UNIVERSITI PUTRA MALAYSIA

SUSTAINABILITY OF STREET FURNITURE DESIGN IN URBAN MALAYSIA

ARNIS BINTI AZIZ

FRSB 2013 2
SUSTAINABILITY OF STREET FURNITURE DESIGN IN URBAN MALAYSIA

By

ARNIS BINTI AZIZ

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science.

September 2013
COPYRIGHT

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia
Today, urban spaces are one of the major elements that define the city’s unique and attractive points. Although comparatively small in scale, street furniture is an element that can play an essential role in developing the quality of urban spaces and add value in representing city identity. Street furniture refers to the objects or facilities that provide various services and functions to the public in the area of urban public spaces. It is a structural element of environment that normally varies depending on the social and cultural features of a city or a country. It helps in contributing to human activities and to surrounding. This research seeks study is to implement the criteria of sustainable design in street furniture.

Thus, in this research it is imperative that the sustainable criteria for street furniture design in Malaysia should be assessed. In providing a comprehensive data and background information, a literature search and document analysis was done. The major findings of this research proposed sustainable design criteria based on the literature search and document analysis. This was used to measure each sets of the data collection gathered. Furthermore, interviews with professionals formed part of the author’s in depth method. Data collection of these methods was analysed via the qualitative approach. Links were made between the sustainable street furniture design practised in Malaysia and the practised experiences in the other countries. The question of what is roles street furniture plays and what sustainable design is, are discussed. The criteria for sustainable design were examined and sustainability issues and problems of street furniture design in Malaysia were also analysed.

Finally, the study explored the importance and possibilities of adopting sustainable design criteria for street furniture in Malaysia. It is hoped that this study will contribute towards creating awareness of the importance of sustainable design in street furniture.
in the country which in turn will help in the sustainable development of the urban areas and cities, besides improving the environment and urban living.

**Keywords**: Sustainable Design, Street Furniture, Malaysia Urban
Abstrak tesis yang di kemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains.

KELESTARIAN REKA BENTUK PERABOT JALANAN DI BANDARAN MALAYSIA

Oleh

ARNIS BINTI AZIZ

September 2013

Pengerusi : Prof. Madya LAr Osman Mohd Tahir, PhD

Fakulti : Rekabentuk dan Senibina

Hari ini, ruang urbanisasi adalah salah satu unsur penting yang menegaskan keunikan dan tarikan utama sesuatu bandar. Walaupun berskala kecil, perabot jalan merupakan elemen yang mampu memainkan peranan yang penting dalam proses pengubahan kualiti ruang urbanisasi dan penambahan nilai bagi menggambarkan identiti sesuatu bandar. Perabot jalan adalah merujuk kepada objek atau kemudahan yang disediakan dari pelbagai perkhidmatan dan bertindak sebagai kemudahan utama bagi penggunaan di ruang urbanisasi. Ia adalah struktur unsur kepada persekitaran yang kebiasaannya bergantung kepada kehidupan sosial dan kebudayaan sesuatu bandar atau pun negara tersebut. Ia membantu dalam menyumbang aktiviti harian manusia dan persekitaran. Kajian ini mencari ruang untuk mengaplikasi reka bentuk lestari di dalam perabot jalanan.

Akhirnya, kajian bertujuan untuk menyelidik kepentingan dan kemungkinan menggunakan kriteria kelestarian reka bentuk bagi perabot jalan di bandaran urbanisasi Malaysia. Harapan agar kajian ini mampu menyumbang atau membentuk kesedaran mengenai kepentingan kelestarian di dalam reka bentuk perabot jalan di dalam negara yang membangun selain daripada meningkatkan keadaan persekitaran dan kehidupan urbanisasi.

**Kata Kunci: Reka Bentuk Lestari, Perabot Jalan, Bandaran Urbanisasi Malaysia**
ACKNOWLEDGEMENTS

I would like to acknowledge the following people for their contributions during the preparation of this thesis:

My gratitude goes especially to Assoc. Prof. LAr. Dr. Osman Mohd Tahir, supervisor extraordinaire, for his guidance, encouragement, patience, and unfailing optimism.

My special thanks also go to Dr. Mohamad Fakri Zaky, Co-supervisor, for his support, timely comments and attention to details.

Most importantly, I thank my beloved mother Robiyah Ideris and beloved family members for their endless reassurance, prayers and support and also everyone who continuously inspire me.

Finally, I would like to thank all my dear friends; Dr. Azhari Md Hashim and colleagues, for their empathy and encouragement. Thank you very much too to all the experts involved in this research’s interviews. Their cooperation and contributions were really meaningful in completing this thesis.
I certify that a Thesis Examination Committee has met on 12 September 2013 to conduct the final examination of Arnis binti Aziz on her thesis entitled “Sustainability of Street Furniture Design in Urban Malaysia” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U. (A) 106] 15 March 1988. The Committee recommends that the student be awarded the Master of Science.

