

Degradation of medium density fibreboard and particleboard mechanical performance after exposed to different environmental condition

ABSTRACT

Wood or natural-based products will continue to be susceptible to degradation. However, this degradation process can be slow-down by introducing additives or certain treatment. The properties (i.e. mechanical, physical, bonding etc.) of wood-based panel such as Medium Density Fiberboard (MDF) and Particleboard (PB) degrades in function with period of usage or exposure due to factors in surrounding conditions. This work focuses on the study of mechanical performance deterioration for MDF and PB after condition in the air-conditioned room and ambient for three months. Through this study, comparisons of various board variables (board types, exposure conditions, board thicknesses, resin types) influences the board performance degradation process. The project also studied the effects of cold-water immersion (12, 24 and 72 hours) to the mechanical properties of the board. The mechanical performance of boards was evaluated based on static bending (Modulus of Elasticity and Modulus of Rupture) and internal bonding tests after exposed for 3 months. All boards (MDF and PB) used in this study were obtained from local commercial panel manufacturer and test according to JIS A 5908-1994. The findings show that all the variables studied: exposure conditions, resin type, board thickness and board type respectively, have a significant effect on the diminished strength of panel strengths. The conditioning method and board type found to influence foremost compared with resin type. Exposing both of panels in air-conditioned room found to delay the degradation compared with ambient exposure for tested properties; MOE, MOR and IB respectively. The board thickness seems influenced the degradation of the board in any exposure conditions; air-conditioned, ambient or cold-water soaking. The thicker of the board, the greater the degradation occurred.

Keyword: Medium density fibreboard; Melamine urea formaldehyde; Particleboard; Urea formaldehyde