# Comparison Analysis in Evaluation Procedures and Evaluation Methods of Civil Buildings

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## Abstract

**With the increasingly fierce competition in the civil construction market, the bidding procedures and standardized management are becoming more and more important. In order to better meet the tendering requirements, it is of utmost importance to select the construction unit, the bid evaluation procedure, the bid evaluation method, and the application of the project appraisal bid evaluation method. In this case, this article analyzes the bid evaluation procedures for commercial buildings and the bid evaluation methods for commercial targets, and examines the content, advantages, and disadvantages of the lowest bid winning bid assessment method and comprehensive assessment method, and selects suitable projects for different characteristics of the project. Evaluation method provides a reference.**

## Keywords

**Civil architecture,bid evaluation procedure,business standard,the lowest bid winning bid method,comprehensive assessment method.**

## 1. Introduction

The purpose of bid evaluation is to ensure the minimum cost for civil construction under the premise of meeting the quality requirements of the project. To achieve the above-mentioned objectives, the bid price is only one of the factors to be considered in the bid evaluation. Other factors include: the time of completion of the project. The conditions for the payment of costs; technical advantages, capabilities, productivity; operating costs; maintenance costs; efficiency and so on. When assessing bids, comprehensive consideration of the above factors shall be taken to comprehensively evaluate bids.

The evaluation procedures for civil buildings are composed of the following steps: (1) Preliminary examination of bids, determination of responsive bids, and correction of calculation errors; (2) Conversion of different tender currencies in the bid into common currency (3) Analysis and quantification of deviations and omissions of bids;(4) Evaluation of bids using bid evaluation criteria; (5) Preparation of bid evaluation reports.

## 2. Evaluation Procedures for Civil Buildings

### 2.1 Bid check

2.1.1 The main contents of the tender check

After the bid opening and before the formal bid evaluation, the owner must first determine whether each bid document is in full compliance with the requirements of the bidding documents. Therefore, it is necessary to inspect the bid documents. This process is also called preliminary review. The main contents of the examination of bids include: (1) whether the bids are complete and whether they are signed; (2) whether they include bid security and other required documents; and (3) whether there are any calculation errors.

According to the relevant provisions of the bidding documents, check whether there are substantial deviations in the following aspects of the bid: (1) technology; (2) finance; (3) management; (4) law.

The purpose of the inspection is to determine whether the bid documents have substantially responded to the requirements of the bidding documents, and the detailed evaluations in the later stages are only for those bids that are substantially responsive.

2.1.2 Unacceptable Deviations

Unacceptable deviations from the bid documents will be treated as abolished. According to the World Bank procurement policy, if the following conditions occur in the bidding documents, they may be regarded as unacceptable deviations.

(1) late submission of bid documents; (2) unqualified bidders; (3) unsigned bid documents; (4) no or unacceptable bid security; (5) bidders/associates fail prequalification (6) Request a fixed price, and bidders require price adjustments; (7) Unacceptable alternative designs; (8) Non-conforming time schedule requirements (9) Unacceptable subcontracting; (10) Requirements for changing arbitration conditions , rules, places, etc.

2.1.3 Correction Calculation Error

Correcting calculation errors is a common business practice and is usually done during the inspection process and before the official evaluation. The World Bank's procurement policy requires that the following principles should be used to correct calculation errors: (1) When the capitalization figures are inconsistent, the capitalization shall prevail; (2) When the position of the decimal point is obviously wrong, it should be corrected; (3) Generally not Modify the unit price and quantity, only modify arithmetic errors (add, subtract, multiply, divide), ie modify the subtotals and totals.

The above amendment does not require the consent of the bidder, nor does it require confirmation. If the amendment is appropriate, the bidder will accept these corrections. If the bidder does not accept it, there is a risk that the bid security will be forfeited. Of course, bidders may be required to clarify if necessary.

## 3. Evaluation Method for Commercial Buildings of Civil Buildings

The business review is to determine the reliability and rationality of the offer from two aspects of economy and cost by analyzing the quotation. After review, choose the right bidder for a bid and give a reasonable evaluation. Business review is the core task of bid invitations for tenderers. As a bidder, bidders who are reasonably priced but not less than the cost of project construction should be selected.

### 3.1 Maximum bid limit price, bargaining price, and no-bid price

The maximum bidding price limit is to ensure the project budget or construction cost. The bidding documents clearly stipulate that the maximum bid price must not exceed a certain specific amount, otherwise it will lead to the cancellation of the bid. The highest bid limit price is generally agreed in the bidding documents of the project to be tendered.

