Chapter One
Introduction

1.1 General

The research work presents a methodology allowing individuals or organizations to compare the capacity of construction firms using a fuzzy logic expert system model. It briefly discusses the concept of fuzzy logic and the task of choosing an appropriate family of parametric membership function by which to define capacity. The model provides a means by which general contractors, private owners, or public agencies can rank competing construction organizations on matters in addition to the bid price for the work.

1.2 Problem Definition

General contractors, private owners, and public agencies are often faced with a problem; how to evaluate the bids of competing construction organizations with respect to variables other than the lowest price. It is axiomatic that each of these constituencies wants to choose from amongst the competing firms the one that best suits their needs. However, all too often the evaluation is made on the basis of cost alone with subsequent regret when the chosen firm proves incapable, for a variety of reasons, of performing the work.

That problem has led to the design of a multiple attribute analytical fuzzy logic expert system model. In order to use the model a list of attributes had to be developed and data accumulated for each bid of competing construction organizations that were under consideration.

1.3 Research Objective

This research aimed to increase the success chance of different construction projects by developing general framework that help decision makers in evaluating the different vendors.

This could be through;

- Identify the problem of vendor evaluation and determine an objective function;
- Determination of the attributes that describe the essential features of the objective function;
- Determination of a means to rank these attributes with respect to each other;
- Establishing software to both generate the fuzzy sets and perform calculations provides the necessary link between theory and practice;

An additional effort is required to demonstrate the usefulness of the model. In particular, it is necessary to move to the practitioners to:

- Develop the attributes that are of concern;
- Develop the weights and see if these can be generalized throughout the construction industry.

1.4 Research Methodology

This study aimed to evaluating the construction bids according to a lot of variables other than the lowest price by using fuzzy logic methodology, to achieve this goal, a study was established through four stages;

First stage: it introduces general background including general information such as types of construction contractors, different types of construction organization strategies, methods of contractor's selection, and types of contracts.

Second stage: it introduces literature review including bid types, tendering procedures according to Fidic, and decision making techniques.

Third stage: it introduces the definition of Fuzzy logic and its foundations.

Fourth stage: it introduces a model design and applied this model on two major road projects in the General Authority for Roads, Bridges, and Land Transportation.

1.5 Research Organization

This thesis comprises six chapters of which this introduction is the first chapter. In chapter two, an extensive general background is provided. Chapter three is literature review concerned with bid evaluation systems, and describes decision making tools in bid analysis. Chapter four concerned with the basis of fuzzy logic theory and its concept and finally the development of the purposed fuzzy model of our system and case study are presented in chapter five. Also this chapter describes the implementation issues of the system, and the experimental results. Finally, chapter six summarizes basic results, conclusions, and recommendations.