Members of the Thesis Examination Committee were as follows:

**Suhardi bin Maulan, PhD, LAr**
Senior Lecturer,  
Faculty of Design and Architecture  
Universiti Putra Malaysia  
(Chairman)

**Raja Ahmad Azmeer bin R.A. Effendi, PhD**
Senior Lecturer  
Faculty of Design and Architecture  
Universiti Putra Malaysia  
(Internal Examiner)

**Mustafa Kamal bin Mohd Sharif, PhD, LAr**
Professor,  
Faculty of Design and Architecture  
Universiti Putra Malaysia  
(Internal Examiner)

**Julaihi Wahid, PhD**
Professor  
Faculty of Housing, Building and Planning  
Universiti Sains Malaysia  
(External Examiner)

__________________________

**NORITAH OMAR, PhD**  
Associate Professor and Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: 21 January 2014
This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

**Osman bin Mohd Tahir, PhD**  
Associate Professor, LAr  
Faculty of Design and Architecture  
Universiti Putra Malaysia  
(Chairman)

**Mohamad Fakri Zaky bin Jaafar, PhD**  
Senior Lecturer  
Faculty of Design Architecture  
Universiti Putra Malaysia  
(Member)

________________________________

**BUJANG BIN KIM HuAT, PhD**  
Professor and Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date:
DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

________________________________

ARNIS BINTI AZIZ

Date: 12 September 2013
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>v</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>vi</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>vii</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>Xv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>Xvii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>Xviii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td></td>
</tr>
</tbody>
</table>

## CHAPTER

### 1 INTRODUCTION

1.0 Early Observation of Research  
1.1 Research Aim and Objectives  
1.2 Significance of the Research  
1.3 Scope of the Research  
1.4 Structure of the Thesis  

### 2 LITERATURE REVIEW

2.0 Introduction  
2.1 Definition of Street Furniture  
2.2 The Significant Roles of Street Furniture  
   2.2.1 Increase the Quality of Life  
   2.2.2 The Role of Social Community Space  
   2.2.3 Generate Movement of City Identity  
   2.2.4 Create Surrounding Activities  
   2.2.5 Present Aesthetics Value
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>Problems and Issues of Street Furniture in Urban Malaysia</td>
<td>15</td>
</tr>
<tr>
<td>2.3.1</td>
<td>Poor Consciousness of Sustainability Principles Concept in Street Furniture</td>
<td>15</td>
</tr>
<tr>
<td>2.3.2</td>
<td>Poor Professional Design Advise in Choosing the Design Aesthetics and Concept</td>
<td>16</td>
</tr>
<tr>
<td>2.3.3</td>
<td>Poor Material Usage in Street Furniture Design</td>
<td>16</td>
</tr>
<tr>
<td>2.3.4</td>
<td>Poor of Local Government Support</td>
<td>17</td>
</tr>
<tr>
<td>2.3.5</td>
<td>Poor Discipline and Sense of Responsibilities Among Designers</td>
<td>18</td>
</tr>
<tr>
<td>2.4</td>
<td>Sustainability: The Definition and Benefits to the Quality of Life</td>
<td>18</td>
</tr>
<tr>
<td>2.5</td>
<td>Importance of Sustainable Design</td>
<td>20</td>
</tr>
<tr>
<td>2.5.1</td>
<td>Eco-Design in Relation with Sustainable Product Design?</td>
<td>21</td>
</tr>
<tr>
<td>2.6</td>
<td>Malaysian Street Furniture Development</td>
<td>23</td>
</tr>
<tr>
<td>2.7</td>
<td>Malaysia's Sustainability Development</td>
<td>30</td>
</tr>
<tr>
<td>2.8</td>
<td>The starting point of Sustainable Street Furniture in Malaysia</td>
<td>32</td>
</tr>
<tr>
<td>2.9</td>
<td>The Need of Sustainable Design in Malaysia's Street Furniture</td>
<td>33</td>
</tr>
<tr>
<td>2.10</td>
<td>Review of Sustainability Documentation</td>
<td>35</td>
</tr>
<tr>
<td>2.10.1</td>
<td>The Hannover Principles</td>
<td>36</td>
</tr>
<tr>
<td>2.10.2</td>
<td>The Brundtland Report</td>
<td>36</td>
</tr>
<tr>
<td>2.10.3</td>
<td>Kyoto Protocol</td>
<td>37</td>
</tr>
<tr>
<td>2.10.4</td>
<td>Agenda 21</td>
<td>37</td>
</tr>
<tr>
<td>2.11</td>
<td>A Study on Manual Guidelines from Various Development Countries</td>
<td>38</td>
</tr>
<tr>
<td>2.11.a</td>
<td>United State of America (USA)</td>
<td>38</td>
</tr>
<tr>
<td>2.11.b</td>
<td>United Kingdom (UK)</td>
<td>39</td>
</tr>
<tr>
<td>2.11.c</td>
<td>Australia</td>
<td>40</td>
</tr>
<tr>
<td>2.12</td>
<td>Summary</td>
<td>46</td>
</tr>
</tbody>
</table>
3 METHODOLOGY

