

UNIVERSITI TEKNOLOGI MARA

**veneer recovery and
properties of plywood made
from coconut trunk (*Cocos
nucifera*)**

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Thesis submitted in fulfillment
of the requirements for the degree of
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Faculty of Applied Science

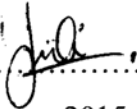
February 2015

AUTHOR’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.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

A study was undertaken to evaluate the physical and mechanical properties of plywood made from coconut veneers bonded with urea formaldehyde resin. Five coconut trunks were obtained from a coconut plantation in Bagan Datoh, Hutan Melintang, Perak. Trunks were cut into 165 cm billets of different portions, bottom, middle and top from which veneers were obtained. The specific objectives of the study were, firstly, to evaluate veneer recovery percentage from peeling process, secondly, to evaluate physical properties of plywood made of coconut trunk. The portions were peeled to get the inner and the outer veneers. The study showed that the veneer recovery rate of the coconut trunks decreased from the bottom to the top portion of the stem. However, the difference of the recovery rate between each portion was not significant. The mean values of the green veneer recovery for the bottom, the middle, and the top were 53.71%, 48.41% and 47.00% respectively. The veneer recovery rate was also evaluated through different diameters of coconut trunks. The diameter classes chosen for the study were 23.1cm-25cm (class 1), 25.1cm-28cm (class 2), and 28.1cm-33cm (class 3). Veneer recovery rate showed insignificant differences in height level and diameter classes. There was insignificant difference in MC % even though inner part of trunks possessed higher MC % compared to the outer part. By comparing the MC % between bottom, middle and top parts, it seemed that higher MC % values were recorded from the top part compared to the middle and bottom parts. As for density study of the veneers, it could be seen that inner veneers had lower density from that of the outer veneers. The outer part showed higher density due to the concentration of vascular bundles present in the region. The bottom part of the trunk exhibited higher density value compared to the middle and top parts. Pressing pressure and time were also evaluated. The study revealed that the best pressing pressure and time to manufacture coconut-based plywoods were 500psi and 10 minutes respectively. The evaluation was made based on the physical and mechanical properties of the plywoods made at three different pressing pressure and time. The pressing pressure and time were used to fabricate more coconut-based plywoods for further physical and mechanical testing. This time, only density test was included for physical testing. Three types of mechanical testing were conducted on the plywood made from coconut i.e modulus of rupture (MOR) (BS EN 310:1993), modulus of elasticity (MOE) (BS EN 310:1993), screw withdrawal (SW) (BS EN 699: Part 1:1989) and shear strength (SS) (BS EN 314-1:1993). The physical and mechanical examinations showed that the plywoods made of the determined pressing pressure and time was suitable to produce plywoods which has strength that surpassed the standard requirement values of each testing.

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