

**APPLICATION OF OFF-SITE CONSTRUCTION
IN SRI LANKA**

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Master of Science in Project Management

Department of Building Economics

University of Moratuwa

Sri Lanka

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

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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 the acknowledgement is made in the text.

Further, I am acknowledging the intellectual contribution of my research supervisor Dr.Thanuja Ramachandra for the successful completion of this research dissertation. I affirm that I will not make any publication from this research without the name(s) of my research supervisor(s) as contributing author(s) unless otherwise I have obtained written consent from my research supervisor(s).

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I hereby acknowledge that Ravirajasinghe Sanjeepan has followed the dissertation process set by the Department of Building Economics.

.....
Dr. Thanuja Ramachandra
Dissertation Supervisor

.....
Date

ABSTRACT

APPLICATION OF OFF-SITE CONSTRUCTION IN SRI LANKA

The end of World War II brought an increment in the necessity of building construction along with insufficient provision of conventional constructions. The innovative techniques of Offsite Constructions (OSC) was brought into action to cope up with the risen demand as it delivers the products in desired quality and reduced time of construction. In the present global context, the credit goes to OSC for its process of planning, designing, factory fabrication, transporting and making an assemblage of the fabricated components in a rapid and time-saving on-site fixation, with its appreciable benefits of budget feasibility in cost without hampering the quality or strength of the end product against the conventional construction methods. The implementations of these techniques are rarely bought into practice in the Sri Lanka construction sector.

With the aim of increasing the adoption of offsite constructions in Sri Lanka this research examines the nature and level of adoption of different off-site construction systems in Sri Lanka, benefits and barriers in implementing off-site construction methods, and identify the challenges faced in the application of off-site construction methods. Through the snowball method of sampling 60 offsite construction professionals were picked as research samples. The research embraced the survey method; data was gathered through a well structured close ended questionnaire. The data was then statistically analyzed implementing percentage, weighted mean rating and standard deviations to obtain the objectives of the study.

The research concluded that all the OSC methods (i.e.; volumetric systems, panelized systems, hybrid construction, and sub-assemblies) are equal in offering high satisfaction, and would boost benefit/income through superior quality, less duration, financial benefits generation from early completion, and onsite less safety risks. The implementation of these methods also minimizes the waste leading to a reduction in the project budget. Contractors' profit is high in OSC due to low competitors in industry and due to "design and build" type quotation.

The study also brought to light that some critical and dominant challenges out of many are still existent in Sri Lankan construction industry, requiring proper attention for minimizing, or alleviating their impact on the OSC application, such as lack of experienced collaboration groups, complicated project planning and coordination, uncertainty of market demand, unpredictable planning decisions, unable to freeze design early on, fragmented nature of the construction industry, lack of awareness of prefabrication by the market and public, owners' negative perception, highly respective construction tolerance, transportation restraints and special requirements to unload OSC components, high initial and capital cost, longer capital payback period, resistance to change, lake of guidance and information, lack of technologies and testing institute, and limited suppliers for OSC components. However, the research also brought to a highlight the benefits such as increasing product quality and reducing construction duration, ensuring time certainty and cost certainty, compensating for shortage of skilled workers, increasing sustainability and value are usually offered or ripped through the implementation of the OSC techniques.

Many empirical suggestions were offered in this research to alleviate the obstacles and challenges to the implementation of OSC techniques; including removing logistical constraints, incapability for on-site alterations and expanding the design alternatives.

Keywords: Offsite production, Offsite construction Challenges, Sri Lanka.

*This research is dedicated to my parents
for their everlasting love, endless support and
encouragement.*

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TABLE OF CONTENT

| | |
|--|----------|
| DECLARATION | i |
| ABSTRACT..... | ii |
| ACKNOWLEDGEMENT | iv |
| TABLE OF CONTENT | v |
| LIST OF FIGURES | x |
| LIST OF TABLES | xi |
| LIST OF ABBREVIATIONS | xii |
| LIST OF APPENDICES | xiii |
| | |
| CHAPTER ONE | 1 |
| 1.0 INTRODUCTION..... | 1 |
| 1.1 Research Background..... | 1 |
| 1.2 Problem Statement | 3 |
| 1.3 Aim..... | 5 |
| 1.4 Objectives..... | 5 |
| 1.5 Outline of Research..... | 6 |
| 1.6 Scope and Limitations | 6 |
| 1.7 Chapter Divisions | 7 |
| | |
| CHAPTER TWO | 8 |
| 2.0 LITERATURE REVIEW | 8 |
| 2.1 Introduction | 8 |
| 2.2 Historical Background of Offsite Construction..... | 8 |
| 2.3 What is Offsite Method of Construction? | 10 |

