INFLUENCE OF PARTICLE SIZES IN HOMOGENOUS AND HETEROGENEOUS WOOD CEMENT BOARD PROPERTIES MADE FROM Acacia mangium

BY

AZLAN BIN SERAILA

Thesis Submitted in Partial Fulfilment of the Requirements for the Degree of Bachelor of Science (Hons.) Bio Composite Technology In the Faculty of Applied Science Univerisiti Teknologi MARA

JANUARY 2015
CANDIDATE’S DECLARATION

The author declare that the work in this Final Year Project was carried h the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. The final year project report has not been submitted to any other academic institution or non academic institution for any other degree or qualification.

In the event that the author’s Final Year Project is found to violate the condition mention above, the author voluntarily waive the right of conferment of my bachelor degree and agree to be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

Name of Candidate : AZLAN BIN SERAILA

Candidate's ID No : 2011918805

Signature of Candidate : .............................................

Date :
ABSTRACT

Influenced of particle sizes in homogenous and heterogeneous wood cement board properties made from Acacia mangium

Wood-cement board (WCB) is a panel product that has the advantages of inorganic and organic materials. However, the main problems affecting the manufacture and use of WCB are the inhibitory effects of wood on the setting of cement and the high specific gravity of the final product. This paper examines the potential and the use of particle sizes used and board layer that was use to facilitate the production of a WCB from Acacia mangium. Wood cement boards (WCB) were manufactured with wood/cement (w/w) ratio of 1:3, target density is 1300kg m$^{-3}$ and $\text{Al}_2\text{(SO}_4\text{)}_3$ and $\text{Na}_2\text{SiO}_3$ content as chemical additives is 3.0%. Besides that, WCB also manufactured with the layer (homogenous and heterogeneous). The WCB were tested for static bending (MOR and MOE) properties in parallel and perpendicular directions; internal bond (IB), thickness swelling (TS) and water absorption (WA).
# TABLE OF CONTENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROVAL SHEET</td>
<td>i</td>
</tr>
<tr>
<td>CANDIDATE'S DECLARATION</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENT</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>viii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ix</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>x</td>
</tr>
</tbody>
</table>

## CHAPTER 1

1.0 Introduction

1.1 Background of study 1

1.2 Problem statement 2

1.3 Justification of study 2

1.4 Significance of study 3

1.5 Limitations of study 3

1.6 Objectives of study 4

## CHAPTER 2

2.0 Literature review

2.1 Overall view of *Acacia mangium* 5

2.2 Properties of wood cement board 7

2.2.1 Utilization 7

2.2.2 Fungus and termites resistant 8

2.2.3 Workability 8

2.2.4 Fire resistance 8

2.3 Uses 8

2.3.1 Permanent work 8

2.3.2 Partition and wall 9
2.4 Raw material supply

2.4.1 Acacia mangium

2.4.2 Rubberwood

2.5 Factor affecting board properties

2.5.1 Cement ratio

2.5.2 Particle sizes

2.5.3 Additives

CHAPTER 3

3.0 Materials and methods

3.1 Field procedure

3.2 Materials preparation

3.2.1 Debarking

3.2.2 Chipping process

3.2.3 Flaking process

3.2.4 Screening process

3.3 Wood cement board making process

3.3.1 Blending process

3.3.2 Mat forming

3.3.3 Pre pressing

3.3.4 Cold press

3.3.5 Clamped

3.3.6 Hardening chamber

3.3.7 Board cutting

3.4 Boarding evaluation

3.5 Determination of flexural strength

3.6 Determination of thickness swelling

3.7 Determination of water absorption

3.8 Determination of internal bonding