hour), and so on.

- vi. Labor only: The agreement specifies that the contractor will offer labour exclusively at an agreed price for each building phase. The agreed price will cover overhead and profit, and the client will typically provide materials. The agreement also specifies that the price for labour will be the same for each building phase.
- vii. Perform and invoice: Because the price of the agreement is not defined and because the value of the work that is performed is evaluated and charged (work value fees), there are frequently arguments regarding the terms of the agreement.
- viii. Design and construction: it is the responsibility of the contractor to design, construct, and implement the project in accordance with the standards that have been agreed upon with the owner.

The second group - consists of contract classifications based on their form [29].

- a) Bilateral contract: A promise made under the terms of a contract that was made under the terms of a promise.
- b) Unilateral contract: A contract with a promise to work.
- c) Express contract: Orally or in writing.
- d) Implied in fact contract: The action of both parties confirms the contract's conclusion.
- e) Quasi contract: A legal compact intended to prevent illegal enrichment.
- f) Formal contract: It necessitates the use of a distinctive form or a unique technique of completing it.
- g) Informal contract: A contract that does not necessitate any special forms or stipulations.

Group Three - Contract classifications based on their effectiveness[30]

- i. Valid contract: It is a contract that satisfies all of the basic contracting requirements.
- ii. Void contract: There is no contract in place.
- iii. Voidable contract: One of the parties may withdraw the contract or refuse to enforce it.
- iv. Unenforceable contract: Contract unenforceable under defensive legislation.

Group four - consists of contract performance evaluations [31].

- a) Executed contract: A contract that both parties can completely enforce.
- b) Executor contract: One or both parties have failed to fully implement a contract.

The fifth group - consists of classifications based on the contract price valuation technique (contract price value) [32]

- i. Fixed price contract: This contract, also known as the total contract, has a fixed and agreed-upon price (Lump Sum) just at time of signing, and this price doesn't really change with the passage of time unless the requirements specified in the contract terms are changed, and any risks of rising costs due to inflation, higher taxes, or increased material prices are considered.

Advantages:

- a) The costs are predetermined, which benefits the customer.
- b) It does not necessitate a lot of information.
- c) Speed, on the other hand, allows for well-defined activities.
- d) Suitable for equipment supply and installation Some works are less prone to inflation since they do not require several stages of implementation.

Disadvantages:

- a) If a change is required later, problems arise.
- b) If there are issues with a certain aspect of the job as well as the tasks also weren't sufficiently described at the time of contract signing, the contract may be terminated.
- c) The cost of bidding could be quite expensive.
- d) There's a chance that a high-priced subcontractor may be recruited.
- ii. Price adjustment contract: This contract contains a price adjustment clause known as (settlement prices), under which the actual cost is increased or decreased because of the changes in the contractor's specific expenses, as determined by some recognized statistics or indicators.

- iii. Cost plus contract: It reimburses the contractor for the actual expenditures spent as well as a set amount of money.

Advantages:

- a) The contractor is not at risk.
- b) When executing technical components of a project, this is quite useful.

Disadvantages:

- a) There is a conflict between both the company owner and the owner of the business.
 - b) The engineer is under more pressure to maintain tight control.
 - c) Negotiations must be done with care.
 - d) Putting in place the essential safeguards to ensure that the employer's interests are protected.
 - e) Wage rates might be a major stumbling block.
- iv. Target cost contract:
 - a) Because there are incentives in place, the contractor must be efficient.
 - b) On the foundation of the guarantee, the contractor is entitled a cost in excess of an actual cost.

Advantages:

- a) a bonus for the contractor
- b) Since the contractor might obtain the profit regardless, this is a reasonable incentive.

Disadvantages:

- a) It's difficult to set a goal cost.
 - b) The engineer must keep a close eye on it.
- v. It is a common type of contract in engineering (especially civil engineering and project construction) for projects that have been designed by the employer and can be determined at the tender stage, where the works are divided into parts or activities

starting from the bottom (excavations), and time is determined according to the stages of implementation. Bills of quantity contract: It is a common type of contract in engineering (especially civil engineering and project construction) for projects that have been designed by the employer and can be determined at the tender stage. All of these things have to be mentioned in the bid, along with an estimation of how much they will cost and a pricing point for each. The contractor who is submitting the bid is the one who inputs the price of each item based on its quantity and cost, in addition to the total value of the item. The total value of the contract is calculated by adding up the values of all of the items in the bid. The terms of the contract should make it abundantly apparent whether these quantities are to be fixed or whether they are to be subject to reevaluation.

- vi. The rate contract's schedule is as follows: It is also sometimes referred to as a contract for unit pricing. When there is a large number of units but only a small number of types of those units, as in the case described above, this contract is utilised because it is impossible to estimate the actual size of the business prior to signing it. This contract has with it a number of benefits, the most notable of which are the flexibility to either grow or decrease the volume of business and the frequency with which it is used. when the entity holding the contract is a private company or organisation. On the other hand, public institutions hardly ever utilise this kind of contract since there is a limit to how much the owner can grow or decrease the volume of business. This constraint discourages the use of such contracts.
- vii. Contract won through competitive bidding: The contract was won through a bidding method known as competitive bidding, in which multiple bidders (contractors) competed for the same criteria in an official tender. After an organisation has announced its intention to build a project and provided a brief description of the project, the organisation will contact contractors who have expressed interest in taking part in a tender for the project. Complete and submit Qualification Forms, as well as a record of earlier study, and the owner will select a group of the most qualified applicants, after which they will be invited to purchase a copy of the project's conditions, specifications, and drawings, as well as the rest of the tender documentation, and they will be instructed to study these documents and submit their bids on a specific day and time that will be

specified within the invitation. The employer retains the right to turn down any and all bids without providing a justification of their decision, regardless of which one is the lowest or any other.

- viii. Negotiated contract: It's the agreement reached between the employer and the project's possible contractor, and it can sometimes be accepted for the following reasons:
- a. When there is a lack of clarity in the requirements.
 - b. When there is only one source of supply (equipment supplier for example).
 - c. If the employer is unable to reach an agreement with the contractor chosen, a new attempt is made with a different contractor; however, time may be lost in this case, and some of the information discussed in previous negotiations must remain confidential, so the negotiation time must be scheduled within the project's schedule, which is critical.

Advantages:

- a) It is possible to guarantee the effectiveness (Quality Assurance).

Disadvantages:

- a. Technical delay by contractor.
- b. There is lost time if the initial negotiation fails.
- c. He may not assure (guarantee) a low cost of the contract.
- d. Package contract: A contract in which providing corrective are merged; each of these tasks can be a distinct contract, but they can also be mixed in one contract, such as design and implementation.

Advantages:

- a) Continuity of project technical and administrative responsibility.
- b) Keep the number of contractors on the job site to a minimum.
- c) Inducing the contractor to combine two proposals, one of which is a disease and the other about which he is ill.

Disadvantages:

- i. If the initial attempt at integrating functions fails to fulfill the employer's expectations, the contract should be clearly written out, detailing the tasks and who is accountable for the redesign.
- d. Turnkey contract:
 - a) Contract packages will be divided into disciplines. Mechanical, electrical, civil engineering, and so forth.
 - b) It is the sole contract that has the contractor in charge of assigning another subcontractor, as well as delegating work from him to a subcontractor.
 - c) There may be issues with the contract's terms, such as their complexity and the need for extra attention in writing with additional provisions to the normal terms.

Advantages:

- ii. The agency oversees and develops the project, relieving the employer of much of the formatting and technicalities.

Disadvantages:

- iii. No disadvantages
 - e. Continuation contract: It's a new project negotiating contract with the first contract administrator based on the previous project's terms and conditions.

Advantages:

4rContinuity in the performance of administrative and technical tasks.

- iv. It enables rapid switching of manufacturing equipment between two identical projects, which saves both time and money.

Disadvantages:

- a) Negotiating a price might be difficult. Because the contractor is capable of estimating the strength of his economic state, it is advantageous for the employer to benefit from the contractor's speed of completion.

- f. Running contract: It is a contract for the provision of products or services at predetermined times or as necessary from time to time, over a specified and agreed upon length of time. This could contain a pricing structure. Contract Price Adjustment (CPA).
- g. Service contract: It is a contract that is solely for the purpose of providing services, such as consulting contracts with clients for the purpose of designing and drawing up drawings, supervising, and seeking advice, or a station maintenance contract, or contracts with public utility companies that provide services such as electricity, water, and gas.

1.8. A FIELD OF INVESTIGATION

The management of the construction industry is broken down into several stages, the stage of contract preparation being the most important of these stages. During this stage, the terms of the contract are written while taking into consideration the technical, legal, and administrative aspects of the construction project that is being discussed. This stage is one of the most challenging and important stages, and as a consequence, the engineers, lawyers, and administrators who are focused on the task at hand and have a great deal of experience are required to write the conditions of the contract with the utmost precision and after conducting extensive research.

1.9. PROBLEM IN THE FIELD OF RESEARCH

As the needs of the project dictate, variables overlap, and changes accelerate at an alarming rate in an increasingly complex world. Therefore, we discover that, depending on the type of contract and the nature of the project, many construction contracts may fail to address the solution to problems that develop during implementation, necessitating the use of the courts or arbitration during or after the completion of the project. As a result, it was important to conduct research to find solutions to at least some of these issues.

1.10. QUESTIONS AND HYPOTHESES FOR INVESTIGATION

The following questions served as the basis for our investigation:

- i. Is it permissible for engineers to be familiar with the contracts for the construction sector in Iraq?
- ii. Is it true that the legal administration of a company has an impact on the signing and drafting of a building contract?
- iii. Does the legal culture of engineers who work on construction contracts meet the requirements?
- iv. Is it required to enter a contract in Iraq for modest projects of a limited scope?
- v. To what extent do existing engineering rules contribute to the education of engineers regarding the significance of contracts?

1.11. THE SIGNIFICANCE OF RESEARCH

As a result of the large number of complaints received from contractors on various construction projects in Sudan, the need for a clear contract in terms of the rights and obligations of both parties arose, resulting in the creation of an agreement that is more logical and balanced, thereby reducing the likelihood of entering and resolving disputes between the parties.

1.12. METHODS OF INVESTIGATION

To putting up this study, the researcher employed a scientific technique that was based on two conceptual frameworks:

- a) **Methods of investigation:** The researcher analyzed a collection of references, books, scientific journals, and papers, as well as prior studies in this subject, which together provide a trustworthy database for research.
- b) **Scientific framework:** Within this framework, data were gathered from the study community, which consisted of companies and engineers that worked in the construction

industry at the time. As an example, a questionnaire based on a pyramid of questions and the research problem is developed and distributed to a random sample of the research community, after which data is analyzed using a statistical program and results are discussed within a framework, in order to arrive at general indicators and recommendations in the contract problem field that work to mitigate its negative consequences.



2. LITERATURE REVIEW

2.1 INTRODUCTION

It would appear that building construction projects are rife with conflict, which can result in a variety of challenges, including increased management expenses and delays, decreased productivity and loss of profit, and damage to corporate relationships, amongst others. The primary purpose of this research is to produce an outline of the numerous factors that, when combined, increase the likelihood of conflict occurring during the course of building projects [33]. According to the findings of the study, there are three different factors that contribute to conflict: conflicts resulting from behavioural difficulties, contractual issues, and technological concerns. Resistance to verifying the constructability of the building, Lack of precision and thoroughness, as well as a lack of coordination among the members of the project team, are examples of behavioural factors that have the potential to result in conflict within the context of a project. A number of the concerns that are being disputed about in the contract include the late ownership of the property, late interim payments, and confusing contract requirements. The inability of the contractor to execute the work in a professional manner and the failure of the architect or engineer to deliver timely instructions are both examples of conflicts that might arise as a result of technical issues. This article was written with the intention of serving as a guide for settling disagreements that may arise in the course of future construction projects [34].

Today's construction projects are becoming increasingly difficult to plan and execute. Building is the process in which conflicts are nearly unavoidable due to the intricate nature of the complex design and construction process as well as the interconnectedness of all of its components and the length of time required for each step [35]. In addition, the utilisation of interdisciplinary teams in the execution of a building project may result in disagreements between the participants of those teams. It would appear that disagreements and disputes are an inevitable aspect of the construction industry, particularly considering the fact that activities related to building are sometimes fraught with unpredictability.

According to a literature analysis that was carried out by Basler and Partner (1998), current study is concentrating on sustainability performance for the transportation industry. This research is basing its findings on the three facets of sustainability, which are economy, ecological, and society. These highlights in the scientific literature are illustrated in figure 2.1 [36].

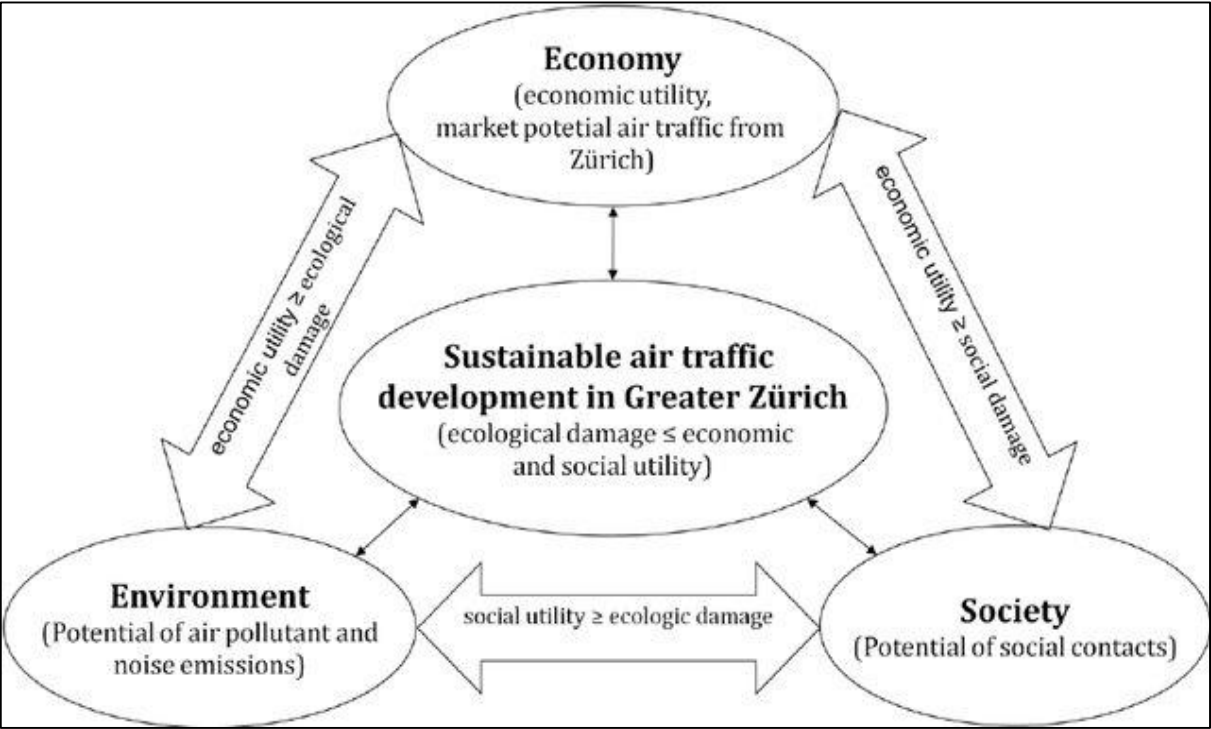


Figure 2.1: Transportation sector sustainability criteria [36]

2.2 DEFINITIONS OF PREVALENT CONTRACT CONFLICT

One of the most important references on the common origins of building controversies is the work that Kumaraswamy and Yogeswaran did. According to the findings of the survey, the majority of problems that occur during construction are caused by contractual issues such as variation, time extension, payment, and the quality of technical specification. Other prevalent factors that contribute to construction disputes include a lack of understanding, inefficient management and administration, excessive client expectations, and tenacity on the part of one or both parties. According to the findings of subsequent research, disagreements may surface as

a result of a scarcity of resources, which may include a shortage of time, money, labour, supplies, or equipment [37].

According to Smith, the construction industry is plagued by recurring issues related to conflict and the resolution of disputes. Conflict can result in social isolation, the destruction of personal and professional connections, and a general decrease in overall productivity. A disagreement leads to the build-up of tension, which in turn diverts the focus of the members of the team away from the task at hand. According to Cheung and Suen, disagreements that are not resolved amicably can result in a number of negative outcomes, including the postponement of projects, the deterioration of team morale, an increase in the overall cost of the project, and, most significantly, the termination of long-term business collaborations. Because of this, many people involved in the construction industry continue to view conflict as undesirable and believe that it ought to be avoided or dealt with as soon as possible, which is a sensible viewpoint. According to the findings of a number of researchers, contrary to the widespread belief, conflict is a phenomenon that, depending on how it is managed, can either positively or negatively affect the lives of individuals, communities, and organisations [38].

