

Analysis of the Potential Risks of Winning the Bid at a Low Price in Construction Project Management

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ABSTRACT

In the international world, winning bidding at a low price in construction industry is a normal bidding mode under FIDIC contract conditions. This method is also promoted and widely used in the Chinese market. Under this contract condition, the principal of consistent use of honest and trustworthy lowest bid is followed. While a specific construction project, in different geographical locations, consisted of different participating companies and personnel structures, under different management mode and philosophy, makes the manifestation of disputes varied. But to sum up, the disputes mainly include the project quality, cost, and management. Especially, the cost of the dispute is more prominent, this is normally named "Low bid, high claim". Implementing project successfully under FIDIC contract condition, preventing the risks, and avoiding claim and counterclaim events requires construction technicians and project consulting personnel to strengthen project consulting management, enhance the precaution consciousness, and take effective measures. Firstly, this article is based on the analysis of bidding data from several recent different-scale projects in Chongqing. It shows there exist extremely low-price bid winner cases and the importance of taking measures throughout the whole life cycle is emphasized. The following sections are conducting the discussion about the potential risks in different stages. Finally, some key points in prevention and settlement of disputes to achieve a satisfying risk management like pre-confirmation of contract clauses are presented.

Keywords: *management, winning bidding at a low price, claim, construction project*

1. INTRODUCTION

The standard form of contract condition published by the International Federation of Consulting Engineers (FIDIC) institution has become a wide recognized template in construction industry, which aims to promote the reasonable contract form and avoid unnecessary claim. In China construction market, FIDIC contract condition is either practiced or used as a reference, especially for numerous large infrastructure projects funded by the international fund agencies [1][2]. According to the spirit of "Guidelines Procurement under International Bank for Reconstruction and Development (IBRD) loans and International Development Association (IDA) credits" [3], the procurement of contract in the construction project is adopted the principle of low price winning first under FIDIC contract condition. This is based on the condition that participating bidders should be honest, trustworthy, and the quoted price should be given according to their own manpower, material, financial condition, and not less than the cost price. This method

is also recognized and adopted in the Chinese market, and become the normal bidding mode in construction industry [4]. While the problem is that from the perspective of actual practice and operation, the Chinese low-price biddings exist in vicious competition cases. Some data in Asian market indicate that: some construction company even cannot make any profits for 10 years because of the unusually low bids and the poor risk management procedures [5]. The bidding price is lower than the actual project cost, which is in contrast with the spirit defined in the FIDIC provision [6]. Another problem is that the supporting facility and the programmatic guidance document to implementation cannot assist the execution, such phenomenon as (1) The professional ability to measure the planned construction price by the potential bidding company is insufficient. Still rely on the government functional departments, which are irregularly issued measurement and operation rules that adopted directly by the contractor without modification according to the specific condition; (2) Lack of professional practical training. The ability to implement bidding at the low price of a large number of relevant personnel or staff

involved in the preparing bidding documents, advertising, bid evaluation, and contract award process should be improved. (3) Some main responsible persons are not fully equipped with the sense of competition in the current market economy. (4) Grievance redress mechanism has not been fully established, and claim and counterclaim awareness is insufficient.

This article is based on the perspective of the Chinese domestic market. The importance of necessary work spent on identifying risks when carrying out bidding at a low price process is presented through a list of projects data obtained from the survey in section 2. The potential risks that may arise in different stages, including pre-project document preparation, project investigation, design phases, bidding and procurement phase, construction phase to facilitate to take the precautionary measures, are presented in section 3. Dispute treatment procedure and general conclusion are presented in section 4. Finally, a conclusion is given.

