# ADAPTABILITY OF A NEW NATIONAL BUILDING CODE TO THE BUILDING SECTOR IN SRI LANKA

C.D De Mel

(189595V)

MSc / PG Diploma in Project Management

Department of Building Economics Faculty of Architecture

> University of Moratuwa Sri Lanka

> > February 2024

# ADAPTABILITY OF A NEW NATIONAL BUILDING CODE TO THE BUILDING SECTOR IN SRI LANKA

C.D De Mel

## (189595V)

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

> Department of Building Economics Faculty of Architecture

> > University of Moratuwa Sri Lanka

> > > February 2024

### 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 and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

C.D. de Mel Signature: Date:

The above candidate has carried out research for the PhD/MPhil/Masters thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Ch.QS. Mr Vijitha Disaratna Name of Supervisor:

Signature of the Supervisor:

Date:

## **DEDICATION**

This Research is Dedicated to the Health, Safety and Wellbeing of the Building Sector of the Construction Industry Sri Lanka

#### ACKNOWLEDGEMENT

Familiarizing with the research discipline is not an easy task. Therefore, keen guidance and supervision are vital. The foremost gratitude is therefore dedicated to my supervisor Ch. QS (Mr.) Vijitha Disaratna for his guidance, constant encouragements, and motivation with constructive criticisms on achieving the success of this endeavor. I thank Ch.QS Indunil Senevirathne, Program Director of PG Dip/MSc. in Project Management program for his support in resolving issues during the postgraduate studentship.

My sincere gratitude is rendered to Prof. (Mrs.) Yasangika Sandanayaka, Former Head of the Department of Building Economics, Ch.QS Prof. (Mrs.) Kanchana Perera, for their valuable guidance from the commencement of the postgraduate studies.

My appreciation is forwarded to Mrs. P. L. I. Wimalaratne, Assistant Program Coordinator, for her assistance during the program's second year.

I also acknowledge all the other academic and non-academic staff for their commitment to MSc. program. My special appreciation is conveyed to the expert professionals, the respondents for allocating time to the interviews. My special gratitude goes to my friends Miyuru and Erandi for been with me in times of challenging moments.

I am indebted to my loving husband and two children for tolerating and their moral encouragement and understanding, and finally, I thank all who have supported me in numerous ways.

Thanking you. C.D. De Mel

#### ABSTRACT

Building Construction is one of the main economic activities where planning, designing, construction, funding and maintenance are included in completing a building project. Building controlling systems (BCs) have been identified as a necessary engine of global economic progress. Therefore, need arose to establish an important guideline for ensuring safe, innovative, energy and cost-effective building construction. Many countries utilize building codes to meet key requirements for health, safety, well-being, of people and the built environment. After facing many disasters Sri Lankans have understood the absence of a national building code. This study identifies six objectives after identifying the problem to examine the adaptability of a new National Building Code to the Building Sector in Sri Lanka. Lack of building code and awareness is noticeable as a gap in Sri Lanka and need for a National Building Code for building sector was significant. To address this gap as a problem, the researcher conducted qualitative research including semi-structured interviews to collect data and three main construction professions were identified, namely Chartered Architects, Chartered Engineers and Chartered Quantity Surveyors. Primary data collection method and a literature review as secondary data collection method. The respondents were identified by using the snowball sampling technique since the population is not précised and sample is limited to 12 participants in saturation. The data collected was analyzed by using manual content analysis. Research findings revealed the answers for the six research questions derived from the research objectives. The findings of the study reveals that, the Sri Lankan government will have to take major action in making awareness of the opportunities and challenges in future, to adopt a National Building Code to protect public health, safety, and well-being while lowering disaster risk and working towards a sustainable built environment. At the conclusion findings were presented as what is a building code? Impact created by building code, functions, opportunities created, challenges faced а and recommendations to overcome those challenges were presented accomplishing the objectives.

