

**PROPERTIES OF PARTICLEBOARD MADE FROM ADMIXTURE
MATERIALS OF KELEMPAYAN (*Neolamarckia cadamba*), MIXED
SPECIES OF DURIAN HUSK AND OIL PALM FROND (*Elaeis
guineensis jacq.*) IN RELATION TO DENSITY**

IZZAH BINTI ISMADI

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirement for the
Bachelor of Science (Hons.) in Furniture Technology
in the Faculty of Applied Science
Universiti Teknologi MARA**

JULY 2014

ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Assalamualaikum W.B.T

First of all, I would like to express my gratitude to Allah SWT, the almighty for giving me the opportunity and a healthy condition during the process of finishing my final year project. To my FYP's lecturers, Prof. Dr. Jamaluddin bin Kasim and Assoc. Prof. Dr. Wan Mohd Nazri bin Wan Abd Rahman , thank you so much for all your valuable guidance and knowledge and all the experiences you had shared with me .

I also would like to say a big thanks to my supervisor, Dr. Shaikh Abdul Karim Yamani bin Zakaria, for guiding and correcting me through all the way in finishing my project. Do not forget, thanks to Miss Nurus Syahida binti Tahreb for helping me in my writing.

My sincerest appreciation also goes to UiTM staffs and other people whom willing to sacrifice their time and also provided me with the materials I need. Lastly, thousand thanks to my beloved parents, Mr Ismadi bin Ismail and Madam Rohayati bt. Mohd Ali for their support in term of finance and morale. And thanks to all my classmates from AS2276B for all the information they shared and all those helping hands they had gave.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF PLATES	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xi
ABSTRAK	xii
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Research problem	2
1.3 Justification of study	4
1.4 Objectives	5
CHAPTER 2 REVIEW OF LITERATURE	
2.1 Wood based industry	6
2.2 Particleboard	7
2.2.1 Definition of particleboard	7
2.2.2 Particleboard manufacturing process	7
2.3 Kelempayan	10
2.3.1 Anatomy of Kelempayan	11
2.4 Oil palm	12
2.4.1 History of Malaysia's oil palm	12
2.4.2 Oil palm	13
2.4.3 Oil palm frond	15
2.5 Durian	16
2.6 Adhesive	18
2.6.1 Wood adhesive	18
2.6.2 Urea Formaldehyde	19
2.6.3 Phenol Formaldehyde	20
2.6.4 Melamine Formaldehyde	20

CHAPTER 3 METHODOLOGY

3.1	Preparation of raw materials	22
3.1.1	Preparation of Kelempayan	22
3.1.2	Preparation of durian husk	23
3.1.3	Preparation of oil palm frond	23
3.2	Chipping and flaking	23
3.2.1	Chipping and flaking of Kelempayan.	25
3.2.2	Chipping and flaking of durian husk	25
3.2.3	Chipping and flaking of oil palm frond	25
3.3	Screening and drying	26
3.3.1	Screening and drying of Kelempayan	26
3.3.2	Screening and drying of durian husk	27
3.3.3	Screening and drying of oil palm frond	27
3.4	Resin mixing and blending	27
3.4.1	Resin mixing and blending for particleboard made from Kelempayan.	28
3.4.2	Resin mixing and blending for particleboard made from Kelempayan and durian husk.	28
3.4.3	Resin mixing and blending for particleboard made from Kelempayan and oil palm frond.	29
3.5	Mat Forming	29
3.6	Pre-press/Cold press process	30
3.7	Hot press	30
3.8	Trimming	31
3.9	Sample cutting	32
3.10	Panel Testing	32
3.10.1	Bending testing	32
3.10.2	Internal bonding	33
3.10.3	Thickness swelling	34

CHAPTER 4 RESULTS AND DISCUSSION

4.1	Mechanical and physical properties	36
4.2	Statistical significance	40
4.3	Effects of wood composition on the mechanical properties of particleboard	41
4.3.1	Bending strength (MOR and MOE)	41
4.3.2	Internal bond	44
4.4	Effects of wood composition on the physical properties of particleboard	46
4.4.1	Thickness swelling	46

ABSTRACT

PROPERTIES OF PARTICLEBOARDS MADE FROM ADMIXTURE MATERIALS OF KELEMPAYAN (*Neolamarckia cadamba*), MIXED SPECIES OF DURIAN HUSK AND OIL PALM FROND (*Elaeis guineensis jacq.*) IN RELATION TO DENSITY

The properties of particleboards made from admixture materials of Kelempayan (*Neolamarckia cadamba*), mixed species of durian husk and oil palm frond (*Elaeis guineensis jacq.*) were studied. This is due to the depleting amount of forest resources and also concerned towards the environment. Three types of boards which were produced from Kelempayan (*Neolamarckia cadamba*), Kelempayan (*Neolamarckia cadamba*) mixed with the mixed species of durian husk and Kelempayan (*Neolamarckia cadamba*) mixed with oil palm frond (*Elaeis guineensis jacq.*). The effect of different board densities (600, 700 and 800 kg/m³) and different admixture materials on particleboard's mechanical and physical properties were determined. 10% of Phenol Formaldehyde (PF) was used in this study. Tests were done according to MS 1787. The result obtained were compared to specification MS 1036: 2006. The MOR, MOE, internal bonding and thickness swelling results had showed that higher density has a higher value. Among three boards, Kelempayan (*Neolamarckia cadamba*) mixed with oil palm frond (*Elaeis guineensis jacq.*) the best performance for mechanical and physical properties.