

**DEVELOPING A FRAMEWORK FOR MINIMIZING
CONSTRUCTION AND DEMOLITION WASTE IN
URBAN DEVELOPMENT PROJECTS IN SRI LANKA**

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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.

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

Name of the supervisor: Dr.Menaha Thayaparan

Signature of the supervisor:

Date: 14/9/2023

ABSTRACT

The construction industry is indeed one of the largest producers of Construction and Demolition Waste (CDW). CDW consists of materials such as concrete, bricks, wood, metals, glass, plastics, and other debris generated from construction, renovation, and demolition activities. This study examines the production of construction and demolition waste (CDW) specifically from unused or demolished materials, which can be categorized as virgin or non-virgin materials. The findings highlight the various problems associated with this practice, including environmental pollution, negative health impacts, economic challenges, social issues, and the creation of undesirable landfills. The scarcity of dumping sites in urban areas in Colombo is another issue behind the problem. Although, the government has streamlined the regulations and introduced new policies, inefficient administration significantly affects the waste management plans. Strategies for minimization, such as institutional arrangements, human perceptions, and attitudes, procedures for minimizing hierarchy, establishing new legislation and benchmarks, new technologies, are analysed for CDW minimization. This study aims to make a valuable contribution towards addressing these problems and advocating for sustainable approaches in the management of CDW through careful analysis and the suggestion of practical remedies.

Further, this study employed a qualitative research approach, which involved collecting and reviewing literature related to theories and concepts. The researcher gathered data from various sources, such as academic papers, books, and other relevant literature to establish a theoretical foundation for the study. The objectives of this research were to enhance comprehension of the subject matter and expand upon established theories and concepts by thoroughly reviewing and analysing the available knowledge base. The qualitative research approach allowed for a comprehensive exploration of the subject matter, enabling the researcher to draw meaningful insights and make informed conclusions. Findings were validated by the experts of the construction industry through interviews. The researcher needed to be further examined the findings in a real-life context by using three different case studies and collected data through semi structured interviews. The availability of limited literature

specific to CDW management in the Sri Lankan urban development projects highlights the need for this research to explore and draw from global research and practices. This approach allows for the adaptation and implementation of successful CDW minimization practices from around the world to address the specific needs and challenges faced in the Sri Lankan context.

The framework serves as a practical tool that brings together the research findings, strategies, and recommendations to facilitate effective CDW management. Its application aims to guide decision-making processes, promote sustainable practices, and contribute to minimizing CDW in the Sri Lankan context. Finally, the researcher explained the limitations of interviews of the case studies and strategies to overcome those in the analysis and data presentation. This framework will be a blueprint for individual participants who involved in multi-story projects in urban areas to prioritize and awareness of CDW management more systematically.

Keywords: CDW, CDW generation, Urban development projects, and CDW management

DEDICATION

I would like to dedicate my dissertation to the people who have supported me throughout my whole education.

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LIST OF ABBREVIATIONS

| | | |
|------------------|---|--|
| BEAM | - | Building Environmental Assessment Method |
| BIM | - | Building Information Modelling |
| | - | Building Research Establishment Environmental Assessment |
| BREEAM | - | Method |
| | - | Comprehensive Assessment System for Built Environment |
| CASBEE | - | Efficiency |
| CDW | - | Construction and Demolition waste |
| CDWM | - | Construction and Demolition waste Management |
| CEA | - | Central Environment Authority |
| CIDA | - | Construction Industry Development Authority |
| CMC | - | Colombo Municipal Council |
| CO ₂ | - | Carbon Dioxide |
| COWAM | - | Construction Waste Management |
| EMS | - | Environmental Management System |
| GB | - | Green Building |
| GBCSL | - | Green Building Council of Sri Lanka |
| GBRS | - | Green Building Rating System |
| GC | - | Green Construction |
| GDP | - | Gross Domestic Product |
| GFA | - | Ground Floor Area |
| GPS | - | Global Positioning System |
| GRIHA | - | Green Rating for Integrated Habitat Assessment |
| H ₂ S | - | Hydrogen Sulphide |
| ICT | - | Information and Communication Technology |
| LA | - | Local Authority |
| LEED | - | Leadership in Energy and Environmental Design |
| MC | - | Municipal Council |
| MSW | - | Municipal Solid Waste |
| PC | - | Provincial Council |

| | | |
|-------|---|--|
| REBRI | - | Resource Efficiency in the Building and Related Industries |
| SWM | - | Solid Waste Management |
| UAE | - | United Arab Emirates |
| UC | - | Urban Council |
| UDA | - | Urban Development Authority |
| UK | - | United Kingdom |
| USA | - | United States of America |

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