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STRENGTH OF JOINTS AND PHYSICAL PERFORMANCE OF CHAIRS MADE FROM LVL OIL PALM

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STRENGTH OF JOINTS AND PHYSICAL PERFORMANCE OF CHAIRS MADE FROM LVL OIL PALM TRUNK

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Abstract

Rubberwood has been the main raw material in furniture making after a series of research in the 80's showed it had the potential to be used as a basic material for wooden furniture. However, as the continuous supply of rubberwood is not possible to sustain the industry, research on the use of oil palm timber were initiated to determine the applicability of this material as an alternative. This study used oil palm and rubberwood veneer in the form of laminated veneer lumber (LVL). The LVL's oil palm board was pressed based on pressures applied to rubberwood LVL board using a high frequency press machine. The studies investigated the specific gravity, MOE and MOR, strength of T-shape joints and physical performance of a particular item of furniture, the JUNO chair. The results of specific gravity showed the value of rubberwood LVL was 0.7642 whilst the value of oil palm LVL was 0.5549, which is significantly different. The values of MOE and MOR between rubberwood and oil palm LVL were significantly different. Meanwhile the T-shape joints for three types of tests; namely, end-to-edge, end-to-surface and edge-to-surface mostly showed not significant difference. Results of the physical performance test on LVL oil palm JUNO chair fulfilled the requirements of BS 4875 part 1, 1985. However, there was a minimum failure (crack and split) at the end of legs. Indeed, the strength properties of oil palm LVL were comparable to those of rubberwood LVL that was affected with one parameter of pressure in this study.

Keywords: strength; jointing; physical performances; oil palm trunk; rubberwood

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CHAPTER 3

MATERIALS AND METHODS

3.1 Veneer Production

Oil palm trunks used in this study were obtained from plantation area in Kuala Sedim, Kulim, Kedah. The ages of the tree ranges from 25 to 30 years old. The trunks were transported to Cheah Seah Joo Plywood Mill in Butterworth, Penang for the peeling process. The diameter of trunks selected for peeling ranged from 36 cm to 72 cm (Plate 3.1). Veneers were produced from the trunks through two processing stages. In the first stage (Figure 3.1), the trunks were peeled using a chucked peeler lathe (Plate 3.2), whilst in the second stage, they were peeled using a chucked-less peeler lathe (Plate 3.4). At the first processing stage, the trunks were peeled down to approximately 24 cm diameter (Plate 3.3) before they were transferred to the second stage of processing (Plate 3.5). The thickness of green veneer peeled ranged from 4mm to 5mm. The veneers peeled during second stage of processing contained less fiber and the veneers took a shorter time to dry. Meanwhile the first-stage veneers took a longer time to dry. All veneers were dried using a roller dryer. The first-stage veneers were dried at a speed of 0.5m/min., and the second stage veneers were dried at a speed 0.7m/min. The green veneer moisture content (mc) was more than 90% (Plate 3.6) and when dried the mc ranged from 5% to 10%. The thickness of the dried veneer varied between 2.7 mm to 3.1 mm (Plate 3.7)