

## Application of BIM Technology in Passive Buildings

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### Abstract

**FIDIC contract is the standard contract and execution basis in the international civil engineering field. The FIDIC contract conditions are widely used in international projects, and the project claim always runs through the whole project process, which is of great significance to the project cost and risk control. Therefore, it is an effective means to control the project risk and improve the international competitiveness of enterprises to strengthen the claim management and do a good job in each project claim. By comparing the current situation of the FIDIC contract claim at home and abroad, and combining the causes of the project claim under the FIDIC contract and the corresponding claim procedure, this paper makes a multi-aspect analysis of the contract claim under the FIDIC contract.**

### Keywords

**FIDIC Contract; Claim; Engineering Claim.**

### 1. Introduction

Driven by the belt and Road Initiative, China's construction contractors have gone abroad to undertake more and more foreign exchange and financing projects. As the standard contract conditions established by the International Federation of Consulting Engineers, FIDIC contract is an important basis for civil engineering construction projects around the world. At the same time, construction contracting enterprises in China also need to have a full understanding of FIDIC contract management and have a full understanding and application of the related work of change claims when executing international projects, so as to ensure that the interests of enterprises are not harmed. With the increasingly fierce competition in the construction market at home and abroad, "winning the bid by low price, profit by claim" has become the best choice for construction contractors.

The FIDIC contract is fair in stipulating the rights and obligations of both parties, and it is also a means and weapon to protect their own legitimate interests when both parties fail to meet the conditions of each other's interests, which is the emergence of claims. A good command of the terms of the contract and the proper use of the claim method and procedure will make the change of the claim valid.

### 2. General situation of FIDIC

FIDIC is the French abbreviation for International Federation of Consulting Engineers. Founded in 1913 by independent consulting engineers association of Belgium, France and Switzerland. FIDIC is the most authoritative organization of consulting engineers. More than 70 countries and regions have become members of FIDIC, representing more than 1 million consulting engineers around the world. China Engineering Consulting Association formally joined the organization in 1996 on behalf of China. FIDIC has effectively promoted the development of global engineering consulting service industry towards high quality and high level. The FIDIC contract model has gradually become the main contract model followed by the world and has been widely used in the international engineering community. Nature, according to the contract FIDIC contract model of publishing includes two categories: one is the engineering contracts, which is used in between the employer and the contractor and contract model between the contractor and the subcontractor, another kind is engineering consulting service contract is mainly used for consultancy services, and between the employer and consultancy services, consulting services agreement or cooperation agreement. The contract

conditions prepared by FIDIC are formulated on the basis of summarizing the experience in various aspects of international project management and are regularly revised and improved.

A complete FIDIC construction contract consists of three main parts, agreement, General Terms and Special Terms, and three annexes. The Agreement is the first part of the FIDIC contract and the general programmatic legal document of the construction contract. The contract will be established once signed and sealed by the employer and the contractor. The general terms are the second part of the contract, also known as the general conditions, which are the fixed part of the contract. It is the summary of the experience of the construction project contracting industry for many years. Therefore, the full text of the general terms is not changed when used. The third part of THE FIDIC Contract is special Terms, which supplement and refine the general terms and is specific to specific projects, reflecting the specific treatment of specific situations. The combination of general conditions and special conditions constitutes the contract conditions for the rights and obligations of the parties.

In the field of international engineering, due to the different legal systems of various countries, FIDIC contract is not only the embodiment of the autonomy of the parties, but also the result of harmonization and compromise of laws of various countries, which has the rule effect of international conventions. International convention refers to the unwritten agreement gradually formed due to repeated similar behaviors in the process of handling international affairs. There are generally two effective international conventions: one is the repeated behavior of events; The second is the recognition of the participants, so that it is binding. As long as both parties acknowledge the use of FIDIC contract, the international practice is legally binding.

