PLANNING AND IMPLEMENTATION OF THE PARTICIPATION IN BIDDING PROCESSES FOR ENGINEERING WORKS

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ABSTRACT

This paper covers planning and implementation of the participation in bidding processes for engineering works. It initially discusses the characteristics and peculiarities of bidding processes and the planning and execution of projects. Then it addresses scope, time and cost planning, in order to increase the chances of success of the project, since construction bidding processes have features and particularities that may result in disqualification, or not winning the contract. It also addresses the specifics of the implementation of participation in the bidding process.

1. INTRODUCTION

For the implementation of engineering works and services with public funds, it is required a bidding process, which respects the principles of legality, impersonality, morality, publicity, and efficiency, and aims to meet the public interest via its contracts, hindering any harmful practices.

It has also been an increasingly common practice the occurrence of bidding processes for contracting of engineering works and services financed with private resources, aiming mainly at reducing the price.

Bidding is a method of competitive procurement, which can bring more economical and higher quality projects, goods or services to the purchasers. It is also the internationally used and verified project procurement method, which is adopted widely by developed countries and most of developing countries [1].
Bidding is a process where an entity, the customer, puts on an offer for a work, for the provision of a service, or for the supply of a special type of goods, or process or construction equipment.

Competitive bidding and the negotiation of prices are common practices in business, government, and institutional markets. The development of a successful bidding strategy represents a real problem for the industrial competitive bidding. [2]

The bidding process is one of the most important phases in the construction industry. The major objective of construction companies is to expand business volume by successful bidding on various projects. For this reason, companies must prepare realistic bid proposals. However, the traditional bidding process is time consuming and requires a great deal of effort. [3]

The type of bidding process normally used for engineering works (construction, reform, manufacturing, recovery, or expansion) is the Competition, being usually formed by the following steps:

- **Request for Proposals:** are carried out all the necessary actions for the preparation of the document (the bid notice) by means of which the customer provides all instructions, conditions, rules, and bidding documents, and presents all the characteristics of the subject-matter (the work) of the bidding process.
- **Qualification of bidders:** evaluation of legal qualification, technical qualification, the economic and financial qualification, and tax compliance;
- **Examination and Classification of Proposals:** the proposals are ranked according to objective criteria listed in the bid notice.
- **Ratification and award:** awards (assigns) the subject-matter of the bidding process to the winning bidder, being given to it preference to the contract. After the after the periods for examination, awarding, and time limits for appeals, the relevant authority will approve and ratify all its previous acts, confirming their validity.

However, when the subject-matter of the bidding process are engineering works or services, the bidding process contains characteristics and peculiarities that can turn into opportunities or threats, depending on the way they are managed by engineering companies.

That is, the strict ritual demanded by the bidding process means that the participation of engineering companies in bidding processes for engineering works can represent either an opportunity or a threat.

The most effective way to increase the engineering companies’ chance of success in participating in bidding processes is to consider such participation as a project itself, which must be managed considering the characteristics and peculiarities of the bidding process and the project management best practices.

Considering the characteristics of the bidding process of engineering works, note that it is finite (it has a date to start and to finish), aims at producing a product (the set of proposals and other documents provided for in the bid notice), and needs to be managed, so that the chances of success are viable.

Considering the above, it can be concluded that the most appropriate way to deal with the uncertainties, characteristics, and peculiarities of bidding processes for engineering works is to consider the participation in these bidding processes as projects that must be properly managed.

2. PROJECT PLANNING FOR PARTICIPATION IN BIDDING PROCESSES FOR ENGINEERING WORKS

Planning is responsible for setting the course of actions to be taken. Via planning, the objectives, goals and strategies are analyzed and explained so that the project can achieve its goals of cost, schedule and technical performance during its life cycle. [4]
Planning is comprised of processes that define and refine objectives and plan the necessary action to ensure that the objectives and the scope of the project are achieved. Planning processes develop the project management plan, identify, define, and mature the scope of the project, the project cost, and schedule project activities that take place within it [5].

2.1. Planning the Project Scope

A properly detailed scope of work makes it possible to improve the accuracy of cost estimates, time, and resource estimates. It also facilitates the definition of a baseline for project performance monitoring and control, and the definition of the responsibilities of the project team.

Thus, the requirements of the project and of the product contained in the bid notice, especially those defined by means of the basic design, should be adequately analyzed, so that, in the light of these, the PPLOE scope is defined, validated and controlled. The definition of scope involves the detailed description of the project and of the product based on the main deliverables, assumptions and constraints.

