

## **Evaluating The Criteria for Contractors' Selection and Bid Evaluation**

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**ABSTRACT :** *Construction contractors have big influences upon projects and their successes. Therefore, it is quite critical to select a qualified contractor in the process of construction management. A competent construction contractor is one of the indispensable conditions of a proper process and completion of a construction project. There are several theoretical frameworks or models applied in the evaluation of contractors. And there are some practical criteria for selecting an appropriate contractor. This paper analyzed the relevant theoretical methods for contractor evaluation and examined the actual criteria for the selection of contractors. This study aims at identifying the criteria for selection of contractor and bid evaluation means by which different emphases can be recommended to suit the requirements of clients and projects. The research was conducted by sending a questionnaire to different project managers in India and had an exceptionally high rate of response of 72%. The analysis led to some interesting findings that reflect on the current practice. The paper is concerned with providing construction contractors with recommendations in pursuit of better evaluation of construction bids both technically and financially.*

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### **I. INTRODUCTION**

Construction project must be managed in an effective manner. The demands from clients and competition have been growing rapidly (Crowley and Hancher, 1995). These challenges present a paradox. Few of these demands directly contribute to the physical construction of the project, however, a failure to properly manage them can lead to problems for the entire project and construction team. The selection of a proper construction contractor increases chances of successful completion of a construction project (Alhazmi and McCaffer, 2000). It can also fulfill the client goals, and keep the schedule of the cost, time and quality. So it is extremely critical to select an appropriate contractor in the process of construction management.

The selection of construction contractors are very often conducted during tendering. Tendering definitely gives a client a choice in awarding contract a company which proposes the lowest price and short construction cycles, but usually they do not allow to precisely evaluate a tender. At the same time there are more and more procedures in which the decision criterion of choosing a tender is the price. In recent years, most clients made use of such a method. On the other hand, the research results show that the cheapest tenderers often have problems with completing the project. Accepting the lowest price is the basic cause of the project completion problems because very often lowering the price means lowering the quality. It is true in some cases. The above conditions make that it is especially important to properly evaluate the contractor's capabilities. We analyzed in Selecting the most suitable contractor for a construction project is a crucial decision for owners and project managers. Therefore, this paper aims at selection of construction project contractors with recommendations about the suitable criteria for better evaluation of construction bids both technically and financially. Furthermore, it provides practitioners working or intending to work in the North East with better insight due to the common trends.

The objectives of this paper are as follows:

- Reviewing the various criteria used for contractors pre-qualification and bid evaluation.
- Identifying the criteria that are actually used to evaluate contractors' pre-qualification and bids in India.
- Introducing some recommendations for enhancing the contractors' selection process.

### **II. LITERATURE REVIEW**

Contractor pre-qualification and bid evaluation procedures are currently used in many countries, and it involve the development and wide consideration of necessary and sufficient decision criteria to evaluate the overall suitability of contractors. The literature review discovered the existence of various criteria, types of information and methods of assessment.

Hatush and Skitmore (1997 a) pointed that the tender system of basing decisions on the minimum price has been used in New York since 1848 for highway and bridge tenders. The main idea of such a method was to save financial resources and create equal competition for all contractors by lowest bid. Hatush and Skitmore (1997 a) recognized five main elements that was common factors in the contractor selection process for each and every one types of procurement arrangements. These are project packaging, invitation, prequalification, short listing and bid evaluation. Hatush and Skitmore (1997a) identified pre-qualification as a pre-tender process used to investigate and assess the capabilities of contractors, hence providing the client with a list of potential contractors to invite to tender. Bid evaluation despite involves similar process it is different in two aspects; it occurs at the post tender stage and it considers both bid amount and the contractors' capabilities. Russel and Skibiniewski (1988) defined bid evaluation as a decision-making process that involves the development and wide consideration of necessary and sufficient decision criteria used to assess the contractors' capabilities. It requires knowledge and experience from the project manager in order to use the appropriate criteria to insure the selection of the most suitable contractor technically and financially for the project (Hatush and Skitmore (1997a)