2. BACKGROUND

Driven by the bidding at the lowest price method, many competing firms tend to calculate the cost and benefits of this project and come up with the lowest bid price to win the contract. However, the basic cost of management, supervision, personnel, equipment, material, site, contingencies, profit should have a general estimate based on the market, and the up and down should be within a certain range. If the bid is won at a malicious low price, which means the winner price of the contract package is extremely lower than the limited price given by the owner, it may be achieved by sacrifices made to the project quality. Also, it can cause potential risks to the later project management. The following table shows the limited price and bid winner price of both large and small projects in Chongqing in recent years, as well as the falling ratio:

Table 1. Relevant bidding data on different types of projects in Chongqing [7]

Project name	Type	Limited price (million yuan)	Bid winner price (million yuan)	Falling ratio
The intelligent construction of municipal comprehensive office building	Installation project	508.25	345.68	31.99%
University Town water plant expansion and supporting pipe network (phase I) civil work and installation	Municipal project	1564.84	1087.78	30.49%
Chongqing science city Nankai primary school decoration project	Decoration project	1497.49	1005.12	32.88%
Construction of the first section (K0+900~K3+500) of the double-track tunnel in University Town	Municipal project	102648.23	57176.81	44.30%
Chongqing railway Zhongliang Mountain overhaul infrastructure civil work general contract project	Municipal project	107532.02	56161.19	47.77%
Construction of the second section (K3+500~K6+840) of the double-track tunnel in University Town	Municipal project	134648.05	859.05.45	36.20%

It can be analyzed from the data,

(1)The larger the project estimate bid is, the more intense the project competition is, and the higher the possible falling ratio is.

(2)The project estimate bid (limited price) is calculated and obtained by the project management company according to the normal or above-average market level, which mainly includes the normal cost spent during implementation, management expense, and certain profit.

(3)According to the current normal domestic competition case, the falling ratio of a reasonably

quoted price dropping from the limited price should be no more than 15%.

(4)While, in the above cases, all the bid winners have a falling ratio of more than 30% or even more than 40%. It indicates that this price exceeds a reasonable level, and there may be potential risks in the implementation process. Therefore, all parties involved in the construction must strengthen risk control.

From the owner's perspective, one of the main parties of project management, this paper discusses how to strengthen project control and avoid unnecessary disputes such as claims, change, lawsuits and arbitration by identifying potential risks.

3. DISCUSSION

The early stage of construction projects mainly includes dealing with various supporting procedures, such as initial planning, environment investigation and evaluation, geological disaster identification, site investigation, design, tendering and procurement, etc. The application and implementation of the outcomes obtained from each procedure may cause potential risks and lead to disputes and ambiguities between the two parties in the follow-up project implementation process. Furthermore, it may result in changes in the decision, schedule quantity, project cost, and claim events.

This chapter will simply discuss the potential risks that need to be noticed and managed through different stages from the owner's perspective.

3.1 Pre-project documents preparation

According to China's current capital construction management procedures, it is necessary to prepare the relevant official documents for site selection, land acquisition, original nature of land clarification, and environmental evaluation for project approval and later promotion. These pre-project documents preparation directly influences:

- (1) The initial decision making regarding the market, material, energy, transportation, maintenance and public utility, labour, and financial source;
- (2) The promotion of the survey, design, and construction activities;
- (3) Whether the contractors can promote the project smoothly in the later construction stage of the project. If the construction activities are blocked, it may cause idle personnel, machinery, and waste of money;
- (4) It may also lead to changes in scale, nature of the project and the project layout, even changes in the nature of the contract and the corresponding measurement and valuation standards.

3.2 Project investigation

The information and data collected in this stage are used as the reference in the proposed initial design scheme, design principal and technique, also the construction and acceptance inspection stages. Therefore, the results obtained through the investigation process must be precise and detailed, which should include

- (1) The classification, mechanical parameters like water content and bearing capacity of the soil, should be tested adopting an acceptable method no matter whether it is determined in the site or in the laboratory.
- (2) The definition of geological structure, fault, and cracks. If the important features of site soil are missed, it

may lead to failure during construction.

- (3) Identification of weak foundation soil and inspect whether the corresponding mitigation measure is appropriate.

In the investigation phase, the information and outcomes should be comprehensive to avoid proposing the claims and changes by the contractor and causing loss.