The construction industry is looking into various approaches that would enable for conflicts and disputes to be addressed in an appropriate manner while being cost-effective because the number of conflicts and disputes is growing at an alarming rate. According to Shin, negotiation should become a standard practise for project management throughout the construction process. This is due to the fact that disagreements are common in the construction business and ought to be settled as soon as it is practically possible on the job site.

Conflict is defined by Brown et al. as "doubt or questioning, resistance, incompatible behaviour, disagreement, or hostile engagement." According to Brown et al., conflicts are one of the occurrences that fall under the category of conflict. According to Kumaraswamy and Yogeswaran, the emergence of a conflict occurs when one side's claim or report is rejected by the other side and that rejection is not accepted by the first party. When parties that are opposed to one another take action or make arguments in reaction to a dispute, the likelihood of a conflict occurring and its intensity are both increased [39].

According to Vorster, a dispute is a disagreement over a centrally concerned with constructing research issue that typically arises as a result of a discussion over two or more stakeholders' differing opinions on the current situation. Vorster defines a dispute as a disagreement over an issue that is centrally concerned with constructing research. Conflict arises if the actions of one group interfere with or impede the activities of another person. This notion is bolstered by Deutsch's description of dispute as mismatched activities [40].

There are almost certainly just as many different ways to define conflict as there are different situations in which it can arise. Thomas identifies three distinct categories of conflict definitions in his research. There are two very important points to take into consideration. To begin, one's view of the situation determines whether or not there is a dispute. In all likelihood, the differences that can be seen do not correspond to the differences that exist; despite this, there is no contradiction if the differences exist but are not recognised. It is also important to note that both sides are dependent upon the other (i.e., Each can damage one another.). Last but not least, there are the problems of obstruction, hostility, and shortage that need to be taken into consideration. They engage in conduct that is obstructing because there are only a limited number of resources available, such as money, power, and social standing, and because of this, there are limited opportunities. The level of conflict increases if one party thwarts the attempts of another to attain their objectives or protect their interests in the situation.

These various definitions are evidence that academics examine conflicts from a number of perspectives; but is there a distinction between conflict and disagreement, and if so, should we be concerned if there is a difference? Some authors make no distinction between the two, as Moore does in the first sentence of Chapter 1 of his work; nevertheless, Moore is not one of these authors. This classification was approved for this project despite the fact that the vast majority of earlier studies described conflict and disagreements in the same way, that is, as frequently as differences over interests or points of view. Remember that both of these expressions have traditionally been seen as undesirable and therefore to be avoided at all costs; this is the most important factor to keep in mind.

This all-encompassing approach provides a beginning point for constructing a definition of sustainable building that is more concrete and for beginning to highlight the stakes and issues of ecological sustainability as they apply to the construction industry. An initiative toward achieving this goal was initially launched in 1995 by the International Council for Research and Innovation in Constructing Structures (Bourdeau 1999) [41].

There is no way around the fact that the phrase "sustainable building" will give rise to a plethora of semantic problems. It is abundantly clear that the construction industry does not qualify as one of the sustainable activities as defined by the International Threatened species (1994). This is because the definition of a sustainable activity states that it must be able to continue without end. To make matters even worse, the phrase "sustainable construction" is commonly used to describe a process that begins a very long time before construction (in the stage of design and planning) and continues for a very long time after the construction company has left the site. This makes the situation even more confusing. According to Wyatt (1996), sustainable construction encompasses a 'cradle to grave' appraisal, which includes controlling a building's serviceability throughout its lifecycle and ultimate deconstruction and recycling of resources to lessen the waste stream that is typically associated with destruction. In other words, sustainable construction takes into account the entire lifecycle of a building, from the moment it is conceived to the moment it is demolished.

According to Miyatake (1996), everyone needs to realise that in order to achieve sustainable building, the industry needs to reform the processes of generating the built environment. This is something that needs to be recognised by everyone. In light of this, the means by which the implementation is carried out need to be modified so as to accommodate the manner in which all construction activities are carried out. They are able to construct buildings, rehabilitate damaged and contaminated landscapes, and improve arid conditions, which are all ways in which they can make a contribution to the realisation of sustainable construction. The construction industry's knowledge of sustainability principles is expanded as a result of this notion throughout the entirety of the building process [42].

2.3 FACTORS CONTRIBUTING TO PREVALENCE CONTRACT DISPUTES IN CONSTRUCTION

Before attempting to solve a problem, it is essential to determine how it arose in the first place. A significant amount of study has been conducted on the topic of disagreements and conflicts that arise in the construction industry. It has come to light that there are a number of facets that must be taken into consideration while identifying the origins and factors that contribute to these disputes.

According to Hohns, the spontaneous nature of building disputes, as well as their features and origins, distinguish them from other types of legal conflicts. According to the findings of a study conducted by the author, disagreements in the construction sector are brought on by faulty contracts, inaccurate estimates, shifting conditions, adverse reactions from customers, and the participation of third parties. According to Williamson, the three most significant underlying causes of conflicts are behavior, concerns over contractual obligations brought on by inexperience and ambiguity, and challenges relating to technology that are brought on by inexperience and ambiguity [39].

According to a survey conducted by McPherson and colleagues, the three factors—scope adjustments, unfavorable weather, and restricted site access—make up the majority of the cases in which claims lead to disputes. According to Pelled's interpretation of the findings, cosmopolitan teams are more prone to avoid conflict, whereas productive teams are more inclined to engage in it. Diekmann and Girard investigated in further depth the factors that play a role in the occurrence of contract disputes. It was researched to see if the occurrence of contract conflicts was influenced in any way by the many aspects of the project, such as the people involved, the methodology used, and the characteristics of the project itself. The following is a list of them: The researchers based their conclusions on data gathered from 159 different construction projects, which included information on the frequency and severity of disagreements. They used the method of logic regression to arrive at their findings. The investigation revealed that all three factors had an impact on the likelihood of legal wrangling

over a contract, with the 'people' component proving to be the most significant in terms of minimizing the risk of such conflicts.

On top of Kumaraswamy's summary of 20 common causes of construction disputes, many subsequent studies on construction conflict and disputes were able to be built. These causes included construction speed and cost as well as quality control, technological advancements, stringent building codes and regulations, and economic hardships. According to Fenn et al., the escalation of customer construction disagreements was caused in part by late responses, poor team connectivity, a lack of reporting and tracking processes, poor project management, supervision, and coordination efforts, a reduced mentality in contractor and designer involvement, and a lack of team spirit among participants. According to Kumaraswamy and Yogeswaran, the most common problem in construction disputes is contractors' contractual issues, such as a variation, a time extension for payment, payment, the quality of technical specifications, the availability of information, the administration and management of information, and unrealistic client expectations. Other common issues include the quality of technical specifications, the availability of information, the administration and management of information, and the availability of information [43].

Life-cycle cost analysis, also known as LCCA, and benefit-cost analysis, often known as BCA, are both components of engineering economics (Lee 2002b). The evaluation of public-sector investment makes use of both of these techniques. These methods have taken on increased significance as part of an effort to serve the needs of individuals in the future. The goal is to ensure that adequate funds are invested on the construction of highway infrastructure so that associated services may be provided at a reduced cost. In the meanwhile, these techniques aid stakeholders in striking a balance between competing demands while keeping in mind the necessities and goals of the long run (Gluch and Baumann 2004; Lee 2002b). In many instances, the existing financial capacity is insufficient to cover the amount of capital works that are required. As a consequence of this, it is essential to make use of rigorous and open-ended approaches when assessing and ranking the many efforts that are required to ensure that new projects are prioritised in an objective manner [44].

There are a number of definitions of life-cycle costing, but the one provided by Lee (2002b), which states that the life-cycle cost of an item "is the sum of any and all finances expended in support of the item from its idea and manufacturing through its operation to the end of its useful life," is as useful as any other definition and shorter than the majority of the others. In order to make the lifecycle costing technique more understandable and structured, Figure 2.2 illustrates a typical structure and skillful approach to using the method [45]. This should make it much simpler to grasp. The LCCA can be utilised as an investment calculus in order to analyse various financial decisions based on the aforementioned systematic flow (Michal BIERNACKI 2022) [46].

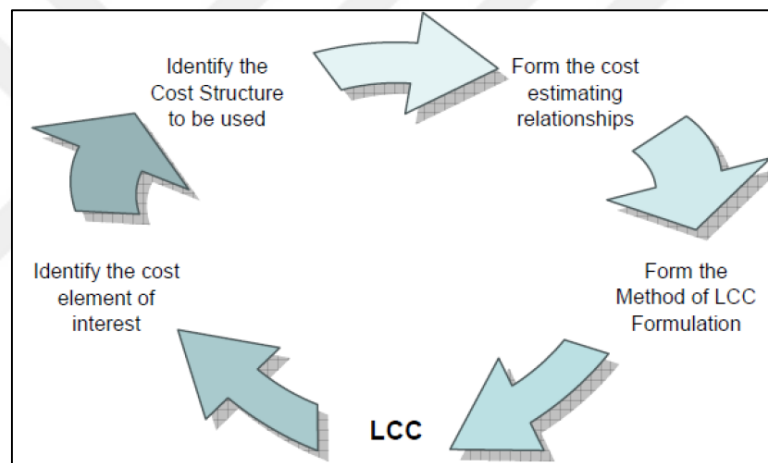


Figure 2.2: Procedure for lifecycle estimating [45]

Individuals involved in the project, such as architects, engineers, contractors, and other project-related professions, among others, may cause problems, according to Shin. According to Thompson and colleagues, the most common causes of conflict include a lack of communication, distrust, misinterpretations of contracts, misunderstandings about function and responsibilities, and a "we versus them" mentality based on an unjust distribution of risks. According to Hall, a failure to comprehend its obligations under the design team contract, overdesigning and underestimating the costs involved, late information delivery, and a difficult method to request for information are all examples of reasons of construction disputes caused by consultants. Other reasons for construction problems that can be linked back to consultants

and their businesses include errors and omissions caused by uncoordinated civil, structural, architectural, mechanical, and electrical designs, as well as structural incompatibility. Cheung et al. discovered that by looking at the reasons of conflict and the characteristics of the project, it is feasible to identify disagreements in the construction sector [47]. Budget overruns, late payments, varied percentages of claim submission and certification, the number of days behind schedule, liquidated damages, and design changes that were a percentage of the original design were the most often stated causes for failure in this contest.

Carmichael has uncovered a slew of problems that must be resolved. This includes insufficient Critical Path Method (CPM) scheduling and update requirements, poor contractor management and supervision, insufficient contractor coordination, work delays or suspension, failure to plan and execute work changes, failure to understand and correctly bid or price the works, a reluctance to seek clarification, and insufficient CPM scheduling and update requirements [48].

When project schedules created by a significant number of project stakeholders are combined, they often reveal indicators of conflict between the parties, according to Chua and Song. Communication between construction workers and supervisors is impeded due to the inherent interfacial dependency on project operations [49]. Kathleen discovered in a second study that damaging arguments are caused by a shortage of resources, such as time, money, labor, supplies, or equipment (or a combination of these factors).

According to Edwin and Henry, there are 20 potential sources of disputes in Sino-Foreign Joint Venture construction projects: payment, variation (including time extensions), quality (including unfamiliarity with local conditions), project scope definition (including risk allocation), difference in ways of doing things (including technical specifications), poor communication (including poor administration/management), unrealistic client expectations (including lack of information), and project scope definition (including risk allocation). Construction conflicts can arise as a result of the addition of unique terms in contracts, alterations to building plans and specifications, and the consequent conflicting and error-ridden information in a plethora of papers, as Cheung et al. point out. Cheung and Yiu looked at the role of mediation in conflict resolution and discovered a number of useful variables related to

dispute origins. The results of their research were published in the journal Conflict Resolution. They separated the reasons of conflicts into two groups: those linked to construction and those related to people's behavior. Customers dissatisfied with the main contractor's work progress, disputes over the cost of prolongation and delay, clients who refuse to pay for variation claims, late delivery of possession by the client, clients who take over the site and deny access to the main contractor, errors in bills of quantities resulting in significant changes, disputes over the cost of measurement and delay, and clients who refuse to pay for variation claims. Apart from that, it includes a disagreement over the subcontractor's time extension costs, changes in scope due to additional work, an inadequate site and/or site investigation report, a delay in employment due to a utility services organization, non-payment of the subcontractor by the main contractor, the main contractor ceasing work on-site, a disagreement over the main contractor's time extension costs, and the main contractor denying access to the site.

This report goes into great detail about everything from the subcontractor's site location to the primary contractor's delay in subcontractor work, the ramifications of opening the area for inspection, and the subcontractor's decision to halt working on the site. Unpreparedness for agreements, both parties wanting to exert control over the proceedings, both parties unwilling to settle, unrealistic expectations, a lack of leadership within project teams, a lack of trust between the parties, and a lack of faith in the mediator were all factors that contributed to conflict, according to Cheung and Yiu's research [50].

Late payments for completed work, frequent owner interference, changing requirements, a lack of communication between the various parties, problems with neighbors, and unforeseen site conditions, according to the findings of their research, all have the potential to result in disputes between the various parties involved.

Several elements that were relevant to their analysis were disclosed by the findings of a previous conflict-related study. The bulk of the investigated traits are the same. Because the causes appear to be diverse and complex, pinpointing or focusing on one is challenging. The group or root of reasons identified by Williamson would be used to conduct this study. Causes ascribed to behavioral, contractual, and technological issues; causes attributed to other variables; and causes

attributed to other factors are the three categories of findings from the study on the causes of conflict.

This study lets tools for analyzing and avoiding natural risks in a real project be used. It is emphasized how important it is to explain who is involved, what the main steps of risk management are, and what the difference is between risk and uncertainty. The goal of the study is to carefully find the risk and where it is, as well as find out if there is a chance of slick ground on the site. In this study, the Ghandouri project is explained in terms of a geotechnical analysis that proves there are different stages and that there is a risk of slipping in real life. This paper tries to get rid of the risk by analyzing the soil and using the Talren and Slop programs. It also suggests a way to make sure that the site is stabilized, Sepanta Naimi, and Houda Hrizi 2019 [51].

The goal of the study is to show how things change from year to year from an economic, technical, social, and political perspective, as well as to try to figure out how different fields relate to transportation. In this context, we talk about how the last few decades' growth in informatics and technology has affected the way transportation systems have changed, keeping in mind the needs of today. In this situation, it's clear that transportation and urbanization go hand in hand, and it's also clear that transportation is a driving force behind the common level of human civilization. In this content, the development period and ongoing investments of high-speed rail, which are part of the future outlook and are based on the economic and technological context of the transportation system, are also evaluated in detail, Mehmet Fatih Altan, Sepanta Naimi, and Taha Vardar [52].

A big chunk of Iran's money is spent on civil projects every year. There are many problems with putting these projects into action, especially road construction projects that focus on time, cost, and quality. To improve the quality of these projects, we need a reliable planning and policy making system. Also, the lack of value engineering in national and large-scale projects has made managers and experts feel like they don't have a comprehensive, applicable, and pervasive policy as a solution. This has had bad effects on the environment during construction and maintenance. Because of how important this topic is, this research has talked about and

evaluated a new way to build roads that takes value engineering into account as a tool for making projects more sustainable Masoud Reihanifar and Sepanta Naimi [53].

2.4 CONFLICTS BETWEEN STANDARD CONTRACTS OCCUR BECAUSE OF BEHAVIORAL ISSUES.

Interaction, personality, culture, and professional history are all issues in regulating one's emotions and behaviors. Ambition, sadness, discontent, a desire for growth, communication, power, dishonesty, and religion are all factors that can lead to conflicts. The construction industry is an art rather than a science, as previously asserted. It is necessary for the effective contract administrator, or disputant in a contract interpretation or negative occurrence on a project, to be familiar with the individuals involved in the transaction or disagreement. There is a great herding instinct in the industry, which pushes it. Acceptance is something we all seek and require. A tremendous desire to follow in the footsteps of their profession's pioneers drives them. Human traits of gregariousness include association, imitation, loyalty, recognition, superiority, and prestige, to mention a few. To make the opposing party feel included in the organization, you must first make him feel like an insider. Identify the organizations that the opposition party views to be essential. Prove to him why settling the conflict will aid him in attaining or retaining group allegiance.

