

Density distribution of oil palm stem veneer and its influence on plywood mechanical properties

ABSTRACT

Oil Palm Stem (OPS) has been introduced as potential raw material for plywood manufacture in Malaysia. Two 25 years old OPS were selected for the study which aim to establish the veneer density distribution of the stem. The main purpose of this study is to improve the strength and to determine the optimum resin spread rate for oil palm stem plywood manufacture. The study comprised (1) the establishment of veneer density profile and (2) the effects of resin consumption and lay-up pattern on the strength and bond integrity of the plywood. The method used to determine the veneer density was a standard oven-dry method. The OPS veneer were fabricated into 5-ply plywood panels using UF (urea formaldehyde) resin adhesive. Three types of OPT veneer were classified which were 100% from outer veneer, 100% from inner veneer and mix (2-ply of outer veneer as face and Three-ply of inner veneer as core material) with four different glue spread rate (250, 300, 350 and 400 g m⁻²). The results show the veneer density of the OPS can be categorized into three classes: 400-500, 300-400 and 200- 300 kg m⁻³. The outer-layer veneers have density between 358 to 442 kg m⁻³, whilst the densities of the inner-layer veneer were 272 to 446 kg m⁻³. Segregating the oil palm veneers by density classes prior to plywood manufacture improved the strength and bond integrity of the OPS plywood greatly.

Keyword: Plywood; Oil palm stem; Density; Strength; Bond integrity