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Comparison of AIA and FIDIC Construction Contracts with an equivalent Egyptian contract

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Abstract

Precisely drafting the infrastructure construction contract is a way to ensure the success and continuity of the project without any complications, and through which the rights and duties of each party involved in the project are determined. International standard contract conditions such as FIDIC and AIA contribute significantly to reducing disputes between the parties; yet, due to the absence of a standard construction contract in Egypt, the infrastructure construction industry became more complicated in recent years and contractual commitments are often not carried out in a good faith. This research aims to highlight the major causes of contractual conflicts that may be addressed in infrastructure construction projects and to compare and analyze the Egyptian Construction Contract (ECC), International Federation of Consulting Engineers (FIDIC), and American Institute of Architects (AIA) construction contracts for the clauses that cause disputes in the Egyptian infrastructure construction contract in order to improve, develop, and enhance the ECC as well as overcome the obstacles that hinder the development of infrastructure construction projects, leading to an increase in the chances of achieving basic project success indicators (cost, time, quality, and safety).

Keywords: Disputes, Infrastructure Projects, Comparison, AIA, FIDIC and equivalent Egyptian contract.

I. INTRODUCTION

In order to link the conceptual design and the ability to implement the project, there must be a powerful document linking them. This vital document is the construction contract which is the link between the employer and the contractor and is created by the project consultant [17]. In it, responsibilities and duties are defined between the parties, as well as the Engineer's roles and duties that flow from the contract [16]. Therefore, it is important that all aspects of the project be covered in the terms of a contract, including not only daily administration and supervision, but also the solutions of the project problems when they occur, including ways of remediation for the innocent party [18,34].

While drafting a contract, it is very important to understand the basics aspects that contract specialists and practitioners look at in order to make assessments of their research. Some of the most important elements that each contract must address have been identified within its conditions by [28] as the scope of the project, payment and billing terms, limitation of liability, suspension and termination, and dispute resolution. Scope of the project refers to the scope of the works to be undertaken, which

must be clear and specific, or it may become a cause for conflicts due to the lack of precise identification, and therefore failure to define the obligations well.

Payment terms, billing times, materials, milestones, time to maturity, and failure to schedule payment were clarified by [28]. As explained above, limitation of liability is about determining the amount of damage that the contractor will bear as a result of non-compliance with the terms of the contract. There must be procedures in place to preserve the rights when any suspension or termination of the project occurs. In the event of a bankruptcy of the financing party, a waiver in favor for creditors, a fundamental change of conditions or a change in the materials, these conditions will lead to a suspension or termination [28]. For disputes resolution, the main goal when drafting a contract is to settle disputes and thus avoid reaching litigation and arbitration between the parties.

(Green, 1982) stressed that a construction contract that improves its writing leads to the prevention of claims as it should give the project schedule, workshop drawings, procedures for payment of dues, dealing with delays and any additional work. (Ibbs and Ashley, 1987) and (Haidar, 2011) discussed the impact of each of the principles of risk allocation between the owner and the contractor and the incentives for project success indicators: cost, time, quality, safety, employer satisfaction, and contractor satisfaction.

(Halligan et al., 1987) explained that the drafting of the construction contract does not control the actual cost of the projects borne by both the employer and the contractor, because the methods used to manage the soil problems are the ones that control the cost, and they proposed two methods for dealing with soil problems: 1) That the contractor be submitted within the tender documents, a report explaining the soil condition, 2) Prompt settlement of claims (during project implementation) related to any differences from the delivered report for the contractor.

There are several incentive models, some of which are simple, which is related to the end of the project, and some are related to milestone in the middle of the project. There are also intermediate models. (Jaraied et al., 1995) have provided controls to help select projects whose contracts contain incentives / penalties and how to draft the contract materials at that time to achieve the greatest success in exchange for their use. (Shr and Chen, 2004) discussed the method for determining the value of the incentives granted to the contractor in return for the early completion of the project, because increasing this value leads to

the loss of public money, but its shortage eliminates its effectiveness.

In the event that any problems occur during the implementation of the construction contract, there must be a way to compensate the aggrieved party, and these are the claims. There are reasons for submitting the claims, and (Zack, 1993) highlighted more considerations that lead to the claims. But it will be a cause of disputes if these claims are not evaluated by the parties, and therefore it is important that they exist in the process of drafting the contract because it will reduce the likelihood of encountering related disputes

There is no unified contract used in Egypt but the Egyptian civil law no.131 of 1948 is the governing document for contracting clauses in Egypt. However, the Egyptian Tenders and Auctions Law No.182 of 2018 and its Executive Regulations No.692 of 2019 are the general conditions for the government organizations in general within the civil law. Each government organization chooses the particular conditions of the construction contract appropriate to its projects. The equivalent Egyptian construction contract is based on the general conditions of the Egyptian Ministry of Housing, Utilities and Urban Communities for infrastructure construction projects. The equivalent Egyptian contract will be addressed as the Egyptian construction contract (ECC).

