OPTIMIZING THE EFFECT OF VARIOUS ETHANOL CONCENTRATION AS DRYING AGENT TO THE MECHANICAL PROPERTIES OF OIL PALM LUMBER (*Elaeis guineensis*)

SITI FADHILAH BINTI ROSLI

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

JULY 2017

CANDIDATE'S DECLARATION

I declare that the work in this project 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 a reference work. This research has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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

Signature of Candidate : 

Name of candidates	: Siti Fadhilah binti Rosli
Candidate's ID	: 2015854172
Programme	:Bachelor of Science (Hons.) in Furniture Technology
Faculty	: Applied Sciences
Thesis title	:**OPTIMIZING THE EFFECT OF VARIOUS ETHANOL CONCENTRATION AS DRYING AGENT TO THE MECHANICAL PROPERTIES OF OIL PALM LUMBER (*Elaeis guineensis)***

Date : JULY 2017

ABSTRACT

OPTIMIZING THE EFFECT OF VARIOUS ETHANOL CONCENTRATION AS DRYING AGENT TO THE MECHANICAL PROPERTIES OF OIL PALM LUMBER (*Elaeis guineensis*)

Wood-based industry in Malaysia is dependent on the natural forest resources and forest plantations. The high demand of this resource makes it more scarce and expensive. Currently the industries are searching for other resources to overcome the over dependence on local timber. The waste biomass from the oil palm industries can be turned into value-added products providing an alternative raw material for the wood industry, but OPT (Oil Palm Trunk) was reported to be difficult to dry, not only because of its extremely high green moisture content, but also its drying defects. The objectives of this study were to determine mechanical properties of Oil Palm Lumber (OPL) and the effect of different ethanol concentration on mechanical properties of OPL. Samples sized were cut according to the standard size of bending, compress and shear tests that were soaked with various concentration of ethanol and soaking time with dried by oven method. Response Surface Methodology (RSM) was conducted to develop regression equation of OPL layer in different ethanol concentration. The result showed that bending (MOE) for outer layer was 3534.83 N/mm^2 while core layer was 1667.36 N/mm^2. The bending (MOR) strength for outer and core layer was 32.2352 N/mm^2 and 17.8545 N/mm^2 respectively. The compression strength of outer layer was 16.1238 N/mm^2 and 5.58209 N/mm^2 for core layer. Meanwhile, for outer layer of shear strength was 2.4196 N/mm^2 and at core layer was 2.2282 N/mm^2. This research found that the drying method of OPT using ethanol had been successful and showed that ethanol had an effect on mechanical properties of OPT in drying the outer and core layer of OPT for 24 hours with a temperature of 80°C by using oven and only 55% of the ethanol concentration was suggested to obtain the best mechanical properties of OPT.

TABLE OF CONTENTS