### III. BID EVALUATION

Bid evaluation according to Herbsman and Ellis (1992), amount to the 'major' criteria of cost, time, and quality as measured by the bid amount, time of execution, and quality of previous work respectively. This implies that the winning bid is fully responsive to the contract in addition to the bidder's being sufficiently well qualified to undertake the contract (Hardy, 1978). Bid evaluation is used to indicate the procedure for strategic assessment to tender bids submitted by pre-qualified contractors. The strategy used for bid evaluation should reflect the client's objectives (Hardy, 1978). In addition, Herbsman and Ellis (1992) have also further project-specific criteria, including safety, durability, security, and maintenance. More objective methods have been proposed by Moselhi and Martinelli (1990) and Diekmann (1981) by means of multi-attribute utility techniques for combining the bid price and contractor selection criteria. The evaluation of bids by multi-attribute methods may encounter some difficulties when comparing different criteria measured by different scales. Hence various ways have been suggested for combining criterion values into a single scale. Herbsman and Ellis (1992), on the other hand, proposed a time/cost approach to determine the winning bid in the highway construction contracts. By converting the contract time to cost, a straightforward comparison can be made on a single criterion. Finally, Holt *et al.* (1993) combine their P2 and P3 score into a simple index by assigning 60% weighting for the P3 score and 40% to the P2 score.

Hence, it could be concluded that there is no consensus as yet on a common set of selection criteria for contractor selection. Selection criteria may vary in emphasis according to the characteristics of the project.

**The Selection of Construction Project Contractors :**It is problematical to select a suitable contractor. Bid evaluation is one of the major challenges that face owners and consultants in the public and private sectors. On the other hand, there are objective means to gauge the ability of a contractor to properly manage the business aspects of the construction project. Some models and frameworks have been created to evaluate contractors' bids and select the most suitable one.

**The Cost Consideration :** Among all factors the main evaluation factor is cost or price consideration that may affect the selection of a contractor. Although the lowest bidder system protects the public from improper practices, it has certain disadvantages. These include unreasonable low bids either accidentally or deliberately or unqualified contractor which cause extensive delay, cost overrun, quality problems and increased number of disputes. Over the years some modification to the lowest bidder system were made, such as reasonable bidder, public interest and prequalification list which open the door to other evaluation methods to be adopted instead of the single criterion system lowest bidder system.

**The TOPSIS and SAW-G Grey Techniques :**The grey theory is a new technique for performing prediction, relational analysis and decision-making in many areas. The grey theory techniques were applied for defining the utility of an alternative. Proposed assessment model covers well known method of TOPSIS (Technique for Order Preference by Similarity to Ideal Solution), method with attributes values determined at intervals (TOPSIS-grey) and a method of Simple Additive Weighting with Grey relations (SAW-G). The methods of grey relations methodology can be implemented as an effective decision aid for tasks with uncertain data.

**Pre-Qualification and Bid Evaluation Criteria :** To ensure the quality of contractors, the valuation can be done beforehand with a prequalification method. Facing the owner's scrutiny regarding its competency to handle the business aspects of the operation during prequalification allows the contractor to focus on the specifics of the construction project once it has passed through prequalification and been short-listed. This also

allows the owner’s bid evaluation team to focus only on the specific elements of the project, without being distracted by the other business considerations. In the simplest meaning prequalification is a before tendering procedure which allows to choose the most appropriate candidates from amongst those declaring willingness to participate in the tendering. Prequalification is defined by Moore (1985) as the screening of construction contractors by project owners or their representatives according to a predetermined set of criteria deemed necessary for successful project performance, in order to determine the contractor’s competence or ability to participate in the project bid. Clough (1986) thinks that prequalification means that the firm which wants to participate in the tendering needs to be qualified before it can be issued bidding documents or before it can submit a proposal. Pre-qualification and bid evaluation procedures involve different types of criterion to evaluate the overall suitability of contractors such as: General, technical, managerial, and financial criteria (Hunt *et al.*, 1966); Financial stability, managerial capability and organizational strength, technical expertise and experience of comparable construction (Merna and Smith, 1990); Relevance of experience, size of firm, and safety record (Moselhi and Martinelli, 1990).