The objectives of this study are: investigating the causes of contractual disputes in the Egyptian infrastructure projects; conducting a comparison between the general conditions clauses of the Red FIDIC 1999, the American Institute for Architects (AIA) A201-1997 and the ECC for the clauses that cause disputes in the infrastructure construction contract. To achieve the above objectives, the remainder of the paper is structured as pointed in Fig. 1. First, is presenting and discussing the merits of using contract. Second, is presenting the evolving of the ECC. Third, is the causes of disputes in Egyptian infrastructure construction contract are reviewed. Then, the comparison between ECC, FIDIC and AIA is carried out. Summary and conclusions are drawn in the last section.

II. THE MERITS OF USING FIDIC AND AIA AS STANDARD FORMS OF CONTRACT

FIDIC is considered a variety of legal and jurisdictions systems that the contract will work on, including both notions and philosophies for common and civil law, which led to its handling of the needs and special requirements of the work [26]. Contracts based on FIDIC conditions are commonly utilized in the Middle East. Not only are they well-known but also have served as the foundation for government standard contract forms in Abu Dhabi, Oman and Saudi Arabia, for example. They are written in a straightforward and easy-to-understand manner [11]. A fairly equitable risk allocation is at the core of FIDIC. The procedural structure for requesting additional time and money and informing claims can also be utilized to address any issues that arise early in the project, allowing the contract and programme to serve as an effective project management tool. FIDIC assigns risk to the party that is best positioned to bear that risk. Ultimately, the contractor is in charge of organizing and carrying out the work, while the employer is in charge

of the site, access to it and unanticipated site risks. The design-risk is borne by the entity that is accountable for the design. To that end, the allocation of risk is relatively balanced. Clause 1.13 of the 1999 Red Book, for example, states: a) both the contractor and the employer are now required to adhere to all applicable legislation; b) the contractor is now obligated to assist the employer in getting permits and other approvals. As for the procedural framework, FIDIC is typically thought to be simple to use, it should lead to more successful project management - at least theoretically. Engineer's decisions and procedural techniques for notifying claims for additional time or money can assist detect and minimize any points for conflict [11]. In the construction sector, the American Institute of Architects (AIA) is the one of the most extensively used standard form contract. AIA facilitates for all parties engaged in the construction process to communicate, making it easier to deliver a high-quality project within time and on budget [3].

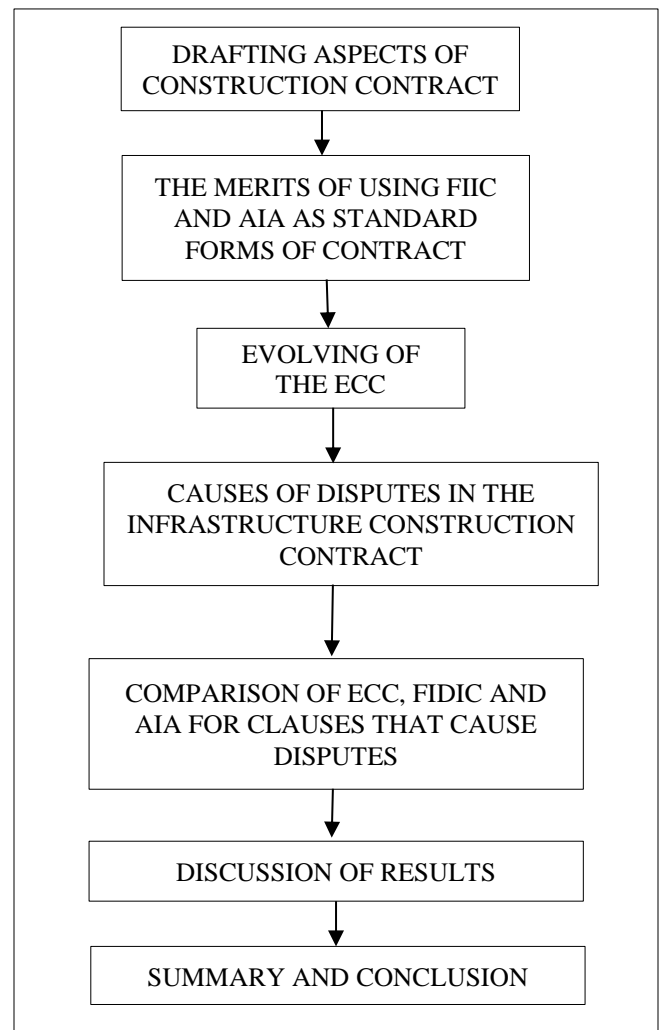


Fig. 1: Flowchart for Methodology and Sequence

The AIA contract documents are standardized forms that are applicable to many construction projects; AIA produces a variety of contracts that could apply in this scenario, depending on

the type of project as the A201 (General Conditions of the Contract for Construction). The most important benefits of AIA documents: 1) AIA considers input from a variety of parties when writing contract documents. They do their best to strip them of confusing language, and use simple, easy-to-understand text. In fact, any contract document will contain sometimes dense legal wording that requires some close consideration, 2) There are several sections of the contract provide space for specific terms that the parties can negotiate together such as retainage rate, bonds or insurance required by the contractor, interest rates on late payments, etc., 3) While the contract does include retainage in its own article, it doesn't set specific retainage percentages. Instead, it provides space for the parties to include their own retainage terms, 4) Article 15 of the AIA A201 sets out the full notice requirements and procedure for handling any disputes or claims on the project. In addition to that, there are also provisions outlining the mediation and arbitration requirements to resolve disputes without having to resort to lawsuits [3].