Thus, in order to enable the appropriate characterization of the engineering work subject-matter of the bidding process, the bid notice is usually followed by a Basic Design, composed of a set of required elements, sufficient and accurate, that characterize the work subject-matter of the bidding process. “(...) a perfectly defined phase of a broader set of studies and projects, preceded by preliminary studies, preliminary design, technical feasibility studies, economic and environmental impact assessment, and succeeded by the phase of executive project or detailing.”[6]

The project requirements must be collected in order to document the needs of stakeholders through Scope Planning. The scope must be defined through the project scope statement, and the main project work and deliverables should be broken down into smaller, more easily manageable components, via work breakdown structure.

The project scope is defined through the project scope statement, which contains the description of the project scope, assumptions, exclusions, and limitations of the project, the acceptance criteria, and the project deliverables.

Normally the project deliverables need to be broken down into smaller units, the work packages, through the WBS, which demand knowledge of the characteristics and peculiarities of the bidding process, and previous experience in similar projects.

A WBS is presented as follows, considering the main activities related to planning and execution of the participation in bidding processes:

**WBS - PARTICIPATION PROJECT IN BIDDING PROCESSES FOR ENGINEERING WORKS**

1. **Kick-Off Meeting**
2. **Planning for participation in the bidding process**
   2.1. **Prepare the Scope Planning**
   2.1.1. **Collection of the bidding process requirements**
   2.1.1.1. Acquire the bid notice
   2.1.1.2. Analyze the bid notice regarding the subject-matter of the bidding
   2.1.1.3. Analyze the bid notice regarding legal qualification
   2.1.1.4. Analyze the bid notice regarding tax compliance
   2.1.1.5. Analyze the bid notice regarding economic and financial qualification
   2.1.1.6. Analyze the bid notice regarding the technical qualification
   2.1.1.7. Analyze the bid notice regarding deadlines and deliverables
   2.1.2. **Define the scope**
   2.1.3. **Prepare the WBS**
2.2. Prepare the Time Planning
2.2.1. Define the activities:
2.2.2. Plan the activities according to a timeline
2.2.3. Estimate activity resources
2.2.4. Estimate activity durations
2.3. Prepare the Cost Planning
2.3.1. Estimate costs
2.3.2. Determine the budget
3. Implementation of participation in the bidding process
3.1. Meeting the requirements of the bid notice
3.1.1. Obtaining the documents regarding legal qualification, tax compliance, economic and financial qualification, and technical qualification with the relevant agencies
3.1.2. Organization of the documents as required in the bid notice
3.1.3. Filling out registration of participation (if applicable)
3.1.4. Contracting bank-issued guarantee or performance bond
3.2. Elaboration of proposals
3.2.1. Elaboration of business proposal
3.2.2. Elaboration of technical proposal
3.3. Preparation for the submission of proposals
3.3.1. Preparing and verifying the envelopes regarding documents, the business proposal, and the technical proposal
3.3.2. Submission of proposals
3.4. Participation in the proposal examination step
3.5. Termination of participation in the bidding process
3.5.1. Making arrangements regarding the award and ratification step (if winner)
3.5.2. Making arrangements regarding the withdrawal of the documents presented (if not winner)
4. Termination of the Project
4.1. Revision of the information
4.2. Archiving of project information for future use
4.3. Lessons learned
5. Follow-up meetings

2.2. Planning the Project Time

Through the Time Planning, specific activities that must be performed to produce the various project deliverables should be identified and documented, the resources required by the activities must be estimated considering the type and quantities of each, the duration of the activities must also be estimated, and the project schedule must be developed considering the resources needed, constraints, durations, and the timeline of activities.

The project schedule should be drawn up taking into consideration the dates of delivery provided for in the schedule normally supplied attached to the bid notice, and be based in the activities defined in the scope management step, through a WBS. Thus, the activities must be planned according to a timeline and, for each activity, its duration should be calculated, and resources be allocated.

Due to the characteristics of the activities, the resources required are mainly labor with experience in this type of project. Thus, it is recommended that part of the project team are comprised of the following professionals: project manager; bidding process expert; cost and budget expert; professional with technical knowledge to interpret the basic design, typically a civil engineer or architect. Depending on the requirements provided for in the bid notice regarding sustainability, it may be recommended to include a professional specialized in this field.
However, as the team size, in addition to influencing the duration of activities, also have a strong influence over project costs, it may be necessary to reduce staff, but keeping the same skills, through versatile professionals. So, for example, the same professional can be specialized in bidding processes and in sustainability.