The loss of money is one thing; the loss of one's reputation is quite another. Everyone has a self-concept that is are continuously attempting to enhance and polish more. When everyone's egos remain intact, it is usually easy to resolve a dispute. People are prepared to defend their image, but they also seek to grow or assert their place. Because of this, any message that pertains to obtaining, advancing, saving money, or protecting oneself will be heard, and common practice will dictate that it be followed by sitting on. Everyone has the same goals: they want more space, a better future, and the chance to be recognized for their achievements. They also want to be recognized for their achievements. It is possible to resolve disagreements by drawing attention to one's goals, accomplishments, and authority.

Carmichael believes that the reason building disputes arise is that individuals have contrasting wants and needs. The most important thing for a contractor is that they be compensated for their

work. The designer is responsible for supervising the concepts, the structure or design, the reputation, the creative temperament, the money, the insurance premiums, and any other needs that would normally be handled by a general contractor. In addition to the expectations of the owners, they have expectations pertaining to corporate affairs, politics, and logistics. In this environment, goals and security are put at risk, communication channels become overburdened, and tension appears to be intimately tied to requests and refusals, in addition to even larger strains, harsh attitudes, and financial losses. These issues are brought about because there is a lack of team spirit and communication between the project teams. People are the sole possible answer to any architectural challenge, as well as the source of the problem itself. A flurry of debates has been sparked by the prevalent social assumption that every individual should be entitled to certain rights.

2.5 CONTRACTUAL ISSUES LEAD TO ABUSE

The participants in a project are required to trade building materials and services in accordance with the terms of a contract. It is a record that can be used in court. A contract is an agreement between many parties for which the state either provides a remedy or requires implementation. A contract can either be implemented or it can be required to be implemented. Before the contract can be put into effect, it must first be defined, interpreted, and explained in greater detail. The majority of project disagreements can be traced back to problematic contractual arrangements. Contracting challenges identified by Kumaraswamy and Yogeswaran include exceeding client expectations, variation, an extension of time, payment delays, the quality of technical specifications, the availability of information, the administration and management of the project, and determination as to potential sources of construction disputes.

Industrial trade groups, standards, and laws give criteria for traditional contract papers. By guaranteeing that all of the parties are dealt with in the same manner, the idea of a consistent contract helps to contribute to the standardisation of business procedures. Therefore, standard contracts offer sufficient ground for the establishment of contractual terms, the clarity of construction methods, and the achievement of project requirements through agreement. Everyone working in the construction industry is aware that there is no such thing as an ideal

set of contract terms that can be applied to each and every conceivable circumstance. In every single one of the contract drawings, there are either mechanical drafting problems or important dimensions or bits of information that are missing that really ought to be there. Because of their fundamentally human character, designers and draughtsmen are prone to making numerous errors in their work. Because of the possibility of human mistake and the ways in which the environment might shift, alterations are inevitable during the phases of design and construction. In the event that the needs of the owner shift, it is required to revise the documentation and the job scopes. When compared to straightforward undertakings, complex initiatives are more likely to be significantly impacted by alterations. The shorter the amount of time available for design, the greater the number of necessary appendices will be, as will the likelihood of errors. There is not a single person who is aware of the location of a certain feature that was shown.

The more people, images, ideas, and thoughts there are, the higher the probability that there will be errors. Obligations outlined in contracts frequently serve as a catalyst for disagreement. Document errors that result in the contractor losing money that was not budgeted for are considered to be the owner's responsibility when those errors lead the contractor to lose money.

If flaws in the documents are seen to be significant and inexcusable by peers and the customs of the industry, then they are considered to be the duty of the designer. Document errors become liabilities in circumstances in which a professional's ability to rely on them has been severely undermined. In the event that the fact finder concludes that a professional's unwillingness to accept responsibility runs counter to any acceptable standards of conduct, the fact finder may decide to award punitive damages against the professional.

There are disagreements that develop as a result of the production of blueprints or drawings. Plan flaws are a frequent cause of design disputes; however they are frequently disregarded as a potential cause. The majority of individuals whose jobs involve working with plans are aware of what this implies; nonetheless, neither a local nor a national standard exists to uncover flaws in projects before they are put into action.

Those who have experience working with blueprints are aware of the fact that no drawing is 100% accurate. This is a common knowledge. All of the information, including the size, scales,

details, elevations, and slopes, as well as the other elements, are wrong. Everyone who works with blueprints is aware that there is always room for improvement with regards to the designs, despite the fact that these errors are common. Even though plans can be continuously revised in an effort to make them more effective, conflict is unavoidable. As a direct consequence of this, all of the plans are flawed, and those who are employed in the construction sector are routinely subjected to working with flawed blueprints. When the quality of the plans declines to the point where their utilisation leads in unneeded expenditures, this can lead to deficiencies in the design of the plans, which can lead to conflicts. The legislative definition specifies that projects have to be completed in accordance with the ordinary professional level of care, despite the fact that no precise benchmark has been established. The designer has the distinct advantage of being able to understand what the plans are trying to communicate. In the event that you are unable to achieve performance levels that are superior to the plan's objective aim, the client may put pressure on you to do so. There is a possibility that lower performance, as judged by peers, will arise from plans, details, notes on drawings, and requirements that were poorly conceived. Problems in technique and performance are more difficult to identify than holes in a plan or strategy that have been left unfilled.

The majority of the time, the people who have the answers are the ones who are willing to consistently face challenging situations and actively search out ways to overcome them. The best that can be said about this idea is that it is an approach to finding a solution that is based on wishful thinking. It is not always possible, and there is a deficiency in the amount of practise measurement that is available in this field. On the other hand, guilt has the potential to outweigh either omission or error. Nearly all of the time, the indirect costs associated with a problem are significantly more than the direct expenses associated with the issue. The owner and the contractor have an equal right to look forward to obtaining building blueprints from the architect. The owner represents and warrants to the contractor that the designs can be built and will result in the anticipated outcomes in accordance with the techniques outlined in the document. As a consequence of this, the issue of capability and cost evaluation comes into play in the event that the inaccuracy of the designer makes it challenging for the contractor to accomplish its goals.

2.6 TECHNICAL ISSUES CAUSE CONFLICT

Uncertainty is the most common cause of disagreements when it comes to problems that arise in the technical aspects of project operations. The difference between the information that is required and the information that is digested is what Galbraith means when he talks about uncertainty. Before beginning the "execution" part of a project, it is important to perform planning, which involves collecting and analyzing data. It is possible, for instance, that the architect or engineer's instructions or client information will be delivered late, that the site will be overdesigned, that the soil research report will have errors, and that there will not be sufficient technology needs.

Disagreements on a technical level are common during the process of developing technical statements, and they have the potential to be quite frustrating. For instance, Requests for Information (RFIs), or request for clarifications, are useful tools for clearing up misunderstandings that may crop up at any point throughout the operation and implementation of a project. The majority of unresolved issues are fixed on-site before they can become a source of a technical dispute. This solves the problem of inadequate tracing techniques for information requests. The individuals working on the project who have the relevant field knowledge can recognize these differences in opinion and address them accordingly. Everyone who was a part of the decision-making process for the engineering field believes that it is uncomplicated and, in the end, justifiable.

In contrast to arguments regarding the terms of a contract, technical issues that have not been handled can be fixed through the management of a project. When it comes to software, a major design mistake is often more than just a lack of functionality on the part of the developer. A critical flaw in the design causes the building project to be carried out differently in terms of its means, methods, environment, length, or other conditions. There are many different factors to take into consideration here. The foundations, the frame and enclosure construction, the space use, the method and material selection, the building timetable, and the performance of third parties required to contribute to the project at some stages are some of the most frequently encountered design faults.

When costs are not determined right from the start of a project, it almost always results in disagreement. Only a very small percentage of contractors can boast that their projects were finished ahead of schedule and under budget. When projects are finished on time or within a time range that is considered appropriate, owners almost never ask for reimbursement. Disputes are uncommon when designers are able to provide solid justification for the goods they define, and when those justifications align to the claims made by the sales representative. In spite of the widespread notion to the contrary, a relatively tiny percentage of contractors knowingly make incorrect or misleading representations. The majority of project supervisors who work for the parties involved in the project do not have a solid understanding of the ins and outs of disputes, as well as the complexities of litigation and arbitration. As a consequence of this, they choose to argue amongst themselves and produce lengthy letters in order to establish a record. Furthermore, they have a general contempt for legal specialists. Contractors that stand to profit financially from a project are less likely to fabricate or pursue bogus claims in relation to that project. If the work is finished in a satisfactory manner, the majority of the time, a contractor who is legally entitled to a reasonable contract modification will dismiss the issue.

It is in the best interest of contractors to finish projects as rapidly as they can. As constructors, they are naturally curious, and the fact that assertions are brand new piques their attention. Disputes can arise when building projects do not turn out as expected, and all too frequently, the root cause is an inability to estimate costs accurately. Sadly, the contractor is not the only one involved in the project that is grossly underestimating the price. It is applicable to both the owner and the designer of a building that was built at a lower cost than what it would have been in the past to plan or traditionally build the project. The construction industry is known for its rapid calculation and commitment of significant amounts of both money and labour. It happens from time to time that somebody will grossly underestimate the value of something, resulting in a lower price. Even more unfortunate is the fact that the vast majority of people working in this industry lack the financial resources necessary to make up for their errors. Even someone with the best of intentions will not be able to make amends for the errors they have committed. On the other hand, there are many who believe that persons who are fortunate enough to have the

resources necessary to atone for their wrongdoings do not possess the level of sincerity that is necessary to bring the ledger completely into equilibrium.

Collecting the dollar after all of the delays and problems that have arisen as a result of retainage, back charges, punch lists, and other variables is the element that poses the greatest challenge. In most cases, construction pricing procedures do not take into consideration the erection process, which makes it difficult for contractors to absorb cost overruns when they are constrained by retainage and other forms of cash flow constraints. This designer believes that there should not be any sequential constraints that are unrelated to strength that are imposed or expressed at any point throughout the design. A great number of projects, either now underway or completed in the past, have demonstrated that predetermined prices per unit may be utilized to price work amounting to millions of dollars while adhering to strict schedule limitations. The majority of these projects have not yet been completed. The failure of a contractor, at the outset of the project, to correctly assess and/or estimate the extent of the work is one of the most typical reasons why disagreements arise. The too confident notion that all contractors are charismatic and capable of overcoming an apparent proposal also makes the problem worse, and it is one of the contributing factors.

2.7 SUMMERY

Because of this chapter, all project teams should have a greater understanding of the potential sources of conflict in the projects they are working on. According to the findings of this research, the competition may be broken down into three categories: behavioral, contractual, and technological. Conflict will arise if there is insufficient communication among the members of the project team, if there are problems with the multicultural team, and if there is a failure to analyse the constructability, clarity, and completion of the project. Disputes can arise for a number of reasons, including but not limited to late customer payments, delayed client responses, time extensions, and erroneous project timelines. These factors come on top of any contractual considerations that may be present. Inadequate performance from the contractor, problems with pricing or costs, and tardy instructions from the architect or engineer are some of the additional factors that contribute to customer discontent. This report was produced to assist

the project team in resolving any issues that may occur during future construction projects, and it may be downloaded from this page.



3. METHODOLOGY

3.1 INTRODUCTION

This section includes a detailed presentation of the researcher's methodology, which was used to prepare this research, as well as the data needed for the study, including a precise identification and statement of the sources of information, methods for collecting them from the study community, and then defining the method of analysis to arrive at the results that support and prove the study. In addition, this section includes a discussion of the implications of the study's findings. In this section, you'll find a description of the conclusions that were drawn from the statistical analysis of the data that was monitored, as well as the study technique, the research sample selection, the questionnaire design, and the results of the monitoring of the data.

3.2 COMMUNITY OF RESEARCHERS

Engineers and technicians who focus on the field of building and construction are incorporated into the study community at various phases, regardless of whether the study community is located in the field, the office, or both.

3.3 THE STUDY'S SAMPLE

The data that supported the research hypotheses were accessed by the researcher through the use of a random sample from the community that was being studied. After that, the questionnaire was given out to a random sample of people, which comprised both civilians and architects, as well as technicians working for private companies and the government. These individuals ranged in age and had varying amounts of professional experience.

3.4 DESIGN OF A RESEARCH QUESTIONNAIRE

A questionnaire was developed by the researcher in order to collect the necessary data for the investigation, and it was distributed to participants in the study on a random basis. The researcher conducted interviews with engineers and technicians working for a variety of construction companies in order to get information regarding the drawbacks of construction sector contracts in Iraq.

The researcher relied on the principles that are followed in scientific research procedures to prepare the research questionnaire, which was then given to the supervisor to determine the acceptability of these claims for the Final Questionnaire with updates until the final version is completed. During the previous theses, the researcher used these principles to prepare the research questionnaire.

3.5 STATISTICAL ANALYSIS WAS EMPLOYED TO INTERPRET THE RESULTS

The shorthand for "data analysis" is "SPSS," which stands for "Statistical Package for the Social Sciences." The researcher utilized the statistical data analysis software known as the Statistical Pack for Social Sciences in order to produce the initial Latin letters of the term "Statistical Packs for Social Sciences." These statistical packs are integrated computer programmers that can be used for data entry and analysis. In spite of the fact that it was initially developed for the purpose of conducting social research, it is now routinely utilized in all types of scientific research that involves a significant amount of digital data. This is the case despite the fact that its application is not restricted to social research alone. Its utilization is widespread because it is included on nearly all statistical tests, possesses exceptional data processing capabilities, and is compatible with the majority of widely used software. It is possible to extract SPSS by reading data from a wide variety of file types. This application has the capability to generate statistical reports, visual forms, moderation distribution, and descriptive statistics that can be as basic or complex as desired. Both inexperienced and seasoned researchers are able to benefit from the software's ability to make statistical analysis more approachable.

A data editor is the name of the initial package interface, which is used for the very first time to enter raw data. This interface is analogous to the spreadsheets that are provided by SPSS. And the data can be read, changed, or revised in order to deal with the variables, such as identifying them or altering their names. Files can be stored through the data editor, but this file cannot extract any kind of data results. The information is kept in data files, but the results are exported to a separate format. The files in question are those that are considered the output.

It contains all of the results of any statistical process, the output files, as well as the output files, and each time the program asks the user to save or delete the file, it is recommended not to save all of the output files. Instead, it is recommended to save only those output files that the researcher or user needs on an ongoing basis, and only after confirming that the results are accurate. Because its loss requires a complete re-entry, the data must be saved in more than one file and preserved. This is in contrast to the output files, whose retrieval requires only the retrieval of the statistical process and the request for results from the program, both of which are controlled by a list of commands and options that are available in the program. The data must be saved and preserved. In this lesson, we will examine all aspects of data analysis as well as the statistical procedure in four parts.

- i. Encoding of data.
- ii. Enter the information into the application.
- iii. Completion of the relevant form, as well as data selection and analysis.
- iv. Identifying the change data to be studied and completing a statistical process.

3.6 IMPROVE THE SYSTEM OF WORKFORCE MANAGEMENT ON BUILDING SITES

There are several organizations in the construction industry that have a difficult time establishing the key performance indicators (KPIs). The majority of construction companies make an effort to hire and keep the most qualified workers on staff in order to improve the efficiency with which they handle their resources. On construction sites, workers, engineers, and project managers, along with others who are involved in supporting activities that have an

indirect impact on the performance of their coworkers, labor tirelessly around the clock to accomplish significant advancements in the quality of their work. These enhancements are naturally accomplished via the efforts of individuals. It is people with efforts like his that will determine whether or not a construction project is successful. The way in which contractors evaluate the contributions made by their personnel, both on an individual and a collective level, across a number of projects ought to be reflected in the key performance indicators, or KPIs.

However, it is necessary to strike a balance between their personal interests and the commercial objectives of the organization, which are represented in the tasks and responsibilities that are assigned to each employee. This balance is necessary in order to ensure that the organization is successful. As an illustration, employees of a corporation have the right to the perks and remuneration that they receive if they fulfil the obligations that are associated with their jobs. Putting money into the workforces of contracted businesses helps move projects closer to completion and advances their overall objectives. In the construction business, employee morale has a considerable bearing not just on productivity and profitability but also on the overall success of projects.

Despite the fact that there is not a single rule that can be followed when determining the optimal number of workers to complete specific units of work or when dealing with issues such as overtime pay and productivity, project managers and contractors can use a variety of rules of thumb to assist them in managing their workforce on construction sites. When it comes to managing the personnel of construction teams, therefore, it is necessary to have a strong combination of interpersonal skills, knowledge, empathy, and objectivity. The most effective strategy for accomplishing this is for the employees of the organisation to work together in an environment characterized by trust and cooperation.