Hatush and Skitmore (1997a) have identified five main criteria for contractor prequalification and bid evaluation along with the information necessary to assess these criteria as shown in Table (1).

**Table 1: Main Criteria and Sub-criteria for Contractors’ Prequalification and Bid Evaluation**

<b>Financial soundness</b>	Financial stability.
	Credit rating.
	Banking arrangements and bonding.
	Financial status.
<b>Technical ability</b>	Experience.
	Plant and equipment.
	Personnel.
	Ability.
<b>Management capability</b>	Past performance and quality.
	Project management organization
	Experience of technical personnel.
	Management knowledge.
<b>Health and safety</b>	Safety.
	Experience modification rating.
	OSHA Incident rate.
	Management safety accountability.
<b>Reputation</b>	Past failures.
	Length of time in business.
	Past owner/contractor relationship.
	Other relationships.

Russel (1996) put forward some other simple contractor prequalification criteria. He distinguishes three basic groups of criteria: \_ Preliminary screening criteria (among others: references, reputation, past performance, \_ Constructor resources (financial, technical, status of current work program), \_ Other items (project specific criteria). Quite interesting are the criteria presented by the Palaneeswaran and Kumaraswamy (2001). The following groups of criteria have been suggested: (1) Responsiveness, promptness, realism, completeness. (2) Meeting deadlines, correctness and valid information, totality in providing information. (3) Responsibility, obeying the law and complying with local government regulations, standards and bylaws, quality system, safety system. (4) Competence, recourse (financial, machinery, plant and equipment, human resources), experience, constraints (current workload, subcontracts, guarantees).

**Information**

It is necessary to collect and investigate information to quantify objectively the criteria for bid evaluation. This information includes that relating to the (1)contractor’s permanent place of business; (2) capability of plant and equipment to do the work properly and expeditiously; (3)suitability of financial capability to meet obligations required by the work; (4)appropriateness of technical ability and experience; (5)adequate experience in similar projects regarding type and size; (6) the current position of the contractor to perform the contract well; the contractor’s relationship with subcontractors, or employees. In total, the information used for the assessment of

criteria for pre-qualification and bid evaluation falls into five groups: general information that is used mainly for administrative purposes, financial information, technical information, managerial information, and safety information (Hatush and Skitmore; 1997a).

**Assessment :**The information concerning to the criteria can be assessed in various ways. This can be done by assigning a maximum point value for each used criterion. These values are then weighted to their relative importance on the overall project delivery strategy. When a criterion is made up of sub-criteria, the weighed value scores of the sub criteria are added to calculate the total value for the category. To avoid biases, it is recommended that a minimum of three evaluators is required for each scoring activity.

Holt *et al.* (1993) have planned a modified quantitative model for selecting contractors. This model comprises a three-stage process requiring the calculation of what is called P1 scale index to investigate the more general areas surrounding potential bidders. A P2 scale index is calculated for the second stage to assess the contractor further in the light of specific factors. Finally a P3 scale index is calculated to compare the bid prices amongst the invited bidders.

**The Construction Management at Risk Method :** The Construction Management at Risk method was introduced in the 1980s. Construction management at risk (CMAR) as a project delivery method was created to provide input to the designer to increase constructability of designs and to decrease schedule duration through overlapping of the design. Kknocherand Sanvido (1998) emphasized that the contractor usually has a significant input in the design process. In general, CMAR creates a collaborative environment that uses the wisdom, experience, and creativity of the architect and the CM.

