

**AN ANALYTICAL STUDY OF EFFECTIVE
FORMWORK SYSTEMS FOR HIGH-RISE BUILDING
CONSTRUCTION IN SRI LANKA**

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Degree of Master of Science in Construction Project Management

Department of Civil Engineering

University of Moratuwa

Sri Lanka

January 2014

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Dissertation submitted in partial fulfilment of the requirements for the degree Master
of Science in Construction Project Management

Department of Civil Engineering

University of Moratuwa

Sri Lanka

January 2014

DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where acknowledgement is made in the text.

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The above candidate has carried out research for the Masters dissertation under my supervision.

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ABSTRACT

Formwork system is the most important factor determining the project success especially, in high-rise building construction projects in terms of speed, quality cost and safety of the work as it accounts 40% of the total project cost of the structure. The contractor needs to complete the project in the shortest time possible as a means to minimise the cost and the clients wants the building to start the business as early as possible. The most effective way to speed up the works in high-rise buildings is to achieve a very short floor cycle to have the structure of typical floors completed in the shortest time. That directly depends on the selected formwork type for the particular construction project. Thus, appropriate selection of an effective formwork system is crucial factor in successfully completing any high-rise building project.

Two case studies were carried out to analyse the cost for different types of formwork: modern conventional method; semi-system formwork; and, Aluminium panel system formwork use in construction projects. Case study projects were selected among high-rise buildings projects more than 25 stories which are located in Colombo metropolises in Sri Lanka.



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The results indicated that the cost of formwork does not directly affect to the total project cost but the type of formwork is highly affected to the total project cost especially, in high-rise building construction projects. Accordingly, the Aluminium panel system formwork reduces the project duration and hence, the total project cost and gives construction structure a very high quality finish though the Aluminium panel system is very expensive itself. Moreover, this study reveals most cost effective formwork system for high-rise buildings more than 25 stories is the Aluminium panel system comparatively. Thus, this outcome is useful to decision makers to select the most appropriate formwork system for high-rise building construction.

Keywords: Aluminium panel system, Conventional method, Cost effective, Floor cycle, Formwork system, High-rise building, Modern conventional method; Semi-system formwork

DEDICATION



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I dedicate this dissertation to my dearest wife and children.....

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TABLE OF CONTENTS

<i>Declaration</i>	<i>i</i>
<i>Abstract</i>	<i>ii</i>
<i>Dedication</i>	<i>iii</i>
<i>Acknowledgement</i>	<i>iv</i>
<i>Table of contents</i>	<i>v</i>
<i>List of figures</i>	<i>ix</i>
<i>List of tables</i>	<i>xi</i>
<i>List of equations</i>	<i>xii</i>
<i>List of abbreviations</i>	<i>xiii</i>
CHAPTER 1 – INTRODUCTION	1
1.1 Background	1
1.2 Research Problem Definition	2
1.3 Objectives	4
1.4 Methodology	4
1.5 Scope and Limitations	5
1.6 Main Findings	5
1.7 Structure of the Report	6
1.8 Summary	7
CHAPTER 2 – LITERATURE SYNTHESIS	8
2.1 Introduction	8
2.2 Introduction to Formwork Systems	8
2.3 Formwork Economy and Significance	9
2.4 Types of Formwork use in the Construction Industry	11

2.4.1 Conventional type formwork	11
2.4.2 Modern conventional type formwork.....	13
2.4.3 Semi-system formwork	13
2.4.3.1 Safety consideration of using semi-system formwork.....	15
2.4.4 System formwork	16
2.4.4.1 Conventional formwork vs. system formwork	17
2.4.4.2 Facts to be considered when using system formwork.....	18
2.4.4.3 Sequence for striking and erecting system formwork.....	19
2.5 Comparison of Different Features of Formwork Systems.....	20
2.6 Areas of Cost Reduction.....	21
2.7 Safety in General	22
2.8 Formwork Failures	23
2.9 Planning for Formwork	25
2.10 Formwork Erection.....	25
2.11 Summary.....	26
CHAPTER 3 – RESEARCH METHODOLOGY.....	27
3.1 Introduction	27
3.2 Research Approach.....	27
3.3 Research Process	27
3.3.1 Initial impetus.....	27
3.3.2 Literature review	28
3.3.3 Research problem statement.....	28
3.3.4 Case study design.....	30
3.3.5 Data collection.....	31
3.3.6 Data analysis	31