2.3. Planning the Project Cost

Competitive bid pricing for most firms is essentially a process of estimating the cost of doing the job, and adding a markup to provide for profit. The lower the bid, the greater the likelihood of winning the job, but at a sacrifice to profit. Conversely, a high bid relative to competition, will include a greater profit target, but at the same time, will lessen the chance of winning the job. It is the task of the pricing analyst and bid decision makers to arrive at an optimum combination of price and profits to achieve the long-run objectives of the firm. [2]

With pricing objective(s) differing from contractor to contractor, approaches to bid pricing are therefore unique to individual construction firms. Essentially, they need to win jobs by targeting at bid opportunities that assist in meeting firms’ objectives. [7]

The process of arriving at a bid price relies heavily on configuring the lowest possible cost for the job, combined with an intuitive judgment on mark-up percentage. Each new bid opportunity is viewed as a stand-alone opportunity and the primary pricing goal is to win as many jobs as possible within capacity constraints. By bidding often enough, and by adjusting the mark-up fee based on the most recent bid, a supplier can be expected to garner a share of business. However, the cost of bidding is high and improved profitability relies on turning out projects at an increasing rate. [2]

Through the cost planning, it should be estimated the cost of the resources needed to complete the project activities. Cost estimation is the process of developing an estimate of the monetary resources needed to perform project activities. The main benefit of this process is the definition of the costs required to complete the project works. [5]

Thus, for the formulation of the price of the proposal, it should be considered the costs of all features required by the performance of the work activities and by the management activities, plus the BDI (Budget Difference Income).

The cost estimate should also consider the cost of acquisition of the bid notice and document copies. It should be also taken into account commuting costs for the acquisition of the bid notice, costs with technical visits, visits to government agencies, and costs for the participation in meetings of the bidding process, especially in the case of bids in other cities, such as those relating to tickets, accommodation, and meals.

To comply with the requirements regarding documentation, it may be required to obtain certificates, pay fees of registry offices, government agencies, and professional associations, such as the Council of Architecture and Urbanism, and the Regional Council of Engineering and Agronomy, which means these costs also have to be estimated. Depending on the size, characteristics, and peculiarities of the work and of the bidding process, it may be necessary to estimate the cost of legal counsel.

However, to consider all these costs and keep the proposal price competitive is a complex task. The final price of the commercial proposal must be assessed regarding its feasibility, since prices above or far below the limit laid down in the bid notice are disqualified. In some cases, it may be necessary to demonstrate the feasibility of the budgeted value.
3. PROJECT IMPLEMENTATION OF THE PARTICIPATION IN BIDDING PROCESSES FOR ENGINEERING WORKS

The project implementation of the participation in bidding processes for engineering works encompasses the processes of compliance with the requirements of the bid notice, and preparation and submission of the proposals.

3.1. Meeting the Bid Notice Requirements

To meet the requirements of the notice, it should be provided the documents regarding legal qualification, tax compliance, economic and financial qualification, and technical qualification with the relevant agencies. The Legal Qualification aims to prove the legality of the company and the legitimacy of its representation.

Tax Compliance aims to prove that the bidder, under the Federal, State and Municipal governments, is suitable before the tax authority, the guarantee fund for length of service, and social security. The Technical Qualification aims to demonstrate that the bidder has the professional requirements needed to perform the work on the standards expected. The Economic and Financial Qualification aims to demonstrate that the bidder has sufficient economic and financial capacity to ensure the full performance of the contract.

Such documents shall be organized as requested in the bid notice. Some bidding processes require filling out registrations for participation, which should be arranged. It also must be provided the contracting of a bank-issued guarantee or a performance bond.

3.2. Preparation and Submission of Proposals

Normally, two types of proposals are necessary: the business proposal, and the technical proposal. Regarding the business proposal, it should be printed on letterhead, and show the date of delivery by the bidder. It must present global and unit prices, based on the price sheet. It is also common to be requested the detailing of the social security contributions and the BDI percentages, as well as the compositions of unit prices for all services. In addition, it should be informed the period of validity of the proposal, banking information, and other specific requests of the bid notice.

The technical proposal must demonstrate the company's ability to perform the activities provided for in the bid notice regarding infrastructure and manpower. Thus, it must present the facilities and equipment available, as well as the qualification of the members of the technical team.

Usually the bid notices require that the proposals are submitted via three envelopes: one contains the technical proposal, another containing the business proposal, and a third one containing the documentation concerning the legal qualification, tax compliance, technical qualification, and the economic and financial qualification.

4. CONCLUSIONS

For the implementation of engineering works and services with public funds, it is required a bidding process, which respects the principles of legality, impersonality, morality, publicity, and efficiency, and aims to meet the public interest via its contracts, hindering any harmful practices.

When the subject-matter of the bidding process are engineering works or services, the bidding process contains characteristics and peculiarities that can turn into opportunities or threats, depending on the way they are managed by engineering companies.

In order to increase the engineering companies’ chance of success in participating in bidding processes, this article considers the participation in bidding processes for engineer works as a project itself, which must be planned and performed considering the characteristics and peculiarities of the bidding process and the project management best practices.
Regarding the best practices in planning the scope, time, and cost, and the project performance, it were adopted the PMBOK (Project Management Body of Knowledge), edited by the Project Management Institute.

Regarding the characteristics and peculiarities of the bidding process, it was considered as a set of processes that aggregate actions taken by people and that generate results; these processes interact and overlap throughout the bidding process.

REFERENCES