- a) In the field of construction, the application of People Key Performance Indicators takes into account the sub-criteria that are listed below:
- b) The primary focus of "People Management" is on employees who are either directly or indirectly involved in activities linked to production.

- c) Additionally, taken into account are factors such as accident rates and levels of employee satisfaction.
- d) In the modern-day corporate environment, having strong organizational values, culture, a mission, and a vision are all essential components of a successful leader.
- e) This section focuses on staff as part of the design and implementation of organizational policies, work strategies, and long-term corporate objectives that include personnel.
- f) measuring the many tactics taken to increase employee satisfaction and comparing those results to those of other companies.
- g) The Society Results program places a significant emphasis on an organization's ethical principles and social responsibilities, as well as the obligations it has toward the community in which it operates and the employees of that organization.

Indicators based on a person are supposed to be used in conjunction with other strategies for the purpose of establishing in the general public a sense of community and belonging. Therefore, "Person," which deals with the growth of people, their credentials, abilities, remuneration, and hours of work, as well as employee morale and absences, is a key performance indicator (KPI) for the success of construction projects. Construction companies can develop work places and the community around them more effectively by following these recommendations and using them as a guide and support system, respectively. Adopting people KPIs not only gives a framework for monitoring performance and the progress of work, but it also provides foundation metrics for the company.

3.7 PERFORMANCE OF THE ENVIRONMENT

In recent years, the environment has garnered a greater amount of attention, which has resulted in considerable efforts being made by governments, corporations, and communities to preserve and improve the environment as a whole. Environmental performance should be taken into account in the construction industry not only because buildings are where people live and work, but also because of the obvious significance of this factor to the long-term health and prosperity

of the community. Long-term viability depends on a number of factors, one of which is the capacity to function effectively in the surrounding environment. A decision was made regarding the significance of environmental performance in the construction industry, and it became apparent that ratings for evaluating contractors' environmental performance were required. The ratings were required because it became obvious that ratings for evaluating environmental performance were required. In order to accomplish this goal, the company devised an environmental performance index that takes into account criteria that are associated with the environmental concerns of its contractors. Furthermore, it informs the community and the environment of the additional costs that will be incurred by the community and the environment, which are sometimes unanticipated or overlooked, and which will be dispersed in indirect ways as a result of routine construction operations during the construction phase. Additionally, it informs the community and the environment of the benefits that will accrue to the community and the environment.

Environmental performance is a key performance indicator (KPI) for construction contractors, and it refers to the level of excellence in managing or minimising potential and actual negative environmental ramifications caused by project execution in the context of construction management. This is important because environmental impacts can have a significant impact on the cost of a construction project. The reduction and management of waste, the conservation of energy and water, the production of greenhouse gases and other pollutants as by-products of building services, as well as direct and indirect contributions to deforestation, are some of the factors that need to be investigated. The scenario could be evaluated subjectively using a few different metrics that are frequently applied.

3.8 PREDICTABILITY OF THE BUILDING SCHEDULE

In order to effectively manage construction projects, one effective strategy is to establish a detailed schedule outlining when each individual aspect of the work that will be carried out as part of the project throughout the course of its allotted time period will be finished. A construction project's duration can be measured in terms of the number of months, weeks, or days that pass between the start of the project and the time when it is finished. Everyone involved

in the project—its proprietors, contractors, managers, customers, and end-users—and even those who live in the immediate neighborhood—is expected to arrive on time for scheduled meetings and other events. While a consequence of this, it is essential to devise a comprehensive yet workable programmed and timetable for the undertaking, and it is equally important to make certain that the schedule and timetable are kept up to date as building work on the site proceeds.

The timely completion of construction projects is essential to the overall success of a project since construction contractors are liable to pay fines if they fail to hand in their work on time. Additionally, if a construction project takes longer to finish than anticipated, the contractor will be obliged to utilize their resources for a longer period of time than anticipated, which will result in increased expenditures, decreased profits, and even losses in a variety of different scenarios. Time expansion, often referred to as time overrun, is an indicator that something is incorrect and should be investigated further. It is possible that the project was a failure if the time overrun had a negative influence on the clients' stated goals and, as a result, on the satisfaction of the end-users.

The stakeholders in a construction project place a high value not only on the total cost of the project but also on the length of time it takes to finish the project. As a result, it is essential to finish the project on time in order to meet their expectations. Estimating how long it will take to finish a project can be done by the application of many different approaches, such as the time variance methodology.

By monitoring the times at which individual jobs are finished, managers of construction projects can establish whether or not their projects are proceeding according to plan and whether or not they are operating smoothly. It is the responsibility of the construction contractors who have been recruited to see to it that the projects they are working on are finished in a timely manner. The length of time that has passed after the beginning of site preparation work on a project until the time that the project is completed and turned over to the clients is referred to as the construction time for that project. Construction time is defined as the amount of time that has elapsed. Construction contract agreements typically include essential components such as interim construction timetables and an estimated delivery date. One of the key performance

indicators (KPIs) that was developed by the KPI working group in the year 2000 was construction time predictability. "The difference between the actual construction time and the estimated construction time, given as a percentage of the estimated construction time," states the definition of "actual construction time overrun."

3.9 PREDICTABILITY OF BUILDING EXPENSES IS IMPORTANT

Before beginning the implementation of building projects, it is essential to generate accurate cost estimates and requirements evaluations in order to prevent incurring additional expenses due to costly delays, as indicated by industry professionals and practitioners. As a direct result of the collective efforts of the team, the models used for cost estimate have been improved and developed. As a direct consequence of these efforts, a significant number of conceptual models have been developed.

These models consist of, among other things, regression analysis, probabilistic methods like fuzzy logic and case-based reasoning (CBR), and genetic algorithms (GA). It was found that there are many different approaches to estimating costs, and each one has its own distinct set of perks and drawbacks that need be taken into account. As a consequence of this, it is challenging to claim that there is a solitary method that is well acknowledged all over the world for estimating construction expenses. The experience of the estimators and the historical data offered by the building firm are two of the most crucial parts of the process of estimating.

A model based on linear regression is described here; it is going to be utilized in the construction of office buildings. Another study developed a multivariate regression model and a set of linear regression models for estimating construction costs in the United Kingdom using data from 286 real-world buildings. This research was conducted in the United Kingdom. The corpus of knowledge on cost estimating models has been contributed to by a large number of academics and industry personnel who have developed a wide variety of models within this field.

The NN technique was found to be effective for cost estimation after an investigation into the costs of low-rise manufactured structural steel construction in Canada. However, the researcher

recommended that the technique be further developed in order to improve the results and minimize any potential flaws.

Estimating the cost of construction, notwithstanding the approach that is taken, is an essential part of the overall plan for any project and is not to be neglected. As a consequence of this, one of the most important aspects of attaining success is to win and produce units of work that match the objectives while staying within the allotted budget. It is possible that increased expenses incurred as a result of inaccurate or imprecise cost estimation will not be eligible for cost reimbursement in accordance with modification orders. This can lead to significant financial losses for construction companies. In a paper written in 2000 by the KPI Working Group, the KPI for construction projects was defined as the percentage difference between the estimated and actual construction costs expressed as a percentage of the estimated costs. This was the definition of the KPI.

4. RESULT AND DISCUSSION

4.1 INTRODUCTION

This thesis examines the data and percentages gathered from respondents to a questionnaire that was distributed among institutions, universities, and research groups to gain an understanding of their opinions and responses to the topics presented in the questionnaire; 75 responses were obtained on the topic of the thesis, and all responses were classified as appropriate. The next parts provide a more in-depth explanation.

4.2 QUESTIONNAIRE SECTION

In this section are arranged according to their presence in the questionnaire that was provided to those who responded to the questionnaire, and they are as follows:

4.2.1 General Question

There are three broad questions in the first paragraph, which are concerning (place of employment, years of experience, and age) Table 4.1, and the results of these questions are as follows:

TABLE 4.1: General Questions 1

Job place	Government	61.3%
	Private	30.7%
	Mixed sector	4%
	Single	4%
Years of Experience	Less than 5 years	40%
	5to 10 years	21.3%
	10 to 15 years	21.3%
	More than 15 years	17.3%
Age	Less than 30 years	42.7%
	30 to 40 years	38.7%
	40 to 50 years	12%
	More than 50 years	6.6%

The first question is the job place comes in sequence where (Government comes with 61.3% , Then Private sector comes with 30.7 , and both Mixed and Single works comes with 4%) that shown in Figure 4.1 below.

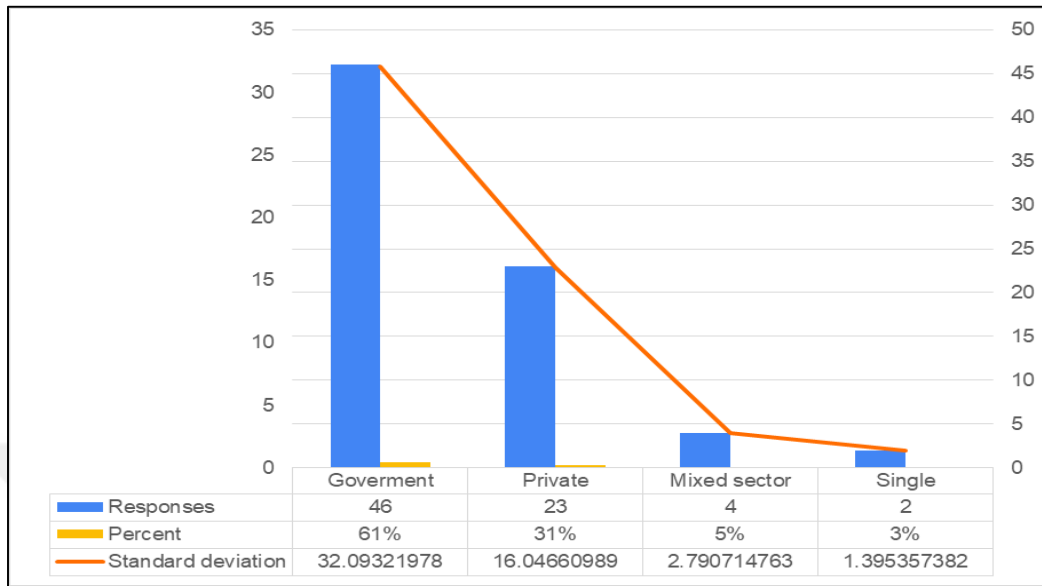


Figure 4.1: Jobs Places.

The second question about Experience year of works comes with the following percentage and shown in Figure 4.2 below in sequences from the bigger value to small value where the values come from responses as (Less than 5 years 40%, 5-10 21.3%, 10-15 21.3, More than 15 17.3%).

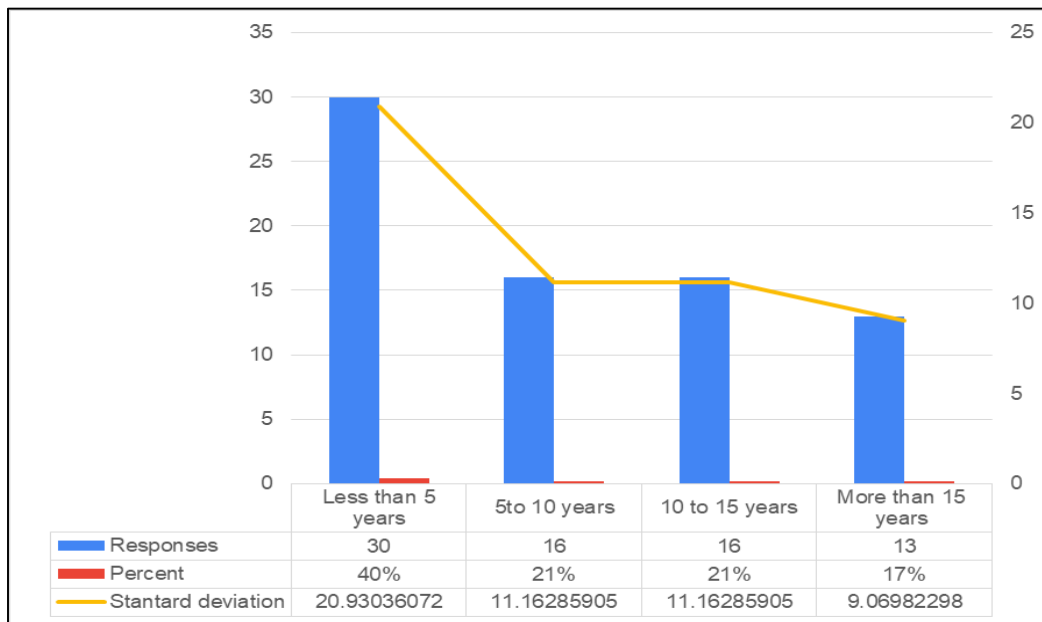


Figure 4.2: Year of Experiences.

The last question in this section is the age of the responders comes with age (Less than 30 comes with 42.7%, 30-40 comes with 38.7%, 40-50 comes with 12%, more than 50 comes with 6.6%) as shown in Figure 4.3 below.

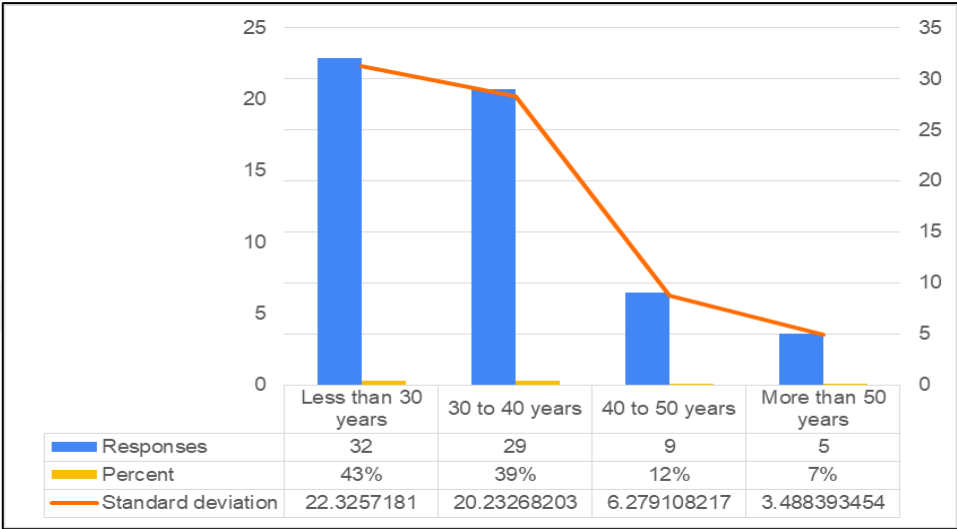


Figure 4.3: Age of Responses.

4.2.2 Occupational Specialization

This paragraph contains questions about functional specialization, which are divided into four categories: professional specialization, level of education, the field of work, and type of job as shown in Table 4.2 below. The responses to these questions were as follows:

TABLE 4.2: Occupational Specialization 1

Job Type	Engineering	92%
	law	8%
Education level	B.Sc.	65.3%
	High diploma	1.3%
	M.Sc.	26.7%
	Ph.D.	6.7%
Work field	Construction contracting	73.3
	Consultancies	26.7
Jobs Work	At office	33.3%
	At site	22.7%
	Both of them	44%

The job type is one of the questions asked the responses to know there actually response depend on their jobs, Figure 4.4 show that, the responses come with the majority of Engineering fields 92%, then Law fields 8%.

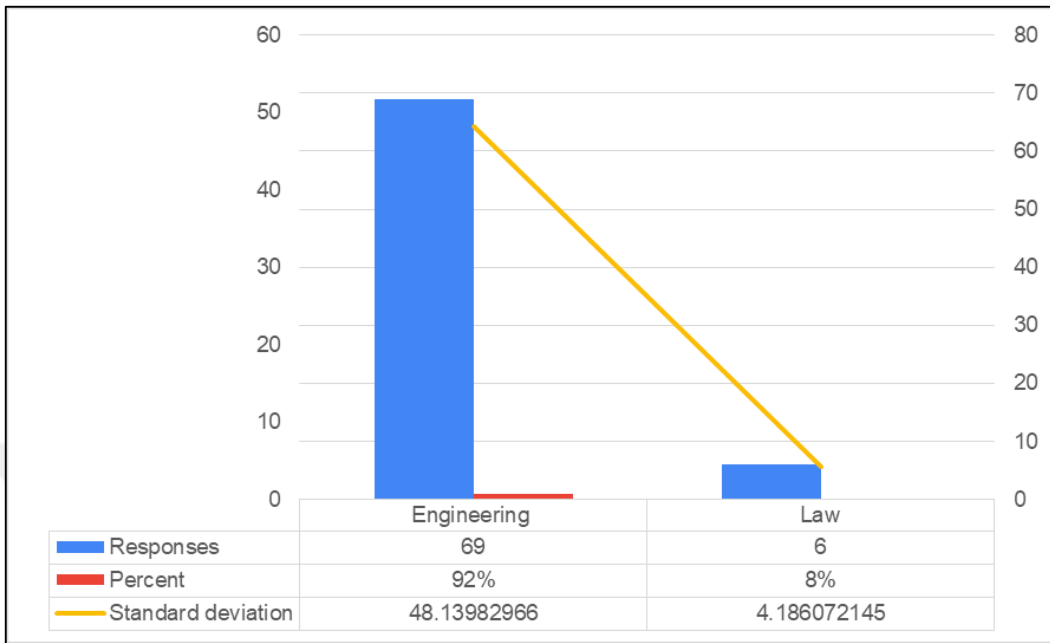


Figure 4.4: Job Type.