III. EVOLVING OF ECC

After the Egyptian revolution of July 23, 1952, there was a tendency by the government to issue a law to organize the government tenders. The first Egyptian law regulating tendering and auctions was enacted in 1954 and was known as Law No. 236 [8]. Then, the government issued many amendments to this over the past decades up to the new Law No. 182 of 2018 and its executive regulations. Despite these efforts, there is still no Egyptian standard construction contract. As a result of the absence of any Egyptian standard contract, each government ministry drafts the construction contract to suit the way it works and this leads to the absence of important clauses in the contract and the occurrence of disputes between the parties.

IV. INVESTIGATION OF THE CAUSE OF DISPUTES IN THE EGYPTIAN INFRASTRUCTURE CONSTRUCTION CONTRACT

The cause of contractual disputes in the Egyptian infrastructure project may vary from those in other nations due to the unique character of the Egyptian market in terms of project parties' views and the governmental and business environment. Since the causes of disputes in Table 1 were compiled from global literature, Egyptian professionals scrutinized them to filter and amend the list to make it more suited for Egyptian infrastructure construction contracts. To realize the required objective, structured interviews were held with ten professionals, with experiences ranging from 20 to 42 years. Project manager, consultant, contract administration and academic are among the interviewees' work titles or positions. The interviewees were chosen with the goal of representing as many different perspectives as possible. The list of the causes of disputes that illustrated in Table 1 was reviewed by the professionals and discussed in terms of the impact of the causes of contractual disputes on infrastructure projects in Egypt.

There was consensus among experts in canceling 1) Unfair Risk Allocation, 2) Force Majeure, 3) In the event of a dispute; there is no mechanism for settling it, 4) Fluctuation in prices, 5)

Termination of the contract for convenience of the employer and 5) Disruption of works by the employer. The final list of modified causes of disputes can be seen in Table 2.

V. COMPARISON OF ECC, FIDIC AND AIA FOR CLAUSES THAT CAUSE DISPUTES

The tables below present the comparison of the ten causes of disputes that were identified in Table 2 between the general conditions of Red FIDIC 1999, AIA (A201-1997) and ECC. Table 3 presents a comparison between the three contracts for "Various Interpretations of Contract Conditions". Table 4 presents a comparison between the three contracts for "Conflicting and Ambiguity Information in the Contract Documents". Table 5 presents a comparison between the three contracts for "Different Site Conditions". Table 6 presents a comparison between the three contracts for "Delayed Payment by the employer". Table 7 presents a comparison between the three contracts for "New Legislations". Table 8 presents a comparison between the three contracts for "Insufficient time or money compensation for change orders". Table 9 presents a comparison between the three contracts for "Changing the Executed Quantities from those mentioned in the Bill of Quantities, which leads to a Change in the Project Execution Plan". Table 10 presents a comparison between the three contracts for "Suspension of the Works by the employer". Table 11 presents a comparison between the three contracts for "Breach of Contract by the contractor". Table 12 presents a comparison between the three contracts for "Breach of Contract by the employer". Table 13 presents a comparison between the three contracts for "Acceleration of the Works".

VI. DISCUSSION OF RESULTS

1- From the comparison in Table 3:

- "Interpretation" Clause: Section 2.1 in the ECC is similar to FIDIC sub-clause 1.2 in defining interpretation, clarifying meanings and vocabulary in the contract. However, FIDIC mentions more details about what should be made for any provision that includes agreement, while sections 1.2.3 and 1.3.1 in AIA indicate that the phrases included in the contract documents are generally understood definitions.
- "Law and Language" Clause: The ECC stipulate in section 3.1 that the language and the law governing the contract are included in the particular conditions of the contract. Section 13.1.1 in the AIA only states that the contract is executed in the law according to the country without mentioning any other languages. FIDIC sub-clause 1.24 indicates that the appendix to tender is mentioning the use of more than one language, in the case of multiple languages, and if there is no language stated it should be the same as the communication language.

TABLE 1: Causes of contractual disputes in the infrastructure projects.