The bid price refers to the maximum limit for the total price of the project project publicly displayed by the bidder during the bidding process. It is the expected price of the bidder and requires the bidder to not exceed it during the bidding process. Otherwise, it is a waste bid. The bargaining price generally rises to a certain extent on the basis of the bidder's bid price, which generally rises by about 5%. The base bid price is the expected price of the tenderer. Its compilation is based on local consumption quota, information price, and local fee collection standards and reasonable construction organization design. The bidder's bid price is generally announced together with the bidder's bid price.

No bid-and-quote bid is for bidders who do not have a bid base in the tendering process. Only one standard and method of bid evaluation can be used as a bidding method.

In the project bidding for setting the highest bid limit price or bargaining price, the bidder's quotation cannot exceed the maximum bid limit price or bargaining price, otherwise, the business review will no longer be conducted. No bid-and-bid tender will no longer consider the bid price and the bidder to determine the price gap, regardless of the level of quotations will not affect the business review.

### 3.2 Bid Evaluation Method of Business Standards

The bid evaluation of commercial buildings for civil buildings mainly examines the qualifications of enterprises, business licenses, relevant award certificates, and the company's reputation and performance. The method of bid evaluation generally includes a proportional method, a reasonable reference plus (subtraction) method, and a technical standard plus (subtraction) method.

The bid evaluation price generally refers to the bid price of the bidder, but if there is a temporary amount stipulated in the tender documents, the temporary amount is not used as the basis for the assessment and should be deducted. Therefore, the bid evaluation price is the price of the bid price deducted from the provisional amount.

3.2.1 Proportional method

Based on the evaluated minimum bid price, a bid method that is higher than the lowest bid price is reduced.

Calculation formula:

Business benchmark score = C × [1 - (Awarded bid price - evaluated minimum bid price) ÷ Appointed minimum bid price]

Including: C is the number of business standard scores

Total score = commerce standard score + technical standard score.

3.2.2 Reasonable baseline addition (subtraction) method

After the screening of the quoted price, the arithmetic average was used to determine the benchmark and an evaluation method for adding and subtracting points was conducted. This method is applicable to projects with more than 7 bidders. calculation steps:

(1) Identify abnormal quotes

A one-off screening of bids after review is performed. The business bids with the following exceptions are given constant K, and the base price is not added or subtracted.

1 The highest price quoted is higher than the second highest price quoted by n% (including n%), n% (high)=[(highest quoted price - second highest price quoted) or one high bid price] × 100%; 2 lowest quoted price is lower than the second lowest quoted price m % (including m%), m% (low) = [(lowest quoted price - lowest quoted price) or low quoted price] × 100%.

Note: K, n and m are determined in advance according to the characteristics of the project in the evaluation method. n and m are generally not more than 20.

(2) Calculate a reasonable base price

After screening, remove one of the highest quotation and the lowest quotation, and then use the arithmetic average method to calculate the benchmark price of this project.

(3) Calculate the score

After determining the benchmark price, determine the benchmark points, and then calculate the commerce benchmark score for each bid unit according to the following rules (the commerce score score is kept at a decimal point, and the minimum score unit is 0.1):

1C is divided into the number of business benchmark scores; 2 benchmark points are agreed by the bid evaluation method; 3 the total quotation is higher than the benchmark price% benchmark points minus points, at least reduced to K points; 4 total quotes are lower than the benchmark price% benchmark points Add points, up to C points.

Total score = commerce standard score + technical standard score.

3.2.3 Technical Baseline Plus (Subtraction) Method

Determine the benchmark based on certain factors for technological advantages, and then conduct a bid evaluation method for adding and subtracting points. This method is applicable to projects where the construction technology is difficult and the construction plan is highly competitive, or the construction contractor is invited to bid for the project.

(1) Determine the base price

1 The arithmetic average of the bid prices Bi after the evaluation of each bidding unit is arithmetically averaged to obtain the arithmetic average A1; 2 The arithmetical average of the bid prices within the range of 65% A1 to 115% A1 will be arithmetically averaged to obtain A2; 3 70% A2 ~ 100% A2 within the range of bid prices to perform arithmetic average, come to A3; 4 to take the first bid for the technical bid for A4; 5 to take the second bid for the technical bid is A5; 6 The benchmark price is A0=80%A3+12%A4+8%A5.

Note: The setting of the above percentages and weights can be adjusted according to different circumstances and agreed upon in the evaluation method.