The Educational Level shown in Figure 4.5 below shows the values that get it from the responses as the following levels where (B.Sc. 65.3%, High Diploma 1.3%, M.Sc. 26.7, Ph.D. 6.7%)

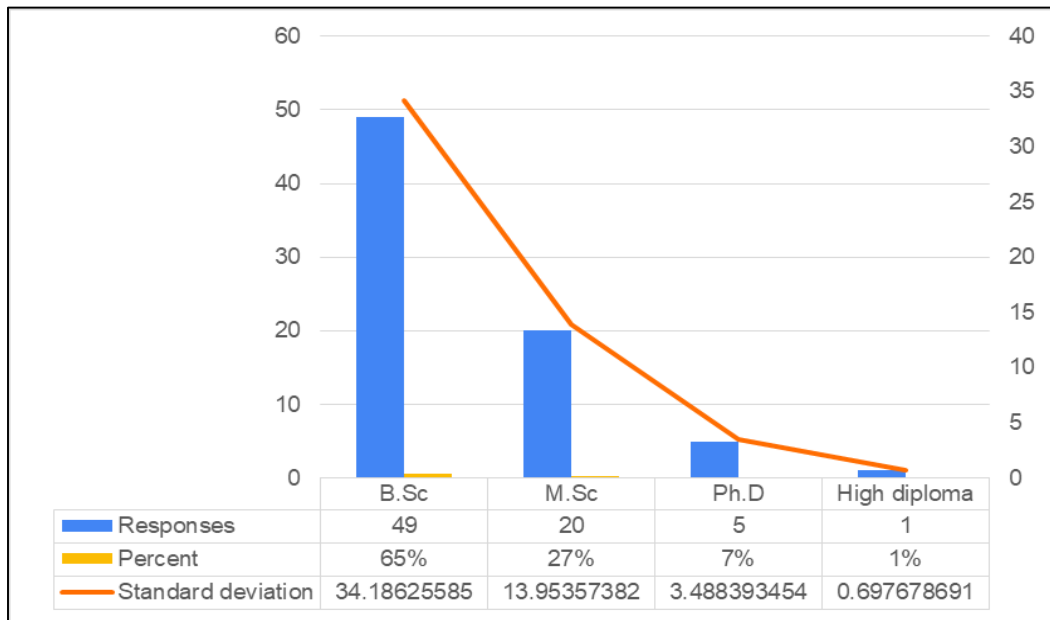


Figure 4.5: Education Level.

The works field shown in Figure 4.6 for the sample type (Construction contracting comes with 73% and Consultancies comes with 27%)

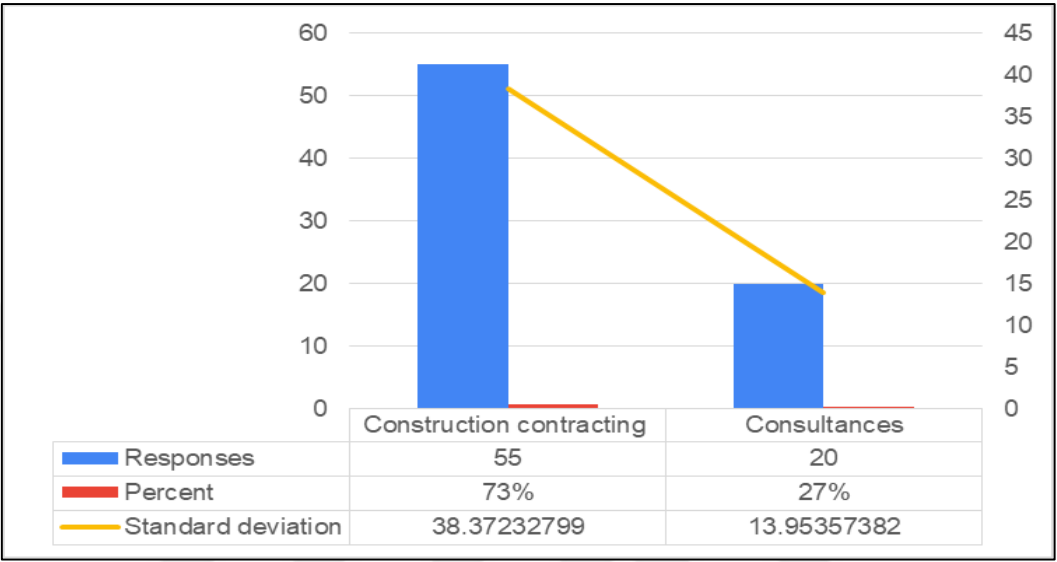


Figure 4.6: Work Field.

The Jobs work in Figure 4.7 below comes with the majority for works in both places office and site comes with 44%, then at the office work comes with 33%, and at the last place is works in site comes with 23%.

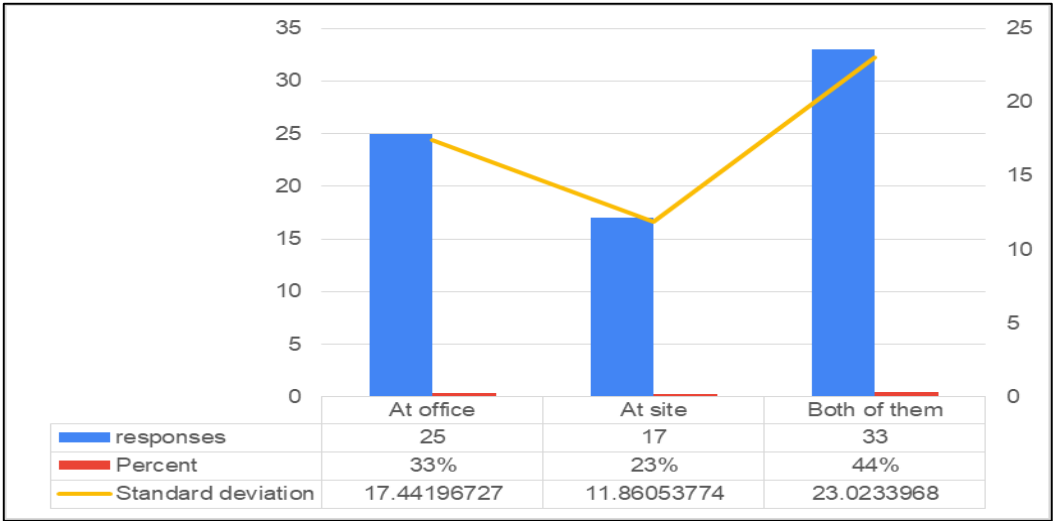


Figure 4.7: Jobs Work.

4.2.3 Contract Engineering Concept

In the third paragraph, you'll find questions on the engineering concept of contracts, which are divided into 18 specialized questions regarding the engineering concept of contracts. As a result of these inquiries, the following conclusions are reached:

The researcher asks, “Is it acceptable for engineers to understand and be familiar with contracts regulating construction projects?” in the questioner and the result come as the following information, Figure 4.8 shows the result.

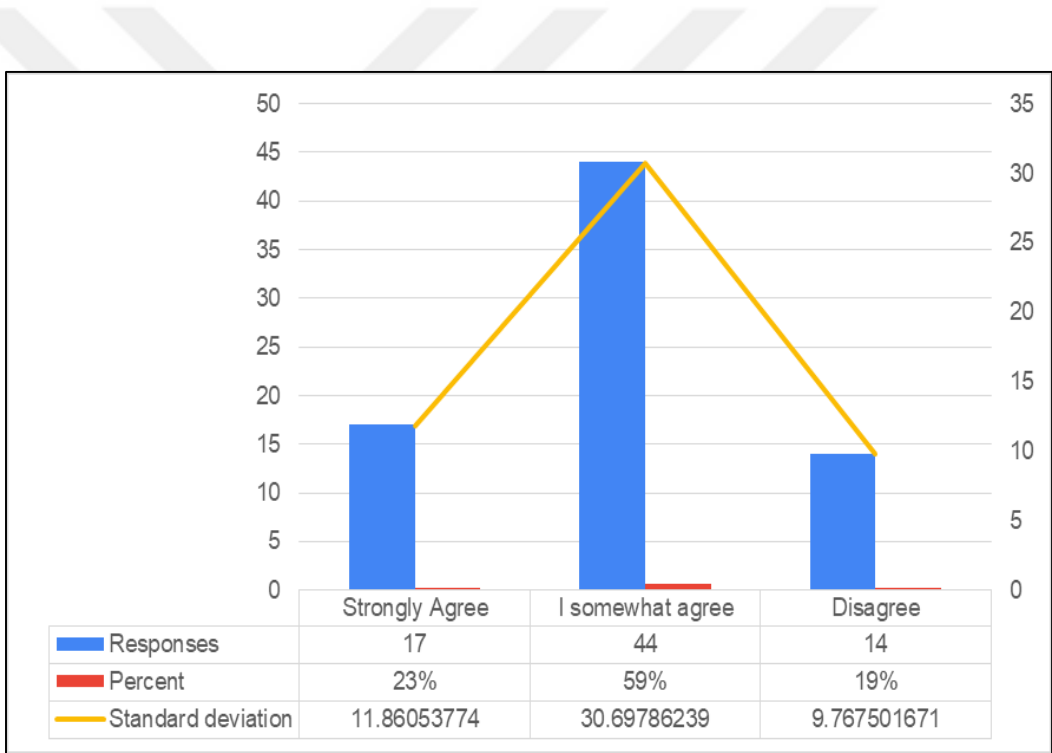


Figure 4.8: Is it permissible for engineers to know and understand construction contracts.

When asks the specialist “Does academic study at Iraqi engineering colleges encompass engineering contracts, laws, and instructions?”, Figure 4.9, the response come at the following data (Strongly Agree 4%, I somewhat agree 24%, at the last Disagree 48%).

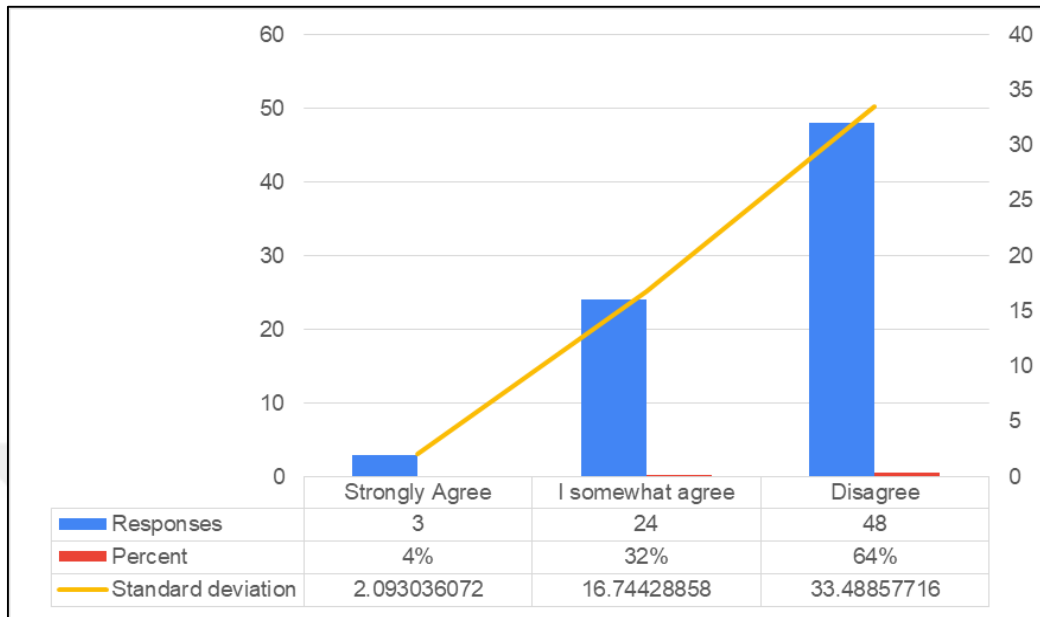


Figure 4.9: Cover the Concept of Engineering Contract.

At Figure 4.10 below, if the responses answer the question “No” for the does this issue have a negative impact on construction projects, the result appears to the figure below where (Max Effect with 73.5%, and Min Effect 25.5%, and No Effect 1%).

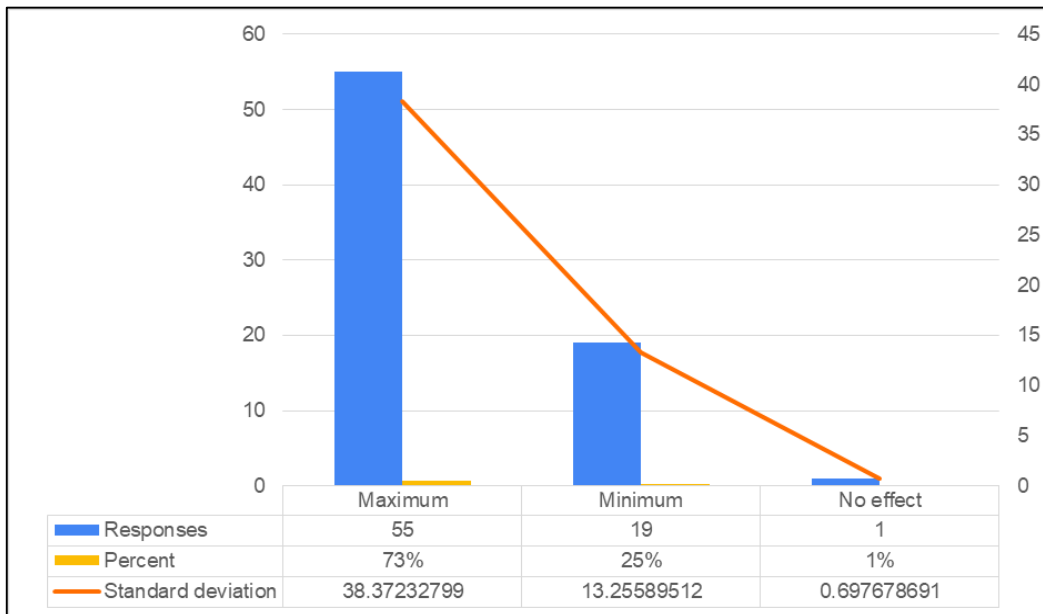


Figure 4.10: does this issue have a negative impact on construction projects.

If the Engineering contract in Keep pace with global contracts, the result come with (Strongly Agree 4%, I somewhat agree 29%, Disagree 67%), as shown in Figure 4.11 below.

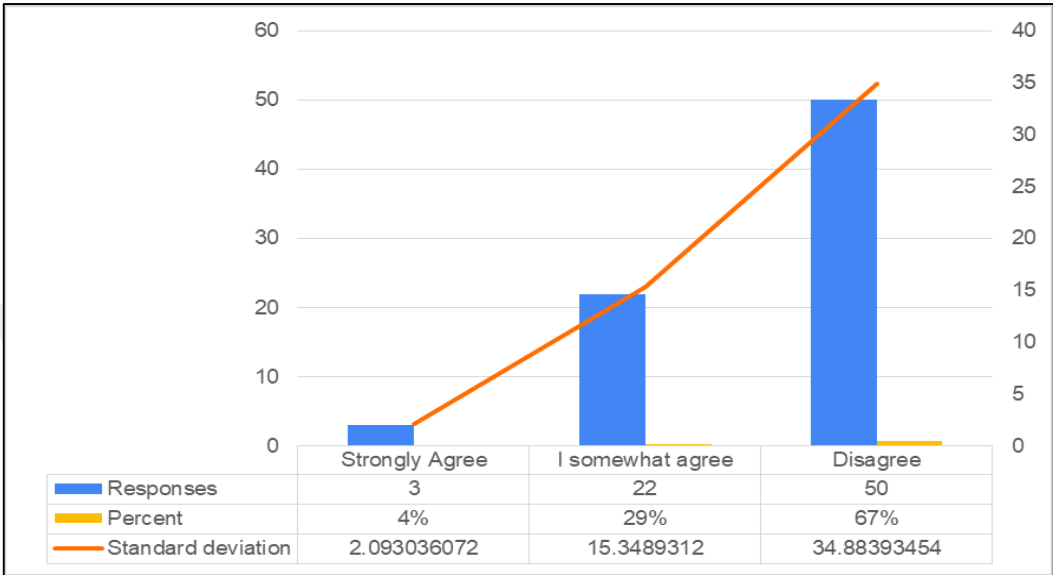


Figure 4.11: Engineering contract in Keep pace with global contracts.

