

TECHNICAL ARTICLE

Bid-Awarding Systems: An Overview

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Construction work is usually initiated by an owner who signs a contract with a contractor. This contract fully describes the nature of the work to be carried out, and the contractor is entitled to payments as per the agreement. An owner may select a contractor through competitive bidding, negotiation, or a combination of these methods. There are different types of competitive bidding, such as the lowest-bidder system and the non-lowest-bidder system: the latter includes the nearest to the average of all bids, limited to the owner's estimate bid, and weighted average bids (the Danish system).

This article reviews some of the different bid-awarding systems available worldwide, with special emphasis on the systems used in Saudi Arabia and Germany.

COMPETITIVE BIDDING

Lowest Bidder

One of the most common methods used to award contracts is the lowest-bidder system. It is a competitive system, and many contractors obtain their work through it. Generally, all public works are bid for using this method.

The basic idea behind competitive bidding is that the lowest-bidder system protects the public from extravagance, corruption, and other improper practices by public officials [1]. The system encourages efficiency and innovation by contractors, which (hopefully) results in a completed project of specified quality at the lowest possible price. However, competitive bidding sometimes leads to the selection of incompetent contractors, ex-

cessive claims by a contractor against an owner, disputes and litigation between parties, bid shopping, and other problems [2]. There are two types of competitive bidding, open and closed. In open bidding, all contractors use the same proposal form that is provided with the bidding documents, and the bids are opened publicly to preclude accusations of favoritism. In closed bidding, no prescribed proposal form is used, and there is no public opening of bids.

Table 1 is an example of bid tabulation. The data are used here to demonstrate different bid-awarding systems. The table shows six bids, including the highest and the lowest bids, the bids' average, the engineer's estimate, and the average of the six bids along with the engineer's estimate. The engineer's estimate is assumed to be equal to the base project budget. In the lowest-bidder system, the contract is awarded to the second bidder.

It is very important to understand that not every country uses this system in the public-works sector. Many nations use a non-lowest-bidder system. France and Portugal try to disqualify what they believe are abnormally low bids. They define abnormally low as "any bid whose price appears abnormally low and consequently may cause implementation problems [5]." For the example in table 1, the second bidder would be disqualified if it were judged to be abnormally low.

Nearest to the Average of All Bids Received

In this system, once the owner has received all of the offers, he or she performs a simple mathematical calculation to find the average bid value (ABV): all of the participants' offers are summed and divided by the total number of bids received.

$$ABV = \frac{\sum \text{participants' offers}}{\text{number of bids received}} \quad (\text{equation 1})$$

To award the contracts, the owner looks for the nearest offer to ABV and selects this bid. Through this system, which is used in some European countries [2], an owner tries to avoid low bidders who have not studied the contract carefully or do not have enough experience, and also avoids overestimated bids. However, the owner might not have enough information about the degree and type of experience of the successful bidder.

For the example in table 1, the contract would be awarded to bidder number 1, since it is the nearest to the average of all bids.

Limited by Average Bids and the Owner's Estimate

In the system discussed previously, all bids received are summed, and the summation is divided by the number of bids received to get the ABV. In this system, owners also use their own resources and experience to estimate the project cost.

To award the bid, the owner reviews all of the participating offers and looks for the offer nearest to the average bid value but which, at the same time, does not exceed the estimated cost (see equation 2). The offer that satisfies these two requirements is the successful bid.

$$\text{owner's estimate} > \text{offer of successful bidder} \leq ABV. \quad (\text{equation 2})$$

Table 1—Sample Bid Tabulations

Bid 1	\$25,636,180.56	Bid 5 (highest)	\$28,848,565.14
Bid 2 (lowest)	\$20,436,673.25	Bid 6	\$26,587,264.28
Bid 3	\$26,070,558.46	Engineer's estimate	\$26,000,000.00
Bid 4	\$25,328,825.06	Average of all bids	\$25,484,677.79

This is different from the previous system, because the successful bid is between the owner's estimate and the average bid. This method may give an owner some indication of the seriousness of the offer and of the contractor's understanding of the project documents.

With this method, in the example shown in table 1, the contract would be awarded to bidder number 4 because it is less than the owner's estimate and less than the average.

Another similar practice is "bracketing," or considering only bids that are within a certain range above and below the engineer's estimate. In this system, the lowest responsive bid within the range gets the award. For the example given in table 1, assuming that the range is 10 percent above and below the engineer's estimate, the range is \$23,400,000 to \$28,600,000. The lowest bid in that range also is bid number 4.

THE DANISH SYSTEM

This system, developed in Europe and known as the Danish system [7], is a simple formula to select the most reasonable offer from the competitive bids received. It rejects the two extreme offers (highest and lowest); a new highest and lowest offer, and consequently a new average (NA), thus exist. The remaining offers are considered in relation to the new highest offer (NH). The new lowest offer (NL) and the average (A) of all of the offers are calculated. The new average (NA), which helps in selecting the successful bidder, is calculated as follows:

$$NA = (NL + 4A + NH)/6 \quad (\text{equation 3})$$

The offer that is ranked first above this new average is then treated as realistic and acceptable.

