

**PROPERTIES OF PARTICLE BOARD MADE FROM BATAI  
(*paraserianthes falcataria*) USING PHENOL FORMALDEHYDE**

**BY**

**SITI AINATUL MARDHIAH BT MOHD HATA**

**SITI KHAIROH BT HASSAN**

**Final Project Submitted in Partial Fulfillment for the Diploma in Wood Industry,  
Faculty of Applied Science, Universiti Teknologi MARA, Pahang Branch**

**April 2011**

## ACKNOWLEDGEMENT

### BISMILLAHIRRAHMANIRRAHIM

#### ASSALAMUALAIKUM WARAHMATULLAHHIWABARAKATUH

Firstly, we would like to be thankful to the Almighty Allah S.W.T for His blessing and favor in guiding towards completing this final project and to our beloved family that keep giving our the spirit to keep up with the study and encourage leading towards the success of this final project.

We also want to express our special thanks to our advisor, Prof. Dr. Jamaludin b. Kassim who's the willingness to contribute his knowledge, time, and effort till we completed our project. He also gave our support and references about how we can do it to finish our final project.

Thanks also to all our friends for their continuous support. Also to others lecturers and staff of Diploma in Wood Industry for their priceless help inpreparing the materials needed in this research work.

Lastly, we appreciation is to those who are involved either directly or not indirectly completing this project. Without their help, it is impossible to us to complete the paper project.

Thank you.

## TABLE OF CONTENT

| CONTENT   | PAGES |
|---|-------|
| APPROVAL SHEET.....   | ii    |
| DEDICATION .....  | iii   |
| ACKNOWLEDGEMENT .....   | iv    |
| LIST OF TABLES.....   | viii  |
| LIST OF FIGURES.....  | ix    |
| LIST OF PLATES.....   | x     |
| LIST OF ABRECIATION.....  | xi    |
| ABSTRACT .....  | xii   |
| ABSTRAK .....   | xiii  |
|   |       |
| CHAPTER ONE   |       |
| 1.0 INTRODUCTION  |       |
| 1.1 Malaysia Market.....  | 1     |
| 1.2 Problem statement.....  | 2     |
| 1.3 Justification .....   | 3     |
| 1.4 Objectives .....  | 3     |
|   |       |
| CHAPTER TWO   |       |
| 2.0 REVIEW OF LITERATURE  |       |
| 2.1 Batai ( <i>Paraserianthes falcataria</i> ).....               | 4     |
| 2.1.1 Botanic Description.....                                    | 4     |
| 2.1.2 Functional Uses.....  | 5     |
| 2.2 Particle Board History.....                                   | 6     |
| 2.3 Factor Affecting Board Properties .....                       | 8     |
| 2.3.1 Effect of Particle Size.....                                | 8     |
| 2.3.2 Effect of board density.....                                | 8     |
| 2.3.3 Effect of resin content.....                                | 9     |
| 2.4 Phenol Formaldehyde.....                                      | 10    |
| 2.4.1 Properties of Phenol Formaldehyde.....                      | 10    |
| 2.4.2 Advantages and Disadvantages of Phenol<br>Formaldehyde..... | 11    |
| 2.4.3 Application .....   | 11    |

CHAPTER THREE

3.0 MATERIALS AND METHOD..... 12

3.1 RAW MATERIAL COLLECTION AND PARTICLE PREPARATION..... 12

3.1.1 Raw Materials..... 12

3.1.2 Debarking ..... 13

3.1.3 Chipping ..... 14

3.1.4 Flaking ..... 15

3.1.5 Screening ..... 16

3.1.6 Drying ..... 17

3.2 BOARD MANUFACTURING ..... 18

3.2.1 Glue mixing and blending ..... 18

3.2.2 Mat forming ..... 19

3.2.3 Cold Press ..... 20

3.2.4 Hot press ..... 21

3.2.5 Trimming ..... 22

3.2.6 Cut into size ..... 23

3.2.7 Testing Of Panel of Particle Board ..... 24

3.2.7.1 Bending (MOR & MOE) ..... 24

3.2.7.2 Internal bonding (MOE) ..... 25

3.2.7.3 Thickness Swelling (TS) and Water Absorption (WA) ..... 26

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Particle Size Analysis ..... 27

4.1.1 Bulk Density ..... 27

4.1.2 Particle Size Analysis ..... 28

4.2 Mechanical and Physical Properties of particle board on Particleboard ..... 29

4.3 Statistical Significant ..... 30

4.3.1 Effect of Density ..... 31

4.3.2 Effect of Resin Content ..... 33

4.3.3 Effect on Particle Size ..... 35

Abstract of Final Project present to the University of Technology Mara fulfill of  
requirement for Diploma in Wood Industry

PROPERTIES OF PARTICLEBOARD FROM BATAI (*Paraserianthes falcataria*) BY  
USING PHENOL FORMALDEHYDE

BY

SITI AINATUL MARDHIAH BT MOHD HATA

SITI KHAIROH BINTI HASSAN

APRIL 2011

Advisor: Prof. Madya. Dr. Jamaluddin Bin Kasim

Faculty: Applied Science

In this study, 5% and 7% of phenol formaldehyde (PF) will use and mixed the particle size of 1.0 mm and 2.0 mm of *Paraserianthes falcataria*. Mechanical and physical properties were determined using BS EN 1993 Standard method. The result showed that the density significant effect on all the board properties except for thickness swelling (TS). Resin content showed only significant effect on thickness swelling (TS). Particle size showed significant effect on MOE and IB. The interaction of density, resin content and particle size showed significant effect on all board properties except for MOR, MOE and TS. In conclusion, the particleboard made from Batai spp does not meet the standard requirement for BS EN 1993.