When the expert asked in the questioner “Is it necessary to conclude contracts for small projects (low costs) in Iraq”, the results be as the following (Strongly Agree 46%, I somewhat agree 24%, Disagree 5%), Figure 4.12 shows that values.

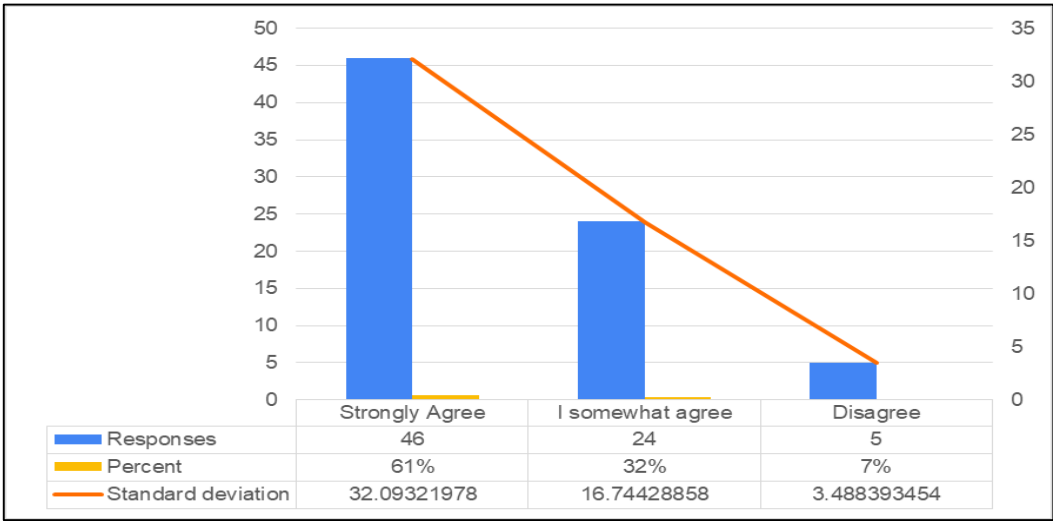


Figure 4.12: Low costs contracts.

When the expert asked in the questioner “Companies should have awareness of the importance of engineering contracts”, the results be as the following (Strongly Agree 96%, I somewhat agree 4%), Figure 4.13 shows that values.

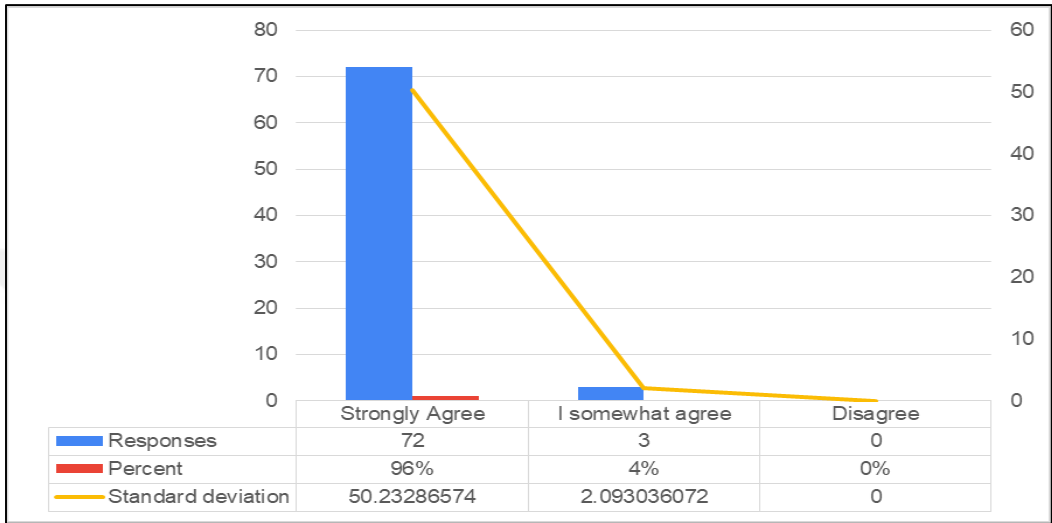


Figure 4.13: Companies should have awareness of the importance of engineering contracts.

If the Legal management plays a major role in the success of construction projects, the result come with (Strongly Agree 77%, I somewhat agree 19%, Disagree 4%), as shown in Figure 4.14 below.

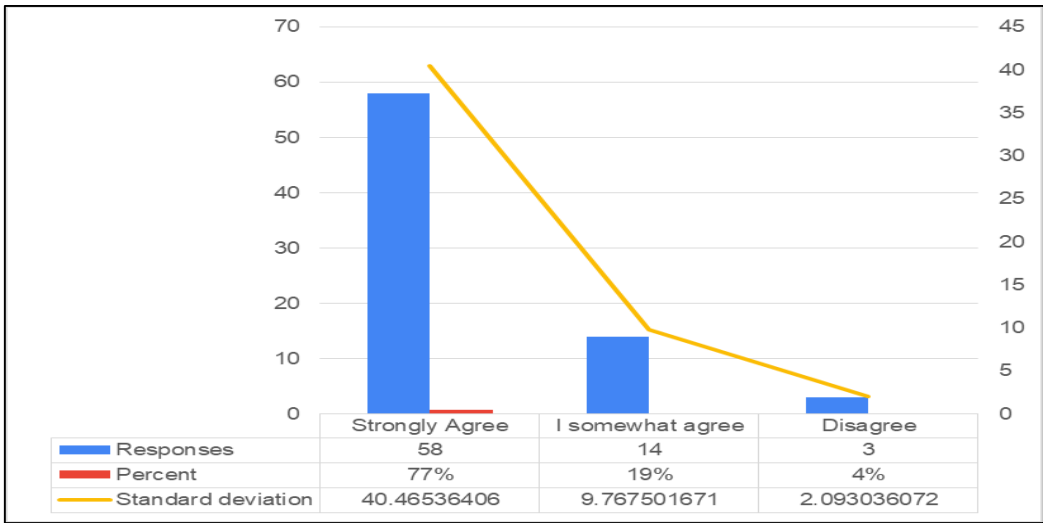


Figure 4.14: Legal Management.

To what extent does non-referral to the legal department affect when drafting engineering contracts? so the result come with (Strongly Agree 81.5%, I somewhat agree 17.5%, Disagree 1%), as shown in Figure 4.15 below.

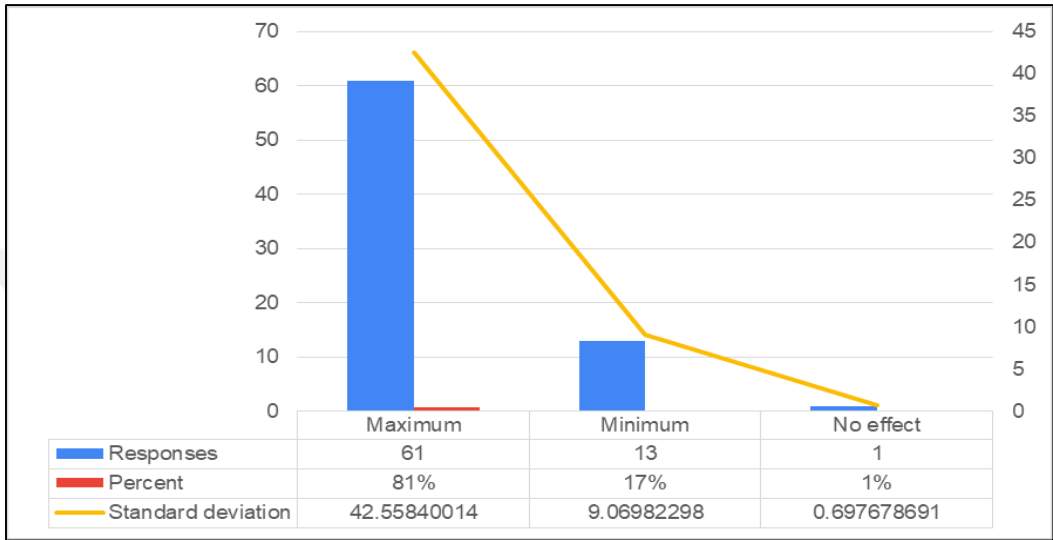


Figure 4.15: Effective when drafting contracts.

If the lack of adequate study of all technical and legal aspects of contracts so the result come with (Strongly Agree 79%, I somewhat agree 21%), as shown in Figure 4.16 below.

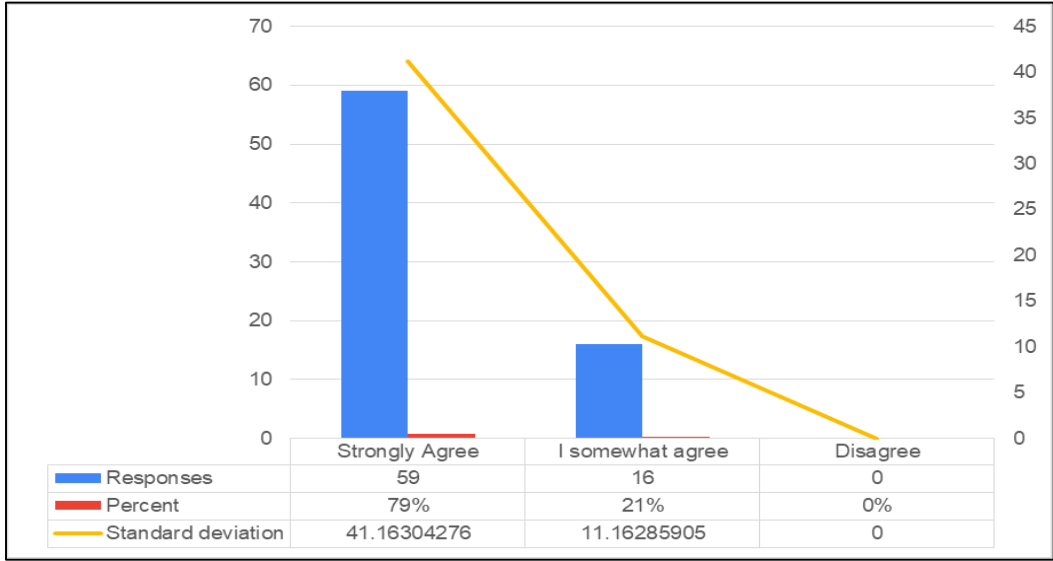


Figure 4.16: The lack of adequate study of all technical and legal aspects of contracts.

Lack of interest in engineering contracts is one of the biggest risks of construction projects is one of the conflict reasons than the result come with (Strongly Agree 80%, I somewhat agree 19%, Disagree 1%), as shown in Figure 4.17.

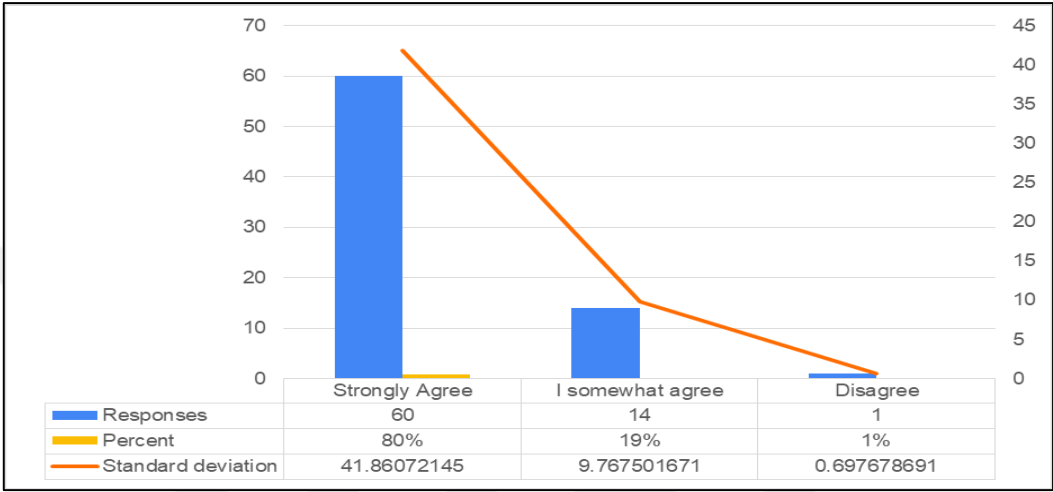


Figure 4.17: Lack of interest in engineering contracts is one of the biggest risks of construction projects.

The general conditions for engineering contracting in Iraq do not keep pace with international conditions, one of the questions in the questioner, Figure 4.18 show the result of the answers as the following (Strongly Agree 35%, I somewhat agree 52%, Disagree 13%).

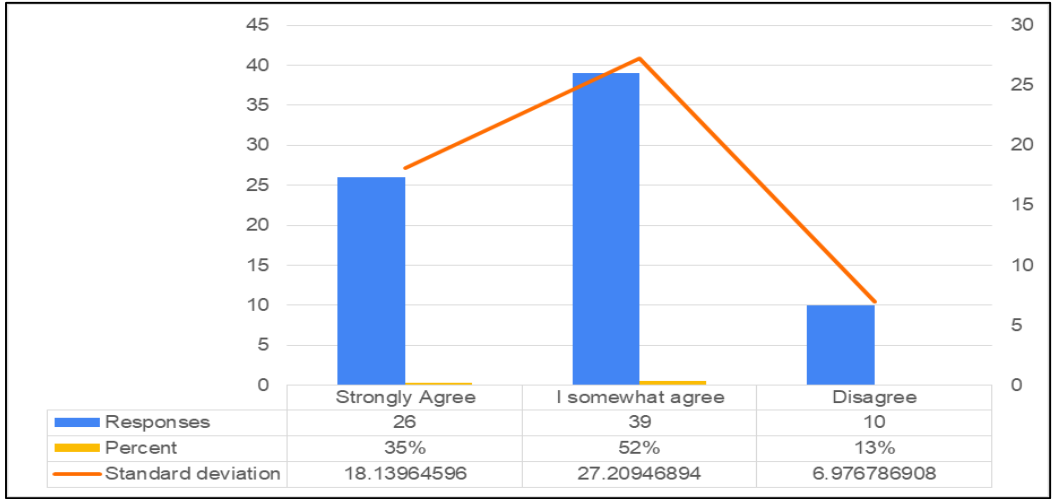


Figure 4.18: The general conditions for engineering contracting in Iraq do not keep pace with international conditions.

The Iraqi contracts, the reference (Iraqi government contracts instructions 35%, General conditions for Engineering contracts 36%, and Standard documents 29%) result shown in the Figure 4.19.

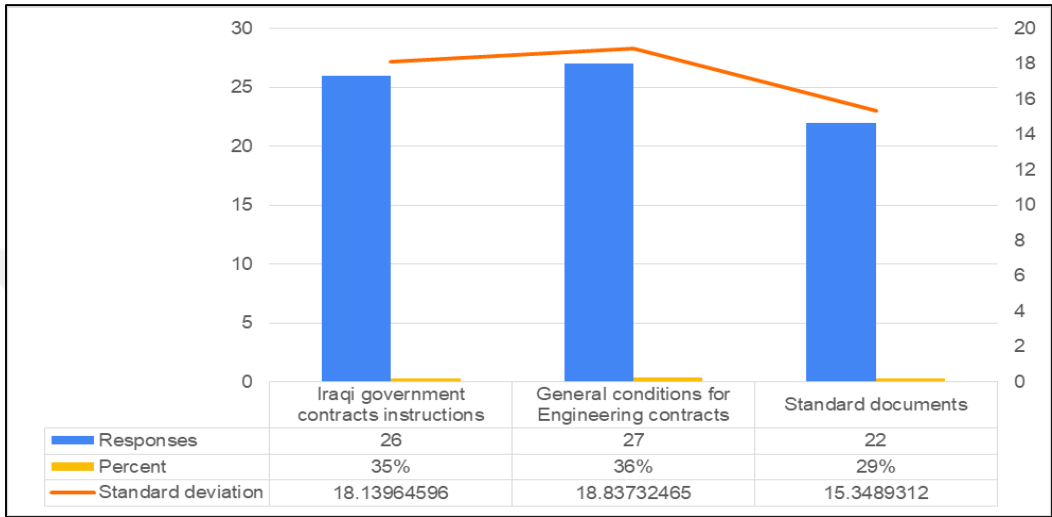


Figure 4.19: The Iraqi contracts, the reference.