**Keywords**: Building Code, Construction Industry, Chartered Architects, Engineers, Quantity Surveyors, Impact, Public Health, Safety, Well-Being

## TABLE OF CONTENTS

Declara	tion	i
Dedicat	ion	ii
Acknow	ledgement	iii
Abstrac	t	iv
Table of	f Contents	v
List of H	igures	viii
List of 7	Гables	ix
List of A	Abbreviations	X
List of A	Appendices	xi
Chapter	1	1
Introduc	ction	1
1.1 B	ackground Study	1
1.2 R	esearch Problem	4
1.3 A	im	5
1.4 R	esearch Objectives	5
1.5 R	esearch Methodology	5
1.6 S	cope and Limitations of the Study	6
1.7 C	hapter Breakdown	7
Chapter	2	
Literatu	re Review	8
2.1	Introduction	
2.3	A Brief History of Building Codes	11
2.4	Building Codes for Existing and Historic Buildings	13
2.5	Building Codes in the Global Context	14
2.6	Building Codes in the Sri Lankan Context	19
2.6	.1 Current Approach of a National Building Code for Sri Lanka	
2.7	Building Code Development Supporting Process	
2.8	Current Codes and Standards	23
2.9	Impact of Building Codes	24
2.10	Codes as Living Documents	25
2.11	Importance of Three-Year Updates	25
2.12	Why We Should Adopt Current Model Codes	
2.13	Considerations Law Makers Should Develop	
2.1	3.1 Cost and Benefits of Codes	

2.1	3.2	Greater Resilience provided by the Current Safety Codes	27
2.1	3.3	Current Energy Codes for Lower Energy Bills and Improved Comfo 28	ort
2.1	3.4	Benefits for the Environment	28
2.14	Cus	stomer Feedback	28
2.15	Life	e Cycle Cost (Purchase Price + Operating Costs)	29
2.16	De <sup>.</sup> 30	velopments in Performance-Based Building Codes and Standar	ds
2.1	6.1	Performance versus Prescriptive Building Codes	30
2.17	Pol	itical Philosophies on Government Regulations: Regulatory Burden	34
2.18 chang	Con ging 1	ntinuing improving technology and the way forward to fulfilling requirements of public health and safety and resiliency	34
2.20	Ene	ergy Savings	35
2.21 Comp	Wo petiti	rkforce Training: Best Practices to Meet/Exceed Mandatory Codes C vely. Examples of Enhanced Builder Profitability	ost 36
2.22 in Co	Edu de A	acating Consumers about the Value of Codes and Getting Them Involution Hearings	lved 36
2.23	Dei	monstrating the Business Case for Three-Year Code Updates	37
2.24	Ris	k Management	37
2.25	Imp	portance of Insurance Industry in the Building Code Process	38
2.26	Nee	ed for up-to-date building codes	39
2.27	Co	mplementary Policies	40
2.28	Cha	apter Conclusion	40
Chapter	3		41
Researc	h Me	ethodology	41
3.1	Intr	oduction	41
3.2	Res	search Approach	41
3.3	Туţ	bes of Research Data	43
3.4	San	npling Design Process	43
3.4	.1	Define the Population	43
3.4	.2	Sampling Design	44
3.4	.3	Sampling Technique - Snowball Sampling	44
3.5	Inst	trument Development Process for Data Collection	45
3.6	Dat	a Analysis Process (Qualitative)	46
3.6	5.1	Data Collection	46
3.6	5.2	Data Coding	46
3.6	5.3	Content Analysis of Data	46
3.7	Eth	ical Considerations	47

