PROPERTIES OF ORIENTED STRAND BOARD USING A COMBINATION SPECIES FROM RUBBERWOOD AND KELEMPAYAN

ISKANDAR BIN MUSTAPA

Final Year Project Report Submitted in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science (Hons.) Furniture Technology in the Faculty of Applied Science Universiti Teknologi MARA

JULY 2014

ACKNOWLEDGEMENT

Assalamualaikum w.b.t

Kudos to Allah for his kindness and mercy that have plan to give me a chance to finish this project at last. He also send a wise and humble man to guide me through this, thanks you very much to my advisor Dr Wan Mohd Nazri Bin Wan Abdul Rahman who always support me and help me with all he got. Your kindness will always be remembered forever. Thanks you again for all your advise and guide.

I also wanted to thanks my friend who help me together endure this challenge for 6 months and finish the projects. Suhaini Binti Suria who always with me during my hardest time to finish this project, thanks you for all you helps and workship.

To all staff UiTM in the workshop I wanted to thanks you all of you for the assistant and guidience to handling the machine especially to En. Shahril who helps alot with the machines and cutting my timber tree. I also want to thanks you to all my friend who helps me by given me a transportation to UiTM workshop. It really helps me alot.

And last but not least, my family. Although they did not know how difficult my situation here but I know my family especially my mom, Zainon Binti Shaari always prays for my goodness. Thanks you mom because of your support and prayers, without your prayers it will be hard for me. And I also to thanks you to my late father who always support and push me to study futher, because of him I am here now. Thanks you father.

May Allah Bless All of You

TABLE OF CONTENTS

			Page
CAN	i		
DED	ICATIO	ii	
ACK	NOWL	iii	
TAR	LESOF	iv	
LIST	CES OF	vi	
LIST		vii	
LIST	OFTR	VII !!!	
LISI		VIII 	
		IX	
ABS	TRACT	X	
ABS	FRAK		xi
CILA	DTED 1	INTRODUCTION	
UHA	PIERI	round	1
1.1	Droble	statement	1
1.2	Obioo	tives	2
1.5	Objec	lives	4
СНА	PTER 2	2 LITERATURE REVIEW	
2.1	Wood	Composite	5
2.2	Orient	ted Strand Board (OSB)	6
	2.2.1	OSB Process	6
	2.2.2	Properties of OSB	8
	2.2.3	Board Dimension	9
	2.2.4	Particle Size and Shape	10
	2.2.5	Particle Alignment	11
	2.2.6	Structural Stability	12
	2.2.7	Uses of OSB	12
2.3	Raw M	Materials	13
	2.3.1	Rubberwood	14
	2.3.2	Characteristic of Rubberwood	14
	2.3.3	Properties of Rubberwood	15
	2.3.4	Kelempayan	16
	2.3.5	Characteristic of Kelempayan	16
	2.3.6	Properties of Kelempayan	17
2.4	Adhesive		17
	2.6.1	Phenol Formaldehyde	18

CHAPTER 3 MATERIALS AND METHODS

Material		
3.1.1	Felling the Tree	19
3.1.2	Cut to Length	20
3.1.3	Cut to Billets	21
3.1.4	Debarking	22
Material Preparation		
3.2.1	Flaking	23
3.2.2	Air-drying	24
3.2.3	Oven-drying	24
Board Making Process		24
3.3.1	Glue Blending	25
3.3.2	Forming	26
3.3.3	Cold Pressing	26
3.3.4	Hot Pressing	27
3.3.5	Conditioning	28
Trimming		29
3.2.1	Cutting Planning	25
Board Testing		
3.5.1	Mechanical Strength Testing	30
	3.5.1.1 Modulus of Elasticity and Modulus of Rupture	31
	3.5.1.2 Internal Bond	33
3.5.2	Physical Testing	34
Experi	mental Design	35
	Materi 3.1.1 3.1.2 3.1.3 3.1.4 Materi 3.2.1 3.2.2 3.2.3 Board 3.3.1 3.3.2 3.3.3 3.3.4 3.3.5 Trimm 3.2.1 Board 3.5.1 3.5.2 Experi	Material 3.1.1 Felling the Tree 3.1.2 Cut to Length 3.1.3 Cut to Billets 3.1.4 Debarking Material Preparation 3.2.1 Flaking 3.2.2 Air-drying 3.2.3 Oven-drying Board Making Process 3.3.1 Glue Blending 3.3.2 Forming 3.3.3 Cold Pressing 3.3.4 Hot Pressing 3.3.5 Conditioning Trimming 3.2.1 Cutting Planning Board Testing 3.5.1 Mechanical Strength Testing 3.5.1.1 Modulus of Elasticity and Modulus of Rupture 3.5.1.2 Internal Bond 3.5.2 Physical Testing Experimental Design

CHAPTER 4 RESULTS AND DISCUSSION

4.1	Effect of	36	
	4.1.1	Properties of OSB	36
	4.1.2	Statistical Significance	37
4.2	Effects of Combination		
	4.2.1	Modulus of Rupture	38
	4.2.2	Modulus of Elasticity	39
	4.2.3	Internal Bonding	41
	4.2.4	Thickness Swelling	42
4.3	Effects	of Resin Content	44
	4.3.1	Modulus of Rupture	44
	4.3.2	Modulus of Elasticity	45
	4.3,3	Internal Bonding	47
	4.3.4	Thickness Swelling	48

ABSTRACT

PROPERTIES OF ORIENTED STRAND BOARD USING A COMBINATION SPECIES FROM RUBBERWOOD AND KELEMPAYAN

This project was to manufacture a combination Oriented Strand Board (OSB) from two different species. The species that have been choosen is rubberwood and kelempayan. This project purpose is to find alternatif ways to used rubberwood timber as a new materials for manufacture a product. The reason to use a combination species is to reduce the dependency to one base materials, kelempayan is the best option due to it successfull result as a base materials for many product. The objectives is to determine the properties and to evaluate the effects of resin content on the board produce by the combination of two species. Adhesive used in this project is Phenol Formaldehyde, the manipulating variables for resin content is 7%, 9% and 11%. The target density was 700 kg/m³. Standard requirement based on BS EN 300:1997. Types for OSB was OSB/4 heavy-duty load-bearing boards and for use in humid conditions.