3.3 Design phases

The final design drawing is usually determined by the owner and delivered to the contractor directly. Sometimes, the contractor can propose the detailed design drawing and technique and submit it to the owner during the bidding process. In many cases, designers and experts should carefully evaluate the data obtained in the previous stage, analyze the shortcomings of great consequence and design difficulties existing in the project, and compare multiple schemes before confirming the final efficiency-improved and cost-reduced scheme. The design drawing is the necessary document to guide the implementation of construction activities. The completeness, buildability, and precision can cause some dispute and contradiction to both parties of contractor and owner. Some checks need to carry out before the drawings are officially put into use:

- (1) Whether the standard and specifications of the mandatory documents and programmatic documents issued by the construction authorities are executed in the detailed design outputs;
- (2) Completeness of design output. whether there are any faults, gaps, and omissions or other unspecific issues existing in the final design documents;
- (3) Buildability of the design output. Whether the design drawing seems intact, but it cannot guide the implementation in practice may because of the omission of the specific site situation, then cause the design changes;
- (4) The construction material and equipment must comply with the relevant regulations of project location, the principle of selected resource in design is using the local market material, or that can be easily accessible;
- (5) The construction process flow adopted in design output should be traditional, efficient, and widely used in the local construction project.

3.4 Bidding and procurement phase

The project bidding and contract procurement is the end of the project's early stage and the transition phases before the construction period. Usually, it can be divided into 5 sub-stages according to the open ADB's competitive bidding [8].

(1) Compile the procurement plan and bidding document. Analysis of the whole project to determine the initial procurement plan should include the description of how the procurement activities support the project development aim, the cost estimate, and the personnel arrangement plan. And in the bidding documents, the bidding method and the evaluation criteria, qualification requirements at least should be involved.

(2) Invitation for bidding candidates. Usually, open competitive bidding is adopted in contract procurement in the domestic construction industry. The bidding advertisement is published on the website facing all potential participators. Then make a shortlist after the pre-qualification and determine the final cooperate that can hand in the bidding documents.

(3) Evaluation. As the economic benefit is the main factor to drive both owners and contractors, bidding at a low price is the most common cause. Evaluation of the technical proposal first, then all financial proposals with technical scores above the minimum passing mark will be unsealed. The company with the lowest bid will be invited to negotiate contracts.

(4) Contract negotiations. During the negotiation, the information on any issues identified during technical or financial reviews can be clarified or corrected.

(5) Contract award and management.

The bidding documents should follow the terms of reference [9], which clearly specify the description of project features, rights, and obligations of both owner and contractors, general terms, particular terms and constraints in the contract, exceptions. It cannot be ambiguous, vague, and inaccurate in words. It also should include the project quantities and characteristic description of sub-projects, work content, measurement unit (length, area, currency), price adjustment method due to inflation, etc. When the contract is awarded to the bidder successfully, contract management start and should be executed through the project process afterwards, including the construction, operation and maintenance phases. As the nature of contract, it defines the different obligations and rights of several independent companies which act as a multi-agent system (MAS). Especially in the civil contract packages, the main involved parties are supervisors, owners and contractors and subcontractors. Due to the importance and complexity of contract management, the working experience and professions of the experts is always the dominant factor, while recently some computer-aided programs are put into practice in this area. Defeasible Logic (DL) is one example, which is also verified to meet three levels in clause 67 (define the dispute-solving) of FIDIC contract management [10]. All disputes that arise in the later implementation should be referenced back to the original contract.

3.5 Implementation phase

The project construction and implementation phase are to turn a volume of blueprints, through engineering practice, into a visible, tangible scenery. Project construction management includes quality control, schedule control, and cost control, which requires the issues emerging in the project should be handled and managed and ensure to complete the project task on time, quality, and achieve the expected economic benefits. But the implementation process involves people (operating personnel, labours, experts, supervisors), machinery and equipment, materials procurement and use, construction process flow, construction site preparation, environment. The owner's management personnel should need in accordance with the documents which include official laws and regulations of engineering construction, the requirements of technical specification, the signed civil contract package, supervision contract package, and other contract documents, and mobilize all aspects of the comprehensive resources, to provide overall control over quality, schedule, cost and other goals from inception to completion. However, any link in this process has the possibility to raise disputes and contradictions between owners and contractors. So, it is necessary to make sure:

(1) The preparation work must be full and detailed, such as the construction site obstacles must be cleaned thoroughly, the site must be in line with transport conditions, water and electricity supply is guaranteed to meet the needs of construction.

