

**ASSESSMENT OF ELECTRONIC DOCUMENT AND
COMMUNICATION MANAGEMENT SYSTEMS IN
CONSTRUCTION PROJECTS**

**MASTER OF SCIENCE
IN
CONSTRUCTION PROJECT MANAGEMENT**

Kudaligamage Eshan Saminda Perera
(158978M)

Department of Civil Engineering

University of Moratuwa

July 2019

**ASSESSMENT OF ELECTRONIC DOCUMENT AND
COMMUNICATION MANAGEMENT SYSTEMS IN
CONSTRUCTION PROJECTS**

BY

**Kudaligamage Eshan Saminda Perera
(158978M)**

Supervised by

Dr. C.S.A Siriwardana

“This dissertation was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Master of Science in Construction Project Management”

Department of Civil Engineering

University of Moratuwa

July 2019

Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any University to the best my knowledge and believe it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text.

I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for inter library loans, and for the title and summary to be available to outside organizations.

.....

Signature of Candidate

K.E.S. Perera
158978M

.....

Date

The above particulars are correct, to the best of my knowledge.

.....

Signature of Supervisor

Dr. C.S.A Siriwardana
Department of Civil Engineering
Faculty of Engineering
University of Moratuwa

.....

Date

Dedication

I would like to dedicate

This thesis,

To my Parents and Wife,

Whose affection, love, encouragement, and prayers

of day & night make me able to

Get such success and honour,

And teachers, who taught me

To think, understand and express.

I earnestly feel that without

their inspiration, guidance and dedication

I would not be able

To pass through the tiring process of this research.

Acknowledgement

It is a great pleasure to offer my sincere gratitude to all individuals who contributed and helped me in various ways to make this research a success. Firstly, I would like to express my sincere thanks to Dr. Chandana Siriwardana, Senior lecturer, Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, the research supervisor of this study, for assisting and guiding me towards the right direction to achieve this goal.

I am grateful to Central Engineering Consultancy Bureau, my current employer, for the great professional exposure provided for their employees which was a enormous support for me to carry out this research and further, for facilitating my course attendance.

I express my gratitude to my colleagues, friends and many others, who supported me whole heartedly in this career. Last but not least, I am greatly beholden to my parents and wife for their endless patience, encouragement and support given throughout the study.

Abstract

Effective communication plays a major role in a project towards its success. Today, most of the construction projects deal with stakeholders around the world. Therefore, it is essential to have a proper communication channel for the smooth flow of the project execution. Traditional paper-based communication seems to be not practical in this context and the requirement of an alternative method is essential. In this regard web-based electronic document and communication management system can be proposed as a solution. In the construction industry, documents and drawings related to various disciplines such as engineering, architectural, planning, financial etc. are widely used. Electronic document and communication management systems can handle both incoming and outgoing correspondence related to a project in one place with a defined access. Nowadays, internet and other communication means are booming up and construction industry too has a tendency of moving to the electronic documentation and communication management systems. Since, it is a new transformation in the construction industry, most of the stakeholders are still in a dilemma on upgrading their existing systems. This research assesses the potential reasons, whether to adopt or avoid the electronic document and communication management systems for construction projects and further the benefits and challenges of implementation of such systems in a project by conducting the industry survey and the case study.

TABLE OF CONTENT

1. INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	3
1.3 Objectives	3
1.4 Research Methodology	4
1.5 Limitations of the Study.....	6
1.6 Research Deliverables.....	6
1.7 Guide to Thesis	6
2. LITERATURE REVIEW	8
2.1 Document Management System	8
2.2 Evolution of Document Management in Construction Projects	8
2.3 Web based Document Management System.....	9
2.4 Requirement of an EDMS.....	10
2.5 Benefits of the Implementation.....	11
2.6 Features of EDMS.....	12
2.7 Challenges of the Implementation	13
3. RESEARCH METHODOLOGY.....	14
3.1 Method of Data Collection.....	14
3.2 Questionnaire Content	14
3.3 Pilot Study.....	15
3.4 Method of Data Analysis	16
4. DATA COLLECTION AND ANALYSIS	17
4.1 Respondents Background.....	17
4.2 Existing Communication System and Previous Experience.....	19
4.3 System Security & Reliability	20
4.4 Legal Acceptance.....	21
4.5 Facilities Required	22
4.6 Coordination Issues.....	22
4.7 Search of Past Documents	23
4.8 Storage Mode	24

