

**STUDY OF SUSTAINABLE PRACTICES USED IN
WOOD WASTE MANAGEMENT IN THE SRI LANKAN
CONSTRUCTION INDUSTRY**

R. Shalini Maduwage

(189619C)

Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa

Sri Lanka

February 2023

**STUDY OF SUSTAINABLE PRACTICES USED IN
WOOD WASTE MANAGEMENT IN THE SRI LANKAN
CONSTRUCTION INDUSTRY**

R. Shalini Maduwage

(189619C)

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

Department of Building Economics

University of Moratuwa

Sri Lanka

February 2023

DECLARATION

I declare that this is my own work, and this thesis/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 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 hereby grant to university of Moratuwa the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

Date: 22nd February 2023.

R.S. Maduwage

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

.....

Ch.QS. Dr. (Mrs) Thanuja Ramachandra,
Dissertation Supervisor

Date: 22nd February 2023

ABSTRACT

Construction waste has become a major concern in almost all sorts of construction projects which include residential, non-residential as well as infrastructure projects. A considerable amount of construction and demolition waste is generated in those types of construction projects. Such generated waste includes brick waste, concrete and aggregate deposits, masonry waste, paper, cardboard, plastic, and wood waste. Wood waste has been recognised as the second largest contributor to construction and demolition waste after concrete and aggregate deposits as evidenced by several past studies. Hence, sustainable practices have received an important place in managing construction and demolition wood waste in the modern era of construction practices. Furthermore, sustainable practices used in wood waste management results in several benefits such as financial benefits, support to achieve green certification and improve the quality of the project, etc. Therefore, this study was focused on exploring various strategies to enhance the application of sustainable wood waste management practices used in the construction industry of Sri Lanka.

The research problem was addressed using a quantitative research approach. The comprehensive literature review was carried out in order to determine sustainable practices used in wood waste management in the construction industry. It was followed by a questionnaire which assisted in the collection of data from 50 respondents that were analysed to determine the research findings. According to findings, four major sustainable practices that are implemented to manage wood waste in Sri Lanka include reusing, recycling, using as by-products and using for energy recovering. However, there are several barriers exist to implement sustainable practices. The key barriers include five main financial barriers, five main technical barriers, eight main knowledge barriers, five main institutional barriers and two main socio-cultural barriers applicable in implementing sustainable practices in wood waste management in the Sri Lankan construction industry. To overcome above identified barriers, this study proposed fifteen suitable strategies to enhance sustainable practices used in wood waste management including making awareness on sustainable wood waste management practices, establishing policies on sustainable wood waste management, encouraging contractors to implement sustainable wood waste management and promoting sustainable products, and so on.

Keywords: - *Sustainable Practices, Wood Waste Management and Construction Industry*

DEDICATION

This research is passionately dedicated to
my beloved family members for the strength and support
that they continuously bestow upon me.

TABLE OF CONTENTS

DECLARATION	iii
ABSTRACT	iv
DEDICATION	v
LIST OF TABLES	x
CHAPTER 01	1
1.0 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	5
1.3 Research Aim.....	6
1.4 Research Objectives	7
1.5 Outline of Research Methodology	7
1.6 Scope of Research.....	8
1.7 Chapter Breakdown	8
1.8 Summary	9
CHAPTER 02	10
2.0 LITERATURE REVIEW	10
2.1 Introduction.....	10
2.2 Construction and Demolition Waste.....	10
2.2.1 Contribution of Construction & Demolition Waste to Total Waste Generation.....	12
2.2.2 Types of Construction & Demolition Waste	13
2.3 Overview of Construction Wood Waste Management	18
2.3.2 Construction Wood waste.....	19
2.3.3 Significance of Construction Wood Waste.....	21
2.3.4 Significance of construction wood waste management.....	23