(2) The construction drawing material must be delivered to the contractor accurately and fully. Make sure the site workers understand the details and prepare the material and equipment based on the quantity and cost recorded in the bidding contract.

(3) The participants from all parties must reach the professional technical level, have the professional skills, be familiar with all kinds of operations on-site, and the awareness of whom must be timely, accurate so that they can be skilled in dealing with possible problems.

(4) The owner must approve design change processing, and the method is appropriate and accurate. Once passed, the results should be timely transmitted to the construction company, supervision company, and other sub-contractors.

(5) The contractor's claim must be clearly responded to and dealt with within the prescribed time [2]. Avoid the case that the unanswered demands may escalate into conflicts between all parties, resulting in worker strikes, schedule delays, and eventual economic losses.

4. DISPUTE

During every phase, there are possibilities of dispute and claim events. According to a survey conducted by Choi and Kim, it is identified that the top 10 Risk Priority Number (RPN) dispute risk factors are mainly associated with the ability of contract managers, varying from the claim-related clause handling, unclear excuses spotting to contractual language understanding based on FIDIC contract conditions [5]. Once it occurs, how to handle this problem effectively is the key thing in construction management. In this section, some principles, precaution measures and dispute review mechanism are presented in the prevention and settlement procedure of disputes [11].

(1) Treatment principle of disputes

To fully and efficiently perform the contract and smoothly achieve the construction objectives, the disputes shall be prevented and handled according to the characteristics of the disputes in accordance with the principle of "prevention first, timely handling and fair results".

(2) Pre-confirmation of a key clause

During the compliance of the contract, the participating parties should standardize their own behaviour and perform their obligations in strict accordance with the contract. The relevant project management personnel should analyze the contract terms carefully. Firstly, they should not break the contract, and at the same time, they should "pre-confirm" the clause that may be controversial to the relevant parties to avoid the loss of interests. Then, the contract management personnel of all parties should fully understand and be familiar with the terms of the contract, overcome the bad habit that the management personnel do not read or understand the contract, and nip the dispute in the bud.

(3) Strengthen coordination and communication

All parties involved in the project should understand and support each other, strengthen communication and coordination, play the full role of supervision and regular on-site meetings, jointly analyze and identify possible disputes, formulate plans, and avoid the occurrence of disputes as far as possible.

(4) Dispute processing methods

Disputes can be settled by reconciliation, adjustment, dispute review, arbitration and litigation. Typically, the written decision made by the dispute review panel shall be binding on both parties after it is signed and confirmed by the parties. However, if either party fails to accept or implement the decision of the dispute review panel, the parties may choose other means of dispute resolution.

5. CONCLUSION

Construction management is a dynamic and continuing process, and bidding at a low price is irreversible. The owner must clearly understand and be aware of the risks of conflicts raised by the bidding at a low price, to achieve this: (1) in the tendering and bidding phases, the hydrology, engineering geotechnics and weather condition, and the supply of the labour, material, equipment of the local market should be clearly investigated; (2) in the design phase, the designers should carry out the thorough market survey and information collection, to ensure that the outcomes is complete and adequate; (3) in the construction phase, due to the many uncertain factors largely affected by the surrounding environment, the involved groups should firstly strengthen internal organization and coordination; then strengthen the coordination and cooperation between various types of work and professional personnel; thirdly, adopt advanced process and technology, utilize the local human resource and material stock to achieve the economic.

In conclusion, they must carefully sort out all the potential risks in every phase to achieve good risk control during the construction management and avoid leaving contractors unnecessary chances to claim and dispute.

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