UNIVERSITI TEKNOLOGI MARA

PROPERTIES OF OIL PALM TRUNK PARTICLEBOARD WITH LIGHT HARDWOOD VENEER OVERLAID

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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 results 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 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

This study was to determine the performance of oil palm trunk (OPT) as an alternative raw material overlaid with light hardwood veneers to produce sandwich board (SB). The main objectives of the study are to develop and determine properties of particleboard from oil palm trunk particles as raw material and to evaluate the potential of the sandwich board. The chemical and physical properties, sample selection and preparation for these investigates were carried out according to the Technical Association of the Pulp and Paper Industry Standards (TAPPI). In particleboard manufacturing, the effects particle size, density, resin content and wax addition on the physical and mechanical properties of the particleboard also determined. Effects of different species on veneers and press temperature on the physical and mechanical properties were also investigated for SB. The oil palm particles, urea formaldehyde and additives were blended and compressed to manufacture particleboard. The mechanical and dimensional stability of the board was evaluated to determine the quality of the board. The test specimen and preparation of the board quality were carried out according to Japanese Industrial Standards. The particleboard was then overlaid with face and back veneer using phenol formaldehyde and pressed to manufacture sandwich board. From this study, the statistical analysis revealed that OPT portion and distance were found to significantly affect the specific gravity and moisture content. The chemical properties were significantly affected by the OPT portion except for the holocellulose. In the manufacture of particleboard, all variables were found to affect physical and mechanical properties significantly except wax addition for modulus of rupture (MOR) and water absorption (WA). Variable of species on the SB affect the MOR, modulus of elasticity and surface soundness (SS) properties significantly. The thickness swelling and SS of the SB were affected at different press temperature. Correlation of physical and chemical properties of the particleboard had less association with particleboard properties. However, correlations of wettability and veneer species also had less association with sandwich board properties. The regression analysis of the data shows that there is a good relationship between the main factors of the manufacturing variables and the performance of the particleboard. At the same time, the TS and SS of the sandwich panel are significantly different. This study shows that it is feasible and beneficial to use OPT particles as the raw material for particleboard to overlay with light hardwood veneer.

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