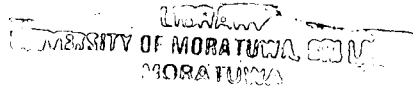
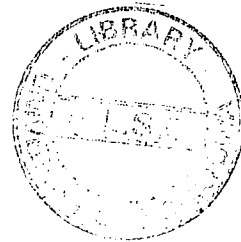


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**INTEGRATED DSS FOR CONSTRUCTION COST MANAGEMENT
USING RELATIONAL DBMS AND FUZZY LOGIC**

By

K.IMRIYAS



**Thesis submitted to the Department of Civil Engineering of the University
of Moratuwa in partial fulfilment of the requirement for the Degree of
Master of Philosophy**

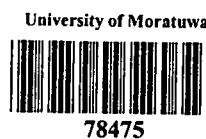
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July 2003

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Dedication

To My Parents

For their continuous dedication and encouragement for all the endeavours towards my advancement.



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Declaration

This thesis is a report on the research work carried out in the Department of Civil Engineering, University of Moratuwa, Sri Lanka, during July 2001 to July 2003. This submission is original and does not have any materials previously published or written by any others anywhere, except where citing is made.

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Abstract

Construction Cost Management encompasses and embraces estimating, scheduling, cost control, resource costing, and interim billing, which are highly interconnected to each other, and share data. Also produces very large quantity of information thus necessitates an integrated information system for effective management. Additionally, data related to progress control exhibits imprecision, vagueness and subjectivity, that demands some sophisticated approach to be introduced in the system for predictions and corrective acting in progress control. Advanced systems using current state-of-the-art could be developed to address the problems. But, construction organizations cannot afford to procure such system due to high cost involvement, therefore expects a cost effective solution.

Through an extensive literature review Schedule activity as the denominator, relational DBMS, and Fuzzy logic were identified as suitable method and tools for data integration and vagueness handling. MS Access™, MS project™, and MATLAB™ also identified as cost effective software for physical design. Then, an integrated Decision Support System (DSS) complementing a common database, a scheduler, and a knowledge base was supposed to solve the problem.

Interviews, documentary surveys, and questionnaire surveys were adopted as research techniques. By analyzing the survey data and information, terms and references of the proposed DSS, system architecture, process models, data models and logical models of common database, knowledge representation model for knowledgebase, and dynamic data exchange model for data transfer and conversation were designed. Then MS Access™, MS project™, and MATLAB™ were used to develop the proposed DSS. Finally the developed system was tested for its feasibility in terms of technique and function, and accuracy. Data transfer between database, scheduler, and knowledgebase was very successful. The output produced by the DBMS, and Scheduler had an accuracy of 100 % while Knowledge Based System (KBS) had 80%.

It is proved that general software like MS Access™ and MS project™ have potential for advanced integrated system development with higher technical, functional, and cost feasibilities using relational database concept. They can also be integrated with KBS for heuristic decision making.

Key Words: Cost Management ,Integration, Relational DBMS, Fuzzy Logic, Information System

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Abbreviations

DSS	- Decision Support System
DBMS	- Database Management System
KBS	- Knowledge-Based System
BOQ	- Bill Of Quantities
WBS	- Work Breakdown Structure
CBS	- Cost Breakdown Structure
OBS	- Organisation Breakdown Structure
DCBS	- Design Component Breakdown Structure
WABS	- Work Area Breakdown Structure
BOD	- Basic Construction Operation required by Design object
WP	- Work Package
PEC	- Primitive Elements of Construction
PBS	- Project Breakdown Structure
ABC	- Activity-Based Costing
CICA	- The Construction Industry Computer Association
IT	- Information Technology
CAD	- Computer Aided Designing
DFD	- Data Flow Diagram
ERD	- Entity Relationship Diagram
DDE	- Dynamic Data Exchange
OLE	- Object Embedding and Linking
AI	- Artificial Intelligence
GUI	- Graphical User Interface
FIS	- Fuzzy Inference System