No.	Causes of disputes	References
1	Various interpretations of contract conditions	Marzouk et al. [24]
2	Conflicting and ambiguity information in the contract documents	Jergeas and Hartman, [21] ; Kumaraswamy and Yogeswaran [22]
3	Unfair risk allocation	Besaiso et al. [4]
4	In the event of a dispute, there is no mechanism for settling it	Marzouk et al. [24]
5	Force majeure	Besaiso et al. [4]
6	Different site conditions	Jergeas and Hartman [21] ; El-Rasas and Marzouk [9]
7	Delayed payment by the employer	Al-Momani [1]
8	Fluctuation in prices	El-Rasas and Marzouk [9]
9	New legislations	El-Rasas and Marzouk [9]
10	Insufficient time or money compensation for change orders	Semple et al. [29]; Jergeas and Hartman [21] ; Kumaraswamy and Yogeswaran [22]
11	Changing the executed quantities from those mentioned in the bill of quantities, which leads to a change in the project execution plan.	Kumaraswamy and Yogeswaran [22] ; Al-Momani [1]
12	Suspension of the works by the employer	Surahyo [31]
13	Termination of the contract for convenience of the employer	Manuel et al. [25]
14	Disruption of works by the employer	Burr and Castro [6]
15	Breach of contract by each of contract parties	Burton[7]; Perloff [27]
16	Acceleration of the works	Semple et al. [29] ; Jergeas and Hartman [21]

TABLE 2: Modified causes of contractual disputes resulting from experts' interview.

No.	Causes of Disputes
1	Various interpretations of contract conditions.
2	Conflicting and Ambiguity Information in the Contract Documents.
3	Different Site Conditions.
4	Delayed Payment by the employer.
5	New Legislations.
6	Insufficient time or money compensation for change orders.
7	Changing the executed quantities from those mentioned in the bill of quantities, which leads to a change in the project execution plan.
8	Suspension of the Works by the employer.
9	Breach of Contract by each of Contract Parties.
10	Acceleration of the works.

Table 3: Various Interpretations of Contract Conditions

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Interpretation	-Unless otherwise stated in the contract, words express all genders whether singular or plural. If there are provisions that include agreement, it should be in writing as handwritten, typewritten, printed, or electronically made, and resulting in a permanent record. -The marginal words and other headings are indicative. -Sub-clause 1.2	- Unless the parties agree differently, words and phrases included in contract documents are interpreted to have their commonly understood definitions. Through A201, certain words and phrases are defined and capitalized thereafter. - Section 1.2.3, 1.3.1	- Unless otherwise stated in the general conditions, Words indicating the same gender include both genders. The words if singular or plural referring to each other. The titles are not indicative. The Engineer clarifies the meaning of any word that needs explanation in the general conditions. - Section 2.1
Law and language	-The governed law and the ruling language if there is more than one language shall be stated in the Appendix to Tender. -If no language is stated, the language of communication is the language of the contract and shall be stated in the Appendix to Tender. -Sub-clause 1.24.	- The contract is controlled by the law of the country in which the project is taking place. - No mention about the communication language. - Section 13.1.1	-The languages used in the contract are stipulated in the particular conditions, while the law governing the contract is the law of the Arab Republic of Egypt. - Section 3.1

Table 4: Conflicting and Ambiguity Information in the Contract Documents

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Priority of Documents	<ul style="list-style-type: none"> - Contract includes the agreement of the contract, the acceptance letter, the tender letter, the general and particular conditions, the specifications, the drawings, the project schedule, and the moreover documents (if any) which are registered in the agreement of the contract, or in the acceptance letter. - If an inconsistency or dispute in the documentation is discovered, the Engineer should provide any necessary clarification or direction. - Sub-clause 1.1.1.1. 	<ul style="list-style-type: none"> -Contract includes owner-contractor agreement, general and supplementary conditions, drawings, specifications and addenda issued prior to contract execution plus later written modifications. - Shop drawings, product data and samples are not a part of the contract. -No precedence among the contract documents is stated since AIA prefers to leave it to the law and to the custom that specific terms ordinarily take precedence over more generalized ones. -Section 1.1.1.1. 	<ul style="list-style-type: none"> - Contract consists of the following documents, arranged according to the following priority order: the contract agreement, the acceptance letter, reports of the final negotiation, the winning contractor's bid letter, the particular conditions, the general conditions, the requirements of the employer, priced bill of quantities, the technical contractor's bid or any other document mentioned or attached with the documents above. -Section 2.3.

Table 5: Different Site Conditions

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Different Site Conditions	<ul style="list-style-type: none"> - If the contractor incurs delay in the schedule or incurs more costs due to different site conditions, a notice is sent to the Engineer to carry out the inspection and take a decision to determine the extent of the contractor's entitlement, whether for an increase in time or more costs or not. -Sub-clause 4.12 	<ul style="list-style-type: none"> - If the soil site conditions substantially differ from those regarded as underlying in the contract documents' requisites, the contractor shall be entitled to an equitable adjustment in time and price, subject to the architect's approval and written notice before proceeding to execute the Work. - Section 4.3.4 	<ul style="list-style-type: none"> -The contractor shall be entitled to compensation if the soil conditions of the site are fundamentally different from what was supposed to have been before the issuance of the acceptance letter through information issued to bidders, publicly available information and from a visual inspection of the site. -Section 41.1

