

UNIVERSITI TEKNOLOGI MARA

**EFFECT OF SCREW TYPES ON
SCREW WITHDRAWAL AND BASIC
STRENGTH OF PARTICLEBOARD**

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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.

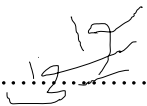
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ABSTRACT

This research was carried out to study the basic strength of commercial particleboard, the screw withdrawal properties of three types of screws on the face, edge machine direction (EMD) and edge cross machine direction (ECMD) of particleboard and the effect of screw type on screw withdrawal and the correlation between screw properties and basic strength. The commercial particleboards were obtained from two companies, Mieco Chipboard Bhd and HeveaBoard Berhad. The particleboard was produced from mixture of particle with a ratio 60:40 of rubberwood:mix tropical wood and urea formaldehyde (UF) adhesive for Type E1 board and include 15mm, 18mm and 25mm thicknesses. The particleboard was evaluated for basic strength include bending test (Modulus of Rupture and Modulus of Elasticity), internal bond (IB), water absorption (WA)/thickness swell (TS) and screw withdrawal (SW) testing with three different directions (edge machine direction, edge cross-machine direction and face direction) and the pilot hole was according to Malaysian Standard (MS). The screw design for screw withdrawal testing included three different screws type (standard screw/Screw A, particleboard screw/Screw B and chrome screw/Screw C) and two different lengths (short and long). This study found all thicknesses from both companies passed the standard (MS) for the bending test, IB, WA/TS and SW testing. It can be concluded that screw withdrawal resistance showed where edge direction shows more resistance compared to face direction. For correlation between screw withdrawal and basic strength shows only IB correlated with more than 40% for both companies. Meanwhile, the correlation between Screw A with Screw B and Screw C shows 76% and 77% and 63% and 73% respectively for Company 1 and Company 2.

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