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CONSTRUCTION WORKS BIDDERS SELECTION

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Summary: In this paper a very "easy to use" tool is shown in order to evaluate the best Technical and Cost Proposal for a Construction Works Bid, particularly when big amounts of money and public institutions are involved. Different criteria, known by the bidders, are structured in two absolute measure models, costs and benefits. The Benefits model stands for the offers technical qualification (work schedule and proposed methodology) as well as for the bidding company's attributes (offered infrastructure, general and specific experience, other simultaneous work commitments and financial stability). The Costs model considers the final bidding amount and the risks involved in strong deviations between the bidding amount and the official budget (in time and money limits).

The Benefits model acts as a filter for the following economic proposal aperture. As a common practice, the bidders those technical evaluation (in addition to the company's evaluation) exceeds the threshold defined by the Benefits model, may continue to the next step: the economic offer evaluation. By these means, not only a minimum acceptable quality level is guaranteed, but the mayor effort of the economical analysis is concentrated only in these bidders, which are initially scored equally. Finally, and after a sensitive analysis for the Cost-Benefits ratio, the offere that obtains the best score is recommended to the Decision Making Committee, for the construction works contract.

1.- Introduction

In our country and surely in many others, many irregularities are related with the Construction Works contracts and procurements. Without entering nearly illegal practices, it usually happens that bidders have no precise idea of the criteria by which they are going to be measured, which means that certain facts are stressed in their proposals with no visible effect on the results. It can also happen, to their great surprise, that even though they obtained a good (or the best) technical qualification and, in addition, offered the lowest construction price, they are reported, that some other company won the bid. The relative value of the technical and economic bid sections may not be known until the very end of the process, and inside each of these branches, complete different aspects are integrated in a single "grade scale", as if all of the criteria involved were of the same kind, of the same importance, and their final score is simply an addition, that may be mathematically invalid.

1.1- Common problems that arise in the Construction Works contracts real world

It also occurs in practice, that some of the apparently strict and must-be universal constraints or filters, turn to be something like "recommended facts", that can be managed by the evaluator (client) in order to help some of the bidders to avoid the disqualification or invalidation of their offer and allowing them to integrate the selected set of valid bidders.

Or course that, as the contract amount rises, more and more irregularities may appear.

It is therefore important, to warn the bidders with enough time, how they are going to be evaluated, and how the required information must be submitted, in order to qualify them all in a uniform way.

1.2- Different types of Construction Works Bids

In Chile, there are mainly two types of call for tenders in the construction works area, differing in their level of competency:

> Open Calls: to which all interested companies are invited whenever they accomplish the qualification established by the scope of the work. This implies: Total competency.
>
> Closed Calls: under certain restraints, a selected group of companies is invited to send their proposal. The minimum number is established by law. In this case, we talk about Restricted competency.

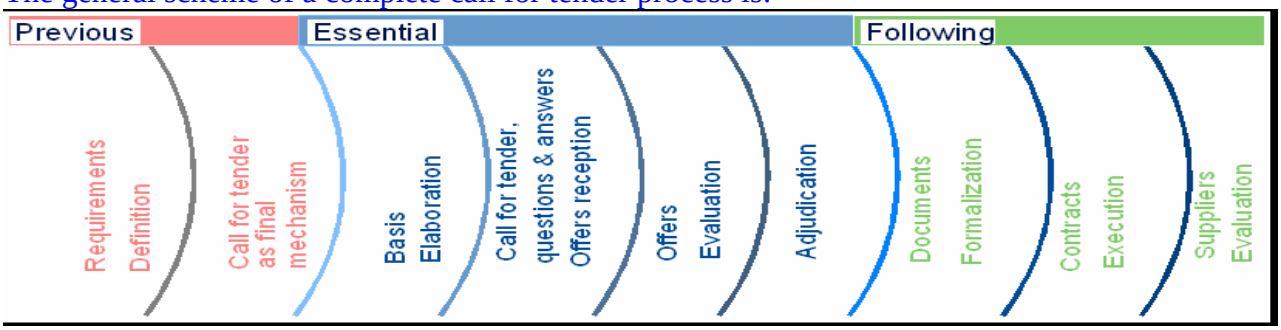
Public calls usually prefer the first scheme for three main reasons:

- it guarantees the maximum of transparency, inviting all the interested and registered bidders,
- looks for efficacy, as probabilities of obtaining exactly the expected results increases
- efficiency, as costs of the acquisition of goods, services or public works diminishes.

For example, Chilecompra is the Chilean Government's e-procurements system, designed to distribute and to maintain the information of its supply operations in an updated form, using the Internet platform. Its market reaches 10% of the NGP.

This is not always the case for private companies, and under certain conditions, they may select a group of bidders to invite. The number of privately invited companies must be 3 or more.

The general scheme of a complete call for tender process is:



This paper only deals with part of the central area of the above scheme, mainly evaluation of offers, the management of this information in terms of supporting the evaluation process and the final designation instance.

Even though it does not make part of the evaluation process itself, there are several dates and steps that must be stated previously, in order to gather the appropriate information in the desired form, type and time. These are specified in the General Basis and consider:

- Date and time of publication
- Date and time of explanatory questions opening
- Date and time of explanatory questions ending
- Date of explanatory answers publication
- Date and time of offers reception closing
- Date and time of technical proposal opening act
- Date and time of economical proposal opening act
- Date and time of physical proposals reception (if applicable)
- Date and time of physical proposals opening (if applicable)
- (Estimated) Date of proposals evaluation
- Date for designation
- Date for contractor's formal agreement
- Contract's work length

Depending on the bid's complexity and relevance, it may be of interest to consider the following aspects:

- Making the official budget be known
- Set of important definitions or glossary distribution
- Allowed level of subcontractors presence (if allowed at all)
- Number of steps involved in the evaluation (2 are common, a technical and an economic one)
- Defined control mechanisms (particularly in very long or complex situations). They include: progress reports, periodic meetings, periodic or step by step reports, etc.
- Penalties for contract breaches
- Controversies or conflict resolution mechanisms, to be applied during the offers opening or during the projects execution
- Additional clauses related with the definitive contract or other administrative aspects.
- Type and amount of guaranties needed to ensure the offer and contract seriousness
- Number of persons involved in the evaluation process as a measure of transparency

In this sense, the “best value” is a very common concept used is the Anglo-Saxon world, and searches for the solution that offers greatest benefits. So, besides the price factor, important facts to be considered are: technical quality, guaranties, operational or maintenance costs, insurances, term fulfilment, etc.

Any special requirement involving time, as intermediate periods for questions and answers, ground inspection, laboratory samples and testing, guaranties handling, registrations, legal writings, deeds, etc, must be considered and included in the scheduling (with the associated slacks).

Additionally the initial filters must be established, in order to prevent the unnecessary evaluation of proposals that do not meet the basic requirements, among these: the legal documentation that supports the company’s juridical existence, commercial reports, taxes and social security payments, certifications, municipality permissions, etc.

Clearly-stated bid-issue documents not only simplify contractors’ tasks of preparing bids, but more importantly, minimizes the need for clarifications of intentions and for extra equipment, work and charges.

Ideally, before a bid package is issued, if should be submitted to the cost engineer for preparation of:

- A bidding specification with the instructions to bidders on the required form of bid breakdown, unit price data, hours per man estimates and other specific information to be supplied in accordance with the project codes of accounts.
- An available-funds memorandum showing the amount of money that has been included in the authorization estimate for the bid package. This will facilitate bid appraisal and justifications of variances, as well as provide data that will be useful for preparing future cost figures.