| | | |
|--------|--|----|
| 2.4 | Definition of Terms | 10 |
| 2.4.1 | Offsite pre-fabrication | 10 |
| 2.4.2 | Volumetric systems | 10 |
| 2.4.3 | Panelized systems | 10 |
| 2.4.4 | Hybrid systems | 11 |
| 2.4.5 | Sub-assembly and accessory system | 11 |
| 2.4.6 | Prefabricated buildings | 11 |
| 2.5 | Overview of Offsite Construction Methods | 11 |
| 2.6 | The Use of Offsite Construction Techniques | 13 |
| 2.6.1 | Applications of offsite construction techniques in United Kingdom | 13 |
| 2.6.2 | Applications of offsite construction techniques in European Countries .. | 16 |
| 2.6.3 | Applications of offsite construction techniques in other Asian countries | 16 |
| 2.6.4 | Applications of offsite construction methods in Sri Lanka | 18 |
| 2.7 | Types of Off-Site Construction | 19 |
| 2.7.1 | Volumetric system | 19 |
| 2.7.2 | Panel systems | 20 |
| 2.7.3 | Hybrid system | 22 |
| 2.7.4 | Sub-assemblies and component system | 22 |
| 2.8 | How Does the Off-Site Process Work? | 24 |
| 2.9 | Why Off-Site Construction | 26 |
| 2.10 | When Should Off-Site Construction Be Used | 28 |
| 2.11 | Benefits of Offsite Construction Methods | 30 |
| 2.11.1 | Time saving | 30 |
| 2.11.2 | Quality improvement | 31 |
| 2.11.3 | Cost reduction | 32 |

| | | |
|--------|--|----|
| 2.11.4 | Cost predictability..... | 33 |
| 2.11.5 | Addressing shortages of skills | 33 |
| 2.11.6 | Productivity improvement | 34 |
| 2.11.7 | Improve health and safety..... | 34 |
| 2.11.8 | Help society and environment | 34 |
| 2.11.9 | Business integration and economy development..... | 35 |
| 2.12 | Challenges / Barriers in Implementing Off-Site Construction..... | 36 |
| 2.12.1 | Project planning and coordination | 41 |
| 2.12.2 | Transportation restraints | 41 |
| 2.12.3 | Costly construction | 41 |
| 2.12.4 | Resistance to change..... | 42 |
| 2.12.5 | Flexibility to make changes on-site | 42 |
| 2.12.6 | Capital investment | 42 |
| 2.12.7 | Guidance and information | 43 |
| 2.12.8 | Cynical perceptions | 43 |
| 2.12.9 | Conventional construction industry models | 43 |
| 2.13 | Construction Clients' Fundamental Needs..... | 43 |
| 2.13.1 | Functionality of the building | 44 |
| 2.13.2 | Quality of a building..... | 44 |
| 2.13.3 | Completion in time | 44 |
| 2.13.4 | Cost of a building..... | 45 |
| 2.13.5 | Safety of a building..... | 45 |
| 2.13.6 | Maintenance costs of the building | 46 |
| 2.14 | Findings of Literature Review..... | 46 |

| | |
|--|-----------|
| CHAPTER THREE | 48 |
| 3.0 RESEARCH METHODOLOGY | 48 |
| 3.1 Introduction | 48 |
| 3.2 Research Methodology | 48 |
| 3.3 Research Process | 49 |
| 3.3.1 Research approach | 49 |
| 3.4 Research Methods | 50 |
| 3.4.1 Data collection methods | 50 |
| 3.4.2 Data analysis methods | 52 |
| 3.5 Difficulties and Problems Encountered..... | 54 |
| 3.6 Summary | 55 |
| | |
| CHAPTER FOUR..... | 56 |
| 4.0 DATA COLLECTION, DATA ANALYSIS AND FINDINGS | 56 |
| 4.1 Introduction | 56 |
| 4.2 Questionnaire Survey | 56 |
| 4.2.1 Rate of response..... | 57 |
| 4.2.2 Profile of participants | 57 |
| 4.3 Findings of Questionnaire Survey..... | 60 |
| 4.3.1 Satisfaction level of offsite construction techniques | 61 |
| 4.3.2 Sectors Appropriate For Each OSC Techniques | 62 |
| 4.3.3 Components that lend themselves easily to off-site fabrication | 64 |
| 4.3.4 Cost of construction methods | 64 |
| 4.3.5 Preferred construction method..... | 65 |
| 4.3.6 Motivations for the usage of offsite construction methods | 65 |