When the presence of foreign companies has raised the level of interest in engineering contracts in Iraq the result will be shown in Figure 4.20 with the values (Strongly Agree 51%, I somewhat agree 40%, Disagree 9%).

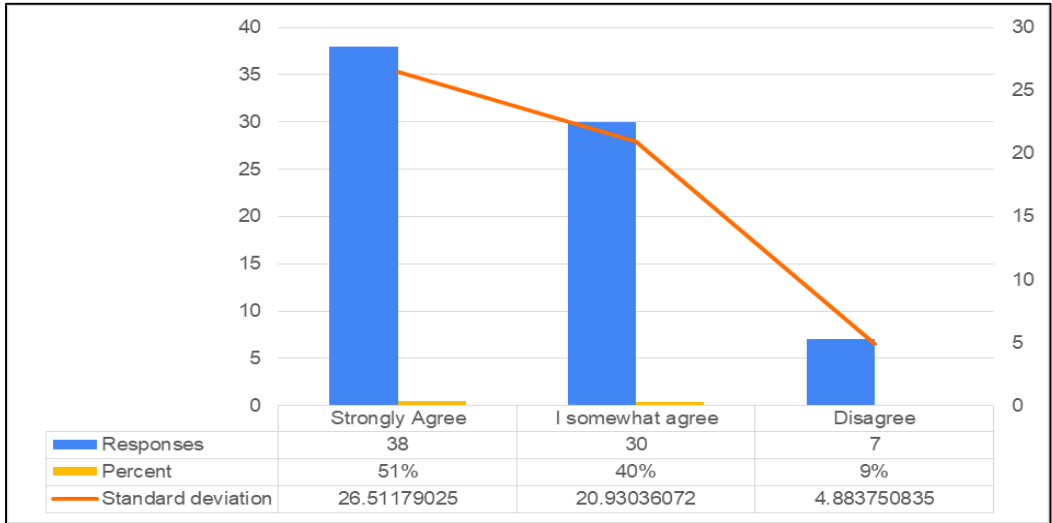


Figure 4.20: A rise in interest in engineering contracts in Iraq due to foreign businesses' presence.

In Figure 4.21, “The general conditions for Iraqi engineering contracting meet the needs of projects?” asks the responses and the result appears in the values (Strongly Agree 13%, I somewhat agree 60%, Disagree 27%).

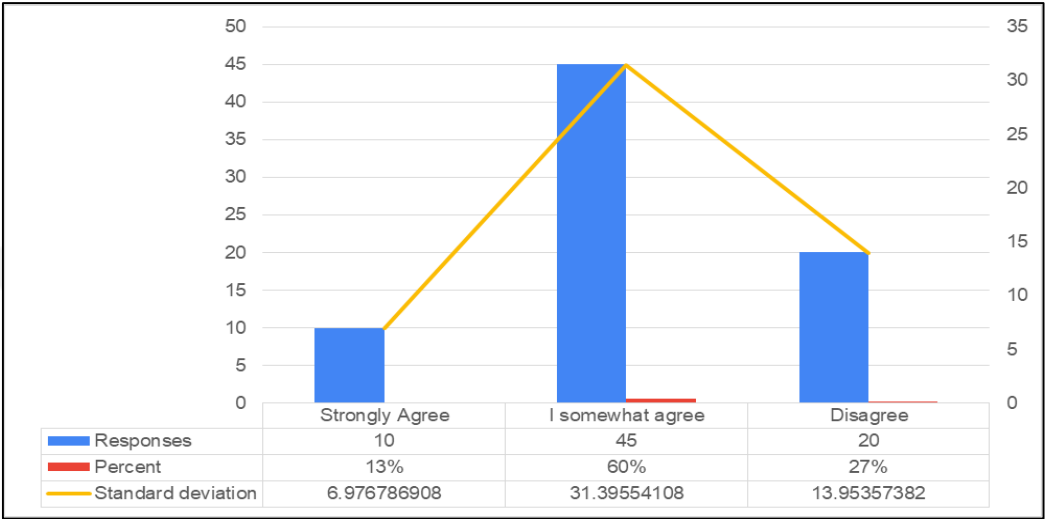


Figure 4.21: Iraqi engineering contracting meet the needs of projects.

The lack of a department dedicated to training workers in engineering companies is one of the main reasons why engineers are not aware of the importance of engineering contracts, so the Figure 4.22 show the values for the answer (Strongly Agree 81%, I somewhat agree 16%, Disagree 3%).

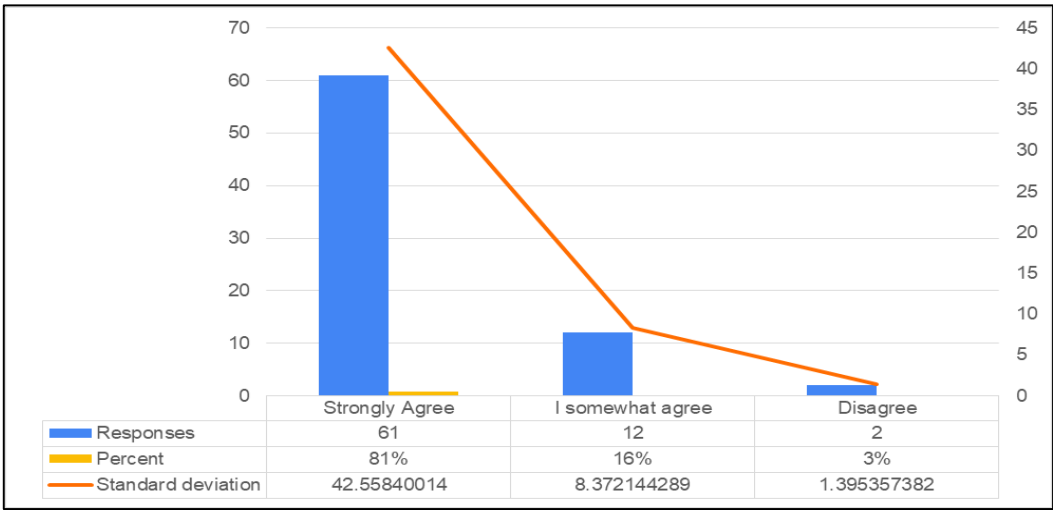


Figure 4.22: The lack of a department dedicated to training workers in engineering companies is one of the main reasons why engineers are not aware of the importance of engineering contracts.

The answers for the question “Engineering associations and unions have a significant impact on educating engineers about the importance of contracts?” (Strongly Agree 59%, I somewhat agree 27%, Disagree 15%), in Figure 4.23 the results shown.

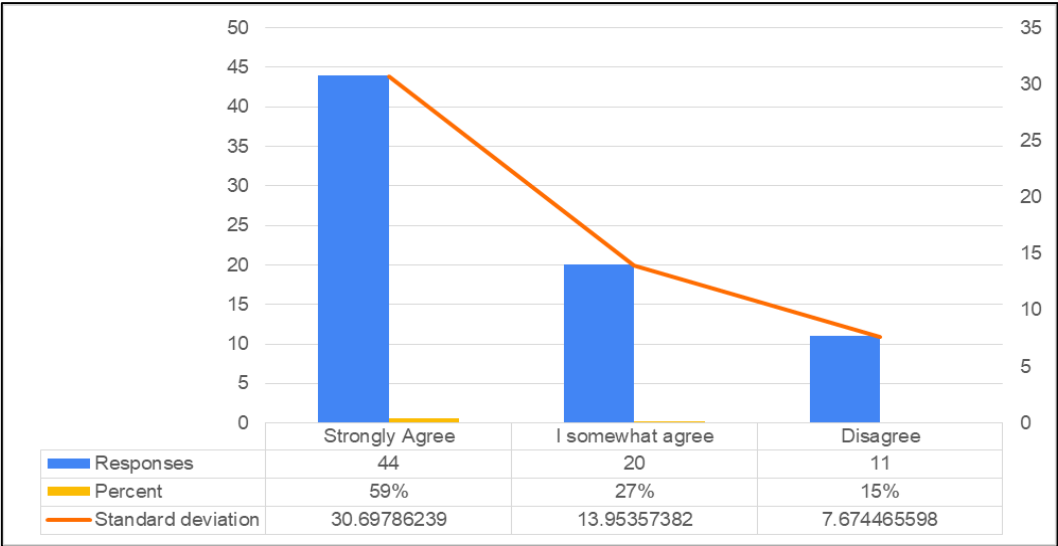


Figure 4.23: Engineering groups and unions educate engineers on the value of contracts.

The Tribal custom has a role in deciding the issue of compensation for injuries in the workplace, not the contract respond as the following answers (Strongly Agree 53%, I somewhat agree 35%, Disagree 12%), in Figure 4.24 the results shown.

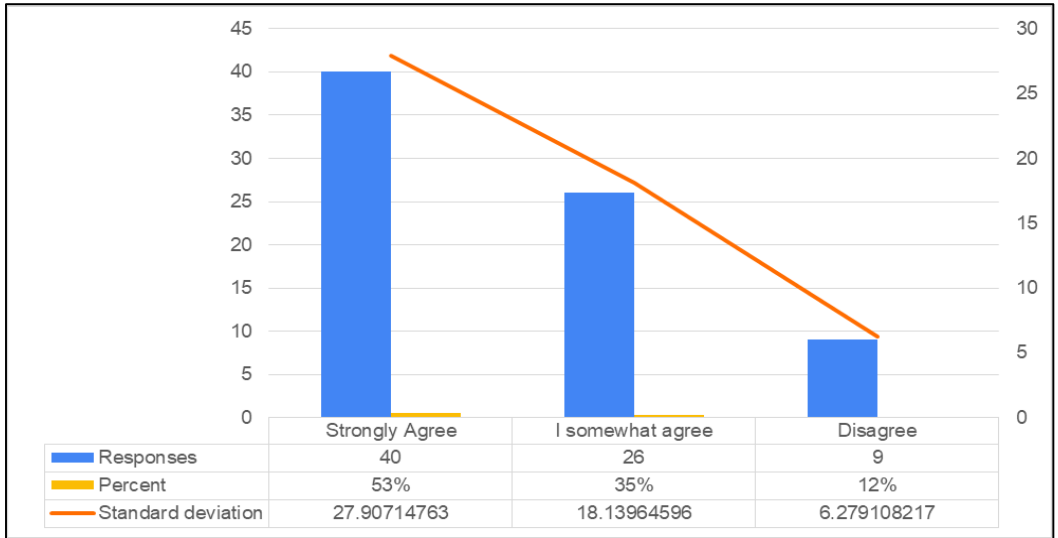


Figure 4.24: Not the contract, but tribal tradition decides on workplace injury compensation.

When the engineer management not paying attention to the security and safety clauses in the project insurance policy is one of the most dangerous risks in engineering projects. Figure 4.25 shows the values that the responses answer as the following values (Strongly Agree 83%, I somewhat agree 17%).

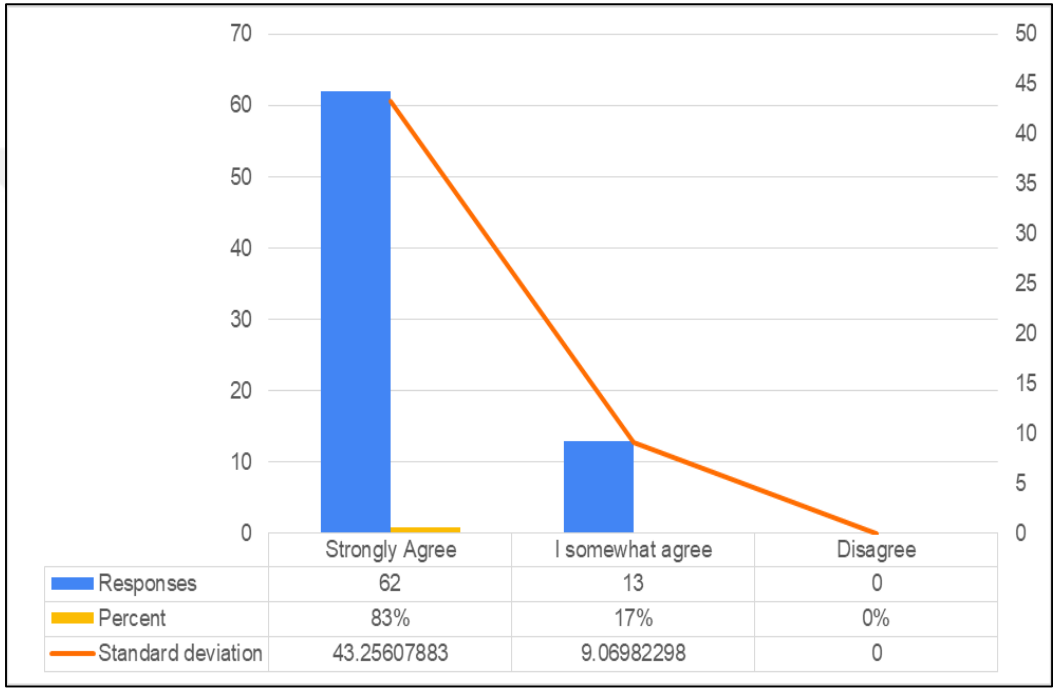


Figure 4.1: Ignoring the project insurance policy's security and safety provisions is one of the most dangerous engineering risks?

4.2.4 Causes of Conflicts

When a contractor and a beneficiary sign an engineering contract, they are creating a legal agreement that describes the rights and obligations of both parties to the contract, as well as the terms and conditions under which they will be carried out. One of the contributing elements to the conflict is a set of five questions directed at the audience with the goal of learning their opinions and learning how to work on actual projects, and the outcome was as follows:

The avoid conflicts the companies should awareness of importance of contracts and that shown in Figure 4.26, where the values (Strongly Agree 96%, Somewhat Agree 4%).

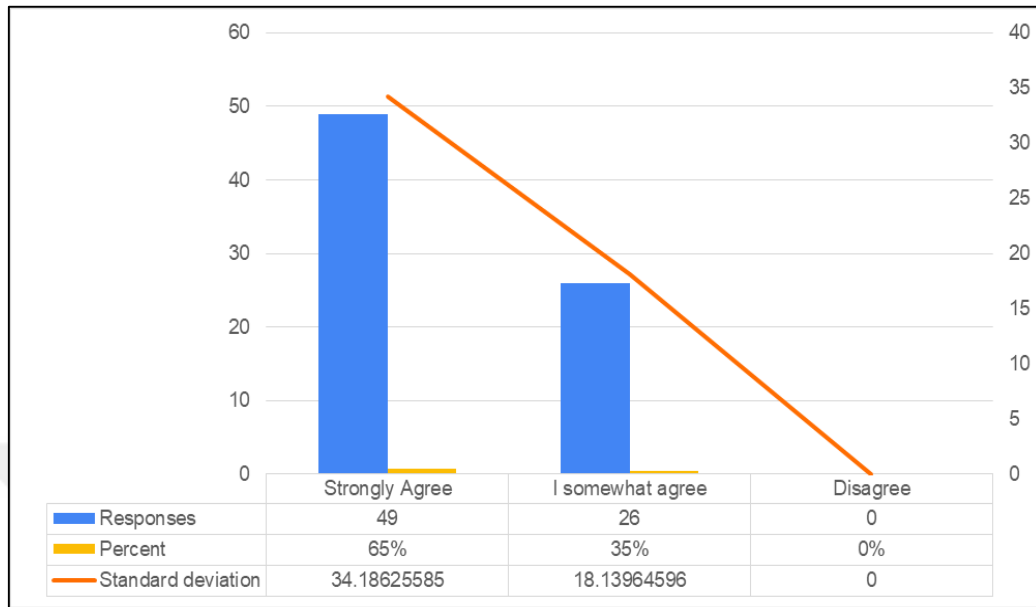


Figure 4.26: Companies and Contracts.

Figure 4.27 below show the values that get in from the questioner, the answers be as the following (Strongly Agree 73%, I somewhat agree 27%).

