

**KENAF CORE PARTICLEBOARD BASED ON PHYSICAL,
MECHANICAL AND ACOUSTIC PROPERTIES**

NUR 'IZZATI BINTI ISMAIL

**BACHELOR OF SCIENCE (Hons.)
FURNITURE TECHNOLOGY
FACULTY OF APPLIED SCIENCE
UNIVERSITY TEKNOLOGI MARA**

JULY 2014

ACKNOWLEDGEMENT

First of all, the author would like to say Alhamdulillah and very grateful to Allah for giving her this opportunity, time and many ways to finish her final year thesis without much problem. Without Allah guide, it is impossible for the author to finish this study.

Then, the author would like to say thank you to her parents for giving her support without giving up and always pray for her. Not forgetting to the author's important lecturer and first supervisor Associate Professor Said bin Ahmad for giving so many guidances and keep continuing correcting her mistakes. It is a bless to receive help and advice from him. Furthermore, to the author's second supervisor Mr. Hashim bin W. Samsi from Forest Research Institute of Malaysia (FRIM) for giving the author necessity instruction regarding particleboard and Kenaf material. All the helps and guides will not be forgotten.

Moreover, the author would like to express her sign of appreciation to the project coordinator, Associate Professor Dr. Wan Mohd Nazri bin Wan Abdul Rahman, Mr. Amran bin Shafie as the Head of Programme for providing her with further materials and equipment needed for this study. Not forget to mention, their effort to maintaining these equipment's still functional for the author's as one of the student to use. Millions of gratitude the author would like to express to her close friends Suhaini Suria, Norazwanis Aida Fauzi, Nur Syahirah Jaus, Siti Anisah Arshad, Noor Azreen Seni Nor Shuhada Abdullah

TABLE OF CONTENTS

	Page
APPROVAL SHEET	i
DEDICATION	ii
CANDIDATE'S DECLARATION	iii
PUBLICATION OF THE PROJECT UNDERTAKING	iv
PERMISSION FOR REFERENCES AND PHOTOCOPYING	v
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF PLATES	xii
LIST OF ABBREVIATIONS	xiii
LIST OF APPENDICES	xiv
ABSTRACT	xv
ABSTRAK	xvi
CHAPTER 1 INTRODUCTION	
1.1 Background	1
1.2 Problem Statement	3
1.3 Justification	4
1.5 Objectives	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Kenaf	
2.1.1 General Characteristics	6
2.1.2 Importance of Kenaf	7
2.1.3 Kenaf in Malaysia	7
2.2 Urea Formaldehyde	
2.2.1 Background and Usage	8
2.3 Particleboard	
2.3.1 Definition	9
2.3.2 Properties and Factors	10
2.3.1.2 Advantages	10
2.4 Noise Pollution	
2.4.1 Definition	11
2.4.2 Harmful Effects of Noise Pollution	12

CHAPTER 3 MATERIALS AND METHOD	
3.1	Experimental Design 14
3.2	Materials Preparation 14
3.3	Kenaf Core Particleboard Manufacturing 16
3.3.1	Screening and drying 16
3.3.2	Mixing of particles with resin 18
3.3.3	Mat Forming 19
3.3.4	Hot and Cold Pressed 20
3.3.5	Trimming, cutting and conditioning 22
3.4	Kenaf Samples Cutting for Mechanical and Physical Test 25
3.4.1	Determination of Moisture Content and Density 26
3.5	Method of Testing 28
3.5.1	Bending Test (MOE and MOR) 29
3.5.2	Internal Bonding 30
3.5.3	Thickness Swelling and Water Absorption 31
3.6	Kenaf Sample Manufacturing for Acoustic Test 32
3.7	Method of Analysis 33
3.8	Mechanical, physical and acoustic samples replicate 34
CHAPTER 4 RESULTS AND DISCUSSION	
4.1	Introduction 35
4.2	Mechanical Properties
4.2.1	Bending Test
4.2.1.1	Modulus of Rupture 38
4.2.1.2	Modulus of Elasticity 41
4.2.2	Internal Bonding 44
4.3	Physical Properties
4.3.1	Thickness Swelling 49
4.3.2	Water Absorption 54
4.4	Acoustic Properties
4.4.1	Effect of Resin Content 57
4.4.2	Effect of Density 60
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS	61
REFERENCES	63
APPENDICES	68
<i>CURRICULUM VITAE</i>	78

ABSTRACT

KENAF CORE PARTICLEBOARD BASED ON PHYSICAL, MECHANICAL AND ACOUSTIC PROPERTIES

In this study, manufacturing Kenaf (*Hibiscus cannabinus L.*) core particleboards were carried out. Objective of this study was to evaluate the properties of Kenaf core particleboard. All the boards were manufactured with three different densities of 500kgm^{-3} , 600kgm^{-3} and 700kgm^{-3} at two percentages of urea formaldehyde which are 8% and 10%. 30 boards were produced and cut to the dimension according to 3 types of test which includes physical, mechanical and acoustic. (Acoustic characteristic was tested to evaluate the ability of Kenaf core particleboard to absorb the noise in sound.) Based on the study, it was found that the increase of resin content and density caused an improvement in the mechanical and physical properties of the boards. However, it differs with its acoustic properties that show that the lowest density shows an increase in acoustic properties while resin content gives no significant effect towards the board's properties. This kind of board also had it weakness in damp condition. Thus, improvements towards moisture resistance properties need to be done in further research to cover the lack in this particleboard.