Table 6: Delayed Payment by the employer

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Payment	<ul style="list-style-type: none"> -The employer is required to pay the contractor: the amounts due, whether interim or final payment after the Engineer approval, within 8 weeks of submitting the contractor payment documents, supplied that the payment currencies are paid as mentioned in the contract. - In the event that the employer is late in paying the contractor's dues for the aforementioned period, the contractor is entitled to receive his financial dues in addition to an annual financing fee of three percentage points above the discount rate of the country's Central Bank. - Sub-clause 14.7, 14.8 	<ul style="list-style-type: none"> -The owner must pay the contractor's dues within a specified period of time in the contract after the Engineer issues the payment certificate. - In case of a delay in the payment of receivables, it shall be charged with interest from the date the payment is due at a rate which the parties may agree in writing or, in the absence of such, at the legal rate prevailing from time to time in the place where the project is located. - Section 9.6.1, 13.6.1 	<ul style="list-style-type: none"> -The employer pays the contractor the amounts approved by the Engineer within 5 weeks from the date of issuance of each invoice. -If the employer delays in paying, the contractor gets the interest due on the late payments with the subsequent payment and the interest is calculated from the date the payments are due to the late payment date according to the prevailing interest rate for commercial lends for each currency in which the payment is made. -Section 40.1, 40.2, 40.3

Table 7: New Legislations

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Adjustments for Changes in Legislation	<ul style="list-style-type: none"> -The price amendment of the contract, whether by raise or reduction shall take into account, in the case of a change in the laws of the country (the introduction of new laws or the cancellation or modification of existing laws), that happens after the base date, which affects the contractor's performance of obligations under the contract. - Sub-clause 13.7 	<ul style="list-style-type: none"> - When bids are received or talks are completed, the contractor must pay sales, use, and similar taxes. The contractor's right to reimbursement for future tax rate changes is implied but not explicitly stated. - Section 3.6.1 	<ul style="list-style-type: none"> -The Engineer adjusts the Contract value if the tax and other fees change within 28 days before the date of bidding and also the date of the last Completion certificate of the Work. The amendment is the change in the amount of tax paid by the contractor, provided that these changes are not actually included in the Contract value. -Section 42.1

Table 8: Insufficient time or money compensation for change orders.

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Variations	<p>- If the contractor is deserved to an extension of the completion time and/or any additional payments, a claim must be submitted within 28 days with supporting details, the contractor must send to the Engineer a fully detailed claim that includes supporting details for the claim and the extension of time and/or additional payment claimed or otherwise, the contractor won't be able to get any compensation. Within 42 days after receiving a claim, the Engineer must respond with approval or disapproval and detailed comments.</p> <p>-Sub-clause 20.1, 8.4.</p>	<p>- If there is cost adjustment, it should base on: (1) unit prices stated in the contract documents and (2) cost determination and a fixed fee or percentage acceptable to both parties. If the contractor does not agree to the method of adjustment in the contract amount, the Engineer will determine the adjustment, if there is an increase in the contract amount; a reasonable portion is allocated for overheads and profits. If there is agreement on adjustments in the cost and the time of the contract, this agreement must be in effect.</p> <p>-Section 7.3.3, 7.3.6, 7.3.8, 7.3.9.</p>	<p>- In the case of Measurement Contract: new price class approved by the Engineer is used as the price class for the change order line in the following cases: (1) if the nature and timing of the work required under the bill of quantities, (2) if the Engineer considers that the timing of the work quantity will exceed the time limit for it (the quantity in excess of 25 percent of the quantity in the bill of quantities) will result in a change in the unit price cost.</p> <p>-Section 37.6.</p>

Table 9: Changing the Executed Quantities from those mentioned in the Bill of Quantities, which leads to a Change in the Project Execution Plan

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Variations	<p>- The Engineer must determine the appropriate price for the item so that it is suitable for the work item based on a change order if: (1) the quantity of the item is changed by more than 10% of the quantity of this item in the bill of quantities,</p>	<p>- If the contract is measurement one, if the agreed quantities are substantially changed in the variations (directive/constructive change orders) such that the application of the prices to the proposed work quantities would significantly inequity to the owner or the contractor, the unit prices shall be adjusted equitably.</p> <p>- Section 4.3.9</p>	<p>- In the case of a Measurement Contract: (1) The final quantity differed from the quantity stated in the BOQ for one item by more than 25% provided that the value of the change exceeds 1% of the value of the contract, the Engineer shall adjust the price category in line with the change in the contractor's cost to allow for the change with,</p>
Variations	<p>(2) This change exceeds the value of 0.01% of the amount contract, (3) this change causes the unit cost of this item to change by more than 1% and (4) this item is not specified in the contract as a "fixed price item". Until the price is agreed, the Engineer sets a temporary price for the temporary payment certificates.</p> <p>- Sub-clause 12.3</p>		<p>(2) In increasing the value of the original contract by more than 25%, the Engineer will not modify the price categories without the prior approval of the employer.</p> <p>- Section 36.1</p>