For the example in table 1, bid 2 and bid 5 are deleted because they are the lowest and the highest bids. The average equals \$25,905,707.09. The new average, using equation 3, equals \$25,923,152.97. The bid above this amount is bid number 3, therefore the contract is awarded to the third bidder.

THE GERMAN SYSTEM

In Germany, bidding and tendering are regulated by two books of norms produced by the Deutsches Institut: **DIN 1960** (General Rules for Bidding and Tendering) [3] and **DIN 1961** (Rules for Contracting Construction Work) [4]. The principles of these rules are as follows.

Under normal circumstances, contracting should be done in separate contracts with each specialized firm (the construction firm or mason, the firm building the facade, windows, and doors, and firms specialized in plumbing, electrical work, central heating and air conditioning, etc.).

The contracting should be specified item-by-item.

Contracting by lump sum for public authorities (even in smaller packages) is strictly forbidden. The rules of **DIN 1960** and **DIN 1961** are not binding for private contracting, yet in the vast majority of cases involving private contracting, these rules are applied, and in a specific chapter of the contract are declared as a binding part of the contract.

Bidding and tendering are, in general, open processes. The project will be announced publicly (throughout the European Union for larger projects). The public authority or private owner supplies the bidders with the necessary detailed plans and specifications, so the bidding is based on identical construction information. The precise nature of plans and specifications is defined in **DIN 1961**. Alternatives are acceptable. In such cases, both the original construction and the alternative must be calculated, and the alternative one submitted with complete construction details.

The proposals are opened in public, and this action must be announced well in advance. The bidders have to be invited.

In normal cases, the contract has to be given to the most economical bidder. This means that the life-cycle cost of later maintenance has to be considered. It also means that the lowest bidder does not always get the contract.

In order to evaluate proposals and to judge reasonable prices, most public authorities computerize their contracting results. The agency thus obtains an overview of the current average pricing,

section-by-section and item-by-item. If the bidder goes far below such price averages, he/she will be scrutinized closely about reliability, financial backing, and economic potential. If there is any doubt in such a case, the bidder with the price closest to the average of the previous contract will probably be awarded the contract.

If an investor (private or public) has publicly announced a bidding and tendering procedure, and bidders have received the appropriate material and have submitted an offer or proposal, according to German law, a preliminary contract between the investor and all bidders has now come into effect. Only under certain conditions can either party withdraw. These rules are set up to:

- achieve an efficient procedure to operate bidding, tendering, and contracting;
- protect those who are not sufficiently trained in such matters;
- avoid wild bidding and tendering operations on both sides; and
- prevent anyone from incurring unjustified losses as a result of speculative bidding, tendering, or contracting.

Once the contract has been signed and implementation has started, the construction work is rigorously controlled on-site by the construction manager.

In Germany, the construction management of public buildings or infrastructure projects is performed by the respective public agency. Only in rare cases will a public agency engage a highly-specialized and competent private construction management firm. In the private sector, a private construction management organization (usually a civil engineering or architectural firm) performs construction management.

A NEGOTIATED OFFER

When an owner negotiates a contract with a pre-selected contractor or group of contractors, the competitive process is eliminated entirely, and the contractor is chosen on the basis of reputation and overall qualifications to do the job. The forms of such contracts are almost limit-

less because they could include provisions that are best suited to the particular work involved and which are agreeable to both parties.

Negotiated contracts are normally limited to privately financed work because competitive bidding is a legal requirement for most public projects except under extraordinary or unusual application of negotiated contracts across the board in the private sector. This can only be interpreted as a sign that owners are increasingly finding that such arrangements are in their best interest [2].

THE BID AWARDING SYSTEM IN SAUDI ARABIA

All bidders are informed through at least two public announcements in the official newspaper, or through a private invitation in the case of limited bidding. The offers are opened on the date announced by the envelope-opening committee. The offers are publicly read. For construction work, at least five classified contractors in the required class are invited to submit their bids within a period of 1 month. The date and time of opening are fixed. All offers are sent to the bids evaluation committee, which awards the contract to the lowest bidder who satisfies the contract conditions and specifications (unless the offer is so low that there is concern that the project will not be completed). The evaluation committee may negotiate with the lowest bidder if the price is higher than the market price, in order to achieve a price reduction. Also, the committee may negotiate with the lowest bidder to have limits in the offer withdrawn. In either case, if the lowest bidder does not agree with the committee, the negotiation moves to the second-lowest bidder, and so on, until the best offer is selected [6].

With the movement toward free trade between countries, it is essential for contractors to be aware of different bid-awarding systems. Although the

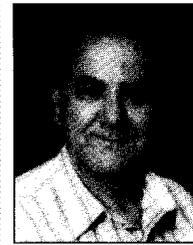
lowest-bidder method is very common, it is important to understand that not every country uses it in the public-works sector. Many nations use non-lowest-bidder systems.

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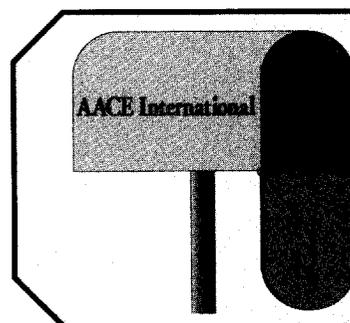


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