

**PROPERTIES OF THREE LAYER PARTICLEBOARD FROM  
KELEMPAYAN**

*(Neolamarckia cadamba)*

**MOHAMAD ROSHAFIZI BIN RASHID**

**Final Year Project Report Submitted In  
Partial Fulfillment of The Requirements For The  
Degree of Bachelor of Science (Hons.) Furniture Technology  
In the Faculty Applied Science  
Universiti Teknologi Mara, Pahang**

**JULY 2014**

## ABSTRACT

### PROPERTIES OF THREE LAYER PARTICLEBOARD FROM KELEMPAYAN

*(Neolamarckia cadamba)*

Particleboard is a panel product made by compressing small particles of wood while simultaneously bonding them with an adhesive. The objective of the study to investigate the mechanical and physical properties of three layer particleboard from Kelempayan (*Neolamarckia cadamba*) at different proportion level and properties were evaluated based on Japanese Industrial Standard. Variables factor were as density (500 kg/m<sup>3</sup>, 600 kg/m<sup>3</sup> and 700 kg/m<sup>3</sup>) and resin content of urea formaldehyde (8%, 10% and 12%). The mechanical and physical properties were presented and analyzed using Software Package Used for Statistical Analysis (SPSS) to determine the significant different of variables. The result collected shows that all the variables for mechanical properties were significant different and the better result was 700 kg/m<sup>3</sup> of density when using 12% of resin content. For physical properties, the strength of board decrease since the board has no water repellent.

## TABLE OF CONTENT

	<b>Pages</b>
<b>DEDICATIONS</b>	iii
<b>ACKNOWLEDGEMENT</b>	iv
<b>TABLE OF CONTENTS</b>	v
<b>LIST OF TABLES</b>	vii
<b>LIST OF FIGURES</b>	viii
<b>LIST OF ABBREVIATION</b>	ix
<b>ABSTRACT</b>	x
<b>ABSTRAK</b>	xi
<b>1.0 INTRODUCTION</b>	
1.1 General	1
1.2 Problem statements	3
1.3 Justification	4
1.4 Objective	4
<b>2.0 LITERATURE RIVIEW</b>	
2.1 Particle Composite	5
2.1.1 History and Development	6
2.1.2 Application and Market Distribution	8
2.1.3 Raw Material Specification	9
2.2 Kelempayan Species	10
2.3 Urea Formaldehyde	11
2.4 Effect of density on particleboard	12
2.5 Effect of resin content on particleboard	12

### **3.0 MATERIAL AND METHOD**

3.1	Raw Material Preparation	14
3.2	Particleboard Manufacturing	15
3.3	Panel Testing	17
	3.3.1 Density	17
	3.3.2 Bending Strength	18
	3.3.3 Internal Bonding	19
	3.3.4 Thickness Swelling and Water Absorption	19
3.4	Experimental Design	20
3.5	Statistical Analyzed	21

### **4.0 RESULT AND DISCUSSION**

4.1	Mechanical and Physical Properties of Particleboard	22
	4.1.1 Effect Density On Mechanical Properties	23
	4.1.2 Effect Density On Physical Properties	25
	4.1.3 Effect Resin Content On Mechanical Properties	27
	4.1.4 Effect Resin Content On Physical Properties	29

### **5.0 CONCLUSION**

5.1	Conclusions	31
-----	-------------	----

<b>REFERENCES</b>	33
-------------------	----

<b>APPENDICES</b>	36
-------------------	----

<b>CURRICULUM VITAE</b>	69
-------------------------	----

## LIST OF FIGURES

<b>Figure</b>	<b>Caption</b>	<b>Pages</b>
3.1	Schematic diagrams of panel cutting	16
3.2	Experimental design of study	20
4.1	Effect of density on mechanical properties	23
4.2	Effect of density on physical properties	25
4.3	Effect of resin content on mechanical properties	27
4.4	Effect of resin content on physical properties	29