Table 10: Suspension of the Works by the employer

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Suspension of Work	<p>- If the suspension of work results in the contractor being delayed and/or incurring more costs, the contractor shall be compensated either (i) by extending the time for any such delay or (ii) paying any such cost in addition to a reasonable profit, which shall include it in the contract price.</p> <p>- The contractor shall also be entitled to financial compensation for the materials on the site if the suspension period for more than 28 days or the ownership of the materials became owned by the employer.</p> <p>- If the suspension is more than 84 days, the contractor submits permission to complete the works, and the response is given within 28 days. In the event of non-response by the Engineer, the suspension may be treated as a variation. In the case of continuous suspension, the contractor may terminate the contract.</p> <p>- Sub-clause 8.9, 8.10, 8.11.</p>	<p>- The contractor submits a claim if he believes that there is an additional cost to him as a result of reasons including but not limited to (1) an order from the owner to stop the work where the contractor was not at fault (2) the owner's suspension of the work.</p> <p>- If the contractor makes a claim to increase the time of the contract, the claim must contain a rating of the cost and potential impact of the delay in the progress of the works. If the delay persists, just one claim is required.</p> <p>- Section 4.3.6, 4.3.7.1.</p>	<p>- Subject not addressed.</p>

Table 11: Breach of Contract by the contractor

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Termination by the employer	- The employer can terminate the contract if the contractor does one of the following: (1) became bankrupt or subcontracts the works without the agreement, (2) offered a bribe or reward to people related to the works, (3) did not continue to perform his work according to the contract and (4) fails to follow up and correct actions without an acceptable excuse.	- If the contractor does one of these actions, the owner has the right to terminate the contract: (1) failure to provide qualified manpower, (2) failure to pay subcontractor dues, (3) willful disregard for the law, and (4) a fundamental breach of one of the contract's provisions.	- The employer has the right to withdraw the work from the contractor for a reason related to the contractor's breach of the contract, after giving the contractor written notice for fourteen days. - Violations of the Contractor include: (1) failure to provide the required insurance, (2) is bankrupt, (3) is involved in corrupt practices, (4) reaches the maximum limit of liquidated damage, (5) stop carrying out the work for 28 days without notice and
	- The employer gives a 14-day notice to the contractor, after which the contractor's contract is terminated and handing over the contractor's equipment after completion at the contractor's expense or selling it to pay the remaining dues to the employer. - Sub-clause 15.2	- Following a 7-day notice to the contractor and surety, if any, the owner may terminate the contractor if the architect certifies that there is sufficient cause. After then, the owner has the option of finishing the work at the contractor's expense. The contractor will not be given a second notice or a chance to correct the problem. -Section 14.2.1, 14.2.2	- (6) has failed to repair any defects within (30) thirty days after receiving written notice from the Engineer. - Section 57.1

Table 12: Breach of Contract by the employer

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Termination by the contractor	- The contractor has the right to terminate the contract, after giving 14 days' notice to the employer, if: (1) The Engineer fails to provide a Payment certificate within 56 days, (2) The employer has significantly failed to perform its responsibilities under the contract, (3) If the employer becomes bankrupt or insolvent, (4) Affects prolonged suspension of entire works (5) don't receive the payment due under the temporary payment. - The contractor's decision to revoke the contract does not affect his other rights. - Sub-clause 16.2	- The contract may be terminated by the contractor, upon written notice of 7 days, if the work is interrupted for various reasons not attributable to the contractor's fault for 30 consecutive days or, the work has discontinued entirely for 120 days in any 365 days. - Owner inability to make regular payments or provide sufficient evidence of appropriate project financing is among the reasons. For a 60-day work stoppage due to owner default, contract termination is also allowed. The contractor is granted indemnification for the work performed, as well as fair overhead, profit, and damages. -Section 14.1.1, 14.1.2, 14.1.3	- The contractor may terminate the contract in cases of breach by the employer of one of the following provisions of the contract: (1) the employer becomes bankrupt the exception that the liquidation is for the purpose of restructuring or merger, (2) conditions of Force Majeure, (3) The Engineer issues his instructions to delay the execution without justification or withdraw those instructions within 28 days and (4) The employer refrains from paying any payment within 84 days from the date of issuing the Engineer certificate. - Section 56.2

Table 13: Acceleration of the Works

Comparison	Red FIDIC 1999	AIA-A201-1997	ECC
Rate of progress	- If (1) the actual works progression is too overdue, or (2) the progress has regressed (or will regress) from the existing programme, the Engineer may require the contractor to submit a revised program and a supporting report describing the revised methods the contractor proposes to adopt in order to expedite and complete progress within the time achievement. - The contractor shall adopt the modified methods to expedite the works and shall be at his own expense and compensate the employer for any additional costs in addition to the delay compensation (if any). - The contractor may submit a proposal to the Engineer: (i) expedite completion, (ii) reduce the cost to the employer of execute, maintain, or operate the works, (iii) improve the efficiency or value to the employer of the	- Subject not addressed.	- If the employer wants to accelerate and finish the execution of the works before the completion date, the Engineer gets from the contractor a quotation to conduct the necessary expediting process. -If the employer agrees with the contractor's quotations regarding acceleration, those offers are included in the contract price and dealt with as a change order with amending the scheduled completion date due to the acceleration. - Section 27.1, 27.2

	work performed, (iv) otherwise be of interest to the employer. - The proposal is at the expense of the contractor. - Sub-clause 8.6, 13.2		
Bonus to due Progress Acceleration	- Subject not addressed.	- Subject not addressed.	- The contractor will be paid a bonus calculated according to the price stipulated in the Particular conditions for each day which the works are completed earlier than the scheduled completion date. - The Engineer certifies the completion of the works despite not having reached the completion date according to the scheduled date. - Section 47.1

- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: The writing of the terms must be clarified according to the general and the particular conditions, taking into account not to write general and vague words that lead to misinterpreting them, such as “everything is included” and “according to the specifications”.

