

Selection of Contractor Using Analytical Hierarchy Process - A Review

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Abstract: More or less there are few contractor selection methods currently in existence condemned as incomplete and biased, and lacking consideration in terms of the contractor's ability to achieve simultaneously, time, cost, quality and safety standards. This paper outlines an alternative contractor selection prototype called the analytical hierarchy process (AHP), which will help construction clients to identify contractors with the best potential to deliver satisfactory outcomes in final contractor selection process which is not based simply on the lowest bid. A hierarchical structure is assembled for the prequalification standards. By applying the AHP, the prequalification criteria can be prioritized and a descending order list of contractor can be made in order to select the best contractor to perform the project. Since each construction project is unique, final contractor selection through the AHP gives clients the flexibility to add or reduce the elements of a problem hierarchy regarding an individual project.

Keywords: AHP (Analytic Hierarchy Process), Prequalification.

1. Introduction

In any construction project contractor is the key performer. The execution part of the project is totally in hands of contractor. Hence for successful completion of the project it is of utmost importance that the best choice of contractor is made among the available options. Till now "lowest bid" was the criteria used for selection of contractor, but as the world is progressing, projects are getting larger and complicated. Technical requirements of projects are varying so that experts are desired on the team by owners. Generally, abnormally low bids and contractors' opportunistic bidding behaviour are frequently observed in the competitive bidding system. Many research conclusions have pointed out that rate rivalry itself is not satisfactory to guarantee the use of cost-effective and respectable quality yields. Several and often contradictory objectives and substitutes, such as tender price, accomplishment date, and experience, need to be considered. Selecting the accurate contractor for the right project is the most crucial task for any construction client.

This research intends to assist the client in decision making so as to help them select the best contractor. For this purpose,

various contractor selection methods as well as the criteria based on which the contractor is evaluated are considered. Various stakeholders (clients, contractors, technical supervisors of construction, etc.) are involved in the construction process. A construction project is developed considering the goals and requirements of a client and the potential of a contractor and suppliers. In a construction project, the selection of an appropriate contractor is the most critical for project success. Quite often construction projects behind agenda, price changes and unsuitable quality are a direct conclusion of the selection of scarce contractor.

When selecting a contractor, a client evaluates its qualification (checks whether it meets specified legal, financial, economic and technical requirements) and compares qualification of different contractors. There are three prime grounds of scarce contractor assortment. Firstly, inappropriate criteria are selected when evaluating qualification of a contractor. Secondly, inappropriate significance is attributed to the criteria (e.g. to bid price). Thirdly, unsuitable methodology is applied for the contractor estimation and assortment task.

2. Literature Review

A review of some relevant literature on contractor selection methods is done. The review of the literature publicized the existence of several criteria, types of information and methods of valuation.

[1] Patrick Sik-Wah Fong and Sonia Kit-Yung Choi (1999), examined an alternative contractor selection model called the analytical hierarchy process (AHP), which will help construction clients to identify contractors with the best potential to deliver satisfactory outcomes in final contractor selection process which is not based simply on the lowest bid. The model tested by a hypothetical scenario where three contractor candidates were evaluated. The criteria used for contractor selection in the model had been identified, and the significance of each criterion had been arrive at by conducting a questionnaire survey in public organizations in Hong Kong. Comparisons were made by ranking the aggregate scores of each candidate with regard to their performance against each of

the criteria, and the candidate associated with the highest scores is the best contractor on this occasion.

[2] Meghalkumar I Zala, Prof. Rajiv B Bhatt (2011), Suggested AHP technique for contractor selection problem in Indian context. The data collected by them was used to create a hierarchical model for contractor selection that represented by the Analytic Hierarchy Process(AHP). By using the model & with the help of AHP technique one can develop contractor selection approach which can be most useful for the stakeholders.by the study they found out that Contractor selection is one of the most important aspects in construction contract.

[3] Mohammed Balubaid, Rami Alamoudi (2015), examined the use of the analytical hierarchy process (AHP) as a decision-support model for contractor selection. In the study, an AHP-based model was tested using a hypothetical scenario in which candidate contractors were evaluated. Six criteria for the primary objective were evaluated. The criteria used for contractor selection in the model were identified, and the significance of each criterion was determined using a questionnaire. Comparisons were made by ranking the aggregate score of each candidate based on each criterion, and the candidate with the highest score was deemed the best. The study contributed to the construction sector in two ways: first, it extended the understanding of selection criteria to include degrees of importance, and second, it the best contractor.

