

**FINISHING PERFORMANCE OF NITROCELLULOSE LACQUER ON
OIL PALM LUMBER (OPL)**

By

UMMI FATIN BINTI AB RAZAK

**This Project Report Submitted in Partial Fulfillment of The
Requirements for The Bachelor of Science (Hons.) in
Furniture Technology In The Faculty of Applied Sciences
Universiti Teknologi MARA**

JANUARY 2016

CANDIDATE'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non academic institution for any other degree or qualification.

In the event that my thesis is found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree to be subjected to the disciplinary rules and regulation of Universiti Teknologi MARA.

Name : Ummi Fatin Binti Ab Razak
Student ID : 2013148065
Programme : Bachelor of Science (Hons.) Furniture Technology
Faculty : Faculty Applied Sciences
Thesis Title : Finishing Performance of Nitrocellulose Lacquer on Oil Palm Lumber (OPL)

Signature of Candidate :  _____

Date : January 2016

ABSTRACT

FINISHING PERFORMANCE OF NITROCELLULOSE LACQUER ON OIL PALM LUMBER (OPL)

Finishing is the last process of manufacturing furniture but it is important process that will determine the value of the furniture. The finishing properties of coating material (nitrocellulose lacquer) on oil palm lumber was ascertained. The effect of finishing material system with the number of the undercoat and topcoat layer was determined. There are two system finishing application which is system A (6 sealer + 3 lacquer) and system B (4 sealer + 4 lacquer). Three types of finishing testing was used to determined the properties of nitrocellulose lacquer. There are household test, scratch test and cross-hatch test. This study used American Society for Testing and Material (ASTM) for the standard testing and procedures. The result revealed that 6x3 system has good performance in household test compared to 4x4 system. But, 6x3 and 4x4 system shows no different in heat resistance and pencil hardness test. This is because of the properties of oil palm and the characteristic of nitrocellulose lacquer.

TABLE OF CONTENTS

	Pages
APPROVAL SHEET	ii
DEDICATIONS	iii
CANDIDATE'S DECLARATION	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF PLATES	x
LIST OF APPENDICES	xi
LIST OF ABBREVIATIONS	xii
ABSTRACT	xiii
ABSTRAK	xiv

CHAPTER

1	INTRODUCTION	
	1.1 General	1
	1.2 Problem statement	4
	1.3 Justification of study	5
	1.4 Objective of study	5
2	LITERATURE REVIEW	
	2.1 Finishing	6
	2.2 Lacquer	7
	2.2.1 Nitrocellulose lacquer	9
	2.3 Raw material	10
	2.4 General characteristic	13
	2.4.1 Density	16
	2.4.2 Moisture content	17
	2.4.3 Vascular bundle	18
	2.5 Chemical and physical properties	19
	2.6 Mechanical properties	20
	2.7 Machining properties	20

2.8	Product based oil palm	21
3	MATERIALS AND METHODS	
3.1	Materials	23
3.2	Experimental design	25
3.3	Methods	26
3.3.1	Spray	27
3.4	Finishing testing	29
3.4.1	Pencil hardness test	29
3.4.2	Household test	30
3.4.3	Heat resistant test	31
3.5	Statistical analysis	32
4	RESULTS AND DISCUSSION	
4.1	Finishing properties according to the different finishing system	33
4.2	Summary of results for finishing system on different testing	34
4.3	Household test	35
4.3.1	Effect of finishing system on household test of OPL	35
4.4	Pencil hardness test	36
4.4.1	Summary of the ANOVA for pencil hardness test	37
4.4.2	Effect of different finishing system on pencil hardness	38
4.5	Heat resistant test	39
4.4.1	Effect of different finishing system on heat resistant	39
5	CONCLUSIONS AND RECOMMENDATIONS	
5.1	Conclusions	41
5.2	Recommendations	42
	REFERENCES	43
	APPENDICES	47
	CURRICULUM VITAE	52