From the comparison in Table 4:

- “Priority of Documents” Clause: In section 2.3 of the ECC, there is an alignment in arranging the order of precedence in the contract documents with FIDIC sub-clause 1.1.1.1. However, section 1.1.1 of the AIA does not include any information about the arrangement of documents within the contract and the priority for each document and only states that the priority of documents is according to the law, while FIDIC states that the Engineer should provide any necessary clarification in the event of a conflict in the arrangement of documents.
- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: a necessary and required clarification by the Engineer for the priority of the documents clause as stipulated in FIDIC.

From the comparison in Table 5:

- “Different Site Conditions” Clause: Section 41.1 of the ECC indicates that the contractor shall be entitled to compensation if the site conditions differ substantially from the information provided to the contractor prior to the issuance of the acceptance letter. Section 4.3.4 of AIA and sub-clause 4.12 of FIDIC mention that the contractor should send a notification to the Engineer to clarify the difference in the site conditions, mention the Engineer's reviewing the data submitted by the contractor and determining the compensation value, whether time or financial. However, the same AIA section states the period for sending the contractor a notification to the Engineer.
- AIA mentions that the different site conditions are conditions that are fundamentally different from contract documents or generally differ from what is generally recognized in construction activities, while FIDIC indicates that the different site conditions are natural physical conditions,

man-made obstructions, and pollutants, including subsurface and hydrological conditions without counting climatic conditions.

- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: the contractor shall not bear any responsibility for the different conditions of the soil, and he shall have the right to submit claims for compensation as a result of the problems associated with that in the different site condition clause as clarified in FIDIC and AIA.

From the comparison in Table 6:

- “Payment” Clause: For the payment, FIDIC sub-clause 14.7 indicates that the employer must pay the contractor's financial dues from the contractor's submission of payment documents, review, and approval by the Engineer within eight weeks, while the time period in section 40.1 of the ECC is five weeks, but the AIA section 9.6.1 states that the time period for payment will be determined by the contract.
- “Payment” Clause: For the delayed payment, sections 40.2, 40.3 of the ECC state the interest rate owed on the amount of the invoice in the event of late payment according to the prevailing interest rate for commercial lends. In AIA section 9.6.1, it states that the contractor will be compensated for the delay with a rate mentioned in the contract or with the legal rate prevailing in the project place, while sub-clause 14.8 in the FIDIC indicates a constant rate that the contractor should gain for his delayed dues in currencies that constitute the value of the contract.
- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: The contractor shall submit a financial claim for the delay period according to the interest rate for lending according to the rate of the Central Bank.

From the comparison in Table 7:

- “Adjustments for Changes in Legislation” Clause: In sub-clause 13.7 of FIDIC, it indicates that the prices should be adjusted (increase or decrease) in the event of amending the laws after the start of the project, while section 3.6.1 in AIA implicitly stipulates the contractor's right to compensation as a result of the increase in taxes, Section 42.1 of the ECC indicates that the Engineer must adjust the prices if the tax

changes before the submission of the bid and at the date of the last certificate of completion of the work which affects the performance of the contractor and its commitment to the project.

- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: The contractor shall receive his dues according to the actual cost in addition to the profit margin agreed upon before the start of the project for the new works related to any new legislation.

From the comparison in Table 8:

- “Variations” Clause: FIDIC sub-clauses 20.1 and 8.4 indicate that the contractor must submit a claim to the Engineer stating the extent of his entitlement to extend the time or additional cost with the details supporting the change orders within 28 days, otherwise the contractor will not become eligible for compensation. AIA sections 7.3.3, 7.3.6, 7.3.8, and 7.3.9 indicate that in the case of financial compensation to the contractor, the compensation must be based on the prices stipulated in the contract and that the amendment shall be satisfactory to both parties; in the case of temporal compensation, the Engineer must extend the time for the critical path that was delayed due to change orders according to section 8.3.1. Sections 26.1 and 26.2 of the ECC indicate that if the contractor will expose to a delay in time due to the change order, which led to the impossibility of executing the works on time and the contractor incurring additional costs, the employer must compensate the contractor within 21 days of submitting a claim for compensation, and in the event of the contractor’s delay in submitting the notice, the delay is not taken into account when calculating the amendments.
- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: The contractor shall receive an extension of time for the additional works that the Engineer agrees to have an impact on the critical path of the project schedule.

From the comparison in Table 9:

- “Evaluation” Clause: Section 36.1 of the ECC indicates that the Engineer must amend the price categories if the quantities change if they exceed 25%, provided that the change value exceeds 1% of the contract value, but the Engineer needs prior approval from the employer to adjust the prices in case the contract value increases by more than 25%. AIA section 4.3.9 indicates that the contract price must be adjusted in case of changing the quantities and the price adjustment is fair to the parties, while sub-clause 12.3 in FIDIC indicates that the Engineer must adopt the new prices in the categories of variable quantities if the quantity of the item changes by more than 10% of the percentage of the main item, and this change exceeds the value of 0.01% of the contract amount, and this change causes a change in the unit cost of this item by more than 1%, and this clause is not specified in the contract as a “fixed price component”.

- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC section: The Engineer estimates the execution time of quantities that exceed what is stated in the bill of quantities and determines their impact on the project duration and compensates the contractor if necessary. The same principle shall also be applied if the quantities of works mentioned in the schedule of quantities are cancelled or decreased.

From the comparison in Table 10:

- “Suspension of Work” Clause: FIDIC sub-clause 8.9 indicates that in the event of a suspension by the employer, he must compensate the contractor either by increasing the project time or adjusting the cost in addition to a reasonable profit with the inclusion of these amendments in the contract, provided that the Engineer determines what is owed to the contractor, while FIDIC sub-clauses 8.10 and 8.11 indicate that the compensation of material stored on the site if the suspension period is more than 28 days and the status of works continuity after prolonged suspension. Sections 4.3.6 and 4.3.7.1 of the AIA refer to the contractor submitting a claim for additional costs if the employer suspends the works, and if there is a claim to increase the time, cost, and the effect of the delay on the progress of the works must be clarified, while the Egyptian general conditions do not include any information regarding the suspension of works by the employer.
- It is recommended to add a provision to the Egyptian construction contract that allows the contractor to remedy his loss according to Suspension of the works by the employer, as discussed in FIDIC sub- and AIA.

From the comparison in Table 11:

- “Termination by the employer” Clause: Section 57.1 of the ECC agrees with FIDIC sub-clause 15.2 on the period required (14 days) to notify the contractor of the termination of the contract, while Section 14.2.2 of the AIA indicates that the period for notifying the contractor is 7 days. The same section in the Egyptian general conditions and FIDIC referred to several reasons that led to a breach of contract, including the bankruptcy of the contractor or involvement in corrupt practices, while section 14.2.1 of the AIA indicates that deliberately ignoring the law is one of the reasons that leads to a breach of contract.
- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to use the ECC section as mentioned.

From the comparison in Table 12:

- “Termination by the contractor” Clause: Sub-clause 16.2 of the FIDIC indicates the period for the contractor to send a notice to the employer of the termination of the contract, which is 14 days, while AIA section 14.1.3 clarifies that this period is 7 days. However, Section 56.2 of the ECC does not indicate the period for sending this notice. The three contracts agree to indicate that one of the reasons for

the termination of the contract is the employer's becoming bankrupt or insolvent, or the failure of the Engineer to abide by the contract. Sub-clause 16.2 of the FIDIC and AIA sections 14.1.1 and 14.1.2 indicate that the contractor should be compensated for the work performed, in addition to fair overheads, profits, and damages.

- As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to use the ECC section as mentioned.
- 2- From the comparison in Table 13:
- “Rate of progress” Clause: FIDIC sub-clauses 8.6 and 13.2 indicate that in the case of accelerating the works as a result of a delay in the schedule or the progress of the works is very slow, the contractor submits a revised programme approved by the Engineer to expedite and complete the works within the specified time, while sections 27.1 and 27.2 of the Egyptian general conditions indicate the employer’s desire to speed up the works in order to complete them before the specified completion time, and thus the Engineer gets from the contractor, offers to accelerate the work, and in the event of approval of the prices, the contract price is modified and it is considered as a change order. AIA does not mention any data for accelerating the works.
 - “Bonus to due Progress Acceleration” Clause: Section 47.1 of the Egyptian general conditions indicates that the contractor obtains a reward because of accelerating the works and completing them before the specified date and it is stipulated in the contract for each day on which the works are completed before the specified completion date.
 - As discussed in the comparison between ECC, FIDIC and AIA, it is recommended to propose an amendment to the ECC: Obligating the contractor to submit a revised program in order to expedite progress and complete it within the time specified for completion if the actual works progression is too overdue for rate of progress clause as clarified in FIDIC.

VII. SUMMARY AND CONCLUSION

When drafting a construction contract, it is necessary to pay attention to the considerations in the contract for identifying accurate definitions of employers’ and contractors’ roles and responsibilities, which are the causes of disputes between the parties. International standard contract conditions such as FIDIC and AIA construction contracts were chosen to compare the ECC with them because they are among the most familiar contracts that have been used in many projects worldwide, many owners and contractors were satisfied with these standard contracts and contribute significantly to reducing disputes between the parties. This research investigates the causes of disputes in the Egyptian infrastructure construction contract. Then, interviews with experts in the field of infrastructure projects are carried out to determine the impact of these causes. This is followed by a comparison of ECC, FIDIC and AIA construction contracts in order to evaluate and recommend improvements for the clauses that cause disputes in the Egyptian infrastructure construction contract by exhibiting the advantages of the FIDIC and

AIA which can be added to the ECC that can be comprehensive for all parties in the construction industry and help to reduce disputes between the parties.

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