1.3- General Definition of the Models

For evaluating the Benefits of the technical offers, an absolute measure model is proposed. Only by using absolute measure, we will be able to construct the technical threshold, by means of which selected proponents will be considered for the economic evaluation. In terms of the technical evaluation, most of these criteria are of qualitative type, which means that to some extent, some of them were traditionally left aside because of not knowing how to “measure” them. Others, partially because of the same kind of reason, were “transformed” or “measured” in terms of costs. This common practice, that “unifies” all measure scales, implies forcing the nature of the criteria, to an unnatural scale. It is not natural to measure the benefits of, for instance, using the latest up-to-date technology in managing some environmental waste, in terms of the “money saved if that environmental waste had spilled over the area”. It might be no monetary “cost” to measure that damage.

The Cost Evaluation, with essentially quantitative criteria, takes into account the total offered amount and the risks related with the main items. These risks are measure in terms of costs deviations from the offered budget and in terms of time delays. The Cost/Risks

evaluation is performed only for those bidders whose technical offer has been considered of an acceptable level, this is, located over the threshold defined by the first model step. The economic offer of the not qualified bidders, remains in a closed envelope and is returned to the corresponding construction company.

Obviously, the bidder ranked in the lowest position (less Cost&Risk), is the potential candidate to have the bid adjudicated.

1.4- Actors involved

For entering the pairwise weights and defining the terminal criteria scales, the main specialists involved came from:

- The client's administrative headquarters, as they are used to analyze bids monthly
- The ITO's (that stands in Spanish for Technical Works Inspector) office, as they act as the winners company's counterpart, representing the client's interests
- Several engineers with years of construction works experience

2.- The Benefit Models' Structure

The benefits of the technical offer are analysed in terms of two main areas: the offer in itself and the bidder (the company).

The offer is studied in its own merits: the technical quality, which includes aspects like refinement level of items, amount and type of human resources offered for this project, construction terms (within the limits established in the basis), several criteria that take coherence factors into account and a complete analysis of the proposed methodology: constructive sequences, hazard and climate conditions management, comprehensive level shown in the proposal, self control mechanisms, etc. Some companies are reluctant to show a deep level of detail in these criteria, as it also constitutes a common practice to use a bidder's methodology and technical considerations as a mean for negotiating with another company, once the economic factors are known. In these cases, the offered economic proposal is used as an upper bound for obtaining a new offer with the selected methodology at a lower price. It can be stated that the desegregation level must be such that no activity exceeds a certain percentage of the complete work, measured in terms of a Gantt Chart, as not all bidders use Microsoft Project, Primavera or similar software tools. It is important to define clearly, the standard software tools considered, as it helps to evaluate all bidders with the same ruler. This is not always obvious, and it may happen that several different file types are received, with the corresponding need to translate them to a common basis, carefully check error translations and assign special resources to the task.

When looking at the bidding company, the idea is to be able to check several aspects of specific and general experience (years within the activity, number of same kind of projects or projects of similar amount in the last 10 years, etc), both of the company and of its main subcontractors. We also want to recognize future problematic areas: too many simultaneous works that might need to share resources (human, infrastructure, machinery, etc),

probability of changes in the offered main positions, delays in starting or in placing different facilities, differences in the offered quality of supplies and machinery, etc.

It is also important to observe the offer's present level of subcontracts. While a high subcontract level may be a plus in terms of the flexibility to inject the required resources in necessary periods, it also means a high rotation staff, where the quality levels tend to vary strongly, working conflicts appear sooner or later, and there is less compromise with the company and their goals.

Finally, the company is evaluated in terms of its economic sanity: several static and dynamic financial index are considered, oriented towards identifying the bidding company's economic and credit capacity as a rate of the offers economic value.

2.1- Technical Evaluation Model and an "Acceptable" Threshold Definition

With the aid of the experts in these fields: bids checkers (proposal reviewers), field engineers, ITO's personnel and economists, the comparisons were made and the model was completely evaluated.