Construction Management at Risk or CMAR is gaining popularity, especially in the construction of the large projects such as schools, airports, and sports arenas.

The CMAR method aims to reduce the risk of cost overrun and schedule creep and to expedite the construction process without compromising quality. The construction manager works with the designer as a team during the design phase. There are some advantages to the owner from using the CMAR delivery method are-

- [1] Risk is reduced for the architect and owner.
- [2] Produce a more manageable and predictable project cost and schedule outcomes.
- [3] Centralizes responsibilities.
- [4] The owner benefits from the CM's experience both during design and construction.
- [5] Allow for an early start to construction by phasing the work.
- [6] Results in better quality construction

**The Multi Criteria Evaluation Models :** It can be stated that contractor's selection problem is a multi-criteria problem in most cases. Many multi-criteria techniques are proposed and applied (Goicoechea *et al.* 1992, Zavadskas *et al.* 2008). Skibniewski and Chao (1992), Banaitis and Banaitiene (2006), Mitkus and Trinkuniene (2006), Ginevicius and Podvezko (2008), Turskis (2008) and Zavadskas *et al.* (2008), Plebankiewicz (2009) investigated assessment of construction firms and contractors evaluation problems. There is a Multi Criteria Bidding System which is an evaluation method that considers not only the cost as the awarding reason, but also considers other important attributes. The key of Multi attributes system is that the selection process of the contractors is based on more attributes such as, bid price or cost, time, quality, managerial safety accountability, competence and sufficiency of contractors (Liu *et al.*, 2000). The main concept of the Multi Attributes Bidding System is that the selection process of the contractors will be based on more attributes than just the price, and the successful bidder will be the one who has the highest combined bidding value of the multiple attributes. The scores of those attributes are transformed into values and those values of all the attributes are totaled to give the combined bidding value.

**Some Actual Criteria for the Selection of Construction Project Contractors :**In actuality, contractor evaluation is regularly performed by industry professionals using their accumulated experience and judgment. There are variations in the amount of effort expended in the process. An important step in evaluation is to examine the contractor's system for handling project information regarding work tasks. The contractor's approach to safety and what actions it takes to achieve desired results should be closely scrutinized. Many factors should be considered during the contractors' qualification screening. The following list includes most of the components that should be examined when conducting a contractor qualification. (1) Financial standing, such as financial stability, turnover, profit, obligations, amounts due, and owned financial funds. (2) Technical ability, such as experience, plant and equipment, and personnel. (3) Management capability, such as past performance and quality, quality control policy, quality management system, project management system, experience of technical personnel, and management knowledge. (4) Quality, safety, senior management, including experience,

tenure with firm, and division of responsibilities. (5) Current projects/backlog, including number, size, and location of projects, percent of capacity being utilized, and status and expected completion, past failures in completed projects, number of years in construction, past client relationships and cooperation with contactors. One way to collecting the data necessary to perform contractor evaluations is to conduct questionnaires. But in this way, contractors will be tempted to answer in a way that puts them in the best light. For instance, one commonly used questionnaire asks contractors if safety is a priority in their business.

#### IV. CONCLUSIONS

This paper proposed criteria to evaluate contractors and bid selection based on chosen criteria. The objective of this paper is to deliver a completed project that serves the intentional function. Some clients may choose to use just one of the criteria used to qualify a candidate to the stage of tendering procedure and it is usually the contractor's experience. Majority of studied clients evaluate contractor companies after having completed their cooperation, they keep their data and also declare giving preferences for those companies with which their cooperation was successful. This proves that they pay great attention to reliability and competence of the contractors. One important step that can be taken to ensure project success in safety is to prequalify and select only those contractors who are fully qualified by virtue of their safety programs and performance. A good safety record reduces the cost of construction and helps to support the desired attitude toward quality and productivity. Comprehensive contractor evaluations conducted prior to selection can significantly reduce the risks faced by a construction project.

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