# COST MONITORING AND CONTROLLING PRACTICES OF CONSTRUCTION COMPANIES IN SRI LANKA

## **MASTER OF SCIENCE**

IN

CONSTRUCTION PROJECT MANAGEMENT University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk

> S. B. Weerasinghe Department of Civil Engineering University of Moratuwa May 2012

# COST MONITORING AND CONTROLLING PRACTICES OF CONSTRUCTION COMPANIES IN SRI LANKA

By

S. B. Weerasinghe



The Dissertation was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfillment of the requirement for the Degree of Master of Science.

> Department of Civil Engineering University of Moratuwa May 2012

#### DECLARATION

I hereby certify that this dissertation does not incorporate any material without the acknowledgement of the author of any such material previously submitted for a degree or diploma in any university to the best of my knowledge and I believe it does not contain any material previously published, written or orally communicated by another person except where due reference is made in the text.

Approved By Dr. R.U. Halvatta Department of Civil Engineering University of Moratuwa Electronic Theses & Dissertations Engineering University of Moratuwa 21<sup>st</sup> May 2012

#### ACKNOWLEDGEMENT

I am pleased to express my sincere gratitude to the Department of Civil Engineering of the University of Moratuwa, for giving me this opportunity to do an empirical study and my supervisor Dr. R.U. Halwatura of the Department of Civil Engineering, University of Moratuwa for his continuous support and supervision during this dissertation.

I deeply appreciate Prof. Asoka Perera and Dr. Lesley Ekanayaka of the Department of Civil Engineering, University of Moratuwa, for their valuable suggestions and comments during the progress presentations. Further I would like to thank all the members of the Department of Civil Engineering for their support throughout the period. Further my appreciation goes to Chairman & Managing Director, Directors and all other staff members of Maga Engineering (Pvt) Ltd, for encouraging me towards the success of this exercise.

In addition the contribution of the Directors, Senior Managers, Engineers, Quantity Surveyors of other construction companies and government organizations by sharing information making comments, during the data collection is also gratefully acknowledged www.lib.mrt.ac.lk

I express my thanks and appreciation to my family for their understanding, motivation and patience towards the accomplishment of this exercise as well as to all my colleagues and friends who helped me in the compilation of this dissertation.

Samantha Weerasinghe May 2012

#### ABSTRACT

The wealth of any nation is gauged by its performance in infrastructure provision through its construction industry. The construction industry is large, volatile, and requires tremendous capital outlays (Kaliba, Mundia & Kanyuka, 2008).

Cost is a comprehensive index, which is not only closely related to the efficiency and competitiveness of an enterprise, but also reflects the superiority and inferiority of its management in various aspects. Cost control is the main means of reducing the cost of products and it serves as the precondition for the enhancement of estimation and economic returns of the business. Cost monitoring concepts have been in the international construction companies for many years. Hence, it needs to analyze the Sri Lankan context of cost monitoring in construction companies.

The main objective of this research work is to discover the current cost monitoring practices in Sri Lankan construction companies, find out the drawbacks of existing CMSs, professional and the ICMSs and other affective characteristics related to the implementation of an automated CMS and to give some recommendation to implement an enhanced Project Management System in construction firms, in which cost management, planning and control can be gradually integrated, in order to overcome the existing limitations of the current cost monitoring systems.

This research is based on the literature review and the data collected through questionnaire surveys and interviews among 57 professionals in the construction companies in Sri Lanka. With the findings of this research, it is expected to guide construction professionals towards enhancing the current cost monitoring systems in order to become more proactive, and be able to deal with the dynamic, uncertain and complex construction environment that exists in most of the construction projects in Sri Lanka.

Key words: Cost, Cost Monitoring Systems, Projects, Integrated Cost Monitoring Systems (ICMS), Performance Indicators, Construction Industry.