### **3. Research on FIDIC contract claims at home and abroad**

#### **3.1 The theoretical basis of claim**

##### **3.1.1 The domestic situation**

It was the implementation of Yunnan Lubuge Hydropower Station project in the 1980s that "claim" first entered the engineering circle of China and made people realize its importance. As for the concept of engineering claim, most scholars in Our country believe that engineering claim includes both contractor's claim and subcontractor's claim, but the subcontractor's claim is called counter-claim, and "counter-claim" is the behavior and means to prevent the counterclaim against the contract. However, a small number of scholars believe that engineering counterclaim refers to the claim made by one party of the construction project contract against the other party, which is not limited to the claim made by the contractor. In a word, there are different arguments about the specific definition of claim in academic circles. Only by grasping the definition of claim accurately, can we identify the opportunity of claim in construction engineering practice and protect our legal rights with claim. Therefore, the definition of claim is worth in-depth discussion. With the development of construction projects, theoretical studies on claims in China become more and more frequent, which is embodied in the following aspects: Cheng Hu (2000), in his book *Construction Engineering Contract Management and Claims* [1], introduced the claims procedure, method of calculating the amount of claims, claim strategy research and counter-claim in construction projects. He Weimin (2003) discussed relevant legal issues of international engineering claims, such as legal basis and liability principle. Liang Jian and Chen Yongqiang (2011) believe that construction claim is a comprehensive subject. In their book *International Engineering Construction Claim* [2], they have made a comprehensive discussion on the theory, practice and management of engineering claim. Yuan Huazhi (2016) believes that claim is of great significance to ensure the reasonable development of construction project. His book *Construction Project Claim and Counter Claim* [3] combines cases and discusses matters with "law" in the case, which is novel and can more vividly popularize legal knowledge of construction project claim to readers. However, at present, China has spent relatively little time and energy on the research of engineering construction claims. Compared with developed countries, the specific contents, methods and conclusions of the analysis are still relatively simple, and the research on the field of construction engineering claims is still in the primary stage.

In general, the model text of construction project contract is far from perfect in China. It is necessary to supplement and perfect the contract type and specific clause design on the basis of the national conditions of Our country and the advanced experience of international engineering claim theory, so as to truly realize the international standards.

### **3.1.2 The status quo abroad**

As for the definition of claim, both FIDIC Conditions of Design, Procurement and Construction Contract (Silver Book) and FIDIC Conditions of Construction Contract (Red Book) define "claim" as the request for extension of construction period and additional payment, and point out that the main body of claim is limited to the contractor and does not involve the claim of the employer.

## **3.2 Claims dispute settlement mechanism**

### **3.2.1 The status quo abroad**

ADR is the Abbreviation of Alternative Dispute Resolution, which is the Alternative Dispute Resolution method when translated into Chinese. ADR is the Alternative Dispute Resolution method except litigation. Practitioners of engineering construction actively absorb the results of ADR in civil and commercial fields and promote the dispute settlement mode of gongqin in addition to the typical litigation mode.

Tiejun, Wang Yuesen, Ren Xiaoshuai road (2008) in alternative dispute resolution ADR of international project definition of the concept and category of the application of ADR mechanism in FDICI contract made corresponding analysis, finally combining the international new trend and problem of project dispute solution mechanism in our country, for our country engineering construction of dispute settlement mechanism are proposed. Yang Yu and Zhang Jie (2012) made a comparative analysis of DAB and domestic legal construction contract dispute resolution methods in terms of time, cost, professionalism and binding force of results, and summarized the advantages of DAB in resolving construction contract disputes.

As for ADR mechanisms (especially DAB and DRB), most of them are based on their advantages, definitions and reference functions, and the discussion is relatively comprehensive. However, there are still deficiencies in the methods of analyzing the advantages of ADR mechanisms. For example, the advantages of ADR are generally discussed from the perspective of cost and efficiency. In terms of DRB and DAB, the practical application of DRB and DAB in international engineering contracts is introduced to learn from, but innovative measures are seldom put forward based on the status quo of construction project dispute claims

### **3.2.2 The status quo abroad**

As for the claim settlement mechanism, in addition to typical engineer settlement of claim, lawsuit, final award and other ways, more foreign research lies in the study of selective dispute resolution.

The original form of DRB is the Joint Advisory Board brought about by the Washington Dam project in the 1960s. The American Society of Civil Engineers introduced the DRB in 1975 to resolve disputes. DRBS were first recommended in the World Bank's "Standard Solicitation Documents" in 1991. In 1995, the World Bank put forward the procedure of using DRB to settle disputes in its official published Bidding Document of Engineering Procurement Standard.

The NEC contract developed by the Institution of Civil Engineers in the UK made an innovation based on the experience of DRB: the NEC contract introduced an independent adjudicator in the process of settling disputes between the owner and the contractor, making the procedure simpler and more efficient. The "independent adjudicator" in The UK is more efficient and cost efficient in settling claims, but how to ensure the impartiality of adjudicator is also worth thinking about.

## **4. Causes of engineering claims**

### **4.1 Claims arising from risks**

Generally including contract risk, political risk, economic risk, such as price inflation, natural conditions change, complex construction site conditions, changes in various laws and regulations,

foreign projects currency exchange risk. Project owners often take advantage of their dominant position to transfer more risks to contractors during bidding and contract signing, leading to an increase in the proportion of risks borne by contractors.