[4] Agraj Sharma, Ramesh Kumar Batra (2016), reviewed about all the aspects of selection of contractor with the Analytical Hierarchy Process (AHP) as a potential decision making method for use in project management. Given that contractor plays a critical role in any construction project, contractor selection constitutes key decision. It is a very important part of project it must be well experienced. A hierarchical structure is constructed for the prequalification criteria. They found out that by applying the AHP, the prequalification criteria can be prioritized and a descending order list of contractor can be made in order to select the best contractor to perform the project.

3. Objectives

The primary objective of the project is to “Evaluate the Contractor” for selection.

By evaluating the contractor, the project result tries to help the owner or client to avoid any risk associated with the contractor such as cost overruns, time overruns. To achieve this objective, a tool to evaluate key features of contractors is developed. The special requirements of projects will be associated with that qualification of the contractors who have passed the pre-qualification process. It encompasses all the components that describe the characteristics of a contractor (corporate image, technical ability, financing ability, management skills, human resources strength, equipment and machinery ownership and knowledge, experience and expertise/specialization) and the different functional features

that are part of these components. The evaluation of functional features is based on preferences decided with the help of Analytical Hierarchy Process (AHP).

Evaluation of contractors on the basis of tender document is difficult as handling all the information at one time may lead to confusion. Converting the given information into numbers or preferences which can be used to compare the contractors among the available options can help to create a ranking of the contractors which will assist the owner in awarding the contract. The research is set-up to examine the criteria of contractor selection and to support the procurers on the appropriate contractor selection using the decision support system. Hence the objective shortly can be discussed as:

- a) To understand the nature of contractor selection approaches practiced by various contractor.
- b) To discover and define the prospective standards which affect the selection of contractor.
- c) To progress theoretical model that characterizes the suitable contractor selection based on AHP process.

4. Scope of Study

The selection of a contractor is one of the most important issues in the course of construction projects. Bid evaluation is one of the foremost challenges that face owners and consultants in both the public and private sectors in deciding on the finest construction contractor. Selecting the best one requires a sophisticated knowledge and experience to ensure that the contractor is technically and financially capable to accomplish the project on time, within budget, and as specified.

Among various contractor selection systems, the competitive bidding system has become the most popular practice around the world. This theoretically selects the contractor with the most innovative and cost effective solution to construct the facility at the lowest construction cost. In addition, its objectivity is ensured because the price is the sole criteria used for evaluating the bids. However, under this system, contractors may win the bid by submitting an abnormally low bid either accidentally or deliberately. This unanticipated problem has been observed in many countries.

Previous studies have suggested that once contractors take a project at sacrifice, they would adopt some strategies to compensate for the deficit, such as cutting corners to lower the cost and bringing up claims against the owner. To avoid this, selection criteria of contractor shall be well defined and a suitable system to judge them on the basis of the requirements of the project shall be designed. This would help the client or owner to escape the possibility of project delay, cost overrun, poor quality and hence low product value. Thus the scope of the research is to identify the criteria for contractor selection using knowledge acquisition phases and to assess the information which involves multi criteria decision making ability using Analytic Hierarchy Process. Hence, the research is limited to the following scope:

- a) Acquaintance attainment segment involve contractor

working methodology in INDIA.

- b) Assessment of the information is used to develop the theoretical model based on Analytic Hierarchy Process.
- c) The study is considered for contractor selection and it will focus on the application of AHP as one of tool for decision support system.

5. Significance

Study in this subject and specifically in this area is essential as a decision problem like selecting a contractor often involves choosing the optimum solution among a number of competing alternatives. In such a process use of Analytical Hierarchy Process will be a significant endeavor in promoting systematic decision making. This study will be beneficial to the clients, owner and other members of construction industry who come across decision making where multiple criteria are involved. This paper will provide recommendation on how to evaluate the performance of a certain contractor in accordance to requirements of the specific project.

Moreover, this study will be helpful to the construction industry and construction managers in taking assessment of various decision problems usually encountered in the field as well as off the field. It will also serve as future reference for researchers on the subject of construction management and especially multi criteria decision making. And importantly, this research will educate clients and owners in deciding whether the right decision is made considering all aspects of the problem.

6. Conclusion and Future Study

The project in the future will include the methodology of AHP (Analytical Hierarchy Process). Different methods can be used to select a contractor from among a group of bidders for a construction project. The low bidder is frequently selected to perform the project. In the paper study of Analytical Hierarchy Process will be made as a method of selecting the best bid. The Analytical Hierarchy Process (AHP), is an operative tool for

dealing with composite decision making and may relief the decision maker to set priorities and make the finest decision. The paper will also suggest AHP on the basis of a habitual case study performed on a Private Sector Company keeping the names of the contractors confidential. On the hypothesis of the case study the results so obtained will be studied thoroughly and the conclusion regarding the AHP will be made. Also apart from the case study and methodology the project will also provide the recommendations and the future scope of the AHP in addition depending on the results procured from the overall report.

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