(2) Calculate the commerce score

When Bi>A0, Qi=C-[(Bi-A0)÷A0×100×a]

When Bi<A0, Qi=C-[(A0-Bi)÷A0×100×b]

Note: 1C is the business quotient score value; 2Qi is the corresponding Bi commerce score value; 3a is the deduction coefficient higher than the benchmark A0, which is agreed by the bid evaluation method; 4b is the deduction coefficient below the benchmark A0, The bidding method agreed.

The bid scores of the bid units are up to C points, and the lowest is 0 points.

Total score = commerce standard score + technical standard score.

(3) Simplified method for determining the base price

According to the ranking of technical targets, the bid prices B1, B2, B3,... BN after evaluation are listed, and then the corresponding weights are set to a1, a2, a3...aN (generally a1>a2>a3... aN,a1+a2+a3+..., aN=100%, the specific weight should be pre-agreed in the bid evaluation method), and finally the base price A0=B1×a1+B2×a2+B3×a3...BN×aN is calculated.

## 4. Comparative analysis of the lowest bid winning bid evaluation method and comprehensive evaluation method

### 4.1 The lowest evaluated bid method

4.1.1 The content of the lowest bid winning bid assessment

Using the lowest price bid method that has been evaluated, the purpose is to encourage bidders to strengthen management through price competition, reduce costs, and adopt new technologies and processes. In the review process, if the following conditions occur in the bidding documents, the bid evaluation committee may determine that its preferential conditions or cost-saving measures are unreasonable and use this as a basis for determining that the bid price is lower than the individual cost price. (1) Failure to make a bid that is not less than its cost price commitment; (2) Change the amount of fixed subheadings and engineering quantities that are listed in the official budget of the project; (3) Major omissions or calculation errors in reported budgets (except for slight deviations); (4) The cost-saving measures, preferential conditions, content, and reasons are not listed in detail, or the content is incomplete, incomplete, and persuasive; (5) There are other major unreasonable profit-making.

The part of the bidder's bids that can be used for making profits consists of: the collection of comprehensive overheads can be adjusted according to the items and rates listed in the local quotas; the direct fees can be appropriate for the labor, materials, and machinery classes included in the fixed unit price. Adjustments; non-physical form of the measure of cost, the bidder according to the construction of the organization design or construction program to offer. The following fee bidders may not lower the standard charge when bidding for bids: on-site safety, civilized construction cost; labor insurance and labor insurance co-planning fees; project fixed cost determination fees; tax; A-supply and independent fee items with clear prices in the bidding documents.

When using the evaluated lowest bid price method to evaluate bids, and the bid evaluation committee determines that the minimum bid price is not lower than its individual cost, the bidder is the first

successful bid candidate. If the bid evaluation committee confirms that the minimum bid price is lower than its individual cost, the bid evaluation committee will review the bid price of the next bidder in turn until it is determined that there is a successful bid candidate.

4.1.2 Advantages and Disadvantages of the Lowest Price Awarded Method

The advantages of the lowest bid winning bid method are: (1) It can fully reflect the competition and significantly reduce the construction cost. It is an inevitable trend of social development and is in line with the requirement of the micro-subject to pursue profit maximization under the market economy system. (2) The reviewed minimum price law can effectively prevent and reduce corruption and prevent the spread of unhealthy trends. There is only one criterion for the lowest price bid method that has been evaluated, and it does not rely on the subjective scoring of the judges and tenderers. It is more objective and true. (3) Simplify the evaluation process, improve efficiency, and reduce the impact of human factors. Using the lowest bid winning bid method, bidding documents do not need to be cumbersome, as long as they are tailored. The tenderee and the judges only need to focus on the cost part of the review, and they will be more careful about the cost part, help find loopholes and unreasonable factors in the bid, and prevent the bidders' unreasonable quotations and unbalanced quotations. Finding missing items and ambiguous items is more perfect and rigorous when signing a contract. Compared with the comprehensive scoring method, the evaluation time is shortened. (4) The lowest bid winning bid evaluation method can promote enterprises to strengthen their own management, establish enterprise quotas, do a good job of internal potential exploration, and improve the construction, technical management level and bid price bidding ability.

