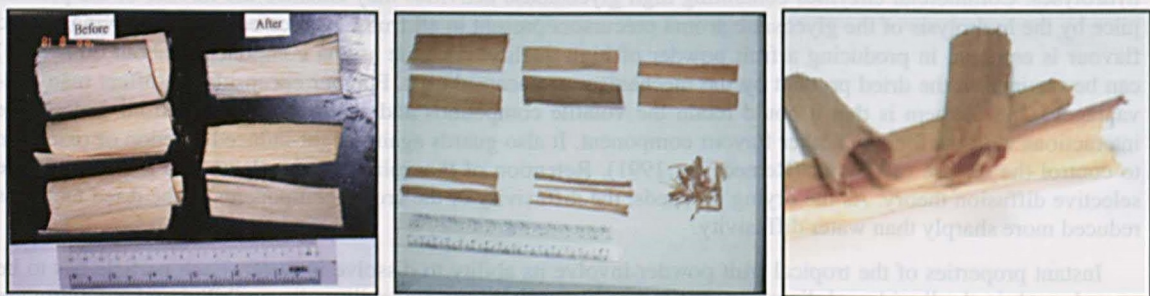


Development of Dimensionally Stable Multilayered Oriented Strand Board from Plantation Species by Phenolic Resin Impregnation

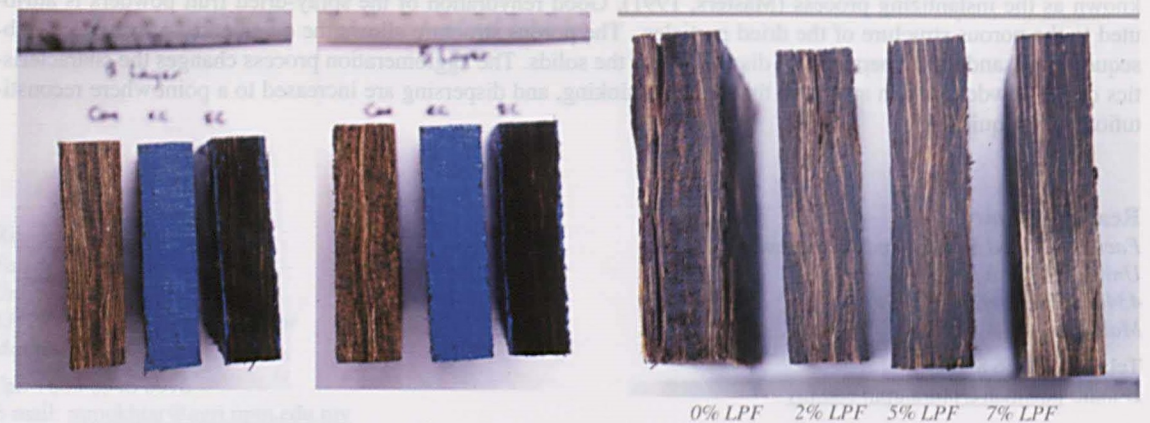


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Wood composite panels such as plywood, particleboard and oriented strand board (OSB), are known to be hygrothermal-viscoelastic materials. The load-carrying capacity of these materials would be changed substantially when they are subjected to changing relative humidity. Since OSB is normally used as floor sheathings or as concrete form works, it is most likely being exposed to high moisture surroundings for a long period of time. Hence, the evaluation of physical properties of the board under moisture influence such as thickness swelling, linear expansion and water absorption are crucial. This study was carried out to investigate the effectiveness of pre-treating the wood strands with low molecular weight phenol formaldehyde (LPF) resin to improve the dimensional stability of oriented strand board (OSB). Three- and five-layered OSBs were fabricated from *Acacia mangium* and *Hevea brasiliensis* wood strands by first impregnating them with LPF resin. The LPF-coated strands were left for air dry prior to spraying with 5% w/w conventional PF resin. The properties of the OSB were evaluated in accordance with the Japanese Industrial Standard, JIS A5908 - 1994. The origin of thickness swelling (TS) was determined by coating method where the edges and surfaces of the panel were coated with oil-based pigmented paint. To assess the degree of TS, the OSB specimens were sliced/sectioned into four layers through the thickness direction of the panel and were subjected to 24 hours cold water soaking.



Wood Strands from Rubberwood and *Acacia mangium*



The results show that the higher density layer experienced relatively higher TS. The average Pearson correlation between board density and TS were > 0.90 suggesting that there was a positive relationship between board density and thickness swelling. Impregnating the wood strands with LPF had significantly improved the TS to $< 5\%$, at the same time enhanced the strength of the boards. Between Rubberwood and *Acacia mangium*, the later showed significantly higher improvement in both the strength (MOR) and the stiffness (MOE) of the board. Although the internal bond (IB) strength was reduced, increasing the hot pressing time from 3.5 min to 7 min improved the bonding tremendously.

Reader Enquiry

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