| | | |
|---------------------------------------|--|------------|
| 4.3.7 | How does the waste reduction occur by the use of OSC affect total cost | 66 |
| 4.3.8 | Cost reduction due to the use of OSC methods | 67 |
| 4.3.9 | Contractor's profit margin..... | 68 |
| 4.3.10 | Materials used in off-site construction | 69 |
| 4.3.11 | Reasons restraining the usage of offsite construction methods..... | 69 |
| 4.3.12 | Drivers for the usage of OSC methods..... | 74 |
| 4.3.13 | Off-site construction challenges | 78 |
| 4.4 | Discussion | 88 |
| 4.5 | Summary | 98 |
| CHAPTER FIVE | | 99 |
| 5.0 | CONCLUSION AND RECOMMENDATION | 99 |
| 5.1 | Introduction | 99 |
| 5.2 | Conclusions | 99 |
| 5.3 | Recommendations | 107 |
| 5.4 | Further Study..... | 109 |
| REFERENCES..... | | 110 |
| APPENDIX A: QUESTIONNAIRE..... | | 122 |

LIST OF FIGURES

| | |
|---|----|
| Figure 2.1:Some Sri Lankan Offsite Construction Projects..... | 18 |
| Figure 4.1: Professional Background of Participants | 59 |
| Figure 4.2: Building Sectors Appropriate For Each OSC Techniques | 62 |
| Figure 4.3: Components That Lend Themselves Easily to Off-Site Fabrication..... | 64 |
| Figure 4.4: More Expensive Construction Method..... | 64 |
| Figure 4.5: Method of Preference | 65 |
| Figure 4.6: Cost Reduction Due To The Use Of Offsite Construction Methods..... | 67 |
| Figure 4.7: Could OSC Methods Increase Contractor's Profit Margin? | 68 |
| Figure 4.8: Materials Used in OSC in Place of Traditional Materials..... | 69 |
| Figure 4.9: Reasons Restraining The Usage of OSC Methods | 71 |
| Figure 4.10: Drivers For The Usage of OSC Methods | 75 |

LIST OF TABLES

| | |
|--|----|
| Table 2.1 : List of Off-Site Construction Challenges and Their Source..... | 37 |
| Table 4.1: Rate of Response | 57 |
| Table 4.2: Type of Organization | 58 |
| Table 4.3: Participant's Experience in Off-Site Constructions Projects | 59 |
| Table 4.4: Participant's Knowledge in Offsite Construction Methods | 60 |
| Table 4.5: Participant's Overall Satisfaction Level of Using OSC Techniques..... | 61 |
| Table 4.6: Motivators For The Usage of Offsite Construction Methods..... | 66 |
| Table 4.7: Did Waste Reduction Reduce The Total Cost of The Project | 67 |
| Table 4.8: Reasons Restraining The Usage of OSC Methods | 70 |
| Table 4.9: Reasons For Usage of Offsite Construction Methods | 74 |
| Table 4.10: Ranking of Critical Challenges For The Uptake Of OSC In Sri Lanka . | 80 |
| Table 4.11: Cluster Matrix of Critical Challenges After Rotation..... | 81 |
| Table 4.12: OSC Challenges - Industry Structure and Supply Chain..... | 82 |
| Table 4.13: OSC Challenges - Constructability Implementation | 83 |
| Table 4.14: OSC Challenges - Architectural Performance | 84 |
| Table 4.15: OSC Challenges - Cost | 84 |
| Table 4.16: OSC Challenges - Policies and Regulations..... | 85 |
| Table 4.17: OSC Challenges - Technological Innovation | 86 |
| Table 4.18: OSC Challenges - Social Climate and Attitudes | 87 |
| Table 4.19: OSC Challenges - Other Challenges..... | 88 |

LIST OF ABBREVIATIONS

| | |
|-------|--|
| CII | Construction Industry Institute |
| CIRIA | Construction Industry Research & Information Association |
| HDB | Housing Development Board |
| MMC | Modern Methods of Construction |
| NAHB | National Association of Home Builders Research Centre |
| OSC | Off-Site Construction |
| OSF | Off-Site Fabrication |
| OSM | Off-Site Manufacturing |
| OSMC | Off-Site Methods of Construction |
| OSP | Off-Site Production |
| POST | Parliamentary Office of Science and Technology |
| R&D | Research and Development |
| RICS | Royal Institute of Chartered Surveyors |
| UK | United Kingdom |
| USA | United State of America |

LIST OF APPENDICES

| Appendix | Description | Page |
|-----------------|--------------------|-------------|
| APPENDIX A | Questionnaire | 122 |