The disadvantage is that it is difficult to grasp the evaluation criteria, what is the reasonable minimum price, and how to determine the reasonableness of the tender offer. At present, there are still many disputes about this issue. The lowest price reviewed is not the lowest price quoted by the bidder, but a reasonable price that is not less than the company's cost. Some people, often tenderers, are not able to understand the “accreditation”, and to lower the investment, whoever is lower will win the bid. In order to win bids, a small number of construction units have appeared irrational in their bids, pinned hopes on project changes, increased work content, and on-site visas. After winning the bid at a low price, in order to pursue profits and avoid large losses, they are reluctant to invest in machinery and equipment, human and material resources, reduce quality standards during the construction process, reduce management personnel, use package management, and exaggerate the cost of construction projects. Increased engineering supervision and construction unit management difficulty. Disrupted the normal order of the construction market.

### 4.2 Comprehensive Assessment

4.2.1 Content of Comprehensive Evaluation Method

Comprehensive assessment method, also known as comprehensive scoring method or percentage method. The implementation steps of using the comprehensive bid evaluation method are as follows: First, classify each index factor, determine the weight of the index factor and the corresponding scoring criteria; second, the score of the bid evaluation committee is unmarked; third, the score of the bidder is counted, and the highest is the bid winner.

Quantitative assessment indicators are the core of the comprehensive assessment method. They are mainly to determine the weights of the scoring indicator elements and formulate corresponding scoring standards. In general, based on the purpose of comprehensively and accurately demonstrating the overall strength of bidders, the weight of the bid evaluation elements should be given and the scoring standards should be determined. In accordance with the principle of fair, open, and fair bidding, the final price is reasonable, the construction quality is excellent, the scheme is advanced, and the technical Strong, high-reputation bidders won the bid. Although the weighting value of scoring elements and the method of assessing standards are not the same, in principle, it must be observed: First, the evaluation elements reflect the tendencies of the tenderers. On the premise of fairness and impartiality, the corresponding weight distribution should be adjusted according to the characteristics of the project. In other words, the weights of the bid evaluation elements that meet the

intention of bidding can be appropriately increased, and the weights of elements that do not reflect the intention of bidding can be appropriately reduced. Secondly, when assigning and assigning weights to various bid evaluation elements, they should be ranked in order of importance, and then weight values should be assigned in order. The weight of important elements must be higher than the minor elements. Third, the bid evaluation elements should be set to make the bidding process as competitive as possible. The ability to highlight highly competitive evaluation elements is usually not just the strength of a single bidder, but rather a highly competitive element that most bidders have. If the price factor should be highly weighted, the relatively low competitive bidding evaluation elements, such as quality and duration, are less important. Fourth, the content of the qualification examination has a certain influence on the various evaluation elements. When setting the weight of each evaluation factor, you should consider post-qualification and prequalification. The weights of the bid evaluation elements that are prequalified during prequalification shall be appropriately reduced. The elements of the bid evaluation that are not qualified for prequalification or that are planned for postqualification shall be increased.

4.2.2 The advantages and disadvantages of the comprehensive assessment method

The comprehensive evaluation method has certain advantages in bid evaluation of construction projects. First, it weakens the owners' bid base, making evaluation of bids relatively scientific and avoiding the limitations of bid evaluation; bidders avoid overquotion and increase the competitiveness of bids. The second is that it is beneficial to the role of bid evaluation experts. It can not only compare tenderers' quotation and owner's bid, but also can conduct in-depth quantitative evaluation. The third is to avoid deliberately low-price competition. The bidder's bid and bidder's number and situation will affect the reasonableness of the bid. The bidder's bid lower than its own individual cost will not only fail to win the bid but may also be rejected, as well as the long-term reputation of the bidder. Survival will also have a certain impact. The fourth is to achieve owners adopt market-based bidding, encourage competition, help bidders to improve their quotation ability and make reasonable quotation with the help of game theory, and at the same time achieve a reasonable low bid for the bid, and finally achieve the lowest bid price of the bill of quantities and win the bid. However, the disadvantage is that the comprehensive evaluation method has a certain subjectivity due to time constraints, and it may also increase the engineering cost.

## 5. Conclusion

This article introduced the evaluation procedures of commercial buildings and the bid evaluation methods of commercial targets, and analyzed the lowest bid winning method and comprehensive evaluation method. It was concluded that the lowest bid winning bid method was not affected by human factors. But the key lies in what is a reasonable minimum price. The comprehensive evaluation method does not depend on the bid price, but it is influenced by the bid evaluation experts, and is more suitable for the material procurement project, so that the construction unit can choose products with reasonable prices and reasonable prices. However, regardless of which bid evaluation method is used in the construction project bidding process, there are pros and cons in the bid evaluation process. We must combine the actual conditions of the project, constantly summarize the past experience, and find suitable bid evaluation methods according to the new situation. Constantly improve and improve.

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