3.3.7 Write-up	34
3.4 Summary.....	34
CHAPTER 4 – ANALYSIS AND DISCUSSION OF RESULTS	35
4.1 Introduction	35
4.2 Case Study Descriptions.....	35
4.3 Within Case Analysis	36
4.3.1 Case study-1 (Emperor Apartment Tower).....	36
4.3.1.1 Impact on project duration.....	38
4.3.1.2 Preliminary running cost.....	39
4.3.1.3 Cost for the finishes (affected by the formwork).....	40
4.3.1.4 Machinery cost.....	41
4.3.1.5 Cost for waste disposal	42
4.3.2 Case study-2 (On Three 20 Building).....	43
4.3.2.1 Impact on project duration.....	45
4.3.2.2 Preliminary running cost.....	46
4.3.2.3 Cost for the finishes (affected by the formwork).....	47
4.3.2.4 Machinery cost.....	48
4.3.2.5 Cost for waste disposal	48
4.4 Overall Discussion of Results.....	49
4.4.1 Reasons for the cost reduction in system formworks.....	49
4.5 Summary.....	51
CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS	52
5.1 Introduction	52
5.2 Conclusions	52
5.3 Recommendations	54

5.4 Limitations of the Research	54
5.5 Recommendations for Future Research.....	54
REFERENCES.....	56
APPENDIX A: FORMWORK SYSTEMS.....	59
APPENDIX B: SEQUENCE FOR STRIKING AND ERECTING OF SYSTEM FORMWORK	67
APPENDIX C: FORMWORK COST CALCULATIONS	72



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LIST OF FIGURES

Figure 2. 1: Typical wall form with its components	59
Figure 2.2: Conventional type formwork.....	59
Figure 2.3: Side view of traditional timber formwork for flight of stairs.....	60
Figure 2.4: Poor finish in conventional type formwork.....	60
Figure 2.5: Modern conventional formwork for a concrete column.....	61
Figure 2.6: Modern conventional formwork for slabs and beams	62
Figure 2.7: Modern conventional formwork for a slab.....	62
Figure 2.8: Modern conventional formwork.....	63
Figure 2.9: Semi system formwork for slabs and beams	63
Figure 2.10: Semi-system formwork for a column.....	64
Figure 2.11: Semi-system formwork	64
Figure 2.12: Typical system formwork.....	65
Figure 2.13: System formwork for walls and slab.....	65
Figure 2.14: System formwork	66
Figure 2.15: System formwork for columns.....	66
Figure 2.16: Sequence 1.....	67
Figure 2.17: Sequence 2.....	67
Figure 2.18: Sequence 3.....	68
Figure 2.19: Sequence 4.....	68
Figure 2.20: Sequence 5.....	69
Figure 2.21: Sequence 6.....	69
Figure 2.22: Sequence 7.....	70
Figure 2.23: Sequence 8.....	70
Figure 2.24: Sequence 9.....	71
Figure 2.25: Sequence 10.....	71
Figure 3.1: Unit of analysis.....	30
Figure 4.1: Total project cost when using different formwork types (Emperor Apartment Tower).....	37
Figure 4.2: Cost of Different formwork types (Emperor Apartment Tower)	38

Figure 4.3: Duration of the project with the formwork type (Emperor Apartment Tower).....	39
Figure 4.4: Preliminary running cost with different formwork types (Emperor Apartment Tower).....	40
Figure 4.5: Cost of finishes affected by the type of formworks (Emperor Apartment Tower).....	41
Figure 4.6: Machinery cost affected by different type of formworks (Emperor Apartment Tower).....	42
Figure 4.7: Cost for waste disposal with the type of formwork (Emperor Apartment Tower).....	43
Figure 4.8: Total project cost when using different formwork types (On Three 20 Building)	44
Figure 4.9: Cost of Different formwork types (On Three 20 Building)	45
Figure 4.10: Duration of the project with the formwork type (On Three 20 Building)	46
Figure 4.11: Preliminary running cost with different formwork types (On Three 20 Building)	47
Figure 4.12: Cost of finishes affected by the type of formworks (On Three 20 Building)	47
Figure 4.13: Machinery cost affected by different types of formwork (On Three 20 Building)	48
Figure 4.14: Cost for waste disposal with the type of formwork (On Three 20 Building)	48



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LIST OF TABLES

Table 2.1: Features of different formwork systems	20
Table 4.1: Descriptions of the case study projects.....	35
Table 4.2: Summary of the analysis (Emperor Apartment Tower).....	36
Table 4.3: Summary of the analysis (On Three 20 Building).....	43
Table 4.4: Summary of case study analysis	51



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LIST OF EQUATIONS

Equation 3.1: Total project post of building project	31
Equation 3.2: Preliminary running cost of building project	32



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LIST OF ABBREVIATIONS

BOQ – Bill of Quantities

OSHA – Occupational Safety and Health Administration



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