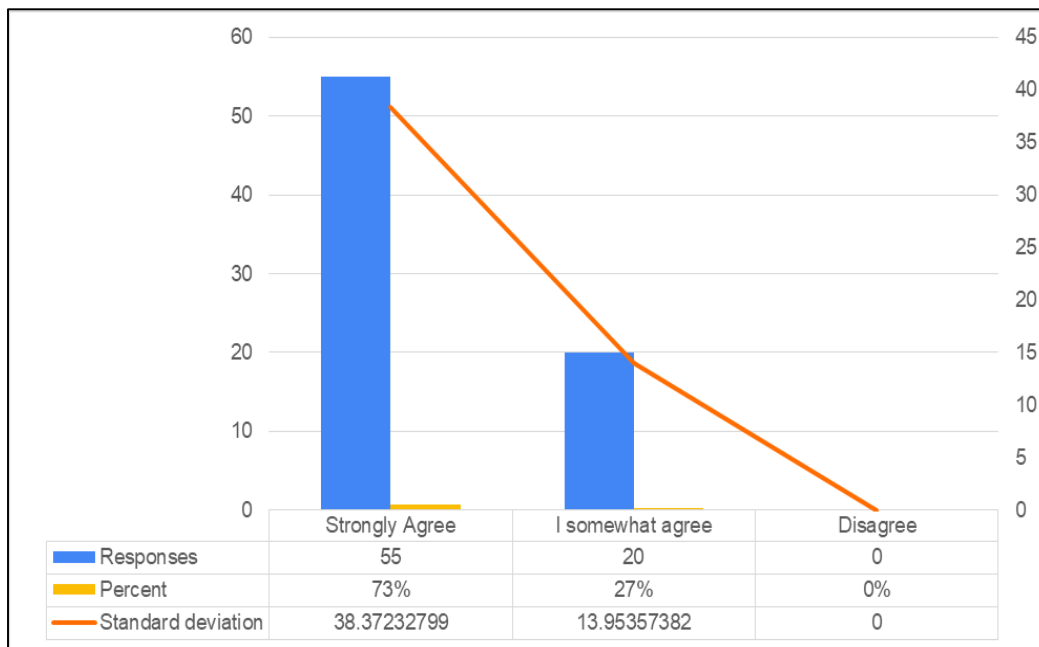


Figure 4.27: Lack of understanding.

The failure of study the terms and clauses of the contract answers (Strongly Agree 73.5%, I somewhat agree 25.5%, Disagree 1%) and shown in the Figure 4.27.

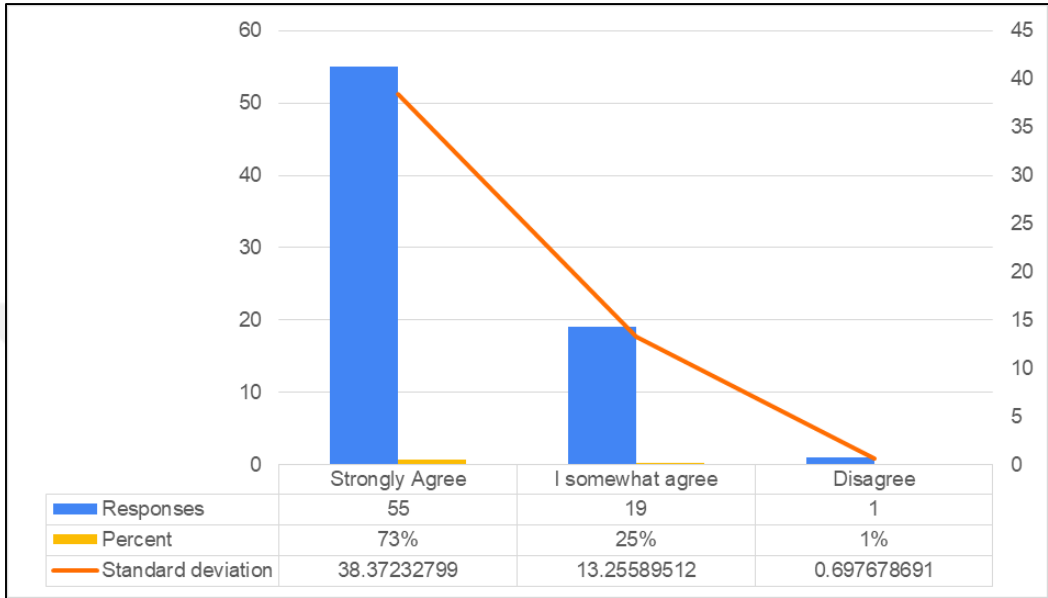


Figure 4.28: Failure to study the terms & clauses of the contract.

The Inexperience of Engineers question answers as the following values (Strongly Agree 73.5%, I somewhat agree 25.5%, Disagree 1%) and shown in the Figure 4.28.

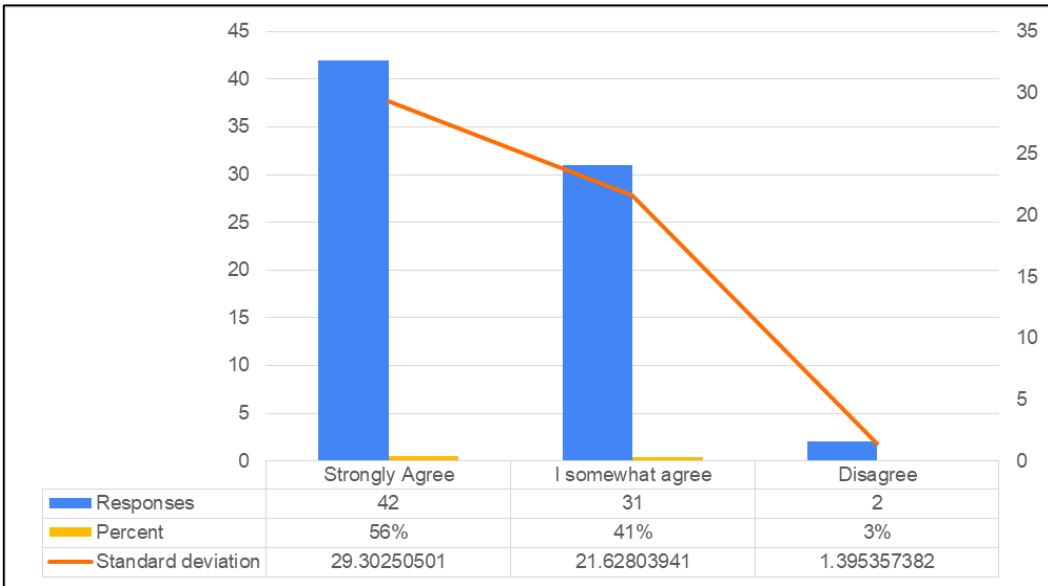


Figure 4.29: Inexperience of Engineers.

The results of failure to comply with the general conditions of engineering contracting with the international conditions shown in Figure 4.29 below and the values appears as (Strongly Agree 60%, I somewhat agree 35 %, Disagree 5%).

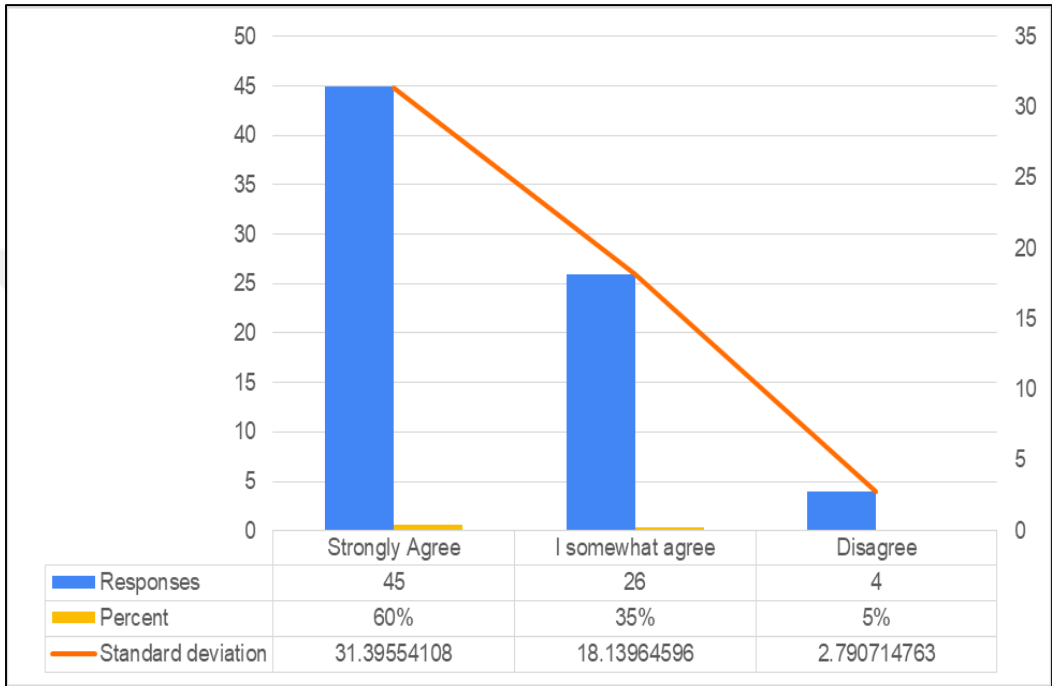


Figure 4.30: Non-compliance with international engineering contracts general conditions.

4.3 SUMMERY

As a result of what appeared in response to the researcher's inquiries through the questionnaire he supplied and the answers that were obtained, the results were encouraging and useful for resolving conflicts emerging from engineering contracts. So, the questionnaire seeks to collect and analyze data related to building project contracts in Iraq by having respondents complete the questions developed for this purpose. As a result, it was chosen because the experts in construction project management who contributed to the answer play an important role in achieving more complete, clear, and accurate findings, as well as overcoming challenges and impediments.

5. CONCLUSION AND FUTURE WORKS

5.1 CONCLUSION

The vast majority of respondents to the poll agreed with the statement that there are a great deal of factors that can make it challenging to draught the construction contract provisions and complete them in the appropriate manner. The following are the most significant of these:

- a) Understanding the role that the Department of Engineers plays in the building industry is a great way to get a glimpse into the future of Iraq's construction sector and how things will develop there.
- b) When drafting the terms of a contract, it is critical to give consideration to both the legal and administrative considerations involved. To do this, legal and administrative personnel should collaborate on the writing of the contract. This contributes to the guarantee that a balanced contractual connection exists between the two parties, which is necessary for the completion of a successful project.
- c) The significance of paying attention to the training of engineers who work for companies and providing them with opportunities to learn how to write construction contracts through both internal and external responsibilities is emphasized here.
- d) People who work in the construction and building industry need to collaborate, and they need to collaborate through their affiliation with engineering societies. These societies provide members with the opportunity to receive assistance from professionals as well as information regarding the challenges that contractors face while working on a project.
- e) When working on smaller projects, it is essential to give careful consideration to the documentation of the contract. Because of this, the project does not experience a significant amount of difficulty. It ensures that the task is completed successfully.

- f) The study of construction contracts and legislation is not emphasised nearly as much as it should be in engineering schools, which is a clear indication that graduates are not highly qualified for the field. It's not good, and it's having a negative impact on this company.

5.2 FUTURE WORKS

People should follow these suggestions after they looked at the data and talked about it in terms of the theoretical framework, their hypotheses, and their research questions.

- i. The need for engineering companies to set up a special department that studies the project plans and all of its documents from public and private specifications, as well as engineering contracts and their requirements. This way, the company can fully understand the project, analyses its data, and figure out its goals.
- ii. In the early stages of a project, it is important to look closely at how the project is described and what the project's needs are. This is often the start of a more detailed and organized study of the project, as well as a discussion of the best ways to carry out and fully implement the agreed terms and specifications for the work agreed upon.
- iii. The need to choose the contractor based on the technical evaluation more than the financial evaluation, because choosing the contractor in an unthoughtful way could make it impossible to complete the work in the right way.
- iv. Excluding companies that offer prices that are much lower than the real cost of the project, because they can't do the project the way the schedules of quantities say it should be done, which means the project will fail and there will be disputes.
- v. The need for a local and standard way to write the contract clauses so that the projects can move forward without any problems.

- vi. A look at his previous and similar projects, as well as an official visit to the company's headquarter, should show that the contractor can do the job without a hitch.
- vii. The main things that affect the accuracy of bid pricing.
- viii. Contractual disputes and how they affect the time it takes to finish a project, as well.
- ix. The steps to follow when writing the contract clauses.



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APPENDIX

QUESTIONNAIRE

A questionnaire form to complete the requirements for obtaining a master's degree in project management in the Department of Civil Engineering.

QUESTIONNAIRE LINK:

https://docs.google.com/forms/d/e/1FAIpQLSfOSv4-0acBGfANIVN_eBeE9XaWerLOm2dHwHMcFF131coShA/viewform

This questionnaire aims to collect and analyze data related to construction project contracts in Iraq by answering the questions prepared for this purpose. Therefore, you have been selected as one of the specialists working in the field of construction project management, and that your contribution to the answer has a major role in reaching more comprehensive and understandable results. And accuracy and solving problems and obstacles.

Note: The information provided by you will remain strictly confidential

I would like to thank you very much for giving your time and interest in answering.

The first axis: general questions

1. Job place

Government Private Mixed sector

2. Experience years

Less than 5 years 5to 10 years 10 to 15 years More than 15 years

3. Age

Less than 30 years 30 to 40 years 40 to 50 years More than 50 years

The second axis:

1. Job

Law Engineering

2. Education level

BSc MSc high diploma PhD

3. Work field

Construction contracting Consultants

The third axis:

1. Job type

At site At office Both of them

2. Is it acceptable for engineers to understand and be familiar with contracts regulating construction projects?

Strongly Agree I somewhat agree Disagree

3. Does the academic study in engineering colleges in Iraq cover the concepts of engineering contracts, laws and instructions related to construction projects?

Strongly Agree I somewhat agree Disagree

4. Does the academic study in engineering colleges in Iraq cover the concepts of engineering contracts, laws and instructions related to construction projects?

Strongly Agree I somewhat agree Disagree

5. If the answer is “no”, does this issue have a negative impact on construction projects?

Maximum Minimum No effect

6. Engineering contracts in Iraq keep pace with global contracts

Strongly Agree I somewhat agree Disagree

7. Is it necessary to conclude contracts for small projects (low costs) in Iraq
- Strongly Agree I somewhat agree Disagree
8. Companies should have awareness of the importance of engineering contracts
- Strongly Agree I somewhat agree Disagree
9. Legal management plays a major role in the success of construction projects
- Strongly Agree I somewhat agree Disagree
10. To what extent does non-referral to the legal department affect when drafting engineering contracts?
- Maximum Minimum No effect
11. One of the reasons for disagreements in projects is the lack of adequate study of all technical and legal aspects of contracts?
- Strongly Agree I somewhat agree Disagree
12. Lack of interest in engineering contracts is one of the biggest risks of construction projects?
- Strongly Agree I somewhat agree Disagree
13. The general conditions for engineering contracting in Iraq do not keep pace with international conditions.?
- Strongly Agree I somewhat agree Disagree
14. in the iraqi contracts, the reference will be :
- General conditions for Engineering contracts
- Iraqi government contracts instructions
- Standard documents

15. The presence of foreign companies has raised the level of interest in engineering contracts in Iraq.?

Strongly Agree I somewhat agree Disagree

16. The general conditions for Iraqi engineering contracting meet the needs of projects?

Strongly Agree I somewhat agree Disagree

17. The lack of a department dedicated to training workers in engineering companies is one of the main reasons why engineers are not aware of the importance of engineering contracts

Strongly Agree I somewhat agree Disagree

18. Engineering associations and unions have a significant impact on educating engineers about the importance of contracts?

Strongly Agree I somewhat agree Disagree

19. Tribal custom has a role in deciding the issue of compensation for injuries in the workplace, not the contract?

Strongly Agree I somewhat agree Disagree

20. Not paying attention to the security and safety clauses in the project insurance policy is one of the most dangerous risks in engineering projects.

Strongly Agree I somewhat agree Disagree

Fourth section:

The engineering contract is a document between the contractor and the beneficiary in which the rights and duties of both parties of the contract and their obligations are specified and when they failed to implement the terms of the contract this may lead to the outbreak of claims leading to disputes, in your opinion what are the reasons leading to disputes

1. Inaccuracy in preparing and regulating engineering contracts

Strongly Agree I somewhat agree Disagree

2. Lack of understanding of bidding and contract documents?

Strongly Agree I somewhat agree Disagree

3. Failure to study the terms and clauses of the contract?

Strongly Agree I somewhat agree Disagree

4. Inexperience of engineers

Strongly Agree I somewhat agree Disagree

5. Failure to comply with the general conditions of engineering contracting with the international conditions?

Strongly Agree I somewhat agree Disagree

Thank you for your time.