3.0 Introduction 47

3.1 Research Development Strategy 48

3.1.1 Stage 1: Research Framework and Background Study 50

3.1.2 Stage 2: Conceptual Framework 50

3.1.3 Stage 3: Results and Analysis 50

3.1.4 Stage 4: Final Discussions, Conclusion and Recommendations 51

3.2 Research Methods and Techniques 51

3.2.1 Literature Review 52

3.2.2 Document Sources 53

3.2.3 Interview 53

3.3 Analysis of Data 56

3.4 Summary 56

4 RESULTS AND DISCUSSIONS

4.0 Introduction 57

4.1 Interview Analyses 58

4.1.1 Expert's Background 58

4.1.2 The Street Furniture in Urban Malaysia 60

1 The Understanding of Street Furniture 60

2 The Significance of Street Furniture 60

i. Visualise City Quality 61

ii. Functional to Social Living 61

iii. Represents City Identity 61
iv. Creating the Environment of Community Culture 62
v. Aesthetics Values 62

4.1.3 Sustainable Design in Urban Malaysia’s Street Furniture 63

1 Problems and Issues of Street Furniture and Its Design in Urban Malaysia 63
i. Lack of Awareness in Sustainability 63
ii. Lack of Knowledge and Understanding 64
iii. Lack of Funds 64
iv. Lack of Enforcement 65
v. Lack of Criteria and Guidelines 65
vi. Lack of Communication 66

2 Understanding of Sustainable Design 66
3 Significances of Implementing and Practising Sustainable Design 67

4.1.4 Sustainable Design Criteria for Street Furniture in Urban Malaysia 68
i. Environmental Impact 68
ii. Materials and Resources 68
iii. Cost Efficiency 69
iv. Health and Safety 69
v. Social 70
vi. Aesthetics 70
a) Other Views and Opinion 71

4.1.5 The Future of Purpose Sustainable Design 71
i Communication Among All Designers 72
ii Support by Top Management 72
iii Public’s Need 72

4.1.6 Recommendation on Standard Sustainable Design Guidelines for Street Furniture 72
4.2 Discussion and Recommendations 74
4.2.1 The Understanding of Street Furniture 74
4.2.2 The Significant Roles of Street Furniture 75
   i. Visualise City Quality 75
   ii. Functional to Social Living 75
   iii. Represent City’s Identity 75
   iv. Built Environment of Culture 76
   v. Present the Aesthetics Value 76
4.2.3 Problems and Issues Related to Sustainable Street Furniture in Urban Malaysia 77
   i. Lack of Awareness in Sustainability 77
   ii. Lack of Knowledge and Understanding 77
   iii. Lack of Fund 77
   iv. Lack of Enforcement 78
   v. Lack of Criteria and Guideline 78
   vi. Lack of Communication 78
4.2.4 The Understanding and Knowledge of Sustainable Design 79
4.2.5 The Significances of Implementing or Practising Sustainable Design 79
4.2.6 The Sustainable Design Criteria Review 80
   i. Environmental Impact 80
   ii. Materials and Resources 80
   iii. Cost Efficiency 81
   iv. Health and Safety 81
   v. Social 81
   vi. Aesthetics 81
4.3 Summary 82
## 5 CONCLUSION AND RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>Introduction</td>
<td>83</td>
</tr>
<tr>
<td>5.1</td>
<td>The Significant Roles of Sustainable Street Furniture in Urban</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>Street Furniture Sustainability Problems and Issues in Urban</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>Sustainable Design Criteria Identified</td>
<td>95</td>
</tr>
<tr>
<td>5.4</td>
<td>Recommendations for Future Research</td>
<td>87</td>
</tr>
<tr>
<td>5.5</td>
<td>Contribution and Final Remarks</td>
<td>87</td>
</tr>
</tbody>
</table>

**BIBLIOGRAPHY** 89

**APPENDICES** 95

**BIODATA OF STUDENT** 102

**LIST OF PUBLICATIONS** 103