FUZZY EXPERT SYSTEM FOR ESTIMATING USAGE RATES FOR LABOUR, EQUIPMENT AND MATERIAL

BY

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Dedication

To My Parents

Declaration

I hereby declare that this submission is my own work and that to the best of my knowledge and belief, it contains neither materials previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma or a university or other institute of higher studies, except where an acknowledgment is made in the text.

R. Shiyamasuntharan

UOM Verified Signature

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May God bless us all.

R. Shiyamasuntharan
May 2005.

Abstract

The importance of cost estimating is well recognized as it predicts the costs of construction and provides a basis for the contractor to submit a bid for a project. As each project is unique and no two are quite a like, subjective judgments are needed to adjust the estimating norms, which are based on historical data and experience of estimators to suit the proposed site conditions. Hence, the estimating practice has large element of subjective process rather than a precise technical and analytical process.

The direct cost is established with two types of data namely factual and productivity. Factual data are fixed and can be determined with certainty. However, productivity data are not permanently fixed and need subjective judgments of estimators in determination. The established average norms of direct cost elements such as labour, equipment and material have to be adjusted to suit each project conditions.

This study aimed at developing a fuzzy expert model, which produces a deterministic output for productivity multiplier to adjust the standard rates. As a mode of approach factors, which include activity characteristics and project conditions, influencing resource usage are identified. Further, relationships among the factors and resource usage are quantified using generalized expert knowledge and an artificial intelligence technique called fuzzy logic. The use of fuzzy expert system removes the subjective questionable human factors as much as possible by providing a base with objective data and improves the efficiency of the estimating practice.

Keywords: Fuzzy Logic, Cost Estimating, Standard Norms, Activity Characteristics and Project Conditions

Table of Contents

List of Tables

List of Figures

Abbreviations

ANN	Artificial Neural Networks
BOQ	Bills of Quantities
BSR	Building Schedule of Rates
CIOB	Chartered Institute of Building
KMO	Kaiser- Meyer- Olkin measure of sampling accuracy