As the number of possible bidders was unknown, an absolute scheme was chosen to evaluate the alternatives, and measure scales were built. Most of them were of rating kind (from 3 to 5 steps) and just three of the terminal criteria were dichotomic, a very important fact for threshold construction. The final dichotomic criteria were those which measured the environment management and quality self control program, both described simply in terms of an adequate or inadequate program.

To conclude this model, two thresholds were built: the technical acceptable level and the lowest required threshold. Below this lowest level, offers are considered invalid. Making a comparison relation between these ratio scale values with the typical Chilean school grade ordinal scale, that runs from 1 (very bad) to 7 (excellent), the lowest bound matches with a 5.0 (sufficient) and the acceptable level matches more or less with a 5.9 (good). No offer will be considered, if its technical evaluation is less than good.

3.- The Costs Model

The cost model, also an absolute measure model, simply evaluates de total amount offered by the bidder and the costs and terms deviation risks. These criteria (just 3 terminal criteria) were considered in a unique model, as their "sign" is the same. This is, high costs or high risks both evaluate bad and should give low-chance companies' prioritization.

The total amount, with a direct scale expressed in MM of $CLP (millions of Chilean pesos), is entered in its reciprocal form to display the bidders in the same descending order (the higher the price, the offer is less interesting and evaluates in a lower position).

For the cost and risks deviation, we pretend to detect wrong computations in terms and in costs, that latter on, can mean delays, extra budget resources or at least, troubles. In the costs case, small deviation of items cost with respect to the internally estimated total cost (less than 5%) are welcome, as it means savings, that benefit both the bidder and the client. From 5% on, these deviations tend to be less favourable as an error is presumed. This criterion is measured with an absolute scale that adds over all the differences between items and the total internally estimated cost. Norm 2 (Euclidean norm) is used to measure the differences.

In the project's length case, the computation is a little different. First the critical path items are identified, this is, items related with some critical path activity. Then, this period length is compared with the mean distance, as a rate with respect to the complete length of the project. As in the case above, a value less than 12% is considered good, as it stands for a month of time savings. Between 1 and 3 months of time savings are considered regular, and beyond that value, figures are presumed to be mistaken and do not favour the evaluated bidder.

The official budget's value plus the correct evaluation of the deviations risks define the natural threshold for this model, and alternatives that evaluate above it, are discarded.

4.- The Alternatives, Evaluation and Final Conclusions

There were initially 10 participants in this construction works bid. Once all passed the initial filters related with the proper accreditation of documentation, only 9 of them survived.

The technical threshold left one of the bidders behind, as his evaluation was deficient. No bidders was evaluated below the lower limit. The contract company "Fe Grande" was prioritized in the first place, with 86.9%, where 1000% means complete matching with the "ideal" technical evaluation, and Icafal took the second place with 79.9%. These values are referential, as the threshold, located in 59.6% is quite far from the first places.

For the second stage, all ratings were deleted, and the remaining 8 bidders (that survey the benefit threshold) start a new race for the lowest costs&risks rating.

Here, the contract company that had had the best evaluation in the previous stage fell to the 6º place, with a compound rating of 89.27%. Icafal, that was in the 2º place, rised the first place, (100%) as being the cheapest and the one with lowest risk. In the second place, with 97.58% stood International, that had the 4th place in the previous stage.

So, even if we did not do so, if we had chosen to combine the Benefits and Cost&Risks evaluations, the final rating gave Icafal as the best evaluated contract company.

What happened later…..

On the first instance, the bid was declared void, as all the bidders largely exceeded the official budget, and no way was found towards a successful agreement.

A second formal call for tender was performed, with Icafal, the actual contractor's company winning the bid.

Several adjustments were made on the run, as the initial terms changed slightly for the second call. Arrangements were needed in order to modify the general scope of the contract, as the official budget was still below the best economic offer.

The construction work is now 99% completed and entering the final **"testing period".**