### TABLE OF CONTENTS

Declaration		i
Acknowledgement		ii
Abstract		iii
Table of contents		iv
List of Figures		vi
List of tables		vii
Appendices		viii
Abbreviations		ix
Chapter	1	1
Introd	uction	1
1.1	Background	1
1.2	The research problem	2
1.3	Research objectiversity of Moratuwa, Sri Lanka.	3
1.4	standibande better and Theses & Dissertations	3
1.5	Methodologyww.lib.mrt.ac.lk	4
1.6	Limitations of the research	4
1.7	Main findings	4
1.8	Guide to the report	5
Chapter 2	2	6
Literat	ure review	6
2.1	General	6
2.2	History and background	6
2.3	Importance of having an effective and efficient CMS	8
2.4	Cost management processes	10
2.5	Cost management techniques	12
2.6	Uses and benefits of the ICMS	16
2.7	Performance indicators of projects	17
2.8	Summary	20

## Chapter 3

Research methodology		21
3.1	General	21
3.2	Framework of the study	21
3.3	Research approach	22
3.4	Population of sample	22
3.5	Method of data collection	22
3.6	Method of data analysis	26
3.7	Summary	33
Chapter 4		34
Analysis and discussion		34
4.1	General	34
4.2	Distribution of sample and demographic characteristics of respondents	34
4.3	Characteristics of organizations involved for the study	40
4.4	Characteristics of the existing cost monitoring systemsnka.	41
4.5	Organizational contribution to execute and develop the existing CMS	43
4.6	www.lib.mrt.ac.lk	44
4.7	Discussion of results	55
4.8	Summary	56
Chapter 5		57
Conclusi	ions and recommendations	57
5.1	Conclusion	57
5.2	Recommendations	58
5.3	Recommendations for future researches	58

### Appendixes

#### LIST OF FIGURES

Figure 2.1: The Project control processes	11
Figure 2.2: Project S - curve	14
Figure 4.1: Distribution of sample	
Figure 4.2: Age variation	35
Figure 4.3: Gender variation	36
Figure 4.4: Education level	37
Figure 4.5: Construction experience	
Figure 4.6: Specialization in the construction industry	
Figure 4.7: Computer literacy	39
Figure 4.8: Experience with ICMS	40
Figure 4.9: Experience in construction industry atuwa; Sri Lanka.	41
Figure 4.10 Types of the lexisting visit Thomas of Systemser Lations	42
Figure 4.11: Nature of the existing cost monitoring systems	43

#### LIST OF TABLES

Table 2.1: Key performance indicators	20
Table 3.1: Indicator types and classification of CMS	
Table 3.2: Marks allocation for the outcomes of the existing CMSs	26
Table 3.3: Type of exiting cost monitoring system	
Table 3.4: Five point Likert scale	27
Table 3.5: Evaluation scenarios	
Table 3.6: Hypothesis (Scenario – 01)	28
Table 3.7: Hypothesis (Scenario – 02)	29
Table 3.8: Hypothesis (Scenario – 03)	32
Table 4.1: Distribution of sample (Question No. 02)	
Table 4.2: Age variation (Question No 02) foratuwa; Sri Lanka.	35
Table 4.3: Education 1e Fel question Notices & Dissertations	
Table 4.4: Construction experience (Question No. 06)	37
Table 4.5: Experience with ICMS(Question No. 10)	39
Table 4.6: Experience in construction industry (Question No. 12)	40
Table 4.7: Outcomes of existing CMSs	41
Table 4.8: Type of the existing cost monitoring systems	
Table 4.9: Nature of the existing cost monitoring system	43
Table 4.10: Data analysis (Scenario 01)	45
Table 4.11: Hypothesis testing (Scenario 01)	46
Table 4.12: Data analysis (Scenario 02)	47
Table 4.13: Hypothesis testing (Scenario 02)	49
Table 4.14: Data analysis (Scenario 03)	52
Table 4.15: Hypothesis testing (Scenario 03)	

#### ABBREVIATIONS

ABC	- Activity Based Costing
CMS	- Cost Monitoring System
EMS	- Enterprise Management System
ERP	- Enterprise Resource Planning
EVM	- Earned Value Management
ICMS	<ul> <li>Integrated Cost Management System</li> </ul>
IMA	- Institute of Management Accountants
KPI	- Key Performance Indicators
NPV	- Net Present Value
PCM	- Project Cost Management
PM	- University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations
ROI	- Return On Investmentmrt.ac.lk
SPI	- Schedule Performance Index
SV	- Schedule Variance
WBS	- Work Breakdown Structure