Salwa Akl

بسم الله الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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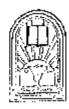
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PROPOSED PROBABILISTIC MODEL FOR PREDICTING THE LOWEST BID IN EGYPTIAN CONSTRUCTION PROJECTS

By

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ABSTRACT

Competitive bidding is the major nightmare for contractors because most of their life's blood depends on it. It is an intriguing and critical activity of management. It appears to defy analysis and cloaked with a certain amount of uncertainties. This is because direct cost estimating of construction is a complex and crude process due to the absence of standardization of conditions from one job to the other. Also, the inherently complex factors of labor, material and locality make the computation of exact construction costs a matter of accident than of design. Subcontractor's quotation is another factor which affect direct cost estimating. On the other hand, indirect cost and markup estimating depend on a large number of factors such as total number of competitors the contractor is going to compete with and size of the project. In addition, most of the contractors have not a systematic approach of bidding.

The contractor must first of all, develop a good estimate for his direct cost. Then, deciding his indirect cost and markup taking into consideration all the uncertainties such as labor and materials' prices, material shortage, quantities required and the difficulties. In addition, he must outguess his competitors. If his bid is too high, he fails to get the contract and losses the time and money spent on preparing the bid. When he bids much lower than necessary, he "leaves money on the table". A good bid will allow for a decent profit and not yet be less than other bids. To obtain this bid, the contractor must develop a strategy for predicting the lowest bid taking into consideration his competitors' characteristics. This bid must allow for a decent profit and with little percentage of money left on the table.

This research presents a new probabilistic mathematical model for predicting the lowest bid for construction projects in Egypt. The model is probabilistic in nature and depend on mathematics in modeling. The model's parameters are derived from questionnaires directed to contractors, subcontractors, clients and consultants. From these questionnaire it was concluded that a large number of factors affect estimating project's direct cost.

Accordingly, the issue of adjusting project's direct cost is considered through model development.

Using the proposed model, three cases of dealing with competitors are suggested. These cases are: 1) classification of competitors into key and secondary is considered; 2) classification of competitors is not considered; and 3) probability of beating secondary competitors is not considered. The model gives the best results when competitors' types of project under consideration are identical to the case of dealing with competitors. The proposed model was compared with two other probabilistic mathematical models proposed by Sugrue (1980) and Ali's (1997) models for predicting the lowest bid. The proposed model results high success rate for predicting lowest bid and minimum value of associated money left on the table.

A computer program is developed to automate the proposed model to suit the short time usually available for bidding process. Two case studies are presented for small and large size projects to demonstrate model validity. Another case study in which the classification of projects sizes does not considered is also presented to quantify the effect of classification. Analysis of the results for the three case studies revealed that: classification of projects' sizes results in about 85% success rate on the average for predicting the lowest bid and average percentage of money left on the table of about 6.5%. Neglecting classification results in about 65% success rate and average percentage of money left on the table of about 5 %.

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