2.4	Integration of Sustainability with Construction Wood Waste Management ..	26
2.4.1	Importance of Sustainable Practices on Wood Waste Management	27
2.4.2	Types of Sustainable Construction Wood Waste Management Practices	28
2.4.3	Benefits of Sustainable Wood Waste Management Practices	33
2.5	Barriers in implementation of Sustainable Practices	34
2.5.1	Financial Barriers.....	34
2.5.2	Technical barriers	35
2.5.3	Knowledge Barriers	35
2.5.4	Institutional Barriers	35
2.5.5	Socio-Cultural Barriers.....	36
2.6	Strategies to enhance the Application of Sustainable Practices.....	36
2.7	Summary	38
	CHAPTER 03	39
	3.0 METHODOLOGY	39
3.1	Introduction.....	39
3.2	Research Philosophy	39
3.3	Research Approach	40
3.4	Research Techniques.....	40
3.5	Research Process.....	41
3.5.1	Initial Impetus	41
3.5.2	Research Background	41
3.5.3	Identification of Research Problem	41
3.5.4	Literature review	43
3.5.5	Data Collection Technique	43
3.5.6	Data Analysis Techniques	44
3.6	Summary	45

CHAPTER 04	46
4.0 ANALYSIS, FINDINGS AND DISCUSSION	46
4.1 Introduction.....	46
4.2 Overview of Data Analysis	46
4.3 Significance of Wood Waste.....	48
4.3.1 Types of waste and their significance.....	48
4.3.2 Significance wood waste in the Sri Lankan context.....	49
4.3.3 Wood waste generation activities in construction industry	50
4.3.4 Use of conventional waste management practices	51
4.4 Sustainable Practices used in Wood Waste Management.....	53
4.4.1 Suitability of Sustainable practices used to manage wood waste.....	53
4.4.2 Barriers for implementing sustainable practices.....	54
4.4.3 Suitable strategies to enhance sustainable practices.....	59
4.5 Discussion	62
4.6 Summary	65
CHAPTER 05	66
5.0 CONCLUSIONS AND RECOMMENDATIONS	66
5.1 Achievement of Objectives.....	66
5.2 Recommendations	69
5.3 Limitations of the Study.....	70
5.4 Further Research	71
5.5 Final Note.....	71
6.0 REFERENCES	72
7.0 ANNEXURES	86

LIST OF FIGURES

Figure 3.1: Research Process	42
Figure 4.1: Professions of the respondents	46
Figure 4.2: Experience of respondents.....	47

LIST OF TABLES

Table 2.1: Waste composition in Hong Kong.....	15
Table 2.2: Waste composition in Sri Lanka.....	15
Table 2.3: Sources of waste	16
Table 2.4: Types of wastes in construction Industry	17
Below table lists six key activities that generated wood waste.	20
Table 2.5: Wood waste generation activities in construction industry ...	20
Table 2.6: Significance of wood waste management	23
Table 2.7: Conventional waste management practices	24
Table 2.8: Sustainable practices used in the construction industry	32
Table 4.1: Types of waste in Sri Lankan construction industry	48
Table 4.2: Significance of wood waste management	49
Table 4.3: Wood waste generation activities in construction industry ...	50
Table 4.4: Conventional waste management practices used	51
Table 4.5: Suitability of sustainable practices to manage wood waste ..	53
Table 4.6: Financial barriers in implementing sustainable practices.....	54
Table 4.7: Technical barriers in implementing sustainable practices.....	55
Table 4.8: Knowledge barriers in implementing sustainable practices .	56
Table 4.9: Institutional barriers in implementing sustainable practices .	57
Table 4.10: Socio-cultural barriers in implementing sustainable practices.....	58
Table 4.11: Strategies to enhance application of sustainable practices .	59

LIST OF ABBREVIATIONS

C&DW – Construction and Demolition Waste

CW – Construction Waste

CHP – Combined Heat and Power

C&I – Commercial and Industrial

CMRA – Construction Material Recycling Association

EWC – European Waste Catalogue

MSW – Municipal Solid Waste

SDG – Sustainable Development Goals (SDGs)