

**MANUFACTURING OF PARTICLE BOARD FROM OIL
PALM FROND**

By

NORHALIMAHTUS SAADIAH RAZALI

NOOR AIN MOHD HAZAN

IZZAH AZIMAH NOH

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirement for the
Diploma in Wood Industry
in the Faculty of Applied Science
Universiti TeKnologi MARA**

MARCH 2012

ACKNOWLEDGMENT

Praise to ALLAH the most merciful and the greatest; with permission we finished the report on particleboard from oil palm frond. First and foremost, I would like to express my sincere appreciation to my subject lecture Assoc. Prof Abdul Jalil for guiding and encourage us in the final project.

Thanks to our advisor Miss Mufidah who willingly supervise our final project, giving advice and knowledge. Thanks a lot for giving us the knowledge, sharing the experience and providing guide line finishing the final report.

A millions thanks also to Miss Farahin, PHD student for her willingness to teach the proceeding making the particle board, using the machine and its function, and give hand to produce the particle board, as without her the work does not run smoothly.

A thousands thanks also to all the staff for helping us in conducting the machines and conducting the testing. Also thank to our group members Izzah Azimah Bt.Noh, Noor Ain Mohd Hazan and Norhalimahtus Saadiah Bt.Razali for giving to give the energy and full cooperation in making the project work smoothly.

TABLE OF CONTENTS

CONTENTS	PAGE
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF PLATES	ix
LIST OF GRAPH	x
LIST OF ABBREVIATION	xi
ABSTRACT	xii
ABSTRAK	xiii
CHAPTER 1 INTRODUCTION	1
1.1 Background	1
1.1 Problem Statement	2
1.3 Justifications	2
1.4 Objectives	2
CHAPTER 2 LITERATURE REVIEW	3
2.1 Oil Palm	3
2.1.1 Oil Palm Frond	4
2.1.2 OPF As An Alternative Source Of Particle Board	5
2.2 Particleboard	6
2.2.1 History of Particleboard	7
2.2.2 Properties of Particleboard	8
2.3 Phenol Formaldehyde	8
CHAPTER 3 METHODOLOGY	10
3.1 Manufacturing of Particleboard	10
3.2 Preparation of Particleboard	11
3.2.1 Preparation of Raw Material	11

3.2.2 Chipping and Flaking	12
3.2.3 Drying and Screening	13
3.2.4 Glue Mixing and Blending	14
3.2.5 Mat Forming	14
3.2.6 Hot Pressing	15
3.2.7 Trimming	16
3.2.8 Testing	17
3.3 Method of Testing	18
3.3.1 Bending Test	18
3.3.1.1 Modulus of Rupture	18
3.3.1.2 Modulus of Elasticity	18
3.3.2 Internal Bonding	19
3.3.3 Thickness Swelling and Water Absorption	20
CHAPTER 4 RESULT AND DISCUSSION	21
4.1 Modulus of Elasticity (MOE)	21
4.1.1 Table of ANOVA analysis of MOE	22
4.2 Modulus of Rupture (MOR)	23
4.2.1 Table of ANOVA analysis of MOR	24
4.3 Internal Bonding	25
4.3.1 Table of ANOVA analysis of Internal Bonding	26
4.4 Thickness Swelling (TS)	27
4.4.1 Table of ANOVA analysis of Thickness Swelling	28
4.5 Water Absorption	29
CHAPTER 5 CONCLUSION RECOMMENDATION	30
REFERENCES	31
APENDICES	32
VITA	49

ABSTRACT

MANUFACTURING OF PARTICLE BOARD FROM OIL PALM FROND

Oil palm frond becomes new source of raw material for making particleboard in the Malaysian industries. Oil palm frond were used in the production of particleboard with 7%, 9%, and 11% content of phenol formaldehyde (PF) and particle sizes of 1.0 mm and 2.0 mm with target density 600 kg/m³. This study aims to investigate the physical and mechanical properties of particleboard made from oil palm frond at several percent of resin content and particle sizes. The particleboard produced was then tested for their mechanical and physical properties using the British standard methods. The modulus of rupture (MOR), modulus of elasticity (MOE), internal bonding (IB) and thickness swelling were tested to identify the aspects that affect the manufacturing of particleboard. Result for MOE testing of the project, particle size 2.0 mm higher is than 1.0 mm, and the resin of 11% is higher than 7% and 9% of resin content. For MOR 2.0 mm is higher than 1.0 mm while the resin at 11% is higher than 7% and 9% of resin content. For the internal bonding, particle size 1.0 mm is higher than 2.0 mm and 11% resin higher than 7% and 9% of resin content. Thickness swelling result of particle size 2.0 mm higher than 1.0 mm and the resin 7% higher than 9% and 11% of resin content. Lastly, water absorption result 11% of resin content is less than 7% and 9% of resin content and particle size 1.0 mm is better for water absorption.