3.8	How Reliability and Validity Achieve in Qualitative Research	
3.9	Chapter Summary	
Chapter	4	
DATA A	ANALYSIS & RESEARCH FINDINGS	
4.1	Introduction	
4.2	Semi-Structured Interview	
4.3	Objectives of the Semi-Structured Interview	
4.3	.1 Pilot Study	
4.4	Outline of the Semi-Structured Interviews	
4.4	.1 Justification for Selected Professional Categories	
4.4	.2 Details of the Interviewees	
4.5	Findings of the Semi-Structured Interviews	
4.5	.1 Main Functions of a Building Code	
4.5	.2 Impact of the Building Code in Sri Lanka	
4.5 Coe	.4 Challenges Associated with the Implementation of a National de 58	Building
4.5	.6 Summary of Approvals to be gained by Design & Construction 62	n Stage
4.5	.7 Code Development Process	
4.5	.8 Chapter Summary	
Chapter	5	
ConclUS	Sions & Recommendations	
5.1	Introduction	
5.2	Conclusions	
5.3	3 Recommendations	
5.4	5.4 Contribution to Industry Practitioners	
5.6	5.6 Further Research	
5.7 Chapter Summary		76
Referen	ces	
Interview Guidelines		

## LIST OF FIGURES

#### Figure Description Page Figure 1.1 Chapter Break down 08 Figure 2.1 GDP contribution by the Construction Industry, 09 Sri Lanka Figure 2.2 **Code Development Process** 23 Figure 2.3 30 Life Cycle Cost Figure 3.1 **Research Design Process** 44 Figure 4.1 Stages of the Design & Construction Process 64 Figure 4.2 **Code Development Process** 65

## LIST OF TABLES

Table	Description	Page
Table 2.1	Common attributes in defining building code	11
Table 2.2	Overview through the history	13
Table 2.3	List of Building Code establishment and updates of	
	various countries	16
Table 2.4	Impact of Building Codes	25
Table 2.5	Challenges Identified in implementation of a National	
	Building Code in Sri Lanka	33
Table 2.6	Opportunities Identified in implementation of a National	
	Building Code	34
Table 4.1	Details of Interview of Construction Professionals	54
Table 4.2	Functions of a National Building Code	55
Table 4.3	Impact of the Building Code in Sri Lanka	57
Table 4.4	Opportunities identified in implementation of a National	
	Building Code in Sri Lanka	59
Table 4.5	Challenges Identified in implementation of a National	
	Building Code in Sri Lanka	61
Table 4.6	Recommendations Identified in implementation of a	
	National Building Code in Sri Lanka	63

## LIST OF ABBREVIATIONS

Abbreviation	Description
ABCB	Australian Building Codes Board
AMUBC	Australian Model Uniform Building Code
ASHRAE	The American Society of Heating, Refrigerating and Air-
Conditioning Eng	gineers
BC	Building Control
BCEGS	Building Code Effectiveness Grading Schedule
BOCA	Building Office and Code Administration
CABO	Council of American Building Officials
CIB	International Council for Research and Innovation in Building
and Construction.	· · · · · · · · · · · · · · · · · · ·
CIDA	Construction Industry Development Authority
EC	European Commission
ECE	
GDP	Gross Domestic Product
IAPMO	International Association of Plumbing and Mechanical Officials
IBC	International Building Code
IBHS	Institute for Building & Home Safety
ICBO	International Conference of Building Officials
ICC	International Code council
IEBC	International Existing Building Code
IECC	International Energy Conservation Code
IESL	Institute of Engineers Sri Lanka
IRCC	Immigration, Refugees and Citizenship Canada
ISCUBR	Interstate Standing Committee on Uniform Building Regulation
ISO	Insurance Services Organization
ISO	International Organization for Standardization
ITPSL	Institute of Town Planners Sri Lanka
MBIE	Ministry of Business, Innovation, and Employment
NBRO	National Building Research Organization
NCC	National Construction Code
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
SBCCI	Southern Building Code Congress International
SLGS	Sri Lanka Geotechnical Society
SLIA	Sri Lanka Institute of Architects
SSESL	Society of Structural Engineers Sri Lanka
UDA	Urban Development Authority
USSK	Union of Soviet Socialist Republics

## LIST OF APPENDICES

Appendix	Description	Page
Appendix - A	Interview Guidelines	118