4.9 Challenges of Implementation of EDCM System	25
5. CASE STUDIES OF COMMUNICATION AND DOCUMENT MANAGEMENT SYSTEMS.....	28
5.1 Project A	29
5.1.1 Project Description.....	29
5.1.2 Stakeholders of the Project	29
5.1.3. Current Document and Communication Management System.....	29
5.1.4. Volume of Documents Transferred.	30
5.1.5. Observations on Current system	32
5.2. Project B.....	35
5.2.1. Project Description.....	35
5.2.2 Stakeholders of the Project	35
5.2.3. Current Communication and Document management system	35
5.2.4. Reasons for the Adoption of Letter management system.	36
5.2.5. Volume of Documents Transferred.	36
5.2.6. Observations on Current System	37
5.3 Project C.....	40
5.3.1. Project Description.....	40
5.3.2. Stakeholders of the Project	40
5.3.3. Current Communication and Document Management System	41
5.3.4. Reasons for the Adoption of Web based EDCM System	41
5.3.4. Volume of Documents Transferred.	42
5.3.5. Observations on Current System	42
5.4. Summary of Case Studies	46
6. CONCLUSIONS AND RECOMMENDATIONS	49
6.1 Conclusion	49
6.2 Recommendations.....	52
REFERENCES	54
APPENDICES	57

LIST OF FIGURES

Figure 1 Research Methodology.....	5
Figure 2 Questionnaire Format.....	15
Figure 3 Type of Project.....	17
Figure 4 Type of Client.....	18
Figure 5 Type of Participant.....	18
Figure 6 Prime Communication Mode of Project.....	19
Figure 7 Previous experiences on ECDM.....	19
Figure 8 Security Issues.....	20
Figure 9 Legal Acceptance.....	21
Figure 10 Facilities Required.....	22
Figure 11 Coordination Issues.....	23
Figure 12 Searching Facility.....	24
Figure 13 Storage Mode.....	25
Figure 14 Challenges of implementation EDCM system.....	26
Figure 15 Comparison between Government and Private sector.....	27
Figure 16 Letter Log – Project A.....	30
Figure 17 Process of Document approval in Project A.....	33
Figure 18 Letter Catalogue - Project B.....	36
Figure 19 Photo Catalogue - Project B.....	38
Figure 20 Drawing Register - Project B.....	38
Figure 21 User Interface in Aconex.....	43
Figure 22 Process of Document approval in Project C.....	44

LIST OF TABLES

Table 1 Scale used for data measurement.....	16
Table 2 Stakeholders Background and Project Details.....	28
Table 3 Volume of documents transferred in Project A	31
Table 4 Volume of documents transferred in Project B	37
Table 5 Volume of documents transferred in Project C	42
Table 6 Summary of Project details.....	46
Table 7 Summary of advantages and disadvantages on document management system	47

LIST OF ABBREVIATIONS

Abbreviation	Description
AGM	Additional General Manger
BIM	Building Information Modeling
BOQ	Bill of Quantity
CIDA	Construction Industry Development Authority
DMS	Document Management Systems
EDMS	Electronic Document Management Systems
EDCM	Electronic Documents and Communication Management
ELV	Extra low voltage
IPC	Interim Payment Certificate
IT	Information Technology
LAN	Local Area Network
LP	Liquefied Petroleum
MEP	Mechanical Electrical Plumbing
MCM	Million Cubic Meters
NSC	Nominated Sub Contractor
PA	Public Address System
PDF	Portable Document Format
PM	Project Manager
PMD	Project Management Division
RE	Resident Engineer
RFI	Request for Information
RII	Relative importance index

LIST OF APPENDICES

Appendix	Description	Page
Appendix - A	Sample Questionnaire	57