شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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HANAA ALY

AN EXPERT SYSTEM FOR ENHANCED ACCURACY OF COST ESTIMATING IN EPC/TURN-KEY PROJECTS

By

Mahmoud Mohamed Sami Metwalli

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
STRUCTURAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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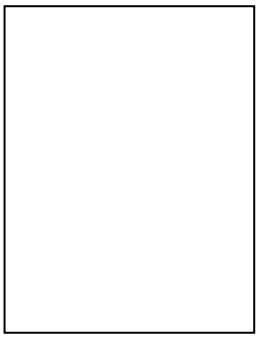

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Title of Thesis: **An Expert System For Enhanced Accuracy Of Cost Estimating In EPC/Turn -Key Projects**

Key Words: EPC; Cost; Estimate; Contingency; Fuzzy

Summary:

An expert system based on Fuzzy logic would be developed and used to enhance the cost estimation accuracy in EPC projects. The cost estimation accuracy in EPC projects depends on multiple variables representing the project structure. These variables were classified into 5 categories: tender documents, contract obligations, tender status, and circumstances, known data about the project status and the estimate resources. To analyze the impact of these variables on the cost estimation accuracy, an open structured questionnaire was published, and the most influencing variables were determined, studied, and covered by all the possible scenarios that might be generated. These scenarios would be considered as the rule base of the Fuzzy system describing the basic concept of Fuzzy logic and the relationships between variables. The main objective of this research, which is improving the cost estimate accuracy, will be achieved by modifying the contingency percentage as output from Fuzzy system.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Abstract

Cost estimation in EPC contracts is considered as a major challenge to increase the profitability and reduce the probability of failure due to cost prediction mistakes since the EPC contractor is solely responsible of the project cost, schedule and quality requirements under agreed contract price.

This research effort has a primary objective which is enhancing the cost estimation accuracy of EPC projects by developing a model using Fuzzy logic that facilitate creating a competitive cost estimate and finalize the project within the approved budget without the threat of losing the tender due to submitting higher price than the other bidders.

The cost estimation accuracy in projects under EPC contracts depends on multiple variables representing the EPC project parameters and to develop the expert system these variables were listed and classified into 5 categories: tender documents, contract obligations, tender status and circumstances, known data about the project status and the estimate resources.

To analyze the impact of these variables on the cost estimation accuracy, an open structured questionnaire was published, and the most influencing variables were determined, studied and covered by all the possible scenarios that might be generated.

These scenarios would be considered as the rule base of the Fuzzy system describing the basic concept of Fuzzy logic and the relationships between variables. The main objective of this research, which is improving the cost estimate accuracy, will be achieved by following a selected approach of modifying the contingency percentage as output from Fuzzy system.