#### **4.2 Claims arising from changes in quantity of work**

During the actual construction, the completed engineering quantity is often different from the designed engineering quantity. According to the provisions of FIDIC general contract, when the contract quantity changes or increases or decreases by more than 15%, the effective contract price is allowed to be adjusted. The change of contract price is mainly caused by the change of engineering quantity, and the claims caused by it are mainly in the following aspects.

First, construction equipment increase and decrease. With the increase of engineering quantity, it is bound to require the increase of new construction machinery, or increase the number of original machinery, which causes the input of the contractor beyond the plan and increases the planned cost of the project. Engineering quantity is cut, then cause the original equipment idle or abandoned, resulting in the loss of the contractor.

Second, material quantity changes. The change in the amount of work causes the contractor to change the quantity of building materials prepared, causing claims.

Third, schedule changes. As a result of engineering quantity change causes the change of original time limit for a project, cause time limit for a project to prolong or rush to work, cause claim for compensation.

Fourth, construction conditions change. In the process of construction, new changes inevitably appear, such as design changes, changes in natural conditions.

Contractor's quotation on the basis of the original tender documents and drawings to calculate, according to the terms of the contract, the construction drawings in any number and nature of the work of change, or change the program or any part of the project construction scheme, are changes, if such changes affect the cost of the contractor, the contractor can be asked to estimate, and extend the time limit for a project requirements are put forward. In project construction, as a result of weather, hydrology, geology, the factor such as water outage is affected, will cause project time limit extension or delay, cause construction claim for compensation thereby.

Fifth, claims arising from other causes. The owner fails to provide the construction site in time as required, and fails to deliver the construction drawings, equipment and payment on time, resulting in the failure of the contractor's construction team to enter the construction site in time; The owner adopts measures to speed up construction for economic benefit; The owner's capital turnover difficulties, affecting the progress of the project or the owner's improper termination of the project and other claims.

### **5. Forms and basic procedures for changing claims under FIDIC contracts**

#### **5.1 Form of variation and claim**

According to the change subject, the change can be divided into the change advocated by the main business, the change advocated by the consulting, the change advocated by the contractor and the change generated under other conditions; According to the change form, it can be divided into engineering quantity change, engineering content change and engineering nature change.

The main claim can be divided into three aspects :(1) claim for construction period. The Contractor shall have the right to claim compensation for the delay caused by the Owner, the Consultant or a third party. (2) Expense claims. The Contractor shall be entitled to claim for costs in the event of any loss of interest suffered by the Owner, the Consultant, a third party or otherwise under the terms of the Contract. (3) Claim for construction period and cost together. The Contractor shall be entitled to claim compensation for the construction period and costs under the terms of the Contract in the event of any delay or loss of benefit attributable to the Owner, the Consultant, a third party or otherwise. Below the circumstance that differentiates clearly in authority responsibility commonly, pure time

limit for a project claim for compensation, owner agrees to give time limit for a project also can give corresponding charge compensation at the same time.

## **5.2 Basic principles and procedures for changing claims**

### **5.2.1 Basic principles for changing claims**

(1) Read the document thoroughly. In the early stage of construction and even in the whole construction process, it is necessary to read the contract documents. The contract documents are not limited to the FIDIC contract itself, but also include bidding documents, pre-bid meeting data, site geological survey data, design specifications and drawings, etc. Conflicts and differences in the contract documents are often the entry points for claims for change.

(2) Retained data. All construction materials should be collected and retained during the construction. For each step of the work, there should be written instructions for consultation, written approval, photos and videos of the whole process of construction, as well as internal management documents and correspondence.

(3) Quick thinking. They should be sensitive to the geological and hydrological environment, the socio-economic dynamics of the host country, and national policies. Often changing external factors are also important factors in making claims for change.

(4) Reasonable use of third parties. For the major change difficulties of the project, reasonable use of the dispute committee or arbitration body to promote the final determination of the change claim in the case of sufficient evidence by the contractor.

### **5.2.2 Change the basic procedure of claim**

(1) Timely find the events that can cause changes, and send a written notice of the change events within 28 days, explain the impact of the possible time limit and cost, and wait for the reply of the consultation.

(2) Submit the claim report within 28 days after the owner and the consultation reply, and timely provide a written reminder for the delayed reply of the consultation.

(3) To give clear approval to the consultation of the change, timely follow up the construction period and cost of the claim negotiation.

(4) For changes that cannot be approved in a short period of consultation, a written claim progress report shall be submitted every 28 days, and the overall claim report shall be submitted within 28 days after the final completion and claim negotiation shall be conducted.

(5) Follow up the cashing of the claim after the claim is successful, and submit the claim to the Dispute Committee for arbitration after the claim fails.

## **6. Conclusion**

more and more companies understand the meaning and essence of the terms, gradually improving the capacity of the flexible application of the provisions, through exploration and summary, growing in solve new problems.

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